YAEC Chemistry Lab Spectrum name: 107F_13JUNE2006_1332.An1

Sample description
FSS-NOL-05-01-031-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_13JUNE2006_1332.An1

Acquisition information
Start time: 13-Jun-2006 13:35:12
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/channel^2

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: 1.9740E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9740E+03) =
5.0659E+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	08-Jun-2006 11:40:00
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. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0956

***** 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
74.95	318.	15.15	1.18	2.862E-02	74.81	9.600	7.869E-01	PB212
77.23	534.	9.21	1.18	2.967E-02	77.11	17.500	7.059E-01	PB212
					77.11	10.700	1.144E+00	PB214
86.53	169.	24.70	1.19	3.279E-02				
86.53	169.	24.70	1.19	3.279E-02	86.45	32.740	1.079E-01	EU155
89.92	171.	23.50	1.19	3.367E-02	88.04	3.790	PBC<MDA	CD109
93.25	245.	16.60	1.19	3.443E-02	92.38	2.570	1.837E+00	TH234
					92.80	3.000	1.492E+00	TH234
129.00	139.	33.91	0.74	3.818E-02				
185.89	227.	21.24	1.77	3.611E-02	185.99	3.280	1.315E+00	RA226
209.54	132.	29.03	1.22	3.426E-02				
238.76	1282.	3.79	1.30	3.188E-02	238.63	43.100	6.305E-01	PB212
241.52	255.	18.09	1.30	3.166E-02	241.00	3.900	1.399E+00	RA224
					241.92	7.470	7.343E-01	PB214
270.19	118.	24.78	1.04	2.945E-02				
277.21	102.	34.25	1.62	2.893E-02				
295.37	322.	9.13	1.34	2.768E-02	295.22	19.200	4.085E-01	PB214
300.80	88.	25.52	1.34	2.731E-02				
327.54	148.	22.00	1.49	2.563E-02				
338.66	405.	10.79	1.51	2.499E-02	338.40	12.010	9.159E-01	AC228
352.06	619.	7.83	1.65	2.425E-02	351.99	37.100	4.669E-01	PB214
462.73	108.	25.04	1.59	1.955E-02				
462.73	108.	25.04	1.59	1.955E-02	463.51	10.000	3.715E-01	SB125
511.13	253.	11.64	2.35	1.807E-02	510.72	22.500	3.684E-01	TL208
583.32	499.	5.96	1.81	1.629E-02	583.14	86.000	2.416E-01	TL208
609.41	449.	6.99	1.98	1.574E-02	609.32	46.090	4.194E-01	BI214
617.53	36.	39.57	0.93	1.558E-02				

661.77	462.	7.84	1.74	1.477E-02	661.62	84.620	2.509E-01	CS137
727.77	126.	16.87	1.70	1.373E-02	727.17	11.800	5.261E-01	BI212
795.11	53.	29.83	1.68	1.284E-02	795.76	85.400	3.349E-02	CS134
911.54	362.	8.35	2.32	1.160E-02	911.07	29.000	7.272E-01	AC228
964.51	66.	20.86	1.80	1.113E-02				
969.24	196.	9.79	1.80	1.109E-02	968.90	17.460	6.862E-01	AC228
1120.59	105.	22.69	2.36	9.970E-03	1120.28	15.040	4.799E-01	BI214
1461.04	2006.	2.26	2.35	8.190E-03	1460.75	10.700	1.563E+01	K40
1620.31	37.	19.89	2.07	7.569E-03	1620.56	2.750	1.227E+00	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1765.04	86.	11.33	2.24	7.084E-03	1764.51	15.920	5.191E-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	
172.74	86.29	789.	169.	0.085	74.11	1.186	BI-207	D
179.50	89.67	723.	171.	0.086	70.51	1.189	PB-214	D
186.17	93.00	701.	245.	0.122	49.80	1.191	TH-234	D
418.73	209.54	584.	132.	0.066	87.08	1.216	AC-228	
540.01	270.19	332.	118.	0.059	74.33	1.043	AC-228	s
554.05	277.21	431.	105.	0.052	89.27	1.624	TL-208	s
600.88	300.63	355.	105.	0.052	91.80	1.681	PB-212	s
654.70	327.54	328.	148.	0.074	65.99	1.486	AC-228	s
1234.64	617.53	76.	37.	0.018	112.96	0.934	W-187	s
1929.26	964.56	60.	69.	0.035	59.27	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	876.	317.	0.159	42.44	1.178D
PB-212	153.89	77.11	940.	338.	0.169	35.16	1.179A
PB-214	153.89	77.11	1642.	185.	0.093	85.23	1.500A
EU-155	173.70	87.02	1789.	152.	0.076	120.29	1.500
TH-234	185.95	93.15	1677.	212.	0.106	81.32	1.500
TH-234	185.94	93.14	1616.	207.	0.104	77.26	1.500
RA-226	371.43	185.89	810.	227.	0.114	63.71	1.770s
TH-227	471.79	236.08	1499.	-170.	-0.085	99.39	1.500s
PB-212	476.89	238.63	475.	1269.	0.635	10.96	1.297D
RA-224	481.63	241.00	1391.	153.	0.076	105.33	1.299D
PB-214	483.47	241.92	678.	161.	0.081	50.44	1.299A
PB-214	590.01	295.19	366.	363.	0.181	29.53	1.420s
AC-228	676.93	338.66	433.	402.	0.201	32.37	1.513s
PB-214	703.73	352.06	472.	614.	0.307	23.48	1.646s
SB-125	925.58	462.99	179.	90.	0.045	68.01	1.500
TL-208	1021.86	511.13	225.	219.	0.109	34.93	2.353s
TL-208	1166.23	583.32	138.	494.	0.247	17.88	1.805s
BI-214	1218.40	609.41	172.	444.	0.222	20.97	1.984s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	1323.12	661.77	221.	458.	0.229	23.53	1.738s
BI-212	1455.11	727.77	113.	125.	0.062	50.60	1.704s
CS-134	1589.79	795.11	103.	53.	0.027	89.48	1.684s
AC-228	1822.65	911.54	135.	358.	0.179	25.05	2.322s
AC-228	1937.36	968.90	88.	194.	0.097	29.26	1.799D
BI-214	2240.75	1120.59	136.	105.	0.053	68.07	2.359s
K-40	2921.68	1461.04	19.	2002.	1.001	6.77	2.351s
BI-212	3240.24	1620.31	6.	37.	0.019	59.67	2.071s
BI-214	3529.72	1765.04	3.	86.	0.043	33.98	2.237s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		7.1748E-04					
			477.56	7.175E-04	&(	2.432E-01 7.08E-02	G
K-40		1.5634E+01					
			1460.75	1.563E+01	@(P	1.816E-01 3.54E-01	G
MN-54		-2.5967E-03					
			834.81	-2.597E-03	&(P	3.222E-02 9.38E-03	G
CO-57		-5.3590E-03					
			122.07	-5.359E-03	%(P	3.547E-02 1.06E-02	G K
			136.43	6.497E-03	% P	2.612E-01 7.79E-02	G
CO-60		1.7720E-03					
			1332.51	1.772E-03	%(P	2.811E-02 7.83E-03	G K
			1173.23	1.164E-02	% P	4.195E-02 1.24E-02	G K
Sr-85		-1.9941E-02					
			514.00	-1.994E-02	%(	3.748E-02 1.14E-02	G
Kr-85		-4.5731E+02					
			513.99	-4.573E+02	%(P	8.219E+02 2.49E+02	G
Y-88		-5.5650E-03					
			1836.01	-5.565E-03	%(P	2.363E-02 6.56E-03	G K
			898.02	-2.100E-04	& P	3.193E-02 9.12E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	2.5502E-03						
		871.10	2.550E-03	%(P	3.049E-02	8.87E-03	G K
		702.50	6.876E-03	% P	2.348E-02	6.96E-03	G K
Ag-108M	-2.1179E-02						
		722.95	-2.118E-02	&(	4.127E-02	1.25E-02	G K
		614.37	-1.877E-02	&	3.541E-02	1.08E-02	G
		433.93	-2.546E-03	& P	2.859E-02	8.39E-03	G
CD-109	4.5549E-02						
		88.04	4.555E-02	%(P	1.129E+00	3.38E-01	G
SN-113	1.1237E-02						
		391.71	1.124E-02	&(P	3.925E-02	1.17E-02	G K
		255.04	-2.835E-01	&	1.376E+00	4.12E-01	G
SB-125	7.9145E-02						
		427.95	-1.565E-03	%(P	7.836E-02	2.28E-02	G K
		600.77	4.135E-02	% P	1.412E-01	4.20E-02	G
		636.15	5.339E-02	& P	2.193E-01	6.49E-02	G
		463.51	3.180E-01	(P	2.292E-01	7.43E-02	G
		176.29	-6.514E-02	% P	4.334E-01	1.30E-01	G
I-131	1.9449E-02						
		364.48	1.945E-02	%(	4.144E-02	1.26E-02	G K
		636.97	1.802E-01	%	5.003E-01	1.50E-01	G
		284.29	9.609E-02	&	5.991E-01	1.78E-01	G
CS-134	-2.2267E-02						
		604.66	-2.227E-02	%(P	3.866E-02	1.18E-02	G K
		795.76	3.349E-02	+ P	3.135E-02	1.01E-02	G
		569.29	2.878E-02	%	1.498E-01	4.41E-02	G
		801.84	9.364E-02	% P	3.036E-01	9.03E-02	G
CS-137	2.5090E-01						
		661.62	2.509E-01	(P	3.944E-02	1.98E-02	G
CE-139	4.9141E-03						
		165.85	4.914E-03	&(P	3.613E-02	1.08E-02	G
EU-152	-1.4600E-02						
		121.78	-1.460E-02	&(P	1.056E-01	3.17E-02	G K
		344.30	-2.335E-02	% P	8.880E-02	2.65E-02	G
		1408.08	-2.658E-02	& P	1.103E-01	3.15E-02	G
		964.00	-6.309E-02	& P	2.569E-01	7.62E-02	G
		1112.07	-1.106E-02	& P	2.532E-01	7.28E-02	G
		778.90	-7.917E-02	% P	2.104E-01	6.29E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	-1.0894E-02						
		123.10	-1.089E-02	%(P	6.982E-02	2.09E-02	G K
		1274.80	-9.064E-03	% P	1.041E-01	3.01E-02	G
		723.30	-4.042E-03	& P	2.494E-01	7.36E-02	G
		1004.80	2.077E-02	& P	1.461E-01	4.22E-02	G
EU-155	9.7186E-02						
		86.45	9.719E-02	(	1.275E-01	3.90E-02	G K
		105.31	3.012E-02	% P	1.510E-01	4.54E-02	G
HG-203	-1.0773E-03						
		279.17	-1.077E-03	&(P	3.425E-02	1.01E-02	G K
		72.87	-3.366E-01	% P	9.929E-01	3.00E-01	G
		70.83	3.809E-01	%	1.584E+00	4.77E-01	G
		82.50	-8.472E-01	%	1.916E+00	5.81E-01	G
TL-208	2.4162E-01						
		583.14	2.416E-01	@(P	2.803E-02	1.45E-02	G
		510.72	3.684E-01	+ P	1.222E-01	4.95E-02	G
PB-212	6.5342E-01						
		238.63	6.320E-01	(P	5.192E-02	2.34E-02	G K
							Energy duplication
		77.11	4.477E-01	}	1.926E-01	5.25E-02	G
		74.81	7.942E-01	+ P	3.519E-01	1.14E-01	G
PB-214	4.6709E-01						
		351.99	4.669E-01	*(P	7.909E-02	3.69E-02	G K
		295.22	4.675E-01	*(P	1.184E-01	4.66E-02	G
							Energy duplication
		77.11	4.003E-01	} P	4.144E-01	1.14E-01	G
		241.92	4.671E-01	} P	3.594E-01	7.85E-02	G
BI-212	5.2605E-01						
		727.17	5.261E-01	*(P	2.209E-01	8.97E-02	G K
		1620.56	1.227E+00	+ P	4.551E-01	2.47E-01	G
		785.42	-3.337E-02	% P	1.310E+00	3.73E-01	G
BI-214	4.3426E-01						
		609.32	4.194E-01	*(P	6.014E-02	2.96E-02	G K
		1764.51	5.191E-01	+ P	6.934E-02	5.94E-02	G
		1120.28	4.799E-01	(P	2.604E-01	1.10E-01	G
RA-224	8.4706E-01						
							Derived Ave Activity
		241.00	8.471E-01	}(P	9.773E-01	3.11E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RA-226	1.3147E+00						
		185.99	1.315E+00	*(	7.822E-01	2.79E-01	G
AC-228	7.1198E-01						
		911.07	7.272E-01	@(P	1.158E-01	6.15E-02	G K
		968.90	6.868E-01	(P	1.638E-01	6.78E-02	G
		338.40	9.159E-01	+ P	2.273E-01	9.97E-02	G
TH-227	-3.2386E-01						
		236.00	-3.239E-01	?(P	3.486E-01	1.07E-01	G K
		256.25	-1.251E-01	& P	3.865E-01	1.16E-01	G
PA-234	-2.4873E-02						
		98.44	-2.487E-02	&(	1.244E-01	3.74E-02	G K
		946.00	-2.960E-03	%	1.563E-01	4.50E-02	G
		131.28	-2.330E-02	%	1.487E-01	4.46E-02	G
		94.67	-1.484E-01	%	2.533E-01	7.71E-02	G
		883.24	5.542E-02	&	1.737E-01	5.14E-02	G
		926.70	1.060E-01	%	2.233E-01	6.77E-02	G
		569.26	4.250E-02	%	2.212E-01	6.52E-02	G
TH-234	1.1169E+00						
		63.29	5.677E-01	%(P	1.569E+00	4.73E-01	G K
		92.80	1.376E+00	(P	1.261E+00	3.88E-01	G
		92.38	1.648E+00	(P	1.503E+00	4.63E-01	G
AM-241	-5.8651E-02						
		59.54	-5.865E-02	%(P	2.094E-01	6.31E-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 - 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	6.7170E-04	7.1748E-04	2.1227E-01	2.1227E-01	2.277E-01
K-40	#	1.5634E+01	1.5634E+01	1.0614E+00	1.4069E+00	
MN-54	#A	-2.5676E-03	-2.5967E-03	3.3850E-02	3.3850E-02	3.186E-02
CO-57	#B	-5.2895E-03	-5.3590E-03	3.2636E-02	3.2637E-02	3.501E-02
CO-60	#B	1.7687E-03	1.7720E-03	2.3491E-02	2.3491E-02	2.806E-02
Sr-85	#A	-1.8887E-02	-1.9941E-02	3.4205E-02	3.4226E-02	3.550E-02
Kr-85	#A	-4.5729E+02	-4.5731E+02	8.3869E+02	8.3912E+02	8.219E+02
Y-88	#B	-5.3842E-03	-5.5650E-03	2.6726E-02	2.6728E-02	2.286E-02
NB-94	#B	2.5502E-03	2.5502E-03	2.6595E-02	2.6596E-02	3.049E-02
Ag-108M	#B	-2.1177E-02	-2.1179E-02	3.7640E-02	3.7661E-02	4.127E-02
CD-109	#A	4.5196E-02	4.5549E-02	1.0152E+00	1.0152E+00	1.120E+00
SN-113	#B	1.0898E-02	1.1237E-02	3.5176E-02	3.5183E-02	3.807E-02
SB-125	#F	7.8870E-02	7.9145E-02	5.5500E-02	5.5697E-02	7.808E-02
I-131	#B	1.2552E-02	1.9449E-02	3.7673E-02	3.7691E-02	2.674E-02
CS-134	#B	-2.2164E-02	-2.2267E-02	3.6089E-02	3.6113E-02	3.848E-02
CS-137	#	2.5082E-01	2.5090E-01	5.9482E-02	6.1300E-02	
CE-139	#A	4.7898E-03	4.9141E-03	3.2469E-02	3.2470E-02	3.521E-02
EU-152	#B	-1.4589E-02	-1.4600E-02	9.6150E-02	9.6154E-02	1.055E-01
EU-154	#B	-1.0882E-02	-1.0894E-02	6.5630E-02	6.5633E-02	6.974E-02
EU-155	#A	9.6997E-02	9.7186E-02	1.1690E-01	1.1703E-01	1.272E-01
HG-203	#B	-9.9885E-04	-1.0773E-03	6.7393E-02	6.7393E-02	3.176E-02
TL-208	#	2.4162E-01	2.4162E-01	4.3604E-02	4.5879E-02	
PB-212		6.5342E-01	6.5342E-01	7.2502E-02	8.2133E-02	
PB-214		4.6709E-01	4.6709E-01	8.9067E-02	9.3242E-02	
BI-212	#	5.2605E-01	5.2605E-01	2.6895E-01	2.7074E-01	
BI-214		4.3426E-01	4.3426E-01	9.1938E-02	9.5448E-02	
RA-224	A	8.4706E-01	8.4706E-01	9.0521E-01	9.0659E-01	
RA-226	#	1.3147E+00	1.3147E+00	8.3761E-01	8.4120E-01	
AC-228		7.1198E-01	7.1198E-01	1.3873E-01	1.4496E-01	
TH-227	#A	-3.2386E-01	-3.2386E-01	3.2241E-01	3.2298E-01	3.486E-01
PA-234	#B	-2.4873E-02	-2.4873E-02	1.1210E-01	1.1211E-01	1.244E-01
TH-234	#B	1.1169E+00	1.1169E+00	9.4238E-01	9.4441E-01	1.569E+00

AM-241 #A	-5.8650E-02	-5.8651E-02	1.9425E-01	1.9427E-01	2.094E-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) 2.1081078E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 2.1081165E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_8JUN2006_1034.An1

Sample description
NOL-05-01-25-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\101_8JUN2006_1034.An1

Acquisition information
Start time: 08-Jun-2006 10:35:01
Live time: 2000
Real time: 2004
Dead time: 0.21 %
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/channel^2

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: 2.1220E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1220E+03) =
4.7125E+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	08-Jun-2006 10:00:00
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: 0.2634

***** 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
77.09	270.	23.24	1.50	1.720E-02	77.11	10.700	9.350E-01	PB214
					77.11	17.500	PBC<MDA	PB212
77.09	274.	23.24	1.50	1.720E-02	77.11	10.700	9.350E-01	PB214
					77.11	17.500	5.795E-01	PB212
86.78	164.	37.64	1.34	1.915E-02	86.45	32.740	1.671E-01	EU155
					88.04	3.790	PBC<MDA	CD109
92.79	128.	37.06	1.42	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
125.05	131.	34.57	0.87	2.114E-02				
238.67	656.	6.05	1.12	1.557E-02	238.63	43.100	6.167E-01	PB212
241.68	131.	25.63	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
294.94	196.	17.00	0.90	1.293E-02				
294.94	196.	17.00	0.90	1.293E-02	295.22	19.200	4.996E-01	PB214
327.21	74.	40.04	1.46	1.172E-02				
338.21	187.	21.12	1.32	1.136E-02	338.40	12.010	8.634E-01	AC228
351.55	300.	13.22	1.69	1.094E-02				
351.55	300.	13.22	1.69	1.094E-02	351.99	37.100	4.689E-01	PB214
510.56	92.	35.68	1.40	7.593E-03				
510.56	92.	35.68	1.40	7.593E-03	510.72	22.500	PBC<MDA	TL208
582.93	210.	11.51	1.26	6.687E-03				
582.93	210.	11.51	1.26	6.687E-03	583.14	86.000	2.298E-01	TL208
608.94	206.	13.15	1.56	6.416E-03	609.32	46.090	4.413E-01	BI214
661.32	5236.	1.45	1.37	5.940E-03	661.62	84.620	6.636E+00	CS137
726.61	31.	38.02	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
860.03	41.	24.82	1.27	4.680E-03				
910.76	151.	12.46	1.50	4.448E-03	911.07	29.000	7.355E-01	AC228
967.04	126.	14.43	1.38	4.219E-03	968.90	17.460	1.083E+00	AC228

1119.51	91.	20.05	1.85	3.713E-03	1120.28	15.040	1.033E+00	BI214
1155.47	34.	39.90	1.12	3.612E-03				
1172.43	68.	19.84	1.64	3.565E-03	1173.23	99.860	1.214E-01	CO60
1332.20	57.	22.37	1.20	3.191E-03	1332.51	99.980	1.144E-01	CO60
1459.98	636.	4.12	1.90	2.944E-03	1460.75	10.700	1.281E+01	K40
1763.52	13.	37.17	2.11	2.481E-03	1764.51	15.920	PBC<MDA	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	
477.04	238.68	461.	656.	0.328	18.16	1.122	PB-212	D
483.05	241.68	496.	131.	0.065	76.90	1.124	PB-214	D
654.19	327.21	370.	74.	0.037	120.13	1.461	AC-228	s
1720.35	860.03	29.	41.	0.021	74.46	1.267	TL-208	
2311.58	1155.47	50.	34.	0.017	119.69	1.118	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.79	77.11	1894.	270.	0.135	69.73	1.499D
PB-212	153.79	77.11	1891.	274.	0.137	69.73	1.499D
EU-155	173.85	87.14	1923.	161.	0.080	118.08	1.499s
CD-109	173.80	87.11	1670.	155.	0.078	113.77	1.499s
TH-234	185.11	92.77	1839.	233.	0.116	76.95	1.499s
TH-234	185.13	92.77	1859.	190.	0.095	95.37	1.499s
PB-212	476.96	238.63	1061.	552.	0.276	27.77	1.499
PB-214	589.85	295.05	618.	175.	0.088	63.56	1.499s
AC-228	676.21	338.21	530.	185.	0.092	63.36	1.322
PB-214	703.49	351.85	493.	264.	0.132	39.82	1.499s
TL-208	1165.88	582.94	115.	207.	0.103	29.93	1.499
BI-214	1217.92	608.94	171.	205.	0.102	39.45	1.558s
CS-137	1322.73	661.32	145.	5235.	2.618	4.34	1.369
BI-212	1453.38	726.61	55.	31.	0.015	114.07	1.499
AC-228	1821.87	910.76	55.	149.	0.074	37.38	1.503
AC-228	1937.22	968.40	44.	72.	0.036	52.03	1.616s
BI-214	2239.61	1119.51	56.	91.	0.045	60.15	1.850
CO-60	2345.51	1172.43	38.	68.	0.034	59.52	1.643s
CO-60	2665.25	1332.20	26.	57.	0.029	67.12	1.198s
K-40	2920.98	1459.98	15.	633.	0.317	12.37	1.900
BI-214	3528.47	1763.52	6.	13.	0.006	111.52	2.106s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-8.6693E-02					
			477.56	-8.669E-02	%(	8.449E-01 2.51E-01	G
K-40		1.2810E+01					
			1460.75	1.281E+01	(P	4.160E-01 5.30E-01	G
MN-54		5.5445E-03					
			834.81	5.544E-03	%(P	4.843E-02 1.38E-02	G
CO-57		-2.2991E-02					
			122.07	-2.299E-02	%(	7.185E-02 2.17E-02	G K
			136.43	-4.413E-02	%	5.034E-01 1.51E-01	G
CO-60		1.1791E-01					
			1332.51	1.144E-01	(P	5.257E-02 2.56E-02	G K
			1173.23	1.214E-01	*(P	5.634E-02 2.41E-02	G K
Sr-85		-2.9141E-03					
			514.00	-2.914E-03	%(	7.595E-02 2.24E-02	G
Kr-85		-9.3092E+01					
			513.99	-9.309E+01	%(P	1.756E+03 5.17E+02	G
Y-88		4.5337E-03					
			1836.01	4.534E-03	%(	3.910E-02 1.03E-02	G K
			898.02	1.821E-02	% P	4.467E-02 1.34E-02	G
NB-94		1.9106E-02					
			871.10	1.911E-02	&(P	3.213E-02 1.00E-02	G K
			702.50	-4.890E-04	% P	4.718E-02 1.34E-02	G K
Ag-108M		-1.0758E-02					
			722.95	-1.076E-02	&(	5.902E-02 1.73E-02	G K
			614.37	2.274E-02	% P	6.047E-02 1.81E-02	G
			433.93	-8.476E-04	&	9.238E-02 2.74E-02	G
CD-109		1.3513E+00					
			88.04	1.351E+00	&(P	1.679E+00 5.14E-01	G
SN-113		-2.0559E-02					
			391.71	-2.056E-02	%(	1.199E-01 3.59E-02	G K
			255.04	3.264E-01	% P	2.810E+00 8.40E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-5.9542E-02						
		427.95	-5.954E-02	%(P	2.702E-01	8.09E-02	G K
		600.77	-1.210E-03	& P	3.146E-01	9.10E-02	G
		636.15	6.853E-02	& P	4.903E-01	1.43E-01	G
		463.51	4.012E-01	% P	8.452E-01	2.56E-01	G
		176.29	-1.559E-01	% P	9.323E-01	2.80E-01	G
I-131	-4.2760E-03						
		364.48	-4.276E-03	%(	8.157E-02	2.42E-02	G K
		636.97	-4.199E-02	&	7.975E-01	2.32E-01	G
		284.29	-2.921E-01	&	8.992E-01	2.71E-01	G
CS-134	4.7519E-03						
		604.66	4.752E-03	%(P	1.130E-01	3.35E-02	G K
		795.76	2.551E-03	% P	6.282E-02	1.79E-02	G
		569.29	4.918E-02	% P	3.948E-01	1.16E-01	G
		801.84	-1.566E-02	%	6.185E-01	1.76E-01	G
CS-137	6.6355E+00						
		661.62	6.636E+00	(P	7.453E-02	9.59E-02	G
CE-139	8.9074E-03						
		165.85	8.907E-03	&(P	6.422E-02	1.92E-02	G
EU-152	2.4809E-03						
		121.78	2.481E-03	%(P	2.113E-01	6.33E-02	G K
		344.30	1.155E-02	& P	2.146E-01	6.35E-02	G
		1408.08	2.698E-02	% P	1.759E-01	4.79E-02	G
		964.00	2.391E-01	& P	3.965E-01	1.22E-01	G
		1112.07	-7.356E-02	& P	4.137E-01	1.19E-01	G
		778.90	6.825E-02	% P	2.823E-01	8.18E-02	G
EU-154	-4.8932E-02						
		123.10	-4.893E-02	&(P	1.430E-01	4.32E-02	G K
		1274.80	5.618E-02	% P	1.708E-01	5.05E-02	G
		723.30	-2.984E-02	& P	2.752E-01	7.95E-02	G
		1004.80	-5.584E-02	& P	3.007E-01	8.68E-02	G
EU-155	1.6382E-01						
		86.45	1.638E-01	@(	2.109E-01	6.45E-02	G K
		105.31	9.929E-02	%	2.721E-01	8.23E-02	G
HG-203	-2.4902E-02						
		279.17	-2.490E-02	%(	7.819E-02	2.36E-02	G K
		72.87	-3.367E-01	% P	1.346E+00	4.06E-01	G
		70.83	-2.680E-01	%	2.155E+00	6.47E-01	G
		82.50	-1.171E+00	%	3.196E+00	9.67E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2893E-01						
		583.14	2.289E-01	(P	5.843E-02	2.31E-02	G
		510.72	2.185E-01	% P	3.295E-01	9.99E-02	G
PB-212	5.3961E-01						
		238.63	5.234E-01	(P	1.465E-01	4.90E-02	G K
							Energy duplication
		77.11	5.795E-01	(	4.343E-01	1.35E-01	G
		74.81	5.054E-01	& P	8.440E-01	2.57E-01	G
PB-214	4.2723E-01						
		351.99	4.152E-01	*(P	1.669E-01	5.55E-02	G K
		295.22	4.504E-01	*(P	3.044E-01	9.64E-02	G
							Energy duplication
		77.11	9.350E-01	+ P	7.111E-01	2.20E-01	G
		241.92	3.148E-02	% P	9.824E-01	2.94E-01	G
BI-212	3.0251E-01						
		727.17	3.025E-01	(P	3.708E-01	1.18E-01	G K
		1620.56	3.490E-01	&	1.547E+00	4.35E-01	G
		785.42	6.646E-01	% P	1.892E+00	5.60E-01	G
BI-214	4.4126E-01						
		609.32	4.413E-01	@(P	1.372E-01	5.83E-02	G K
		1764.51	2.091E-01	- P	2.300E-01	8.03E-02	G
		1120.28	1.033E+00	+ P	4.305E-01	2.08E-01	G
RA-224	8.9110E-01						
		241.00	8.911E-01	&(P	1.789E+00	5.43E-01	G
RA-226	1.0184E+00						
		185.99	1.018E+00	%(	1.845E+00	5.61E-01	G
AC-228	7.2870E-01						
		911.07	7.355E-01	(P	1.842E-01	9.28E-02	G K
		968.90	6.247E-01	&(P	2.915E-01	1.09E-01	G
		338.40	8.634E-01	(P	5.140E-01	1.84E-01	G
TH-227	-3.5971E-01						
		236.00	-3.597E-01	&(P	6.594E-01	2.00E-01	G K
		256.25	5.726E-04	& P	8.948E-01	2.66E-01	G
PA-234	7.0140E-02						
		98.44	7.014E-02	%(	2.425E-01	7.32E-02	G K
		946.00	-7.729E-02	%	2.837E-01	8.35E-02	G
		131.28	-1.229E-02	&	3.016E-01	9.04E-02	G
		94.67	-1.737E-01	%	4.262E-01	1.29E-01	G
		883.24	1.040E-01	&	3.447E-01	1.01E-01	G
		926.70	8.620E-02	%	3.990E-01	1.15E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 7.492E-02 %   5.854E-01 1.72E-01 G

TH-234       1.7147E+00
                           63.29 6.878E-01 &(P 2.709E+00 8.15E-01 G K
                           92.80 2.031E+00  (P 2.173E+00 6.67E-01 G
                           92.38 2.904E+00  (P 2.529E+00 7.80E-01 G

AM-241      -1.0670E-01
                           59.54-1.067E-01 %(P 3.871E-01 1.17E-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:                      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 - 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 *****

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	-8.6666E-02	-8.6693E-02	7.5434E-01	7.5436E-01	8.446E-01
K-40		1.2810E+01	1.2810E+01	1.5898E+00	1.7468E+00	
MN-54	#A	5.5442E-03	5.5445E-03	4.1542E-02	4.1543E-02	4.842E-02
CO-57	#B	-2.2990E-02	-2.2991E-02	6.5110E-02	6.5123E-02	7.185E-02
CO-60		1.1790E-01	1.1791E-01	5.2981E-02	5.3398E-02	

Sr-85	#A	-2.9134E-03	-2.9141E-03	6.7215E-02	6.7215E-02	7.593E-02
Kr-85	#A	-9.3092E+01	-9.3092E+01	2.5760E+03	2.5760E+03	1.756E+03
Y-88	#B	4.5330E-03	4.5337E-03	3.0814E-02	3.0815E-02	3.909E-02
NB-94	#B	1.9106E-02	1.9106E-02	3.0052E-02	3.0071E-02	3.213E-02
Ag-108M	#B	-1.0758E-02	-1.0758E-02	5.1782E-02	5.1786E-02	5.902E-02
CD-109	#A	1.3513E+00	1.3513E+00	1.5421E+00	1.5439E+00	1.679E+00
SN-113	#B	-2.0556E-02	-2.0559E-02	1.0759E-01	1.0759E-01	1.199E-01
SB-125	#B	-5.9541E-02	-5.9542E-02	2.4905E-01	2.4907E-01	2.702E-01
I-131	#B	-4.2671E-03	-4.2760E-03	7.2623E-02	7.2623E-02	8.140E-02
CS-134	#B	4.7518E-03	4.7519E-03	1.0061E-01	1.0061E-01	1.130E-01
CS-137		6.6355E+00	6.6355E+00	2.8773E-01	4.7261E-01	
CE-139	#A	8.9063E-03	8.9074E-03	5.7745E-02	5.7747E-02	6.421E-02
EU-152	#B	2.4809E-03	2.4809E-03	1.8984E-01	1.8984E-01	2.113E-01
EU-154	#B	-4.8932E-02	-4.8932E-02	1.3324E-01	1.3327E-01	1.430E-01
EU-155	#A	1.6382E-01	1.6382E-01	1.9344E-01	1.9365E-01	2.109E-01
HG-203	#B	-2.4893E-02	-2.4902E-02	7.0690E-02	7.0704E-02	7.817E-02
TL-208	#	2.2893E-01	2.2893E-01	6.9303E-02	7.0500E-02	5.843E-02
PB-212	#	5.3961E-01	5.3961E-01	1.5152E-01	1.5456E-01	1.465E-01
PB-214	#	4.2723E-01	4.2723E-01	1.6173E-01	1.6352E-01	1.669E-01
BI-212	#A	3.0251E-01	3.0251E-01	3.5273E-01	3.5314E-01	3.708E-01
BI-214		4.4126E-01	4.4126E-01	1.7503E-01	1.7680E-01	
RA-224	#A	8.9110E-01	8.9110E-01	1.6291E+00	1.6298E+00	1.789E+00
RA-226	#A	1.0184E+00	1.0184E+00	1.6828E+00	1.6838E+00	1.845E+00
AC-228		7.2870E-01	7.2870E-01	2.2133E-01	2.2513E-01	
TH-227	#B	-3.5971E-01	-3.5971E-01	6.0640E-01	6.0674E-01	6.594E-01
PA-234	#B	7.0140E-02	7.0140E-02	2.1954E-01	2.1957E-01	2.425E-01
TH-234	#B	1.7147E+00	1.7147E+00	1.3810E+00	1.3843E+00	2.709E+00
AM-241	#A	-1.0670E-01	-1.0670E-01	3.6221E-01	3.6225E-01	3.871E-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 (294.6 to 1999.1 keV) 2.0733459E+01 pCi/gm
Total Decayed Activity (294.6 to 1999.1 keV) 2.0733471E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_8JUN2006_1207.An1

Sample description
NOL-05-01-31-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\101_8JUN2006_1207.An1

Acquisition information
Start time: 08-Jun-2006 12:07:48
Live time: 2000
Real time: 2002
Dead time: 0.12 %
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/channel^2

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: 2.2710E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.2710E+03) =
4.4033E+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	08-Jun-2006 11:45:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1999

***** 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
74.62	172.	27.90	1.50	1.654E-02	74.81	9.600	6.461E-01	PB212
77.05	267.	18.67	1.50	1.720E-02	77.11	10.700	8.621E-01	PB214
					77.11	17.500	5.271E-01	PB212
77.05	270.	18.67	1.50	1.720E-02	77.11	10.700	8.621E-01	PB214
					77.11	17.500	5.345E-01	PB212
86.77	96.	33.49	1.10	1.914E-02	86.45	32.740	9.097E-02	EU155
92.73	110.	39.74	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.74	103.	41.16	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.61	73.	33.65	1.05	1.861E-02				
185.61	73.	33.65	1.05	1.861E-02	185.99	3.280	7.137E-01	RA226
238.62	715.	4.55	1.12	1.558E-02				
238.62	715.	4.55	1.12	1.558E-02	238.63	43.100	6.280E-01	PB212
241.53	108.	21.65	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.22	101.	27.81	1.65	1.400E-02				
295.22	152.	14.56	1.11	1.292E-02	295.22	19.200	3.591E-01	PB214
327.45	88.	30.20	1.75	1.171E-02				
338.51	148.	17.27	1.15	1.135E-02	338.40	12.010	6.374E-01	AC228
351.94	307.	9.90	1.15	1.093E-02				
351.94	307.	9.90	1.15	1.093E-02	351.99	37.100	4.484E-01	PB214
463.54	54.	27.92	0.99	8.341E-03	463.51	10.000	3.763E-01	SB125
510.11	116.	18.37	1.66	7.599E-03	510.72	22.500	3.501E-01	TL208
582.87	211.	8.73	1.56	6.687E-03	583.14	86.000	2.157E-01	TL208
608.97	210.	9.90	1.55	6.416E-03	609.32	46.090	4.206E-01	BI214
661.42	193.	11.95	0.94	5.939E-03	661.62	84.620	2.278E-01	CS137

726.89	71.	17.60	1.63	5.445E-03	727.17	11.800	6.478E-01	BI212
861.02	50.	30.00	0.88	4.675E-03				
910.75	162.	9.83	1.58	4.448E-03	911.07	29.000	7.371E-01	AC228
968.64	126.	14.98	1.46	4.213E-03	968.90	17.460	1.010E+00	AC228
1119.57	53.	22.94	1.76	3.713E-03	1120.28	15.040	5.631E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.03	648.	4.06	1.65	2.944E-03	1460.75	10.700	1.220E+01	K40
1620.42	12.	37.62	0.71	2.682E-03	1620.56	2.750	1.001E+00	BI212
1763.48	31.	20.02	2.02	2.481E-03	1764.51	15.920	4.604E-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	
370.87	185.61	280.	73.	0.037	100.94	1.051	U-235	l
476.93	238.56	172.	715.	0.357	13.65	1.121	PB-212	D
482.77	241.48	217.	108.	0.054	64.96	1.124	PB-214	D
540.16	270.22	262.	101.	0.050	83.44	1.651	AC-228	s
654.68	327.45	215.	88.	0.044	90.59	1.752	AC-228	s
1722.33	861.02	50.	50.	0.025	73.48	0.878	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	148.81	74.62	1145.	172.	0.086	83.71	1.499
PB-214	153.79	77.11	1142.	267.	0.133	56.00	1.499D
PB-212	153.79	77.11	1139.	270.	0.135	56.00	1.499D
PB-212	476.94	238.62	466.	549.	0.274	20.77	1.499
PB-214	590.19	295.22	253.	163.	0.082	46.89	1.499D
AC-228	676.81	338.51	177.	146.	0.073	51.81	1.151s
PB-214	703.54	351.87	137.	280.	0.140	25.01	1.499
SB-125	925.93	463.02	79.	43.	0.022	94.59	1.499s
TL-208	1020.16	510.11	120.	100.	0.050	55.11	1.663s
TL-208	1165.76	582.87	56.	208.	0.104	26.18	1.558
BI-214	1217.97	608.97	75.	209.	0.104	29.69	1.553s
CS-137	1322.92	661.42	93.	192.	0.096	35.84	0.941s
BI-212	1453.94	726.89	37.	70.	0.035	52.79	1.626s
AC-228	1821.85	910.75	34.	160.	0.080	29.49	1.582
AC-228	1937.70	968.64	55.	125.	0.062	44.95	1.456
BI-214	2239.73	1119.57	37.	53.	0.026	68.81	1.756s
K-40	2921.08	1460.03	13.	646.	0.323	12.17	1.649
BI-212	3242.07	1620.42	3.	12.	0.006	112.86	0.714s
BI-214	3528.39	1763.48	3.	31.	0.015	60.05	2.023s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.5184E-02					
			477.56	-1.518E-02	%(	3.996E-01 1.16E-01	G
K-40		1.2200E+01					
			1460.75	1.220E+01	(P	3.746E-01 4.96E-01	G
MN-54		9.4151E-03					
			834.81	9.415E-03	%(P	4.401E-02 1.28E-02	G
CO-57		-3.2602E-04					
			122.07	-3.260E-04	&(	3.903E-02 1.16E-02	G K
			136.43	7.651E-02	&	3.455E-01 1.04E-01	G
CO-60		1.4625E-02					
			1332.51	1.463E-02	&(P	4.738E-02 1.39E-02	G K
			1173.23	9.003E-03	% P	4.834E-02 1.38E-02	G K
Sr-85		-1.7624E-02					
			514.00	-1.762E-02	%(	4.936E-02 1.48E-02	G
Kr-85		-4.2840E+02					
			513.99	-4.284E+02	%(P	1.143E+03 3.42E+02	G
Y-88		-7.0682E-03					
			1836.01	-7.068E-03	&(	4.807E-02 1.32E-02	G K
			898.02	1.390E-02	& P	4.872E-02 1.43E-02	G
NB-94		3.8194E-03					
			871.10	3.819E-03	&(P	3.409E-02 9.54E-03	G K
			702.50	-9.301E-03	% P	4.399E-02 1.29E-02	G K
Ag-108M		-1.2791E-03					
			722.95	-1.279E-03	%(	9.261E-02 2.71E-02	G K
			614.37	-1.835E-02	& P	4.743E-02 1.42E-02	G
			433.93	-3.034E-03	%	4.202E-02 1.22E-02	G
CD-109		-5.4411E-01					
			88.04	-5.441E-01	%(P	1.388E+00 4.20E-01	G
SN-113		1.0756E-02					
			391.71	1.076E-02	&(	4.687E-02 1.38E-02	G K
			255.04	4.535E-01	% P	1.622E+00 4.85E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0747E-01						
		427.95	3.923E-02	%(P	1.055E-01	3.16E-02	G K
		600.77	3.831E-02	% P	1.880E-01	5.47E-02	G
		636.15	-2.361E-02	% P	3.668E-01	1.05E-01	G
		463.51	3.095E-01	@(P	3.147E-01	1.01E-01	G
		176.29	-1.588E-02	& P	5.055E-01	1.49E-01	G
I-131	8.3345E-03						
		364.48	8.335E-03	%(	4.293E-02	1.27E-02	G K
		636.97	5.696E-02	%	5.636E-01	1.62E-01	G
		284.29	1.588E-01	%	5.677E-01	1.70E-01	G
CS-134	-1.5183E-02						
		604.66	-1.518E-02	%(P	4.736E-02	1.41E-02	G K
		795.76	2.383E-03	% P	5.105E-02	1.44E-02	G
		569.29	3.263E-03	& P	2.260E-01	6.40E-02	G
		801.84	2.889E-04	&	3.889E-01	1.07E-01	G
CS-137	2.2777E-01						
		661.62	2.278E-01	(P	5.634E-02	2.73E-02	G
CE-139	4.9261E-03						
		165.85	4.926E-03	%(P	4.052E-02	1.21E-02	G
EU-152	2.7902E-02						
		121.78	2.790E-02	&(P	1.232E-01	3.70E-02	G K
		344.30	-2.394E-02	& P	1.228E-01	3.62E-02	G
		1408.08	2.030E-02	% P	1.586E-01	4.26E-02	G
		964.00	1.678E-02	% P	4.116E-01	1.17E-01	G
		1112.07	9.812E-03	& P	3.685E-01	1.03E-01	G
		778.90	-1.198E-03	& P	2.675E-01	7.37E-02	G
EU-154	1.9919E-02						
		123.10	1.992E-02	%(P	9.708E-02	2.91E-02	G K
		1274.80	3.620E-02	% P	1.664E-01	4.83E-02	G
		723.30	-1.087E-01	% P	3.003E-01	8.98E-02	G
		1004.80	-4.390E-02	% P	3.114E-01	8.97E-02	G
EU-155	-1.0132E-02						
		86.45	-1.013E-02	%(	1.558E-01	4.66E-02	G K
		105.31	4.991E-02	%	1.866E-01	5.61E-02	G
HG-203	-5.8499E-03						
		279.17	-5.850E-03	%(	4.243E-02	1.26E-02	G K
		72.87	-3.926E-01	% P	1.054E+00	3.18E-01	G
		70.83	-2.621E-02	&	1.689E+00	5.04E-01	G
		82.50	-9.044E-01	%	2.302E+00	6.96E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.1574E-01						
		583.14	2.157E-01	(P	3.876E-02	1.90E-02	G
		510.72	3.501E-01	+ P	1.870E-01	7.45E-02	G
PB-212	5.0016E-01						
		238.63	4.862E-01	(P	9.156E-02	3.40E-02	G K Energy duplication
		77.11	5.345E-01	(	3.161E-01	9.98E-02	G
		74.81	6.461E-01	& P	6.011E-01	1.86E-01	G
PB-214	4.0423E-01						
		351.99	4.105E-01	(P	8.397E-02	3.45E-02	G K Energy duplication
		295.22	3.921E-01	(P	1.842E-01	6.19E-02	G Energy duplication
		77.11	8.621E-01	+ P	5.179E-01	1.63E-01	G
		241.92	1.089E-01	% P	6.354E-01	1.90E-01	G
BI-212	7.1447E-01						
		727.17	6.478E-01	*(P	2.880E-01	1.15E-01	G K
		1620.56	1.001E+00	(	8.249E-01	3.76E-01	G
		785.42	-2.977E-02	% P	2.204E+00	6.20E-01	G
BI-214	4.3078E-01						
		609.32	4.206E-01	*(P	8.676E-02	4.18E-02	G K
		1764.51	4.604E-01	(P	1.710E-01	9.34E-02	G
		1120.28	5.631E-01	+ P	3.319E-01	1.30E-01	G
RA-224	6.9882E-01						
		241.00	6.988E-01	%(P	1.150E+00	3.51E-01	G
RA-226	7.3401E-01						
		185.99	7.340E-01	%(	1.069E+00	3.28E-01	G
AC-228	7.0791E-01						
		911.07	7.371E-01	(P	1.384E-01	7.33E-02	G K
		968.90	1.010E+00	+ P	3.018E-01	1.52E-01	G
		338.40	6.374E-01	@(P	2.825E-01	1.12E-01	G
TH-227	-1.3020E-01						
		236.00	-1.302E-01	%(P	4.189E-01	1.26E-01	G K
		256.25	-9.302E-03	% P	5.144E-01	1.51E-01	G
PA-234	-5.2499E-03						
		98.44	-5.250E-03	%(	1.582E-01	4.71E-02	G K
		946.00	-3.420E-02	%	2.667E-01	7.68E-02	G
		131.28	8.092E-03	&	2.005E-01	5.98E-02	G
		94.67	-6.635E-02	%	2.995E-01	9.00E-02	G
		883.24	2.857E-02	%	2.371E-01	6.54E-02	G
		926.70	2.048E-02	&	3.844E-01	1.08E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 5.320E-03 &   3.239E-01 9.17E-02 G

TH-234       4.3946E-01
                           63.29 4.395E-01 %(P 1.868E+00 5.60E-01 G K
                           92.80 1.096E+00 % P 1.506E+00 4.60E-01 G
                           92.38 1.196E+00 % P 1.787E+00 5.44E-01 G

AM-241      -5.4933E-03
                           59.54-5.493E-03 &(P 2.527E-01 7.51E-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 - 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 *****

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	-1.5180E-02	-1.5184E-02	3.4765E-01	3.4765E-01	3.996E-01
K-40		1.2200E+01	1.2200E+01	1.4898E+00	1.6415E+00	
MN-54	#A	9.4148E-03	9.4151E-03	3.8327E-02	3.8331E-02	4.401E-02
CO-57	#B	-3.2601E-04	-3.2602E-04	3.4735E-02	3.4735E-02	3.903E-02
CO-60	#B	1.4625E-02	1.4625E-02	4.1567E-02	4.1575E-02	4.738E-02

Sr-85	#A	-1.7621E-02	-1.7624E-02	4.4424E-02	4.4435E-02	4.936E-02
Kr-85	#A	-4.2840E+02	-4.2840E+02	1.1342E+03	1.1344E+03	1.143E+03
Y-88	#B	-7.0675E-03	-7.0682E-03	3.9650E-02	3.9652E-02	4.807E-02
NB-94	#B	3.8194E-03	3.8194E-03	2.8609E-02	2.8609E-02	3.409E-02
Ag-108M	#B	-1.2791E-03	-1.2791E-03	8.1436E-02	8.1436E-02	9.261E-02
CD-109	#A	-5.4410E-01	-5.4411E-01	1.2766E+00	1.2770E+00	1.388E+00
SN-113	#B	1.0755E-02	1.0756E-02	4.1461E-02	4.1466E-02	4.686E-02
SB-125	#F	1.0747E-01	1.0747E-01	1.0505E-01	1.0522E-01	1.055E-01
I-131	#B	8.3232E-03	8.3345E-03	3.8065E-02	3.8068E-02	4.288E-02
CS-134	#B	-1.5182E-02	-1.5183E-02	4.5536E-02	4.5544E-02	4.736E-02
CS-137	#	2.2777E-01	2.2777E-01	8.2017E-02	8.3021E-02	
CE-139	#A	4.9257E-03	4.9261E-03	3.6188E-02	3.6190E-02	4.052E-02
EU-152	#B	2.7902E-02	2.7902E-02	1.1090E-01	1.1091E-01	1.232E-01
EU-154	#B	1.9919E-02	1.9919E-02	8.7367E-02	8.7374E-02	9.708E-02
EU-155	#B	-1.0132E-02	-1.0132E-02	1.3982E-01	1.3982E-01	1.558E-01
HG-203	#B	-5.8486E-03	-5.8499E-03	3.7686E-02	3.7687E-02	4.242E-02
TL-208		2.1574E-01	2.1574E-01	5.7131E-02	5.8417E-02	
PB-212	#	5.0016E-01	5.0016E-01	1.0503E-01	1.0877E-01	9.156E-02
PB-214	#	4.0423E-01	4.0423E-01	1.0181E-01	1.0434E-01	8.397E-02
BI-212		7.1447E-01	7.1447E-01	3.8081E-01	3.8294E-01	
BI-214	#	4.3078E-01	4.3078E-01	1.2859E-01	1.3087E-01	
RA-224	#A	6.9882E-01	6.9882E-01	1.0518E+00	1.0526E+00	1.150E+00
RA-226	#A	7.3401E-01	7.3401E-01	9.8275E-01	9.8362E-01	1.069E+00
AC-228		7.0791E-01	7.0791E-01	2.1119E-01	2.1495E-01	
TH-227	#B	-1.3020E-01	-1.3020E-01	3.8678E-01	3.8685E-01	4.189E-01
PA-234	#B	-5.2499E-03	-5.2499E-03	1.4140E-01	1.4140E-01	1.582E-01
TH-234	#B	4.3946E-01	4.3946E-01	1.6793E+00	1.6795E+00	1.868E+00
AM-241	#A	-5.4933E-03	-5.4933E-03	4.2788E-01	4.2788E-01	2.527E-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 (270.1 to 1999.1 keV) 1.4496854E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.4496854E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_1JUNE2006_0853.An1

Sample description
FSS-NOL-05-01-002-F

Spectrum Filename: C:\GammaVision\Spectra\101F_1JUNE2006_0853.An1

Acquisition information
Start time: 01-Jun-2006 08:55:28
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/channel^2

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: 1.9240E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9240E+03) =
5.1975E+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	31-May-2006 08:50:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2669

***** 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
74.14	129.	24.42	1.00	1.633E-02				
74.14	129.	24.42	1.00	1.633E-02	74.81	9.600	PBC<MDA	PB212
77.06	312.	10.24	1.01	1.719E-02	77.11	10.700	1.177E+00	PB214
					77.11	17.500	7.282E-01	PB212
87.09	112.	38.37	1.50	1.910E-02	86.45	32.740	PBC<MDA	EU155
93.26	120.	32.19	1.31	1.994E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.80	118.	24.72	1.70	1.859E-02				
185.80	118.	24.72	1.70	1.859E-02	185.99	3.280	1.362E+00	RA226
238.65	689.	4.53	1.12	1.557E-02	238.63	43.100	7.150E-01	PB212
241.55	107.	19.59	1.12	1.542E-02	241.00	3.900	1.238E+00	RA224
					241.92	7.470	6.487E-01	PB214
277.92	66.	32.98	1.14	1.366E-02				
277.92	66.	32.98	1.14	1.366E-02	279.17	81.500	4.213E-02	HG203
295.27	145.	12.25	1.16	1.293E-02	295.22	19.200	4.063E-01	PB214
300.15	41.	36.82	1.16	1.273E-02				
327.75	58.	30.72	1.00	1.170E-02				
338.49	142.	17.72	1.09	1.135E-02	338.40	12.010	7.199E-01	AC228
351.74	258.	9.91	1.16	1.093E-02	351.99	37.100	4.433E-01	PB214
462.64	64.	25.80	1.37	8.357E-03				
462.64	64.	25.80	1.37	8.357E-03	463.51	10.000	5.304E-01	SB125
510.51	77.	19.37	2.05	7.594E-03	510.72	22.500	2.499E-01	TL208
582.96	210.	10.00	1.35	6.686E-03	583.14	86.000	2.542E-01	TL208
608.99	190.	11.43	1.44	6.416E-03	609.32	46.090	4.486E-01	BI214
727.11	85.	21.21	1.72	5.443E-03				
727.11	85.	21.21	1.72	5.443E-03	727.17	11.800	9.221E-01	BI212
794.49	39.	31.82	1.63	5.023E-03				

794.49	39.	31.82	1.63	5.023E-03	795.76	85.400	6.348E-02	CS134
910.62	125.	11.45	1.64	4.448E-03	911.07	29.000	6.685E-01	AC228
968.04	112.	18.18	1.18	4.215E-03	968.90	17.460	1.058E+00	AC228
1119.81	62.	32.68	1.45	3.711E-03	1120.28	15.040	7.817E-01	BI214
1460.17	627.	4.12	1.74	2.943E-03	1460.75	10.700	1.395E+01	K40
1763.78	27.	19.25	1.27	2.481E-03	1764.51	15.920	4.723E-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	
147.76	74.15	438.	123.	0.061	77.29	1.004	BI-207	D
476.99	238.64	144.	689.	0.345	13.60	1.121	PB-212	D
599.60	299.92	129.	54.	0.027	103.41	0.982	TH-227	s
655.27	327.75	119.	58.	0.029	92.15	1.000	AC-228	s
1454.37	727.11	92.	53.	0.027	86.45	1.722	BI-212	
1589.21	794.49	40.	39.	0.020	83.66	1.629	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

********** 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	148.84	74.64	970.	172.	0.086	77.83	1.499s
PB-214	153.79	77.11	359.	308.	0.154	30.73	1.006D
PB-212	153.79	77.11	921.	246.	0.123	55.72	1.499D
EU-155	173.77	87.09	868.	112.	0.056	115.12	1.499s
TH-234	185.43	92.93	831.	160.	0.080	74.74	1.499s
TH-234	185.42	92.92	783.	173.	0.086	69.84	1.499s
RA-226	371.43	185.89	434.	99.	0.049	94.40	1.499s
PB-212	476.96	238.63	341.	568.	0.284	18.44	1.499D
RA-224	483.22	241.76	456.	77.	0.038	121.49	1.499
PB-214	483.54	241.92	138.	97.	0.049	59.14	1.124D
HG-203	554.49	277.38	151.	55.	0.028	102.65	1.499s
PB-214	589.83	295.04	180.	163.	0.082	46.90	1.174s
AC-228	676.76	338.49	171.	140.	0.070	53.16	1.092
PB-214	703.28	351.74	148.	256.	0.128	29.73	1.158
SB-125	926.26	463.18	63.	37.	0.018	100.18	1.499
TL-208	1020.96	510.51	76.	61.	0.030	58.11	2.048s
TL-208	1165.93	582.96	75.	208.	0.104	30.00	1.353
BI-214	1218.01	608.99	86.	189.	0.094	34.28	1.442s
BI-212	1454.08	726.96	47.	40.	0.020	85.36	1.499
AC-228	1821.60	910.62	32.	123.	0.061	34.36	1.635
AC-228	1936.50	968.04	67.	111.	0.055	54.53	1.177
BI-214	2240.21	1119.81	83.	62.	0.031	98.05	1.455s
K-40	2921.36	1460.17	12.	625.	0.313	12.36	1.742
BI-214	3529.00	1763.78	0.	27.	0.013	57.74	1.266s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.5644E-01					
			477.56	1.564E-01	%(	3.634E-01 1.10E-01	G
K-40		1.3945E+01					
			1460.75	1.395E+01	(P	4.188E-01 5.76E-01	G
MN-54		1.9736E-02					
			834.81	1.974E-02	%(P	4.930E-02 1.47E-02	G
CO-57		-2.1854E-03					
			122.07	-2.185E-03	&(	4.708E-02 1.40E-02	G K
			136.43	4.948E-02	&	3.819E-01 1.14E-01	G
CO-60		2.3519E-02					
			1332.51	2.352E-02	%(P	5.621E-02 1.68E-02	G K
			1173.23	1.761E-02	% P	6.410E-02 1.88E-02	G K
Sr-85		-2.5707E-02					
			514.00	-2.571E-02	%(	5.507E-02 1.67E-02	G
Kr-85		-6.1261E+02					
			513.99	-6.126E+02	%(P	1.263E+03 3.81E+02	G
Y-88		-1.9307E-03					
			1836.01	-1.931E-03	%(	4.253E-02 1.07E-02	G K
			898.02	9.087E-03	% P	4.601E-02 1.32E-02	G
NB-94		-5.2045E-03					
			871.10	-5.205E-03	&(P	5.023E-02 1.42E-02	G K
			702.50	9.234E-03	& P	4.592E-02 1.33E-02	G K
Ag-108M		3.9193E-03					
			722.95	3.919E-03	%(	4.638E-02 1.31E-02	G K
			614.37	3.682E-03	% P	4.666E-02 1.33E-02	G
			433.93	0.000E+00	%	4.732E-02 1.36E-02	G
CD-109		-1.0929E-01					
			88.04	-1.093E-01	%(P	1.451E+00 4.34E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-1.5128E-02						
		391.71	-1.513E-02	%(	6.232E-02	1.85E-02	G K
		255.04	-4.606E-03	% P	1.769E+00	5.18E-01	G
SB-125	7.7748E-02						
		427.95	-3.405E-04	&(P	1.096E-01	3.10E-02	G K
		600.77	-2.209E-03	% P	1.815E-01	5.01E-02	G
		636.15	1.479E-01	% P	3.290E-01	9.92E-02	G
		463.51	3.089E-01	(P	3.354E-01	1.07E-01	G
		176.29	-1.460E-01	& P	5.984E-01	1.79E-01	G
I-131	1.5195E-02						
		364.48	1.520E-02	%(	4.527E-02	1.35E-02	G K
		636.97	2.804E-01	%	4.878E-01	1.51E-01	G
		284.29	-4.916E-03	%	5.978E-01	1.74E-01	G
CS-134	-4.2506E-03						
		604.66	-4.251E-03	%(P	1.183E-01	3.50E-02	G K
		795.76	-6.853E-04	% P	4.931E-02	1.35E-02	G
		569.29	4.465E-02	% P	2.888E-01	8.38E-02	G
		801.84	-9.609E-02	&	5.515E-01	1.59E-01	G
CS-137	3.4649E-02						
		661.62	3.465E-02	%(P	5.124E-02	1.59E-02	G
CE-139	-1.0994E-03						
		165.85	-1.099E-03	%(P	4.941E-02	1.46E-02	G
EU-152	-1.9859E-02						
		121.78	-1.986E-02	&(P	1.401E-01	4.18E-02	G K
		344.30	-2.152E-02	% P	1.489E-01	4.37E-02	G
		1408.08	2.808E-02	% P	2.038E-01	5.55E-02	G
		964.00	-1.071E-02	& P	4.409E-01	1.24E-01	G
		1112.07	5.348E-02	% P	3.939E-01	1.11E-01	G
		778.90	-1.172E-01	% P	3.938E-01	1.16E-01	G
EU-154	-9.1052E-03						
		123.10	-9.105E-03	%(P	9.843E-02	2.93E-02	G K
		1274.80	-2.401E-02	% P	2.004E-01	5.71E-02	G
		723.30	-5.982E-02	& P	3.027E-01	8.85E-02	G
		1004.80	-1.234E-02	& P	2.179E-01	5.89E-02	G
EU-155	1.2590E-01						
		86.45	1.259E-01	(	1.573E-01	4.83E-02	G K
		105.31	1.059E-01	%	1.877E-01	5.72E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	3.5477E-02						
		279.17	3.548E-02	&(	3.851E-02	1.21E-02	G K
		72.87	-3.925E-01	% P	1.201E+00	3.62E-01	G
		70.83	-1.814E-01	%	2.082E+00	6.23E-01	G
		82.50	-4.487E-01	%	2.397E+00	7.19E-01	G
TL-208	2.5329E-01						
		583.14	2.542E-01	(P	5.261E-02	2.57E-02	G
		510.72	2.499E-01	*(P	1.785E-01	6.12E-02	G
PB-212	5.8819E-01						
							Energy duplication
		238.63	5.940E-01	(P	9.288E-02	3.69E-02	G K
							Energy duplication
		77.11	5.740E-01	(	3.363E-01	1.07E-01	G
		74.81	7.594E-01	+ P	6.540E-01	2.03E-01	G
PB-214	4.4954E-01						
		351.99	4.433E-01	(P	1.030E-01	4.42E-02	G K
		295.22	4.616E-01	(P	1.847E-01	7.29E-02	G
							Energy duplication
		77.11	1.177E+00	+ P	3.470E-01	1.22E-01	G
		241.92	5.932E-01	+ P	3.506E-01	1.18E-01	G
BI-212	4.3475E-01						
		727.17	4.347E-01	(P	3.777E-01	1.26E-01	G K
		1620.56	2.848E-01	%	1.498E+00	4.11E-01	G
		785.42	3.111E-01	& P	2.557E+00	7.33E-01	G
BI-214	4.5471E-01						
		609.32	4.486E-01	@(P	1.093E-01	5.15E-02	G K
		1764.51	4.723E-01	(P	1.310E-01	9.24E-02	G
		1120.28	7.817E-01	+ P	5.680E-01	2.57E-01	G
RA-224	8.9665E-01						
		241.00	8.966E-01	(P	1.192E+00	3.66E-01	G
RA-226	1.1393E+00						
		185.99	1.139E+00	*(	1.151E+00	3.58E-01	G
AC-228	6.8356E-01						
		911.07	6.685E-01	(P	1.589E-01	7.77E-02	G K
		968.90	1.058E+00	+ P	3.908E-01	1.93E-01	G
		338.40	7.199E-01	(P	3.282E-01	1.30E-01	G
TH-227	-1.5571E-01						
		236.00	-1.557E-01	&(P	4.293E-01	1.29E-01	G K
		256.25	1.181E-01	% P	5.146E-01	1.53E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	0.0000E+00						
		98.44	0.000E+00	%(	1.825E-01	5.43E-02	G K
		946.00	6.695E-03	&	2.747E-01	7.70E-02	G
		131.28	-4.794E-02	%	2.111E-01	6.33E-02	G
		94.67	-6.972E-02	%	3.201E-01	9.61E-02	G
		883.24	-9.045E-03	&	2.749E-01	7.37E-02	G
		926.70	4.445E-02	%	4.139E-01	1.16E-01	G
		569.26	7.054E-02	%	4.269E-01	1.24E-01	G
TH-234	1.4012E+00						
		63.29	3.890E-01	&(P	2.045E+00	6.11E-01	G K
		92.80	2.031E+00	(P	1.566E+00	4.90E-01	G
		92.38	2.202E+00	(P	1.886E+00	5.86E-01	G
AM-241	-5.6409E-03						
		59.54	-5.641E-03	%(P	2.731E-01	8.10E-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 - 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	1.5441E-01	1.5644E-01	3.2858E-01	3.2870E-01	3.586E-01
K-40		1.3945E+01	1.3945E+01	1.7294E+00	1.9004E+00	
MN-54	#A	1.9692E-02	1.9736E-02	4.4220E-02	4.4234E-02	4.919E-02
CO-57	#B	-2.1798E-03	-2.1854E-03	4.1998E-02	4.1998E-02	4.696E-02
CO-60	#B	2.3511E-02	2.3519E-02	5.0546E-02	5.0564E-02	5.619E-02
Sr-85	#A	-2.5433E-02	-2.5707E-02	5.0041E-02	5.0062E-02	5.448E-02
Kr-85	#A	-6.1261E+02	-6.1261E+02	1.2421E+03	1.2426E+03	1.263E+03
Y-88	#B	-1.9181E-03	-1.9307E-03	3.2194E-02	3.2194E-02	4.225E-02
NB-94	#B	-5.2045E-03	-5.2045E-03	4.6181E-02	4.6182E-02	5.023E-02
Ag-108M	#B	3.9192E-03	3.9193E-03	3.9370E-02	3.9370E-02	4.638E-02
CD-109	#A	-1.0912E-01	-1.0929E-01	1.4124E+00	1.4124E+00	1.449E+00
SN-113	#B	-1.5037E-02	-1.5128E-02	5.5367E-02	5.5374E-02	6.194E-02
SB-125	#B	7.7694E-02	7.7748E-02	8.0961E-02	8.1080E-02	1.095E-01
I-131	#B	1.3936E-02	1.5195E-02	4.0552E-02	4.0561E-02	4.152E-02
CS-134	#B	-4.2467E-03	-4.2506E-03	1.4569E-01	1.4569E-01	1.181E-01
CS-137	#A	3.4647E-02	3.4649E-02	4.7822E-02	4.7862E-02	5.124E-02
CE-139	#A	-1.0939E-03	-1.0994E-03	5.7410E-02	5.7410E-02	4.916E-02
EU-152	#B	-1.9856E-02	-1.9859E-02	1.3727E-01	1.3728E-01	1.401E-01
EU-154	#B	-9.1031E-03	-9.1052E-03	1.0364E-01	1.0364E-01	9.841E-02
EU-155	#A	1.2585E-01	1.2590E-01	1.4494E-01	1.4511E-01	1.573E-01
HG-203	#A	3.4951E-02	3.5477E-02	3.6416E-02	3.6471E-02	3.794E-02
TL-208		2.5329E-01	2.5329E-01	7.6857E-02	7.8178E-02	
PB-212	#	5.8819E-01	5.8819E-01	1.0962E-01	1.1454E-01	9.288E-02
PB-214		4.4954E-01	4.4954E-01	1.2606E-01	1.2859E-01	
BI-212	#	4.3475E-01	4.3475E-01	3.7743E-01	3.7823E-01	3.777E-01
BI-214		4.5471E-01	4.5471E-01	1.5475E-01	1.5687E-01	
RA-224	#A	8.9665E-01	8.9665E-01	1.0995E+00	1.1006E+00	1.192E+00
RA-226	#A	1.1393E+00	1.1393E+00	1.0755E+00	1.0774E+00	1.151E+00
AC-228		6.8356E-01	6.8356E-01	2.1970E-01	2.2307E-01	
TH-227	#B	-1.5571E-01	-1.5571E-01	3.9683E-01	3.9693E-01	4.293E-01
PA-234	#B	0.0000E+00	0.0000E+00	1.6280E-01	1.6280E-01	1.825E-01
TH-234	#B	1.4012E+00	1.4012E+00	1.0137E+00	1.0167E+00	2.045E+00
AM-241	#A	-5.6409E-03	-5.6409E-03	5.1217E-01	5.1217E-01	2.731E-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 (277.6 to 1999.1 keV) 1.5786536E+01 pCi/gm
Total Decayed Activity (277.6 to 1999.1 keV) 1.5786536E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_1JUNE2006_0932.An1

Sample description
FSS-NOL-05-01-004-F

Spectrum Filename: C:\GammaVision\Spectra\101F_1JUNE2006_0932.An1

Acquisition information
Start time: 01-Jun-2006 09:34:09
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/channel^2

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: 2.0180E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0180E+03) =
4.9554E+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	31-May-2006 08:30:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2104

***** 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
74.66	245.	14.51	1.00	1.651E-02				
74.66	245.	14.51	1.00	1.651E-02	74.81	9.600	1.011E+00	PB212
77.13	379.	9.56	1.01	1.722E-02	77.11	10.700	1.366E+00	PB214
					77.11	17.500	8.435E-01	PB212
86.81	101.	30.60	1.01	1.916E-02	86.45	32.740	1.084E-01	EU155
90.15	86.	35.59	1.02	1.960E-02	88.04	3.790	PBC<MDA	CD109
93.55	119.	26.50	1.02	1.998E-02	92.80	3.000	PBC<MDA	TH234
185.83	181.	20.44	1.03	1.859E-02	185.99	3.280	1.984E+00	RA226
209.29	100.	28.02	0.81	1.722E-02				
219.33	63.	40.68	1.18	1.664E-02				
238.66	820.	4.20	1.12	1.557E-02	238.63	43.100	8.122E-01	PB212
241.57	115.	21.20	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
270.31	66.	29.90	1.39	1.400E-02				
295.22	159.	12.22	1.16	1.293E-02				
295.22	159.	12.22	1.16	1.293E-02	295.22	19.200	4.243E-01	PB214
300.12	46.	34.60	1.16	1.273E-02				
328.01	63.	33.78	1.42	1.170E-02				
338.28	167.	18.03	1.16	1.135E-02	338.40	12.010	8.097E-01	AC228
352.04	222.	10.92	1.39	1.092E-02	351.99	37.100	3.627E-01	PB214
462.81	76.	19.58	0.83	8.354E-03				
462.81	76.	19.58	0.83	8.354E-03	463.51	10.000	5.973E-01	SB125
511.02	138.	15.45	1.16	7.586E-03	510.72	22.500	4.783E-01	TL208
583.09	246.	8.99	1.17	6.685E-03	583.14	86.000	2.833E-01	TL208
609.10	196.	9.39	1.38	6.415E-03	609.32	46.090	4.407E-01	BI214
726.90	46.	36.09	1.14	5.445E-03	727.17	11.800	4.684E-01	BI212
794.80	54.	21.52	0.70	5.022E-03				
860.48	50.	24.51	1.21	4.677E-03				

910.84	180.	11.57	1.20	4.447E-03	911.07	29.000	9.240E-01	AC228
968.29	134.	14.79	1.02	4.214E-03	968.90	17.460	1.216E+00	AC228
1119.99	41.	29.86	1.21	3.711E-03	1120.28	15.040	4.898E-01	BI214
1460.12	729.	3.80	1.99	2.944E-03	1460.75	10.700	1.545E+01	K40
1763.80	32.	17.68	1.17	2.481E-03	1764.51	15.920	5.350E-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	
148.88	74.72	509.	245.	0.122	43.54	1.005	BI-207	D
153.82	77.19	468.	379.	0.190	28.69	1.006	PB-214	D
173.19	86.87	429.	101.	0.051	91.79	1.013	TB-160	lD
179.87	90.21	427.	86.	0.043	106.78	1.016	PB-214	lD
418.25	209.29	323.	100.	0.050	84.05	0.807	AC-228	s
438.35	219.33	274.	63.	0.032	122.05	1.176	J-135	s
477.03	238.64	184.	820.	0.410	12.60	1.122	PB-212	D
482.85	241.55	239.	115.	0.057	63.59	1.124	PB-214	D
540.35	270.31	154.	66.	0.033	89.70	1.390	AC-228	s
655.79	328.01	156.	63.	0.032	101.35	1.423	AC-228	s
1589.83	794.80	30.	55.	0.028	57.88	0.699	AC-228	s
1721.25	860.48	34.	50.	0.025	73.53	1.206	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	149.17	74.80	1182.	225.	0.112	66.26	1.499
PB-214	153.79	77.11	1108.	342.	0.171	43.88	1.499D
PB-212	153.79	77.11	1105.	346.	0.173	43.88	1.499D
TH-234	185.71	93.06	997.	166.	0.083	81.02	1.499s
RA-226	371.32	185.83	454.	181.	0.090	61.31	1.034s
PB-212	476.96	238.63	433.	745.	0.373	15.99	1.499D
PB-214	589.90	295.08	234.	150.	0.075	49.08	1.499s
AC-228	676.34	338.28	233.	165.	0.082	54.08	1.158
PB-214	703.82	352.01	146.	227.	0.113	29.80	1.499
SB-125	925.91	463.00	68.	60.	0.030	67.67	1.499s
TL-208	1021.98	511.02	115.	122.	0.061	46.36	1.155s
TL-208	1166.18	583.09	89.	243.	0.122	26.97	1.166
BI-214	1218.24	609.10	56.	194.	0.097	28.16	1.378s
BI-212	1453.94	726.90	71.	45.	0.022	108.28	1.140
AC-228	1822.04	910.84	72.	178.	0.089	34.70	1.197
AC-228	1937.00	968.29	67.	134.	0.067	44.36	1.021s
BI-214	2240.56	1119.99	41.	41.	0.020	89.58	1.214
K-40	2921.25	1460.12	12.	726.	0.363	11.40	1.985

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3529.04	1763.80	0.	32.	0.016	53.03	1.166s

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	Peak Energy keV	Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-5.2010E-02					
			477.56	-5.201E-02	%(	3.492E-01 1.01E-01	G
K-40		1.5450E+01					
			1460.75	1.545E+01	(P	3.949E-01 5.89E-01	G
MN-54		3.1859E-02					
			834.81	3.186E-02	%(P	4.861E-02 1.51E-02	G
CO-57		-6.6323E-04					
			122.07	-6.632E-04	&(	5.141E-02 1.53E-02	G K
			136.43	-1.334E-02	&	4.117E-01 1.23E-01	G
CO-60		1.8121E-02					
			1332.51	1.812E-02	%(P	5.930E-02 1.74E-02	G K
			1173.23	2.347E-02	& P	7.170E-02 2.13E-02	G K
Sr-85		-1.5561E-02					
			514.00	-1.556E-02	%(	5.611E-02 1.67E-02	G
Kr-85		-3.8053E+02					
			513.99	-3.805E+02	%(P	1.285E+03 3.82E+02	G
Y-88		3.6354E-04					
			1836.01	3.635E-04	%(	4.460E-02 1.12E-02	G K
			898.02	-5.272E-03	% P	5.196E-02 1.47E-02	G
NB-94		-1.7879E-03					
			871.10	-1.788E-03	%(P	5.588E-02 1.58E-02	G K
			702.50	5.637E-03	& P	3.957E-02 1.13E-02	G K
Ag-108M		-9.1646E-03					
			722.95	-9.165E-03	&(	5.889E-02 1.71E-02	G K
			614.37	-1.398E-02	% P	4.904E-02 1.45E-02	G
			433.93	-5.913E-03	%	4.288E-02 1.25E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	2.1597E-01						
		88.04	2.160E-01	%(P	1.461E+00	4.38E-01	G
SN-113	-7.7146E-03						
		391.71	-7.715E-03	%(	6.818E-02	2.00E-02	G K
		255.04	4.285E-01	& P	1.788E+00	5.33E-01	G
SB-125	1.2051E-01						
		427.95	-2.585E-03	%(P	1.419E-01	4.10E-02	G K
		600.77	-8.673E-03	% P	2.124E-01	6.01E-02	G
		636.15	1.140E-01	& P	3.523E-01	1.04E-01	G
		463.51	4.849E-01	@(P	3.299E-01	1.12E-01	G
		176.29	2.011E-01	% P	6.280E-01	1.89E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	&(	5.603E-02	1.63E-02	G K
		636.97	-1.582E-01	&	7.271E-01	2.13E-01	G
		284.29	7.787E-02	%	7.332E-01	2.17E-01	G
CS-134	-1.9967E-02						
		604.66	-1.997E-02	%(P	5.449E-02	1.63E-02	G K
		795.76	-2.323E-03	% P	4.482E-02	1.23E-02	G
		569.29	5.835E-02	% P	2.650E-01	7.75E-02	G
		801.84	1.077E-01	&	4.919E-01	1.43E-01	G
CS-137	-1.0156E-02						
		661.62	-1.016E-02	%(P	4.520E-02	1.30E-02	G
CE-139	-4.6858E-03						
		165.85	-4.686E-03	%(P	5.208E-02	1.55E-02	G
EU-152	-8.9953E-03						
		121.78	-8.995E-03	&(P	1.500E-01	4.47E-02	G K
		344.30	3.742E-04	% P	1.317E-01	3.81E-02	G
		1408.08	4.468E-02	% P	1.829E-01	5.15E-02	G
		964.00	2.202E-01	& P	5.174E-01	1.56E-01	G
		1112.07	-9.959E-02	% P	5.057E-01	1.47E-01	G
		778.90	-4.400E-03	% P	3.339E-01	9.31E-02	G
EU-154	2.3012E-02						
		123.10	2.301E-02	%(P	1.067E-01	3.20E-02	G K
		1274.80	3.302E-02	% P	1.511E-01	4.34E-02	G
		723.30	-2.260E-03	& P	3.775E-01	1.09E-01	G
		1004.80	1.252E-01	% P	2.720E-01	8.23E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	2.2813E-03						
		86.45	2.281E-03	%(	1.790E-01	5.35E-02	G K
		105.31	4.066E-02	%	2.090E-01	6.27E-02	G
HG-203	-4.9408E-03						
		279.17	-4.941E-03	&(	5.157E-02	1.52E-02	G K
		72.87	3.054E-02	% P	1.040E+00	3.10E-01	G
		70.83	-1.213E+00	&	2.075E+00	6.32E-01	G
		82.50	1.754E-02	&	2.660E+00	7.94E-01	G
TL-208	2.8333E-01						
		583.14	2.833E-01	(P	5.430E-02	2.57E-02	G
		510.72	4.783E-01	+ P	2.066E-01	8.37E-02	G
PB-212	7.5089E-01						
							Energy duplication
		238.63	7.437E-01	(P	9.940E-02	4.00E-02	G K
							Energy duplication
		77.11	7.686E-01	@(	3.505E-01	1.12E-01	G
		74.81	9.483E-01	& P	6.870E-01	2.14E-01	G
PB-214	3.8487E-01						
		351.99	3.748E-01	(P	9.746E-02	3.76E-02	G K
		295.22	4.044E-01	(P	1.996E-01	6.70E-02	G
							Energy duplication
		77.11	1.244E+00	+ P	5.742E-01	1.84E-01	G
		241.92	-3.073E-01	% P	7.252E-01	2.19E-01	G
BI-212	4.6837E-01						
		727.17	4.684E-01	(P	4.379E-01	1.72E-01	G K
		1620.56	-1.692E-03	&	1.474E+00	3.73E-01	G
		785.42	7.887E-01	% P	2.416E+00	7.15E-01	G
BI-214	4.6974E-01						
		609.32	4.407E-01	@(P	8.480E-02	4.16E-02	G K
		1764.51	5.350E-01	(P	1.249E-01	9.59E-02	G
		1120.28	4.898E-01	(P	3.913E-01	1.48E-01	G
RA-224	9.4767E-01						
		241.00	9.477E-01	%(P	1.306E+00	4.00E-01	G
RA-226	1.9842E+00						
		185.99	1.984E+00	*(	1.121E+00	4.05E-01	G
AC-228	1.0339E+00						
		911.07	9.240E-01	(P	2.195E-01	1.08E-01	G K
		968.90	1.216E+00	(P	3.731E-01	1.81E-01	G
		338.40	8.097E-01	- P	3.629E-01	1.48E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -8.8564E-02
                          236.00-8.856E-02 %(P 3.802E-01 1.14E-01 G K
                          256.25-8.031E-02 & P 6.005E-01 1.78E-01 G

PA-234      -3.6544E-03
                           98.44-3.654E-03 %(  1.935E-01 5.77E-02 G K
                          946.00-1.078E-01 %   3.613E-01 1.07E-01 G
                          131.28-2.044E-02 %   1.896E-01 5.65E-02 G
                           94.67 1.960E-02 %   2.455E-01 7.30E-02 G
                          883.24-3.881E-02 &   3.603E-01 1.02E-01 G
                          926.70 7.394E-02 %   4.148E-01 1.19E-01 G
                          569.26 9.066E-02 %   3.917E-01 1.15E-01 G

TH-234       1.2805E+00
                           63.29 8.353E-01 %(P 2.192E+00 6.61E-01 G K
                           92.80 1.859E+00  (P 1.682E+00 5.21E-01 G
                           92.38-1.425E-01 & P 2.019E+00 5.99E-01 G

AM-241      -6.4139E-02
                           59.54-6.414E-02 %(P 2.993E-01 8.98E-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 - 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	-5.1309E-02	-5.2010E-02	3.0414E-01	3.0416E-01	3.445E-01
K-40		1.5450E+01	1.5450E+01	1.7669E+00	1.9708E+00	
MN-54	#A	3.1785E-02	3.1859E-02	4.5372E-02	4.5408E-02	4.850E-02
CO-57	#B	-6.6145E-04	-6.6323E-04	4.5913E-02	4.5913E-02	5.127E-02
CO-60	#B	1.8114E-02	1.8121E-02	5.2164E-02	5.2174E-02	5.928E-02
Sr-85	#A	-1.5388E-02	-1.5561E-02	5.0129E-02	5.0136E-02	5.548E-02
Kr-85	#A	-3.8053E+02	-3.8053E+02	1.3007E+03	1.3009E+03	1.285E+03
Y-88	#B	3.6108E-04	3.6354E-04	3.3745E-02	3.3745E-02	4.430E-02
NB-94	#B	-1.7879E-03	-1.7879E-03	5.8960E-02	5.8961E-02	5.588E-02
Ag-108M	#B	-9.1645E-03	-9.1646E-03	5.1381E-02	5.1383E-02	5.889E-02
CD-109	#A	2.1562E-01	2.1597E-01	1.3142E+00	1.3143E+00	1.459E+00
SN-113	#B	-7.6662E-03	-7.7146E-03	6.0062E-02	6.0063E-02	6.775E-02
SB-125	#B	1.2043E-01	1.2051E-01	8.3508E-02	8.3785E-02	1.418E-01
I-131	#B	0.0000E+00	0.0000E+00	4.8901E-02	4.8901E-02	5.120E-02
CS-134	#B	-1.9948E-02	-1.9967E-02	5.2110E-02	5.2122E-02	5.444E-02
CS-137	#A	-1.0156E-02	-1.0156E-02	4.9113E-02	4.9117E-02	4.520E-02
CE-139	#A	-4.6612E-03	-4.6858E-03	4.9398E-02	4.9399E-02	5.181E-02
EU-152	#B	-8.9939E-03	-8.9953E-03	1.6205E-01	1.6205E-01	1.499E-01
EU-154	#B	2.3006E-02	2.3012E-02	9.6013E-02	9.6021E-02	1.067E-01
EU-155	#B	2.2804E-03	2.2813E-03	1.6036E-01	1.6036E-01	1.789E-01
HG-203	#B	-4.8646E-03	-4.9408E-03	4.5735E-02	4.5736E-02	5.077E-02
TL-208		2.8333E-01	2.8333E-01	7.7161E-02	7.8804E-02	
PB-212	#	7.5089E-01	7.5089E-01	1.2105E-01	1.2827E-01	9.940E-02
PB-214	#	3.8487E-01	3.8487E-01	1.1172E-01	1.1381E-01	9.746E-02
BI-212		4.6837E-01	4.6837E-01	5.1480E-01	5.1548E-01	
BI-214		4.6974E-01	4.6974E-01	1.3302E-01	1.3564E-01	
RA-224	#A	9.4767E-01	9.4767E-01	1.2010E+00	1.2021E+00	1.306E+00
RA-226	#	1.9842E+00	1.9842E+00	1.2164E+00	1.2216E+00	
AC-228		1.0339E+00	1.0339E+00	2.9329E-01	2.9905E-01	
TH-227	#B	-8.8564E-02	-8.8564E-02	3.5397E-01	3.5400E-01	3.802E-01
PA-234	#B	-3.6544E-03	-3.6544E-03	1.7310E-01	1.7310E-01	1.935E-01
TH-234	#B	1.2805E+00	1.2805E+00	1.0761E+00	1.0784E+00	2.192E+00
AM-241	#A	-6.4138E-02	-6.4139E-02	2.8592E-01	2.8594E-01	2.993E-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 (270.1 to 1999.1 keV) 1.9689930E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.9689932E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_7JUNE2006_0901.An1

Sample description
FSS-NOL-05-01-022-I

Spectrum Filename: C:\GammaVision\Spectra\101F_7JUNE2006_0901.An1

Acquisition information
Start time: 07-Jun-2006 09:03:57
Live time: 2000
Real time: 2009
Dead time: 0.46 %
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/channel^2

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: 2.0800E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0800E+03) =
4.8077E+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	06-Jun-2006 11:49:00
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: 0.2983

***** 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
76.97	348.	26.84	1.50	1.720E-02	77.11	10.700	1.226E+00	PB214
					77.11	17.500	PBC<MDA	PB212
76.97	351.	26.84	1.50	1.720E-02	77.11	10.700	1.226E+00	PB214
					77.11	17.500	7.579E-01	PB212
133.41	287.	27.45	1.24	2.102E-02				
238.68	708.	8.61	1.12	1.557E-02	238.63	43.100	6.792E-01	PB212
295.57	135.	40.34	0.75	1.291E-02	295.22	19.200	PBC<MDA	PB214
351.88	274.	21.55	1.20	1.093E-02				
351.88	274.	21.55	1.20	1.093E-02	351.99	37.100	4.364E-01	PB214
510.76	130.	27.56	1.31	7.591E-03				
510.76	130.	27.56	1.31	7.591E-03	510.72	22.500	PBC<MDA	TL208
582.73	221.	14.30	1.58	6.689E-03				
582.73	221.	14.30	1.58	6.689E-03	583.14	86.000	2.473E-01	TL208
608.91	190.	20.41	1.43	6.417E-03	609.32	46.090	4.148E-01	BI214
661.33	23532.	0.67	1.40	5.940E-03	661.62	84.620	3.043E+01	CS137
726.89	53.	37.84	0.69	5.445E-03				
726.89	53.	37.84	0.69	5.445E-03	727.17	11.800	5.272E-01	BI212
795.54	32.	31.77	1.50	5.016E-03	795.76	85.400	4.902E-02	CS134
910.84	142.	10.34	1.70	4.447E-03				
910.84	142.	10.34	1.70	4.447E-03	911.07	29.000	7.086E-01	AC228
967.46	117.	13.65	1.85	4.218E-03				
967.46	117.	13.65	1.85	4.218E-03	968.90	17.460	1.027E+00	AC228
1119.84	50.	22.51	1.12	3.712E-03	1120.28	15.040	5.834E-01	BI214
1172.52	157.	12.06	1.61	3.567E-03	1173.23	99.860	2.864E-01	CO60
1331.64	138.	12.17	2.11	3.192E-03	1332.51	99.980	2.810E-01	CO60
1460.02	519.	4.61	2.02	2.944E-03	1460.75	10.700	1.067E+01	K40
1764.14	30.	18.26	1.40	2.481E-03	1764.51	15.920	4.862E-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	
477.05	238.66	1503.	708.	0.354	25.82	1.122	PB-212	D
590.88	295.57	1344.	135.	0.067	121.03	0.747	PB-214	l
1453.94	726.89	96.	53.	0.026	113.51	0.693	J-132	l
1935.32	967.46	114.	49.	0.024	102.93	1.848	SB-124	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-214	153.79	77.11	4271.	348.	0.174	80.52	1.499D
PB-212	153.79	77.11	4267.	351.	0.176	80.52	1.499D
PB-212	477.05	238.68	3343.	732.	0.366	35.01	1.499s
PB-214	703.76	351.98	1807.	310.	0.155	60.29	1.499
TL-208	1165.74	582.86	421.	197.	0.098	48.48	1.499s
BI-214	1217.85	608.91	453.	189.	0.094	61.24	1.426s
CS-137	1322.74	661.33	410.	23531.	11.766	2.02	1.402
CS-134	1591.30	795.54	38.	32.	0.016	95.32	1.502s
AC-228	1821.97	910.81	38.	144.	0.072	30.28	1.578
AC-228	1937.31	968.45	46.	81.	0.040	48.18	1.616s
BI-214	2240.26	1119.84	32.	50.	0.025	67.54	1.116s
CO-60	2345.70	1172.52	48.	157.	0.078	36.18	1.609s
CO-60	2664.14	1331.64	36.	138.	0.069	36.51	2.108
K-40	2921.05	1460.02	15.	517.	0.258	13.83	2.025
BI-214	3529.72	1764.14	0.	30.	0.015	54.77	1.404s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-2.2076E-01					
			477.56	-2.208E-01	%(	1.612E+00 4.85E-01	G
K-40		1.0667E+01					
			1460.75	1.067E+01	(P	4.293E-01 4.94E-01	G
MN-54		2.8076E-02					
			834.81	2.808E-02	%(P	4.265E-02 1.33E-02	G
CO-57		-1.9300E-02					
			122.07	-1.930E-02	%(	1.200E-01 3.62E-02	G K
			136.43	-4.048E-01	%	9.687E-01 2.94E-01	G
CO-60		2.8368E-01					
			1332.51	2.810E-01	(P	6.256E-02 3.42E-02	G K
			1173.23	2.864E-01	@(P	6.398E-02 3.46E-02	G K
Sr-85		-4.9218E-02					
			514.00	-4.922E-02	&(	1.411E-01 4.26E-02	G
Kr-85		-1.1339E+03					
			513.99	-1.134E+03	&(P	3.226E+03 9.74E+02	G
Y-88		1.0264E-02					
			1836.01	1.026E-02	%(	3.756E-02 1.06E-02	G K
			898.02	3.717E-03	% P	4.679E-02 1.31E-02	G
NB-94		2.8280E-03					
			871.10	2.828E-03	&(P	4.440E-02 1.25E-02	G K
			702.50	-2.514E-03	& P	5.368E-02 1.54E-02	G K
Ag-108M		-2.5348E-03					
			722.95	-2.535E-03	%(	6.157E-02 1.77E-02	G K
			614.37	-5.805E-03	% P	1.051E-01 3.11E-02	G
			433.93	2.049E-02	%	1.761E-01 5.29E-02	G
CD-109		1.7175E+00					
			88.04	1.718E+00	&(P	2.586E+00 7.87E-01	G
SN-113		-3.3737E-02					
			391.71	-3.374E-02	%(	2.155E-01 6.48E-02	G K
			255.04	7.687E-01	% P	5.050E+00 1.52E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.8841E-01						
		427.95	1.884E-01	&(P	5.123E-01	1.55E-01	G K
		600.77	5.572E-02	& P	5.383E-01	1.60E-01	G
		636.15	4.356E-02	% P	7.214E-01	2.12E-01	G
		463.51	5.492E-01	% P	1.748E+00	5.28E-01	G
		176.29	-3.471E-01	& P	1.622E+00	4.89E-01	G
I-131	-7.8166E-04						
		364.48	-7.817E-04	&(	1.735E-01	5.20E-02	G K
		636.97	-1.142E-01	%	1.435E+00	4.25E-01	G
		284.29	-2.975E-01	%	2.020E+00	6.08E-01	G
CS-134	8.5521E-03						
		604.66	-2.685E-02	%(P	1.064E-01	3.18E-02	G K
		795.76	4.902E-02	*(P	4.776E-02	1.58E-02	G
		569.29	1.884E-03	& P	6.142E-01	1.81E-01	G
		801.84	1.939E-01	%	4.707E-01	1.41E-01	G
CS-137	3.0430E+01						
		661.62	3.043E+01	(P	1.255E-01	2.05E-01	G
CE-139	-2.4057E-02						
		165.85	-2.406E-02	%(P	1.263E-01	3.81E-02	G
EU-152	-5.6781E-02						
		121.78	-5.678E-02	%(P	3.504E-01	1.06E-01	G K
		344.30	-8.022E-02	% P	4.613E-01	1.39E-01	G
		1408.08	-1.499E-02	% P	2.282E-01	6.18E-02	G
		964.00	-1.447E-01	& P	5.435E-01	1.61E-01	G
		1112.07	1.301E-01	% P	3.622E-01	1.07E-01	G
		778.90	-5.415E-02	% P	4.014E-01	1.16E-01	G
EU-154	-3.1198E-02						
		123.10	-3.120E-02	%(P	2.379E-01	7.17E-02	G K
		1274.80	-2.898E-02	% P	1.845E-01	5.30E-02	G
		723.30	1.408E-03	& P	2.875E-01	8.22E-02	G
		1004.80	-6.924E-02	% P	3.072E-01	8.93E-02	G
EU-155	-7.7460E-03						
		86.45	-7.746E-03	%(	3.383E-01	1.02E-01	G K
		105.31	3.496E-02	%	4.595E-01	1.38E-01	G
HG-203	3.3394E-02						
		279.17	3.339E-02	%(	1.230E-01	3.71E-02	G K
		72.87	-1.226E-02	% P	1.720E+00	5.17E-01	G
		70.83	-7.394E-01	%	3.888E+00	1.17E+00	G
		82.50	8.530E-01	%	4.448E+00	1.34E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2241E-01						
		583.14	2.224E-01	*(P	1.111E-01	3.64E-02	G
		510.72	3.980E-01	% P	6.074E-01	1.85E-01	G
PB-212	7.2250E-01						
		238.63	7.081E-01	@(P	2.634E-01	8.33E-02	G K
							Energy duplication
		77.11	7.579E-01	(	6.628E-01	2.03E-01	G
		74.81	2.868E-01	& P	1.275E+00	3.85E-01	G
PB-214	4.9636E-01						
		351.99	4.964E-01	(P	3.219E-01	1.00E-01	G K
		295.22	3.471E-01	% P	5.823E-01	1.77E-01	G
							Energy duplication
		77.11	1.226E+00	+ P	1.084E+00	3.33E-01	G
		241.92	-8.353E-01	% P	1.654E+00	5.02E-01	G
BI-212	1.6051E-01						
		727.17	1.605E-01	%(P	4.437E-01	1.32E-01	G K
		1620.56	9.283E-03	&	1.204E+00	2.94E-01	G
		785.42	9.082E-01	% P	2.345E+00	7.01E-01	G
BI-214	4.6245E-01						
		609.32	4.148E-01	@(P	2.241E-01	8.51E-02	G K
		1764.51	4.862E-01	(P	1.212E-01	9.01E-02	G
		1120.28	5.834E-01	(P	3.378E-01	1.32E-01	G
RA-224	-6.9538E-01						
		241.00	-6.954E-01	&(P	2.976E+00	8.98E-01	G
RA-226	1.7758E+00						
		185.99	1.776E+00	%(	3.361E+00	1.02E+00	G
AC-228	7.2312E-01						
		911.07	7.277E-01	(P	1.579E-01	7.44E-02	G K
		968.90	7.155E-01	@(P	3.030E-01	1.16E-01	G
		338.40	4.918E-01	% P	9.956E-01	3.02E-01	G
TH-227	-5.0389E-01						
		236.00	-5.039E-01	&(P	1.099E+00	3.33E-01	G K
		256.25	-4.117E-01	% P	1.662E+00	5.02E-01	G
PA-234	2.5260E-02						
		98.44	2.526E-02	%(	4.044E-01	1.22E-01	G K
		946.00	1.429E-02	&	2.095E-01	5.83E-02	G
		131.28	-7.945E-02	%	4.978E-01	1.50E-01	G
		94.67	1.187E-01	%	6.533E-01	1.97E-01	G
		883.24	-1.040E-01	%	4.651E-01	1.36E-01	G
		926.70	-6.074E-03	%	4.880E-01	1.37E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 6.665E-03 &   9.100E-01 2.69E-01 G

TH-234      -9.2825E-02
                           63.29-9.283E-02 %(P 4.356E+00 1.31E+00 G K
                           92.80 1.459E+00 & P 3.476E+00 1.05E+00 G
                           92.38 1.542E+00 % P 4.089E+00 1.24E+00 G

AM-241       8.2797E-03
                           59.54 8.280E-03 &(P 5.752E-01 1.73E-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:                      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 - 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 *****

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	-2.1823E-01	-2.2076E-01	1.4536E+00	1.4537E+00	1.594E+00
K-40		1.0667E+01	1.0667E+01	1.4818E+00	1.5997E+00	
MN-54	#A	2.8021E-02	2.8076E-02	3.9935E-02	3.9967E-02	4.257E-02
CO-57	#B	-1.9256E-02	-1.9300E-02	1.0868E-01	1.0869E-01	1.198E-01
CO-60		2.8359E-01	2.8368E-01	7.2965E-02	7.4705E-02	

Sr-85	#A	-4.8755E-02	-4.9218E-02	1.2780E-01	1.2783E-01	1.397E-01
Kr-85	#A	-1.1339E+03	-1.1339E+03	3.0448E+03	3.0455E+03	3.226E+03
Y-88	#B	1.0205E-02	1.0264E-02	3.1706E-02	3.1711E-02	3.734E-02
NB-94	#B	2.8280E-03	2.8280E-03	3.7411E-02	3.7411E-02	4.440E-02
Ag-108M	#B	-2.5348E-03	-2.5348E-03	5.3105E-02	5.3105E-02	6.157E-02
CD-109	#A	1.7152E+00	1.7175E+00	2.3612E+00	2.3631E+00	2.582E+00
SN-113	#B	-3.3558E-02	-3.3737E-02	1.9445E-01	1.9446E-01	2.143E-01
SB-125	#B	1.8829E-01	1.8841E-01	4.6485E-01	4.6497E-01	5.120E-01
I-131	#B	-7.2422E-04	-7.8166E-04	1.5597E-01	1.5597E-01	1.608E-01
CS-134	#B	8.5452E-03	8.5521E-03	8.2576E-03	8.2717E-03	1.063E-01
CS-137		3.0428E+01	3.0430E+01	6.1445E-01	1.8259E+00	
CE-139	#A	-2.3949E-02	-2.4057E-02	1.1563E-01	1.1564E-01	1.257E-01
EU-152	#B	-5.6774E-02	-5.6781E-02	3.2660E-01	3.2662E-01	3.504E-01
EU-154	#B	-3.1192E-02	-3.1198E-02	2.2501E-01	2.2501E-01	2.379E-01
EU-155	#B	-7.7434E-03	-7.7460E-03	3.0558E-01	3.0558E-01	3.382E-01
HG-203	#B	3.2957E-02	3.3394E-02	1.1135E-01	1.1137E-01	1.214E-01
TL-208	#	2.2241E-01	2.2241E-01	1.0913E-01	1.0985E-01	1.111E-01
PB-212	#	7.2250E-01	7.2250E-01	2.5506E-01	2.5831E-01	2.634E-01
PB-214	#	4.9636E-01	4.9636E-01	3.0114E-01	3.0245E-01	3.219E-01
BI-212	#B	1.6051E-01	1.6051E-01	3.9707E-01	3.9718E-01	4.437E-01
BI-214		4.6245E-01	4.6245E-01	1.6542E-01	1.6747E-01	
RA-224	#A	-6.9538E-01	-6.9538E-01	2.7555E+00	2.7557E+00	2.976E+00
RA-226	#A	1.7758E+00	1.7758E+00	3.0614E+00	3.0631E+00	3.361E+00
AC-228	#	7.2312E-01	7.2312E-01	2.0781E-01	2.1179E-01	1.579E-01
TH-227	#B	-5.0389E-01	-5.0389E-01	1.0059E+00	1.0063E+00	1.099E+00
PA-234	#B	2.5260E-02	2.5260E-02	3.6549E-01	3.6549E-01	4.044E-01
TH-234	#B	-9.2825E-02	-9.2825E-02	2.6927E+01	2.6927E+01	4.356E+00
AM-241	#A	8.2797E-03	8.2797E-03	5.1865E-01	5.1865E-01	5.752E-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 - Halflife limit exceeded

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

Total Activity (269.1 to 1999.1 keV) 4.1841110E+01 pCi/gm
Total Decayed Activity (269.1 to 1999.1 keV) 4.1842899E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_7JUNE2006_1041.An1

Sample description
FSS-NOL-05-01-023-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_7JUNE2006_1041.An1

Acquisition information
Start time: 07-Jun-2006 10:43:28
Live time: 2000
Real time: 2006
Dead time: 0.30 %
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/channel^2

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: 1.9910E+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	06-Jun-2006 16:11:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3271

***** 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
74.77	240.	31.93	1.50	1.654E-02				
74.77	240.	31.93	1.50	1.654E-02	74.81	9.600	PBC<MDA	PB212
77.00	262.	29.11	1.50	1.720E-02	77.11	10.700	9.649E-01	PB214
					77.11	17.500	PBC<MDA	PB212
77.00	265.	29.11	1.50	1.720E-02	77.11	10.700	9.649E-01	PB214
					77.11	17.500	5.983E-01	PB212
186.10	215.	38.26	1.21	1.858E-02	185.99	3.280	2.392E+00	RA226
238.67	728.	6.91	1.12	1.557E-02				
238.67	728.	6.91	1.12	1.557E-02	238.63	43.100	7.302E-01	PB212
241.62	129.	33.83	1.12	1.542E-02				
295.38	146.	33.47	1.42	1.291E-02	295.22	19.200	PBC<MDA	PB214
338.39	161.	22.66	1.19	1.134E-02	338.40	12.010	7.890E-01	AC228
351.76	224.	23.48	1.04	1.093E-02				
351.76	224.	23.48	1.04	1.093E-02	351.99	37.100	3.726E-01	PB214
510.39	76.	39.19	1.50	7.590E-03	510.72	22.500	PBC<MDA	TL208
582.86	253.	12.96	1.20	6.688E-03				
582.86	253.	12.96	1.20	6.688E-03	583.14	86.000	2.958E-01	TL208
609.17	170.	16.60	1.47	6.414E-03	609.32	46.090	3.874E-01	BI214
661.37	14517.	0.85	1.39	5.940E-03	661.62	84.620	1.961E+01	CS137
726.92	68.	21.48	1.57	5.445E-03	727.17	11.800	7.072E-01	BI212
794.67	33.	29.34	1.50	5.016E-03	795.76	85.400	5.171E-02	CS134
910.80	134.	12.58	1.27	4.448E-03	911.07	29.000	6.955E-01	AC228
967.94	92.	16.05	1.16	4.216E-03	968.90	17.460	8.424E-01	AC228
1119.46	46.	26.34	1.93	3.711E-03	1120.28	15.040	5.548E-01	BI214
1172.57	110.	17.40	2.29	3.566E-03	1173.23	99.860	2.091E-01	CO60
1331.67	90.	12.61	1.84	3.192E-03	1332.51	99.980	1.903E-01	CO60
1460.10	613.	4.14	1.90	2.944E-03	1460.75	10.700	1.317E+01	K40

1763.67	30.	22.21	2.39	2.481E-03	1764.51	15.920	5.148E-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	
371.86	186.10	2515.	215.	0.107	114.78	1.209	PA-234	l
477.04	238.63	904.	728.	0.364	20.74	1.122	PB-212	D
482.93	241.57	892.	129.	0.065	101.48	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

********** 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	149.11	74.77	2952.	240.	0.120	95.79	1.499s
PB-214	153.79	77.11	2855.	262.	0.131	87.32	1.499D
PB-212	153.79	77.11	2851.	265.	0.133	87.32	1.499D
PB-212	476.96	238.63	2088.	730.	0.365	28.51	1.499D
PB-214	480.37	240.33	2173.	-171.	-0.085	118.64	1.499s
PB-214	590.11	295.18	1342.	161.	0.081	97.99	1.499s
AC-228	676.89	338.55	863.	146.	0.073	91.22	1.231s
PB-214	703.46	351.83	1143.	202.	0.101	73.21	1.499
TL-208	1166.06	583.03	293.	217.	0.108	38.73	1.499s
BI-214	1218.38	609.17	232.	169.	0.084	49.79	1.466
CS-137	1322.83	661.37	213.	14516.	7.258	2.55	1.393
BI-212	1454.00	726.92	50.	67.	0.033	64.44	1.568s
CS-134	1589.57	794.67	31.	33.	0.016	88.03	1.502s
AC-228	1821.95	910.80	52.	132.	0.066	37.73	1.268
AC-228	1936.29	967.94	43.	91.	0.046	48.15	1.162
BI-214	2239.51	1119.46	36.	46.	0.023	79.02	1.925s
CO-60	2345.80	1172.57	67.	110.	0.055	52.21	2.291s
CO-60	2664.19	1331.67	12.	89.	0.045	37.84	1.840
K-40	2921.21	1460.10	9.	611.	0.305	12.41	1.900
BI-214	3528.78	1763.67	5.	30.	0.015	66.62	2.386

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	Peak Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-2.4176E-01					
			477.56	-2.418E-01	%(	1.283E+00 3.85E-01	G
K-40		1.3170E+01					
			1460.75	1.317E+01	(P	3.611E-01 5.46E-01	G
MN-54		1.5951E-02					
			834.81	1.595E-02	%(P	3.854E-02 1.15E-02	G
CO-57		-3.2614E-03					
			122.07	-3.261E-03	&(	9.973E-02 3.00E-02	G K
			136.43	-3.482E-01	%	8.249E-01 2.50E-01	G
CO-60		1.9972E-01					
			1332.51	1.903E-01	(P	3.953E-02 2.40E-02	G K
			1173.23	2.091E-01	(P	7.811E-02 3.64E-02	G K
Sr-85		-4.0137E-02					
			514.00	-4.014E-02	%(	1.108E-01 3.34E-02	G
Kr-85		-9.4360E+02					
			513.99	-9.436E+02	%(P	2.538E+03 7.65E+02	G
Y-88		-3.6368E-03					
			1836.01	-3.637E-03	%(	4.004E-02 1.03E-02	G K
			898.02	-1.437E-02	% P	5.909E-02 1.73E-02	G
NB-94		-6.1572E-03					
			871.10	-6.157E-03	%(P	4.868E-02 1.39E-02	G K
			702.50	-1.101E-02	% P	4.433E-02 1.30E-02	G K
Ag-108M		-8.6648E-03					
			722.95	-8.665E-03	&(	5.579E-02 1.62E-02	G K
			614.37	-2.882E-02	% P	8.787E-02 2.63E-02	G
			433.93	2.805E-02	%	1.494E-01 4.49E-02	G
CD-109		-8.1390E-01					
			88.04	-8.139E-01	%(P	2.530E+00 7.65E-01	G
SN-113		2.7329E-02					
			391.71	2.733E-02	&(	1.567E-01 4.70E-02	G K
			255.04	1.187E+00	% P	4.340E+00 1.31E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.2708E-02						
		427.95	1.271E-02	&(P	4.385E-01	1.31E-01	G K
		600.77	1.325E-03	& P	4.745E-01	1.39E-01	G
		636.15	1.064E-01	% P	7.166E-01	2.12E-01	G
		463.51	-3.783E-01	% P	1.446E+00	4.35E-01	G
		176.29	-1.040E-01	& P	1.354E+00	4.07E-01	G
I-131	-6.7202E-03						
		364.48	-6.720E-03	%(	1.337E-01	3.99E-02	G K
		636.97	1.511E-01	&	1.122E+00	3.31E-01	G
		284.29	-3.226E-01	%	1.591E+00	4.79E-01	G
CS-134	3.5827E-02						
		604.66	2.193E-02	%(P	6.861E-02	2.05E-02	G K
		795.76	5.171E-02	*(P	4.535E-02	1.54E-02	G
		569.29	2.393E-01	% P	5.602E-01	1.69E-01	G
		801.84	9.802E-02	&	4.630E-01	1.34E-01	G
CS-137	1.9611E+01						
		661.62	1.961E+01	(P	9.554E-02	1.66E-01	G
CE-139	1.2552E-02						
		165.85	1.255E-02	&(P	9.304E-02	2.80E-02	G
EU-152	-2.0292E-03						
		121.78	-2.029E-03	&(P	2.845E-01	8.54E-02	G K
		344.30	-9.140E-02	% P	3.777E-01	1.14E-01	G
		1408.08	3.745E-02	% P	1.628E-01	4.51E-02	G
		964.00	-2.217E-03	& P	4.707E-01	1.34E-01	G
		1112.07	6.900E-03	& P	4.366E-01	1.22E-01	G
		778.90	-4.448E-02	& P	3.891E-01	1.12E-01	G
EU-154	-5.7974E-03						
		123.10	-5.797E-03	&(P	1.930E-01	5.79E-02	G K
		1274.80	3.157E-02	% P	1.374E-01	3.93E-02	G
		723.30	-6.097E-02	& P	2.714E-01	7.94E-02	G
		1004.80	-5.882E-04	& P	3.670E-01	1.04E-01	G
EU-155	1.4308E-01						
		86.45	1.431E-01	%(	2.855E-01	8.66E-02	G K
		105.31	2.404E-03	%	3.865E-01	1.16E-01	G
HG-203	-2.8893E-02						
		279.17	-2.889E-02	&(	1.165E-01	3.51E-02	G K
		72.87	-4.487E-01	& P	1.815E+00	5.48E-01	G
		70.83	-1.067E+00	%	3.325E+00	1.01E+00	G
		82.50	-3.780E-01	%	4.273E+00	1.29E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5591E-01						
		583.14	2.559E-01	(P	9.736E-02	3.34E-02	G
		510.72	3.034E-01	% P	4.738E-01	1.44E-01	G
PB-212	7.3862E-01						
							Energy duplication
		238.63	7.386E-01	(P	2.181E-01	7.08E-02	G K
							Energy duplication
		77.11	5.983E-01	-	5.671E-01	1.74E-01	G
		74.81	1.026E+00	+ P	1.094E+00	3.35E-01	G
PB-214	3.7397E-01						
		351.99	3.389E-01	(P	2.684E-01	8.35E-02	G K
		295.22	4.418E-01	*(P	4.745E-01	1.46E-01	G
							Energy duplication
		77.11	9.649E-01	+ P	9.280E-01	2.85E-01	G
		241.92	-1.006E+00	- P	1.298E+00	3.96E-01	G
BI-212	7.0722E-01						
		727.17	7.072E-01	(P	3.771E-01	1.53E-01	G K
		1620.56	4.125E-01	%	1.338E+00	3.84E-01	G
		785.42	-8.105E-01	% P	2.800E+00	8.26E-01	G
BI-214	4.4639E-01						
		609.32	3.874E-01	(P	1.693E-01	6.47E-02	G K
		1764.51	5.148E-01	(P	2.263E-01	1.16E-01	G
		1120.28	5.548E-01	@(P	3.748E-01	1.47E-01	G
RA-224	-6.5822E-03						
		241.00	-6.582E-03	&(P	1.967E+00	5.88E-01	G
RA-226	1.5396E+00						
		185.99	1.540E+00	%(	2.725E+00	8.28E-01	G
AC-228	7.4626E-01						
		911.07	6.955E-01	(P	1.909E-01	8.87E-02	G K
		968.90	8.424E-01	(P	3.061E-01	1.36E-01	G
		338.40	7.290E-01	*(P	6.950E-01	2.25E-01	G
TH-227	-4.6307E-01						
		236.00	-4.631E-01	%(P	9.356E-01	2.84E-01	G K
		256.25	-8.158E-02	% P	1.334E+00	4.00E-01	G
PA-234	-5.9881E-02						
		98.44	-5.988E-02	%(	3.400E-01	1.02E-01	G K
		946.00	-5.122E-02	&	2.651E-01	7.66E-02	G
		131.28	5.887E-03	%	4.207E-01	1.26E-01	G
		94.67	1.157E-01	%	5.257E-01	1.59E-01	G
		883.24	3.413E-04	%	4.285E-01	1.20E-01	G
		926.70	5.159E-03	&	3.660E-01	9.99E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 3.591E-01 %   8.299E-01 2.51E-01 G

TH-234       7.8428E-01
                           63.29 7.843E-01 %(P 3.627E+00 1.09E+00 G K
                           92.80 6.571E-01 % P 2.998E+00 9.04E-01 G
                           92.38 5.569E-01 % P 3.517E+00 1.06E+00 G

AM-241      -6.7449E-02
                           59.54-6.745E-02 %(P 4.700E-01 1.41E-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:                      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 - 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 *****

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	-2.3934E-01	-2.4176E-01	1.1556E+00	1.1557E+00	1.270E+00
K-40		1.3170E+01	1.3170E+01	1.6401E+00	1.8010E+00	
MN-54	#A	1.5923E-02	1.5951E-02	3.4557E-02	3.4569E-02	3.848E-02
CO-57	#B	-3.2549E-03	-3.2614E-03	8.9935E-02	8.9935E-02	9.953E-02
CO-60		1.9966E-01	1.9972E-01	6.4470E-02	6.5451E-02	

Sr-85	#A	-3.9807E-02	-4.0137E-02	1.0024E-01	1.0026E-01	1.098E-01
Kr-85	#A	-9.4360E+02	-9.4360E+02	2.4180E+03	2.4186E+03	2.538E+03
Y-88	#B	-3.6185E-03	-3.6368E-03	3.0926E-02	3.0927E-02	3.984E-02
NB-94	#B	-6.1572E-03	-6.1572E-03	4.4324E-02	4.4326E-02	4.868E-02
Ag-108M	#B	-8.6647E-03	-8.6648E-03	4.8525E-02	4.8528E-02	5.579E-02
CD-109	#A	-8.1294E-01	-8.1390E-01	2.3202E+00	2.3207E+00	2.527E+00
SN-113	#B	2.7202E-02	2.7329E-02	1.4090E-01	1.4091E-01	1.559E-01
SB-125	#B	1.2701E-02	1.2708E-02	3.9326E-01	3.9326E-01	4.382E-01
I-131	#B	-6.2872E-03	-6.7202E-03	1.1981E-01	1.1981E-01	1.250E-01
CS-134	#B	3.5801E-02	3.5827E-02	3.1941E-02	3.2005E-02	6.856E-02
CS-137		1.9610E+01	1.9611E+01	4.9925E-01	1.2153E+00	
CE-139	#A	1.2503E-02	1.2552E-02	8.3926E-02	8.3929E-02	9.267E-02
EU-152	#B	-2.0290E-03	-2.0292E-03	6.3388E-01	6.3388E-01	2.844E-01
EU-154	#B	-5.7964E-03	-5.7974E-03	2.2345E-01	2.2345E-01	1.930E-01
EU-155	#B	1.4304E-01	1.4308E-01	2.5993E-01	2.6005E-01	2.854E-01
HG-203	#B	-2.8563E-02	-2.8893E-02	1.0533E-01	1.0535E-01	1.152E-01
TL-208	#	2.5591E-01	2.5591E-01	1.0019E-01	1.0123E-01	9.736E-02
PB-212	#	7.3862E-01	7.3862E-01	2.1236E-01	2.1643E-01	2.181E-01
PB-214	#	3.7397E-01	3.7397E-01	2.3114E-01	2.3211E-01	2.684E-01
BI-212	#	7.0722E-01	7.0722E-01	4.6036E-01	4.6209E-01	
BI-214		4.4639E-01	4.4639E-01	1.7243E-01	1.7427E-01	
RA-224	#A	-6.5822E-03	-6.5822E-03	1.7514E+01	1.7514E+01	1.967E+00
RA-226	#A	1.5396E+00	1.5396E+00	2.4847E+00	2.4862E+00	2.725E+00
AC-228		7.4626E-01	7.4626E-01	2.7688E-01	2.8008E-01	
TH-227	#B	-4.6307E-01	-4.6307E-01	8.5786E-01	8.5826E-01	9.356E-01
PA-234	#B	-5.9881E-02	-5.9881E-02	3.0741E-01	3.0743E-01	3.400E-01
TH-234	#B	7.8428E-01	7.8428E-01	3.2779E+00	3.2782E+00	3.627E+00
AM-241	#A	-6.7448E-02	-6.7449E-02	4.4907E-01	4.4909E-01	4.700E-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 (270.1 to 1999.1 keV) 3.4879253E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 3.4880264E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_13JUN2006_1621.An1

Sample description
FSS-NOL-05-01-028-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_13JUN2006_1621.An1

Acquisition information
Start time: 13-Jun-2006 16:21:33
Live time: 2000
Real time: 2003
Dead time: 0.15 %
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/channel^2

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: 1.7470E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7470E+03) =
5.7241E+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	08-Jun-2006 11:34:00
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: 0.1747

***** 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
77.05	305.	18.05	1.50	1.720E-02	77.11	10.700	1.281E+00	PB214
					77.11	17.500	7.835E-01	PB212
77.05	309.	18.05	1.50	1.720E-02	77.11	10.700	1.281E+00	PB214
					77.11	17.500	7.931E-01	PB212
92.97	181.	31.99	1.02	1.991E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
238.67	736.	7.89	1.01	1.557E-02	238.63	43.100	8.409E-01	PB212
270.20	77.	38.20	1.24	1.401E-02				
295.12	205.	17.57	1.54	1.292E-02				
295.12	205.	17.57	1.54	1.292E-02	295.22	19.200	6.337E-01	PB214
338.13	150.	26.76	1.12	1.136E-02				
338.13	150.	26.76	1.12	1.136E-02	338.40	12.010	8.377E-01	AC228
351.88	235.	18.85	1.42	1.093E-02				
351.88	235.	18.85	1.42	1.093E-02	351.99	37.100	4.447E-01	PB214
510.57	90.	31.00	1.99	7.593E-03				
510.57	90.	31.00	1.99	7.593E-03	510.72	22.500	PBC<MDA	TL208
583.01	202.	11.32	1.37	6.686E-03				
583.01	202.	11.32	1.37	6.686E-03	583.14	86.000	2.686E-01	TL208
608.88	164.	12.75	1.38	6.417E-03	609.32	46.090	4.258E-01	BI214
661.52	5262.	1.42	1.42	5.938E-03	661.62	84.620	8.103E+00	CS137
727.28	53.	22.76	1.24	5.442E-03	727.17	11.800	6.253E-01	BI212
911.25	116.	12.83	1.39	4.446E-03	911.07	29.000	6.847E-01	AC228
967.87	114.	14.77	2.08	4.216E-03				
967.87	114.	14.77	2.08	4.216E-03	968.90	17.460	1.194E+00	AC228
1119.94	65.	21.50	0.83	3.712E-03	1120.28	15.040	8.942E-01	BI214
1172.39	54.	20.58	1.72	3.565E-03	1173.23	99.860	1.183E-01	CO60
1332.86	59.	14.97	1.35	3.190E-03	1332.51	99.980	1.427E-01	CO60

1460.49	530.	4.42	2.02	2.943E-03	1460.75	10.700	1.296E+01	K40
1764.14	26.	19.61	1.37	2.481E-03	1764.51	15.920	5.005E-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
477.03	238.67	1503.	143.	0.071	117.91	1.014	PB-212
540.12	270.20	394.	77.	0.038	114.59	1.244	AC-228
1936.15	967.87	113.	46.	0.023	107.07	2.077	SB-124 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-214	153.79	77.11	1401.	305.	0.152	54.15	1.499D
PB-212	153.79	77.11	1398.	309.	0.154	54.15	1.499D
TH-234	185.72	93.07	1526.	151.	0.076	104.44	1.499s
TH-234	185.71	93.06	1488.	159.	0.079	101.73	1.499s
PB-212	477.06	238.68	912.	584.	0.292	24.92	1.499
PB-214	590.17	295.21	595.	181.	0.090	60.86	1.499s
AC-228	676.28	338.25	519.	109.	0.054	91.38	1.499s
PB-214	703.64	351.92	491.	228.	0.114	45.37	1.499s
TL-208	1166.29	583.14	137.	178.	0.089	35.19	1.499s
BI-214	1217.80	608.88	98.	163.	0.081	38.24	1.376
CS-137	1323.13	661.52	100.	5261.	2.631	4.25	1.425
BI-212	1454.71	727.28	33.	52.	0.026	68.28	1.245s
AC-228	1822.39	911.02	31.	94.	0.047	38.65	1.578
AC-228	1937.76	968.67	56.	70.	0.035	57.27	1.616s
BI-214	2240.46	1119.94	35.	65.	0.032	64.51	0.830s
CO-60	2345.43	1172.39	29.	54.	0.027	61.73	1.718s
CO-60	2666.57	1332.86	5.	59.	0.029	44.92	1.349s
K-40	2921.99	1460.49	9.	527.	0.264	13.27	2.016
BI-214	3529.71	1764.14	0.	26.	0.013	58.83	1.374s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.0696E-01					
			477.56	-1.070E-01	&(	1.038E+00 3.08E-01	G
K-40		1.2958E+01					
			1460.75	1.296E+01	(P	4.019E-01 5.76E-01	G
MN-54		2.4430E-02					
			834.81	2.443E-02	%(P	4.317E-02 1.33E-02	G
CO-57		1.0680E-02					
			122.07	1.068E-02	%(	7.281E-02 2.18E-02	G K
			136.43	-1.015E-01	&	6.314E-01 1.90E-01	G
CO-60		1.3050E-01					
			1332.51	1.427E-01	*(P	3.262E-02 2.14E-02	G K
			1173.23	1.183E-01	(P	6.020E-02 2.44E-02	G K
Sr-85		-3.3959E-02					
			514.00	-3.396E-02	&(	9.623E-02 2.90E-02	G
Kr-85		-7.7009E+02					
			513.99	-7.701E+02	&(P	2.105E+03 6.32E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	2.482E-02 3.37E-03	G K
			898.02	1.388E-02	% P	4.448E-02 1.30E-02	G
NB-94		1.5804E-03					
			871.10	1.580E-03	%(P	4.109E-02 1.12E-02	G K
			702.50	3.917E-03	% P	5.336E-02 1.52E-02	G K
Ag-108M		-1.8649E-02					
			722.95	-1.865E-02	%(	6.590E-02 1.95E-02	G K
			614.37	1.631E-02	& P	6.645E-02 1.96E-02	G
			433.93	2.250E-02	%	1.041E-01 3.11E-02	G
CD-109		-3.0976E-01					
			88.04	-3.098E-01	%(P	1.805E+00 5.42E-01	G
SN-113		-2.8883E-03					
			391.71	-2.888E-03	&(	1.344E-01 3.98E-02	G K
			255.04	-7.086E-02	% P	3.490E+00 1.04E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	3.7649E-03						
		427.95	3.765E-03	&(P	3.198E-01	9.47E-02	G K
		600.77	6.167E-02	& P	3.192E-01	9.36E-02	G
		636.15	5.582E-02	& P	5.228E-01	1.51E-01	G
		463.51	1.915E-01	% P	9.765E-01	2.92E-01	G
		176.29	2.948E-01	% P	1.023E+00	3.08E-01	G
I-131	-9.5927E-03						
		364.48	-9.593E-03	%(	1.506E-01	4.47E-02	G K
		636.97	2.385E-01	&	1.159E+00	3.39E-01	G
		284.29	-5.469E-01	%	1.877E+00	5.65E-01	G
CS-134	-1.3576E-02						
		604.66	-1.358E-02	%(P	6.937E-02	2.04E-02	G K
		795.76	1.191E-02	% P	6.062E-02	1.75E-02	G
		569.29	-1.935E-02	& P	4.602E-01	1.34E-01	G
		801.84	1.143E-02	&	4.589E-01	1.25E-01	G
CS-137	8.1029E+00						
		661.62	8.103E+00	(P	7.583E-02	1.15E-01	G
CE-139	-3.9428E-03						
		165.85	-3.943E-03	&(P	6.949E-02	2.07E-02	G
EU-152	2.6815E-02						
		121.78	2.682E-02	%(P	2.173E-01	6.52E-02	G K
		344.30	-1.583E-02	& P	2.910E-01	8.63E-02	G
		1408.08	3.633E-02	% P	2.107E-01	5.77E-02	G
		964.00	-3.939E-02	% P	5.632E-01	1.61E-01	G
		1112.07	-6.174E-02	% P	4.692E-01	1.33E-01	G
		778.90	-3.497E-02	% P	3.418E-01	9.61E-02	G
EU-154	-2.1265E-04						
		123.10	-2.126E-04	%(P	1.651E-01	4.93E-02	G K
		1274.80	-3.223E-02	% P	1.993E-01	5.70E-02	G
		723.30	-8.820E-02	% P	3.108E-01	9.16E-02	G
		1004.80	-9.079E-03	% P	2.880E-01	7.90E-02	G
EU-155	1.3954E-01						
		86.45	1.395E-01	%(	2.351E-01	7.16E-02	G K
		105.31	6.842E-02	&	2.984E-01	8.98E-02	G
HG-203	7.2068E-03						
		279.17	7.207E-03	%(	9.580E-02	2.85E-02	G K
		72.87	-3.593E-01	% P	1.602E+00	4.82E-01	G
		70.83	-2.909E-01	%	2.870E+00	8.61E-01	G
		82.50	-6.896E-01	%	3.146E+00	9.46E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.3997E-01						
		583.14	2.400E-01	*(P	7.695E-02	2.85E-02	G
		510.72	2.337E-01	% P	3.670E-01	1.11E-01	G
PB-212	7.0755E-01						
		238.63	6.728E-01	(P	1.653E-01	5.65E-02	G K
							Energy duplication
		77.11	7.931E-01	(	4.546E-01	1.43E-01	G
		74.81	4.738E-01	% P	9.355E-01	2.84E-01	G
PB-214	4.7863E-01						
		351.99	4.349E-01	@(P	2.023E-01	6.63E-02	G K
		295.22	5.631E-01	*(P	3.629E-01	1.15E-01	G
							Energy duplication
		77.11	1.281E+00	+ P	7.445E-01	2.34E-01	G
		241.92	-1.814E-01	% P	1.024E+00	3.07E-01	G
BI-212	6.2534E-01						
		727.17	6.253E-01	@(P	3.554E-01	1.44E-01	G K
		1620.56	4.239E-03	%	1.553E+00	3.86E-01	G
		785.42	-1.997E-01	% P	2.085E+00	5.80E-01	G
BI-214	4.4498E-01						
		609.32	4.258E-01	(P	1.280E-01	5.46E-02	G K
		1764.51	5.005E-01	(P	1.443E-01	9.98E-02	G
		1120.28	8.942E-01	+ P	4.223E-01	1.93E-01	G
RA-224	3.0463E-02						
		241.00	3.046E-02	&(P	2.075E+00	6.19E-01	G
RA-226	1.0245E+00						
		185.99	1.024E+00	%(	2.094E+00	6.35E-01	G
AC-228	6.2732E-01						
		911.07	5.658E-01	(P	1.708E-01	7.43E-02	G K
		968.90	7.359E-01	(P	3.966E-01	1.42E-01	G
		338.40	6.179E-01	@(P	6.179E-01	1.92E-01	G
TH-227	-3.4353E-01						
		236.00	-3.435E-01	%(P	6.723E-01	2.04E-01	G K
		256.25	-2.077E-01	% P	1.042E+00	3.12E-01	G
PA-234	1.0040E-02						
		98.44	1.004E-02	%(	2.740E-01	8.20E-02	G K
		946.00	5.183E-02	&	2.298E-01	6.60E-02	G
		131.28	2.272E-03	&	3.266E-01	9.76E-02	G
		94.67	-1.565E-01	%	4.642E-01	1.40E-01	G
		883.24	8.387E-02	&	3.510E-01	1.01E-01	G
		926.70	9.226E-03	&	4.793E-01	1.33E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-2.723E-02 &   6.501E-01 1.89E-01 G

TH-234       1.7282E+00
                           63.29 1.101E+00 %(P 2.982E+00 9.00E-01 G K
                           92.80 2.058E+00 *(P 2.365E+00 7.25E-01 G
                           92.38 2.296E+00 *(P 2.801E+00 8.57E-01 G

AM-241      -2.2144E-03
                           59.54-2.214E-03 &(P 4.283E-01 1.28E-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:                      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 - 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 *****

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	-9.9979E-02	-1.0696E-01	9.2549E-01	9.2551E-01	9.700E-01
K-40		1.2958E+01	1.2958E+01	1.7273E+00	1.8761E+00	
MN-54	#A	2.4149E-02	2.4430E-02	3.9915E-02	3.9939E-02	4.268E-02
CO-57	#B	1.0539E-02	1.0680E-02	6.5536E-02	6.5539E-02	7.184E-02
CO-60	#	1.3025E-01	1.3050E-01	4.9928E-02	5.0469E-02	

Sr-85	#A	-3.2123E-02	-3.3959E-02	8.6859E-02	8.6880E-02	9.103E-02
Kr-85	#A	-7.7006E+02	-7.7009E+02	2.0404E+03	2.0408E+03	2.105E+03
Y-88	#B	0.0000E+00	0.0000E+00	1.0102E-02	1.0104E-02	2.399E-02
NB-94	#B	1.5804E-03	1.5804E-03	3.3587E-02	3.3587E-02	4.109E-02
Ag-108M	#B	-1.8648E-02	-1.8649E-02	5.8434E-02	5.8444E-02	6.590E-02
CD-109	#A	-3.0730E-01	-3.0976E-01	1.6789E+00	1.6790E+00	1.791E+00
SN-113	#B	-2.7992E-03	-2.8883E-03	1.1940E-01	1.1940E-01	1.303E-01
SB-125	#B	3.7515E-03	3.7649E-03	2.8413E-01	2.8413E-01	3.187E-01
I-131	#B	-6.1271E-03	-9.5927E-03	1.3404E-01	1.3404E-01	9.616E-02
CS-134	#B	-1.3512E-02	-1.3576E-02	6.8421E-02	6.8425E-02	6.904E-02
CS-137		8.1002E+00	8.1029E+00	3.4416E-01	5.7277E-01	
CE-139	#A	-3.8408E-03	-3.9428E-03	6.7569E-02	6.7569E-02	6.769E-02
EU-152	#B	2.6795E-02	2.6815E-02	1.9552E-01	1.9553E-01	2.172E-01
EU-154	#B	-2.1240E-04	-2.1265E-04	2.5063E-01	2.5063E-01	1.649E-01
EU-155	#B	1.3927E-01	1.3954E-01	2.1468E-01	2.1482E-01	2.347E-01
HG-203	#B	6.6703E-03	7.2068E-03	8.5642E-02	8.5643E-02	8.866E-02
TL-208	#	2.3997E-01	2.3997E-01	8.5566E-02	8.6634E-02	7.695E-02
PB-212	#	7.0755E-01	7.0755E-01	1.7817E-01	1.8260E-01	1.653E-01
PB-214	#	4.7863E-01	4.7863E-01	1.8338E-01	1.8536E-01	2.023E-01
BI-212	#	6.2534E-01	6.2534E-01	4.3255E-01	4.3399E-01	
BI-214		4.4498E-01	4.4498E-01	1.5832E-01	1.6030E-01	
RA-224	#A	3.0463E-02	3.0463E-02	1.8580E+00	1.8580E+00	2.075E+00
RA-226	#A	1.0245E+00	1.0245E+00	1.9063E+00	1.9072E+00	2.094E+00
AC-228	#	6.2732E-01	6.2732E-01	2.4377E-01	2.4634E-01	1.708E-01
TH-227	#B	-3.4353E-01	-3.4353E-01	6.1912E-01	6.1942E-01	6.723E-01
PA-234	#B	1.0040E-02	1.0040E-02	2.4600E-01	2.4600E-01	2.740E-01
TH-234	#B	1.7282E+00	1.7282E+00	1.6683E+00	1.6710E+00	2.982E+00
AM-241	#A	-2.2143E-03	-2.2144E-03	6.8138E-01	6.8138E-01	4.283E-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) 2.2258760E+01 pCi/gm
Total Decayed Activity (50.2 to 1999.1 keV) 2.2261662E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_13JUN2006_1701.An1

Sample description
FSS-NOL-05-01-027-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_13JUN2006_1701.An1

Acquisition information
Start time: 13-Jun-2006 17:01:16
Live time: 2000
Real time: 2002
Dead time: 0.10 %
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/channel^2

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: 1.8900E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8900E+03) =
5.2910E+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	08-Jun-2006 09:50:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1329

***** 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
74.75	196.	25.38	1.50	1.654E-02	70.83	3.520	2.843E+00	HG203
					74.81	9.600	8.810E-01	PB212
76.97	253.	19.64	1.50	1.720E-02	77.11	10.700	9.823E-01	PB214
					77.11	17.500	PBC<MDA	PB212
76.97	257.	19.64	1.50	1.720E-02	77.11	10.700	9.823E-01	PB214
					77.11	17.500	6.095E-01	PB212
87.23	139.	21.74	1.01	1.925E-02				
89.92	90.	33.97	1.02	1.960E-02				
93.38	152.	20.52	1.02	1.998E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.04	131.	22.86	1.41	1.858E-02	185.99	3.280	1.536E+00	RA226
209.34	110.	30.54	1.35	1.721E-02				
238.72	772.	4.39	1.12	1.557E-02	238.63	43.100	8.160E-01	PB212
241.71	146.	17.39	1.12	1.541E-02	241.00	3.900	1.726E+00	RA224
					241.92	7.470	9.042E-01	PB214
270.34	97.	23.28	0.96	1.400E-02				
295.22	164.	19.18	1.11	1.292E-02	295.22	19.200	4.664E-01	PB214
338.42	136.	19.50	1.05	1.135E-02	338.40	12.010	7.030E-01	AC228
351.85	307.	11.01	1.26	1.093E-02				
351.85	307.	11.01	1.26	1.093E-02	351.99	37.100	5.384E-01	PB214
510.28	83.	26.08	1.18	7.597E-03	510.72	22.500	2.804E-01	TL208
583.16	243.	9.56	1.30	6.684E-03	583.14	86.000	2.988E-01	TL208
609.24	202.	8.85	1.22	6.413E-03	609.32	46.090	4.860E-01	BI214
661.53	801.	4.31	1.27	5.938E-03	661.62	84.620	1.139E+00	CS137
727.13	29.	41.37	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
794.93	34.	30.55	0.97	5.021E-03				
794.93	34.	30.55	0.97	5.021E-03	795.76	85.400	5.549E-02	CS134

911.36	151.	12.10	1.40	4.445E-03	911.07	29.000	8.258E-01	AC228
964.35	43.	21.23	1.61	4.230E-03	964.00	14.580	PBC<MDA	EU152
968.82	86.	13.15	1.62	4.213E-03	968.90	17.460	8.292E-01	AC228
1120.12	40.	36.06	0.89	3.711E-03	1120.28	15.040	5.075E-01	BI214
1460.47	655.	4.12	2.14	2.943E-03	1460.75	10.700	1.483E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.42	36.	16.67	1.21	2.481E-03	1764.51	15.920	6.437E-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	
174.04	87.53	387.	139.	0.069	65.23	1.014	PB-214	lD
418.36	209.34	404.	110.	0.055	91.62	1.354	AC-228	s
477.15	238.66	194.	767.	0.383	13.30	1.122	PB-212	D
540.40	270.34	181.	97.	0.049	69.83	0.961	AC-228	s
1928.79	964.24	24.	39.	0.020	70.68	1.613	EU-152	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	149.06	74.75	1204.	196.	0.098	76.13	1.499s
PB-214	153.79	77.11	1145.	253.	0.126	58.91	1.499D
PB-212	153.79	77.11	1141.	257.	0.128	58.91	1.499D
CD-109	182.55	91.49	1050.	-167.	-0.084	85.75	1.499
TH-234	185.80	93.11	1038.	176.	0.088	76.15	1.499s
TH-234	185.78	93.10	986.	190.	0.095	71.09	1.499s
RA-226	371.62	185.98	575.	137.	0.069	78.28	1.499s
PB-212	477.10	238.70	556.	626.	0.313	19.74	1.499
RA-224	481.70	241.00	492.	112.	0.056	88.03	1.123D
PB-214	590.19	295.22	276.	157.	0.078	50.32	1.499D
AC-228	676.63	338.42	213.	134.	0.067	58.50	1.049
PB-214	703.56	351.88	210.	268.	0.134	29.11	1.499s
TL-208	1020.51	510.28	149.	67.	0.033	78.25	1.180s
TL-208	1166.33	583.16	95.	240.	0.120	28.69	1.302s
BI-214	1218.52	609.24	50.	201.	0.100	26.55	1.219
CS-137	1323.15	661.53	110.	800.	0.400	12.94	1.274
CS-134	1590.04	794.91	23.	26.	0.013	94.81	1.502s
AC-228	1823.08	911.36	57.	149.	0.074	36.30	1.403
AC-228	1938.21	968.90	25.	80.	0.040	42.09	1.616D
BI-214	2240.82	1120.12	56.	40.	0.020	108.17	0.887s
K-40	2921.96	1460.47	22.	653.	0.327	12.37	2.137
BI-214	3530.28	1764.42	0.	36.	0.018	50.00	1.207s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		5.2347E-03					
			477.56	5.235E-03	&(	4.938E-01 1.42E-01	G
K-40		1.4832E+01					
			1460.75	1.483E+01	(P	5.566E-01 6.13E-01	G
MN-54		-1.2136E-02					
			834.81	-1.214E-02	%(P	4.832E-02 1.40E-02	G
CO-57		9.0987E-03					
			122.07	9.099E-03	%(	4.918E-02 1.47E-02	G K
			136.43	1.053E-01	%	4.452E-01 1.34E-01	G
CO-60		1.8221E-02					
			1332.51	1.822E-02	&(P	5.298E-02 1.56E-02	G K
			1173.23	1.500E-02	& P	6.055E-02 1.76E-02	G K
Sr-85		-2.7989E-02					
			514.00	-2.799E-02	%(	6.674E-02 2.01E-02	G
Kr-85		-6.3671E+02					
			513.99	-6.367E+02	%(P	1.460E+03 4.39E+02	G
Y-88		1.0471E-04					
			1836.01	1.047E-04	%(	3.323E-02 7.54E-03	G K
			898.02	1.637E-03	% P	6.152E-02 1.73E-02	G
NB-94		5.2729E-03					
			871.10	5.273E-03	%(P	4.661E-02 1.32E-02	G K
			702.50	1.173E-02	& P	4.435E-02 1.30E-02	G K
Ag-108M		-5.3498E-03					
			722.95	-5.350E-03	%(	5.461E-02 1.56E-02	G K
			614.37	4.396E-04	% P	5.919E-02 1.70E-02	G
			433.93	1.864E-03	&	4.449E-02 1.28E-02	G
CD-109		-1.6439E+00					
			88.04	-1.644E+00	(P	1.513E+00 4.69E-01	G
SN-113		7.7018E-03					
			391.71	7.702E-03	%(	7.985E-02 2.35E-02	G K
			255.04	-2.928E-01	% P	2.222E+00 6.60E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	3.8396E-02						
		427.95	3.840E-02	%(P	1.459E-01	4.32E-02	G K
		600.77	5.025E-03	& P	2.717E-01	7.77E-02	G
		636.15	-6.241E-03	% P	4.670E-01	1.33E-01	G
		463.51	3.005E-01	% P	5.265E-01	1.61E-01	G
		176.29	2.858E-01	& P	6.682E-01	2.02E-01	G
I-131	8.7416E-03						
		364.48	8.742E-03	&(	9.018E-02	2.65E-02	G K
		636.97	2.131E-01	%	9.969E-01	2.91E-01	G
		284.29	1.477E-01	&	1.175E+00	3.48E-01	G
CS-134	2.0246E-02						
		604.66	-7.047E-04	%(P	1.147E-01	3.39E-02	G K
		795.76	4.419E-02	(P	4.187E-02	1.42E-02	G
		569.29	-5.471E-02	% P	3.349E-01	9.76E-02	G
		801.84	1.924E-01	&	4.645E-01	1.39E-01	G
CS-137	1.1387E+00						
		661.62	1.139E+00	(P	7.346E-02	4.92E-02	G
CE-139	-6.6540E-03						
		165.85	-6.654E-03	%(P	5.886E-02	1.76E-02	G
EU-152	-3.4079E-04						
		121.78	-3.408E-04	&(P	1.631E-01	4.85E-02	G K
		344.30	-1.610E-02	% P	1.683E-01	4.94E-02	G
		1408.08	6.063E-02	% P	2.113E-01	6.06E-02	G
		964.00	-5.353E-03	% P	9.613E-01	2.82E-01	G
		1112.07	-1.734E-01	& P	5.933E-01	1.75E-01	G
		778.90	-3.765E-02	& P	3.625E-01	1.03E-01	G
EU-154	-1.0750E-02						
		123.10	-1.075E-02	%(P	1.201E-01	3.59E-02	G K
		1274.80	7.176E-03	% P	1.904E-01	5.32E-02	G
		723.30	-8.239E-03	& P	2.957E-01	8.43E-02	G
		1004.80	9.137E-03	% P	3.478E-01	9.78E-02	G
EU-155	1.0915E-02						
		86.45	1.092E-02	%(	1.569E-01	4.68E-02	G K
		105.31	7.130E-03	%	2.305E-01	6.87E-02	G
HG-203	-1.8881E-02						
		279.17	-1.888E-02	%(	6.618E-02	1.98E-02	G K
		72.87	-2.875E-01	% P	1.112E+00	3.34E-01	G
		70.83	-8.614E-02	%	2.092E+00	6.24E-01	G
		82.50	-3.052E-01	&	2.878E+00	8.61E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9497E-01						
		583.14	2.988E-01	*(P	5.980E-02	2.89E-02	G
		510.72	2.804E-01	*(P	2.495E-01	9.06E-02	G
PB-212	6.5058E-01						
		238.63	6.673E-01	(P	1.200E-01	4.43E-02	G K Energy duplication
		77.11	6.095E-01	(	3.803E-01	1.20E-01	G
		74.81	8.810E-01	+ P	7.404E-01	2.30E-01	G
PB-214	4.6573E-01						
		351.99	4.729E-01	@(P	1.240E-01	4.62E-02	G K Energy duplication
		295.22	4.519E-01	(P	2.310E-01	7.67E-02	G Energy duplication
		77.11	9.823E-01	+ P	6.230E-01	1.96E-01	G
		241.92	4.122E-01	% P	7.784E-01	2.37E-01	G
BI-212	3.1938E-01						
		727.17	3.194E-01	%(P	4.313E-01	1.35E-01	G K
		1620.56	8.100E-01	%	1.068E+00	3.72E-01	G
		785.42	6.046E-01	% P	1.993E+00	5.84E-01	G
BI-214	4.9129E-01						
		609.32	4.860E-01	(P	8.636E-02	4.32E-02	G K
		1764.51	6.437E-01	+ P	1.334E-01	1.09E-01	G
		1120.28	5.075E-01	(P	4.830E-01	1.85E-01	G
RA-224	1.3298E+00						
		241.00	1.330E+00	(P	1.259E+00	3.93E-01	G
RA-226	1.6128E+00						
		185.99	1.613E+00	@(	1.342E+00	4.21E-01	G
AC-228	7.8695E-01						
		911.07	8.258E-01	(P	2.102E-01	1.01E-01	G K
		968.90	7.802E-01	(P	2.517E-01	1.10E-01	G
		338.40	7.030E-01	(P	3.709E-01	1.39E-01	G
TH-227	-1.7616E-01						
		236.00	-1.762E-01	%(P	5.316E-01	1.60E-01	G K
		256.25	-1.557E-02	& P	5.294E-01	1.55E-01	G
PA-234	-2.7635E-02						
		98.44	-2.764E-02	%(	1.970E-01	5.90E-02	G K
		946.00	2.425E-02	%	2.997E-01	8.53E-02	G
		131.28	1.482E-02	%	2.457E-01	7.33E-02	G
		94.67	-1.203E-02	&	3.328E-01	9.92E-02	G
		883.24	-2.983E-02	%	3.780E-01	1.06E-01	G
		926.70	-2.075E-02	%	4.655E-01	1.30E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-7.631E-02 %   4.934E-01 1.44E-01 G

TH-234       1.6136E+00
                           63.29 5.469E-01 %(P 2.100E+00 6.29E-01 G K
                           92.80 2.273E+00  (P 1.786E+00 5.56E-01 G
                           92.38 2.462E+00 &(P 2.143E+00 6.64E-01 G

AM-241      -1.1508E-01
                           59.54-1.151E-01 &(P 3.298E-01 9.95E-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 - 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 *****

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	4.8867E-03	5.2347E-03	4.2744E-01	4.2744E-01	4.610E-01
K-40		1.4832E+01	1.4832E+01	1.8406E+00	2.0224E+00	
MN-54	#A	-1.1994E-02	-1.2136E-02	4.6555E-02	4.6560E-02	4.775E-02
CO-57	#B	8.9758E-03	9.0987E-03	4.4162E-02	4.4165E-02	4.852E-02
CO-60	#B	1.8187E-02	1.8221E-02	4.6765E-02	4.6776E-02	5.288E-02

Sr-85	#A	-2.6447E-02	-2.7989E-02	6.0418E-02	6.0439E-02	6.307E-02
Kr-85	#A	-6.3669E+02	-6.3671E+02	1.4300E+03	1.4304E+03	1.460E+03
Y-88	#B	1.0117E-04	1.0471E-04	2.2634E-02	2.2634E-02	3.210E-02
NB-94	#B	5.2729E-03	5.2729E-03	3.9522E-02	3.9523E-02	4.661E-02
Ag-108M	#B	-5.3494E-03	-5.3498E-03	4.6899E-02	4.6900E-02	5.460E-02
CD-109	#A	-1.6306E+00	-1.6439E+00	1.4136E+00	1.4165E+00	1.501E+00
SN-113	#B	7.4599E-03	7.7018E-03	7.0388E-02	7.0389E-02	7.734E-02
SB-125	#B	3.8257E-02	3.8396E-02	1.2972E-01	1.2974E-01	1.453E-01
I-131	#B	5.5357E-03	8.7416E-03	7.9505E-02	7.9507E-02	5.710E-02
CS-134	#B	2.0148E-02	2.0246E-02	1.9500E-02	1.9534E-02	1.142E-01
CS-137		1.1384E+00	1.1387E+00	1.4757E-01	1.6098E-01	
CE-139	#A	-6.4786E-03	-6.6540E-03	5.5157E-02	5.5158E-02	5.731E-02
EU-152	#B	-3.4052E-04	-3.4079E-04	3.2078E-01	3.2078E-01	1.630E-01
EU-154	#B	-1.0738E-02	-1.0750E-02	1.2406E-01	1.2406E-01	1.200E-01
EU-155	#B	1.0893E-02	1.0915E-02	1.4040E-01	1.4040E-01	1.566E-01
HG-203	#B	-1.7449E-02	-1.8881E-02	5.9537E-02	5.9547E-02	6.116E-02
TL-208	#	2.9497E-01	2.9497E-01	8.5464E-02	8.7074E-02	
PB-212	#	6.5058E-01	6.5058E-01	1.2971E-01	1.3482E-01	1.200E-01
PB-214	#	4.6573E-01	4.6573E-01	1.3656E-01	1.3907E-01	1.240E-01
BI-212	#B	3.1938E-01	3.1938E-01	4.0576E-01	4.0616E-01	4.313E-01
BI-214		4.9129E-01	4.9129E-01	1.3116E-01	1.3407E-01	
RA-224		1.3298E+00	1.3298E+00	1.1782E+00	1.1806E+00	
RA-226	#	1.6128E+00	1.6128E+00	1.2624E+00	1.2657E+00	1.342E+00
AC-228		7.8695E-01	7.8695E-01	2.1454E-01	2.1910E-01	
TH-227	#B	-1.7616E-01	-1.7616E-01	4.9027E-01	4.9037E-01	5.316E-01
PA-234	#B	-2.7635E-02	-2.7635E-02	1.7687E-01	1.7687E-01	1.970E-01
TH-234	#B	1.6136E+00	1.6136E+00	1.1844E+00	1.1878E+00	2.100E+00
AM-241	#A	-1.1507E-01	-1.1508E-01	3.0921E-01	3.0928E-01	3.298E-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 1999.1 keV) 1.8873579E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 1.8873959E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_13JUNE2006_1340.An1

Sample description
FSS-NOL-05-01-032-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_13JUNE2006_1340.An1

Acquisition information
Start time: 13-Jun-2006 13:42:49
Live time: 2000
Real time: 2002
Dead time: 0.11 %
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/channel^2

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	08-Jun-2006 13:20:00
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: 0.1022

***** 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
74.70	127.	37.37	1.50	1.654E-02	70.83	3.520	1.853E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.77	154.	23.68	1.01	1.738E-02	77.11	10.700	PBC<MDA	PB214
					77.11	17.500	3.674E-01	PB212
87.31	98.	32.07	1.01	1.926E-02	86.45	32.740	1.129E-01	EU155
					88.04	3.790	PBC<MDA	CD109
89.61	86.	34.96	1.02	1.956E-02				
93.12	118.	26.41	1.02	1.995E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.12	114.	34.39	0.99	1.858E-02	185.99	3.280	1.350E+00	RA226
238.74	690.	4.85	1.12	1.557E-02	238.63	43.100	7.321E-01	PB212
241.66	87.	28.58	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
270.25	86.	32.55	1.21	1.400E-02				
295.40	149.	13.57	1.16	1.291E-02	295.22	19.200	4.262E-01	PB214
299.87	46.	36.44	1.16	1.273E-02				
338.56	120.	22.10	1.26	1.134E-02	338.40	12.010	6.239E-01	AC228
351.92	270.	12.29	1.03	1.093E-02				
351.92	270.	12.29	1.03	1.093E-02	351.99	37.100	4.757E-01	PB214
462.98	47.	41.31	1.38	8.351E-03				
462.98	47.	41.31	1.38	8.351E-03	463.51	10.000	PBC<MDA	SB125
511.18	123.	17.35	1.53	7.584E-03	510.72	22.500	4.498E-01	TL208
583.01	239.	10.15	1.49	6.686E-03	583.14	86.000	2.959E-01	TL208
609.28	208.	12.42	1.30	6.413E-03	609.32	46.090	5.022E-01	BI214
661.54	1353.	3.07	1.33	5.938E-03	661.62	84.620	1.935E+00	CS137
726.89	55.	26.39	1.61	5.445E-03	727.17	11.800	6.057E-01	BI212
860.09	48.	35.61	1.54	4.679E-03				
910.97	171.	10.28	1.87	4.447E-03				

910.97	171.	10.28	1.87	4.447E-03	911.07	29.000	9.439E-01	AC228
968.12	141.	12.79	1.78	4.215E-03				
968.12	141.	12.79	1.78	4.215E-03	968.90	17.460	1.372E+00	AC228
1119.85	48.	21.68	1.05	3.711E-03	1120.28	15.040	6.223E-01	BI214
1173.41	55.	26.69	1.09	3.564E-03	1173.23	99.860	HL>Cutoff	CO60
1332.51	78.	14.44	1.61	3.190E-03	1332.51	99.980	HL>Cutoff	CO60
1460.49	619.	4.18	2.01	2.943E-03	1460.75	10.700	1.408E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1620.42	12.	36.44	2.02	2.682E-03	1620.56	2.750	1.202E+00	BI212
1764.43	27.	19.25	1.56	2.481E-03	1764.51	15.920	4.833E-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	
174.20	87.56	445.	98.	0.049	96.21	1.014	PB-214	lD
178.79	89.86	412.	86.	0.043	104.89	1.015	PB-214	lD
371.89	186.12	574.	114.	0.057	103.18	0.994	PA-234	l
477.17	238.70	216.	690.	0.345	14.56	1.122	PB-212	D
483.02	241.62	266.	87.	0.044	85.73	1.124	PB-214	D
540.23	270.25	279.	86.	0.043	97.64	1.210	AC-228	s
599.49	299.87	116.	46.	0.023	109.31	1.165	TH-227	lD
925.85	462.98	150.	47.	0.023	123.94	1.375	AC-228	l
1720.48	860.09	68.	48.	0.024	106.82	1.542	TL-208	
1936.66	968.12	109.	75.	0.037	68.73	1.777	SB-124	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	148.96	74.70	1167.	127.	0.064	112.12	1.499
PB-214	153.79	77.11	1061.	314.	0.157	46.56	1.499D
PB-212	153.79	77.11	1057.	318.	0.159	46.56	1.499D
TH-234	185.26	92.84	1127.	121.	0.061	110.44	1.499s
TH-234	185.26	92.84	1086.	129.	0.065	105.97	1.499s
PB-212	477.23	238.77	552.	546.	0.273	22.03	1.499
PB-214	590.56	295.41	310.	143.	0.072	57.05	1.499
AC-228	676.68	338.45	267.	108.	0.054	69.04	1.499
PB-214	703.75	351.98	221.	245.	0.123	31.75	1.499
TL-208	1022.30	511.18	123.	107.	0.053	52.06	1.528s
TL-208	1166.02	583.01	102.	237.	0.118	30.46	1.485s
CS-134	1214.11	607.04	200.	-57.	-0.028	114.45	1.499s
BI-214	1218.60	609.28	122.	206.	0.103	37.27	1.304
CS-137	1323.16	661.54	106.	1352.	0.676	9.20	1.334
BI-212	1453.93	726.89	54.	54.	0.027	79.16	1.607s
AC-228	1822.27	910.96	42.	138.	0.069	31.71	1.578
AC-228	1937.92	968.75	74.	66.	0.033	66.13	1.616s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2240.29	1119.85	28.	48.	0.024	65.04	1.052s
CO-60	2347.48	1173.41	55.	55.	0.027	80.07	1.090s
CO-60	2665.87	1332.51	14.	78.	0.039	43.31	1.608s
K-40	2922.00	1460.49	13.	617.	0.308	12.53	2.009
BI-212	3242.08	1620.42	4.	12.	0.006	109.33	2.021
BI-214	3530.30	1764.43	0.	27.	0.013	57.74	1.561

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm		COMMENTS
BE-7		2.3723E-01						
			477.56	2.372E-01	%(	5.652E-01	1.70E-01	G
K-40		1.4085E+01						
			1460.75	1.408E+01	(P	4.466E-01	5.90E-01	G
MN-54		-7.8976E-03						
			834.81	-7.898E-03	&(P	5.465E-02	1.56E-02	G
CO-57		-5.2346E-03						
			122.07	-5.235E-03	%(	6.014E-02	1.80E-02	G K
			136.43	9.144E-02	%	4.561E-01	1.37E-01	G
CO-60		1.7703E-01						
			1332.51	1.770E-01	*(P	4.490E-02	2.56E-02	G K
			1173.23	1.108E-01	- P	7.555E-02	2.96E-02	G K
Sr-85		-1.5140E-02						
			514.00	-1.514E-02	%(	6.390E-02	1.90E-02	G
Kr-85		-3.5736E+02						
			513.99	-3.574E+02	%(P	1.403E+03	4.15E+02	G
Y-88		-6.7923E-03						
			1836.01	-6.792E-03	&(	5.452E-02	1.47E-02	G K
			898.02	2.610E-04	& P	5.011E-02	1.38E-02	G
NB-94		-7.3130E-04						
			871.10	-7.313E-04	%(P	3.920E-02	1.06E-02	G K
			702.50	-9.968E-03	% P	5.225E-02	1.52E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-8.2791E-03						
		722.95	-8.279E-03	&(	6.118E-02	1.77E-02	G K
		614.37	2.151E-03	& P	5.187E-02	1.48E-02	G
		433.93	9.162E-03	%	5.164E-02	1.52E-02	G
CD-109	-3.8022E-02						
		88.04	-3.802E-02	&(P	1.589E+00	4.74E-01	G
SN-113	-3.6949E-03						
		391.71	-3.695E-03	&(	9.139E-02	2.68E-02	G K
		255.04	1.968E-01	& P	2.278E+00	6.75E-01	G
SB-125	2.1593E-02						
		427.95	2.159E-02	%(P	1.968E-01	5.80E-02	G K
		600.77	4.393E-02	& P	2.345E-01	6.81E-02	G
		636.15	-2.829E-03	& P	4.741E-01	1.35E-01	G
		463.51	3.566E-01	% P	5.898E-01	1.80E-01	G
		176.29	4.400E-02	% P	7.474E-01	2.22E-01	G
I-131	-3.2994E-02						
		364.48	-3.299E-02	%(	9.206E-02	2.77E-02	G K
		636.97	2.153E-01	&	9.883E-01	2.89E-01	G
		284.29	2.184E-01	%	1.227E+00	3.65E-01	G
CS-134	-6.4762E-02						
		604.66	-6.476E-02	(P	7.863E-02	2.44E-02	G K
		795.76	3.323E-02	% P	5.145E-02	1.60E-02	G
		569.29	-2.922E-03	% P	3.468E-01	9.94E-02	G
		801.84	-1.326E-01	&	5.384E-01	1.57E-01	G
CS-137	1.9350E+00						
		661.62	1.935E+00	(P	7.250E-02	5.94E-02	G
CE-139	-5.0460E-03						
		165.85	-5.046E-03	%(P	5.341E-02	1.59E-02	G
EU-152	-3.6310E-03						
		121.78	-3.631E-03	%(P	1.413E-01	4.19E-02	G K
		344.30	-1.287E-02	% P	1.839E-01	5.40E-02	G
		1408.08	6.745E-02	% P	1.864E-01	5.46E-02	G
		964.00	7.347E-03	% P	3.068E-01	8.37E-02	G
		1112.07	9.536E-04	& P	5.204E-01	1.46E-01	G
		778.90	-3.998E-02	% P	3.628E-01	1.03E-01	G
EU-154	-8.4695E-04						
		123.10	-8.469E-04	&(P	1.232E-01	3.67E-02	G K
		1274.80	-3.184E-02	& P	1.995E-01	5.72E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-2.561E-04	& P	2.902E-01	8.25E-02	G
		1004.80	1.971E-03	& P	2.615E-01	7.12E-02	G
EU-155	1.2163E-01						
		86.45	1.216E-01	&(	1.845E-01	5.63E-02	G K
		105.31	-1.691E-03	%	2.470E-01	7.37E-02	G
HG-203	-4.5498E-03						
		279.17	-4.550E-03	%(	6.119E-02	1.81E-02	G K
		72.87	-4.794E-01	% P	1.391E+00	4.20E-01	G
		70.83	-1.350E+00	%	2.338E+00	7.11E-01	G
		82.50	-2.999E-01	%	2.993E+00	8.96E-01	G
TL-208	2.9587E-01						
		583.14	2.959E-01	@(P	6.234E-02	3.03E-02	G
		510.72	4.498E-01	+ P	2.290E-01	8.98E-02	G
PB-212	5.8332E-01						
		238.63	5.848E-01	(P	1.202E-01	4.34E-02	G K
							Energy duplication
		77.11	7.586E-01	+	3.682E-01	1.18E-01	G
		74.81	5.765E-01	&(P	7.329E-01	2.24E-01	G
PB-214	4.2842E-01						
		351.99	4.351E-01	(P	1.276E-01	4.64E-02	G K
		295.22	4.155E-01	(P	2.457E-01	8.00E-02	G
							Energy duplication
		77.11	1.226E+00	+ P	6.032E-01	1.93E-01	G
		241.92	-4.537E-02	% P	6.316E-01	1.87E-01	G
BI-212	7.1845E-01						
		727.17	6.057E-01	@(P	4.131E-01	1.62E-01	G K
		1620.56	1.202E+00	?(	1.165E+00	4.38E-01	G
		785.42	1.400E+00	% P	2.099E+00	6.58E-01	G
BI-214	5.2174E-01						
		609.32	5.022E-01	(P	1.315E-01	6.27E-02	G K
		1764.51	4.833E-01	(P	1.341E-01	9.45E-02	G
		1120.28	6.223E-01	(P	3.507E-01	1.36E-01	G
RA-224	5.9124E-01						
		241.00	5.912E-01	%(P	1.495E+00	4.52E-01	G
RA-226	1.0486E+00						
		185.99	1.049E+00	%(	1.454E+00	4.46E-01	G
AC-228	7.2214E-01						
		911.07	7.711E-01	(P	1.826E-01	8.26E-02	G K
		968.90	6.408E-01	*(P	4.191E-01	1.43E-01	G
		338.40	5.680E-01	- P	4.159E-01	1.33E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227       1.7982E-02
                          236.00 1.798E-02 %(P 4.027E-01 1.19E-01 G K
                          256.25-3.003E-02 & P 7.154E-01 2.11E-01 G

PA-234      -3.4861E-02
                           98.44-3.486E-02 %(  2.076E-01 6.22E-02 G K
                          946.00 8.276E-02 &   2.538E-01 7.49E-02 G
                          131.28 9.974E-02 &   2.159E-01 6.54E-02 G
                           94.67-1.853E-01 &   3.786E-01 1.15E-01 G
                          883.24-8.047E-02 %   4.018E-01 1.16E-01 G
                          926.70 2.803E-03 %   5.194E-01 1.45E-01 G
                          569.26-7.000E-04 %   5.117E-01 1.47E-01 G

TH-234       1.1678E+00
                           63.29 5.107E-01 &(P 2.363E+00 7.08E-01 G K
                           92.80 1.559E+00  (P 1.882E+00 5.77E-01 G
                           92.38 1.708E+00  (P 2.243E+00 6.85E-01 G

AM-241      -9.6097E-02
                           59.54-9.610E-02 %(P 3.073E-01 9.25E-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 - 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	2.2228E-01	2.3723E-01	5.1146E-01	5.1164E-01	5.296E-01
K-40		1.4085E+01	1.4085E+01	1.7714E+00	1.9419E+00	
MN-54	#A	-7.8102E-03	-7.8976E-03	5.5066E-02	5.5068E-02	5.405E-02
CO-57	#B	-5.1676E-03	-5.2346E-03	5.3935E-02	5.3936E-02	5.937E-02
CO-60	#H	1.7671E-01	1.7703E-01	7.6762E-02	7.7411E-02	
Sr-85	#A	-1.4350E-02	-1.5140E-02	5.6902E-02	5.6909E-02	6.056E-02
Kr-85	#A	-3.5734E+02	-3.5736E+02	1.4410E+03	1.4412E+03	1.403E+03
Y-88	#B	-6.5744E-03	-6.7923E-03	4.4144E-02	4.4145E-02	5.277E-02
NB-94	#B	-7.3130E-04	-7.3130E-04	5.7083E-02	5.7083E-02	3.920E-02
Ag-108M	#B	-8.2784E-03	-8.2791E-03	5.3144E-02	5.3146E-02	6.117E-02
CD-109	#A	-3.7732E-02	-3.8022E-02	1.8185E+00	1.8185E+00	1.577E+00
SN-113	#B	-3.5849E-03	-3.6949E-03	8.0549E-02	8.0549E-02	8.867E-02
SB-125	#B	2.1519E-02	2.1593E-02	1.7395E-01	1.7395E-01	1.961E-01
I-131	#B	-2.1411E-02	-3.2994E-02	8.2977E-02	8.2998E-02	5.974E-02
CS-134	#A	-6.4463E-02	-6.4762E-02	7.4930E-02	7.5019E-02	7.827E-02
CS-137		1.9344E+00	1.9350E+00	1.7808E-01	2.0897E-01	
CE-139	#A	-4.9200E-03	-5.0460E-03	5.0657E-02	5.0658E-02	5.208E-02
EU-152	#B	-3.6282E-03	-3.6310E-03	2.1021E-01	2.1021E-01	1.412E-01
EU-154	#B	-8.4600E-04	-8.4695E-04	2.2401E+00	2.2401E+00	1.231E-01
EU-155	#B	1.2139E-01	1.2163E-01	1.6892E-01	1.6905E-01	1.842E-01
HG-203	#B	-4.2226E-03	-4.5498E-03	5.4253E-02	5.4254E-02	5.679E-02
TL-208	#	2.9587E-01	2.9587E-01	9.1038E-02	9.2560E-02	
PB-212	#	5.8332E-01	5.8332E-01	1.2995E-01	1.3406E-01	1.202E-01
PB-214	#	4.2842E-01	4.2842E-01	1.3713E-01	1.3925E-01	1.276E-01
BI-212	#	7.1845E-01	7.1845E-01	4.8698E-01	4.8867E-01	
BI-214		5.2174E-01	5.2174E-01	1.6632E-01	1.6891E-01	
RA-224	#A	5.9124E-01	5.9124E-01	1.3547E+00	1.3551E+00	1.495E+00
RA-226	#A	1.0486E+00	1.0486E+00	1.3366E+00	1.3379E+00	1.454E+00
AC-228	#	7.2214E-01	7.2214E-01	2.3211E-01	2.3566E-01	1.826E-01
TH-227	#B	1.7982E-02	1.7982E-02	3.5742E-01	3.5742E-01	4.027E-01
PA-234	#B	-3.4861E-02	-3.4861E-02	1.8669E-01	1.8670E-01	2.076E-01
TH-234	#B	1.1678E+00	1.1678E+00	1.2966E+00	1.2982E+00	2.363E+00
AM-241	#A	-9.6095E-02	-9.6097E-02	2.8964E-01	2.8969E-01	3.073E-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 (270.1 to 1999.1 keV) 1.7731800E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.7732731E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_15JUN2006_1600.An1

Sample description
FSS-NOL-05-01-036-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_15JUN2006_1600.An1

Acquisition information
Start time: 15-Jun-2006 16:00:22
Live time: 2000
Real time: 2002
Dead time: 0.11 %
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/channel^2

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: 2.1490E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1490E+03) =
4.6533E+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	15-Jun-2006 11:35:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2012

***** 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	190.	18.11	1.00	1.654E-02	74.81	9.600	7.327E-01	PB212
77.57	249.	14.01	1.01	1.743E-02	77.11	10.700	8.385E-01	PB214
					77.11	17.500	5.204E-01	PB212
87.21	125.	39.76	1.50	1.910E-02	82.50	2.240	1.909E+00	HG203
					86.45	32.740	1.257E-01	EU155
					88.04	3.790	PBC<MDA	CD109
92.98	151.	29.21	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.00	157.	28.41	1.50	1.989E-02	92.38	2.570	1.941E+00	TH234
					92.80	3.000	1.659E+00	TH234
128.48	95.	32.60	0.92	2.110E-02				
185.95	85.	36.63	1.12	1.858E-02	185.99	3.280	8.769E-01	RA226
209.50	86.	34.85	1.05	1.720E-02				
238.72	741.	4.50	1.12	1.557E-02	238.63	43.100	6.887E-01	PB212
241.03	90.	34.68	1.12	1.545E-02	241.00	3.900	PBC<MDA	RA224
270.02	90.	27.95	1.16	1.401E-02				
277.36	70.	33.61	1.67	1.368E-02				
295.33	191.	10.38	1.16	1.292E-02				
295.33	191.	10.38	1.16	1.292E-02	295.22	19.200	4.785E-01	PB214
300.09	44.	33.84	1.16	1.273E-02				
327.58	76.	31.28	1.14	1.171E-02				
338.15	136.	18.92	1.05	1.136E-02	338.40	12.010	6.164E-01	AC228
351.96	280.	10.08	1.11	1.093E-02				
351.96	280.	10.08	1.11	1.093E-02	351.99	37.100	4.320E-01	PB214
409.61	47.	38.55	1.81	9.417E-03				
438.67	35.	39.32	1.35	8.804E-03				
462.88	66.	31.91	1.08	8.353E-03				

462.88	66.	31.91	1.08	8.353E-03	463.51	10.000	4.882E-01	SB125
510.70	118.	14.74	1.19	7.591E-03	510.72	22.500	3.740E-01	TL208
583.06	262.	8.96	1.48	6.685E-03	583.14	86.000	2.838E-01	TL208
609.04	217.	12.53	1.23	6.415E-03	609.32	46.090	4.589E-01	BI214
661.47	42.	34.22	1.50	5.937E-03	661.62	84.620	PBC<MDA	CS137
727.21	88.	24.37	1.06	5.443E-03	727.17	11.800	8.550E-01	BI212
794.91	33.	27.79	1.50	5.016E-03	795.76	85.400	4.904E-02	CS134
910.74	136.	13.86	1.56	4.448E-03	911.07	29.000	6.531E-01	AC228
968.42	127.	16.40	1.65	4.214E-03	968.90	17.460	1.083E+00	AC228
1119.63	73.	18.50	2.15	3.713E-03	1120.28	15.040	8.204E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.29	708.	3.93	1.98	2.943E-03	1460.75	10.700	1.409E+01	K40
1619.82	9.	33.33	1.00	2.682E-03	1620.56	2.750	7.674E-01	BI212
1764.09	50.	14.14	2.79	2.481E-03	1764.51	15.920	7.890E-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	
418.67	209.50	358.	86.	0.043	104.55	1.054	AC-228	
477.14	238.71	186.	741.	0.371	13.50	1.122	PB-212	D
481.76	241.02	439.	90.	0.045	104.04	1.123	RA-224	D
539.76	270.02	214.	90.	0.045	83.85	1.162	AC-228	s
554.46	277.36	203.	67.	0.034	97.37	1.670	TL-208	s
599.61	299.93	108.	47.	0.023	103.68	1.248	TH-227	
654.93	327.58	180.	76.	0.038	93.85	1.138	AC-228	
819.07	409.61	107.	47.	0.023	115.65	1.813	AC-228	s
877.21	438.67	68.	35.	0.017	113.81	1.348	BA-140	

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	149.19	74.81	1260.	198.	0.099	76.74	1.499D
PB-214	153.79	77.11	1127.	283.	0.142	52.59	1.499D
PB-212	153.79	77.11	1124.	287.	0.144	52.59	1.499D
EU-155	174.00	87.21	1171.	125.	0.062	119.27	1.499
TH-234	185.54	92.98	1049.	151.	0.076	87.64	1.499
TH-234	185.58	93.00	1005.	157.	0.079	85.23	1.499
RA-226	371.56	185.95	402.	85.	0.043	109.89	1.121
PB-212	477.08	238.69	429.	650.	0.325	17.71	1.499
PB-214	590.33	295.29	201.	168.	0.084	42.11	1.499
AC-228	676.07	338.15	189.	134.	0.067	56.75	1.049s
PB-214	703.62	351.91	134.	265.	0.132	25.92	1.499
SB-125	925.88	462.99	85.	51.	0.026	84.69	1.499
TL-208	1021.34	510.70	86.	102.	0.051	44.23	1.190s
TL-208	1166.14	583.06	93.	259.	0.130	26.88	1.478s
BI-214	1218.11	609.04	138.	216.	0.108	37.60	1.234
CS-137	1323.03	661.47	88.	42.	0.021	102.66	1.499s
BI-212	1454.57	727.21	94.	87.	0.044	73.12	1.058

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	1590.04	794.91	28.	33.	0.017	83.36	1.502s
AC-228	1821.82	910.74	70.	134.	0.067	41.57	1.556s
AC-228	1937.24	968.42	74.	127.	0.063	49.20	1.647s
BI-214	2239.86	1119.63	41.	73.	0.036	55.50	2.153s
K-40	2921.59	1460.29	17.	705.	0.353	11.79	1.979s
BI-212	3240.88	1619.82	0.	9.	0.004	100.00	0.999s
BI-214	3529.61	1764.09	0.	50.	0.025	42.43	2.790s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		8.2892E-04					
			477.56	8.289E-04	&(	3.837E-01 1.10E-01	G
K-40		1.4087E+01					
			1460.75	1.409E+01	@(P	4.342E-01 5.55E-01	G
MN-54		2.2670E-02					
			834.81	2.267E-02	&(P	4.516E-02 1.37E-02	G
CO-57		1.1076E-02					
			122.07	1.108E-02	%(	4.388E-02 1.32E-02	G K
			136.43	-9.249E-02	%	4.091E-01 1.23E-01	G
CO-60		5.1466E-03					
			1332.51	5.147E-03	%(P	5.075E-02 1.41E-02	G K
			1173.23	1.117E-03	& P	6.718E-02 1.90E-02	G K
Sr-85		-1.0587E-02					
			514.00	-1.059E-02	%(	4.714E-02 1.39E-02	G
Kr-85		-2.6726E+02					
			513.99	-2.673E+02	%(P	1.091E+03 3.21E+02	G
Y-88		-4.0170E-03					
			1836.01	-4.017E-03	%(	4.453E-02 1.18E-02	G K
			898.02	6.557E-03	% P	5.194E-02 1.49E-02	G
NB-94		7.1132E-04					
			871.10	7.113E-04	%(P	4.197E-02 1.16E-02	G K
			702.50	5.192E-03	% P	4.452E-02 1.28E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	1.3517E-03						
		722.95	1.352E-03	%(	9.602E-02	2.81E-02	G K
		614.37	-2.556E-02	& P	5.113E-02	1.55E-02	G
		433.93	8.369E-04	&	4.663E-02	1.35E-02	G
CD-109	-4.3526E-03						
		88.04	-4.353E-03	%(P	1.287E+00	3.84E-01	G
SN-113	6.5262E-04						
		391.71	6.526E-04	&(	5.589E-02	1.62E-02	G K
		255.04	-8.972E-02	% P	1.721E+00	5.07E-01	G
SB-125	9.4685E-02						
		427.95	-3.275E-03	%(P	1.276E-01	3.68E-02	G K
		600.77	2.815E-02	% P	2.000E-01	5.76E-02	G
		636.15	-2.591E-03	& P	4.221E-01	1.20E-01	G
		463.51	3.846E-01	(P	3.442E-01	1.12E-01	G
		176.29	7.554E-02	% P	6.111E-01	1.82E-01	G
I-131	-4.9199E-03						
		364.48	-4.920E-03	&(	4.451E-02	1.30E-02	G K
		636.97	1.448E-01	&	5.524E-01	1.62E-01	G
		284.29	1.343E-01	%	6.148E-01	1.83E-01	G
CS-134	1.7511E-02						
		604.66	-1.007E-02	%(P	6.034E-02	1.77E-02	G K
		795.76	4.904E-02	(P	3.996E-02	1.38E-02	G
		569.29	8.731E-02	& P	2.233E-01	6.68E-02	G
		801.84	-8.933E-02	%	4.779E-01	1.38E-01	G
CS-137	5.2902E-02						
		661.62	5.290E-02	*(P	5.821E-02	1.85E-02	G
CE-139	-5.5965E-03						
		165.85	-5.597E-03	&(P	5.106E-02	1.52E-02	G
EU-152	2.9477E-02						
		121.78	2.948E-02	%(P	1.368E-01	4.10E-02	G K
		344.30	2.102E-02	& P	1.336E-01	3.93E-02	G
		1408.08	-1.734E-03	% P	2.049E-01	5.39E-02	G
		964.00	1.822E-01	% P	4.406E-01	1.32E-01	G
		1112.07	6.495E-03	% P	4.513E-01	1.27E-01	G
		778.90	5.620E-02	& P	3.198E-01	9.21E-02	G
EU-154	-1.6282E-02						
		123.10	-1.628E-02	%(P	1.034E-01	3.10E-02	G K
		1274.80	-3.518E-02	& P	1.757E-01	5.08E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-2.937E-02	% P	2.238E-01	6.42E-02	G
		1004.80	-2.989E-02	& P	2.828E-01	8.02E-02	G
EU-155	1.2566E-01						
		86.45	1.257E-01	(	1.631E-01	5.00E-02	G K
		105.31	-3.518E-04	%	1.888E-01	5.62E-02	G
HG-203	1.8167E-03						
		279.17	1.817E-03	&(	4.667E-02	1.37E-02	G K
		72.87	-1.276E-04	% P	1.135E+00	3.39E-01	G
		70.83	7.565E-02	%	2.344E+00	7.02E-01	G
		82.50	-6.187E-02	%	2.152E+00	6.41E-01	G
TL-208	2.8378E-01						
		583.14	2.838E-01	*(P	5.201E-02	2.57E-02	G
		510.72	3.740E-01	+ P	1.695E-01	6.38E-02	G
PB-212	6.0645E-01						
		238.63	6.091E-01	(P	9.296E-02	3.63E-02	G K
							Energy duplication
		77.11	5.999E-01	(	3.319E-01	1.05E-01	G
							Energy duplication
		74.81	7.855E-01	& P	6.657E-01	2.06E-01	G
PB-214	4.1598E-01						
		351.99	4.109E-01	(P	8.797E-02	3.58E-02	G K
		295.22	4.258E-01	(P	1.743E-01	6.04E-02	G
							Energy duplication
		77.11	9.684E-01	+ P	5.438E-01	1.72E-01	G
		241.92	-3.078E-02	% P	5.947E-01	1.76E-01	G
BI-212	8.3840E-01						
		727.17	8.550E-01	(P	4.681E-01	2.10E-01	G K
		1620.56	7.674E-01	(	6.284E-01	2.56E-01	G
		785.42	3.574E-01	% P	2.286E+00	6.59E-01	G
BI-214	4.5890E-01						
		609.32	4.589E-01	(P	1.224E-01	5.78E-02	G K
		1764.51	7.890E-01	+ P	1.173E-01	1.13E-01	G
		1120.28	8.204E-01	+ P	3.675E-01	1.52E-01	G
RA-224	4.9837E-01						
		241.00	4.984E-01	%(P	1.165E+00	3.52E-01	G
RA-226	8.7694E-01						
		185.99	8.769E-01	(	9.919E-01	3.21E-01	G
AC-228	6.4237E-01						
		911.07	6.531E-01	@(P	2.034E-01	9.17E-02	G K
		968.90	1.083E+00	+ P	3.667E-01	1.79E-01	G
		338.40	6.164E-01	@(P	3.083E-01	1.18E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -9.9700E-02
                          236.00-9.970E-02 &(P 3.453E-01 1.04E-01 G K
                          256.25-5.420E-04 % P 4.862E-01 1.42E-01 G

PA-234       3.1950E-02
                           98.44 3.195E-02 &(  1.774E-01 5.32E-02 G K
                          946.00-2.726E-02 %   2.597E-01 7.42E-02 G
                          131.28-6.602E-02 %   2.157E-01 6.50E-02 G
                           94.67-6.084E-02 &   3.166E-01 9.51E-02 G
                          883.24 3.580E-02 &   2.873E-01 8.04E-02 G
                          926.70 1.402E-01 %   4.007E-01 1.19E-01 G
                          569.26 1.334E-01 &   3.301E-01 9.90E-02 G

TH-234       1.1171E+00
                           63.29 2.089E-01 %(P 2.166E+00 6.47E-01 G K
                           92.80 1.659E+00  (P 1.585E+00 4.90E-01 G
                           92.38 1.862E+00  (P 1.894E+00 5.83E-01 G

AM-241      -1.2624E-02
                           59.54-1.262E-02 &(P 2.845E-01 8.48E-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 - 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	8.2694E-04	8.2892E-04	3.3077E-01	3.3077E-01	3.828E-01
K-40	#	1.4087E+01	1.4087E+01	1.6668E+00	1.8471E+00	
MN-54	#A	2.2660E-02	2.2670E-02	4.1181E-02	4.1201E-02	4.514E-02
CO-57	#B	1.1071E-02	1.1076E-02	3.9532E-02	3.9537E-02	4.386E-02
CO-60	#B	5.1463E-03	5.1466E-03	4.2393E-02	4.2394E-02	5.075E-02
Sr-85	#A	-1.0566E-02	-1.0587E-02	4.1813E-02	4.1817E-02	4.705E-02
Kr-85	#A	-2.6726E+02	-2.6726E+02	1.1433E+03	1.1434E+03	1.091E+03
Y-88	#B	-4.0122E-03	-4.0170E-03	3.5385E-02	3.5386E-02	4.448E-02
NB-94	#B	7.1132E-04	7.1132E-04	3.4949E-02	3.4949E-02	4.197E-02
Ag-108M	#B	1.3517E-03	1.3517E-03	8.4375E-02	8.4375E-02	9.602E-02
CD-109	#A	-4.3513E-03	-4.3526E-03	2.9548E+01	2.9548E+01	1.287E+00
SN-113	#B	6.5189E-04	6.5262E-04	4.8482E-02	4.8482E-02	5.582E-02
SB-125	#B	9.4673E-02	9.4685E-02	8.2465E-02	8.2638E-02	1.276E-01
I-131	#B	-4.8423E-03	-4.9199E-03	3.9106E-02	3.9107E-02	4.380E-02
CS-134	#B	1.7508E-02	1.7511E-02	1.4779E-02	1.4812E-02	6.033E-02
CS-137	#A	5.2901E-02	5.2902E-02	5.5443E-02	5.5523E-02	5.821E-02
CE-139	#A	-5.5913E-03	-5.5965E-03	4.7888E-02	4.7889E-02	5.101E-02
EU-152	#B	2.9476E-02	2.9477E-02	1.2312E-01	1.2313E-01	1.368E-01
EU-154	#B	-1.6282E-02	-1.6282E-02	1.0084E-01	1.0084E-01	1.034E-01
EU-155	#A	1.2565E-01	1.2566E-01	1.4987E-01	1.5003E-01	1.631E-01
HG-203	#B	1.8117E-03	1.8167E-03	4.1202E-02	4.1202E-02	4.654E-02
TL-208	#	2.8378E-01	2.8378E-01	7.6991E-02	7.8643E-02	
PB-212	#	6.0645E-01	6.0645E-01	1.0844E-01	1.1373E-01	9.296E-02
PB-214	#	4.1598E-01	4.1598E-01	1.0385E-01	1.0648E-01	8.797E-02
BI-212		8.3840E-01	8.3840E-01	5.2071E-01	5.2286E-01	
BI-214		4.5890E-01	4.5890E-01	1.7341E-01	1.7534E-01	
RA-224	#A	4.9837E-01	4.9837E-01	1.0572E+00	1.0575E+00	1.165E+00
RA-226	A	8.7694E-01	8.7694E-01	9.6366E-01	9.6493E-01	
AC-228	#	6.4237E-01	6.4237E-01	2.2945E-01	2.3230E-01	
TH-227	#B	-9.9700E-02	-9.9700E-02	3.2037E-01	3.2042E-01	3.453E-01
PA-234	#B	3.1950E-02	3.1950E-02	1.5958E-01	1.5959E-01	1.774E-01
TH-234	#B	1.1171E+00	1.1171E+00	9.8947E-01	9.9141E-01	2.166E+00
AM-241	#A	-1.2624E-02	-1.2624E-02	3.3890E-01	3.3890E-01	2.845E-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

YAEC Chemistry Lab Spectrum name: 101F_15JUN2006_1600.An1

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

Total Activity (269.6 to 1999.1 keV) 1.7187553E+01 pCi/gm
Total Decayed Activity (269.6 to 1999.1 keV) 1.7187553E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_25MAY2006_0850.An1

Sample description
FSS-NOL-05-01-010-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\101F_25MAY2006_0850.An1

Acquisition information
Start time: 25-May-2006 08:52:57
Live time: 2000
Real time: 2003
Dead time: 0.14 %
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/channel^2

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: 2.4950E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.4950E+03) =
4.0080E+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	23-May-2006 13:00:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3697

***** 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
74.70	256.	21.80	1.50	1.654E-02				
74.70	256.	21.80	1.50	1.654E-02	74.81	9.600	8.722E-01	PB212
77.07	418.	13.56	1.50	1.720E-02	77.11	10.700	1.228E+00	PB214
					77.11	17.500	7.511E-01	PB212
77.07	421.	13.56	1.50	1.720E-02	77.11	10.700	1.228E+00	PB214
					77.11	17.500	7.578E-01	PB212
86.34	94.	38.83	1.01	1.908E-02				
86.34	94.	38.83	1.01	1.908E-02	86.45	32.740	8.144E-02	EU155
89.71	152.	24.33	1.02	1.954E-02				
93.50	142.	24.80	1.02	1.996E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.84	92.	40.89	0.83	2.110E-02				
186.71	134.	30.86	1.36	1.854E-02	185.99	3.280	1.186E+00	RA226
209.52	104.	35.05	1.08	1.720E-02				
238.64	1170.	3.45	1.12	1.558E-02				
238.64	1170.	3.45	1.12	1.558E-02	238.63	43.100	9.390E-01	PB212
241.78	139.	20.02	1.12	1.541E-02	241.00	3.900	1.243E+00	RA224
					241.92	7.470	PBC<MDA	PB214
270.68	94.	26.81	1.32	1.398E-02				
295.21	173.	12.83	1.00	1.292E-02				
295.21	173.	12.83	1.00	1.292E-02	295.22	19.200	3.738E-01	PB214
300.51	105.	25.15	1.25	1.271E-02				
327.73	74.	32.55	1.15	1.171E-02				
338.25	271.	12.61	1.30	1.135E-02	338.40	12.010	1.069E+00	AC228
351.87	333.	7.58	1.35	1.093E-02				
351.87	333.	7.58	1.35	1.093E-02	351.99	37.100	4.424E-01	PB214
409.02	42.	40.74	1.18	9.430E-03				

463.08	72.	25.00	1.08	8.349E-03				
463.08	72.	25.00	1.08	8.349E-03	463.51	10.000	4.587E-01	SB125
510.65	126.	20.02	1.76	7.591E-03	510.72	22.500	3.500E-01	TL208
582.87	338.	7.36	1.36	6.687E-03	583.14	86.000	3.163E-01	TL208
609.10	218.	8.71	1.50	6.415E-03	609.32	46.090	3.975E-01	BI214
726.58	93.	20.29	1.50	5.447E-03	727.17	11.800	7.752E-01	BI212
794.40	73.	28.11	2.05	5.024E-03				
794.40	73.	28.11	2.05	5.024E-03	795.76	85.400	9.193E-02	CS134
859.85	55.	31.48	1.32	4.680E-03				
910.76	253.	7.69	1.12	4.448E-03	911.07	29.000	1.057E+00	AC228
967.39	196.	10.24	1.39	4.218E-03	968.90	17.460	1.437E+00	AC228
1119.71	50.	24.35	1.06	3.712E-03	1120.28	15.040	4.825E-01	BI214
1459.96	748.	3.90	1.81	2.944E-03	1460.75	10.700	1.283E+01	K40
1619.14	26.	30.35	0.63	2.682E-03	1620.56	2.750	1.880E+00	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1763.45	41.	17.93	1.23	2.481E-03	1764.51	15.920	5.657E-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	
172.26	86.34	618.	94.	0.047	116.48	1.013	BI-207	lD
179.00	89.71	609.	152.	0.076	72.99	1.016	PB-214	lD
418.71	209.52	508.	104.	0.052	105.14	1.083	AC-228	
476.99	238.58	228.	1170.	0.585	10.34	1.121	PB-212	D
541.08	270.68	246.	94.	0.047	80.44	1.321	AC-228	s
600.77	300.51	229.	105.	0.053	67.68	1.251	PB-212	s
655.23	327.73	200.	74.	0.037	97.64	1.153	AC-228	
817.89	409.02	114.	42.	0.021	122.22	1.183	CS-138	
1719.99	859.85	72.	55.	0.027	76.95	1.317	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	148.96	74.70	1493.	256.	0.128	65.40	1.499
PB-214	153.79	77.11	1424.	418.	0.209	40.67	1.499D
PB-212	153.79	77.11	1420.	421.	0.211	40.67	1.499D
TH-234	185.45	92.94	1411.	171.	0.086	89.88	1.499
TH-234	185.46	92.94	1368.	178.	0.089	88.00	1.499
RA-226	373.07	186.71	626.	134.	0.067	92.58	1.359s
PB-212	476.98	238.64	596.	962.	0.481	14.36	1.499
RA-224	481.70	241.00	569.	144.	0.072	74.22	1.123D
PB-214	590.19	295.22	275.	172.	0.086	46.36	1.499D
AC-228	676.28	338.25	292.	269.	0.135	37.83	1.303s
PB-214	703.51	351.86	179.	340.	0.170	23.14	1.499
SB-125	925.63	462.87	116.	74.	0.037	69.78	1.499
TL-208	1021.25	510.65	177.	110.	0.055	60.06	1.761s
TL-208	1165.76	582.87	99.	336.	0.168	22.08	1.356
BI-214	1218.24	609.10	58.	217.	0.108	26.13	1.502s
BI-212	1453.31	726.58	82.	92.	0.046	60.88	1.496
CS-134	1589.86	794.82	46.	42.	0.021	81.95	1.502s
AC-228	1821.88	910.76	41.	252.	0.126	23.08	1.115s
AC-228	1935.19	967.39	58.	195.	0.098	30.71	1.386s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2240.00	1119.71	43.	50.	0.025	73.04	1.064s
K-40	2920.93	1459.96	26.	746.	0.373	11.71	1.807
BI-212	3239.51	1619.14	7.	26.	0.013	91.06	0.635s
BI-214	3528.33	1763.45	4.	41.	0.021	53.78	1.231s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm		COMMENTS
BE-7		2.0351E-03						
			477.56	2.035E-03	%(	4.017E-01	1.16E-01	G
K-40		1.2832E+01						
			1460.75	1.283E+01	(P	4.560E-01	5.02E-01	G
MN-54		2.7267E-02						
			834.81	2.727E-02	%(P	3.834E-02	1.20E-02	G
CO-57		4.9193E-03						
			122.07	4.919E-03	&(	4.717E-02	1.41E-02	G K
			136.43	-6.058E-02	&	3.823E-01	1.15E-01	G
CO-60		-1.9758E-03						
			1332.51	-1.976E-03	&(P	5.420E-02	1.51E-02	G K
			1173.23	1.192E-02	% P	6.092E-02	1.77E-02	G K
Sr-85		-1.6343E-02						
			514.00	-1.634E-02	%(	4.996E-02	1.50E-02	G
Kr-85		-3.8958E+02						
			513.99	-3.896E+02	%(P	1.134E+03	3.39E+02	G
Y-88		-1.6777E-03						
			1836.01	-1.678E-03	%(	4.491E-02	1.19E-02	G K
			898.02	-8.631E-03	% P	4.515E-02	1.30E-02	G
NB-94		5.4149E-03						
			871.10	5.415E-03	%(P	4.470E-02	1.28E-02	G K
			702.50	2.558E-03	% P	3.650E-02	1.04E-02	G K
Ag-108M		7.7221E-03						
			722.95	7.722E-03	&(	4.211E-02	1.22E-02	G K
			614.37	-1.625E-02	% P	4.501E-02	1.35E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	1.089E-03	%	3.897E-02	1.13E-02	G
CD-109	-3.5054E-02						
		88.04	-3.505E-02	&(P	1.425E+00	4.27E-01	G
SN-113	-5.0073E-03						
		391.71	-5.007E-03	%(	6.201E-02	1.82E-02	G K
		255.04	4.402E-01	& P	1.752E+00	5.24E-01	G
SB-125	1.1746E-01						
		427.95	-4.485E-03	%(P	1.172E-01	3.40E-02	G K
		600.77	-1.703E-03	& P	1.852E-01	5.24E-02	G
		636.15	3.184E-02	% P	3.121E-01	8.96E-02	G
		463.51	4.784E-01	(P	3.442E-01	1.13E-01	G
		176.29	1.012E-01	& P	5.731E-01	1.71E-01	G
I-131	-2.8773E-03						
		364.48	-2.877E-03	%(	4.931E-02	1.44E-02	G K
		636.97	-1.562E-01	%	6.304E-01	1.86E-01	G
		284.29	-1.734E-01	%	7.517E-01	2.25E-01	G
CS-134	1.3274E-02						
		604.66	-2.145E-02	%(P	4.947E-02	1.49E-02	G K
		795.76	5.296E-02	(P	4.339E-02	1.46E-02	G
		569.29	6.382E-02	% P	2.254E-01	6.66E-02	G
		801.84	-1.341E-01	&	4.864E-01	1.43E-01	G
CS-137	1.7057E-02						
		661.62	1.706E-02	%(P	5.007E-02	1.49E-02	G
CE-139	-5.8728E-03						
		165.85	-5.873E-03	%(P	4.990E-02	1.49E-02	G
EU-152	2.9267E-02						
		121.78	2.927E-02	&(P	1.181E-01	3.55E-02	G K
		344.30	-2.590E-02	& P	1.205E-01	3.56E-02	G
		1408.08	6.416E-02	& P	1.679E-01	4.96E-02	G
		964.00	-2.923E-03	& P	2.788E-01	7.70E-02	G
		1112.07	7.026E-02	& P	4.331E-01	1.26E-01	G
		778.90	-7.975E-04	% P	3.573E-01	1.02E-01	G
EU-154	-1.8109E-02						
		123.10	-1.811E-02	&(P	8.815E-02	2.64E-02	G K
		1274.80	-1.299E-02	% P	1.718E-01	4.89E-02	G
		723.30	-6.691E-02	& P	2.739E-01	8.09E-02	G
		1004.80	-4.640E-02	% P	2.550E-01	7.35E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.0452E-01						
		86.45	1.045E-01	%(	1.611E-01	4.91E-02	G K
		105.31	1.017E-02	%	1.963E-01	5.87E-02	G
HG-203	-2.5428E-03						
		279.17	-2.543E-03	&(	4.900E-02	1.45E-02	G K
		72.87	-1.213E-01	& P	1.138E+00	3.41E-01	G
		70.83	-3.778E-02	%	1.931E+00	5.78E-01	G
		82.50	-2.885E-01	&	2.381E+00	7.14E-01	G
TL-208	3.2331E-01						
		583.14	3.163E-01	(P	4.630E-02	2.34E-02	G
		510.72	3.500E-01	@(P	2.050E-01	8.02E-02	G
PB-212	7.8493E-01						
		238.63	7.765E-01	(P	9.400E-02	3.74E-02	G K
							Energy duplication
		77.11	7.578E-01	(	3.208E-01	1.03E-01	G
		74.81	8.722E-01	&(P	6.234E-01	1.94E-01	G
PB-214	4.5436E-01						
		351.99	4.544E-01	(P	8.692E-02	3.53E-02	G K
							Energy duplication
		295.22	3.754E-01	- P	1.747E-01	5.86E-02	G
							Energy duplication
		77.11	1.228E+00	+ P	5.254E-01	1.68E-01	G
		241.92	8.702E-02	% P	6.857E-01	2.05E-01	G
BI-212	7.7518E-01						
		727.17	7.752E-01	(P	3.789E-01	1.58E-01	G K
		1620.56	1.880E+00	+	1.130E+00	5.70E-01	G
		785.42	1.138E+00	% P	1.937E+00	5.97E-01	G
BI-214	4.1838E-01						
		609.32	3.975E-01	@(P	7.006E-02	3.48E-02	G K
		1764.51	5.657E-01	+ P	1.607E-01	1.02E-01	G
		1120.28	4.825E-01	(P	3.238E-01	1.18E-01	G
RA-224	1.2942E+00						
		241.00	1.294E+00	(P	1.024E+00	3.22E-01	G
RA-226	1.1863E+00						
		185.99	1.186E+00	*(	1.060E+00	3.67E-01	G
AC-228	1.0601E+00						
		911.07	1.057E+00	(P	1.374E-01	8.19E-02	G K
		968.90	1.437E+00	+ P	2.811E-01	1.47E-01	G
		338.40	1.069E+00	@(P	3.272E-01	1.36E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.2409E-01
                          236.00-2.241E-01 %(P 4.332E-01 1.32E-01 G K
                          256.25 1.469E-01 % P 5.057E-01 1.52E-01 G

PA-234       1.0223E-02
                           98.44 1.022E-02 %(  1.734E-01 5.19E-02 G K
                          946.00-2.055E-02 %   2.256E-01 6.43E-02 G
                          131.28 4.641E-03 &   1.692E-01 5.04E-02 G
                           94.67-1.267E-01 %   3.195E-01 9.67E-02 G
                          883.24-3.281E-04 &   3.319E-01 9.26E-02 G
                          926.70 4.261E-02 &   4.344E-01 1.25E-01 G
                          569.26 9.812E-02 %   3.329E-01 9.86E-02 G

TH-234       1.2644E+00
                           63.29 6.308E-01 %(P 2.049E+00 6.17E-01 G K
                           92.80 1.612E+00  (P 1.589E+00 4.89E-01 G
                           92.38 1.820E+00 &(P 1.887E+00 5.80E-01 G

AM-241      -7.3459E-02
                           59.54-7.346E-02 %(P 2.842E-01 8.55E-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 - 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	1.9873E-03	2.0351E-03	3.4946E-01	3.4946E-01	3.922E-01
K-40		1.2832E+01	1.2832E+01	1.5072E+00	1.6726E+00	
MN-54	#A	2.7157E-02	2.7267E-02	3.6118E-02	3.6150E-02	3.819E-02
CO-57	#B	4.8962E-03	4.9193E-03	4.2363E-02	4.2364E-02	4.695E-02
CO-60	#B	-1.9745E-03	-1.9758E-03	5.2725E-02	5.2725E-02	5.416E-02
Sr-85	#A	-1.6026E-02	-1.6343E-02	4.4893E-02	4.4902E-02	4.900E-02
Kr-85	#A	-3.8958E+02	-3.8958E+02	1.1242E+03	1.1245E+03	1.134E+03
Y-88	#B	-1.6579E-03	-1.6777E-03	3.5691E-02	3.5691E-02	4.438E-02
NB-94	#B	5.4149E-03	5.4149E-03	3.8533E-02	3.8535E-02	4.470E-02
Ag-108M	#B	7.7219E-03	7.7221E-03	3.6692E-02	3.6694E-02	4.211E-02
CD-109	#A	-3.4956E-02	-3.5054E-02	1.5618E+00	1.5618E+00	1.421E+00
SN-113	#B	-4.9524E-03	-5.0073E-03	5.4673E-02	5.4673E-02	6.133E-02
SB-125	#F	1.1731E-01	1.1746E-01	8.3569E-02	8.3833E-02	1.170E-01
I-131	#B	-2.4577E-03	-2.8773E-03	4.3294E-02	4.3294E-02	4.212E-02
CS-134	#B	1.3251E-02	1.3274E-02	1.0987E-02	1.1012E-02	4.939E-02
CS-137	#A	1.7055E-02	1.7057E-02	4.4705E-02	4.4715E-02	5.006E-02
CE-139	#A	-5.8189E-03	-5.8728E-03	4.6532E-02	4.6533E-02	4.944E-02
EU-152	#B	2.9259E-02	2.9267E-02	1.0644E-01	1.0645E-01	1.181E-01
EU-154	#B	-1.8101E-02	-1.8109E-02	8.4512E-02	8.4518E-02	8.811E-02
EU-155	#B	1.0444E-01	1.0452E-01	1.4733E-01	1.4744E-01	1.610E-01
HG-203	#B	-2.4746E-03	-2.5428E-03	4.3504E-02	4.3504E-02	4.768E-02
TL-208		3.2331E-01	3.2331E-01	7.1884E-02	7.4169E-02	
PB-212	#	7.8493E-01	7.8493E-01	1.1342E-01	1.2178E-01	9.400E-02
PB-214	#	4.5436E-01	4.5436E-01	1.0575E-01	1.0882E-01	8.692E-02
BI-212		7.7518E-01	7.7518E-01	4.7538E-01	4.7739E-01	
BI-214		4.1838E-01	4.1838E-01	1.0988E-01	1.1239E-01	
RA-224		1.2942E+00	1.2942E+00	9.6534E-01	9.6811E-01	
RA-226	#	1.1863E+00	1.1863E+00	1.0983E+00	1.1003E+00	
AC-228	#	1.0601E+00	1.0601E+00	2.3678E-01	2.4424E-01	
TH-227	#B	-2.2409E-01	-2.2409E-01	3.9932E-01	3.9952E-01	4.332E-01
PA-234	#B	1.0223E-02	1.0223E-02	1.5561E-01	1.5562E-01	1.734E-01
TH-234	#B	1.2644E+00	1.2644E+00	1.1514E+00	1.1535E+00	2.049E+00
AM-241	#A	-7.3459E-02	-7.3459E-02	2.6761E-01	2.6764E-01	2.842E-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 (270.6 to 1999.1 keV) 1.7889519E+01 pCi/gm
Total Decayed Activity (270.6 to 1999.1 keV) 1.7889521E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_30MAY2006_0845.An1

Sample description
FSS-NOL-05-01-016-F

Spectrum Filename: C:\GammaVision\Spectra\101F_30MAY2006_0845.An1

Acquisition information
Start time: 30-May-2006 08:46:42
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/channel^2

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: 2.0280E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0280E+03) =
4.9310E+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	24-May-2006 10:15:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2300

***** 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
73.11	76.	25.47	1.50	1.720E-02	72.87	6.400	PBC<MDA	HG203
74.73	236.	13.62	1.00	1.654E-02	74.81	9.600	9.919E-01	PB212
77.03	349.	7.67	1.01	1.720E-02	77.11	17.500	7.910E-01	PB212
87.18	145.	20.23	1.01	1.916E-02	86.45	32.740	1.547E-01	EU155
90.03	85.	35.53	1.02	1.954E-02	88.04	3.790	PBC<MDA	CD109
93.33	98.	28.98	1.02	1.992E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	2.096E-01	PA234
129.57	146.	28.35	0.96	2.109E-02				
129.57	146.	28.35	0.96	2.109E-02	131.28	20.000	2.310E-01	PA234
186.32	158.	20.41	1.09	1.856E-02	185.99	3.280	1.723E+00	RA226
209.05	105.	28.49	0.91	1.723E-02				
238.67	775.	4.27	1.12	1.558E-02	238.63	43.100	7.635E-01	PB212
241.18	98.	29.47	1.12	1.544E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.655E-01	PB214
269.60	76.	32.38	1.51	1.403E-02				
295.21	170.	11.11	1.16	1.293E-02	295.22	19.200	4.516E-01	PB214
300.00	69.	22.66	1.16	1.273E-02				
328.38	48.	32.00	1.34	1.168E-02				
338.55	159.	16.11	1.35	1.134E-02	338.40	12.010	7.646E-01	AC228
351.97	357.	8.33	1.34	1.093E-02	351.99	37.100	5.837E-01	PB214
462.97	67.	29.43	1.99	8.351E-03				
462.97	67.	29.43	1.99	8.351E-03	463.51	10.000	5.242E-01	SB125
510.96	129.	13.26	1.49	7.587E-03	510.72	22.500	4.392E-01	TL208
582.89	247.	8.70	1.39	6.687E-03	583.14	86.000	2.834E-01	TL208
609.16	222.	8.06	1.49	6.414E-03	609.32	46.090	4.982E-01	BI214
726.19	76.	22.08	1.34	5.450E-03	727.17	11.800	7.804E-01	BI212

794.93	38.	28.86	1.50	5.016E-03	795.76	85.400	5.924E-02	CS134
910.86	159.	12.13	1.46	4.447E-03	911.07	29.000	8.120E-01	AC228
968.18	124.	14.23	1.93	4.215E-03	968.90	17.460	1.119E+00	AC228
1119.58	67.	20.82	0.85	3.711E-03	1120.28	15.040	8.025E-01	BI214
1460.10	617.	4.12	1.99	2.944E-03	1460.75	10.700	1.301E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1763.93	29.	18.57	1.44	2.482E-03	1764.51	15.920	4.818E-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
173.97	86.86	318.	132.	0.066	63.06	1.014	TB-160 D
179.64	89.72	416.	85.	0.043	106.58	1.016	PB-214 lD
258.75	129.57	627.	146.	0.073	85.06	0.960	AC-228 l
417.78	209.05	329.	105.	0.052	85.46	0.914	AC-228 s
538.93	269.60	205.	76.	0.038	97.13	1.512	AC-228 s
599.49	299.87	99.	66.	0.033	73.85	1.718	TH-227 sM
656.53	328.38	94.	48.	0.024	96.01	1.343	RH-106M s

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	149.19	74.81	426.	236.	0.118	40.85	1.005D
PB-212	153.79	77.11	421.	349.	0.174	23.02	1.006A
PB-214	153.79	77.11	435.	76.	0.038	76.42	1.499A
PA-234	185.92	93.17	685.	106.	0.053	109.10	1.499s
RA-226	372.30	186.32	365.	158.	0.079	61.23	1.095
PB-212	476.96	238.63	166.	769.	0.385	12.81	1.122D
PB-214	483.54	241.92	177.	72.	0.036	84.56	1.124D
PB-214	589.91	295.08	197.	159.	0.080	48.23	1.082
AC-228	676.88	338.55	179.	156.	0.078	48.32	1.352s
PB-214	703.74	351.97	167.	355.	0.178	25.00	1.340s
SB-125	925.99	463.05	88.	48.	0.024	90.89	1.499s
TL-208	1021.87	510.96	78.	113.	0.056	39.78	1.486s
TL-208	1165.79	582.89	76.	245.	0.122	26.11	1.389s
BI-214	1218.36	609.16	44.	221.	0.110	24.19	1.493
BI-212	1452.53	726.19	63.	75.	0.038	66.24	1.342s
CS-134	1590.08	794.93	42.	38.	0.019	86.59	1.502s
AC-228	1822.07	910.86	58.	157.	0.079	36.38	1.455s
AC-228	1936.76	968.18	46.	123.	0.062	42.69	1.934
BI-214	2239.75	1119.58	39.	67.	0.034	62.47	0.850s
K-40	2921.22	1460.10	10.	615.	0.307	12.35	1.990

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3529.09	1763.83	2.	23.	0.011	65.46	2.106s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.3491E-01					
			477.56	1.349E-01	&(	3.066E-01 9.25E-02	G
K-40		1.3014E+01					
			1460.75	1.301E+01	(P	3.705E-01 5.37E-01	G
MN-54		1.8477E-02					
			834.81	1.848E-02	%(P	4.659E-02 1.39E-02	G
CO-57		7.7012E-04					
			122.07	7.701E-04	%(	3.698E-02 1.09E-02	G K
			136.43	-9.732E-03	&	4.129E-01 1.23E-01	G
CO-60		2.6238E-02					
			1332.51	2.624E-02	%(P	4.492E-02 1.40E-02	G K
			1173.23	3.113E-02	% P	5.768E-02 1.77E-02	G K
Sr-85		-1.7303E-02					
			514.00	-1.730E-02	%(	5.749E-02 1.72E-02	G
Kr-85		-3.9904E+02					
			513.99	-3.990E+02	%(P	1.250E+03 3.72E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	8.873E-02 2.45E-02	G K
			898.02	9.874E-04	% P	4.730E-02 1.31E-02	G
NB-94		7.8347E-03					
			871.10	7.835E-03	%(P	4.391E-02 1.26E-02	G K
			702.50	-8.168E-03	% P	4.595E-02 1.33E-02	G K
Ag-108M		-1.5386E-02					
			722.95	-1.539E-02	&(	6.539E-02 1.93E-02	G K
			614.37	1.311E-03	% P	4.970E-02 1.42E-02	G
			433.93	1.826E-02	%	3.332E-02 1.02E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	4.0168E-01						
		88.04	4.017E-01	%(P	1.319E+00	3.97E-01	G
SN-113	1.5544E-02						
		391.71	1.554E-02	%(	5.766E-02	1.71E-02	G K
		255.04	-3.684E-01	% P	1.528E+00	4.54E-01	G
SB-125	1.0409E-01						
		427.95	9.807E-03	%(P	1.144E-01	3.30E-02	G K
		600.77	1.057E-02	% P	2.321E-01	6.62E-02	G
		636.15	5.062E-04	% P	3.550E-01	9.96E-02	G
		463.51	3.832E-01	(P	3.724E-01	1.20E-01	G
		176.29	-2.064E-01	% P	6.271E-01	1.88E-01	G
I-131	-1.9926E-02						
		364.48	-1.993E-02	&(	6.586E-02	1.96E-02	G K
		636.97	6.878E-02	%	8.168E-01	2.31E-01	G
		284.29	-3.814E-02	&	1.046E+00	3.07E-01	G
CS-134	2.7740E-02						
		604.66	1.764E-04	%(P	3.793E-02	1.06E-02	G K
		795.76	5.924E-02	(P	5.167E-02	1.73E-02	G
		569.29	4.650E-03	& P	1.993E-01	5.54E-02	G
		801.84	1.717E-02	%	5.049E-01	1.42E-01	G
CS-137	2.3759E-02						
		661.62	2.376E-02	%(P	5.415E-02	1.63E-02	G
CE-139	1.2581E-04						
		165.85	1.258E-04	&(P	4.871E-02	1.44E-02	G
EU-152	-1.0954E-02						
		121.78	-1.095E-02	&(P	1.070E-01	3.17E-02	G K
		344.30	-2.727E-02	% P	1.499E-01	4.42E-02	G
		1408.08	2.879E-02	% P	1.726E-01	4.69E-02	G
		964.00	1.766E-01	& P	4.320E-01	1.30E-01	G
		1112.07	-3.429E-02	% P	3.356E-01	9.32E-02	G
		778.90	-2.553E-02	% P	2.979E-01	8.35E-02	G
EU-154	-1.0959E-03						
		123.10	-1.096E-03	%(P	9.697E-02	2.88E-02	G K
		1274.80	2.246E-02	% P	1.360E-01	3.83E-02	G
		723.30	-4.509E-02	& P	2.845E-01	8.27E-02	G
		1004.80	-3.245E-02	% P	2.804E-01	7.93E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	0.0000E+00						
		86.45	0.000E+00	%(	1.690E-01	5.04E-02	G K
		105.31	1.267E-02	%	1.967E-01	5.86E-02	G
HG-203	6.9904E-04						
		279.17	6.990E-04	%(	5.212E-02	1.53E-02	G K
		72.87	-7.554E-01	% P	1.316E+00	4.00E-01	G
		70.83	4.561E-01	%	1.996E+00	6.00E-01	G
		82.50	-2.917E-01	&	2.679E+00	8.02E-01	G
TL-208	2.8344E-01						
		583.14	2.834E-01	@(P	5.038E-02	2.49E-02	G
		510.72	4.392E-01	+ P	1.716E-01	6.66E-02	G
PB-212	7.7155E-01						
		238.63	7.636E-01	(P	6.234E-02	3.29E-02	G K
							Energy duplication
		77.11	7.715E-01	}	2.175E-01	5.92E-02	G
		74.81	9.919E-01	+ P	4.148E-01	1.38E-01	G
PB-214	5.8368E-01						
		351.99	5.837E-01	@(P	1.035E-01	4.89E-02	G K
		295.22	4.272E-01	- P	1.830E-01	6.94E-02	G
							Energy duplication
		77.11	2.762E-01	} P	3.617E-01	7.04E-02	G
		241.92	4.196E-01	- P	3.743E-01	1.19E-01	G
BI-212	7.8043E-01						
		727.17	7.804E-01	@(P	4.112E-01	1.74E-01	G K
		1620.56	2.259E-01	%	1.294E+00	3.49E-01	G
		785.42	6.619E-02	% P	2.363E+00	6.66E-01	G
BI-214	4.9823E-01						
		609.32	4.982E-01	(P	7.581E-02	4.04E-02	G K
		1764.51	3.835E-01	- P	1.461E-01	8.53E-02	G
		1120.28	8.025E-01	+ P	3.788E-01	1.68E-01	G
RA-224	6.3983E-01						
		241.00	6.398E-01	%(P	1.206E+00	3.66E-01	G
RA-226	1.7230E+00						
		185.99	1.723E+00	(	1.003E+00	3.52E-01	G
AC-228	7.9812E-01						
		911.07	8.120E-01	*(P	1.972E-01	9.96E-02	G K
		968.90	1.119E+00	+ P	3.094E-01	1.60E-01	G
		338.40	7.646E-01	@(P	3.177E-01	1.25E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-2.2231E-01						
		236.00	-2.223E-01	%(P	4.008E-01	1.22E-01	G K
		256.25	-1.644E-02	% P	4.326E-01	1.26E-01	G
PA-234	7.1758E-02						
		98.44	-2.356E-02	&(	1.731E-01	5.18E-02	G K
		946.00	8.625E-02	%	2.104E-01	6.30E-02	G
		131.28	1.053E-01	%	1.930E-01	5.87E-02	G
		94.67	2.261E-01	?(	2.669E-01	8.22E-02	G
		883.24	7.685E-02	%	3.697E-01	1.07E-01	G
		926.70	1.342E-02	&	3.992E-01	1.11E-01	G
		569.26	-5.189E-02	&	3.666E-01	1.06E-01	G
TH-234	5.2615E-01						
		63.29	5.261E-01	%(P	2.127E+00	6.38E-01	G K
		92.80	1.095E+00	% P	1.604E+00	4.89E-01	G
		92.38	1.196E+00	% P	1.852E+00	5.64E-01	G
AM-241	-6.6289E-02						
		59.54	-6.629E-02	&(P	3.015E-01	9.04E-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 - 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	1.2490E-01	1.3491E-01	2.7742E-01	2.7753E-01	2.838E-01
K-40		1.3014E+01	1.3014E+01	1.6129E+00	1.7726E+00	
MN-54	#A	1.8235E-02	1.8477E-02	4.1756E-02	4.1769E-02	4.598E-02
CO-57	#B	7.5847E-04	7.7012E-04	3.2784E-02	3.2784E-02	3.642E-02
CO-60	#B	2.6182E-02	2.6238E-02	4.2044E-02	4.2070E-02	4.482E-02
Sr-85	#A	-1.6238E-02	-1.7303E-02	5.1460E-02	5.1469E-02	5.396E-02
Kr-85	#A	-3.9902E+02	-3.9904E+02	1.2587E+03	1.2589E+03	1.250E+03
Y-88	#B	0.0000E+00	0.0000E+00	7.3590E-02	7.3590E-02	8.537E-02
NB-94	#B	7.8347E-03	7.8347E-03	3.7758E-02	3.7761E-02	4.391E-02
Ag-108M	#B	-1.5385E-02	-1.5386E-02	5.7849E-02	5.7856E-02	6.539E-02
CD-109	#A	3.9805E-01	4.0168E-01	1.1922E+00	1.1924E+00	1.307E+00
SN-113	#B	1.4997E-02	1.5544E-02	5.1312E-02	5.1319E-02	5.564E-02
SB-125	#B	1.0367E-01	1.0409E-01	9.7478E-02	9.7655E-02	1.140E-01
I-131	#B	-1.1942E-02	-1.9926E-02	5.8777E-02	5.8788E-02	3.947E-02
CS-134	#B	2.7588E-02	2.7740E-02	2.4284E-02	2.4334E-02	3.772E-02
CS-137	#A	2.3751E-02	2.3759E-02	4.8868E-02	4.8886E-02	5.413E-02
CE-139	#A	1.2210E-04	1.2581E-04	4.3270E-02	4.3270E-02	4.727E-02
EU-152	#B	-1.0945E-02	-1.0954E-02	1.1107E-01	1.1107E-01	1.069E-01
EU-154	#B	-1.0945E-03	-1.0959E-03	4.0616E-01	4.0616E-01	9.685E-02
EU-155	#B	0.0000E+00	0.0000E+00	1.5127E-01	1.5127E-01	1.687E-01
HG-203	#B	6.3993E-04	6.9904E-04	4.5878E-02	4.5878E-02	4.771E-02
TL-208	#	2.8344E-01	2.8344E-01	7.4727E-02	7.6424E-02	
PB-212		7.7155E-01	7.7155E-01	9.9596E-02	1.0872E-01	
PB-214		5.8368E-01	5.8368E-01	1.4673E-01	1.5039E-01	
BI-212	#	7.8043E-01	7.8043E-01	5.2159E-01	5.2345E-01	
BI-214		4.9823E-01	4.9823E-01	1.2114E-01	1.2436E-01	
RA-224	#A	6.3983E-01	6.3983E-01	1.0993E+00	1.0999E+00	1.206E+00
RA-226		1.7230E+00	1.7230E+00	1.0549E+00	1.0594E+00	
AC-228		7.9812E-01	7.9812E-01	2.4456E-01	2.4868E-01	
TH-227	#B	-2.2231E-01	-2.2231E-01	3.7132E-01	3.7153E-01	4.008E-01
PA-234	#B	7.1758E-02	7.1758E-02	7.8291E-02	7.8392E-02	1.731E-01
TH-234	#B	5.2615E-01	5.2615E-01	1.9129E+00	1.9131E+00	2.127E+00
AM-241	#A	-6.6287E-02	-6.6289E-02	2.8741E-01	2.8743E-01	3.015E-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 (269.1 to 1999.1 keV) 1.8452799E+01 pCi/gm
Total Decayed Activity (269.1 to 1999.1 keV) 1.8452810E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_30MAY2006_0923.An1

Sample description
FSS-NOL-05-01-011-F

Spectrum Filename: C:\GammaVision\Spectra\101F_30MAY2006_0923.An1

Acquisition information
Start time: 30-May-2006 09:24:48
Live time: 2000
Real time: 2002
Dead time: 0.10 %
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/channel^2

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: 1.9730E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9730E+03) =
5.0684E+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	23-May-2006 13:25:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2828

***** 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
74.14	180.	20.20	1.00	1.633E-02				
74.14	180.	20.20	1.00	1.633E-02	74.81	9.600	7.522E-01	PB212
78.02	93.	40.96	1.01	1.744E-02	77.11	10.700	PBC<MDA	PB214
					77.11	17.500	2.110E-01	PB212
84.21	63.	41.60	0.00	1.874E-02				
87.02	186.	26.34	1.50	1.910E-02	86.45	32.740	2.044E-01	EU155
					88.04	3.790	1.755E+00	CD109
87.69	80.	41.51	1.01	1.932E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
93.16	125.	36.40	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.18	120.	37.02	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.99	121.	28.15	0.98	1.858E-02				
185.99	121.	28.15	0.98	1.858E-02	185.99	3.280	1.359E+00	RA226
209.63	94.	32.80	1.08	1.720E-02				
238.68	895.	3.98	1.12	1.557E-02	238.63	43.100	9.066E-01	PB212
242.12	118.	20.32	1.12	1.539E-02	241.00	3.900	1.328E+00	RA224
270.27	76.	31.19	0.87	1.400E-02				
277.23	62.	39.33	1.33	1.369E-02				
295.27	205.	10.03	1.16	1.292E-02				
295.27	205.	10.03	1.16	1.292E-02	295.22	19.200	5.624E-01	PB214
300.10	63.	26.65	1.16	1.273E-02				
338.44	179.	15.09	1.09	1.135E-02	338.40	12.010	8.884E-01	AC228
351.87	360.	8.72	1.22	1.093E-02				
351.87	360.	8.72	1.22	1.093E-02	351.99	37.100	6.054E-01	PB214
462.29	45.	37.73	1.21	8.363E-03				

462.29	45.	37.73	1.21	8.363E-03	463.51	10.000	PBC<MDA	SB125
510.70	111.	18.04	1.00	7.591E-03	510.72	22.500	3.821E-01	TL208
582.74	277.	7.97	1.41	6.689E-03	583.14	86.000	3.270E-01	TL208
609.02	220.	8.13	1.31	6.416E-03	609.32	46.090	5.082E-01	BI214
661.66	44.	27.99	1.50	5.937E-03	661.62	84.620	6.067E-02	CS137
726.97	34.	37.32	1.15	5.444E-03				
726.97	34.	37.32	1.15	5.444E-03	727.17	11.800	PBC<MDA	BI212
794.65	32.	30.82	1.50	5.016E-03	795.76	85.400	5.150E-02	CS134
910.86	190.	9.61	1.75	4.447E-03	911.07	29.000	9.982E-01	AC228
964.05	32.	30.38	1.61	4.230E-03	964.00	14.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
968.64	91.	13.90	1.62	4.212E-03	968.90	17.460	8.430E-01	AC228
1119.90	69.	19.20	1.21	3.712E-03	1120.28	15.040	8.470E-01	BI214
1331.98	26.	31.16	1.85	3.190E-03	1332.51	99.980	5.567E-02	CO60
1460.10	689.	3.87	1.98	2.944E-03	1460.75	10.700	1.495E+01	K40
1763.48	37.	17.35	1.50	2.483E-03	1764.51	15.920	6.391E-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
418.93	209.63	357.	94.	0.047	98.41	1.081	NP-239 s
540.26	270.27	212.	76.	0.038	93.58	0.870	AC-228 s
599.64	299.94	122.	75.	0.037	71.52	1.824	TH-227 s
1928.35	964.21	32.	31.	0.016	93.44	1.612	EU-152 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	148.87	74.65	1161.	257.	0.128	58.09	1.499
PB-214	153.79	77.11	1158.	289.	0.145	52.20	1.499D
PB-212	153.79	77.11	1154.	293.	0.147	52.20	1.499D
EU-155	173.63	87.02	1109.	186.	0.093	79.03	1.499
TH-234	185.94	93.18	1120.	120.	0.060	111.07	1.499s
TH-234	185.89	93.16	1085.	125.	0.063	109.20	1.499s
RA-226	371.64	185.99	565.	124.	0.062	85.53	1.499D
PB-212	477.06	238.68	506.	645.	0.323	18.71	1.499
RA-224	482.90	241.60	592.	92.	0.046	115.41	1.499s
PB-214	590.31	295.28	251.	190.	0.095	41.15	1.499
AC-228	676.66	338.44	192.	177.	0.088	45.28	1.094
PB-214	703.53	351.87	148.	317.	0.159	23.23	1.499
TL-208	1021.35	510.70	117.	95.	0.048	54.13	1.002s
TL-208	1165.48	582.74	75.	274.	0.137	23.90	1.413s
CS-134	1200.53	600.25	-2.	-48.	-0.024	41.67	1.499s
BI-214	1218.08	609.02	47.	219.	0.110	24.38	1.313
CS-137	1323.42	661.66	59.	44.	0.022	83.97	1.499s
CS-134	1589.53	794.65	34.	32.	0.016	92.45	1.502s
AC-228	1822.07	910.86	48.	188.	0.094	28.84	1.754
AC-228	1938.21	968.90	39.	90.	0.045	42.51	1.616D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2240.39	1119.90	42.	69.	0.035	57.60	1.212s
CO-60	2664.80	1331.98	20.	26.	0.013	93.48	1.846
K-40	2921.21	1460.10	9.	687.	0.344	11.60	1.978
BI-214	3528.39	1763.48	2.	37.	0.018	52.06	1.502

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.3598E-01					
			477.56	1.360E-01	%(	4.085E-01 1.22E-01 G	
K-40		1.4948E+01					
			1460.75	1.495E+01	(P	3.610E-01 5.80E-01 G	
MN-54		9.0402E-03					
			834.81	9.040E-03	&(P	5.495E-02 1.59E-02 G	
CO-57		1.0456E-02					
			122.07	1.046E-02	%(	5.090E-02 1.53E-02 G K	
			136.43	1.967E-02	&	4.357E-01 1.30E-01 G	
CO-60		5.5673E-02					
			1332.51	5.567E-02	(P	5.047E-02 1.74E-02 G K	
			1173.23	4.689E-02	% P	6.875E-02 2.15E-02 G K	
Sr-85		-1.0579E-02					
			514.00	-1.058E-02	%(	5.651E-02 1.67E-02 G	
Kr-85		-2.5202E+02					
			513.99	-2.520E+02	%(P	1.218E+03 3.57E+02 G	
Y-88		5.9082E-04					
			1836.01	5.908E-04	%(	5.151E-02 1.32E-02 G K	
			898.02	5.189E-03	% P	4.984E-02 1.40E-02 G	
NB-94		6.3734E-03					
			871.10	6.373E-03	%(P	3.814E-02 1.08E-02 G K	
			702.50	9.166E-03	% P	5.159E-02 1.50E-02 G K	
Ag-108M		1.4724E-03					
			722.95	1.472E-03	&(	9.152E-02 2.67E-02 G K	
			614.37	9.280E-03	% P	4.303E-02 1.25E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	-7.910E-03	&	3.956E-02	1.16E-02	G
CD-109	7.5603E-01						
		88.04	7.560E-01	%(P	1.028E+00	3.16E-01	G
SN-113	-1.2032E-03						
		391.71	-1.203E-03	%(	6.993E-02	2.03E-02	G K
		255.04	-1.617E-01	% P	1.927E+00	5.69E-01	G
SB-125	-3.0366E-02						
		427.95	-3.037E-02	%(P	1.426E-01	4.20E-02	G K
		600.77	-1.307E-03	& P	2.533E-01	7.20E-02	G
		636.15	7.784E-03	& P	4.538E-01	1.30E-01	G
		463.51	3.160E-01	% P	4.355E-01	1.35E-01	G
		176.29	-1.830E-01	% P	6.416E-01	1.92E-01	G
I-131	-1.8361E-02						
		364.48	-1.836E-02	%(	8.803E-02	2.60E-02	G K
		636.97	-1.335E-01	&	1.215E+00	3.51E-01	G
		284.29	-2.906E-01	&	1.154E+00	3.44E-01	G
CS-134	-5.2204E-02						
		604.66	-5.220E-02	?(P	8.058E-03	7.16E-03	G K
		795.76	5.150E-02	+ P	4.817E-02	1.61E-02	G
		569.29	-2.058E-03	& P	2.923E-01	8.31E-02	G
		801.84	3.719E-02	%	5.463E-01	1.55E-01	G
CS-137	6.0672E-02						
		661.62	6.067E-02	(P	5.244E-02	1.73E-02	G
CE-139	-2.3463E-04						
		165.85	-2.346E-04	%(P	5.408E-02	1.60E-02	G
EU-152	2.8956E-02						
		121.78	2.896E-02	%(P	1.514E-01	4.54E-02	G K
		344.30	-3.704E-02	% P	1.517E-01	4.50E-02	G
		1408.08	1.844E-02	% P	1.868E-01	4.98E-02	G
		964.00	1.510E-02	% P	5.141E-01	1.47E-01	G
		1112.07	-3.023E-03	% P	5.194E-01	1.46E-01	G
		778.90	1.358E-01	% P	3.091E-01	9.31E-02	G
EU-154	2.7443E-02						
		123.10	2.744E-02	%(P	1.059E-01	3.18E-02	G K
		1274.80	5.015E-02	& P	1.722E-01	5.04E-02	G
		723.30	-2.895E-03	& P	2.632E-01	7.45E-02	G
		1004.80	-2.900E-02	& P	3.082E-01	8.72E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	2.0444E-01						
		86.45	2.044E-01	(	1.734E-01	5.39E-02	G K
		105.31	5.857E-02	%	2.152E-01	6.48E-02	G
HG-203	3.0555E-03						
		279.17	3.056E-03	&(	5.333E-02	1.57E-02	G K
		72.87	-1.081E-01	% P	1.258E+00	3.76E-01	G
		70.83	1.140E-01	%	1.761E+00	5.24E-01	G
		82.50	-9.794E-01	%	2.991E+00	9.03E-01	G
TL-208	3.3839E-01						
		583.14	3.270E-01	@(P	5.118E-02	2.63E-02	G
		510.72	3.821E-01	*(P	2.128E-01	8.05E-02	G
PB-212	6.6095E-01						
		238.63	6.586E-01	(P	1.098E-01	4.15E-02	G K
							Energy duplication
		77.11	6.668E-01	(	3.663E-01	1.16E-01	G
		74.81	1.107E+00	& P	6.965E-01	2.19E-01	G
PB-214	5.3202E-01						
		351.99	5.362E-01	(P	1.003E-01	4.18E-02	G K
		295.22	5.240E-01	(P	2.114E-01	7.26E-02	G
							Energy duplication
		77.11	1.077E+00	+ P	6.001E-01	1.90E-01	G
		241.92	-3.181E-01	% P	7.166E-01	2.17E-01	G
BI-212	2.8226E-01						
		727.17	2.823E-01	%(P	3.794E-01	1.19E-01	G K
		1620.56	1.937E-02	&	1.629E+00	4.20E-01	G
		785.42	1.576E+00	% P	2.475E+00	7.68E-01	G
BI-214	5.0818E-01						
		609.32	5.082E-01	(P	8.008E-02	4.15E-02	G K
		1764.51	6.391E-01	+ P	1.651E-01	1.12E-01	G
		1120.28	8.470E-01	+ P	4.038E-01	1.63E-01	G
RA-224	1.0474E+00						
		241.00	1.047E+00	(P	1.320E+00	4.06E-01	G
RA-226	1.3965E+00						
							Energy duplication
		185.99	1.397E+00	(	1.276E+00	3.98E-01	G
AC-228	9.2909E-01						
		911.07	9.982E-01	(P	1.860E-01	9.69E-02	G K
		968.90	8.422E-01	(P	2.948E-01	1.20E-01	G
		338.40	8.884E-01	(P	3.382E-01	1.36E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.2644E-01
                          236.00-2.264E-01 %(P 5.100E-01 1.54E-01 G K
                          256.25-5.405E-02 % P 5.187E-01 1.53E-01 G

PA-234      -5.0357E-05
                           98.44-5.036E-05 &(  2.009E-01 5.99E-02 G K
                          946.00 7.540E-03 %   2.519E-01 7.03E-02 G
                          131.28-3.698E-02 %   2.372E-01 7.11E-02 G
                           94.67-1.469E-01 %   3.408E-01 1.03E-01 G
                          883.24 8.003E-02 %   4.220E-01 1.22E-01 G
                          926.70 1.202E-01 %   4.656E-01 1.36E-01 G
                          569.26 1.682E-03 &   4.296E-01 1.23E-01 G

TH-234       1.1078E+00
                           63.29 5.217E-01 %(P 2.345E+00 7.03E-01 G K
                           92.80 1.438E+00 *(P 1.793E+00 5.49E-01 G
                           92.38 1.612E+00 &(P 2.130E+00 6.51E-01 G

AM-241      -9.1254E-02
                           59.54-9.125E-02 &(P 3.305E-01 9.94E-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 - 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	1.2444E-01	1.3598E-01	3.6513E-01	3.6521E-01	3.738E-01
K-40		1.4948E+01	1.4948E+01	1.7396E+00	1.9338E+00	
MN-54	#A	8.9041E-03	9.0402E-03	4.7621E-02	4.7624E-02	5.412E-02
CO-57	#B	1.0275E-02	1.0456E-02	4.5789E-02	4.5792E-02	5.001E-02
CO-60	#F	5.5536E-02	5.5673E-02	5.2218E-02	5.2313E-02	5.035E-02
Sr-85	#A	-9.8337E-03	-1.0579E-02	4.9967E-02	4.9971E-02	5.253E-02
Kr-85	#A	-2.5201E+02	-2.5202E+02	1.3068E+03	1.3069E+03	1.218E+03
Y-88	#B	5.6514E-04	5.9082E-04	3.9660E-02	3.9660E-02	4.927E-02
NB-94	#B	6.3734E-03	6.3734E-03	3.2367E-02	3.2369E-02	3.814E-02
Ag-108M	#B	1.4723E-03	1.4724E-03	8.0026E-02	8.0026E-02	9.151E-02
CD-109	A	7.4817E-01	7.5603E-01	9.4691E-01	9.4784E-01	
SN-113	#B	-1.1547E-03	-1.2032E-03	6.0979E-02	6.0979E-02	6.711E-02
SB-125	#B	-3.0224E-02	-3.0366E-02	1.3320E-01	1.3321E-01	1.419E-01
I-131	#B	-1.0187E-02	-1.8361E-02	7.8137E-02	7.8143E-02	4.884E-02
CS-134	#A	-5.1877E-02	-5.2204E-02	2.2033E-02	2.2230E-02	8.007E-03
CS-137	#	6.0645E-02	6.0672E-02	5.1958E-02	5.2071E-02	5.242E-02
CE-139	#A	-2.2668E-04	-2.3463E-04	2.0999E-01	2.0999E-01	5.225E-02
EU-152	#B	2.8927E-02	2.8956E-02	1.3617E-01	1.3618E-01	1.513E-01
EU-154	#B	2.7401E-02	2.7443E-02	9.5486E-02	9.5498E-02	1.058E-01
EU-155	#	2.0391E-01	2.0444E-01	1.6157E-01	1.6197E-01	1.730E-01
HG-203	#B	2.7601E-03	3.0555E-03	4.7070E-02	4.7071E-02	4.818E-02
TL-208	#	3.3839E-01	3.3839E-01	8.1568E-02	8.3779E-02	
PB-212	#	6.6095E-01	6.6095E-01	1.2488E-01	1.3034E-01	1.098E-01
PB-214	#	5.3202E-01	5.3202E-01	1.2434E-01	1.2793E-01	1.003E-01
BI-212	#B	2.8226E-01	2.8226E-01	3.5812E-01	3.5848E-01	3.794E-01
BI-214		5.0818E-01	5.0818E-01	1.2450E-01	1.2777E-01	
RA-224	#A	1.0474E+00	1.0474E+00	1.2181E+00	1.2195E+00	1.320E+00
RA-226	#	1.3965E+00	1.3965E+00	1.1944E+00	1.1970E+00	1.276E+00
AC-228		9.2909E-01	9.2909E-01	2.1426E-01	2.2059E-01	
TH-227	#B	-2.2644E-01	-2.2644E-01	4.7019E-01	4.7036E-01	5.100E-01
PA-234	#B	-5.0357E-05	-5.0357E-05	1.7958E-01	1.7958E-01	2.009E-01
TH-234	#B	1.1078E+00	1.1078E+00	1.2693E+00	1.2708E+00	2.345E+00
AM-241	#A	-9.1252E-02	-9.1254E-02	3.1137E-01	3.1141E-01	3.304E-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 1999.1 keV) 1.6723532E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 1.6723532E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_30MAY2006_1017.An1

Sample description
FSS-NOL-05-01-020-F

Spectrum Filename: C:\GammaVision\Spectra\101F_30MAY2006_1017.An1

Acquisition information
Start time: 30-May-2006 10:18:01
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/channel^2

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: 1.8310E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8310E+03) =
5.4615E+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	23-May-2006 10:35:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1698

***** 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
74.72	176.	25.68	1.50	1.654E-02	70.83	3.520	2.711E+00	HG203
					74.81	9.600	8.192E-01	PB212
77.06	267.	17.28	1.50	1.720E-02	77.11	10.700	1.070E+00	PB214
					77.11	17.500	6.542E-01	PB212
77.06	271.	17.28	1.50	1.720E-02	77.11	10.700	1.070E+00	PB214
					77.11	17.500	6.633E-01	PB212
83.71	64.	37.79	0.00	1.865E-02				
86.63	110.	26.84	1.01	1.912E-02	86.45	32.740	1.308E-01	EU155
89.66	73.	38.19	1.02	1.953E-02				
93.50	120.	24.43	1.02	1.996E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.71	112.	30.42	1.31	1.860E-02				
185.71	112.	30.42	1.31	1.860E-02	185.99	3.280	1.350E+00	RA226
209.05	58.	37.34	1.11	1.723E-02				
238.72	734.	4.42	1.12	1.557E-02	238.63	43.100	7.999E-01	PB212
241.56	117.	18.99	1.12	1.542E-02	241.00	3.900	1.421E+00	RA224
					241.92	7.470	PBC<MDA	PB214
269.96	75.	21.63	1.14	1.402E-02				
295.20	184.	12.36	1.16	1.292E-02				
295.20	184.	12.36	1.16	1.292E-02	295.22	19.200	5.433E-01	PB214
300.30	91.	24.10	1.82	1.272E-02				
338.29	186.	13.16	1.19	1.135E-02	338.40	12.010	9.952E-01	AC228
351.85	302.	8.68	1.01	1.093E-02				
351.85	302.	8.68	1.01	1.093E-02	351.99	37.100	5.463E-01	PB214
409.42	32.	38.27	1.84	9.422E-03				
462.47	63.	29.48	0.98	8.360E-03				
462.47	63.	29.48	0.98	8.360E-03	463.51	10.000	5.472E-01	SB125

510.31	137.	13.76	1.10	7.596E-03	510.72	22.500	5.211E-01	TL208
582.89	269.	7.56	1.16	6.687E-03	583.14	86.000	3.418E-01	TL208
609.03	231.	10.43	1.27	6.416E-03	609.32	46.090	5.741E-01	BI214
661.67	29.	38.41	1.50	5.937E-03	661.62	84.620	PBC<MDA	CS137
726.98	58.	28.62	1.61	5.444E-03	727.17	11.800	6.621E-01	BI212
910.62	166.	11.77	1.34	4.448E-03	911.07	29.000	9.394E-01	AC228
968.66	82.	14.35	1.62	4.213E-03	968.90	17.460	8.207E-01	AC228
1120.25	51.	21.69	1.22	3.711E-03	1120.28	15.040	6.667E-01	BI214
1460.19	653.	4.03	1.98	2.943E-03	1460.75	10.700	1.526E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1763.57	13.	39.75	2.11	2.481E-03	1764.51	15.920	PBC<MDA	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	
178.90	89.63	347.	73.	0.036	114.58	1.015	PB-214	lD
417.77	209.05	219.	58.	0.029	112.01	1.113	AC-228	
477.13	238.67	159.	734.	0.367	13.26	1.122	PB-212	D
482.81	241.51	187.	117.	0.058	56.98	1.124	PB-214	D
539.44	269.86	174.	91.	0.046	73.98	1.478	AC-228	s
600.35	300.30	156.	91.	0.045	66.22	1.821	PB-212	s
818.68	409.42	59.	32.	0.016	114.82	1.842	AC-228	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	149.00	74.72	1001.	176.	0.088	77.04	1.499
PB-214	153.79	77.11	962.	267.	0.133	51.84	1.499D
PB-212	153.79	77.11	958.	271.	0.135	51.84	1.499D
EU-155	173.38	86.90	961.	120.	0.060	113.19	1.499s
TH-234	185.73	93.07	868.	166.	0.083	73.80	1.499s
TH-234	185.74	93.08	863.	153.	0.076	81.70	1.499s
RA-226	371.90	186.12	479.	110.	0.055	89.43	1.499
PB-212	477.06	238.68	413.	557.	0.278	19.78	1.499
RA-224	483.00	241.65	483.	90.	0.045	107.72	1.499s
PB-214	590.24	295.24	193.	172.	0.086	40.64	1.499
AC-228	676.36	338.29	155.	184.	0.092	39.48	1.190
PB-214	703.59	351.90	99.	266.	0.133	24.06	1.499
SB-125	925.86	462.98	78.	44.	0.022	92.93	1.499
TL-208	1020.55	510.31	93.	121.	0.060	41.28	1.102s
TL-208	1165.80	582.89	52.	266.	0.133	22.67	1.163
BI-214	1218.10	609.03	101.	230.	0.115	31.30	1.271
CS-137	1323.42	661.67	51.	29.	0.014	115.24	1.499s
BI-212	1454.12	726.98	67.	58.	0.029	85.86	1.607
AC-228	1821.59	910.62	56.	164.	0.082	35.32	1.341
AC-228	1937.73	968.66	28.	82.	0.041	43.06	1.621
BI-214	2241.09	1120.25	26.	50.	0.025	65.06	1.220

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2921.39	1460.19	12.	651.	0.326	12.09	1.983
BI-214	3528.58	1763.57	8.	13.	0.007	119.24	2.106s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		6.7981E-02					
			477.56	6.798E-02	%(	4.147E-01 1.21E-01	G
K-40		1.5263E+01					
			1460.75	1.526E+01	(P	4.400E-01 6.17E-01	G
MN-54		1.4185E-02					
			834.81	1.418E-02	&(P	4.563E-02 1.34E-02	G
CO-57		1.2038E-02					
			122.07	1.204E-02	%(	5.252E-02 1.58E-02	G K
			136.43	-9.849E-02	%	4.171E-01 1.25E-01	G
CO-60		-2.2583E-03					
			1332.51	-2.258E-03	&(P	6.577E-02 1.82E-02	G K
			1173.23	-3.904E-05	% P	8.073E-02 2.28E-02	G K
Sr-85		-3.4027E-02					
			514.00	-3.403E-02	%(	6.792E-02 2.06E-02	G
Kr-85		-7.5562E+02					
			513.99	-7.556E+02	%(P	1.460E+03 4.42E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	&(	2.396E-02 3.25E-03	G K
			898.02	-1.939E-02	& P	7.090E-02 2.08E-02	G
NB-94		4.7690E-03					
			871.10	4.769E-03	&(P	5.574E-02 1.58E-02	G K
			702.50	-2.934E-03	% P	5.351E-02 1.53E-02	G K
Ag-108M		-1.5866E-03					
			722.95	-1.587E-03	&(	1.030E-01 3.01E-02	G K
			614.37	-6.201E-03	% P	4.919E-02 1.41E-02	G
			433.93	2.051E-02	&	3.229E-02 1.00E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-1.0236E-01						
		88.04	-1.024E-01	%(P	1.638E+00	4.90E-01	G
SN-113	7.9511E-03						
		391.71	7.951E-03	&(	5.405E-02	1.57E-02	G K
		255.04	4.773E-01	% P	1.964E+00	5.85E-01	G
SB-125	1.1455E-01						
		427.95	2.116E-02	%(P	1.241E-01	3.62E-02	G K
		600.77	-3.258E-02	% P	2.755E-01	7.96E-02	G
		636.15	-5.903E-02	% P	4.163E-01	1.20E-01	G
		463.51	3.910E-01	(P	3.893E-01	1.25E-01	G
		176.29	1.068E-01	% P	6.492E-01	1.93E-01	G
I-131	-1.9036E-02						
		364.48	-1.904E-02	%(	8.076E-02	2.39E-02	G K
		636.97	-1.703E-01	&	1.180E+00	3.41E-01	G
		284.29	-3.534E-01	%	1.211E+00	3.62E-01	G
CS-134	1.3496E-02						
		604.66	1.350E-02	&(P	4.796E-02	1.41E-02	G K
		795.76	-1.317E-02	% P	5.731E-02	1.66E-02	G
		569.29	7.884E-02	% P	2.181E-01	6.47E-02	G
		801.84	-1.191E-01	%	5.948E-01	1.72E-01	G
CS-137	4.2129E-02						
		661.62	4.213E-02	*(P	5.267E-02	1.67E-02	G
CE-139	-9.3484E-03						
		165.85	-9.348E-03	%(P	5.600E-02	1.67E-02	G
EU-152	3.3808E-02						
		121.78	3.381E-02	&(P	1.468E-01	4.40E-02	G K
		344.30	-4.235E-03	& P	1.085E-01	3.09E-02	G
		1408.08	1.963E-02	& P	1.965E-01	5.22E-02	G
		964.00	-3.153E-01	% P	6.229E-01	1.89E-01	G
		1112.07	-1.580E-03	& P	4.269E-01	1.17E-01	G
		778.90	1.092E-01	& P	3.385E-01	9.98E-02	G
EU-154	2.7206E-02						
		123.10	2.721E-02	%(P	1.066E-01	3.20E-02	G K
		1274.80	-3.251E-02	% P	1.796E-01	5.13E-02	G
		723.30	-2.494E-03	& P	4.476E-01	1.30E-01	G
		1004.80	-3.690E-02	% P	2.989E-01	8.44E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.4179E-01						
		86.45	1.418E-01	*(	1.742E-01	5.35E-02	G K
		105.31	1.772E-02	%	1.621E-01	4.82E-02	G
HG-203	3.2846E-02						
		279.17	3.285E-02	&(	4.655E-02	1.44E-02	G K
		72.87	-4.715E-01	% P	1.329E+00	4.01E-01	G
		70.83	5.961E-01	&	2.047E+00	6.16E-01	G
		82.50	-1.211E+00	%	3.017E+00	9.13E-01	G
TL-208	3.4179E-01						
		583.14	3.418E-01	(P	4.653E-02	2.60E-02	G
		510.72	5.211E-01	+ P	2.064E-01	8.12E-02	G
PB-212	6.2683E-01						
		238.63	6.120E-01	(P	1.071E-01	4.08E-02	G K
							Energy duplication
		77.11	6.633E-01	(	3.602E-01	1.15E-01	G
		74.81	8.192E-01	& P	6.978E-01	2.17E-01	G
PB-214	4.9355E-01						
		351.99	4.837E-01	(P	8.916E-02	3.91E-02	G K
		295.22	5.126E-01	(P	2.006E-01	7.02E-02	G
							Energy duplication
		77.11	1.070E+00	+ P	5.902E-01	1.87E-01	G
		241.92	6.493E-02	% P	7.767E-01	2.31E-01	G
BI-212	6.6215E-01						
		727.17	6.621E-01	(P	4.707E-01	1.92E-01	G K
		1620.56	8.635E-02	%	1.586E+00	4.10E-01	G
		785.42	1.457E+00	% P	2.286E+00	7.12E-01	G
BI-214	5.9686E-01						
		609.32	5.741E-01	(P	1.238E-01	6.02E-02	G K
		1764.51	2.461E-01	- P	3.009E-01	1.01E-01	G
		1120.28	6.667E-01	(P	3.475E-01	1.46E-01	G
RA-224	1.0994E+00						
		241.00	1.099E+00	(P	1.288E+00	3.98E-01	G
RA-226	1.3274E+00						
		185.99	1.327E+00	(	1.268E+00	3.96E-01	G
AC-228	9.1544E-01						
		911.07	9.394E-01	(P	2.149E-01	1.12E-01	G K
		968.90	8.207E-01	(P	2.756E-01	1.19E-01	G
		338.40	9.952E-01	(P	3.290E-01	1.32E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.5953E-01
                          236.00-1.595E-01 &(P 4.669E-01 1.41E-01 G K
                          256.25-1.570E-01 % P 6.202E-01 1.85E-01 G

PA-234       5.8104E-04
                           98.44 5.810E-04 &(  1.677E-01 4.97E-02 G K
                          946.00-3.255E-02 %   2.986E-01 8.52E-02 G
                          131.28 6.623E-04 &   2.137E-01 6.34E-02 G
                           94.67-1.040E-01 &   3.209E-01 9.67E-02 G
                          883.24 8.354E-02 &   4.288E-01 1.24E-01 G
                          926.70 0.000E+00 %   4.554E-01 1.26E-01 G
                          569.26 1.177E-01 %   3.495E-01 1.04E-01 G

TH-234       1.3171E+00
                           63.29 1.641E-01 %(P 2.283E+00 6.79E-01 G K
                           92.80 1.889E+00  (P 1.726E+00 5.35E-01 G
                           92.38 2.400E+00 &(P 2.025E+00 6.29E-01 G

AM-241      -5.8173E-02
                           59.54-5.817E-02 &(P 3.031E-01 9.07E-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:                      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
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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	6.2086E-02	6.7981E-02	3.6192E-01	3.6194E-01	3.787E-01
K-40		1.5263E+01	1.5263E+01	1.8522E+00	2.0432E+00	
MN-54	#A	1.3966E-02	1.4185E-02	4.0139E-02	4.0147E-02	4.493E-02
CO-57	#B	1.1824E-02	1.2038E-02	4.7271E-02	4.7276E-02	5.159E-02
CO-60	#B	-2.2526E-03	-2.2583E-03	6.5121E-02	6.5121E-02	6.560E-02
Sr-85	#A	-3.1578E-02	-3.4027E-02	6.1904E-02	6.1934E-02	6.303E-02
Kr-85	#A	-7.5558E+02	-7.5562E+02	1.4236E+03	1.4243E+03	1.460E+03
Y-88	#B	0.0000E+00	0.0000E+00	9.7512E-03	9.7529E-03	2.289E-02
NB-94	#B	4.7690E-03	4.7690E-03	4.7506E-02	4.7506E-02	5.574E-02
Ag-108M	#B	-1.5864E-03	-1.5866E-03	9.0217E-02	9.0217E-02	1.030E-01
CD-109	#A	-1.0127E-01	-1.0236E-01	1.6126E+00	1.6126E+00	1.621E+00
SN-113	#B	7.6235E-03	7.9511E-03	4.7139E-02	4.7142E-02	5.183E-02
SB-125	#B	1.1400E-01	1.1455E-01	1.0995E-01	1.1014E-01	1.235E-01
I-131	#B	-1.0422E-02	-1.9036E-02	7.1554E-02	7.1562E-02	4.421E-02
CS-134	#B	1.3410E-02	1.3496E-02	4.2382E-02	4.2389E-02	4.765E-02
CS-137	#A	4.2111E-02	4.2129E-02	5.0045E-02	5.0102E-02	5.264E-02
CE-139	#A	-9.0248E-03	-9.3484E-03	5.1910E-02	5.1913E-02	5.406E-02
EU-152	#B	3.3772E-02	3.3808E-02	1.3204E-01	1.3205E-01	1.466E-01
EU-154	#B	2.7163E-02	2.7206E-02	9.6034E-02	9.6045E-02	1.065E-01
EU-155	#A	1.4142E-01	1.4179E-01	1.6050E-01	1.6069E-01	1.738E-01
HG-203	#B	2.9602E-02	3.2846E-02	4.3170E-02	4.3210E-02	4.196E-02
TL-208		3.4179E-01	3.4179E-01	7.8165E-02	8.0515E-02	
PB-212	#	6.2683E-01	6.2683E-01	1.2536E-01	1.3027E-01	1.071E-01
PB-214	#	4.9355E-01	4.9355E-01	1.1766E-01	1.2092E-01	8.916E-02
BI-212		6.6215E-01	6.6215E-01	5.7521E-01	5.7643E-01	
BI-214		5.9686E-01	5.9686E-01	1.8774E-01	1.9074E-01	
RA-224	#A	1.0994E+00	1.0994E+00	1.1937E+00	1.1953E+00	1.288E+00
RA-226	#	1.3274E+00	1.3274E+00	1.1871E+00	1.1895E+00	1.268E+00
AC-228		9.1544E-01	9.1544E-01	2.1051E-01	2.1677E-01	
TH-227	#B	-1.5953E-01	-1.5953E-01	4.3150E-01	4.3160E-01	4.669E-01
PA-234	#B	5.8104E-04	5.8104E-04	1.4919E-01	1.4919E-01	1.677E-01
TH-234	#B	1.3171E+00	1.3171E+00	1.0357E+00	1.0383E+00	2.283E+00
AM-241	#A	-5.8171E-02	-5.8173E-02	2.9265E-01	2.9267E-01	3.031E-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 (269.6 to 1999.1 keV) 1.7779469E+01 pCi/gm
Total Decayed Activity (269.6 to 1999.1 keV) 1.7779469E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_30MAY2006_1056.An1

Sample description
FSS-NOL-05-01-012-F

Spectrum Filename: C:\GammaVision\Spectra\101F_30MAY2006_1056.An1

Acquisition information
Start time: 30-May-2006 10:57:41
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/channel^2

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: 1.8440E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8440E+03) =
5.4230E+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	23-May-2006 09:35:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1987

***** 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
74.70	208.	23.16	1.50	1.654E-02	74.81	9.600	9.597E-01	PB212
77.09	309.	15.64	1.50	1.720E-02	77.11	10.700	1.231E+00	PB214
					77.11	17.500	7.525E-01	PB212
77.09	313.	15.64	1.50	1.720E-02	77.11	10.700	1.231E+00	PB214
					77.11	17.500	7.615E-01	PB212
87.27	125.	24.05	1.01	1.921E-02				
89.77	108.	28.15	1.02	1.954E-02	88.04	3.790	PBC<MDA	CD109
93.05	132.	21.85	1.02	1.991E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.52	83.	37.86	1.22	2.109E-02				
185.92	160.	22.77	1.15	1.859E-02				
185.92	160.	22.77	1.15	1.859E-02	185.99	3.280	1.919E+00	RA226
208.94	67.	37.89	0.99	1.724E-02				
238.56	393.	9.02	1.50	1.540E-02	238.63	43.100	PBC<MDA	PB212
238.66	761.	4.26	1.12	1.557E-02	238.63	43.100	8.237E-01	PB212
241.65	140.	16.55	1.12	1.542E-02	241.00	3.900	1.695E+00	RA224
270.29	69.	38.70	1.52	1.400E-02				
295.18	174.	12.82	1.16	1.292E-02				
295.18	174.	12.82	1.16	1.292E-02	295.22	19.200	5.076E-01	PB214
338.51	154.	13.02	1.14	1.135E-02	338.40	12.010	8.167E-01	AC228
352.01	322.	8.78	1.23	1.092E-02	351.99	37.100	5.781E-01	PB214
409.37	51.	37.09	1.19	9.423E-03				
463.18	85.	26.12	0.74	8.348E-03				
463.18	85.	26.12	0.74	8.348E-03	463.51	10.000	7.376E-01	SB125
510.57	99.	19.55	1.73	7.593E-03	510.72	22.500	3.560E-01	TL208
582.93	240.	10.61	1.43	6.687E-03	583.14	86.000	3.024E-01	TL208
609.14	168.	10.17	1.17	6.414E-03	609.32	46.090	4.143E-01	BI214

661.55	164.	13.42	1.41	5.938E-03	661.62	84.620	2.374E-01	CS137
727.05	73.	22.41	1.19	5.444E-03	727.17	11.800	8.298E-01	BI212
860.34	47.	28.32	1.04	4.678E-03				
910.66	139.	15.07	1.99	4.448E-03	911.07	29.000	7.794E-01	AC228
968.30	126.	13.75	1.67	4.214E-03	968.90	17.460	1.249E+00	AC228
1119.18	70.	27.28	1.10	3.714E-03	1120.28	15.040	9.207E-01	BI214
1237.22	56.	30.22	1.20	3.404E-03				
1460.22	658.	4.05	1.78	2.943E-03	1460.75	10.700	1.526E+01	K40
1763.73	28.	18.90	1.67	2.481E-03	1764.51	15.920	5.113E-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	
174.11	87.21	388.	125.	0.062	72.14	1.014	PB-214	lD
179.11	89.71	407.	108.	0.054	84.45	1.016	PB-214	lD
417.56	208.94	275.	67.	0.034	113.67	0.994	AC-228	
477.03	238.64	144.	760.	0.380	12.77	1.122	PB-212	D
540.31	270.29	236.	69.	0.034	116.09	1.519	AC-228	s
818.58	409.37	116.	51.	0.026	111.28	1.188	AC-228	s
1720.97	860.34	42.	47.	0.023	84.97	1.037	TL-208	
2475.18	1237.22	62.	56.	0.028	90.66	1.203	J-133	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	148.97	74.70	1118.	208.	0.104	69.49	1.499
PB-214	153.79	77.11	1045.	309.	0.155	46.92	1.499D
PB-212	153.79	77.11	1041.	313.	0.156	46.92	1.499D
TH-234	185.30	92.86	970.	117.	0.059	105.78	1.499
TH-234	185.33	92.87	910.	133.	0.066	95.27	1.499
RA-226	371.77	186.06	498.	110.	0.055	90.47	1.499
PB-212	476.91	238.60	400.	588.	0.294	18.77	1.499
RA-224	481.70	241.00	386.	124.	0.062	71.84	1.123D
PB-214	476.83	238.56	434.	393.	0.197	27.05	1.499s
PB-214	590.29	295.27	216.	167.	0.083	43.46	1.499
AC-228	676.80	338.51	110.	152.	0.076	39.05	1.138
PB-214	703.64	351.92	122.	288.	0.144	23.81	1.499
SB-125	926.04	463.07	104.	40.	0.020	114.15	1.499s
TL-208	1021.07	510.57	111.	83.	0.041	58.64	1.728s
TL-208	1165.88	582.93	107.	237.	0.119	31.84	1.430
BI-214	1218.32	609.14	53.	167.	0.084	30.51	1.169
CS-137	1323.19	661.55	89.	163.	0.081	40.25	1.409
BI-212	1454.25	727.05	62.	73.	0.036	67.22	1.189
AC-228	1821.67	910.66	77.	137.	0.069	45.22	1.991s
AC-228	1937.00	968.30	54.	125.	0.063	41.25	1.669
BI-214	2238.94	1119.18	67.	70.	0.035	81.83	1.105s
K-40	2921.45	1460.22	13.	656.	0.328	12.15	1.776

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3528.89	1763.73	0.	28.	0.014	56.69	1.666

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.3073E-01					
			477.56	1.307E-01	&(	4.605E-01 1.37E-01	G
K-40		1.5260E+01					
			1460.75	1.526E+01	(P	4.598E-01 6.20E-01	G
MN-54		-2.5688E-04					
			834.81	-2.569E-04	%(P	4.931E-02 1.36E-02	G
CO-57		1.1311E-02					
			122.07	1.131E-02	%(	5.193E-02 1.56E-02	G K
			136.43	7.033E-02	%	4.165E-01 1.25E-01	G
CO-60		1.1970E-02					
			1332.51	1.197E-02	%(P	6.003E-02 1.71E-02	G K
			1173.23	2.250E-03	% P	8.677E-02 2.47E-02	G K
Sr-85		-2.5761E-02					
			514.00	-2.576E-02	&(	6.538E-02 1.97E-02	G
Kr-85		-5.7815E+02					
			513.99	-5.782E+02	&(P	1.405E+03 4.21E+02	G
Y-88		-3.7431E-03					
			1836.01	-3.743E-03	%(	5.011E-02 1.30E-02	G K
			898.02	2.294E-02	% P	4.896E-02 1.48E-02	G
NB-94		-2.1119E-04					
			871.10	-2.112E-04	%(P	5.210E-02 1.45E-02	G K
			702.50	9.910E-03	& P	4.859E-02 1.41E-02	G K
Ag-108M		-2.5635E-02					
			722.95	-2.564E-02	&(	7.443E-02 2.22E-02	G K
			614.37	-9.841E-04	% P	3.819E-02 1.06E-02	G
			433.93	0.000E+00	&	4.626E-02 1.33E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	8.8904E-02						
		88.04	8.890E-02	&(P	1.589E+00	4.75E-01	G
SN-113	1.2039E-02						
		391.71	1.204E-02	&(	6.576E-02	1.93E-02	G K
		255.04	-1.796E-01	& P	2.064E+00	6.09E-01	G
SB-125	1.2435E-01						
		427.95	4.773E-02	&(P	1.443E-01	4.30E-02	G K
		600.77	9.606E-02	% P	2.211E-01	6.66E-02	G
		636.15	3.138E-02	% P	3.486E-01	9.85E-02	G
		463.51	3.511E-01	*(P	4.431E-01	1.38E-01	G
		176.29	1.728E-01	% P	6.464E-01	1.94E-01	G
I-131	2.9116E-02						
		364.48	2.912E-02	&(	8.476E-02	2.54E-02	G K
		636.97	1.466E-01	%	1.198E+00	3.45E-01	G
		284.29	1.687E-01	%	1.136E+00	3.35E-01	G
CS-134	-2.7730E-02						
		604.66	-2.773E-02	&(P	6.394E-02	1.92E-02	G K
		795.76	-8.501E-04	% P	6.861E-02	1.93E-02	G
		569.29	-1.799E-02	& P	3.177E-01	9.10E-02	G
		801.84	1.256E-01	%	4.598E-01	1.34E-01	G
CS-137	2.3744E-01						
		661.62	2.374E-01	(P	6.821E-02	3.20E-02	G
CE-139	1.6710E-02						
		165.85	1.671E-02	%(P	5.442E-02	1.64E-02	G
EU-152	1.6136E-02						
		121.78	1.614E-02	%(P	1.461E-01	4.36E-02	G K
		344.30	6.067E-02	% P	1.427E-01	4.30E-02	G
		1408.08	1.030E-01	% P	2.224E-01	6.73E-02	G
		964.00	-1.612E-03	& P	6.068E-01	1.74E-01	G
		1112.07	-1.128E-01	% P	4.882E-01	1.42E-01	G
		778.90	-8.553E-02	% P	3.902E-01	1.13E-01	G
EU-154	2.6058E-02						
		123.10	2.606E-02	%(P	9.818E-02	2.95E-02	G K
		1274.80	3.753E-02	% P	1.840E-01	5.30E-02	G
		723.30	-1.076E-01	& P	3.541E-01	1.05E-01	G
		1004.80	-3.755E-03	& P	3.013E-01	8.32E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	7.2477E-03						
		86.45	7.248E-03	%(	1.678E-01	5.00E-02	G K
		105.31	8.179E-02	%	2.133E-01	6.44E-02	G
HG-203	-1.3364E-02						
		279.17	-1.336E-02	%(	5.494E-02	1.64E-02	G K
		72.87	-3.049E-02	% P	1.673E+00	5.01E-01	G
		70.83	3.128E-02	%	1.815E+00	5.39E-01	G
		82.50	-7.660E-02	%	2.978E+00	8.88E-01	G
TL-208	3.1353E-01						
		583.14	3.024E-01	(P	6.484E-02	3.24E-02	G
		510.72	3.560E-01	*(P	2.223E-01	8.30E-02	G
PB-212	6.7652E-01						
		238.63	6.420E-01	(P	1.047E-01	4.06E-02	G K
							Energy duplication
		77.11	7.615E-01	(	3.726E-01	1.19E-01	G
		74.81	9.597E-01	& P	7.316E-01	2.28E-01	G
PB-214	5.1145E-01						
		351.99	5.211E-01	(P	9.798E-02	4.16E-02	G K
		295.22	4.927E-01	(P	2.102E-01	7.21E-02	G
							Energy duplication
		77.11	1.231E+00	+ P	6.104E-01	1.95E-01	G
		241.92	2.504E+00	+ P	6.359E-01	2.26E-01	G
BI-212	8.2977E-01						
		727.17	8.298E-01	(P	4.505E-01	1.88E-01	G K
		1620.56	0.000E+00	%	7.324E-01	9.94E-02	G
		785.42	1.189E+00	% P	2.107E+00	6.49E-01	G
BI-214	4.3921E-01						
		609.32	4.143E-01	(P	9.076E-02	4.24E-02	G K
		1764.51	5.113E-01	(P	1.367E-01	9.81E-02	G
		1120.28	9.207E-01	+ P	5.360E-01	2.52E-01	G
RA-224	1.5108E+00						
		241.00	1.511E+00	(P	1.146E+00	3.64E-01	G
RA-226	1.3256E+00						
		185.99	1.326E+00	(	1.282E+00	4.00E-01	G
AC-228	7.9030E-01						
		911.07	7.794E-01	(P	2.476E-01	1.19E-01	G K
		968.90	1.249E+00	+ P	3.670E-01	1.73E-01	G
		338.40	8.167E-01	(P	2.774E-01	1.08E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.3558E-01
                          236.00-2.356E-01 &(P 4.947E-01 1.50E-01 G K
                          256.25-6.924E-02 % P 6.164E-01 1.82E-01 G

PA-234       4.5203E-02
                           98.44 4.520E-02 %(  1.531E-01 4.60E-02 G K
                          946.00 1.063E-01 %   2.215E-01 6.73E-02 G
                          131.28-5.701E-02 %   2.331E-01 7.00E-02 G
                           94.67-2.270E-02 %   3.400E-01 1.02E-01 G
                          883.24-2.922E-02 %   3.901E-01 1.09E-01 G
                          926.70-1.081E-04 %   3.179E-01 8.40E-02 G
                          569.26-2.193E-02 &   4.672E-01 1.34E-01 G

TH-234       1.3353E+00
                           63.29 8.769E-01 %(P 2.304E+00 6.94E-01 G K
                           92.80 1.630E+00  (P 1.759E+00 5.42E-01 G
                           92.38 1.687E+00  (P 2.124E+00 6.50E-01 G

AM-241      -5.8347E-02
                           59.54-5.835E-02 &(P 3.075E-01 9.20E-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 - 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	1.1928E-01	1.3073E-01	4.0955E-01	4.0962E-01	4.202E-01
K-40		1.5260E+01	1.5260E+01	1.8607E+00	2.0508E+00	
MN-54	#A	-2.5289E-04	-2.5688E-04	9.4746E-02	9.4746E-02	4.854E-02
CO-57	#B	1.1108E-02	1.1311E-02	4.6714E-02	4.6718E-02	5.100E-02
CO-60	#B	1.1939E-02	1.1970E-02	5.1405E-02	5.1410E-02	5.988E-02
Sr-85	#A	-2.3889E-02	-2.5761E-02	5.9030E-02	5.9047E-02	6.063E-02
Kr-85	#A	-5.7812E+02	-5.7815E+02	1.3856E+03	1.3860E+03	1.405E+03
Y-88	#B	-3.5752E-03	-3.7431E-03	3.9077E-02	3.9078E-02	4.787E-02
NB-94	#B	-2.1119E-04	-2.1119E-04	1.1589E-02	1.1589E-02	5.210E-02
Ag-108M	#B	-2.5633E-02	-2.5635E-02	6.6720E-02	6.6735E-02	7.442E-02
CD-109	#A	8.7950E-02	8.8904E-02	1.4248E+00	1.4248E+00	1.572E+00
SN-113	#B	1.1538E-02	1.2039E-02	5.8025E-02	5.8029E-02	6.302E-02
SB-125	#B	1.2375E-01	1.2435E-01	1.4710E-01	1.4727E-01	1.436E-01
I-131	#B	1.5845E-02	2.9116E-02	7.6054E-02	7.6072E-02	4.613E-02
CS-134	#B	-2.7550E-02	-2.7730E-02	6.0801E-02	6.0822E-02	6.353E-02
CS-137		2.3734E-01	2.3744E-01	9.6095E-02	9.7027E-02	
CE-139	#A	1.6126E-02	1.6710E-02	4.9093E-02	4.9102E-02	5.252E-02
EU-152	#B	1.6119E-02	1.6136E-02	1.3069E-01	1.3069E-01	1.459E-01
EU-154	#B	2.6016E-02	2.6058E-02	8.8380E-02	8.8391E-02	9.802E-02
EU-155	#B	7.2282E-03	7.2477E-03	1.5009E-01	1.5009E-01	1.673E-01
HG-203	#B	-1.2032E-02	-1.3364E-02	4.9111E-02	4.9117E-02	4.946E-02
TL-208		3.1353E-01	3.1353E-01	1.0084E-01	1.0238E-01	
PB-212	#	6.7652E-01	6.7652E-01	1.2831E-01	1.3388E-01	1.047E-01
PB-214	#	5.1145E-01	5.1145E-01	1.2259E-01	1.2595E-01	9.798E-02
BI-212		8.2977E-01	8.2977E-01	5.6301E-01	5.6495E-01	
BI-214		4.3921E-01	4.3921E-01	1.3487E-01	1.3713E-01	
RA-224		1.5108E+00	1.5108E+00	1.0917E+00	1.0950E+00	
RA-226	#	1.3256E+00	1.3256E+00	1.1992E+00	1.2016E+00	1.282E+00
AC-228		7.9030E-01	7.9030E-01	2.3938E-01	2.4351E-01	
TH-227	#B	-2.3558E-01	-2.3558E-01	4.5676E-01	4.5696E-01	4.947E-01
PA-234	#B	4.5203E-02	4.5203E-02	1.3796E-01	1.3799E-01	1.531E-01
TH-234	#B	1.3353E+00	1.3353E+00	1.2569E+00	1.2591E+00	2.304E+00
AM-241	#A	-5.8345E-02	-5.8347E-02	2.9671E-01	2.9673E-01	3.075E-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 (270.1 to 1999.1 keV) 1.9381361E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.9381466E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_30MAY2006_1137.An1

Sample description
FSS-NOL-05-01-013-F

Spectrum Filename: C:\GammaVision\Spectra\101F_30MAY2006_1137.An1

Acquisition information
Start time: 30-May-2006 11:38:31
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/channel^2

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: 1.8400E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8400E+03) =
5.4348E+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	24-May-2006 16:11:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1612

***** 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
74.32	142.	23.52	1.00	1.651E-02	70.83	3.520	2.134E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.32	341.	10.11	1.01	1.736E-02	77.11	10.700	1.344E+00	PB214
					77.11	17.500	8.309E-01	PB212
86.86	115.	25.48	1.01	1.914E-02	86.45	32.740	1.352E-01	EU155
89.77	71.	38.67	1.02	1.953E-02	88.04	3.790	PBC<MDA	CD109
93.26	134.	21.06	1.02	1.993E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.31	88.	38.71	0.72	2.109E-02				
186.88	115.	27.60	0.97	1.853E-02	185.99	3.280	1.386E+00	RA226
209.07	66.	41.52	0.87	1.723E-02				
238.72	780.	4.24	1.12	1.557E-02	238.63	43.100	8.465E-01	PB212
241.67	104.	21.66	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.82	46.	37.90	1.36	1.398E-02				
276.94	66.	39.43	1.18	1.370E-02				
295.30	177.	12.21	1.08	1.292E-02	295.22	19.200	5.188E-01	PB214
300.58	50.	37.40	0.90	1.271E-02				
338.44	173.	14.79	1.18	1.135E-02	338.40	12.010	9.187E-01	AC228
351.82	296.	9.70	1.08	1.093E-02				
351.82	296.	9.70	1.08	1.093E-02	351.99	37.100	5.328E-01	PB214
463.31	60.	26.66	1.00	8.345E-03				
463.31	60.	26.66	1.00	8.345E-03	463.51	10.000	5.140E-01	SB125
510.92	112.	17.31	1.84	7.588E-03	510.72	22.500	4.127E-01	TL208
582.94	209.	9.09	1.23	6.687E-03	583.14	86.000	2.638E-01	TL208
609.20	199.	10.75	1.49	6.414E-03	609.32	46.090	4.912E-01	BI214
661.05	67.	26.76	1.15	5.942E-03				

661.05	67.	26.76	1.15	5.942E-03	661.62	84.620	9.639E-02	CS137
726.38	79.	20.94	1.89	5.448E-03	727.17	11.800	9.002E-01	BI212
794.79	33.	29.83	1.50	5.016E-03	795.76	85.400	5.611E-02	CS134
910.67	166.	11.40	1.15	4.448E-03	911.07	29.000	9.348E-01	AC228
963.83	30.	29.17	1.61	4.231E-03				
963.83	30.	29.17	1.61	4.231E-03	964.00	14.580	PBC<MDA	EU152
968.71	79.	14.47	1.62	4.213E-03	968.90	17.460	7.780E-01	AC228
1120.02	42.	37.47	1.80	3.711E-03	1120.28	15.040	5.556E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.20	606.	4.12	1.84	2.943E-03	1460.75	10.700	1.409E+01	K40
1763.99	41.	15.62	1.62	2.481E-03	1764.51	15.920	7.541E-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	
148.21	74.72	486.	142.	0.071	70.57	1.004	BI-207	D
154.21	77.72	422.	341.	0.170	30.33	1.007	PB-214	D
179.12	89.64	342.	71.	0.036	116.00	1.016	PB-214	lD
258.22	129.31	472.	87.	0.044	110.48	0.717	AC-228	s
417.82	209.07	302.	66.	0.033	124.56	0.866	AC-228	
477.14	238.63	156.	780.	0.390	12.71	1.122	PB-212	D
483.04	241.58	204.	104.	0.052	64.99	1.124	PB-214	D
541.37	270.82	129.	46.	0.023	113.71	1.362	AC-228	
553.61	276.94	228.	66.	0.033	103.52	1.178	TL-208	
600.91	300.58	133.	50.	0.025	112.21	0.902	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	146.30	73.37	1073.	-166.	-0.083	87.11	1.499s
PB-212	149.40	74.92	1047.	201.	0.101	69.51	1.499
PB-214	153.79	77.11	908.	313.	0.157	43.64	1.499D
PB-212	153.79	77.11	904.	317.	0.158	43.64	1.499D
EU-155	173.63	87.03	936.	132.	0.066	101.90	1.499
TH-234	185.45	92.93	822.	155.	0.077	76.66	1.499s
TH-234	185.42	92.92	787.	162.	0.081	74.30	1.499s
RA-226	371.73	186.04	420.	96.	0.048	95.99	1.499s
PB-212	476.96	238.63	447.	572.	0.286	19.82	1.499D
PB-214	590.24	295.25	192.	179.	0.089	39.38	1.499
AC-228	676.67	338.44	167.	171.	0.085	44.36	1.182
PB-214	703.70	351.95	116.	256.	0.128	25.65	1.499s
SB-125	926.19	463.15	65.	52.	0.026	75.40	1.499s
TL-208	1021.79	510.92	104.	96.	0.048	51.94	1.843s
TL-208	1165.89	582.94	58.	207.	0.103	27.26	1.226
BI-214	1218.43	609.20	79.	198.	0.099	32.25	1.494
CS-137	1323.19	661.55	61.	31.	0.015	116.35	1.499

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	1452.91	726.38	62.	79.	0.039	62.83	1.893s
CS-134	1589.80	794.79	32.	33.	0.016	89.48	1.502s
AC-228	1821.69	910.67	50.	164.	0.082	34.19	1.148s
EU-152	1928.91	964.25	51.	28.	0.014	119.64	1.612s
AC-228	1935.60	967.59	42.	121.	0.060	39.64	1.522s
BI-214	2240.62	1120.02	63.	42.	0.021	112.40	1.801s
K-40	2921.42	1460.20	6.	604.	0.302	12.35	1.839
BI-214	3529.41	1763.99	0.	41.	0.020	46.85	1.624

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	Peak Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		2.0929E-02					
			477.56	2.093E-02	%(	3.873E-01 1.11E-01	G
K-40		1.4092E+01					
			1460.75	1.409E+01	(P	3.268E-01 5.82E-01	G
MN-54		4.5872E-03					
			834.81	4.587E-03	&(P	4.819E-02 1.36E-02	G
CO-57		-1.2370E-03					
			122.07	-1.237E-03	&(	5.228E-02 1.55E-02	G K
			136.43	9.440E-02	%	3.757E-01 1.13E-01	G
CO-60		-4.7867E-03					
			1332.51	-4.787E-03	%(P	5.551E-02 1.53E-02	G K
			1173.23	2.658E-02	& P	7.017E-02 2.09E-02	G K
Sr-85		-1.4907E-02					
			514.00	-1.491E-02	%(	6.391E-02 1.90E-02	G
Kr-85		-3.5033E+02					
			513.99	-3.503E+02	%(P	1.392E+03 4.11E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	5.321E-02 1.35E-02	G K
			898.02	-2.290E-03	& P	5.529E-02 1.54E-02	G
NB-94		7.0301E-05					
			871.10	7.030E-05	%(P	5.221E-02 1.45E-02	G K
			702.50	-1.865E-02	% P	5.544E-02 1.65E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.3434E-02						
		722.95	-1.343E-02	&(	7.629E-02	2.24E-02	G K
		614.37	-1.923E-02	% P	5.519E-02	1.64E-02	G
		433.93	-1.131E-02	%	4.929E-02	1.46E-02	G
CD-109	6.8830E-02						
		88.04	6.883E-02	&(P	1.550E+00	4.63E-01	G
SN-113	-1.5031E-02						
		391.71	-1.503E-02	%(	6.769E-02	2.00E-02	G K
		255.04	-1.673E-02	% P	1.936E+00	5.67E-01	G
SB-125	9.4258E-02						
		427.95	-2.904E-02	&(P	1.512E-01	4.44E-02	G K
		600.77	-4.260E-02	% P	2.534E-01	7.35E-02	G
		636.15	5.968E-02	% P	3.689E-01	1.06E-01	G
		463.51	4.592E-01	@(P	3.556E-01	1.19E-01	G
		176.29	-2.626E-02	& P	6.400E-01	1.89E-01	G
I-131	2.1501E-02						
		364.48	2.150E-02	&(	7.084E-02	2.11E-02	G K
		636.97	-1.521E-01	&	1.069E+00	3.09E-01	G
		284.29	0.000E+00	%	1.125E+00	3.29E-01	G
CS-134	2.7478E-02						
		604.66	2.428E-03	%(P	3.494E-02	9.74E-03	G K
		795.76	5.611E-02	(P	5.030E-02	1.69E-02	G
		569.29	1.315E-01	& P	2.819E-01	8.52E-02	G
		801.84	-9.425E-02	%	5.347E-01	1.54E-01	G
CS-137	4.5204E-02						
		661.62	4.520E-02	(P	5.720E-02	1.80E-02	G
CE-139	1.5583E-02						
		165.85	1.558E-02	%(P	5.071E-02	1.52E-02	G
EU-152	1.0878E-01						
		121.78	-3.397E-03	&(P	1.509E-01	4.48E-02	G K
		344.30	-3.377E-02	% P	1.553E-01	4.59E-02	G
		1408.08	4.595E-02	% P	2.427E-01	6.81E-02	G
		964.00	3.338E-01	&(P	4.276E-01	1.35E-01	G
		1112.07	1.788E-01	% P	4.657E-01	1.39E-01	G
		778.90	1.032E-02	% P	3.639E-01	1.02E-01	G
EU-154	-2.6205E-03						
		123.10	-2.621E-03	%(P	1.027E-01	3.05E-02	G K
		1274.80	-1.388E-04	% P	1.717E-01	4.69E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-6.708E-02	& P	3.511E-01	1.03E-01	G
		1004.80	8.025E-02	% P	2.799E-01	8.17E-02	G
EU-155	1.5518E-01						
		86.45	1.552E-01	(	1.711E-01	5.27E-02	G K
		105.31	6.667E-02	%	1.989E-01	5.99E-02	G
HG-203	1.6982E-03						
		279.17	1.698E-03	%(	4.786E-02	1.40E-02	G K
		72.87	-3.838E-02	& P	1.599E+00	4.78E-01	G
		70.83	-2.490E+00	+	2.337E+00	7.23E-01	G
		82.50	-9.600E-02	%	2.741E+00	8.17E-01	G
TL-208	2.6385E-01						
		583.14	2.638E-01	(P	4.899E-02	2.42E-02	G
		510.72	4.127E-01	+ P	2.160E-01	8.34E-02	G
PB-212	6.2605E-01						
							Energy duplication
		238.63	6.261E-01	(P	1.107E-01	4.18E-02	G K
							Energy duplication
		77.11	7.730E-01	+	3.484E-01	1.12E-01	G
		74.81	9.309E-01	& P	7.099E-01	2.21E-01	G
PB-214	4.8579E-01						
		351.99	4.633E-01	@(P	9.580E-02	3.99E-02	G K
		295.22	5.291E-01	(P	1.993E-01	7.02E-02	G
							Energy duplication
		77.11	1.249E+00	+ P	5.709E-01	1.84E-01	G
		241.92	-4.014E-01	% P	7.795E-01	2.37E-01	G
BI-212	9.0019E-01						
		727.17	9.002E-01	@(P	4.515E-01	1.90E-01	G K
		1620.56	9.956E-01	&	1.318E+00	4.48E-01	G
		785.42	6.327E-01	% P	2.572E+00	7.51E-01	G
BI-214	5.0706E-01						
		609.32	4.912E-01	(P	1.099E-01	5.31E-02	G K
		1764.51	7.541E-01	+ P	1.370E-01	1.19E-01	G
		1120.28	5.556E-01	@(P	5.215E-01	2.10E-01	G
RA-224	9.1669E-01						
		241.00	9.167E-01	%(P	1.331E+00	4.08E-01	G
RA-226	1.1523E+00						
		185.99	1.152E+00	@(	1.184E+00	3.69E-01	G
AC-228	1.0128E+00						
		911.07	9.348E-01	@(P	2.029E-01	1.08E-01	G K
		968.90	1.207E+00	@(P	3.291E-01	1.60E-01	G
		338.40	9.187E-01	(P	3.395E-01	1.38E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.0822E-01
                          236.00-2.082E-01 &(P 4.811E-01 1.46E-01 G K
                          256.25-1.389E-01 % P 6.066E-01 1.80E-01 G

PA-234      -2.1732E-02
                           98.44-2.173E-02 %(  1.494E-01 4.45E-02 G K
                          946.00-6.519E-02 &   3.771E-01 1.10E-01 G
                          131.28 2.334E-03 %   2.103E-01 6.24E-02 G
                           94.67-1.103E-01 &   3.239E-01 9.77E-02 G
                          883.24-8.518E-02 %   4.005E-01 1.16E-01 G
                          926.70-8.808E-02 &   5.624E-01 1.62E-01 G
                          569.26 1.986E-01 &   4.147E-01 1.26E-01 G

TH-234       1.4804E+00
                           63.29 5.970E-01 %(P 2.180E+00 6.54E-01 G K
                           92.80 1.990E+00  (P 1.642E+00 5.12E-01 G
                           92.38 2.226E+00  (P 1.963E+00 6.09E-01 G

AM-241      -4.9723E-02
                           59.54-4.972E-02 &(P 3.064E-01 9.16E-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 - 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	1.9408E-02	2.0929E-02	3.3192E-01	3.3192E-01	3.592E-01
K-40		1.4092E+01	1.4092E+01	1.7467E+00	1.9196E+00	
MN-54	#A	4.5284E-03	4.5872E-03	4.0730E-02	4.0731E-02	4.757E-02
CO-57	#B	-1.2187E-03	-1.2370E-03	4.6629E-02	4.6629E-02	5.150E-02
CO-60	#B	-4.7767E-03	-4.7867E-03	4.9797E-02	4.9797E-02	5.539E-02
Sr-85	#A	-1.4009E-02	-1.4907E-02	5.6858E-02	5.6864E-02	6.006E-02
Kr-85	#A	-3.5032E+02	-3.5033E+02	1.4367E+03	1.4368E+03	1.392E+03
Y-88	#B	0.0000E+00	0.0000E+00	4.0521E-02	4.0521E-02	5.123E-02
NB-94	#B	7.0301E-05	7.0301E-05	4.3595E-02	4.3595E-02	5.221E-02
Ag-108M	#B	-1.3433E-02	-1.3434E-02	6.7146E-02	6.7150E-02	7.628E-02
CD-109	#A	6.8221E-02	6.8830E-02	1.3884E+00	1.3884E+00	1.536E+00
SN-113	#B	-1.4514E-02	-1.5031E-02	6.0031E-02	6.0037E-02	6.536E-02
SB-125	#B	9.3884E-02	9.4258E-02	7.3050E-02	7.3244E-02	1.506E-01
I-131	#B	1.3028E-02	2.1501E-02	6.3212E-02	6.3224E-02	4.293E-02
CS-134	#B	2.7331E-02	2.7478E-02	2.4901E-02	2.4950E-02	3.475E-02
CS-137	#A	4.5188E-02	4.5204E-02	5.4099E-02	5.4159E-02	5.717E-02
CE-139	#A	1.5133E-02	1.5583E-02	4.5720E-02	4.5728E-02	4.925E-02
EU-152	#B	1.0869E-01	1.0878E-01	1.3229E-01	1.3243E-01	1.508E-01
EU-154	#B	-2.6171E-03	-2.6205E-03	1.6943E-01	1.6943E-01	1.025E-01
EU-155	#A	1.5484E-01	1.5518E-01	1.5813E-01	1.5836E-01	1.707E-01
HG-203	#B	1.5576E-03	1.6982E-03	4.1923E-02	4.1924E-02	4.390E-02
TL-208		2.6385E-01	2.6385E-01	7.2758E-02	7.4270E-02	
PB-212	#	6.2605E-01	6.2605E-01	1.2539E-01	1.3028E-01	1.107E-01
PB-214	#	4.8579E-01	4.8579E-01	1.1522E-01	1.1844E-01	9.580E-02
BI-212	#	9.0019E-01	9.0019E-01	5.7045E-01	5.7272E-01	
BI-214		5.0706E-01	5.0706E-01	1.6447E-01	1.6695E-01	
RA-224	#A	9.1669E-01	9.1669E-01	1.2233E+00	1.2244E+00	1.331E+00
RA-226	#A	1.1523E+00	1.1523E+00	1.1061E+00	1.1080E+00	1.184E+00
AC-228		1.0128E+00	1.0128E+00	2.3402E-01	2.4092E-01	
TH-227	#B	-2.0822E-01	-2.0822E-01	4.4426E-01	4.4442E-01	4.811E-01
PA-234	#B	-2.1732E-02	-2.1732E-02	1.3350E-01	1.3350E-01	1.494E-01
TH-234	#B	1.4804E+00	1.4804E+00	1.1420E+00	1.1449E+00	2.180E+00
AM-241	#A	-4.9722E-02	-4.9723E-02	2.9908E-01	2.9909E-01	3.064E-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 (270.6 to 1999.1 keV) 1.6776152E+01 pCi/gm
Total Decayed Activity (270.6 to 1999.1 keV) 1.6776152E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_30MAY2006_1406.An1

Sample description
FSS-NOL-05-01-003-F

Spectrum Filename: C:\GammaVision\Spectra\101F_30MAY2006_1406.An1

Acquisition information
Start time: 30-May-2006 14:08:04
Live time: 2000
Real time: 2002
Dead time: 0.11 %
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/channel^2

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: 2.0400E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0400E+03) =
4.9020E+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	23-May-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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3347

***** 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
62.29	109.	38.97	1.38	1.053E-02	59.54	36.300	PBC<MDA	AM241
					63.29	3.900	PBC<MDA	TH234
74.53	204.	15.97	1.00	1.643E-02				
74.53	204.	15.97	1.00	1.643E-02	74.81	9.600	8.312E-01	PB212
78.07	95.	39.83	1.01	1.744E-02	77.11	17.500	2.087E-01	PB212
					77.11	10.700	PBC<MDA	PB214
83.71	60.	37.69	0.00	1.865E-02				
92.99	113.	38.72	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.00	111.	38.23	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.80	108.	38.53	1.87	2.110E-02				
238.64	855.	4.06	1.12	1.558E-02				
238.64	855.	4.06	1.12	1.558E-02	238.63	43.100	8.372E-01	PB212
241.42	113.	20.21	1.12	1.543E-02	241.00	3.900	PBC<MDA	RA224
270.55	96.	28.17	1.31	1.399E-02				
295.41	180.	11.16	1.16	1.292E-02	295.22	19.200	4.763E-01	PB214
300.13	60.	26.24	1.16	1.273E-02				
327.62	65.	34.91	0.65	1.171E-02				
338.14	173.	17.54	1.12	1.136E-02	338.40	12.010	8.282E-01	AC228
351.72	313.	9.75	1.11	1.093E-02				
351.72	313.	9.75	1.11	1.093E-02	351.99	37.100	5.090E-01	PB214
462.66	69.	31.81	1.06	8.357E-03				
462.66	69.	31.81	1.06	8.357E-03	463.51	10.000	5.407E-01	SB125
510.38	114.	22.88	1.21	7.595E-03	510.72	22.500	3.816E-01	TL208
582.94	220.	9.85	1.22	6.687E-03	583.14	86.000	2.502E-01	TL208
609.14	193.	11.64	1.37	6.414E-03	609.32	46.090	4.305E-01	BI214

726.37	60.	25.82	1.80	5.448E-03	727.17	11.800	6.139E-01	BI212
910.81	157.	11.13	1.75	4.448E-03	911.07	29.000	7.959E-01	AC228
968.18	115.	15.25	0.89	4.215E-03	968.90	17.460	1.029E+00	AC228
1119.66	45.	23.41	0.66	3.713E-03	1120.28	15.040	5.296E-01	BI214
1460.02	778.	3.78	1.97	2.944E-03	1460.75	10.700	1.633E+01	K40
1620.16	10.	38.86	2.02	2.682E-03	1620.56	2.750	PBC<MDA	BI212
1763.37	41.	15.62	1.87	2.481E-03	1764.51	15.920	6.802E-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	
124.13	62.29	678.	109.	0.054	116.90	1.384	AM-241	l
257.22	128.80	635.	129.	0.065	86.69	1.868	AC-228	s
476.98	238.60	174.	855.	0.427	12.18	1.121	PB-212	D
482.54	241.38	204.	113.	0.056	60.63	1.123	RA-224	D
540.83	270.55	243.	96.	0.048	84.50	1.313	AC-228	s
599.87	300.06	109.	59.	0.030	84.63	1.135	PB-212	
655.01	327.62	180.	65.	0.032	104.74	0.649	AC-228	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	149.15	74.79	1226.	175.	0.088	85.21	1.499
PB-212	153.79	77.11	1025.	344.	0.172	42.63	1.499D
PB-214	153.79	77.11	1028.	341.	0.170	42.63	1.499D
TH-234	185.56	92.99	1016.	113.	0.057	116.17	1.499s
PB-212	477.00	238.65	420.	680.	0.340	17.00	1.499
RA-224	482.93	241.62	582.	85.	0.042	123.72	1.499
PB-214	590.47	295.36	230.	169.	0.084	44.06	1.499s
AC-228	676.07	338.14	228.	170.	0.085	52.62	1.121s
PB-214	703.42	351.81	155.	267.	0.134	26.69	1.499s
SB-125	925.15	462.63	109.	42.	0.021	110.55	1.499s
TL-208	1020.21	510.14	138.	87.	0.044	61.96	1.202s
TL-208	1165.90	582.94	88.	217.	0.109	29.55	1.219
BI-214	1218.31	609.14	102.	192.	0.096	34.92	1.369
BI-212	1452.88	726.37	65.	60.	0.030	77.47	1.802s
AC-228	1821.97	910.81	48.	155.	0.077	33.39	1.754
AC-228	1936.77	968.18	56.	114.	0.057	45.75	0.887s
BI-214	2239.91	1119.66	30.	45.	0.022	70.24	0.663s
K-40	2921.05	1460.02	21.	776.	0.388	11.34	1.975s
BI-212	3241.56	1620.16	2.	10.	0.005	116.58	2.021s
BI-214	3528.17	1763.37	0.	41.	0.020	46.85	1.874

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.0345E-01					
			477.56	1.034E-01	&(	4.194E-01 1.24E-01	G
K-40		1.6332E+01					
			1460.75	1.633E+01	@(P	5.040E-01 6.19E-01	G
MN-54		-1.3906E-02					
			834.81	-1.391E-02	%(P	5.209E-02 1.52E-02	G
CO-57		-5.6660E-04					
			122.07	-5.666E-04	&(	5.180E-02 1.54E-02	G K
			136.43	5.802E-02	&	3.888E-01 1.16E-01	G
CO-60		-1.0660E-03					
			1332.51	-1.066E-03	%(P	6.307E-02 1.75E-02	G K
			1173.23	2.185E-02	% P	7.244E-02 2.14E-02	G K
Sr-85		-2.6767E-02					
			514.00	-2.677E-02	%(	6.290E-02 1.90E-02	G
Kr-85		-5.9632E+02					
			513.99	-5.963E+02	%(P	1.349E+03 4.06E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	&(	2.153E-02 2.92E-03	G K
			898.02	-1.033E-02	& P	6.268E-02 1.81E-02	G
NB-94		5.6901E-04					
			871.10	5.690E-04	&(P	3.613E-02 9.82E-03	G K
			702.50	1.203E-03	% P	5.976E-02 1.72E-02	G K
Ag-108M		-2.2327E-02					
			722.95	-2.233E-02	%(	7.256E-02 2.16E-02	G K
			614.37	3.432E-03	& P	5.175E-02 1.49E-02	G
			433.93	1.975E-05	%	4.610E-02 1.33E-02	G
CD-109		7.3588E-02					
			88.04	7.359E-02	%(P	1.525E+00 4.56E-01	G
SN-113		0.0000E+00					
			391.71	0.000E+00	%(	6.726E-02 1.95E-02	G K
			255.04	-2.455E-01	% P	1.924E+00 5.70E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.0244E-02						
		427.95	-6.432E-03	%(P	1.361E-01	3.94E-02	G K
		600.77	-7.362E-03	% P	2.295E-01	6.52E-02	G
		636.15	-7.873E-02	& P	4.013E-01	1.17E-01	G
		463.51	3.368E-01	(P	4.099E-01	1.28E-01	G
		176.29	-1.088E-01	% P	6.577E-01	1.96E-01	G
I-131	-2.1566E-03						
		364.48	-2.157E-03	%(	7.282E-02	2.10E-02	G K
		636.97	4.226E-01	%	9.193E-01	2.78E-01	G
		284.29	-1.610E-01	&	1.218E+00	3.60E-01	G
CS-134	2.4817E-03						
		604.66	2.482E-03	&(P	5.022E-02	1.44E-02	G K
		795.76	1.636E-02	% P	4.472E-02	1.32E-02	G
		569.29	6.486E-03	& P	2.727E-01	7.77E-02	G
		801.84	-1.039E-01	&	5.563E-01	1.61E-01	G
CS-137	9.5195E-03						
		661.62	9.520E-03	%(P	5.506E-02	1.60E-02	G
CE-139	-1.1941E-04						
		165.85	-1.194E-04	%(P	4.044E-02	1.19E-02	G
EU-152	-8.2724E-03						
		121.78	-8.272E-03	&(P	1.252E-01	3.72E-02	G K
		344.30	-1.254E-02	% P	1.257E-01	3.66E-02	G
		1408.08	-4.271E-03	% P	2.713E-01	7.38E-02	G
		964.00	4.473E-02	% P	3.143E-01	8.90E-02	G
		1112.07	1.285E-01	% P	4.589E-01	1.35E-01	G
		778.90	2.849E-02	% P	3.497E-01	9.93E-02	G
EU-154	-1.8537E-03						
		123.10	-1.854E-03	%(P	1.041E-01	3.09E-02	G K
		1274.80	6.081E-03	& P	1.330E-01	3.62E-02	G
		723.30	-9.510E-02	& P	3.243E-01	9.62E-02	G
		1004.80	-4.179E-02	& P	3.745E-01	1.08E-01	G
EU-155	1.1457E-01						
		86.45	1.146E-01	%(	1.672E-01	5.11E-02	G K
		105.31	6.347E-02	&	1.805E-01	5.44E-02	G
HG-203	1.7253E-02						
		279.17	1.725E-02	%(	4.761E-02	1.43E-02	G K
		72.87	-7.015E-01	& P	1.350E+00	4.09E-01	G
		70.83	-1.853E-01	%	1.987E+00	5.94E-01	G
		82.50	-1.034E+00	%	2.737E+00	8.27E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5020E-01						
		583.14	2.502E-01	(P	5.346E-02	2.49E-02	G
		510.72	3.389E-01	+ P	2.226E-01	8.28E-02	G
PB-212	7.0075E-01						
		238.63	6.711E-01	(P	9.687E-02	3.84E-02	G K
							Energy duplication
		77.11	7.575E-01	(	3.342E-01	1.08E-01	G
		74.81	7.301E-01	&(P	6.919E-01	2.14E-01	G
PB-214	4.4177E-01						
		351.99	4.372E-01	@(P	9.912E-02	3.92E-02	G K
		295.22	4.507E-01	*(P	1.960E-01	6.69E-02	G
							Energy duplication
		77.11	1.226E+00	+ P	5.475E-01	1.76E-01	G
		241.92	-3.090E-01	% P	6.865E-01	2.08E-01	G
BI-212	6.6654E-01						
		727.17	6.139E-01	(P	4.169E-01	1.60E-01	G K
		1620.56	8.924E-01	?(	9.033E-01	3.47E-01	G
		785.42	6.467E-01	% P	2.560E+00	7.51E-01	G
BI-214	4.5490E-01						
		609.32	4.305E-01	(P	1.115E-01	5.04E-02	G K
		1764.51	6.802E-01	+ P	1.236E-01	1.07E-01	G
		1120.28	5.296E-01	(P	3.370E-01	1.25E-01	G
RA-224	9.3389E-01						
		241.00	9.339E-01	(P	1.266E+00	3.88E-01	G
RA-226	8.4913E-01						
		185.99	8.491E-01	%(	1.233E+00	3.78E-01	G
AC-228	8.7225E-01						
		911.07	7.959E-01	(P	1.799E-01	8.96E-02	G K
		968.90	1.029E+00	(P	3.377E-01	1.58E-01	G
		338.40	8.282E-01	@(P	3.548E-01	1.47E-01	G
TH-227	-1.4379E-01						
		236.00	-1.438E-01	%(P	4.631E-01	1.39E-01	G K
		256.25	-1.085E-01	% P	5.718E-01	1.70E-01	G
PA-234	-5.7708E-02						
		98.44	-5.771E-02	%(	1.695E-01	5.11E-02	G K
		946.00	-6.945E-02	%	2.914E-01	8.53E-02	G
		131.28	-6.194E-02	%	2.278E-01	6.86E-02	G
		94.67	-4.800E-02	%	3.215E-01	9.64E-02	G
		883.24	6.337E-02	&	3.508E-01	1.00E-01	G
		926.70	1.463E-01	&	4.333E-01	1.28E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.373E-02 &   4.007E-01 1.15E-01 G

TH-234       1.0800E+00
                           63.29 9.439E-01 %(P 2.085E+00 6.30E-01 G K
                           92.80 1.257E+00  (P 1.678E+00 5.13E-01 G
                           92.38 1.448E+00 % P 1.990E+00 6.07E-01 G

AM-241      -9.4166E-03
                           59.54-9.417E-03 %(P 2.951E-01 8.78E-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 - 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 *****

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	9.4239E-02	1.0345E-01	3.7144E-01	3.7149E-01	3.821E-01
K-40	#	1.6332E+01	1.6332E+01	1.8569E+00	2.0735E+00	
MN-54	#A	-1.3686E-02	-1.3906E-02	4.9690E-02	4.9696E-02	5.126E-02
CO-57	#B	-5.5625E-04	-5.6660E-04	4.6262E-02	4.6262E-02	5.085E-02
CO-60	#B	-1.0632E-03	-1.0660E-03	7.3721E-02	7.3721E-02	6.290E-02

Sr-85	#A	-2.4789E-02	-2.6767E-02	5.6965E-02	5.6986E-02	5.825E-02
Kr-85	#A	-5.9629E+02	-5.9632E+02	1.3202E+03	1.3206E+03	1.349E+03
Y-88	#B	0.0000E+00	0.0000E+00	8.7633E-03	8.7648E-03	2.055E-02
NB-94	#B	5.6901E-04	5.6901E-04	2.9448E-02	2.9448E-02	3.613E-02
Ag-108M	#B	-2.2325E-02	-2.2327E-02	6.4870E-02	6.4883E-02	7.256E-02
CD-109	#A	7.2784E-02	7.3588E-02	1.3678E+00	1.3678E+00	1.508E+00
SN-113	#B	0.0000E+00	0.0000E+00	5.8529E-02	5.8529E-02	6.441E-02
SB-125	#B	7.9850E-02	8.0244E-02	9.1748E-02	9.1860E-02	1.355E-01
I-131	#B	-1.1610E-03	-2.1566E-03	6.2979E-02	6.2979E-02	3.920E-02
CS-134	#B	2.4654E-03	2.4817E-03	4.3311E-02	4.3311E-02	4.989E-02
CS-137	#A	9.5152E-03	9.5195E-03	4.7924E-02	4.7927E-02	5.504E-02
CE-139	#A	-1.1516E-04	-1.1941E-04	4.0421E-01	4.0421E-01	3.900E-02
EU-152	#B	-8.2636E-03	-8.2724E-03	1.3684E-01	1.3684E-01	1.251E-01
EU-154	#B	-1.8507E-03	-1.8537E-03	2.0747E-01	2.0747E-01	1.039E-01
EU-155	#B	1.1425E-01	1.1457E-01	1.5323E-01	1.5336E-01	1.668E-01
HG-203	#B	1.5504E-02	1.7253E-02	4.2926E-02	4.2937E-02	4.279E-02
TL-208		2.5020E-01	2.5020E-01	7.4741E-02	7.6067E-02	
PB-212	#	7.0075E-01	7.0075E-01	1.2024E-01	1.2659E-01	9.687E-02
PB-214	#	4.4177E-01	4.4177E-01	1.1489E-01	1.1757E-01	9.912E-02
BI-212		6.6654E-01	6.6654E-01	4.6811E-01	4.6962E-01	
BI-214		4.5490E-01	4.5490E-01	1.5976E-01	1.6181E-01	
RA-224	#A	9.3389E-01	9.3389E-01	1.1651E+00	1.1663E+00	1.266E+00
RA-226	#A	8.4913E-01	8.4913E-01	1.1330E+00	1.1340E+00	1.233E+00
AC-228		8.7225E-01	8.7225E-01	2.2711E-01	2.3239E-01	
TH-227	#B	-1.4379E-01	-1.4379E-01	4.2769E-01	4.2777E-01	4.631E-01
PA-234	#B	-5.7708E-02	-5.7708E-02	1.5332E-01	1.5335E-01	1.695E-01
TH-234	#B	1.0800E+00	1.0800E+00	1.2679E+00	1.2693E+00	2.085E+00
AM-241	#A	-9.4163E-03	-9.4166E-03	3.9640E-01	3.9640E-01	2.951E-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 (270.1 to 1999.1 keV) 1.8575468E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.8575468E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_30MAY2006_1446.An1

Sample description
FSS-NOL-05-01-019-F

Spectrum Filename: C:\GammaVision\Spectra\101F_30MAY2006_1446.An1

Acquisition information
Start time: 30-May-2006 14:47:54
Live time: 2000
Real time: 2002
Dead time: 0.10 %
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/channel^2

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: 2.0160E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0160E+03) =
4.9603E+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	23-May-2006 10:20:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1634

***** 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
74.68	230.	14.29	1.00	1.651E-02	74.81	9.600	9.501E-01	PB212
89.51	69.	40.66	1.02	1.953E-02	88.04	3.790	PBC<MDA	CD109
93.41	120.	24.31	1.02	1.996E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.92	84.	30.30	1.77	1.859E-02				
185.92	84.	30.30	1.77	1.859E-02	185.99	3.280	9.238E-01	RA226
209.80	91.	33.26	1.06	1.719E-02				
238.65	709.	4.47	1.12	1.557E-02	238.63	43.100	7.015E-01	PB212
240.62	54.	34.12	1.50	1.545E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
241.92	123.	17.48	1.12	1.540E-02	241.92	7.470	7.145E-01	PB214
270.22	79.	30.15	1.50	1.400E-02				
277.03	53.	39.44	0.93	1.370E-02				
295.36	163.	14.58	0.99	1.291E-02	295.22	19.200	4.351E-01	PB214
328.00	68.	31.68	1.24	1.170E-02				
338.33	172.	18.37	1.25	1.135E-02	338.40	12.010	8.375E-01	AC228
351.96	333.	7.48	1.30	1.093E-02	351.99	37.100	5.468E-01	PB214
462.28	103.	17.96	1.71	8.363E-03				
462.28	103.	17.96	1.71	8.363E-03	463.51	10.000	8.225E-01	SB125
510.65	117.	20.95	1.29	7.591E-03	510.72	22.500	3.975E-01	TL208
582.97	225.	9.79	1.61	6.686E-03	583.14	86.000	2.596E-01	TL208
609.15	226.	9.41	1.31	6.414E-03	609.32	46.090	5.112E-01	BI214
665.77	36.	36.81	0.94	5.903E-03				
726.85	71.	20.50	1.58	5.445E-03	727.17	11.800	7.339E-01	BI212
910.88	120.	12.82	1.47	4.447E-03	911.07	29.000	6.151E-01	AC228
964.47	32.	27.91	1.61	4.229E-03	964.00	14.580	PBC<MDA	EU152
968.48	59.	17.67	1.62	4.214E-03	968.90	17.460	5.356E-01	AC228

1120.04	88.	21.02	1.29	3.712E-03	1120.28	15.040	1.052E+00	BI214
1460.17	580.	4.26	1.90	2.943E-03	1460.75	10.700	1.230E+01	K40
1763.78	20.	29.66	2.11	2.481E-03	1764.51	15.920	3.385E-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	
178.61	89.59	364.	69.	0.035	121.97	1.015	PB-214	lD
419.28	209.80	330.	91.	0.045	99.78	1.063	NP-239	s
540.17	270.22	189.	79.	0.040	90.44	1.502	AC-228	s
655.77	328.00	150.	68.	0.034	95.04	1.236	AC-228	s
924.46	462.28	133.	48.	0.024	110.96	1.714	CS-138	s
1331.64	665.77	53.	36.	0.018	98.38	0.941	BI-214	
1928.80	964.52	23.	34.	0.017	80.07	1.613	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	149.19	74.81	369.	226.	0.113	40.14	1.005D
PB-212	153.79	77.11	387.	326.	0.163	26.14	1.006A
TH-234	185.71	93.06	870.	149.	0.075	81.19	1.499s
TH-234	185.67	93.05	849.	153.	0.076	80.95	1.499s
RA-226	371.67	186.01	461.	101.	0.050	95.36	1.499s
PB-212	476.96	238.63	153.	703.	0.351	13.41	1.122D
RA-224	480.94	240.62	148.	54.	0.027	102.37	1.499
PB-214	483.54	241.92	172.	122.	0.061	52.70	1.124D
PB-214	590.47	295.36	176.	161.	0.081	43.74	0.986s
AC-228	676.44	338.33	240.	170.	0.085	55.10	1.246
PB-214	703.72	351.96	112.	331.	0.165	22.45	1.303
SB-125	925.72	462.91	92.	54.	0.027	83.23	1.499s
TL-208	1021.25	510.65	141.	101.	0.051	62.84	1.287s
TL-208	1165.95	582.97	86.	223.	0.111	29.38	1.605
BI-214	1218.34	609.15	75.	225.	0.113	28.23	1.308
BI-212	1453.86	726.85	45.	70.	0.035	61.49	1.577s
AC-228	1822.11	910.88	40.	118.	0.059	38.45	1.468
AC-228	1938.21	968.90	25.	59.	0.029	52.31	1.615D
BI-214	2240.67	1120.04	62.	88.	0.044	63.06	1.286s
K-40	2921.37	1460.17	12.	578.	0.289	12.77	1.896
BI-214	3528.99	1763.78	9.	20.	0.010	88.98	2.106s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-1.8269E-02					
			477.56	-1.827E-02	%(	3.870E-01 1.11E-01	G
K-40		1.2300E+01					
			1460.75	1.230E+01	(P	4.054E-01 5.26E-01	G
MN-54		1.2261E-02					
			834.81	1.226E-02	%(P	4.526E-02 1.32E-02	G
CO-57		3.0589E-04					
			122.07	3.059E-04	%(	4.729E-02 1.40E-02	G K
			136.43	3.274E-03	%	4.012E-01 1.19E-01	G
CO-60		2.4813E-03					
			1332.51	2.481E-03	%(P	5.070E-02 1.38E-02	G K
			1173.23	-1.403E-04	& P	6.138E-02 1.71E-02	G K
Sr-85		-2.3955E-02					
			514.00	-2.396E-02	&(	5.745E-02 1.73E-02	G
Kr-85		-5.3646E+02					
			513.99	-5.365E+02	&(P	1.233E+03 3.70E+02	G
Y-88		-1.4189E-03					
			1836.01	-1.419E-03	%(	4.765E-02 1.22E-02	G K
			898.02	3.827E-03	& P	5.061E-02 1.42E-02	G
NB-94		-1.5238E-04					
			871.10	-1.524E-04	%(P	4.769E-02 1.33E-02	G K
			702.50	-5.303E-05	% P	4.640E-02 1.31E-02	G K
Ag-108M		-1.2839E-02					
			722.95	-1.284E-02	%(	5.542E-02 1.62E-02	G K
			614.37	6.242E-04	& P	5.451E-02 1.56E-02	G
			433.93	8.922E-04	&	4.328E-02 1.25E-02	G
CD-109		-2.1227E-02					
			88.04	-2.123E-02	&(P	1.479E+00 4.41E-01	G
SN-113		1.0535E-02					
			391.71	1.053E-02	%(	5.786E-02 1.70E-02	G K
			255.04	-5.167E-01	% P	1.945E+00 5.82E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0885E-01						
		427.95	-1.533E-03	%(P	1.226E-01	3.51E-02	G K
		600.77	-1.280E-03	% P	2.479E-01	7.05E-02	G
		636.15	-2.521E-02	& P	3.830E-01	1.09E-01	G
		463.51	4.356E-01	*(P	3.824E-01	1.24E-01	G
		176.29	5.319E-02	% P	6.120E-01	1.82E-01	G
I-131	7.8825E-03						
		364.48	7.882E-03	%(	8.049E-02	2.35E-02	G K
		636.97	6.078E-02	%	9.908E-01	2.81E-01	G
		284.29	0.000E+00	&	1.138E+00	3.33E-01	G
CS-134	1.6169E-03						
		604.66	1.617E-03	&(P	1.158E-01	3.43E-02	G K
		795.76	1.832E-02	% P	5.879E-02	1.74E-02	G
		569.29	-1.273E-02	% P	2.593E-01	7.36E-02	G
		801.84	-1.173E-01	%	5.294E-01	1.54E-01	G
CS-137	2.2832E-02						
		661.62	2.283E-02	%(P	5.188E-02	1.56E-02	G
CE-139	-8.0188E-03						
		165.85	-8.019E-03	%(P	4.978E-02	1.49E-02	G
EU-152	-2.7555E-02						
		121.78	-2.756E-02	%(P	1.388E-01	4.15E-02	G K
		344.30	-6.448E-03	% P	1.505E-01	4.39E-02	G
		1408.08	6.766E-02	% P	2.365E-01	6.84E-02	G
		964.00	1.223E-01	& P	4.861E-01	1.43E-01	G
		1112.07	-5.098E-02	& P	4.749E-01	1.36E-01	G
		778.90	3.922E-02	% P	2.922E-01	8.27E-02	G
EU-154	6.0071E-03						
		123.10	6.007E-03	%(P	9.833E-02	2.93E-02	G K
		1274.80	1.408E-02	% P	1.910E-01	5.40E-02	G
		723.30	-4.597E-02	% P	2.106E-01	6.08E-02	G
		1004.80	6.415E-02	% P	2.551E-01	7.39E-02	G
EU-155	9.6975E-02						
		86.45	9.698E-02	%(	1.629E-01	4.96E-02	G K
		105.31	3.113E-02	&	1.952E-01	5.84E-02	G
HG-203	-2.7290E-03						
		279.17	-2.729E-03	%(	4.155E-02	1.21E-02	G K
		72.87	-5.329E-01	% P	1.228E+00	3.71E-01	G
		70.83	-2.382E-01	&	1.614E+00	4.82E-01	G
		82.50	-5.012E-01	&	2.623E+00	7.87E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5959E-01						
		583.14	2.596E-01	(P	5.366E-02	2.57E-02	G
		510.72	3.975E-01	+ P	2.276E-01	9.64E-02	G
PB-212	7.2550E-01						
		238.63	7.015E-01	(P	6.035E-02	3.16E-02	G K
							Energy duplication
		77.11	7.255E-01	}	2.100E-01	6.32E-02	G
		74.81	9.548E-01	+ P	3.893E-01	1.31E-01	G
PB-214	5.4680E-01						
		351.99	5.468E-01	(P	8.618E-02	4.12E-02	G K
		295.22	4.351E-01	- P	1.744E-01	6.42E-02	G
							Energy duplication
		77.11	0.000E+00	} P	5.050E-01	0.00E+00	G
		241.92	7.114E-01	+ P	3.718E-01	1.26E-01	G
BI-212	7.3393E-01						
		727.17	7.339E-01	*(P	3.534E-01	1.52E-01	G K
		1620.56	2.645E-01	&	1.569E+00	4.30E-01	G
		785.42	7.734E-01	% P	1.928E+00	5.76E-01	G
BI-214	5.1118E-01						
		609.32	5.112E-01	(P	9.743E-02	4.83E-02	G K
		1764.51	3.385E-01	- P	2.768E-01	1.03E-01	G
		1120.28	1.052E+00	+ P	4.746E-01	2.22E-01	G
RA-224	6.0080E-01						
		241.00	6.008E-01	(P	6.601E-01	2.08E-01	G
RA-226	1.1064E+00						
		185.99	1.106E+00	(	1.130E+00	3.52E-01	G
AC-228	5.8596E-01						
		911.07	6.151E-01	(P	1.667E-01	8.01E-02	G K
		968.90	5.375E-01	(P	2.372E-01	9.49E-02	G
		338.40	8.375E-01	+ P	3.681E-01	1.56E-01	G
TH-227	-1.8484E-02						
		236.00	-1.848E-02	&(P	4.210E-01	1.25E-01	G K
		256.25	-1.563E-01	& P	5.346E-01	1.60E-01	G
PA-234	8.1032E-03						
		98.44	8.103E-03	%(	1.785E-01	5.32E-02	G K
		946.00	-4.914E-02	&	2.809E-01	8.12E-02	G
		131.28	-1.211E-02	&	1.977E-01	5.89E-02	G
		94.67	4.420E-02	%	2.317E-01	6.92E-02	G
		883.24	-6.827E-02	%	4.037E-01	1.16E-01	G
		926.70	-3.344E-02	&	4.727E-01	1.34E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 5.790E-02 %   2.630E-01 7.58E-02 G

TH-234       1.4245E+00
                           63.29 8.447E-01 %(P 2.068E+00 6.24E-01 G K
                           92.80 1.718E+00 *(P 1.555E+00 4.82E-01 G
                           92.38 1.962E+00 &(P 1.842E+00 5.69E-01 G

AM-241       2.4085E-03
                           59.54 2.408E-03 &(P 2.864E-01 8.51E-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 - 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 *****

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	-1.6642E-02	-1.8269E-02	3.3279E-01	3.3279E-01	3.526E-01
K-40		1.2300E+01	1.2300E+01	1.5775E+00	1.7238E+00	
MN-54	#A	1.2066E-02	1.2261E-02	3.9632E-02	3.9638E-02	4.454E-02
CO-57	#B	3.0030E-04	3.0589E-04	4.2137E-02	4.2137E-02	4.643E-02
CO-60	#B	2.4749E-03	2.4813E-03	4.1486E-02	4.1487E-02	5.057E-02

Sr-85	#A	-2.2184E-02	-2.3955E-02	5.1965E-02	5.1982E-02	5.320E-02
Kr-85	#A	-5.3644E+02	-5.3646E+02	1.2165E+03	1.2168E+03	1.233E+03
Y-88	#B	-1.3541E-03	-1.4189E-03	3.6608E-02	3.6608E-02	4.547E-02
NB-94	#B	-1.5238E-04	-1.5238E-04	3.3701E-01	3.3701E-01	4.769E-02
Ag-108M	#B	-1.2838E-02	-1.2839E-02	4.8747E-02	4.8752E-02	5.541E-02
CD-109	#A	-2.0995E-02	-2.1227E-02	2.0041E+00	2.0042E+00	1.463E+00
SN-113	#B	1.0088E-02	1.0535E-02	5.0985E-02	5.0989E-02	5.541E-02
SB-125	#B	1.0831E-01	1.0885E-01	9.3023E-02	9.3226E-02	1.220E-01
I-131	#B	4.2423E-03	7.8825E-03	7.0438E-02	7.0439E-02	4.332E-02
CS-134	#B	1.6062E-03	1.6169E-03	1.0287E-01	1.0287E-01	1.151E-01
CS-137	#A	2.2822E-02	2.2832E-02	4.6804E-02	4.6822E-02	5.185E-02
CE-139	#A	-7.7335E-03	-8.0188E-03	4.6207E-02	4.6209E-02	4.801E-02
EU-152	#B	-2.7526E-02	-2.7555E-02	1.3259E-01	1.3260E-01	1.386E-01
EU-154	#B	5.9975E-03	6.0071E-03	8.7802E-02	8.7802E-02	9.817E-02
EU-155	#B	9.6709E-02	9.6975E-02	1.4888E-01	1.4897E-01	1.625E-01
HG-203	#B	-2.4523E-03	-2.7290E-03	3.6394E-02	3.6395E-02	3.734E-02
TL-208		2.5959E-01	2.5959E-01	7.7070E-02	7.8453E-02	
PB-212		7.2550E-01	7.2550E-01	9.8131E-02	1.0635E-01	
PB-214		5.4680E-01	5.4680E-01	1.2351E-01	1.2731E-01	
BI-212	#	7.3393E-01	7.3393E-01	4.5567E-01	4.5755E-01	
BI-214		5.1118E-01	5.1118E-01	1.4503E-01	1.4788E-01	
RA-224	A	6.0080E-01	6.0080E-01	6.2318E-01	6.2410E-01	6.601E-01
RA-226	#A	1.1064E+00	1.1064E+00	1.0551E+00	1.0569E+00	1.130E+00
AC-228		5.8596E-01	5.8596E-01	1.9276E-01	1.9558E-01	
TH-227	#B	-1.8484E-02	-1.8484E-02	4.4849E-01	4.4850E-01	4.210E-01
PA-234	#B	8.1032E-03	8.1032E-03	1.5958E-01	1.5958E-01	1.785E-01
TH-234	#B	1.4245E+00	1.4245E+00	1.1990E+00	1.2016E+00	2.068E+00
AM-241	#A	2.4084E-03	2.4085E-03	2.5540E-01	2.5540E-01	2.864E-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 1999.1 keV) 1.6263630E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 1.6263630E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_30MAY2006_1547.An1

Sample description
FSS-NOL-05-01-017-F

Spectrum Filename: C:\GammaVision\Spectra\101F_30MAY2006_1547.An1

Acquisition information
Start time: 30-May-2006 15:49:21
Live time: 2000
Real time: 2002
Dead time: 0.10 %
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/channel^2

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: 2.0750E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0750E+03) =
4.8193E+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	23-May-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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1831

***** 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
74.35	166.	21.16	1.00	1.651E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	6.604E-01	PB212
77.34	350.	10.06	1.01	1.736E-02	77.11	10.700	1.224E+00	PB214
					77.11	17.500	7.564E-01	PB212
87.48	103.	29.75	1.01	1.927E-02				
89.47	92.	32.95	1.02	1.953E-02	88.04	3.790	PBC<MDA	CD109
93.35	117.	24.99	1.02	1.997E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.83	87.	29.33	1.08	1.859E-02				
185.83	87.	29.33	1.08	1.859E-02	185.99	3.280	9.296E-01	RA226
209.08	65.	40.37	1.02	1.723E-02				
238.71	792.	4.21	1.12	1.557E-02	238.63	43.100	7.623E-01	PB212
241.73	153.	15.90	1.12	1.541E-02	241.00	3.900	1.650E+00	RA224
					241.92	7.470	8.645E-01	PB214
295.29	182.	10.85	1.16	1.292E-02				
295.29	182.	10.85	1.16	1.292E-02	295.22	19.200	4.740E-01	PB214
338.45	124.	19.92	1.12	1.135E-02	338.40	12.010	5.796E-01	AC228
351.88	292.	10.75	1.15	1.093E-02				
351.88	292.	10.75	1.15	1.093E-02	351.99	37.100	4.660E-01	PB214
463.06	58.	27.01	1.26	8.350E-03				
463.06	58.	27.01	1.26	8.350E-03	463.51	10.000	4.476E-01	SB125
510.32	122.	19.07	1.78	7.596E-03	510.72	22.500	4.026E-01	TL208
582.89	230.	9.32	1.49	6.687E-03	583.14	86.000	2.573E-01	TL208
609.21	210.	9.23	1.28	6.414E-03	609.32	46.090	4.598E-01	BI214
727.25	67.	26.13	1.41	5.442E-03	722.95	90.499	8.865E-02	Ag108M
					723.30	19.700	4.058E-01	EU154
					727.17	11.800	6.766E-01	BI212

794.37	55.	26.75	1.18	5.024E-03				
833.94	29.	33.81	0.78	4.805E-03	834.81	99.978	4.020E-02	MN54
910.71	141.	13.01	1.93	4.448E-03	911.07	29.000	7.027E-01	AC228
967.67	114.	18.16	1.92	4.217E-03	968.90	17.460	1.008E+00	AC228
1119.96	96.	20.61	1.24	3.712E-03	1120.28	15.040	1.122E+00	BI214
1460.14	621.	4.09	2.02	2.944E-03	1460.75	10.700	1.280E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1619.96	14.	37.47	2.02	2.682E-03	1620.56	2.750	PBC<MDA	BI212
1763.73	33.	17.41	1.50	2.481E-03	1764.51	15.920	5.368E-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	
148.26	74.72	536.	166.	0.083	63.48	1.004	BI-207	D
154.24	77.71	444.	350.	0.175	30.19	1.007	PB-214	D
174.55	87.65	416.	103.	0.051	89.26	1.014	PB-214	lD
178.51	89.63	412.	92.	0.046	98.84	1.015	PB-214	lD
417.84	209.08	297.	65.	0.032	121.12	1.022	AC-228	
477.12	238.74	160.	792.	0.396	12.63	1.122	PB-212	D
483.17	241.76	221.	153.	0.077	47.69	1.124	PB-214	D
1588.97	794.37	51.	52.	0.026	71.22	1.183	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

********** 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	149.37	74.90	1112.	199.	0.099	72.35	1.499s
PB-214	153.79	77.11	989.	341.	0.171	41.83	1.499D
PB-212	153.79	77.11	985.	345.	0.173	41.83	1.499D
TH-234	185.61	93.01	967.	120.	0.060	103.89	1.499
TH-234	185.63	93.02	917.	133.	0.066	95.54	1.499
RA-226	371.72	186.03	460.	106.	0.053	90.43	1.499
PB-212	477.11	238.71	488.	619.	0.310	19.11	1.499
RA-224	483.07	241.69	514.	140.	0.070	72.98	1.499s
PB-214	590.03	295.14	216.	173.	0.086	42.19	1.499
AC-228	676.69	338.45	181.	121.	0.061	59.77	1.123
PB-214	703.64	351.92	123.	249.	0.124	26.56	1.499
SB-125	925.43	462.77	76.	47.	0.023	87.47	1.499
TL-208	1020.58	510.32	138.	106.	0.053	57.21	1.778s
TL-208	1165.79	582.89	76.	227.	0.114	27.96	1.492
BI-214	1218.45	609.21	62.	209.	0.104	27.69	1.276
BI-212	1454.66	727.25	74.	67.	0.033	78.40	1.413
MN-54	1668.14	833.94	30.	29.	0.015	101.43	0.781s
AC-228	1821.77	910.71	65.	139.	0.070	39.02	1.934s
AC-228	1935.76	967.67	78.	114.	0.057	54.47	1.924s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2240.51	1119.96	67.	96.	0.048	61.84	1.243
K-40	2921.30	1460.14	10.	619.	0.309	12.27	2.022
BI-212	3241.16	1619.96	6.	14.	0.007	112.40	2.021
BI-214	3528.90	1763.73	0.	33.	0.016	52.22	1.499

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		5.4361E-02					
			477.56	5.436E-02	%(	4.396E-01 1.28E-01	G
K-40		1.2798E+01					
			1460.75	1.280E+01	(P	3.651E-01 5.25E-01	G
MN-54		4.0201E-02					
			834.81	4.020E-02	*(P	3.879E-02 1.38E-02	G
CO-57		-2.3197E-03					
			122.07	-2.320E-03	%(	4.717E-02 1.40E-02	G K
			136.43	5.421E-03	%	3.440E-01 1.02E-01	G
CO-60		2.4275E-02					
			1332.51	2.428E-02	%(P	4.409E-02 1.36E-02	G K
			1173.23	3.962E-02	% P	6.512E-02 2.01E-02	G K
Sr-85		-2.7379E-02					
			514.00	-2.738E-02	%(	6.086E-02 1.84E-02	G
Kr-85		-6.0884E+02					
			513.99	-6.088E+02	%(P	1.305E+03 3.93E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	2.117E-02 2.87E-03	G K
			898.02	-8.671E-03	& P	5.618E-02 1.61E-02	G
NB-94		5.4395E-03					
			871.10	5.440E-03	%(P	3.377E-02 9.49E-03	G K
			702.50	7.544E-03	& P	4.830E-02 1.40E-02	G K
Ag-108M		3.8837E-04					
			722.95	3.884E-04	%(	5.697E-02 1.62E-02	G K
			614.37	-2.115E-02	& P	5.588E-02 1.67E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	1.598E-02	%	3.402E-02	1.03E-02	G
CD-109	-1.5558E-02						
		88.04	-1.556E-02	&(P	1.415E+00	4.22E-01	G
SN-113	-2.3142E-03						
		391.71	-2.314E-03	&(	5.095E-02	1.47E-02	G K
		255.04	-4.073E-01	% P	1.989E+00	5.93E-01	G
SB-125	1.0389E-01						
		427.95	1.476E-02	&(P	1.092E-01	3.17E-02	G K
		600.77	6.465E-02	& P	1.904E-01	5.64E-02	G
		636.15	-1.437E-02	% P	3.770E-01	1.07E-01	G
		463.51	3.677E-01	(P	3.410E-01	1.11E-01	G
		176.29	1.869E-02	% P	6.272E-01	1.86E-01	G
I-131	-4.4651E-03						
		364.48	-4.465E-03	%(	7.462E-02	2.16E-02	G K
		636.97	0.000E+00	%	9.374E-01	2.62E-01	G
		284.29	1.211E-01	%	1.017E+00	2.99E-01	G
CS-134	3.8533E-03						
		604.66	3.853E-03	%(P	3.492E-02	9.91E-03	G K
		795.76	3.135E-03	% P	5.231E-02	1.47E-02	G
		569.29	9.216E-02	& P	2.351E-01	7.03E-02	G
		801.84	5.208E-02	%	4.908E-01	1.39E-01	G
CS-137	3.4471E-02						
		661.62	3.447E-02	%(P	5.448E-02	1.68E-02	G
CE-139	-1.0612E-02						
		165.85	-1.061E-02	%(P	4.815E-02	1.44E-02	G
EU-152	-2.0914E-02						
		121.78	-2.091E-02	%(P	1.325E-01	3.96E-02	G K
		344.30	4.688E-03	% P	1.126E-01	3.25E-02	G
		1408.08	3.449E-02	% P	1.299E-01	3.60E-02	G
		964.00	6.171E-02	& P	4.068E-01	1.17E-01	G
		1112.07	9.739E-02	& P	3.965E-01	1.15E-01	G
		778.90	-2.465E-03	% P	3.542E-01	9.94E-02	G
EU-154	-2.2756E-02						
		123.10	-2.276E-02	&(P	8.321E-02	2.49E-02	G K
		1274.80	-4.963E-03	& P	1.754E-01	4.89E-02	G
		723.30	2.312E-02	% P	3.181E-01	9.23E-02	G
		1004.80	-7.962E-03	% P	2.801E-01	7.79E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	3.3358E-03						
		86.45	3.336E-03	&(	1.709E-01	5.10E-02	G K
		105.31	3.398E-02	%	1.993E-01	5.97E-02	G
HG-203	-2.9756E-03						
		279.17	-2.976E-03	%(	5.395E-02	1.59E-02	G K
		72.87	-4.145E-01	& P	1.287E+00	3.88E-01	G
		70.83	-2.414E-01	%	1.705E+00	5.09E-01	G
		82.50	1.010E-02	&	2.437E+00	7.25E-01	G
TL-208	2.5731E-01						
		583.14	2.573E-01	(P	4.906E-02	2.42E-02	G
		510.72	4.026E-01	+ P	2.194E-01	8.83E-02	G
PB-212	6.0101E-01						
		238.63	6.010E-01	(P	1.025E-01	3.87E-02	G K
							Energy duplication
		77.11	7.466E-01	+	3.223E-01	1.04E-01	G
		74.81	8.147E-01	& P	6.485E-01	2.02E-01	G
PB-214	4.1819E-01						
		351.99	4.000E-01	(P	8.749E-02	3.57E-02	G K
		295.22	4.533E-01	(P	1.867E-01	6.44E-02	G
							Energy duplication
		77.11	1.208E+00	+ P	5.281E-01	1.70E-01	G
		241.92	1.412E-01	% P	7.111E-01	2.13E-01	G
BI-212	7.7823E-01						
		727.17	6.766E-01	(P	4.347E-01	1.79E-01	G K
		1620.56	1.215E+00	?(	1.280E+00	4.55E-01	G
		785.42	1.208E+00	% P	2.133E+00	6.56E-01	G
BI-214	4.7961E-01						
		609.32	4.598E-01	(P	8.702E-02	4.27E-02	G K
		1764.51	5.368E-01	(P	1.215E-01	9.47E-02	G
		1120.28	1.122E+00	+ P	4.763E-01	2.32E-01	G
RA-224	1.5106E+00						
		241.00	1.511E+00	(P	1.172E+00	3.69E-01	G
RA-226	1.1357E+00						
		185.99	1.136E+00	(	1.097E+00	3.42E-01	G
AC-228	6.6664E-01						
		911.07	7.027E-01	(P	2.032E-01	9.26E-02	G K
		968.90	1.008E+00	+ P	3.890E-01	1.84E-01	G
		338.40	5.796E-01	(P	3.122E-01	1.18E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.9568E-01
                          236.00-1.957E-01 %(P 4.602E-01 1.39E-01 G K
                          256.25-1.348E-01 % P 5.523E-01 1.65E-01 G

PA-234      -1.9977E-02
                           98.44-1.998E-02 &(  1.609E-01 4.80E-02 G K
                          946.00-2.364E-02 &   2.517E-01 7.14E-02 G
                          131.28 1.114E-01 &   1.869E-01 5.70E-02 G
                           94.67-2.471E-03 &   2.676E-01 7.95E-02 G
                          883.24 0.000E+00 &   3.903E-01 1.09E-01 G
                          926.70-2.573E-02 %   4.201E-01 1.18E-01 G
                          569.26 1.399E-01 &   3.452E-01 1.04E-01 G

TH-234       1.0473E+00
                           63.29 4.214E-01 %(P 2.033E+00 6.08E-01 G K
                           92.80 1.450E+00  (P 1.569E+00 4.83E-01 G
                           92.38 1.527E+00 &(P 1.884E+00 5.77E-01 G

AM-241      -4.9130E-02
                           59.54-4.913E-02 %(P 2.738E-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:                      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 - 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	4.9481E-02	5.4361E-02	3.8454E-01	3.8456E-01	4.001E-01
K-40		1.2798E+01	1.2798E+01	1.5760E+00	1.7340E+00	
MN-54	#	3.9559E-02	4.0201E-02	4.1360E-02	4.1422E-02	
CO-57	#B	-2.2769E-03	-2.3197E-03	4.2131E-02	4.2131E-02	4.630E-02
CO-60	#B	2.4212E-02	2.4275E-02	4.0934E-02	4.0957E-02	4.398E-02
Sr-85	#A	-2.5338E-02	-2.7379E-02	5.5230E-02	5.5252E-02	5.633E-02
Kr-85	#A	-6.0881E+02	-6.0884E+02	1.2754E+03	1.2758E+03	1.304E+03
Y-88	#B	0.0000E+00	0.0000E+00	8.6190E-03	8.6205E-03	2.020E-02
NB-94	#B	5.4395E-03	5.4395E-03	2.8470E-02	2.8471E-02	3.377E-02
Ag-108M	#B	3.8833E-04	3.8837E-04	4.8671E-02	4.8671E-02	5.697E-02
CD-109	#A	-1.5386E-02	-1.5558E-02	2.2080E+00	2.2080E+00	1.400E+00
SN-113	#B	-2.2154E-03	-2.3142E-03	4.3982E-02	4.3982E-02	4.877E-02
SB-125	#B	1.0337E-01	1.0389E-01	9.3676E-02	9.3859E-02	1.087E-01
I-131	#B	-2.3907E-03	-4.4651E-03	6.4882E-02	6.4883E-02	3.995E-02
CS-134	#B	3.8277E-03	3.8533E-03	2.9736E-02	2.9737E-02	3.469E-02
CS-137	#A	3.4455E-02	3.4471E-02	5.0417E-02	5.0455E-02	5.445E-02
CE-139	#A	-1.0231E-02	-1.0612E-02	4.4397E-02	4.4401E-02	4.643E-02
EU-152	#B	-2.0892E-02	-2.0914E-02	1.2855E-01	1.2856E-01	1.324E-01
EU-154	#B	-2.2719E-02	-2.2756E-02	7.9550E-02	7.9560E-02	8.307E-02
EU-155	#B	3.3266E-03	3.3358E-03	1.5311E-01	1.5311E-01	1.704E-01
HG-203	#B	-2.6715E-03	-2.9756E-03	4.7690E-02	4.7690E-02	4.844E-02
TL-208		2.5731E-01	2.5731E-01	7.2683E-02	7.4122E-02	
PB-212	#	6.0101E-01	6.0101E-01	1.1602E-01	1.2089E-01	1.025E-01
PB-214	#	4.1819E-01	4.1819E-01	1.0525E-01	1.0787E-01	8.749E-02
BI-212		7.7823E-01	7.7823E-01	5.3504E-01	5.3684E-01	
BI-214		4.7961E-01	4.7961E-01	1.3352E-01	1.3624E-01	
RA-224	#	1.5106E+00	1.5106E+00	1.1080E+00	1.1113E+00	1.172E+00
RA-226	#	1.1357E+00	1.1357E+00	1.0270E+00	1.0290E+00	1.097E+00
AC-228		6.6664E-01	6.6664E-01	2.4189E-01	2.4480E-01	
TH-227	#B	-1.9568E-01	-1.9568E-01	4.2445E-01	4.2459E-01	4.602E-01
PA-234	#B	-1.9977E-02	-1.9977E-02	1.4410E-01	1.4411E-01	1.609E-01
TH-234	#B	1.0473E+00	1.0473E+00	1.0471E+00	1.0487E+00	2.033E+00
AM-241	#A	-4.9128E-02	-4.9130E-02	2.6521E-01	2.6522E-01	2.738E-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 (295.1 to 1999.1 keV) 1.5019577E+01 pCi/gm
Total Decayed Activity (295.1 to 1999.1 keV) 1.5020218E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_30MAY2006_1627.An1

Sample description
FSS-NOL-05-01-008-F

Spectrum Filename: C:\GammaVision\Spectra\101F_30MAY2006_1627.An1

Acquisition information
Start time: 30-May-2006 16:31:21
Live time: 2000
Real time: 2002
Dead time: 0.10 %
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/channel^2

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: 2.0840E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0840E+03) =
4.7985E+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	23-May-2006 09:25:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2306

***** 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
74.66	214.	15.71	1.00	1.660E-02	74.81	9.600	8.516E-01	PB212
77.17	412.	8.55	1.01	1.731E-02	77.11	17.500	8.870E-01	PB212
					77.11	10.700	1.438E+00	PB214
89.71	95.	30.44	1.02	1.957E-02				
93.06	156.	18.95	1.02	1.994E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.623E+00	TH234
128.99	96.	37.88	0.83	2.110E-02				
186.16	136.	21.75	1.15	1.857E-02	185.99	3.280	1.447E+00	RA226
209.83	84.	34.94	1.30	1.718E-02				
238.70	918.	3.94	1.12	1.557E-02	238.63	43.100	8.811E-01	PB212
241.56	116.	20.94	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
270.59	74.	27.16	1.45	1.399E-02				
277.57	93.	31.82	1.20	1.367E-02				
295.26	191.	14.35	1.19	1.292E-02	295.22	19.200	4.936E-01	PB214
338.40	154.	12.70	1.31	1.135E-02	338.40	12.010	7.227E-01	AC228
351.89	358.	10.06	1.11	1.093E-02				
351.89	358.	10.06	1.11	1.093E-02	351.99	37.100	5.699E-01	PB214
463.28	52.	26.73	1.54	8.346E-03				
463.28	52.	26.73	1.54	8.346E-03	463.51	10.000	3.942E-01	SB125
511.10	124.	15.18	1.87	7.585E-03	510.72	22.500	4.107E-01	TL208
582.92	260.	8.94	1.35	6.687E-03	583.14	86.000	2.906E-01	TL208
609.10	248.	9.87	1.11	6.415E-03	609.32	46.090	5.412E-01	BI214
727.36	71.	19.80	1.47	5.442E-03	727.17	11.800	7.140E-01	BI212
794.33	46.	37.01	1.10	5.024E-03				
910.74	190.	9.05	1.35	4.448E-03	911.07	29.000	9.461E-01	AC228
968.33	148.	14.33	1.08	4.214E-03	968.90	17.460	1.294E+00	AC228
1120.80	71.	25.86	0.70	3.711E-03	1120.28	15.040	8.205E-01	BI214

1460.28	650.	4.08	1.91	2.943E-03	1460.75	10.700	1.334E+01	K40
1587.32	46.	20.95	1.75	2.732E-03				
1763.64	39.	16.01	2.31	2.481E-03	1764.51	15.920	6.330E-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	
148.88	75.00	457.	214.	0.107	47.13	1.005	PB-214	D
153.91	77.51	414.	412.	0.206	25.65	1.007	PB-214	D
179.01	89.95	367.	95.	0.047	91.33	1.016	PB-214	lD
419.33	209.83	338.	84.	0.042	104.82	1.296	NP-239	s
477.09	238.67	194.	918.	0.459	11.81	1.122	PB-212	D
482.83	241.54	238.	116.	0.058	62.81	1.124	PB-214	D
540.91	270.59	160.	74.	0.037	81.48	1.452	AC-228	s
554.88	277.57	270.	95.	0.047	79.59	1.204	NP-239	s
1588.88	794.33	74.	40.	0.020	103.03	1.103	AC-228	s
3175.82	1587.32	9.	46.	0.023	62.86	1.749	AC-228	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	149.24	74.84	1314.	152.	0.076	100.23	1.499s
PB-212	153.79	77.11	1117.	365.	0.183	41.90	1.499D
PB-214	153.79	77.11	1121.	361.	0.181	41.90	1.499D
TH-234	185.46	92.94	951.	157.	0.079	83.18	1.499
RA-226	371.69	186.02	481.	138.	0.069	72.13	1.499s
PB-212	476.99	238.64	490.	722.	0.361	16.96	1.499
PB-214	590.11	295.18	223.	192.	0.096	39.09	1.499s
AC-228	676.59	338.40	111.	152.	0.076	38.09	1.307
PB-214	703.60	351.90	160.	302.	0.151	24.57	1.499
SB-125	926.19	463.15	81.	47.	0.023	89.68	1.499s
TL-208	1022.14	511.10	96.	108.	0.054	45.55	1.873s
TL-208	1165.85	582.92	80.	258.	0.129	26.83	1.354s
BI-214	1218.23	609.10	104.	247.	0.123	29.62	1.113
BI-212	1454.87	727.36	48.	71.	0.035	59.41	1.465s
AC-228	1821.83	910.74	35.	188.	0.094	27.15	1.353
AC-228	1937.08	968.33	67.	147.	0.073	42.99	1.081s
BI-214	2242.20	1120.80	70.	71.	0.035	77.57	0.704s
K-40	2921.57	1460.28	15.	648.	0.324	12.24	1.914
BI-214	3528.71	1763.64	0.	39.	0.019	48.04	2.311

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.6406E-01					
			477.56	1.641E-01	%(	3.640E-01 1.10E-01	G
K-40		1.3344E+01					
			1460.75	1.334E+01	(P	4.285E-01 5.46E-01	G
MN-54		1.7702E-02					
			834.81	1.770E-02	&(P	4.551E-02 1.36E-02	G
CO-57		-5.5213E-03					
			122.07	-5.521E-03	%(	4.938E-02 1.48E-02	G K
			136.43	9.393E-02	%	4.078E-01 1.22E-01	G
CO-60		6.5799E-03					
			1332.51	6.580E-03	&(P	4.767E-02 1.33E-02	G K
			1173.23	1.396E-03	% P	5.657E-02 1.57E-02	G K
Sr-85		-1.1015E-02					
			514.00	-1.101E-02	%(	5.023E-02 1.48E-02	G
Kr-85		-2.5878E+02					
			513.99	-2.588E+02	%(P	1.078E+03 3.17E+02	G
Y-88		1.0220E-02					
			1836.01	1.022E-02	%(	4.412E-02 1.23E-02	G K
			898.02	1.308E-02	& P	4.050E-02 1.19E-02	G
NB-94		-7.2004E-03					
			871.10	-7.200E-03	%(P	4.873E-02 1.40E-02	G K
			702.50	2.406E-03	& P	5.796E-02 1.67E-02	G K
Ag-108M		-2.8122E-02					
			722.95	-2.812E-02	%(	6.945E-02 2.09E-02	G K
			614.37	1.165E-02	% P	4.702E-02 1.38E-02	G
			433.93	1.993E-03	%	3.461E-02 9.92E-03	G
CD-109		-2.8559E-01					
			88.04	-2.856E-01	&(P	1.532E+00 4.60E-01	G
SN-113		9.3747E-03					
			391.71	9.375E-03	%(	5.962E-02 1.75E-02	G K
			255.04	1.794E-01	& P	1.726E+00 5.10E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.1548E-02						
		427.95	-9.629E-04	&(P	1.251E-01	3.59E-02	G K
		600.77	-2.244E-02	& P	2.249E-01	6.46E-02	G
		636.15	-4.879E-02	& P	3.543E-01	1.02E-01	G
		463.51	3.654E-01	(P	3.493E-01	1.13E-01	G
		176.29	-8.626E-02	% P	4.801E-01	1.42E-01	G
I-131	9.5888E-03						
		364.48	9.589E-03	%(	8.294E-02	2.43E-02	G K
		636.97	-3.252E-01	%	1.122E+00	3.32E-01	G
		284.29	-1.804E-01	%	1.205E+00	3.57E-01	G
CS-134	-6.4028E-04						
		604.66	-6.403E-04	&(P	1.180E-01	3.50E-02	G K
		795.76	9.374E-03	% P	5.896E-02	1.70E-02	G
		569.29	7.001E-02	& P	2.380E-01	7.02E-02	G
		801.84	-2.386E-02	&	4.923E-01	1.38E-01	G
CS-137	8.4966E-03						
		661.62	8.497E-03	&(P	5.640E-02	1.63E-02	G
CE-139	-1.5018E-03						
		165.85	-1.502E-03	%(P	5.229E-02	1.55E-02	G
EU-152	-1.6265E-02						
		121.78	-1.626E-02	%(P	1.460E-01	4.36E-02	G K
		344.30	1.791E-02	% P	1.346E-01	3.95E-02	G
		1408.08	1.127E-02	% P	2.121E-01	5.69E-02	G
		964.00	-5.160E-03	% P	5.502E-01	1.58E-01	G
		1112.07	2.994E-03	& P	4.245E-01	1.18E-01	G
		778.90	3.887E-02	% P	3.352E-01	9.56E-02	G
EU-154	5.7040E-03						
		123.10	5.704E-03	%(P	1.016E-01	3.03E-02	G K
		1274.80	1.581E-02	% P	1.536E-01	4.31E-02	G
		723.30	-1.283E-01	% P	3.147E-01	9.45E-02	G
		1004.80	-6.048E-02	% P	2.950E-01	8.53E-02	G
EU-155	1.2079E-01						
		86.45	1.208E-01	%(	1.696E-01	5.18E-02	G K
		105.31	2.674E-02	%	2.067E-01	6.19E-02	G
HG-203	-1.9383E-03						
		279.17	-1.938E-03	%(	4.701E-02	1.38E-02	G K
		72.87	-1.835E-01	% P	1.313E+00	3.94E-01	G
		70.83	2.256E-01	%	2.169E+00	6.49E-01	G
		82.50	1.532E-01	&	2.142E+00	6.38E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9060E-01						
		583.14	2.906E-01	@(P	5.018E-02	2.62E-02	G
		510.72	4.107E-01	+ P	1.835E-01	7.17E-02	G
PB-212	7.2336E-01						
		238.63	6.979E-01	(P	1.023E-01	3.98E-02	G K
							Energy duplication
		77.11	7.862E-01	@(	3.413E-01	1.10E-01	G
		74.81	6.226E-01	& P	7.010E-01	2.15E-01	G
PB-214	4.8931E-01						
		351.99	4.832E-01	(P	9.864E-02	3.98E-02	G K
		295.22	5.010E-01	@(P	1.889E-01	6.59E-02	G
							Energy duplication
		77.11	1.273E+00	+ P	5.591E-01	1.80E-01	G
		241.92	-3.827E-01	% P	6.131E-01	1.87E-01	G
BI-212	7.1402E-01						
		727.17	7.140E-01	*(P	3.543E-01	1.43E-01	G K
		1620.56	2.623E-01	%	1.317E+00	3.61E-01	G
		785.42	1.912E-01	% P	2.159E+00	6.12E-01	G
BI-214	5.6479E-01						
		609.32	5.412E-01	(P	1.104E-01	5.37E-02	G K
		1764.51	6.330E-01	(P	1.210E-01	1.02E-01	G
		1120.28	8.205E-01	+ P	4.857E-01	2.13E-01	G
RA-224	9.0531E-01						
		241.00	9.053E-01	%(P	1.259E+00	3.86E-01	G
RA-226	1.4676E+00						
		185.99	1.468E+00	*(	1.116E+00	3.53E-01	G
AC-228	9.4606E-01						
		911.07	9.461E-01	(P	1.520E-01	8.64E-02	G K
		968.90	1.294E+00	+ P	3.608E-01	1.86E-01	G
		338.40	7.227E-01	- P	2.465E-01	9.31E-02	G
TH-227	-1.4236E-01						
		236.00	-1.424E-01	&(P	3.896E-01	1.17E-01	G K
		256.25	1.077E-01	% P	5.467E-01	1.63E-01	G
PA-234	2.6972E-03						
		98.44	2.697E-03	%(	1.881E-01	5.61E-02	G K
		946.00	-2.150E-02	&	2.225E-01	6.26E-02	G
		131.28	-2.584E-02	%	2.147E-01	6.42E-02	G
		94.67	-1.040E-01	%	3.254E-01	9.82E-02	G
		883.24	0.000E+00	&	3.886E-01	1.08E-01	G
		926.70	1.034E-01	%	3.811E-01	1.11E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.072E-01 &   3.496E-01 1.03E-01 G

TH-234       1.0304E+00
                           63.29 5.086E-01 %(P 2.313E+00 6.94E-01 G K
                           92.80 1.709E+00  (P 1.591E+00 4.92E-01 G
                           92.38-1.380E-01 % P 1.948E+00 5.78E-01 G

AM-241      -1.5788E-02
                           59.54-1.579E-02 %(P 3.058E-01 9.12E-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 - 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 *****

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	1.4923E-01	1.6406E-01	3.3004E-01	3.3017E-01	3.311E-01
K-40		1.3344E+01	1.3344E+01	1.6393E+00	1.8044E+00	
MN-54	#A	1.7417E-02	1.7702E-02	4.0733E-02	4.0745E-02	4.478E-02
CO-57	#B	-5.4189E-03	-5.5213E-03	4.4267E-02	4.4268E-02	4.847E-02
CO-60	#B	6.5627E-03	6.5799E-03	3.9870E-02	3.9871E-02	4.754E-02

Sr-85	#A	-1.0188E-02	-1.1015E-02	4.4474E-02	4.4479E-02	4.646E-02
Kr-85	#A	-2.5877E+02	-2.5878E+02	1.1397E+03	1.1398E+03	1.078E+03
Y-88	#B	9.7462E-03	1.0220E-02	3.6871E-02	3.6876E-02	4.208E-02
NB-94	#B	-7.2003E-03	-7.2004E-03	4.4152E-02	4.4154E-02	4.873E-02
Ag-108M	#B	-2.8119E-02	-2.8122E-02	6.2698E-02	6.2718E-02	6.944E-02
CD-109	#A	-2.8242E-01	-2.8559E-01	1.4216E+00	1.4217E+00	1.515E+00
SN-113	#B	8.9717E-03	9.3747E-03	5.2499E-02	5.2502E-02	5.705E-02
SB-125	#B	9.1092E-02	9.1548E-02	8.4643E-02	8.4801E-02	1.245E-01
I-131	#B	5.1120E-03	9.5888E-03	7.2856E-02	7.2858E-02	4.422E-02
CS-134	#B	-6.3599E-04	-6.4028E-04	1.2966E-01	1.2966E-01	1.172E-01
CS-137	#A	8.4927E-03	8.4966E-03	4.9042E-02	4.9044E-02	5.637E-02
CE-139	#A	-1.4476E-03	-1.5018E-03	5.6151E-02	5.6152E-02	5.040E-02
EU-152	#B	-1.6247E-02	-1.6265E-02	1.4481E-01	1.4481E-01	1.459E-01
EU-154	#B	5.6947E-03	5.7040E-03	9.0785E-02	9.0786E-02	1.014E-01
EU-155	#B	1.2045E-01	1.2079E-01	1.5555E-01	1.5569E-01	1.692E-01
HG-203	#B	-1.7389E-03	-1.9383E-03	4.1331E-02	4.1331E-02	4.218E-02
TL-208	#	2.9060E-01	2.9060E-01	7.8695E-02	8.0389E-02	
PB-212	#	7.2336E-01	7.2336E-01	1.2372E-01	1.3030E-01	1.023E-01
PB-214	#	4.8931E-01	4.8931E-01	1.1392E-01	1.1722E-01	9.864E-02
BI-212	#	7.1402E-01	7.1402E-01	4.2826E-01	4.3015E-01	
BI-214		5.6479E-01	5.6479E-01	1.6088E-01	1.6402E-01	
RA-224	#A	9.0531E-01	9.0531E-01	1.1578E+00	1.1589E+00	1.259E+00
RA-226	#	1.4676E+00	1.4676E+00	1.0585E+00	1.0618E+00	1.116E+00
AC-228		9.4606E-01	9.4606E-01	2.5937E-01	2.6483E-01	
TH-227	#B	-1.4236E-01	-1.4236E-01	3.6019E-01	3.6028E-01	3.896E-01
PA-234	#B	2.6972E-03	2.6972E-03	1.6825E-01	1.6825E-01	1.881E-01
TH-234	#B	1.0304E+00	1.0304E+00	8.9077E-01	8.9260E-01	2.313E+00
AM-241	#A	-1.5787E-02	-1.5788E-02	3.4648E-01	3.4648E-01	3.058E-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 (270.1 to 1999.1 keV) 1.5859818E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.5859818E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102_8JUN2006_1038.An1

Sample description
NOL-05-01-26-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\102_8JUN2006_1038.An1

Acquisition information
Start time: 08-Jun-2006 10:38:08
Live time: 2000
Real time: 2023
Dead time: 1.16 %
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/channel^2

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: 2.1470E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1470E+03) =
4.6577E+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	08-Jun-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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5575

***** 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
76.61	285.	19.09	0.83	9.394E-03				
76.61	285.	19.09	0.83	9.394E-03	77.11	10.700	1.758E+00	PB214
					77.11	17.500	1.075E+00	PB212
93.16	125.	31.00	0.66	1.340E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.970E+00	TH234
186.29	125.	26.04	1.37	1.625E-02	185.99	3.280	1.423E+00	RA226
238.91	631.	5.27	1.21	1.379E-02	238.63	43.100	6.677E-01	PB212
242.06	85.	26.60	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.245E-01	PB214
295.55	234.	17.27	1.23	1.145E-02	295.22	19.200	6.691E-01	PB214
338.70	149.	19.74	1.04	1.005E-02	338.40	12.010	7.762E-01	AC228
352.06	290.	9.69	1.18	9.677E-03	351.99	37.100	5.073E-01	PB214
511.31	122.	21.24	1.52	6.687E-03	510.72	22.500	5.114E-01	TL208
583.82	206.	10.33	1.46	5.883E-03	583.14	86.000	2.557E-01	TL208
609.90	175.	9.45	1.23	5.644E-03	609.32	46.090	4.221E-01	BI214
662.32	655.	5.05	1.53	5.224E-03	661.62	84.620	9.316E-01	CS137
727.85	39.	25.47	1.12	4.794E-03	727.17	11.800	4.295E-01	BI212
912.09	145.	11.42	1.35	3.918E-03	911.07	29.000	8.006E-01	AC228
970.33	101.	17.54	1.50	3.713E-03	968.90	17.460	9.790E-01	AC228
1120.93	63.	22.21	0.98	3.283E-03	1120.28	15.040	8.056E-01	BI214
1462.19	614.	4.10	1.74	2.619E-03	1460.75	10.700	1.377E+01	K40
1767.23	12.	37.18	2.24	2.225E-03	1764.51	15.920	PBC<MDA	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	
477.44	238.92	237.	631.	0.316	15.80	1.215	PB-212	D
483.75	242.07	213.	85.	0.042	79.79	1.217	PB-214	D
590.76	295.55	526.	86.	0.043	118.31	1.230	PB-214	

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-214	153.80	77.11	1037.	175.	0.088	81.12	1.500D
PB-212	153.80	77.11	1037.	175.	0.088	81.12	1.500D
TH-234	185.72	93.07	1083.	119.	0.059	119.66	1.500s
TH-234	185.67	93.05	1069.	118.	0.059	120.32	1.500s
RA-226	372.27	186.33	571.	116.	0.058	88.28	1.500s
PB-212	477.48	238.92	526.	588.	0.294	20.67	1.500
PB-214	590.80	295.57	275.	148.	0.074	53.42	1.500
AC-228	677.07	338.70	231.	149.	0.075	59.22	1.040s
PB-214	704.33	352.32	176.	256.	0.128	28.81	1.500s
TL-208	1022.39	511.31	146.	122.	0.061	63.71	1.519s
TL-208	1167.47	583.82	80.	206.	0.103	30.99	1.456
BI-214	1219.65	609.90	44.	175.	0.087	28.35	1.232
CS-137	1324.53	662.32	98.	655.	0.327	15.16	1.530
BI-212	1455.66	727.85	26.	39.	0.019	76.42	1.117
AC-228	1824.31	912.09	39.	145.	0.072	34.27	1.347
AC-228	1940.86	970.33	56.	101.	0.050	52.62	1.500
BI-214	2242.25	1120.93	42.	63.	0.032	66.62	0.985s
K-40	2925.29	1462.19	5.	614.	0.307	12.29	1.744
BI-214	3535.92	1767.23	4.	12.	0.006	111.55	2.237s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.6740E-02					
			477.56	1.674E-02	%(	4.902E-01 1.42E-01	G
K-40		1.3774E+01					
			1460.75	1.377E+01	(P	3.028E-01 5.65E-01	G
MN-54		-2.7286E-03					
			834.81	-2.729E-03	&(P	4.374E-02 1.22E-02	G
CO-57		-9.6206E-03					
			122.07	-9.621E-03	%(	5.516E-02 1.65E-02	G K
			136.43	-2.949E-02	%	4.665E-01 1.39E-01	G
CO-60		-1.2876E-04					
			1332.51	-1.288E-04	%(P	5.587E-02 1.51E-02	G K
			1173.23	1.703E-02	%	6.708E-02 1.96E-02	G K
Sr-85		-1.7593E-02					
			514.00	-1.759E-02	&(	6.158E-02 1.84E-02	G
Kr-85		-4.0299E+02					
			513.99	-4.030E+02	&(	1.421E+03 4.24E+02	G
Y-88		-1.9355E-05					
			1836.01	-1.936E-05	&(P	6.686E-02 1.79E-02	G K
			898.02	-7.033E-03	& P	4.919E-02 1.38E-02	G
NB-94		2.3602E-02					
			871.10	2.360E-02	%(	3.774E-02 1.18E-02	G K
			702.50	2.683E-02	%	3.649E-02 1.16E-02	G K
Ag-108M		-9.4333E-04					
			722.95	-9.433E-04	&(	4.594E-02 1.28E-02	G K
			614.37	3.089E-04	% P	5.189E-02 1.47E-02	G
			433.93	6.678E-03	&	5.584E-02 1.64E-02	G
CD-109		-1.1796E+00					
			88.04	-1.180E+00	%(P	1.994E+00 6.07E-01	G
SN-113		-3.2591E-03					
			391.71	-3.259E-03	%(	7.473E-02 2.18E-02	G K
			255.04	4.954E-02	%	2.084E+00 6.14E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	3.6445E-02						
		427.95	3.645E-02	%(P	1.516E-01	4.48E-02	G K
		600.77	9.095E-03	% P	2.153E-01	6.08E-02	G
		636.15	1.384E-01	% P	3.410E-01	1.02E-01	G
		463.51	2.792E-01	& P	4.994E-01	1.52E-01	G
		176.29	-7.634E-02	% P	6.930E-01	2.06E-01	G
I-131	2.6754E-03						
		364.48	2.675E-03	&(	5.211E-02	1.52E-02	G K
		636.97	8.285E-03	%	5.956E-01	1.68E-01	G
		284.29	-4.632E-03	%	6.800E-01	1.99E-01	G
CS-134	0.0000E+00						
		604.66	0.000E+00	&(	7.399E-02	2.15E-02	G K
		795.76	3.069E-02	%	4.990E-02	1.55E-02	G
		569.29	1.699E-02	&	2.659E-01	7.59E-02	G
		801.84	2.726E-02	% P	3.658E-01	9.97E-02	G
CS-137	9.3164E-01						
		661.62	9.316E-01	(	6.947E-02	4.71E-02	G
CE-139	3.1992E-03						
		165.85	3.199E-03	&(P	4.335E-02	1.28E-02	G
EU-152	-2.4863E-03						
		121.78	-2.486E-03	%(P	1.762E-01	5.24E-02	G K
		344.30	2.850E-02	%	1.601E-01	4.74E-02	G
		1408.08	-3.346E-04	%	2.302E-01	6.09E-02	G
		964.00	2.640E-01	% P	3.880E-01	1.21E-01	G
		1112.07	3.794E-02	%	4.090E-01	1.15E-01	G
		778.90	-9.461E-02	% P	4.021E-01	1.17E-01	G
EU-154	1.2782E-02						
		123.10	1.278E-02	%(P	1.241E-01	3.70E-02	G K
		1274.80	3.787E-02	&	1.747E-01	5.04E-02	G
		723.30	2.844E-02	% P	2.405E-01	6.88E-02	G
		1004.80	-6.258E-02	&	3.447E-01	9.96E-02	G
EU-155	1.2302E-01						
		86.45	1.230E-01	%(P	2.389E-01	7.25E-02	G K
		105.31	1.135E-01	&	2.696E-01	8.16E-02	G
HG-203	2.6072E-02						
		279.17	2.607E-02	&(P	4.843E-02	1.47E-02	G K
		72.87	-4.163E-01	%	2.002E+00	6.02E-01	G
		70.83	1.328E-02	&	3.320E+00	9.88E-01	G
		82.50	-1.513E+00	%	3.772E+00	1.14E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5571E-01						
		583.14	2.557E-01	(P	5.523E-02	2.65E-02	G
		510.72	5.114E-01	+	2.463E-01	1.09E-01	G
PB-212	6.3321E-01						
		238.63	6.219E-01	(	1.159E-01	4.28E-02	G K
							Energy duplication
		77.11	6.611E-01	*(	5.758E-01	1.79E-01	G
		74.81	4.095E-01	& P	1.206E+00	3.64E-01	G
PB-214	4.4067E-01						
		351.99	4.491E-01	@(P	1.130E-01	4.32E-02	G K
		295.22	4.244E-01	(	2.288E-01	7.56E-02	G
							Energy duplication
		77.11	1.081E+00	+	9.418E-01	2.92E-01	G
		241.92	1.522E-01	%	7.569E-01	2.27E-01	G
BI-212	4.2948E-01						
		727.17	4.295E-01	(	2.966E-01	1.09E-01	G K
		1620.56	2.247E-01	% P	1.889E+00	5.13E-01	G
		785.42	5.796E-01	% P	2.466E+00	7.19E-01	G
BI-214	4.2207E-01						
		609.32	4.221E-01	(	8.161E-02	3.99E-02	G K
		1764.51	2.152E-01	- P	2.194E-01	8.06E-02	G
		1120.28	8.056E-01	+	4.186E-01	1.79E-01	G
RA-224	5.5703E-01						
		241.00	5.570E-01	&(P	1.406E+00	4.25E-01	G
RA-226	1.3667E+00						
		185.99	1.367E+00	@(P	1.346E+00	4.18E-01	G
AC-228	8.4886E-01						
		911.07	8.006E-01	(P	1.767E-01	9.17E-02	G K
		968.90	9.790E-01	(P	3.645E-01	1.72E-01	G
		338.40	7.762E-01	@(	3.831E-01	1.53E-01	G
TH-227	-2.4678E-01						
		236.00	-2.468E-01	%(P	5.289E-01	1.60E-01	G K
		256.25	1.434E-01	%	5.978E-01	1.78E-01	G
PA-234	4.6389E-02						
		98.44	4.639E-02	&(	2.610E-01	7.83E-02	G K
		946.00	-2.560E-02	%	2.745E-01	7.79E-02	G
		131.28	5.627E-02	%	2.160E-01	6.48E-02	G
		94.67	-1.155E-01	&	4.837E-01	1.46E-01	G
		883.24	3.624E-02	&	4.181E-01	1.18E-01	G
		926.70	1.143E-01	%	4.221E-01	1.23E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 2.818E-02 &   3.938E-01 1.13E-01 G

TH-234       1.5841E+00
                           63.29 9.676E-01 %(P 4.566E+00 1.37E+00 G K
                           92.80 1.864E+00  (  2.440E+00 7.48E-01 G
                           92.38 2.193E+00  (P 2.885E+00 8.83E-01 G

AM-241      -1.0950E-01
                           59.54-1.095E-01 %(  6.184E-01 1.85E-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:                      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 - 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 *****

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	1.6735E-02	1.6740E-02	4.2671E-01	4.2671E-01	4.900E-01
K-40		1.3774E+01	1.3774E+01	1.6935E+00	1.8615E+00	
MN-54	#A	-2.7284E-03	-2.7286E-03	4.6083E-02	4.6083E-02	4.374E-02
CO-57	#B	-9.6199E-03	-9.6206E-03	4.9522E-02	4.9525E-02	5.515E-02
CO-60	#B	-1.2875E-04	-1.2876E-04	3.1036E-01	3.1036E-01	5.587E-02

Sr-85	#A	-1.7588E-02	-1.7593E-02	5.5097E-02	5.5106E-02	6.156E-02
Kr-85	#A	-4.0299E+02	-4.0299E+02	1.2710E+03	1.2712E+03	1.421E+03
Y-88	#B	-1.9352E-05	-1.9355E-05	7.0343E-04	7.0343E-04	6.685E-02
NB-94	#B	2.3602E-02	2.3602E-02	3.5512E-02	3.5536E-02	3.774E-02
Ag-108M	#B	-9.4333E-04	-9.4333E-04	3.8427E-02	3.8427E-02	4.594E-02
CD-109	#A	-1.1796E+00	-1.1796E+00	1.8827E+00	1.8839E+00	1.994E+00
SN-113	#B	-3.2585E-03	-3.2591E-03	6.5512E-02	6.5512E-02	7.472E-02
SB-125	#B	3.6444E-02	3.6445E-02	1.3449E-01	1.3451E-01	1.516E-01
I-131	#B	2.6693E-03	2.6754E-03	4.5609E-02	4.5610E-02	5.199E-02
CS-134	#B	0.0000E+00	0.0000E+00	6.4571E-02	6.4571E-02	7.399E-02
CS-137		9.3164E-01	9.3164E-01	1.4126E-01	1.5063E-01	
CE-139	#A	3.1987E-03	3.1992E-03	3.8488E-02	3.8488E-02	4.334E-02
EU-152	#B	-2.4863E-03	-2.4863E-03	4.1637E-01	4.1637E-01	1.762E-01
EU-154	#B	1.2782E-02	1.2782E-02	1.1114E-01	1.1114E-01	1.241E-01
EU-155	#B	1.2302E-01	1.2302E-01	2.1742E-01	2.1753E-01	2.388E-01
HG-203	#B	2.6062E-02	2.6072E-02	4.4238E-02	4.4262E-02	4.841E-02
TL-208		2.5571E-01	2.5571E-01	7.9391E-02	8.0678E-02	
PB-212	#	6.3321E-01	6.3321E-01	1.3085E-01	1.3559E-01	1.159E-01
PB-214	#	4.4067E-01	4.4067E-01	1.2713E-01	1.2951E-01	1.130E-01
BI-212		4.2948E-01	4.2948E-01	3.2820E-01	3.2909E-01	
BI-214		4.2207E-01	4.2207E-01	1.1966E-01	1.2199E-01	
RA-224	#A	5.5703E-01	5.5703E-01	1.2738E+00	1.2742E+00	1.406E+00
RA-226	#	1.3667E+00	1.3667E+00	1.2530E+00	1.2553E+00	1.346E+00
AC-228		8.4886E-01	8.4886E-01	2.4432E-01	2.4892E-01	
TH-227	#B	-2.4678E-01	-2.4678E-01	4.8538E-01	4.8558E-01	5.289E-01
PA-234	#B	4.6389E-02	4.6389E-02	2.3487E-01	2.3489E-01	2.610E-01
TH-234	#B	1.5841E+00	1.5841E+00	1.9060E+00	1.9080E+00	4.566E+00
AM-241	#A	-1.0950E-01	-1.0950E-01	5.5512E-01	5.5515E-01	6.184E-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 (295.2 to 1999.0 keV) 1.6661299E+01 pCi/gm
Total Decayed Activity (295.2 to 1999.0 keV) 1.6661301E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102_8JUN2006_1203.An1

Sample description
NOL-05-01-30-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\102_8JUN2006_1203.An1

Acquisition information
Start time: 08-Jun-2006 12:03:46
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/channel^2

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: 2.1100E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1100E+03) =
4.7393E+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	08-Jun-2006 11:42:00
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: 0.5616

***** 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
77.12	181.	24.49	1.50	9.541E-03	77.11	10.700	1.135E+00	PB214
					77.11	17.500	6.942E-01	PB212
77.12	181.	24.49	1.50	9.541E-03	77.11	10.700	1.135E+00	PB214
					77.11	17.500	6.942E-01	PB212
187.21	101.	32.07	1.15	1.621E-02	185.99	3.280	PBC<MDA	RA226
209.73	63.	35.84	1.25	1.517E-02				
238.95	597.	5.04	1.21	1.379E-02	238.63	43.100	6.431E-01	PB212
242.25	103.	19.66	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.461E-01	PB214
270.01	72.	28.29	1.46	1.244E-02				
277.85	36.	38.09	0.74	1.212E-02				
295.65	115.	14.03	1.25	1.145E-02	295.22	19.200	3.360E-01	PB214
300.37	49.	32.51	1.26	1.128E-02				
338.60	163.	17.65	0.99	1.005E-02	338.40	12.010	8.640E-01	AC228
352.46	208.	14.05	1.36	9.666E-03	351.99	37.100	3.712E-01	PB214
511.64	84.	19.36	2.05	6.683E-03	510.72	22.500	3.559E-01	TL208
583.95	235.	9.74	1.54	5.882E-03	583.14	86.000	2.971E-01	TL208
609.92	153.	12.78	1.57	5.644E-03	609.32	46.090	3.758E-01	BI214
662.76	141.	13.29	1.90	5.221E-03	661.62	84.620	2.041E-01	CS137
728.42	42.	25.01	1.35	4.787E-03	727.17	11.800	4.766E-01	BI212
860.90	49.	30.11	1.23	4.121E-03				
912.08	136.	11.59	1.59	3.918E-03	911.07	29.000	7.674E-01	AC228
969.70	78.	19.25	1.46	3.715E-03	968.90	17.460	7.741E-01	AC228
1121.79	32.	27.99	1.82	3.283E-03	1120.28	15.040	4.098E-01	BI214
1174.63	30.	35.93	1.85	3.157E-03	1173.23	99.860	PBC<MDA	CO60
1462.32	429.	4.90	2.03	2.618E-03	1460.75	10.700	9.794E+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	
374.02	187.21	363.	101.	0.050	96.22	1.152	PA-234	l
419.08	209.73	200.	63.	0.031	107.53	1.250	NP-239	s
477.54	238.89	155.	597.	0.299	15.12	1.215	PB-212	D
484.13	242.18	153.	103.	0.051	58.97	1.217	PB-214	D
539.66	270.01	148.	72.	0.036	84.88	1.463	AC-228	s
555.35	277.85	82.	36.	0.018	118.42	0.744	NP-239	s
600.41	300.38	122.	48.	0.024	109.26	1.585	PB-212	s
1721.90	860.90	43.	51.	0.026	68.66	1.228	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-214	153.80	77.11	892.	181.	0.090	73.48	1.500D
PB-212	153.80	77.11	892.	181.	0.090	73.48	1.500D
PB-212	477.54	238.95	369.	538.	0.269	19.90	1.500s
PB-214	590.77	295.56	184.	105.	0.052	62.32	1.500
AC-228	676.87	338.60	190.	163.	0.082	52.96	0.992s
PB-214	704.44	352.38	118.	182.	0.091	33.59	1.500
TL-208	1023.06	511.64	66.	84.	0.042	58.09	2.049s
TL-208	1167.73	583.95	81.	235.	0.117	29.22	1.542s
BI-214	1219.69	609.92	67.	153.	0.076	38.34	1.568
CS-137	1325.41	662.76	60.	141.	0.071	39.86	1.903s
BI-212	1456.79	728.42	30.	42.	0.021	75.03	1.352s
AC-228	1824.31	912.08	33.	136.	0.068	34.77	1.595
AC-228	1939.61	969.70	41.	78.	0.039	57.75	1.462
BI-214	2243.98	1121.79	23.	32.	0.016	83.97	1.819
CO-60	2349.73	1174.63	42.	30.	0.015	107.80	1.854s
K-40	2925.55	1462.32	3.	429.	0.214	14.69	2.026

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		4.4300E-02					
			477.56	4.430E-02	%(	3.296E-01 9.49E-02	G
K-40		9.7944E+00					
			1460.75	9.794E+00	(P	2.508E-01 4.80E-01	G
MN-54		1.6078E-02					
			834.81	1.608E-02	%(P	3.631E-02 1.09E-02	G
CO-57		-1.0918E-02					
			122.07	-1.092E-02	%(	5.229E-02 1.57E-02	G K
			136.43	-4.213E-02	%	4.035E-01 1.20E-01	G
CO-60		4.8077E-02					
			1332.51	3.615E-02	%(P	5.401E-02 1.71E-02	G K
			1173.23	6.002E-02	*(	6.655E-02 2.16E-02	G K
Sr-85		1.8697E-03					
			514.00	1.870E-03	&(	4.966E-02 1.43E-02	G
Kr-85		4.4417E+01					
			513.99	4.442E+01	&(	1.146E+03 3.31E+02	G
Y-88		-5.4065E-03					
			1836.01	-5.407E-03	%(P	4.624E-02 1.22E-02	G K
			898.02	-9.645E-03	% P	5.647E-02 1.61E-02	G
NB-94		-9.1787E-03					
			871.10	-9.179E-03	%(	5.101E-02 1.47E-02	G K
			702.50	1.227E-02	%	3.805E-02 1.12E-02	G K
Ag-108M		-2.5241E-03					
			722.95	-2.524E-03	&(	4.878E-02 1.37E-02	G K
			614.37	-1.630E-02	% P	4.862E-02 1.44E-02	G
			433.93	7.590E-03	%	3.575E-02 1.04E-02	G
CD-109		4.5432E-01					
			88.04	4.543E-01	%(P	1.625E+00 4.88E-01	G
SN-113		-3.4341E-05					
			391.71	-3.434E-05	%(	5.499E-02 1.57E-02	G K
			255.04	1.235E-02	%	1.694E+00 4.95E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-1.1719E-02						
		427.95	-1.172E-02	%(P	1.189E-01	3.40E-02	G K
		600.77	-3.919E-02	% P	2.357E-01	6.82E-02	G
		636.15	-6.484E-02	% P	3.545E-01	1.02E-01	G
		463.51	1.956E-01	% P	3.938E-01	1.19E-01	G
		176.29	-2.892E-02	& P	6.377E-01	1.88E-01	G
I-131	9.0789E-03						
		364.48	9.079E-03	%(	4.650E-02	1.37E-02	G K
		636.97	-1.306E-01	%	5.354E-01	1.56E-01	G
		284.29	-9.517E-02	%	5.981E-01	1.77E-01	G
CS-134	9.5649E-03						
		604.66	9.565E-03	%(	3.625E-02	1.06E-02	G K
		795.76	1.589E-02	%	4.772E-02	1.41E-02	G
		569.29	-6.074E-02	%	3.001E-01	8.78E-02	G
		801.84	-8.209E-02	% P	5.348E-01	1.53E-01	G
CS-137	2.0407E-01						
		661.62	2.041E-01	*(	5.616E-02	2.71E-02	G
CE-139	-6.3159E-03						
		165.85	-6.316E-03	%(P	5.053E-02	1.50E-02	G
EU-152	-3.4157E-02						
		121.78	-3.416E-02	%(P	1.577E-01	4.72E-02	G K
		344.30	-1.637E-02	%	1.389E-01	4.07E-02	G
		1408.08	-2.556E-03	%	2.545E-01	6.82E-02	G
		964.00	-6.913E-02	& P	4.402E-01	1.27E-01	G
		1112.07	0.000E+00	&	5.209E-01	1.46E-01	G
		778.90	-2.634E-02	% P	3.199E-01	8.96E-02	G
EU-154	-1.7710E-02						
		123.10	-1.771E-02	%(P	9.871E-02	2.95E-02	G K
		1274.80	1.529E-02	%	1.518E-01	4.22E-02	G
		723.30	-1.480E-02	& P	2.229E-01	6.27E-02	G
		1004.80	-4.685E-02	&	3.049E-01	8.70E-02	G
EU-155	-1.0169E-03						
		86.45	-1.017E-03	&(P	2.368E-01	7.04E-02	G K
		105.31	5.084E-02	%	2.467E-01	7.40E-02	G
HG-203	-1.1478E-03						
		279.17	-1.148E-03	&(P	4.307E-02	1.26E-02	G K
		72.87	-7.029E-01	&	1.987E+00	6.00E-01	G
		70.83	-2.130E-03	%	3.480E+00	1.04E+00	G
		82.50	-4.186E-02	%	3.591E+00	1.07E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.0930E-01						
		583.14	2.971E-01	@(P	5.646E-02	2.90E-02	G
		510.72	3.559E-01	*(	1.728E-01	6.90E-02	G
PB-212	6.1267E-01						
		238.63	5.796E-01	@(	9.926E-02	3.85E-02	G K
							Energy duplication
		77.11	6.942E-01	*(	5.442E-01	1.70E-01	G
		74.81	8.001E-01	& P	1.159E+00	3.54E-01	G
PB-214	3.1790E-01						
		351.99	3.250E-01	(P	9.515E-02	3.65E-02	G K
		295.22	3.042E-01	(	1.916E-01	6.32E-02	G
							Energy duplication
		77.11	1.135E+00	+	8.901E-01	2.78E-01	G
		241.92	8.724E-02	%	6.860E-01	2.04E-01	G
BI-212	4.7663E-01						
		727.17	4.766E-01	@(	3.192E-01	1.19E-01	G K
		1620.56	-1.784E-01	% P	1.599E+00	4.15E-01	G
		785.42	6.468E-01	% P	2.095E+00	6.15E-01	G
BI-214	3.8421E-01						
		609.32	3.758E-01	(	1.006E-01	4.81E-02	G K
		1764.51	-1.567E-03	% P	1.332E-01	1.81E-02	G
		1120.28	4.098E-01	&(	3.270E-01	1.15E-01	G
RA-224	5.1214E-01						
		241.00	5.121E-01	%(P	1.294E+00	3.91E-01	G
RA-226	8.3119E-01						
		185.99	8.312E-01	%(P	1.221E+00	3.73E-01	G
AC-228	7.8924E-01						
		911.07	7.674E-01	(P	1.654E-01	8.92E-02	G K
		968.90	7.741E-01	(P	3.195E-01	1.49E-01	G
		338.40	8.640E-01	(	3.549E-01	1.53E-01	G
TH-227	-2.4085E-01						
		236.00	-2.409E-01	%(P	4.794E-01	1.46E-01	G K
		256.25	1.258E-01	%	5.426E-01	1.62E-01	G
PA-234	4.6794E-02						
		98.44	4.679E-02	%(	2.277E-01	6.83E-02	G K
		946.00	-4.013E-03	&	1.955E-01	5.27E-02	G
		131.28	-1.298E-02	&	2.205E-01	6.56E-02	G
		94.67	-1.631E-02	%	4.007E-01	1.19E-01	G
		883.24	-5.110E-02	%	3.807E-01	1.08E-01	G
		926.70	1.267E-01	%	4.183E-01	1.23E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-9.007E-02 %   4.451E-01 1.30E-01 G

TH-234       9.4541E-01
                           63.29 9.454E-01 %(P 4.086E+00 1.23E+00 G K
                           92.80 8.797E-01 %   2.221E+00 6.71E-01 G
                           92.38-6.751E-01 % P 2.288E+00 6.87E-01 G

AM-241       1.4880E-01
                           59.54 1.488E-01 &(  4.793E-01 1.44E-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:                      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 - 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 *****

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	4.4292E-02	4.4300E-02	2.8474E-01	2.8475E-01	3.295E-01
K-40		9.7944E+00	9.7944E+00	1.4389E+00	1.5403E+00	
MN-54	#A	1.6077E-02	1.6078E-02	3.2783E-02	3.2795E-02	3.631E-02
CO-57	#B	-1.0918E-02	-1.0918E-02	4.6981E-02	4.6985E-02	5.229E-02
CO-60	#B	4.8077E-02	4.8077E-02	4.2845E-02	4.2930E-02	5.401E-02

Sr-85	#A	1.8694E-03	1.8697E-03	4.3006E-02	4.3006E-02	4.965E-02
Kr-85	#A	4.4417E+01	4.4417E+01	9.9237E+02	9.9237E+02	1.146E+03
Y-88	#B	-5.4060E-03	-5.4065E-03	3.6985E-02	3.6987E-02	4.623E-02
NB-94	#B	-9.1787E-03	-9.1787E-03	4.4069E-02	4.4072E-02	5.101E-02
Ag-108M	#B	-2.5241E-03	-2.5241E-03	4.1192E-02	4.1193E-02	4.878E-02
CD-109	#A	4.5431E-01	4.5432E-01	1.4639E+00	1.4641E+00	1.625E+00
SN-113	#B	-3.4338E-05	-3.4341E-05	4.7244E-02	4.7244E-02	5.499E-02
SB-125	#B	-1.1719E-02	-1.1719E-02	1.6348E-01	1.6348E-01	1.189E-01
I-131	#B	9.0670E-03	9.0789E-03	4.1100E-02	4.1103E-02	4.644E-02
CS-134	#B	9.5648E-03	9.5649E-03	3.1765E-02	3.1770E-02	3.625E-02
CS-137	#	2.0407E-01	2.0407E-01	8.1345E-02	8.2147E-02	
CE-139	#A	-6.3154E-03	-6.3159E-03	4.8147E-02	4.8148E-02	5.052E-02
EU-152	#B	-3.4157E-02	-3.4157E-02	1.5147E-01	1.5148E-01	1.577E-01
EU-154	#B	-1.7710E-02	-1.7710E-02	9.0323E-02	9.0329E-02	9.871E-02
EU-155	#B	-1.0169E-03	-1.0169E-03	2.9377E-01	2.9377E-01	2.368E-01
HG-203	#B	-1.1475E-03	-1.1478E-03	4.1865E-02	4.1865E-02	4.306E-02
TL-208	#	3.0930E-01	3.0930E-01	9.0523E-02	9.2172E-02	
PB-212	#	6.1267E-01	6.1267E-01	1.2195E-01	1.2670E-01	9.926E-02
PB-214	#	3.1790E-01	3.1790E-01	1.0701E-01	1.0848E-01	9.515E-02
BI-212	#	4.7663E-01	4.7663E-01	3.5763E-01	3.5862E-01	
BI-214		3.8421E-01	3.8421E-01	1.4729E-01	1.4886E-01	
RA-224	#A	5.1214E-01	5.1214E-01	1.1718E+00	1.1722E+00	1.294E+00
RA-226	#A	8.3119E-01	8.3119E-01	1.1200E+00	1.1210E+00	1.221E+00
AC-228		7.8924E-01	7.8924E-01	2.2563E-01	2.2994E-01	
TH-227	#B	-2.4085E-01	-2.4085E-01	4.4077E-01	4.4097E-01	4.794E-01
PA-234	#B	4.6794E-02	4.6794E-02	2.0478E-01	2.0479E-01	2.277E-01
TH-234	#B	9.4541E-01	9.4541E-01	3.6755E+00	3.6759E+00	4.086E+00
AM-241	#A	1.4880E-01	1.4880E-01	4.3178E-01	4.3185E-01	4.793E-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 (249.7 to 1999.0 keV) 1.1957889E+01 pCi/gm
Total Decayed Activity (249.7 to 1999.0 keV) 1.1957889E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102_8JUN2006_1541.An1

Sample description
NOL-05-01-34-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\102_8JUN2006_1541.An1

Acquisition information
Start time: 08-Jun-2006 15:41:52
Live time: 2000
Real time: 2021
Dead time: 1.04 %
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/channel^2

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: 2.0520E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0520E+03) =
4.8733E+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	08-Jun-2006 15:00:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.6485

***** 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
74.95	115.	38.37	1.50	8.847E-03				
74.95	115.	38.37	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.26	189.	23.79	1.50	9.541E-03	77.11	10.700	1.219E+00	PB214
					77.11	17.500	7.451E-01	PB212
77.26	189.	23.79	1.50	9.541E-03	77.11	10.700	1.219E+00	PB214
					77.11	17.500	7.451E-01	PB212
186.26	94.	33.81	1.84	1.625E-02	185.99	3.280	PBC<MDA	RA226
209.27	54.	40.82	0.79	1.519E-02				
239.05	700.	6.24	1.12	1.379E-02	238.63	43.100	7.742E-01	PB212
270.70	88.	30.49	0.89	1.241E-02				
295.73	129.	14.42	1.26	1.146E-02	295.22	19.200	3.853E-01	PB214
300.83	47.	31.82	1.26	1.127E-02				
338.57	170.	18.03	1.40	1.005E-02	338.40	12.010	9.266E-01	AC228
352.28	265.	9.95	1.41	9.671E-03	351.99	37.100	4.849E-01	PB214
463.83	40.	34.33	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
512.14	136.	15.69	1.55	6.677E-03	510.72	22.500	5.946E-01	TL208
584.11	202.	10.78	1.31	5.881E-03	583.14	86.000	2.624E-01	TL208
610.21	164.	10.36	1.20	5.641E-03	609.32	46.090	4.148E-01	BI214
662.71	83.	22.12	1.30	5.221E-03	661.62	84.620	1.232E-01	CS137
728.63	66.	22.21	1.09	4.785E-03	727.17	11.800	7.660E-01	BI212
912.38	149.	11.06	1.65	3.917E-03	911.07	29.000	8.614E-01	AC228
969.72	74.	19.81	1.24	3.715E-03	968.90	17.460	7.504E-01	AC228
1120.53	49.	22.31	2.02	3.283E-03	1120.28	15.040	6.575E-01	BI214
1462.65	505.	4.59	2.23	2.618E-03	1460.75	10.700	1.186E+01	K40
1766.90	20.	27.62	2.24	2.225E-03	1764.51	15.920	3.730E-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	
418.15	209.27	216.	54.	0.027	122.47	0.791	AC-228	s
477.74	239.05	962.	126.	0.063	108.20	1.124	PB-212	
541.05	270.70	227.	88.	0.044	91.47	0.892	AC-228	s
600.84	300.59	102.	48.	0.024	96.53	1.076	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
PB-212	149.47	74.95	969.	115.	0.057	115.11	1.500
PB-214	153.80	77.11	916.	189.	0.094	71.38	1.500D
PB-212	153.80	77.11	916.	189.	0.094	71.38	1.500D
RA-226	372.01	186.20	458.	80.	0.040	111.93	1.500s
PB-212	477.60	238.99	399.	545.	0.272	20.18	1.500
PB-214	591.09	295.72	200.	131.	0.065	52.81	1.500
AC-228	676.82	338.57	220.	170.	0.085	54.10	1.403s
PB-214	704.59	352.45	127.	228.	0.114	28.79	1.500s
SB-125	927.41	463.83	83.	40.	0.020	102.99	1.500s
TL-208	1022.55	511.38	99.	68.	0.034	71.81	1.499s
TL-208	1168.05	584.11	83.	202.	0.101	32.35	1.311
BI-214	1220.28	610.21	48.	164.	0.082	31.09	1.200
CS-137	1325.33	662.71	70.	83.	0.041	66.37	1.298s
BI-212	1456.47	728.26	40.	43.	0.022	77.15	1.554
AC-228	1824.91	912.38	36.	149.	0.074	33.17	1.651
AC-228	1939.64	969.72	44.	74.	0.037	59.42	1.237
BI-214	2241.46	1120.53	25.	49.	0.025	66.92	2.016
K-40	2926.23	1462.66	7.	498.	0.249	13.77	2.231
BI-214	3535.27	1766.90	6.	20.	0.010	82.85	2.236s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-1.3550E-02					
			477.56	-1.355E-02	&(	4.355E-01 1.25E-01	G
K-40		1.1687E+01					
			1460.75	1.169E+01	(P	3.604E-01 5.37E-01	G
MN-54		1.7506E-02					
			834.81	1.751E-02	&(P	5.217E-02 1.54E-02	G
CO-57		3.4619E-02					
			122.07	3.462E-02	%(	5.117E-02 1.57E-02	G K
			136.43	3.806E-02	%	3.720E-01 1.11E-01	G
CO-60		-5.9074E-03					
			1332.51	-5.907E-03	&(P	5.817E-02 1.61E-02	G K
			1173.23	2.750E-03	%	5.860E-02 1.62E-02	G K
Sr-85		-2.9506E-03					
			514.00	-2.951E-03	&(	5.692E-02 1.65E-02	G
Kr-85		-6.8388E+01					
			513.99	-6.839E+01	&(	1.314E+03 3.82E+02	G
Y-88		-2.0252E-05					
			1836.01	-2.025E-05	%(P	2.274E-02 3.09E-03	G K
			898.02	5.673E-03	& P	5.079E-02 1.42E-02	G
NB-94		3.9500E-03					
			871.10	3.950E-03	%(	3.847E-02 1.06E-02	G K
			702.50	-5.783E-03	%	4.603E-02 1.32E-02	G K
Ag-108M		-4.3069E-03					
			722.95	-4.307E-03	&(	4.888E-02 1.38E-02	G K
			614.37	-2.964E-02	& P	6.821E-02 2.06E-02	G
			433.93	1.736E-02	%	4.232E-02 1.27E-02	G
CD-109		1.1393E-01					
			88.04	1.139E-01	%(P	2.090E+00 6.24E-01	G
SN-113		2.0036E-03					
			391.71	2.004E-03	&(	6.192E-02 1.79E-02	G K
			255.04	-4.258E-01	%	1.835E+00 5.47E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.6812E-02						
		427.95	-5.175E-03	%(P	1.348E-01	3.85E-02	G K
		600.77	-5.177E-02	& P	2.599E-01	7.58E-02	G
		636.15	5.878E-02	& P	3.997E-01	1.15E-01	G
		463.51	3.591E-01	*(P	4.043E-01	1.28E-01	G
		176.29	-9.270E-02	% P	6.797E-01	2.02E-01	G
I-131	4.7824E-03						
		364.48	4.782E-03	%(	4.831E-02	1.41E-02	G K
		636.97	7.950E-02	&	6.037E-01	1.73E-01	G
		284.29	-1.394E-01	%	5.394E-01	1.60E-01	G
CS-134	1.5082E-02						
		604.66	1.508E-02	%(	3.760E-02	1.13E-02	G K
		795.76	2.430E-02	%	5.017E-02	1.53E-02	G
		569.29	9.064E-02	%	1.750E-01	5.36E-02	G
		801.84	-4.912E-02	% P	5.140E-01	1.45E-01	G
CS-137	1.2322E-01						
		661.62	1.232E-01	@(	6.214E-02	2.73E-02	G
CE-139	6.9846E-03						
		165.85	6.985E-03	%(P	5.290E-02	1.58E-02	G
EU-152	1.0104E-01						
		121.78	1.010E-01	%(P	1.504E-01	4.60E-02	G K
		344.30	3.171E-03	&	1.451E-01	4.21E-02	G
		1408.08	-3.238E-02	%	2.768E-01	7.70E-02	G
		964.00	-2.811E-02	& P	4.035E-01	1.14E-01	G
		1112.07	5.061E-02	&	4.033E-01	1.14E-01	G
		778.90	-1.335E-01	% P	4.623E-01	1.37E-01	G
EU-154	-1.2243E-03						
		123.10	-1.224E-03	%(P	1.112E-01	3.30E-02	G K
		1274.80	-2.484E-02	%	1.646E-01	4.65E-02	G
		723.30	-2.281E-03	% P	2.398E-01	6.69E-02	G
		1004.80	7.295E-03	%	2.721E-01	7.45E-02	G
EU-155	9.0547E-02						
		86.45	9.055E-02	%(P	1.939E-01	5.87E-02	G K
		105.31	6.425E-02	%	2.336E-01	7.02E-02	G
HG-203	2.8299E-02						
		279.17	2.830E-02	%(P	4.202E-02	1.30E-02	G K
		72.87	-2.609E-01	%	1.512E+00	4.52E-01	G
		70.83	-1.419E+00	%	3.646E+00	1.10E+00	G
		82.50	-4.829E-01	%	3.672E+00	1.10E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.6970E-01						
		583.14	2.624E-01	(P	5.879E-02	2.84E-02	G
		510.72	2.978E-01	&(	2.144E-01	7.13E-02	G
PB-212	6.0285E-01						
		238.63	6.029E-01	(	1.060E-01	4.06E-02	G K
							Energy duplication
		77.11	7.451E-01	+	5.669E-01	1.77E-01	G
		74.81	8.914E-01	& P	1.146E+00	3.51E-01	G
PB-214	4.0932E-01						
		351.99	4.185E-01	*(P	1.011E-01	4.02E-02	G K
		295.22	3.916E-01	(	2.053E-01	6.89E-02	G
							Energy duplication
		77.11	1.219E+00	+	9.272E-01	2.90E-01	G
		241.92	1.883E-01	%	6.985E-01	2.10E-01	G
BI-212	5.0132E-01						
		727.17	5.013E-01	(	3.737E-01	1.29E-01	G K
		1620.56	-3.352E-02	% P	7.363E-01	9.99E-02	G
		785.42	-2.156E-01	% P	2.551E+00	7.24E-01	G
BI-214	4.0407E-01						
		609.32	4.148E-01	(	8.851E-02	4.30E-02	G K
		1764.51	3.730E-01	?(P	2.535E-01	1.03E-01	G
		1120.28	6.575E-01	+	3.450E-01	1.47E-01	G
RA-224	3.4689E-01						
		241.00	3.469E-01	%(P	1.348E+00	4.04E-01	G
RA-226	9.8677E-01						
		185.99	9.868E-01	*(P	1.265E+00	3.89E-01	G
AC-228	8.4165E-01						
		911.07	8.614E-01	(P	1.781E-01	9.55E-02	G K
		968.90	7.504E-01	(P	3.412E-01	1.49E-01	G
		338.40	9.266E-01	@(	3.915E-01	1.67E-01	G
TH-227	-1.9595E-01						
		236.00	-1.960E-01	%(P	4.860E-01	1.47E-01	G K
		256.25	-6.961E-02	%	5.978E-01	1.77E-01	G
PA-234	3.9069E-03						
		98.44	3.907E-03	%(	2.518E-01	7.50E-02	G K
		946.00	2.489E-02	%	2.255E-01	6.30E-02	G
		131.28	-4.696E-02	%	2.320E-01	6.95E-02	G
		94.67	-1.449E-01	%	4.464E-01	1.35E-01	G
		883.24	6.074E-02	%	3.665E-01	1.04E-01	G
		926.70	-2.823E-02	%	4.313E-01	1.20E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.344E-01 %   2.595E-01 7.96E-02 G

TH-234      -1.1494E+00
                           63.29-1.149E+00 &(P 4.496E+00 1.35E+00 G K
                           92.80 1.139E+00 &   2.380E+00 7.22E-01 G
                           92.38-1.874E-01 & P 2.783E+00 8.30E-01 G

AM-241      -1.1661E-01
                           59.54-1.166E-01 &(  6.264E-01 1.87E-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:                      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 - 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 *****

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	-1.3544E-02	-1.3550E-02	3.7589E-01	3.7589E-01	4.354E-01
K-40		1.1687E+01	1.1687E+01	1.6101E+00	1.7385E+00	
MN-54	#A	1.7505E-02	1.7506E-02	4.6335E-02	4.6345E-02	5.217E-02
CO-57	B	3.4617E-02	3.4619E-02	4.6998E-02	4.7037E-02	5.116E-02
CO-60	#B	-5.9073E-03	-5.9074E-03	5.1457E-02	5.1458E-02	5.817E-02

Sr-85	#A	-2.9497E-03	-2.9506E-03	4.9632E-02	4.9633E-02	5.691E-02
Kr-85	#A	-6.8388E+01	-6.8388E+01	1.1455E+03	1.1455E+03	1.314E+03
Y-88	#B	-2.0248E-05	-2.0252E-05	1.2151E-04	1.2152E-04	2.274E-02
NB-94	#B	3.9500E-03	3.9500E-03	3.1949E-02	3.1950E-02	3.847E-02
Ag-108M	#B	-4.3069E-03	-4.3069E-03	4.1489E-02	4.1490E-02	4.888E-02
CD-109	#A	1.1392E-01	1.1393E-01	1.8715E+00	1.8715E+00	2.090E+00
SN-113	#B	2.0032E-03	2.0036E-03	5.3667E-02	5.3667E-02	6.191E-02
SB-125	#B	8.6810E-02	8.6812E-02	9.2848E-02	9.2976E-02	1.348E-01
I-131	#B	4.7704E-03	4.7824E-03	4.2282E-02	4.2283E-02	4.819E-02
CS-134	#B	1.5082E-02	1.5082E-02	3.3780E-02	3.3790E-02	3.760E-02
CS-137	#	1.2322E-01	1.2322E-01	8.1779E-02	8.2071E-02	
CE-139	#A	6.9836E-03	6.9846E-03	4.7282E-02	4.7284E-02	5.289E-02
EU-152	#B	1.0104E-01	1.0104E-01	1.3806E-01	1.3817E-01	1.504E-01
EU-154	#B	-1.2243E-03	-1.2243E-03	1.3701E-01	1.3701E-01	1.112E-01
EU-155	#B	9.0546E-02	9.0547E-02	1.7604E-01	1.7611E-01	1.939E-01
HG-203	#B	2.8287E-02	2.8299E-02	3.8857E-02	3.8889E-02	4.200E-02
TL-208		2.6970E-01	2.6970E-01	8.7427E-02	8.8727E-02	
PB-212	#	6.0285E-01	6.0285E-01	1.2165E-01	1.2627E-01	1.060E-01
PB-214	#	4.0932E-01	4.0932E-01	1.1803E-01	1.2024E-01	1.011E-01
BI-212		5.0132E-01	5.0132E-01	3.8677E-01	3.8779E-01	3.737E-01
BI-214		4.0407E-01	4.0407E-01	1.2561E-01	1.2764E-01	
RA-224	#A	3.4689E-01	3.4689E-01	1.2126E+00	1.2127E+00	1.348E+00
RA-226	#A	9.8677E-01	9.8677E-01	1.1661E+00	1.1674E+00	1.265E+00
AC-228		8.4165E-01	8.4165E-01	2.4401E-01	2.4854E-01	
TH-227	#B	-1.9595E-01	-1.9595E-01	4.4587E-01	4.4601E-01	4.860E-01
PA-234	#B	3.9069E-03	3.9069E-03	2.2488E-01	2.2488E-01	2.518E-01
TH-234	#B	-1.1494E+00	-1.1494E+00	4.1336E+00	4.1341E+00	4.496E+00
AM-241	#A	-1.1661E-01	-1.1661E-01	5.6228E-01	5.6231E-01	6.264E-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 1999.0 keV) 1.3826977E+01 pCi/gm
Total Decayed Activity (50.2 to 1999.0 keV) 1.3826978E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102_27JUN2006_1531.An1

Sample description
FSS-NOL-05-01-30-F-I

Spectrum Filename: C:\GammaVision\Spectra\102_27JUN2006_1531.An1

Acquisition information
Start time: 27-Jun-2006 15:31:11
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/channel^2

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: 1.8690E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8690E+03) =
5.3505E+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	08-Jun-2006 11:42:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.7231

***** 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
74.37	113.	26.83	1.10	8.793E-03				
74.37	113.	26.83	1.10	8.793E-03	74.81	9.600	PBC<MDA	PB212
77.29	217.	13.08	1.10	9.671E-03	77.11	10.700	1.535E+00	PB214
					77.11	17.500	9.385E-01	PB212
186.67	78.	30.03	1.14	1.624E-02	185.99	3.280	PBC<MDA	RA226
209.41	77.	37.85	0.98	1.519E-02				
239.11	557.	5.08	1.22	1.378E-02	238.63	43.100	6.769E-01	PB212
242.13	134.	16.10	1.22	1.365E-02	241.00	3.900	1.800E+00	RA224
					241.92	7.470	9.507E-01	PB214
251.79	41.	39.10	1.50	1.307E-02	255.04	2.070	PBC<MDA	SN113
295.82	134.	14.50	1.08	1.144E-02	295.22	19.200	4.414E-01	PB214
338.88	112.	16.93	1.35	1.005E-02	338.40	12.010	6.709E-01	AC228
352.55	210.	9.31	1.27	9.664E-03	351.99	37.100	4.231E-01	PB214
464.04	79.	18.86	1.15	7.356E-03	463.51	10.000	7.665E-01	SB125
511.74	89.	20.13	1.16	6.682E-03	510.72	22.500	4.291E-01	TL208
584.36	166.	12.72	1.49	5.878E-03	583.14	86.000	2.364E-01	TL208
610.40	172.	11.67	1.47	5.640E-03	609.32	46.090	4.787E-01	BI214
663.09	152.	11.44	1.64	5.219E-03	661.62	84.620	2.482E-01	CS137
728.57	50.	25.57	1.96	4.786E-03	727.17	11.800	6.365E-01	BI212
912.75	108.	12.17	2.02	3.916E-03	911.07	29.000	6.819E-01	AC228
969.81	82.	19.69	1.84	3.715E-03	968.90	17.460	9.174E-01	AC228
1463.32	438.	4.92	2.04	2.617E-03	1460.75	10.700	1.128E+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	
148.31	74.64	406.	113.	0.057	80.48	1.098	BI-207	D
154.15	77.56	293.	217.	0.108	39.23	1.100	PB-214	D
418.44	209.41	309.	77.	0.038	113.56	0.982	AC-228	M
477.85	239.08	122.	557.	0.279	15.23	1.215	PB-212	D
483.88	242.10	166.	134.	0.067	48.29	1.217	PB-214	D
1939.83	969.81	46.	84.	0.042	47.66	1.840	AC-228	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 keV
PB-212	149.36	74.89	883.	125.	0.063	101.74	1.500s
PB-214	153.80	77.11	810.	172.	0.086	73.87	1.500D
PB-212	153.80	77.11	810.	172.	0.086	73.87	1.500D
RA-226	372.74	186.57	366.	83.	0.041	97.94	1.500
PB-212	477.92	239.15	416.	468.	0.234	23.09	1.500
RA-224	483.86	242.12	430.	105.	0.053	87.41	1.500
PB-214	483.86	242.11	444.	96.	0.048	97.65	1.500
SN-113	503.22	251.79	107.	41.	0.020	117.29	1.500s
PB-214	591.10	295.72	152.	133.	0.066	47.19	1.500
AC-228	677.59	338.96	138.	113.	0.057	52.20	1.500
PB-214	704.84	352.58	107.	209.	0.104	29.45	1.500
SB-125	927.42	463.83	61.	48.	0.024	78.64	1.500s
TL-208	1023.27	511.74	76.	89.	0.045	60.38	1.155s
TL-208	1168.54	584.36	80.	166.	0.083	38.17	1.490
BI-214	1220.64	610.40	73.	172.	0.086	35.01	1.475
CS-137	1326.08	663.09	48.	152.	0.076	34.33	1.636
BI-212	1457.56	728.80	38.	45.	0.022	73.95	1.554
AC-228	1826.06	912.96	19.	104.	0.052	34.31	1.679
K-40	2927.65	1463.37	4.	418.	0.209	14.80	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	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		9.0937E-03					
			477.56	9.094E-03	%(	4.843E-01 1.37E-01	G
K-40		1.0790E+01					
			1460.75	1.079E+01	(P	3.154E-01 5.33E-01	G
MN-54		-2.6029E-04					
			834.81	-2.603E-04	&(P	5.278E-02 1.45E-02	G
CO-57		5.6133E-04					
			122.07	5.613E-04	&(	5.830E-02 1.73E-02	G K
			136.43	7.827E-02	&	4.762E-01 1.42E-01	G
CO-60		-1.2285E-03					
			1332.51	-1.229E-03	%(P	6.895E-02 1.89E-02	G K
			1173.23	3.041E-03	%	9.061E-02 2.57E-02	G K
Sr-85		-1.7453E-02					
			514.00	-1.745E-02	&(	7.355E-02 2.18E-02	G
Kr-85		-3.3990E+02					
			513.99	-3.399E+02	&(	1.386E+03 4.10E+02	G
Y-88		-3.8696E-03					
			1836.01	-3.870E-03	%(P	5.417E-02 1.38E-02	G K
			898.02	-2.647E-03	% P	5.769E-02 1.56E-02	G
NB-94		6.3109E-04					
			871.10	6.311E-04	%(	4.958E-02 1.36E-02	G K
			702.50	7.068E-03	%	4.916E-02 1.41E-02	G K
Ag-108M		-7.8541E-03					
			722.95	-7.854E-03	%(	6.150E-02 1.77E-02	G K
			614.37	-6.104E-02	% P	8.445E-02 2.62E-02	G
			433.93	-2.601E-03	%	4.700E-02 1.35E-02	G
CD-109		4.2725E-02					
			88.04	4.273E-02	&(P	2.301E+00 6.85E-01	G
SN-113		2.7898E-02					
			391.71	-1.069E-02	&(	8.363E-02 2.45E-02	G K
			255.04	1.224E+00	&(	1.527E+00 4.79E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.4982E-01						
		427.95	3.964E-02	%(P	1.457E-01	4.30E-02	G K
		600.77	-6.480E-03	& P	2.591E-01	7.31E-02	G
		636.15	-5.179E-02	% P	4.173E-01	1.19E-01	G
		463.51	4.759E-01	*(P	3.880E-01	1.29E-01	G
		176.29	-2.593E-01	% P	7.356E-01	2.21E-01	G
I-131	2.7551E-02						
		364.48	2.755E-02	&(	2.475E-01	7.20E-02	G K
		636.97	-2.746E-01	%	3.030E+00	8.56E-01	G
		284.29	-8.579E-01	%	3.682E+00	1.09E+00	G
CS-134	-8.2700E-03						
		604.66	-8.270E-03	%(	5.842E-02	1.70E-02	G K
		795.76	3.712E-02	%	6.095E-02	1.89E-02	G
		569.29	0.000E+00	%	3.574E-01	1.02E-01	G
		801.84	-8.531E-02	% P	6.341E-01	1.81E-01	G
CS-137	2.4816E-01						
		661.62	2.482E-01	(	5.741E-02	2.85E-02	G
CE-139	-3.6287E-04						
		165.85	-3.629E-04	&(P	4.854E-02	1.42E-02	G
EU-152	-2.0557E-02						
		121.78	-2.056E-02	&(P	1.616E-01	4.81E-02	G K
		344.30	-1.537E-02	&	1.490E-01	4.35E-02	G
		1408.08	-1.713E-02	&	3.094E-01	8.48E-02	G
		964.00	-4.274E-02	& P	4.709E-01	1.34E-01	G
		1112.07	0.000E+00	%	4.296E-01	1.17E-01	G
		778.90	-3.458E-02	% P	3.878E-01	1.09E-01	G
EU-154	-3.2957E-03						
		123.10	-3.296E-03	&(P	1.206E-01	3.57E-02	G K
		1274.80	-2.246E-03	%	1.807E-01	4.93E-02	G
		723.30	-4.890E-02	% P	2.900E-01	8.37E-02	G
		1004.80	4.926E-02	&	3.133E-01	8.89E-02	G
EU-155	9.8486E-02						
		86.45	9.849E-02	%(P	2.633E-01	7.94E-02	G K
		105.31	-2.392E-02	&	2.500E-01	7.44E-02	G
HG-203	3.5805E-02						
		279.17	3.580E-02	%(P	6.657E-02	2.03E-02	G K
		72.87	-2.417E-01	%	2.431E+00	7.26E-01	G
		70.83	-1.154E-01	%	5.764E+00	1.72E+00	G
		82.50	-8.289E-02	&	5.476E+00	1.63E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.3637E-01						
		583.14	2.364E-01	(P	6.351E-02	3.02E-02	G
		510.72	4.291E-01	+	2.075E-01	8.65E-02	G
PB-212	5.6921E-01						
		238.63	5.692E-01	(	1.187E-01	4.38E-02	G K
							Energy duplication
		77.11	7.444E-01	+	5.860E-01	1.83E-01	G
		74.81	1.065E+00	& P	1.202E+00	3.70E-01	G
PB-214	4.2620E-01						
		351.99	4.207E-01	(P	1.025E-01	4.14E-02	G K
		295.22	4.368E-01	(	1.978E-01	6.87E-02	G
							Energy duplication
		77.11	1.217E+00	+	9.585E-01	3.00E-01	G
		241.92	6.836E-01	&	7.156E-01	2.23E-01	G
BI-212	5.7032E-01						
		727.17	5.703E-01	(	4.027E-01	1.41E-01	G K
		1620.56	-4.266E-01	% P	2.325E+00	6.43E-01	G
		785.42	2.652E-01	% P	2.886E+00	8.22E-01	G
BI-214	4.7874E-01						
		609.32	4.787E-01	(	1.178E-01	5.60E-02	G K
		1764.51	-6.154E-02	% P	4.431E-01	1.22E-01	G
		1120.28	-8.266E-02	&	5.171E-01	1.49E-01	G
RA-224	1.4265E+00						
		241.00	1.426E+00	&(P	1.344E+00	4.20E-01	G
RA-226	1.1216E+00						
		185.99	1.122E+00	(P	1.245E+00	3.86E-01	G
AC-228	6.6756E-01						
		911.07	6.628E-01	(P	1.477E-01	7.60E-02	G K
		968.90	-1.373E-02	% P	3.886E-01	1.09E-01	G
		338.40	6.790E-01	(	3.440E-01	1.18E-01	G
TH-227	-1.8972E-01						
		236.00	-1.897E-01	%(P	5.096E-01	1.54E-01	G K
		256.25	-9.351E-02	%	5.907E-01	1.75E-01	G
PA-234	8.0040E-03						
		98.44	8.004E-03	&(	2.516E-01	7.48E-02	G K
		946.00	0.000E+00	%	3.554E-01	1.00E-01	G
		131.28	-6.992E-02	%	2.508E-01	7.54E-02	G
		94.67	-1.069E-01	&	4.865E-01	1.46E-01	G
		883.24	-8.777E-02	%	4.313E-01	1.24E-01	G
		926.70	3.880E-03	%	5.176E-01	1.43E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 0.000E+00 %   5.210E-01 1.49E-01 G

TH-234       2.7219E-01
                           63.29 2.722E-01 &(P 4.763E+00 1.42E+00 G K
                           92.80 1.040E+00 %   2.503E+00 7.57E-01 G
                           92.38-2.493E-02 % P 2.971E+00 8.83E-01 G

AM-241      -1.2056E-01
                           59.54-1.206E-01 %(  7.201E-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:                      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 - 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 *****

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	7.0914E-03	9.0937E-03	4.1110E-01	4.1110E-01	3.777E-01
K-40		1.0790E+01	1.0790E+01	1.5978E+00	1.7087E+00	3.154E-01
MN-54	#A	-2.4945E-04	-2.6029E-04	2.3266E-01	2.3266E-01	5.058E-02
CO-57	#B	5.3439E-04	5.6133E-04	5.1804E-02	5.1804E-02	5.550E-02
CO-60	#B	-1.2201E-03	-1.2285E-03	7.8548E-02	7.8548E-02	6.848E-02

Sr-85	#A	-1.4220E-02	-1.7453E-02	6.5280E-02	6.5288E-02	5.992E-02
Kr-85	#A	-3.3986E+02	-3.3990E+02	1.2312E+03	1.2314E+03	1.386E+03
Y-88	#B	-3.4164E-03	-3.8696E-03	4.2009E-02	4.2010E-02	4.783E-02
NB-94	#B	6.3109E-04	6.3109E-04	4.0892E-02	4.0892E-02	4.958E-02
Ag-108M	#B	-7.8518E-03	-7.8541E-03	5.3018E-02	5.3020E-02	6.148E-02
CD-109	#A	4.1492E-02	4.2725E-02	2.0561E+00	2.0561E+00	2.234E+00
SN-113	#B	2.4858E-02	2.7898E-02	3.2722E-02	3.2760E-02	7.451E-02
SB-125	#F	1.4786E-01	1.4982E-01	1.2163E-01	1.2192E-01	1.438E-01
I-131	#B	5.2818E-03	2.7551E-02	2.1597E-01	2.1597E-01	4.745E-02
CS-134	#B	-8.1255E-03	-8.2700E-03	5.0898E-02	5.0900E-02	5.740E-02
CS-137		2.4786E-01	2.4816E-01	8.5205E-02	8.6336E-02	
CE-139	#A	-3.2946E-04	-3.6287E-04	2.4649E-01	2.4649E-01	4.407E-02
EU-152	#B	-2.0498E-02	-2.0557E-02	1.6362E-01	1.6363E-01	1.611E-01
EU-154	#B	-3.2816E-03	-3.2957E-03	1.2247E-01	1.2247E-01	1.200E-01
EU-155	#B	9.7767E-02	9.8486E-02	2.3833E-01	2.3839E-01	2.613E-01
HG-203	#B	2.6925E-02	3.5805E-02	6.0836E-02	6.0869E-02	5.006E-02
TL-208		2.3637E-01	2.3637E-01	9.0435E-02	9.1402E-02	
PB-212	#	5.6921E-01	5.6921E-01	1.3143E-01	1.3525E-01	1.187E-01
PB-214	#	4.2620E-01	4.2620E-01	1.1860E-01	1.2099E-01	1.025E-01
BI-212		5.7032E-01	5.7032E-01	4.2176E-01	4.2298E-01	4.027E-01
BI-214		4.7874E-01	4.7874E-01	1.6759E-01	1.6973E-01	
RA-224	#	1.4265E+00	1.4265E+00	1.2605E+00	1.2631E+00	1.344E+00
RA-226	#A	1.1216E+00	1.1216E+00	1.1577E+00	1.1594E+00	1.245E+00
AC-228		6.6756E-01	6.6756E-01	2.0864E-01	2.1198E-01	1.477E-01
TH-227	#B	-1.8972E-01	-1.8972E-01	4.6744E-01	4.6756E-01	5.096E-01
PA-234	#B	8.0040E-03	8.0040E-03	2.2444E-01	2.2444E-01	2.516E-01
TH-234	#B	2.7219E-01	2.7219E-01	4.2530E+00	4.2530E+00	4.763E+00
AM-241	#A	-1.2055E-01	-1.2056E-01	6.4628E-01	6.4632E-01	7.201E-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 (270.7 to 1999.0 keV) 1.2990525E+01 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.2990825E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13JUN2006_1617.An1

Sample description
FSS-NOL-05-01-035-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_13JUN2006_1617.An1

Acquisition information
Start time: 13-Jun-2006 16:17:42
Live time: 2000
Real time: 2019
Dead time: 0.94 %
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/channel^2

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: 1.8460E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8460E+03) =
5.4171E+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	08-Jun-2006 15:04:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.7688

***** 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
77.06	177.	24.43	1.50	9.541E-03	77.11	10.700	1.269E+00	PB214
					77.11	17.500	7.761E-01	PB212
77.06	177.	24.43	1.50	9.541E-03	77.11	10.700	1.269E+00	PB214
					77.11	17.500	7.761E-01	PB212
120.00	59.	38.15	1.30	1.670E-02				
186.28	97.	34.44	1.15	1.625E-02	185.99	3.280	PBC<MDA	RA226
239.03	602.	4.96	1.22	1.379E-02	238.63	43.100	7.411E-01	PB212
241.99	100.	26.04	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.206E-01	PB214
277.61	42.	41.30	1.37	1.213E-02				
295.47	152.	14.23	0.83	1.146E-02	295.22	19.200	5.061E-01	PB214
339.28	144.	16.58	1.29	1.003E-02	338.40	12.010	8.725E-01	AC228
352.64	203.	10.69	1.48	9.661E-03	351.99	37.100	4.122E-01	PB214
411.41	48.	36.19	1.57	8.291E-03				
463.71	44.	39.10	0.99	7.362E-03	463.51	10.000	PBC<MDA	SB125
511.30	116.	18.83	2.34	6.687E-03	510.72	22.500	5.628E-01	TL208
584.13	193.	9.82	1.45	5.880E-03	583.14	86.000	2.789E-01	TL208
610.28	166.	9.92	1.49	5.641E-03	609.32	46.090	4.667E-01	BI214
662.87	216.	8.56	1.57	5.220E-03	661.62	84.620	3.574E-01	CS137
728.46	54.	27.56	1.48	4.786E-03	727.17	11.800	7.014E-01	BI212
912.69	108.	13.35	1.72	3.916E-03	911.07	29.000	6.937E-01	AC228
969.75	97.	17.25	1.24	3.715E-03	968.90	17.460	1.089E+00	AC228
1121.68	44.	24.48	1.21	3.283E-03	1120.28	15.040	6.508E-01	BI214
1463.13	468.	4.70	1.79	2.617E-03	1460.75	10.700	1.223E+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	
477.69	238.96	146.	602.	0.301	14.89	1.215	PB-212	D
483.60	241.92	292.	100.	0.050	78.12	1.217	PB-214	D
554.86	277.61	126.	42.	0.021	123.91	1.367	NP-239	l
822.54	411.41	86.	48.	0.024	108.56	1.569	KR-89	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-214	153.80	77.11	847.	177.	0.089	73.30	1.500D
PB-212	153.80	77.11	847.	177.	0.089	73.30	1.500D
RA-226	372.29	186.34	447.	78.	0.039	113.51	1.500s
PB-212	477.62	239.00	415.	514.	0.257	21.41	1.500
PB-214	590.87	295.61	186.	138.	0.069	49.01	1.500s
AC-228	678.24	339.28	142.	144.	0.072	49.74	1.292s
PB-214	704.86	352.59	103.	207.	0.104	29.40	1.500
SB-125	927.26	463.76	89.	36.	0.018	115.56	1.500s
TL-208	1022.38	511.30	97.	116.	0.058	56.49	2.340s
TL-208	1168.10	584.13	51.	193.	0.096	29.45	1.451s
BI-214	1220.42	610.28	42.	166.	0.083	29.75	1.491
CS-137	1325.63	662.87	42.	216.	0.108	25.69	1.569
BI-212	1456.87	728.46	53.	54.	0.027	82.69	1.480
AC-228	1825.52	912.69	27.	108.	0.054	40.05	1.718s
AC-228	1939.53	969.66	50.	108.	0.054	51.37	1.295s
BI-214	2243.75	1121.68	23.	44.	0.022	73.45	1.208s
K-40	2927.19	1463.14	5.	444.	0.222	14.39	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	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.3987E-01					
			477.56	1.399E-01	%(	3.781E-01 1.13E-01	G
K-40		1.1585E+01					
			1460.75	1.159E+01	(P	3.443E-01 5.56E-01	G
MN-54		-9.8561E-03					
			834.81	-9.856E-03	&(P	5.979E-02 1.72E-02	G
CO-57		6.9800E-03					
			122.07	6.980E-03	&(	5.517E-02 1.64E-02	G K
			136.43	-1.119E-02	%	4.361E-01 1.29E-01	G
CO-60		1.5770E-02					
			1332.51	1.577E-02	&(P	5.915E-02 1.70E-02	G K
			1173.23	1.651E-02	%	7.976E-02 2.31E-02	G K
Sr-85		-5.7322E-03					
			514.00	-5.732E-03	%(	6.205E-02 1.81E-02	G
Kr-85		-1.3206E+02					
			513.99	-1.321E+02	%(	1.357E+03 3.95E+02	G
Y-88		-1.6808E-03					
			1836.01	-1.681E-03	%(P	5.969E-02 1.54E-02	G K
			898.02	1.296E-03	% P	5.995E-02 1.65E-02	G
NB-94		8.0895E-03					
			871.10	8.089E-03	%(	4.801E-02 1.36E-02	G K
			702.50	1.253E-02	&	3.645E-02 1.07E-02	G K
Ag-108M		-1.0000E-03					
			722.95	-1.000E-03	%(	5.831E-02 1.64E-02	G K
			614.37	-2.353E-02	% P	6.551E-02 1.96E-02	G
			433.93	0.000E+00	%	5.749E-02 1.66E-02	G
CD-109		1.2848E+00					
			88.04	1.285E+00	&(P	2.035E+00 6.21E-01	G
SN-113		-1.5179E-02					
			391.71	-1.518E-02	%(	7.123E-02 2.10E-02	G K
			255.04	5.250E-01	&	1.866E+00 5.57E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0472E-01						
		427.95	1.792E-02	%(P	1.436E-01	4.16E-02	G K
		600.77	5.020E-02	% P	2.023E-01	5.87E-02	G
		636.15	9.884E-02	% P	3.843E-01	1.12E-01	G
		463.51	3.616E-01	@(P	4.647E-01	1.45E-01	G
		176.29	-2.107E-01	% P	6.657E-01	1.99E-01	G
I-131	1.3347E-02						
		364.48	1.335E-02	%(	6.611E-02	1.94E-02	G K
		636.97	2.329E-01	&	7.954E-01	2.33E-01	G
		284.29	1.191E-01	&	1.066E+00	3.14E-01	G
CS-134	-5.2065E-03						
		604.66	-5.206E-03	&(	4.814E-02	1.38E-02	G K
		795.76	3.500E-02	%	6.046E-02	1.87E-02	G
		569.29	-3.276E-02	&	2.403E-01	6.83E-02	G
		801.84	-6.192E-02	& P	5.248E-01	1.47E-01	G
CS-137	3.5744E-01						
		661.62	3.574E-01	(	5.446E-02	3.07E-02	G
CE-139	3.1426E-03						
		165.85	3.143E-03	%(P	5.704E-02	1.69E-02	G
EU-152	-6.7171E-02						
		121.78	-6.717E-02	&(P	1.346E-01	4.08E-02	G K
		344.30	-2.868E-02	%	1.637E-01	4.82E-02	G
		1408.08	0.000E+00	%	3.201E-01	8.66E-02	G
		964.00	-6.617E-02	& P	4.939E-01	1.42E-01	G
		1112.07	-9.212E-03	%	4.371E-01	1.20E-01	G
		778.90	-3.495E-02	% P	3.491E-01	9.77E-02	G
EU-154	2.0544E-02						
		123.10	2.054E-02	&(P	1.212E-01	3.62E-02	G K
		1274.80	-3.573E-02	%	2.073E-01	5.93E-02	G
		723.30	-2.954E-03	& P	2.205E-01	6.04E-02	G
		1004.80	8.506E-02	%	3.103E-01	9.03E-02	G
EU-155	-2.4641E-03						
							Energy duplication
		86.45	-2.464E-03	%(P	2.546E-01	7.56E-02	G K
		105.31	5.987E-02	%	2.543E-01	7.62E-02	G
HG-203	2.4874E-03						
		279.17	2.487E-03	&(P	6.072E-02	1.78E-02	G K
		72.87	-4.619E-01	%	2.361E+00	7.09E-01	G
		70.83	6.604E-01	%	3.845E+00	1.15E+00	G
		82.50	2.535E-01	&	3.797E+00	1.13E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7891E-01						
		583.14	2.789E-01	@(P	5.201E-02	2.75E-02	G
		510.72	5.628E-01	+	2.364E-01	1.06E-01	G
PB-212	6.3209E-01						
		238.63	6.321E-01	(	1.202E-01	4.51E-02	G K
							Energy duplication
		77.11	7.761E-01	+	6.064E-01	1.90E-01	G
		74.81	8.672E-01	& P	1.260E+00	3.85E-01	G
PB-214	4.3524E-01						
		351.99	4.223E-01	(P	1.021E-01	4.15E-02	G K
		295.22	4.603E-01	@(	2.206E-01	7.52E-02	G
							Energy duplication
		77.11	1.269E+00	+	9.919E-01	3.10E-01	G
							Energy duplication
		241.92	-7.640E-03	%	7.322E-01	2.16E-01	G
BI-212	7.0138E-01						
		727.17	7.014E-01	(	4.733E-01	1.94E-01	G K
		1620.56	-1.953E-02	& P	1.853E+00	4.64E-01	G
		785.42	8.299E-01	% P	2.077E+00	6.20E-01	G
BI-214	4.6671E-01						
		609.32	4.667E-01	(	9.253E-02	4.64E-02	G K
		1764.51	-1.791E-03	& P	1.523E-01	2.07E-02	G
		1120.28	6.508E-01	+	3.722E-01	1.60E-01	G
RA-224	9.5552E-01						
		241.00	9.555E-01	&(P	1.439E+00	4.40E-01	G
RA-226	1.0663E+00						
		185.99	1.066E+00	*(P	1.389E+00	4.27E-01	G
AC-228	7.4603E-01						
		911.07	6.937E-01	(P	1.740E-01	9.30E-02	G K
		968.90	1.213E+00	+ P	4.038E-01	2.08E-01	G
		338.40	8.725E-01	*(	3.529E-01	1.45E-01	G
TH-227	-1.8003E-01						
		236.00	-1.800E-01	%(P	4.594E-01	1.39E-01	G K
		256.25	-8.577E-02	&	6.260E-01	1.85E-01	G
PA-234	-8.8859E-02						
		98.44	-8.886E-02	&(	2.397E-01	7.23E-02	G K
		946.00	4.642E-02	%	1.558E-01	4.47E-02	G
		131.28	0.000E+00	%	2.436E-01	7.22E-02	G
		94.67	2.710E-03	%	4.511E-01	1.34E-01	G
		883.24	1.044E-01	%	3.836E-01	1.11E-01	G
		926.70	1.722E-02	%	4.541E-01	1.25E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-4.952E-02 &   3.552E-01 1.01E-01 G

TH-234       4.2137E-01
                           63.29 4.214E-01 %(P 4.869E+00 1.45E+00 G K
                           92.80 9.647E-01 &   2.345E+00 7.09E-01 G
                           92.38 1.116E+00 & P 2.796E+00 8.45E-01 G

AM-241       1.8933E-01
                           59.54 1.893E-01 %(  7.203E-01 2.16E-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:                      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 - 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 *****

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	1.3099E-01	1.3987E-01	3.3839E-01	3.3848E-01	3.541E-01
K-40		1.1585E+01	1.1585E+01	1.6682E+00	1.7904E+00	3.443E-01
MN-54	#A	-9.7462E-03	-9.8561E-03	5.5528E-02	5.5531E-02	5.913E-02
CO-57	#B	6.8901E-03	6.9800E-03	4.9287E-02	4.9288E-02	5.446E-02
CO-60	#B	1.5742E-02	1.5770E-02	5.1147E-02	5.1155E-02	5.905E-02

Sr-85	#A	-5.4309E-03	-5.7322E-03	5.4163E-02	5.4164E-02	5.878E-02
Kr-85	#A	-1.3205E+02	-1.3206E+02	1.1856E+03	1.1856E+03	1.357E+03
Y-88	#B	-1.6265E-03	-1.6808E-03	4.7455E-02	4.7455E-02	5.776E-02
NB-94	#B	8.0895E-03	8.0895E-03	4.0915E-02	4.0917E-02	4.801E-02
Ag-108M	#B	-9.9994E-04	-1.0000E-03	4.9098E-02	4.9098E-02	5.830E-02
CD-109	#A	1.2749E+00	1.2848E+00	1.8622E+00	1.8635E+00	2.019E+00
SN-113	#B	-1.4724E-02	-1.5179E-02	6.2995E-02	6.3001E-02	6.909E-02
SB-125	#B	1.0435E-01	1.0472E-01	1.2617E-01	1.2631E-01	1.431E-01
I-131	#B	8.6348E-03	1.3347E-02	5.8077E-02	5.8082E-02	4.277E-02
CS-134	#B	-5.1823E-03	-5.2065E-03	4.1319E-02	4.1320E-02	4.792E-02
CS-137		3.5732E-01	3.5744E-01	9.1808E-02	9.3973E-02	
CE-139	#A	3.0635E-03	3.1426E-03	5.0718E-02	5.0718E-02	5.561E-02
EU-152	#B	-6.7120E-02	-6.7171E-02	1.2721E-01	1.2727E-01	1.345E-01
EU-154	#B	2.0521E-02	2.0544E-02	1.0857E-01	1.0858E-01	1.210E-01
EU-155	#B	-2.4594E-03	-2.4641E-03	4.6627E-01	4.6627E-01	2.541E-01
HG-203	#B	2.3073E-03	2.4874E-03	5.3469E-02	5.3469E-02	5.633E-02
TL-208	#	2.7891E-01	2.7891E-01	8.2305E-02	8.3780E-02	
PB-212	#	6.3209E-01	6.3209E-01	1.3533E-01	1.3990E-01	1.202E-01
PB-214	#	4.3524E-01	4.3524E-01	1.2443E-01	1.2681E-01	1.021E-01
BI-212		7.0138E-01	7.0138E-01	5.7994E-01	5.8127E-01	
BI-214		4.6671E-01	4.6671E-01	1.3885E-01	1.4130E-01	
RA-224	#A	9.5552E-01	9.5552E-01	1.3211E+00	1.3222E+00	1.439E+00
RA-226	#A	1.0663E+00	1.0663E+00	1.2799E+00	1.2813E+00	1.389E+00
AC-228	#	7.4603E-01	7.4603E-01	2.3841E-01	2.4205E-01	
TH-227	#B	-1.8003E-01	-1.8003E-01	4.2197E-01	4.2209E-01	4.594E-01
PA-234	#B	-8.8859E-02	-8.8859E-02	2.1699E-01	2.1704E-01	2.397E-01
TH-234	#B	4.2137E-01	4.2137E-01	4.3541E+00	4.3542E+00	4.869E+00
AM-241	#A	1.8933E-01	1.8933E-01	6.4910E-01	6.4918E-01	7.203E-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 (277.2 to 1999.0 keV) 1.4135389E+01 pCi/gm
Total Decayed Activity (277.2 to 1999.0 keV) 1.4135504E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13JUNE2006_1346.An1

Sample description
FSS-NOL-05-01-033-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_13JUNE2006_1346.An1

Acquisition information
Start time: 13-Jun-2006 13:48:18
Live time: 2000
Real time: 2022
Dead time: 1.09 %
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/channel^2

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: 1.8270E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8270E+03) =
5.4735E+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	08-Jun-2006 14:55:00
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: 0.7557

***** 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
77.27	164.	27.44	1.50	9.541E-03	77.11	10.700	1.188E+00	PB214
					77.11	17.500	7.263E-01	PB212
77.27	164.	27.44	1.50	9.541E-03	77.11	10.700	1.188E+00	PB214
					77.11	17.500	7.263E-01	PB212
186.51	83.	37.03	1.56	1.624E-02	185.99	3.280	PBC<MDA	RA226
209.39	103.	28.87	0.98	1.519E-02				
239.01	637.	4.80	1.22	1.379E-02	238.63	43.100	7.922E-01	PB212
242.56	69.	29.51	1.22	1.363E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.017E-01	PB214
295.73	147.	18.84	1.14	1.145E-02	295.22	19.200	4.949E-01	PB214
328.88	44.	30.49	0.91	1.034E-02				
338.69	160.	17.07	1.43	1.005E-02	338.40	12.010	9.807E-01	AC228
352.49	207.	11.26	1.15	9.665E-03	351.99	37.100	4.264E-01	PB214
511.30	82.	19.58	1.71	6.687E-03	510.72	22.500	4.017E-01	TL208
583.97	190.	10.44	1.16	5.882E-03	583.14	86.000	2.771E-01	TL208
610.18	147.	11.69	1.52	5.642E-03	609.32	46.090	4.165E-01	BI214
662.75	95.	16.87	1.66	5.221E-03	661.62	84.620	1.588E-01	CS137
728.68	62.	27.71	1.50	4.785E-03	727.17	11.800	8.159E-01	BI212
912.54	149.	12.22	1.90	3.916E-03	911.07	29.000	9.649E-01	AC228
970.80	48.	33.20	1.24	3.712E-03				
1122.18	44.	31.16	0.86	3.278E-03	1120.28	15.040	6.591E-01	BI214
1174.90	60.	24.70	2.63	3.157E-03	1173.23	99.860	1.422E-01	CO60
1333.78	48.	19.80	1.74	2.834E-03	1332.51	99.980	1.266E-01	CO60
1463.01	575.	4.26	2.12	2.617E-03	1460.75	10.700	1.516E+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	
418.39	209.39	299.	103.	0.051	86.61	0.980	AC-228	sM
477.64	238.98	150.	637.	0.319	14.41	1.215	PB-212	D
484.75	242.53	174.	69.	0.035	88.52	1.218	XE-138	D
657.43	328.88	68.	44.	0.022	91.48	0.914	LA-140	M
1941.81	970.80	57.	53.	0.027	72.49	1.237	J-135	M
2244.64	1122.18	32.	36.	0.018	82.09	1.820	TA-182	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	930.	164.	0.082	82.31	1.500D
PB-212	153.80	77.11	930.	164.	0.082	82.31	1.500D
RA-226	372.11	186.25	462.	79.	0.039	113.91	1.500s
PB-212	477.63	239.00	415.	527.	0.263	20.98	1.500
PB-214	591.26	295.80	212.	131.	0.066	53.87	1.500
AC-228	677.31	338.82	136.	122.	0.061	48.92	1.500
PB-214	704.70	352.51	122.	185.	0.092	33.53	1.500
TL-208	1022.37	511.30	67.	82.	0.041	58.74	1.713s
TL-208	1167.78	583.97	64.	190.	0.095	31.32	1.160
BI-214	1220.22	610.18	54.	147.	0.073	35.06	1.522
CS-137	1325.40	662.75	54.	95.	0.047	50.62	1.665
BI-212	1457.33	728.68	70.	62.	0.031	83.14	1.504
AC-228	1825.37	912.61	42.	115.	0.057	36.77	1.679
CO-60	2350.26	1174.90	52.	60.	0.030	74.09	2.631s
CO-60	2668.25	1333.78	13.	48.	0.024	59.41	1.742s
K-40	2927.00	1463.05	7.	561.	0.281	12.82	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	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		2.0489E-01					
			477.56	2.049E-01	%(	5.060E-01 1.52E-01	G
K-40		1.4803E+01					
			1460.75	1.480E+01	(P	4.001E-01 6.33E-01	G
MN-54		1.5391E-02					
			834.81	1.539E-02	%(P	5.090E-02 1.49E-02	G
CO-57		2.5021E-03					
			122.07	2.502E-03	&(	6.000E-02 1.78E-02	G K
			136.43	-3.080E-02	%	4.927E-01 1.47E-01	G
CO-60		1.3442E-01					
			1332.51	1.266E-01	@(P	5.031E-02 2.51E-02	G K
			1173.23	1.422E-01	(	8.574E-02 3.52E-02	G K
Sr-85		-1.9885E-02					
			514.00	-1.989E-02	%(	6.782E-02 2.02E-02	G
Kr-85		-4.3541E+02					
			513.99	-4.354E+02	%(	1.485E+03 4.42E+02	G
Y-88		-2.2104E-03					
			1836.01	-2.210E-03	&(P	5.460E-02 1.39E-02	G K
			898.02	-1.640E-02	% P	6.819E-02 1.97E-02	G
NB-94		4.5214E-03					
			871.10	4.521E-03	%(	5.141E-02 1.44E-02	G K
			702.50	9.534E-03	%	5.813E-02 1.68E-02	G K
Ag-108M		1.1980E-02					
			722.95	1.198E-02	&(	5.908E-02 1.71E-02	G K
			614.37	-4.452E-02	% P	7.549E-02 2.31E-02	G
			433.93	-6.540E-03	%	4.773E-02 1.39E-02	G
CD-109		1.4172E+00					
			88.04	1.417E+00	%(P	2.205E+00 6.73E-01	G
SN-113		3.6581E-03					
			391.71	3.658E-03	%(	7.411E-02 2.15E-02	G K
			255.04	-6.780E-01	%	2.204E+00 6.60E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.8292E-02						
		427.95	5.829E-02	%(P	1.355E-01	4.07E-02	G K
		600.77	5.052E-03	% P	2.704E-01	7.65E-02	G
		636.15	4.238E-02	% P	4.451E-01	1.27E-01	G
		463.51	3.002E-01	% P	4.812E-01	1.48E-01	G
		176.29	-5.324E-02	% P	5.706E-01	1.67E-01	G
I-131	-5.4803E-03						
		364.48	-5.480E-03	%(	7.188E-02	2.08E-02	G K
		636.97	7.166E-03	&	1.082E+00	3.05E-01	G
		284.29	2.665E-01	%	1.036E+00	3.08E-01	G
CS-134	-8.8185E-03						
		604.66	-8.819E-03	&(	5.573E-02	1.62E-02	G K
		795.76	4.156E-02	%	6.777E-02	2.10E-02	G
		569.29	6.485E-02	%	2.931E-01	8.55E-02	G
		801.84	1.035E-01	% P	5.339E-01	1.53E-01	G
CS-137	1.5884E-01						
		661.62	1.588E-01	(	6.179E-02	2.68E-02	G
CE-139	3.4920E-04						
		165.85	3.492E-04	%(P	5.876E-02	1.74E-02	G
EU-152	2.8248E-04						
		121.78	2.825E-04	%(P	1.787E-01	5.30E-02	G K
		344.30	1.626E-02	%	1.612E-01	4.71E-02	G
		1408.08	7.954E-03	&	2.604E-01	6.92E-02	G
		964.00	1.436E-01	% P	4.681E-01	1.38E-01	G
		1112.07	1.194E-01	%	5.079E-01	1.47E-01	G
		778.90	-3.328E-03	% P	4.095E-01	1.14E-01	G
EU-154	-1.4827E-02						
		123.10	-1.483E-02	&(P	1.240E-01	3.70E-02	G K
		1274.80	-4.674E-03	&	1.953E-01	5.38E-02	G
		723.30	1.733E-02	% P	2.338E-01	6.55E-02	G
		1004.80	-1.216E-02	%	3.911E-01	1.10E-01	G
EU-155	1.4722E-01						
		86.45	1.472E-01	%(P	2.697E-01	8.19E-02	G K
		105.31	6.476E-02	%	2.703E-01	8.11E-02	G
HG-203	-1.7981E-03						
		279.17	-1.798E-03	&(P	5.404E-02	1.58E-02	G K
		72.87	-4.622E-01	&	2.372E+00	7.12E-01	G
		70.83	-1.417E+00	%	4.054E+00	1.22E+00	G
		82.50	-2.767E-01	%	4.112E+00	1.23E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7714E-01						
		583.14	2.771E-01	(P	5.848E-02	2.90E-02	G
		510.72	4.017E-01	+	2.009E-01	7.87E-02	G
PB-212	6.7546E-01						
		238.63	6.548E-01	(	1.214E-01	4.58E-02	G K
							Energy duplication
		77.11	7.263E-01	(	6.414E-01	1.99E-01	G
		74.81	7.013E-01	& P	1.320E+00	4.01E-01	G
PB-214	4.0110E-01						
		351.99	3.805E-01	(P	1.116E-01	4.26E-02	G K
		295.22	4.408E-01	(	2.370E-01	7.92E-02	G
							Energy duplication
		77.11	1.188E+00	+	1.049E+00	3.26E-01	G
		241.92	4.231E-01	%	7.682E-01	2.34E-01	G
BI-212	8.1589E-01						
		727.17	8.159E-01	(	5.438E-01	2.26E-01	G K
		1620.56	-3.765E-02	% P	3.688E+00	1.02E+00	G
		785.42	9.622E-01	% P	2.401E+00	7.18E-01	G
BI-214	4.1645E-01						
		609.32	4.165E-01	(	1.053E-01	4.87E-02	G K
		1764.51	-1.809E-03	& P	1.539E-01	2.09E-02	G
		1120.28	3.655E-02	%	5.613E-01	1.60E-01	G
RA-224	9.2063E-01						
		241.00	9.206E-01	&(P	1.453E+00	4.44E-01	G
RA-226	1.0920E+00						
		185.99	1.092E+00	(P	1.426E+00	4.38E-01	G
AC-228	7.4536E-01						
		911.07	7.455E-01	(P	2.138E-01	9.16E-02	G K
		968.90	-7.162E-02	% P	4.815E-01	1.40E-01	G
		338.40	7.450E-01	(	3.493E-01	1.21E-01	G
TH-227	-2.0871E-01						
		236.00	-2.087E-01	%(P	5.287E-01	1.60E-01	G K
		256.25	-2.097E-01	&	6.171E-01	1.85E-01	G
PA-234	1.4022E-03						
		98.44	1.402E-03	&(	2.673E-01	7.94E-02	G K
		946.00	-2.805E-02	&	2.986E-01	8.42E-02	G
		131.28	9.073E-02	&	2.347E-01	7.09E-02	G
		94.67	1.485E-02	%	4.926E-01	1.47E-01	G
		883.24	1.049E-01	%	2.733E-01	8.10E-02	G
		926.70	0.000E+00	&	4.968E-01	1.36E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 9.577E-02 %   4.328E-01 1.26E-01 G

TH-234       9.9589E-01
                           63.29 9.959E-01 &(P 4.483E+00 1.34E+00 G K
                           92.80 1.291E+00 %   2.615E+00 7.94E-01 G
                           92.38-3.908E-01 % P 2.655E+00 7.92E-01 G

AM-241      -4.2314E-02
                           59.54-4.231E-02 %(  7.046E-01 2.10E-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:                      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 - 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 *****

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	1.9213E-01	2.0489E-01	4.5647E-01	4.5661E-01	4.745E-01
K-40		1.4803E+01	1.4803E+01	1.8981E+00	2.0719E+00	4.001E-01
MN-54	#A	1.5223E-02	1.5391E-02	4.4734E-02	4.4743E-02	5.034E-02
CO-57	#B	2.4705E-03	2.5021E-03	5.3451E-02	5.3452E-02	5.924E-02
CO-60		1.3418E-01	1.3442E-01	6.3868E-02	6.4312E-02	

Sr-85	#A	-1.8860E-02	-1.9885E-02	6.0606E-02	6.0616E-02	6.433E-02
Kr-85	#A	-4.3539E+02	-4.3541E+02	1.3270E+03	1.3272E+03	1.485E+03
Y-88	#B	-2.1404E-03	-2.2104E-03	4.2614E-02	4.2614E-02	5.287E-02
NB-94	#B	4.5214E-03	4.5214E-03	4.3197E-02	4.3198E-02	5.141E-02
Ag-108M	#B	1.1979E-02	1.1980E-02	5.1418E-02	5.1422E-02	5.908E-02
CD-109	#A	1.4065E+00	1.4172E+00	2.0187E+00	2.0202E+00	2.189E+00
SN-113	#B	3.5505E-03	3.6581E-03	6.4454E-02	6.4455E-02	7.193E-02
SB-125	#B	5.8095E-02	5.8292E-02	1.2214E-01	1.2219E-01	1.350E-01
I-131	#B	-3.5755E-03	-5.4803E-03	6.2357E-02	6.2358E-02	4.690E-02
CS-134	#B	-8.7784E-03	-8.8185E-03	4.8544E-02	4.8547E-02	5.548E-02
CS-137		1.5879E-01	1.5884E-01	8.0412E-02	8.0905E-02	
CE-139	#A	3.4058E-04	3.4920E-04	5.2128E-02	5.2128E-02	5.731E-02
EU-152	#B	2.8227E-04	2.8248E-04	1.5894E-01	1.5894E-01	1.786E-01
EU-154	#B	-1.4810E-02	-1.4827E-02	1.1424E-01	1.1424E-01	1.239E-01
EU-155	#B	1.4694E-01	1.4722E-01	2.4574E-01	2.4587E-01	2.691E-01
HG-203	#B	-1.6703E-03	-1.7981E-03	5.1440E-02	5.1440E-02	5.020E-02
TL-208		2.7714E-01	2.7714E-01	8.6993E-02	8.8373E-02	
PB-212	#	6.7546E-01	6.7546E-01	1.4172E-01	1.4670E-01	1.214E-01
PB-214	#	4.0110E-01	4.0110E-01	1.2734E-01	1.2931E-01	1.116E-01
BI-212		8.1589E-01	8.1589E-01	6.7831E-01	6.7986E-01	
BI-214		4.1645E-01	4.1645E-01	1.4600E-01	1.4785E-01	
RA-224	#A	9.2063E-01	9.2063E-01	1.3314E+00	1.3324E+00	1.453E+00
RA-226	#A	1.0919E+00	1.0920E+00	1.3143E+00	1.3158E+00	1.426E+00
AC-228		7.4536E-01	7.4536E-01	2.2823E-01	2.3203E-01	2.138E-01
TH-227	#B	-2.0871E-01	-2.0871E-01	4.8508E-01	4.8522E-01	5.287E-01
PA-234	#B	1.4022E-03	1.4022E-03	2.3834E-01	2.3834E-01	2.673E-01
TH-234	#B	9.9589E-01	9.9589E-01	4.0281E+00	4.0285E+00	4.483E+00
AM-241	#A	-4.2313E-02	-4.2314E-02	6.2880E-01	6.2880E-01	7.046E-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 (1172.8 to 1999.0 keV) 1.7350679E+01 pCi/gm
Total Decayed Activity (1172.8 to 1999.0 keV) 1.7350969E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_27JUN2006_1850.An1

Sample description
FSS-NOL-05-01-030-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_27JUN2006_1850.An1

Acquisition information
Start time: 27-Jun-2006 18:50:46
Live time: 2000
Real time: 2018
Dead time: 0.88 %
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/channel^2

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: 1.8690E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8690E+03) =
5.3505E+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	08-Jun-2006 11:42:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.8093

***** 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
75.28	103.	40.17	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.18	155.	27.03	1.50	9.541E-03	77.11	10.700	1.098E+00	PB214
					77.11	17.500	6.713E-01	PB212
77.18	155.	27.03	1.50	9.541E-03	77.11	10.700	1.098E+00	PB214
					77.11	17.500	6.713E-01	PB212
209.93	70.	39.38	1.50	1.516E-02				
239.04	542.	5.34	1.22	1.379E-02	238.63	43.100	6.584E-01	PB212
242.46	101.	19.99	1.22	1.364E-02	241.92	7.470	7.138E-01	PB214
270.73	55.	35.92	1.29	1.241E-02				
295.85	155.	11.67	1.26	1.144E-02	295.22	19.200	5.096E-01	PB214
339.11	126.	15.96	1.57	1.004E-02	338.40	12.010	7.558E-01	AC228
352.76	283.	10.98	0.91	9.658E-03	351.99	37.100	5.687E-01	PB214
511.79	82.	19.75	1.75	6.681E-03	510.72	22.500	3.946E-01	TL208
584.34	186.	10.37	1.42	5.878E-03	583.14	86.000	2.655E-01	TL208
610.43	161.	12.36	1.74	5.640E-03	609.32	46.090	4.482E-01	BI214
662.64	162.	10.59	1.66	5.222E-03	661.62	84.620	2.644E-01	CS137
728.57	45.	22.31	1.25	4.786E-03	727.17	11.800	5.790E-01	BI212
912.74	86.	13.44	1.66	3.916E-03				
970.44	109.	17.54	1.57	3.713E-03	968.90	17.460	1.211E+00	AC228
1121.48	63.	24.74	2.42	3.283E-03	1120.28	15.040	9.225E-01	BI214
1175.01	24.	38.40	1.85	3.157E-03	1173.23	99.860	HL>Cutoff	CO60
1334.60	34.	23.71	1.96	2.834E-03	1332.51	99.980	HL>Cutoff	CO60
1463.39	417.	4.90	1.70	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 **********

Peak Centroid	Background	Net Area	Intensity	Uncert	FWHM	Suspected

Channel	Energy	Counts	Counts	Cts/Sec	3 Sigma %	keV	Nuclide	
419.49	209.93	276.	70.	0.035	118.15	1.500	NP-239	sM

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
477.70	238.90	148.	542.	0.271	16.03	1.215	PB-212	D
484.55	242.32	152.	101.	0.050	59.98	1.217	XE-138	D
541.10	270.73	151.	55.	0.027	107.76	1.287	AC-228	M
1825.62	912.74	20.	86.	0.043	38.86	1.656	AC-228	M
1941.09	970.44	53.	109.	0.054	40.45	1.569	AC-228	M
2927.68	1463.39	-4.	421.	0.210	14.49	1.696	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 keV
PB-212	150.14	75.28	855.	103.	0.051	120.51	1.500
PB-214	153.80	77.11	801.	155.	0.078	81.10	1.500D
PB-212	153.80	77.11	801.	155.	0.078	81.10	1.500D
PB-212	477.63	239.00	399.	471.	0.236	22.69	1.500
PB-214	591.36	295.85	151.	148.	0.074	43.09	1.500
AC-228	677.46	338.89	129.	99.	0.049	57.41	1.500
PB-214	704.97	352.65	144.	228.	0.114	29.84	1.500s
TL-208	1023.35	511.79	65.	82.	0.041	59.26	1.745s
TL-208	1168.52	584.34	65.	186.	0.093	31.11	1.421
BI-214	1220.70	610.43	70.	161.	0.081	37.08	1.740
Ag-108M	1224.58	612.36	158.	-51.	-0.025	112.98	1.499s
CS-137	1325.17	662.64	36.	162.	0.081	31.76	1.659
BI-212	1457.10	728.57	25.	45.	0.023	66.92	1.248
BI-214	2243.36	1121.48	45.	63.	0.032	74.23	2.419s
CO-60	2350.49	1175.01	29.	24.	0.012	115.20	1.854
CO-60	2669.91	1334.60	15.	34.	0.017	71.14	1.959

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		3.1388E-02					
			477.56	3.139E-02	&(	4.712E-01 1.34E-01	G
K-40		-1.0302E-01					
			1460.75	-1.030E-01	%(P	7.280E-01 2.06E-01	G
MN-54		-8.5941E-03					
			834.81	-8.594E-03	&(P	5.104E-02 1.45E-02	G
CO-57		-6.4929E-03					
			122.07	-6.493E-03	%(	5.845E-02 1.74E-02	G K
			136.43	1.172E-01	%	4.628E-01 1.39E-01	G
CO-60		8.6932E-02					
			1332.51	8.693E-02	&(P	5.403E-02 2.07E-02	G K
			1173.23	5.453E-02	&	6.452E-02 2.09E-02	G K
Sr-85		6.2881E-03					
			514.00	6.288E-03	%(	5.949E-02 1.72E-02	G
Kr-85		1.1806E+02					
			513.99	1.181E+02	%(	1.117E+03 3.23E+02	G
Y-88		-2.5202E-05					
			1836.01	-2.520E-05	%(P	1.188E-01 3.29E-02	G K
			898.02	1.997E-04	% P	5.614E-02 1.52E-02	G
NB-94		8.5691E-03					
			871.10	8.569E-03	%(	5.253E-02 1.50E-02	G K
			702.50	1.307E-02	%	4.182E-02 1.23E-02	G K
Ag-108M		1.2999E-02					
			722.95	1.300E-02	%(	4.716E-02 1.38E-02	G K
			614.37	-7.278E-02	+ P	8.742E-02 2.73E-02	G
			433.93	6.508E-03	%	4.855E-02 1.41E-02	G
CD-109		2.7186E-02					
			88.04	2.719E-02	&(P	2.292E+00 6.83E-01	G
SN-113		-1.3480E-02					
			391.71	-1.348E-02	&(	8.131E-02 2.39E-02	G K
			255.04	1.190E-02	%	1.842E+00 5.35E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-3.6536E-03						
		427.95	-3.654E-03	%(P	1.319E-01	3.72E-02	G K
		600.77	4.009E-02	% P	2.517E-01	7.26E-02	G
		636.15	-3.198E-02	% P	4.197E-01	1.19E-01	G
		463.51	1.904E-01	% P	4.676E-01	1.40E-01	G
		176.29	8.961E-02	& P	6.315E-01	1.87E-01	G
I-131	4.2778E-02						
		364.48	4.278E-02	%(	2.448E-01	7.17E-02	G K
		636.97	2.036E-02	%	2.308E+00	6.22E-01	G
		284.29	1.185E+00	&	3.103E+00	9.32E-01	G
CS-134	1.0497E-02						
		604.66	1.050E-02	%(	3.934E-02	1.15E-02	G K
		795.76	-4.653E-03	%	6.314E-02	1.78E-02	G
		569.29	-4.592E-02	%	2.761E-01	7.96E-02	G
		801.84	-6.170E-02	& P	6.284E-01	1.78E-01	G
CS-137	2.6436E-01						
		661.62	2.644E-01	(	5.043E-02	2.80E-02	G
CE-139	-2.5585E-04						
		165.85	-2.558E-04	%(P	6.132E-02	1.81E-02	G
EU-152	-1.6204E-02						
		121.78	-1.620E-02	%(P	1.533E-01	4.55E-02	G K
		344.30	-5.869E-02	%	1.619E-01	4.86E-02	G
		1408.08	-3.707E-02	%	2.959E-01	8.23E-02	G
		964.00	-5.032E-03	% P	4.157E-01	1.15E-01	G
		1112.07	-4.998E-02	%	4.371E-01	1.23E-01	G
		778.90	9.679E-02	% P	3.640E-01	1.06E-01	G
EU-154	1.1564E-02						
		123.10	1.156E-02	%(P	1.079E-01	3.21E-02	G K
		1274.80	-5.842E-04	&	1.855E-01	5.06E-02	G
		723.30	3.955E-03	% P	2.549E-01	7.12E-02	G
		1004.80	6.972E-02	&	2.932E-01	8.44E-02	G
EU-155	5.1758E-03						
		86.45	5.176E-03	%(P	2.577E-01	7.66E-02	G K
		105.31	8.109E-02	%	2.334E-01	7.03E-02	G
HG-203	-9.0744E-05						
		279.17	-9.074E-05	%(P	7.513E-02	2.20E-02	G K
		72.87	1.819E-01	&	2.361E+00	7.04E-01	G
		70.83	0.000E+00	%	5.711E+00	1.70E+00	G
		82.50	0.000E+00	%	5.246E+00	1.56E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.6549E-01						
		583.14	2.655E-01	(P	5.750E-02	2.76E-02	G
		510.72	3.946E-01	+	1.931E-01	7.81E-02	G
PB-212	6.0109E-01						
		238.63	5.726E-01	(	1.165E-01	4.33E-02	G K
							Energy duplication
		77.11	6.713E-01	(	5.828E-01	1.81E-01	G
		74.81	8.755E-01	& P	1.183E+00	3.62E-01	G
PB-214	4.6818E-01						
		351.99	4.592E-01	@(P	1.182E-01	4.58E-02	G K
		295.22	4.855E-01	(	1.973E-01	6.97E-02	G
							Energy duplication
		77.11	1.098E+00	+	9.531E-01	2.97E-01	G
		241.92	3.826E-01	%	7.016E-01	2.14E-01	G
BI-212	5.7899E-01						
		727.17	5.790E-01	(	3.306E-01	1.29E-01	G K
		1620.56	-1.869E-02	& P	1.783E+00	4.44E-01	G
		785.42	-4.300E-01	% P	2.632E+00	7.55E-01	G
BI-214	4.4819E-01						
		609.32	4.482E-01	(	1.155E-01	5.55E-02	G K
		1764.51	-7.206E-02	% P	4.899E-01	1.37E-01	G
		1120.28	9.225E-01	+	4.974E-01	2.28E-01	G
RA-224	-9.2629E-02						
		241.00	-9.263E-02	&(P	1.116E+00	3.28E-01	G
RA-226	7.3785E-01						
		185.99	7.379E-01	%(P	1.346E+00	4.09E-01	G
AC-228	1.7215E-01						
		911.07	-1.336E-03	%(P	1.899E-01	5.22E-02	G K
		968.90	-3.863E-04	% P	3.586E-01	9.96E-02	G
		338.40	5.911E-01	(	3.332E-01	1.13E-01	G
TH-227	-2.1488E-01						
		236.00	-2.149E-01	%(P	4.652E-01	1.41E-01	G K
		256.25	-1.667E-01	%	6.136E-01	1.83E-01	G
PA-234	-3.6914E-03						
		98.44	-3.691E-03	%(	2.500E-01	7.43E-02	G K
		946.00	-3.310E-03	%	2.819E-01	7.79E-02	G
		131.28	4.842E-03	&	2.069E-01	6.12E-02	G
		94.67	-8.914E-02	%	4.454E-01	1.34E-01	G
		883.24	2.482E-02	%	3.779E-01	1.04E-01	G
		926.70	-4.016E-02	%	4.724E-01	1.32E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-6.682E-02 %   4.023E-01 1.16E-01 G

TH-234       1.5893E+00
                           63.29 1.589E+00 %(P 4.579E+00 1.38E+00 G K
                           92.80 1.175E+00 %   2.477E+00 7.51E-01 G
                           92.38 1.243E+00 % P 2.985E+00 9.03E-01 G

AM-241      -3.8943E-02
                           59.54-3.894E-02 %(  6.116E-01 1.82E-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:                      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 - 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 *****

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	2.4433E-02	3.1388E-02	4.0230E-01	4.0231E-01	3.668E-01
K-40	#A	-1.0302E-01	-1.0302E-01	6.6505E-01	6.6507E-01	7.280E-01
MN-54	#A	-8.2337E-03	-8.5941E-03	4.7490E-02	4.7492E-02	4.890E-02
CO-57	#B	-6.1791E-03	-6.4929E-03	5.2212E-02	5.2213E-02	5.563E-02
CO-60	#H	8.6330E-02	8.6932E-02	6.1987E-02	6.2179E-02	5.366E-02

Sr-85	#A	5.1159E-03	6.2881E-03	5.1582E-02	5.1583E-02	4.840E-02
Kr-85	#A	1.1804E+02	1.1806E+02	9.6892E+02	9.6894E+02	1.117E+03
Y-88	#B	-2.2230E-05	-2.5202E-05	1.2953E-03	1.2953E-03	1.048E-01
NB-94	#B	8.5691E-03	8.5691E-03	4.5002E-02	4.5004E-02	5.253E-02
Ag-108M	#B	1.2995E-02	1.2999E-02	4.1267E-02	4.1274E-02	4.715E-02
CD-109	#A	2.6396E-02	2.7186E-02	2.0479E+00	2.0479E+00	2.226E+00
SN-113	#B	-1.2001E-02	-1.3480E-02	7.1677E-02	7.1681E-02	7.238E-02
SB-125	#B	-3.6056E-03	-3.6536E-03	1.3765E+00	1.3765E+00	1.302E-01
I-131	#B	8.1037E-03	4.2778E-02	2.1503E-01	2.1504E-01	4.637E-02
CS-134	#B	1.0312E-02	1.0497E-02	3.4420E-02	3.4425E-02	3.865E-02
CS-137		2.6404E-01	2.6436E-01	8.3955E-02	8.5255E-02	
CE-139	#A	-2.3213E-04	-2.5585E-04	4.7540E-02	4.7540E-02	5.563E-02
EU-152	#B	-1.6158E-02	-1.6204E-02	1.6027E-01	1.6027E-01	1.529E-01
EU-154	#B	1.1514E-02	1.1564E-02	9.6223E-02	9.6225E-02	1.075E-01
EU-155	#B	5.1377E-03	5.1758E-03	2.2993E-01	2.2993E-01	2.558E-01
HG-203	#B	-6.8098E-05	-9.0744E-05	1.2225E-02	1.2225E-02	5.638E-02
TL-208		2.6549E-01	2.6549E-01	8.2785E-02	8.4115E-02	
PB-212	#	6.0109E-01	6.0109E-01	1.3639E-01	1.4050E-01	1.165E-01
PB-214	#	4.6818E-01	4.6818E-01	1.2276E-01	1.2554E-01	1.182E-01
BI-212		5.7899E-01	5.7899E-01	3.8746E-01	3.8882E-01	
BI-214		4.4819E-01	4.4819E-01	1.6620E-01	1.6810E-01	
RA-224	#A	-9.2629E-02	-9.2629E-02	1.3876E+00	1.3876E+00	1.116E+00
RA-226	#A	7.3784E-01	7.3785E-01	1.2261E+00	1.2268E+00	1.346E+00
AC-228	B	1.7215E-01	1.7215E-01	9.8823E-02	9.9294E-02	1.899E-01
TH-227	#B	-2.1488E-01	-2.1488E-01	4.2786E-01	4.2803E-01	4.652E-01
PA-234	#B	-3.6914E-03	-3.6914E-03	2.2278E-01	2.2278E-01	2.500E-01
TH-234	#B	1.5893E+00	1.5893E+00	4.1404E+00	4.1413E+00	4.579E+00
AM-241	#A	-3.8939E-02	-3.8943E-02	5.4454E-01	5.4454E-01	6.116E-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 (270.7 to 1999.0 keV) 1.7288587E+00 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.7291801E+00 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103_8JUN2006_1028.An1

Sample description
NOL-05-01-24-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\103_8JUN2006_1028.An1

Acquisition information
Start time: 08-Jun-2006 10:28:50
Live time: 2000
Real time: 2008
Dead time: 0.38 %
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/channel^2

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: 2.2580E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.2580E+03) =
4.4287E+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	08-Jun-2006 09:50:00
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: 0.5662

***** 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
75.04	156.	31.24	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
77.34	233.	21.59	0.99	1.011E-02	77.11	17.500	7.878E-01	PB212
					77.11	10.700	PBC<MDA	PB214
186.77	216.	38.29	1.28	2.564E-02	185.99	3.280	PBC<MDA	RA226
238.97	1159.	5.23	1.09	2.318E-02	238.63	43.100	6.866E-01	PB212
					241.00	3.900	7.709E+00	RA224
295.45	276.	19.63	1.20	2.024E-02	295.22	19.200	4.183E-01	PB214
338.54	296.	21.67	1.19	1.830E-02	338.40	12.010	8.024E-01	AC228
352.15	463.	12.96	1.10	1.775E-02	351.99	37.100	4.154E-01	PB214
511.42	163.	28.74	1.42	1.316E-02	510.72	22.500	PBC<MDA	TL208
583.77	453.	11.00	1.20	1.183E-02	583.14	86.000	2.639E-01	TL208
609.91	332.	9.04	1.26	1.143E-02	609.32	46.090	3.689E-01	BI214
662.28	20177.	0.74	1.34	1.071E-02	661.62	84.620	1.331E+01	CS137
727.76	116.	17.33	1.19	9.959E-03	727.17	11.800	5.879E-01	BI212
796.13	73.	24.92	1.86	9.298E-03	795.76	85.400	5.494E-02	CS134
861.76	77.	21.99	1.25	8.758E-03				
912.17	261.	8.17	1.49	8.394E-03	911.07	29.000	6.319E-01	AC228
965.52	62.	18.66	1.54	8.046E-03	964.00	14.580	3.152E-01	EU152
969.90	185.	8.74	1.54	8.019E-03	968.90	17.460	7.915E-01	AC228
1121.76	114.	18.98	1.46	7.205E-03	1120.28	15.040	6.164E-01	BI214
1174.80	106.	17.40	1.92	6.965E-03	1173.23	99.860	8.945E-02	CO60
1240.27	69.	29.79	1.08	6.693E-03				
1333.95	85.	15.67	1.43	6.344E-03	1332.51	99.980	7.726E-02	CO60
1462.18	1215.	2.95	1.83	5.928E-03	1460.75	10.700	1.128E+01	K40
1621.56	24.	23.88	2.84	5.488E-03	1620.56	2.750	9.342E-01	BI212
1766.42	74.	11.62	1.91	5.137E-03	1764.51	15.920	5.171E-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	
372.71	186.77	2771.	216.	0.108	114.87	1.279	PA-234	l
1722.56	861.76	67.	77.	0.038	56.77	1.255	TL-208	
1931.88	965.57	53.	46.	0.023	81.35	1.539	TB-160	D
2479.48	1240.27	99.	69.	0.035	89.36	1.079	CO-56	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	1154.	156.	0.078	93.71	0.993D
PB-212	153.39	77.11	1183.	233.	0.117	64.77	0.995D
PB-212	476.42	238.63	1120.	1144.	0.572	15.07	1.093D
PB-214	590.06	295.45	1211.	272.	0.136	58.90	1.198s
AC-228	676.23	338.54	1468.	295.	0.147	65.02	1.190s
PB-214	703.44	352.15	1312.	457.	0.229	38.88	1.100s
TL-208	1021.67	511.28	883.	121.	0.061	87.42	1.500s
TL-208	1166.60	583.75	527.	349.	0.175	31.75	1.500s
BI-214	1218.91	609.91	276.	325.	0.163	27.11	1.256
Ag-108M	1224.14	612.52	545.	-87.	-0.043	118.75	1.500s
CS-137	1323.66	662.28	497.	20176.	10.088	2.21	1.343
BI-212	1454.59	727.76	96.	116.	0.058	51.98	1.193
CS-134	1591.16	796.05	68.	65.	0.032	65.63	1.500s
AC-228	1823.37	912.17	75.	257.	0.129	24.51	1.490
EU-152	1930.43	965.71	67.	43.	0.022	91.08	1.538s
AC-228	1936.81	968.90	42.	184.	0.092	26.68	1.541D
BI-214	2242.50	1121.76	94.	112.	0.056	56.93	1.456s
CO-60	2348.57	1174.80	80.	104.	0.052	52.19	1.921s
CO-60	2666.80	1333.95	32.	82.	0.041	47.01	1.434
K-40	2923.24	1462.18	35.	1196.	0.598	8.84	1.831
BI-212	3241.93	1621.56	2.	24.	0.012	71.64	2.840s
BI-214	3531.59	1766.42	3.	71.	0.035	34.87	1.915s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		2.9270E-01					
			477.56	2.927E-01	%(	7.612E-01 2.30E-01	G
K-40		1.1280E+01					
			1460.75	1.128E+01	(P	2.845E-01 3.38E-01	G
MN-54		8.5585E-03					
			834.81	8.559E-03	%(P	2.565E-02 7.61E-03	G
CO-57		-5.2849E-03					
			122.07	-5.285E-03	&(P	8.564E-02 2.58E-02	G K
			136.43	-1.754E-01	%	6.443E-01 1.95E-01	G
CO-60		8.3353E-02					
			1332.51	7.726E-02	(P	2.743E-02 1.25E-02	G K
			1173.23	8.945E-02	*(P	3.815E-02 1.59E-02	G K
Sr-85		-9.7968E-04					
			514.00	-9.797E-04	%(	6.690E-02 1.99E-02	G
Kr-85		-2.2610E+01					
			513.99	-2.261E+01	%(	1.544E+03 4.60E+02	G
Y-88		4.1746E-04					
			1836.01	4.175E-04	%(P	2.148E-02 5.56E-03	G K
			898.02	-6.774E-03	% P	3.253E-02 9.47E-03	G
NB-94		-1.0531E-03					
			871.10	-1.053E-03	%(	2.377E-02 6.70E-03	G K
			702.50	-8.701E-04	&	2.322E-02 6.60E-03	G K
Ag-108M		-3.4221E-03					
			722.95	-3.422E-03	&(	2.987E-02 8.65E-03	G K
			614.37	-5.055E-02	& P	6.496E-02 2.00E-02	G
			433.93	-9.623E-03	&	8.167E-02 2.45E-02	G
CD-109		-1.2849E+00					
			88.04	-1.285E+00	%(	2.460E+00 7.47E-01	G
SN-113		1.6567E-02					
			391.71	1.657E-02	&(	9.790E-02 2.94E-02	G K
			255.04	4.570E-01	%	2.902E+00 8.73E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.6065E-02						
		427.95	1.606E-02	%(P	2.526E-01	7.57E-02	G K
		600.77	2.145E-04	& P	2.851E-01	8.42E-02	G
		636.15	-8.281E-02	& P	4.349E-01	1.29E-01	G
		463.51	2.037E-01	% P	8.601E-01	2.59E-01	G
		176.29	4.015E-01	%	9.297E-01	2.82E-01	G
I-131	1.8524E-02						
		364.48	1.852E-02	%(P	7.408E-02	2.23E-02	G K
		636.97	3.628E-02	&	7.164E-01	2.12E-01	G
		284.29	3.579E-02	% P	1.021E+00	3.06E-01	G
CS-134	2.1120E-02						
		604.66	-2.966E-03	%(	5.216E-02	1.54E-02	G K
		795.76	4.865E-02	(P	3.095E-02	1.07E-02	G
		569.29	-2.156E-02	& P	3.601E-01	1.07E-01	G
		801.84	-1.213E-02	% P	3.588E-01	1.02E-01	G
CS-137	1.3308E+01						
		661.62	1.331E+01	(P	7.031E-02	9.80E-02	G
CE-139	6.4674E-04						
		165.85	6.467E-04	%(	6.058E-02	1.82E-02	G
EU-152	6.2651E-02						
		121.78	-1.596E-02	&(P	2.441E-01	7.34E-02	G K
		344.30	5.683E-02	% P	2.301E-01	6.93E-02	G
		1408.08	-3.295E-02	%	1.529E-01	4.44E-02	G
		964.00	2.203E-01	&(P	2.082E-01	6.77E-02	G
		1112.07	8.040E-02	%	2.608E-01	7.74E-02	G
		778.90	-1.066E-02	%	2.072E-01	5.93E-02	G
EU-154	-7.5434E-03						
		123.10	-7.543E-03	&(	1.693E-01	5.09E-02	G K
		1274.80	3.531E-03	%	1.050E-01	2.99E-02	G
		723.30	-1.506E-03	&	1.139E-01	3.21E-02	G
		1004.80	3.153E-02	%	1.569E-01	4.56E-02	G
EU-155	1.4845E-01						
		86.45	1.485E-01	%(	3.468E-01	1.05E-01	G K
		105.31	-6.778E-02	&	3.371E-01	1.02E-01	G
HG-203	3.3773E-02						
		279.17	3.377E-02	%(P	7.000E-02	2.12E-02	G K
		72.87	-4.805E-01	% P	2.984E+00	8.99E-01	G
		70.83	-1.391E+00	%	5.507E+00	1.66E+00	G
		82.50	-7.463E-01	&	4.401E+00	1.32E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.1342E-01						
		583.14	2.051E-01	*(P	6.445E-02	2.20E-02	G
		510.72	2.451E-01	(P	2.851E-01	8.71E-02	G
PB-212	7.1439E-01						
		238.63	6.846E-01	(P	9.496E-02	3.48E-02	G K
							Energy duplication
		77.11	7.878E-01	(P	5.511E-01	1.72E-01	G
		74.81	1.072E+00	+ P	1.109E+00	3.42E-01	G
PB-214	4.1640E-01						
		351.99	4.154E-01	@(P	1.558E-01	5.45E-02	G K
		295.22	4.183E-01	*(P	2.538E-01	8.34E-02	G
							Energy duplication
		77.11	-2.208E-01	% P	1.375E+00	4.14E-01	G
		241.92	1.283E-01	%	8.403E-01	2.53E-01	G
BI-212	5.8789E-01						
		727.17	5.879E-01	(P	2.468E-01	1.02E-01	G K
		1620.56	9.342E-01	+ P	3.964E-01	2.24E-01	G
		785.42	3.391E-02	%	1.312E+00	3.74E-01	G
BI-214	3.6894E-01						
		609.32	3.689E-01	(P	9.095E-02	3.40E-02	G K
		1764.51	5.171E-01	+ P	8.144E-02	6.29E-02	G
		1120.28	6.164E-01	+ P	2.646E-01	1.19E-01	G
RA-224	-5.1528E-02						
		241.00	-5.153E-02	&(	1.690E+00	5.08E-01	G
RA-226	1.3078E+00						
		185.99	1.308E+00	%(P	1.989E+00	6.05E-01	G
AC-228	7.1277E-01						
		911.07	6.319E-01	(P	1.056E-01	5.24E-02	G K
		968.90	7.854E-01	(P	1.407E-01	6.99E-02	G
		338.40	8.024E-01	@(P	4.936E-01	1.75E-01	G
TH-227	3.4118E-02						
		236.00	3.412E-02	%(	6.657E-01	2.00E-01	G K
		256.25	1.592E-01	& P	8.318E-01	2.50E-01	G
PA-234	3.7911E-02						
		98.44	3.791E-02	%(P	3.502E-01	1.05E-01	G K
		946.00	-2.445E-02	% P	1.542E-01	4.48E-02	G
		131.28	-4.270E-02	& P	3.529E-01	1.06E-01	G
		94.67	-2.462E-01	% P	6.301E-01	1.91E-01	G
		883.24	8.478E-02	%	2.198E-01	6.58E-02	G
		926.70	-6.120E-02	&	3.328E-01	9.77E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.198E-02 & P 5.343E-01 1.58E-01 G

TH-234      -2.0724E-01
                           63.29-2.072E-01 %(P 9.812E+00 2.94E+00 G K
                           92.80 1.250E+00 % P 3.270E+00 9.89E-01 G
                           92.38 1.431E+00 % P 3.867E+00 1.17E+00 G

AM-241       1.7011E-03
                           59.54 1.701E-03 %(P 1.660E+00 4.98E-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:                      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 - 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 *****

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	2.9260E-01	2.9270E-01	6.9074E-01	6.9095E-01	7.609E-01
K-40		1.1280E+01	1.1280E+01	1.0129E+00	1.2061E+00	
MN-54	#A	8.5580E-03	8.5585E-03	2.2827E-02	2.2833E-02	2.565E-02
CO-57	#B	-5.2845E-03	-5.2849E-03	8.1170E-02	8.1171E-02	8.563E-02
CO-60		8.3352E-02	8.3353E-02	2.9999E-02	3.0387E-02	

Sr-85	#A	-9.7939E-04	-9.7968E-04	5.9809E-02	5.9809E-02	6.688E-02
Kr-85	#A	-2.2610E+01	-2.2610E+01	1.3803E+03	1.3803E+03	1.544E+03
Y-88	#B	4.1739E-04	4.1746E-04	1.6687E-02	1.6687E-02	2.148E-02
NB-94	#B	-1.0531E-03	-1.0531E-03	2.0109E-02	2.0109E-02	2.377E-02
Ag-108M	#B	-3.4221E-03	-3.4221E-03	2.5961E-02	2.5962E-02	2.987E-02
CD-109	#A	-1.2848E+00	-1.2849E+00	2.2411E+00	2.2423E+00	2.460E+00
SN-113	#B	1.6564E-02	1.6567E-02	8.8207E-02	8.8212E-02	9.789E-02
SB-125	#B	1.6064E-02	1.6065E-02	2.2710E-01	2.2710E-01	2.526E-01
I-131	#B	1.8481E-02	1.8524E-02	6.6919E-02	6.6928E-02	7.391E-02
CS-134	#B	2.1119E-02	2.1120E-02	1.3879E-02	1.3933E-02	5.216E-02
CS-137		1.3308E+01	1.3308E+01	2.9391E-01	8.2666E-01	
CE-139	#A	6.4665E-04	6.4674E-04	5.4462E-02	5.4462E-02	6.057E-02
EU-152	#B	6.2651E-02	6.2651E-02	5.7781E-02	5.7885E-02	2.441E-01
EU-154	#B	-7.5434E-03	-7.5434E-03	1.5271E-01	1.5271E-01	1.693E-01
EU-155	#B	1.4845E-01	1.4845E-01	3.1529E-01	3.1540E-01	3.468E-01
HG-203	#B	3.3760E-02	3.3773E-02	6.3712E-02	6.3742E-02	6.998E-02
TL-208	#	2.1342E-01	2.1342E-01	6.8589E-02	6.9700E-02	6.445E-02
PB-212		7.1439E-01	7.1439E-01	1.0880E-01	1.1644E-01	
PB-214	#	4.1640E-01	4.1640E-01	1.4901E-01	1.5096E-01	
BI-212		5.8789E-01	5.8789E-01	3.0691E-01	3.0880E-01	
BI-214		3.6894E-01	3.6894E-01	1.0202E-01	1.0424E-01	
RA-224	#A	-5.1528E-02	-5.1528E-02	1.5233E+00	1.5233E+00	1.690E+00
RA-226	#A	1.3078E+00	1.3078E+00	1.8147E+00	1.8163E+00	1.989E+00
AC-228		7.1277E-01	7.1277E-01	1.7700E-01	1.8177E-01	
TH-227	#B	3.4118E-02	3.4118E-02	6.0104E-01	6.0104E-01	6.657E-01
PA-234	#B	3.7911E-02	3.7911E-02	3.1629E-01	3.1630E-01	3.502E-01
TH-234	#B	-2.0724E-01	-2.0724E-01	8.8604E+01	8.8604E+01	9.812E+00
AM-241	#A	1.7011E-03	1.7011E-03	1.4930E+00	1.4930E+00	1.660E+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) 2.7471594E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.7471617E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
NOL-05-01-29-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\103_8JUN2006_1213.An1

Acquisition information

Start time:	08-Jun-2006 12:13:57
Live time:	2000
Real time:	2002
Dead time:	0.12 %
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/channel^2

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:	2.1710E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.1710E+03) = 4.6062E+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	08-Jun-2006 11:36:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5408

***** 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
74.97	76.	37.02	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
76.76	282.	16.20	0.97	9.955E-03	77.11	17.500	9.826E-01	PB212
					77.11	10.700	1.607E+00	PB214
92.96	97.	40.33	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
186.30	164.	25.02	1.26	2.566E-02	185.99	3.280	1.113E+00	RA226
239.03	968.	4.08	1.09	2.318E-02	238.63	43.100	5.951E-01	PB212
242.28	129.	20.82	1.10	2.301E-02	241.00	3.900	8.901E-01	RA224
					241.92	7.470	4.657E-01	PB214
277.73	69.	40.65	0.94	2.112E-02				
295.54	238.	14.03	1.18	2.023E-02	295.22	19.200	3.746E-01	PB214
338.73	223.	15.59	1.03	1.829E-02	338.40	12.010	6.290E-01	AC228
352.29	380.	8.99	1.19	1.774E-02	351.99	37.100	3.538E-01	PB214
511.24	163.	16.22	1.85	1.316E-02	510.72	22.500	2.872E-01	TL208
583.82	334.	8.88	1.16	1.183E-02	583.14	86.000	2.017E-01	TL208
609.97	329.	8.15	1.43	1.143E-02	609.32	46.090	3.808E-01	BI214
662.43	1710.	2.69	1.36	1.071E-02	661.62	84.620	1.172E+00	CS137
728.15	77.	27.42	0.89	9.954E-03	727.17	11.800	4.066E-01	BI212
796.10	39.	32.16	1.50	9.301E-03	795.76	85.400	3.057E-02	CS134
912.24	230.	10.17	1.67	8.393E-03	911.07	29.000	5.800E-01	AC228
969.75	221.	11.27	1.62	8.021E-03	968.90	17.460	9.793E-01	AC228
1121.64	98.	18.09	1.30	7.205E-03	1120.28	15.040	5.498E-01	BI214
1462.45	1233.	2.96	1.87	5.927E-03	1460.75	10.700	1.191E+01	K40
1766.19	58.	13.08	1.67	5.142E-03	1764.51	15.920	4.435E-01	BI214

No unknown peaks passed sensitivity test.

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	391.	76.	0.038	111.06	0.993D
PB-212	153.39	77.11	370.	169.	0.085	4.76	0.995A
RA-226	371.89	186.36	903.	164.	0.082	75.18	1.500s
PB-212	477.19	239.02	757.	975.	0.488	16.64	1.032
RA-224	483.22	242.03	844.	103.	0.051	123.68	1.500
PB-214	590.22	295.54	355.	234.	0.117	42.10	1.176
AC-228	676.60	338.73	354.	222.	0.111	46.77	1.027s
PB-214	703.72	352.29	321.	374.	0.187	26.98	1.192
TL-208	1021.60	511.24	219.	137.	0.068	48.67	1.852s
TL-208	1166.74	583.82	170.	330.	0.165	26.63	1.165
BI-214	1219.04	609.97	136.	323.	0.161	24.45	1.431
CS-137	1323.94	662.43	137.	1709.	0.854	8.07	1.359
BI-212	1455.36	728.15	113.	77.	0.038	82.26	0.889s
CS-134	1591.26	796.10	60.	39.	0.020	96.49	1.500s
AC-228	1823.51	912.24	100.	227.	0.114	30.51	1.672
AC-228	1938.50	969.74	84.	210.	0.105	33.15	1.615
BI-214	2242.25	1121.64	71.	96.	0.048	54.28	1.295s
K-40	2923.75	1462.44	45.	1203.	0.602	8.90	1.870
BI-214	3531.13	1766.19	5.	58.	0.029	39.25	1.674

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	Nuclide Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		6.0999E-02					
			477.56	6.100E-02	&(	2.477E-01	7.34E-02 G
K-40		1.1800E+01					
			1460.75	1.180E+01	(P	3.322E-01	3.56E-01 G
MN-54		-4.0039E-03					
			834.81	-4.004E-03	%(P	2.706E-02	7.79E-03 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	9.3183E-03						
		122.07	9.318E-03	%(P	4.766E-02	1.43E-02	G K
		136.43	7.060E-02	%	3.354E-01	1.01E-01	G
CO-60	1.2458E-02						
		1332.51	1.246E-02	&(P	2.814E-02	8.33E-03	G K
		1173.23	2.169E-02	% P	3.572E-02	1.10E-02	G K
Sr-85	-1.0336E-02						
		514.00	-1.034E-02	%(	3.886E-02	1.16E-02	G
Kr-85	-2.3844E+02						
		513.99	-2.384E+02	%(	8.969E+02	2.68E+02	G
Y-88	8.5471E-04						
		1836.01	8.547E-04	%(P	2.114E-02	5.47E-03	G K
		898.02	7.610E-03	% P	2.985E-02	8.74E-03	G
NB-94	-6.7586E-03						
		871.10	-6.759E-03	%(	3.040E-02	8.91E-03	G K
		702.50	7.799E-03	%	2.653E-02	7.86E-03	G K
Ag-108M	-5.0836E-03						
		722.95	-5.084E-03	&(	3.346E-02	9.77E-03	G K
		614.37	-1.496E-02	% P	3.706E-02	1.12E-02	G
		433.93	-2.848E-04	%	3.145E-02	9.17E-03	G
CD-109	7.0251E-01						
		88.04	7.025E-01	&(	1.642E+00	4.97E-01	G
SN-113	-1.0943E-02						
		391.71	-1.094E-02	%(	4.887E-02	1.46E-02	G K
		255.04	0.000E+00	%	1.641E+00	4.87E-01	G
SB-125	-2.4412E-03						
		427.95	-2.441E-03	&(P	1.142E-01	3.36E-02	G K
		600.77	4.875E-03	& P	1.542E-01	4.45E-02	G
		636.15	-2.416E-03	% P	2.484E-01	7.11E-02	G
		463.51	2.182E-01	% P	3.473E-01	1.06E-01	G
		176.29	-1.385E-01	%	5.565E-01	1.67E-01	G
I-131	1.5861E-02						
		364.48	1.586E-02	%(P	3.632E-02	1.10E-02	G K
		636.97	7.286E-02	%	4.060E-01	1.19E-01	G
		284.29	-1.332E-01	% P	5.662E-01	1.70E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	1.0417E-02						
		604.66	-7.217E-03	%(	3.311E-02	9.80E-03	G K
		795.76	3.057E-02	(P	3.032E-02	9.85E-03	G
		569.29	-8.527E-05	% P	1.605E-01	4.58E-02	G
		801.84	-4.410E-03	& P	3.621E-01	1.03E-01	G
CS-137	1.1722E+00						
		661.62	1.172E+00	(P	3.933E-02	3.16E-02	G
CE-139	-1.0971E-03						
		165.85	-1.097E-03	&(	4.415E-02	1.32E-02	G
EU-152	2.8183E-02						
		121.78	2.818E-02	%(P	1.436E-01	4.31E-02	G K
		344.30	-2.810E-02	% P	1.200E-01	3.59E-02	G
		1408.08	7.023E-02	%	1.178E-01	3.67E-02	G
		964.00	-1.445E-02	& P	2.530E-01	7.26E-02	G
		1112.07	3.616E-02	%	2.364E-01	6.83E-02	G
		778.90	5.312E-02	%	2.007E-01	5.91E-02	G
EU-154	-2.0822E-03						
		123.10	-2.082E-03	&(	1.037E-01	3.10E-02	G K
		1274.80	-2.919E-02	%	1.098E-01	3.24E-02	G
		723.30	-2.269E-02	&	1.404E-01	4.09E-02	G
		1004.80	0.000E+00	%	1.967E-01	5.60E-02	G
EU-155	7.7790E-02						
		86.45	7.779E-02	%(	2.098E-01	6.34E-02	G K
		105.31	6.451E-02	%	2.154E-01	6.49E-02	G
HG-203	-1.7242E-03						
		279.17	-1.724E-03	&(P	3.946E-02	1.17E-02	G K
		72.87	5.597E-01	% P	1.811E+00	5.46E-01	G
		70.83	-8.900E-01	%	3.781E+00	1.14E+00	G
		82.50	6.548E-02	%	3.259E+00	9.72E-01	G
TL-208	2.0171E-01						
		583.14	2.017E-01	(P	3.877E-02	1.82E-02	G
		510.72	2.872E-01	+ P	1.506E-01	5.57E-02	G
PB-212	5.9565E-01						
		238.63	6.072E-01	(P	8.148E-02	3.42E-02	G K
							Energy duplication
		77.11	5.957E-01	} P	3.248E-01	9.44E-03	G
		74.81	5.436E-01	(P	6.796E-01	2.09E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.6088E-01						
		351.99	3.538E-01	(P	8.142E-02	3.23E-02	G K
		295.22	3.746E-01	(P	1.449E-01	5.35E-02	G
							Energy duplication
		77.11	2.958E-01	} P	8.079E-01	1.93E-01	G
		241.92	2.320E-01	%	5.302E-01	1.61E-01	G
BI-212	4.0659E-01						
		727.17	4.066E-01	(P	2.768E-01	1.12E-01	G K
		1620.56	-7.619E-02	& P	9.750E-01	2.67E-01	G
		785.42	-3.009E-02	%	1.412E+00	4.03E-01	G
BI-214	3.9689E-01						
		609.32	3.808E-01	(P	6.747E-02	3.17E-02	G K
		1764.51	4.435E-01	(P	9.720E-02	6.13E-02	G
		1120.28	5.498E-01	+ P	2.412E-01	1.02E-01	G
RA-224	7.0998E-01						
		241.00	7.100E-01	&(	9.552E-01	2.93E-01	G
RA-226	1.2096E+00						
		185.99	1.210E+00	@(P	1.056E+00	3.27E-01	G
AC-228	5.9437E-01						
		911.07	5.800E-01	(P	1.260E-01	5.99E-02	G K
		968.90	9.317E-01	+ P	2.020E-01	1.03E-01	G
		338.40	6.290E-01	@(P	2.559E-01	9.86E-02	G
TH-227	-1.4584E-01						
		236.00	-1.458E-01	%(	3.654E-01	1.11E-01	G K
		256.25	4.716E-02	% P	4.644E-01	1.38E-01	G
PA-234	5.8792E-03						
		98.44	5.879E-03	&(P	2.102E-01	6.27E-02	G K
		946.00	-7.664E-03	% P	1.450E-01	4.12E-02	G
		131.28	9.953E-02	& P	1.740E-01	5.30E-02	G
		94.67	2.741E-02	% P	3.066E-01	9.15E-02	G
		883.24	3.823E-02	&	1.852E-01	5.34E-02	G
		926.70	1.129E-02	&	2.149E-01	6.02E-02	G
		569.26	-1.964E-03	% P	3.168E-01	9.18E-02	G
TH-234	1.9651E+00						
		63.29	1.965E+00	&(P	5.629E+00	1.70E+00	G K
		92.80	1.228E+00	% P	1.926E+00	5.85E-01	G
		92.38	1.336E+00	& P	2.301E+00	6.98E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	-3.0989E-01						
		59.54	-3.099E-01	%(P	8.562E-01	2.58E-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 - 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 Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	6.0978E-02	6.0999E-02	2.2029E-01	2.2032E-01	2.476E-01
K-40		1.1800E+01	1.1800E+01	1.0671E+00	1.2681E+00	
MN-54	#A	-4.0036E-03	-4.0039E-03	2.6451E-02	2.6452E-02	2.706E-02
CO-57	#B	9.3177E-03	9.3183E-03	4.2928E-02	4.2932E-02	4.766E-02
CO-60	#B	1.2457E-02	1.2458E-02	2.5005E-02	2.5015E-02	2.814E-02
Sr-85	#A	-1.0333E-02	-1.0336E-02	3.4847E-02	3.4852E-02	3.885E-02
Kr-85	#A	-2.3844E+02	-2.3844E+02	8.0419E+02	8.0431E+02	8.969E+02
Y-88	#B	8.5457E-04	8.5471E-04	1.6414E-02	1.6414E-02	2.113E-02
NB-94	#B	-6.7586E-03	-6.7586E-03	2.6737E-02	2.6740E-02	3.040E-02
Ag-108M	#B	-5.0836E-03	-5.0836E-03	2.9308E-02	2.9309E-02	3.346E-02
CD-109	#A	7.0248E-01	7.0251E-01	1.4911E+00	1.4916E+00	1.642E+00

SN-113	#B	-1.0941E-02	-1.0943E-02	4.3698E-02	4.3702E-02	4.886E-02
SB-125	#B	-2.4412E-03	-2.4412E-03	1.0502E-01	1.0502E-01	1.142E-01
I-131	#B	1.5825E-02	1.5861E-02	3.2926E-02	3.2938E-02	3.623E-02
CS-134	#B	1.0417E-02	1.0417E-02	1.0075E-02	1.0093E-02	3.310E-02
CS-137		1.1722E+00	1.1722E+00	9.4719E-02	1.1663E-01	
CE-139	#A	-1.0969E-03	-1.0971E-03	3.9500E-02	3.9500E-02	4.415E-02
EU-152	#B	2.8183E-02	2.8183E-02	1.2935E-01	1.2936E-01	1.436E-01
EU-154	#B	-2.0822E-03	-2.0822E-03	9.2876E-02	9.2876E-02	1.037E-01
EU-155	#B	7.7790E-02	7.7790E-02	1.9015E-01	1.9020E-01	2.098E-01
HG-203	#B	-1.7235E-03	-1.7242E-03	3.5686E-02	3.5686E-02	3.945E-02
TL-208		2.0171E-01	2.0171E-01	5.4408E-02	5.5654E-02	
PB-212		5.9565E-01	5.9565E-01	1.0030E-01	1.0610E-01	
PB-214		3.6088E-01	3.6088E-01	9.1726E-02	9.4088E-02	
BI-212		4.0659E-01	4.0659E-01	3.3659E-01	3.3742E-01	
BI-214		3.9689E-01	3.9689E-01	9.6005E-02	9.8732E-02	
RA-224	#A	7.0998E-01	7.0998E-01	8.7809E-01	8.7905E-01	9.552E-01
RA-226	#	1.2096E+00	1.2096E+00	9.8135E-01	9.8386E-01	1.056E+00
AC-228		5.9437E-01	5.9437E-01	1.6728E-01	1.7080E-01	
TH-227	#B	-1.4584E-01	-1.4584E-01	3.3158E-01	3.3169E-01	3.654E-01
PA-234	#B	5.8792E-03	5.8792E-03	1.8819E-01	1.8819E-01	2.102E-01
TH-234	#B	1.9651E+00	1.9651E+00	5.0860E+00	5.0872E+00	5.629E+00
AM-241	#A	-3.0989E-01	-3.0989E-01	7.8200E-01	7.8219E-01	8.562E-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 (86.4 to 2000.7 keV) 1.5528477E+01 pCi/gm
Total Decayed Activity (86.4 to 2000.7 keV) 1.5528479E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_1JUNE2006_0848.An1

Sample description
FSS-NOL-05-01-005-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1JUNE2006_0848.An1

Acquisition information
Start time: 01-Jun-2006 08:50:18
Live time: 2000
Real time: 2002
Dead time: 0.10 %
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/channel^2

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: 1.8980E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8980E+03) =
5.2687E+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	31-May-2006 09:45:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5601

***** 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
74.98	141.	19.52	0.99	9.052E-03	74.81	9.600	1.151E+00	PB212
77.28	177.	12.71	0.99	1.011E-02	77.11	17.500	7.519E-01	PB212
93.32	90.	39.18	1.34	1.663E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.66	97.	37.78	0.70	2.444E-02				
186.58	123.	29.94	1.41	2.565E-02	185.99	3.280	PBC<MDA	RA226
210.34	99.	30.25	1.26	2.466E-02				
239.16	1064.	3.65	1.09	2.317E-02	238.63	43.100	7.490E-01	PB212
241.83	156.	18.95	1.10	2.303E-02	241.00	3.900	1.232E+00	RA224
					241.92	7.470	6.444E-01	PB214
270.87	86.	33.11	1.00	2.148E-02				
277.12	82.	34.77	1.02	2.115E-02				
295.64	181.	13.13	0.91	2.023E-02	295.22	19.200	3.246E-01	PB214
300.81	83.	23.88	1.03	1.998E-02				
338.86	226.	12.42	0.78	1.828E-02	338.40	12.010	7.285E-01	AC228
352.43	383.	8.29	1.18	1.774E-02	351.99	37.100	4.077E-01	PB214
463.55	91.	23.14	1.64	1.425E-02	463.51	10.000	4.492E-01	SB125
511.83	209.	12.14	1.75	1.315E-02	510.72	22.500	4.387E-01	TL208
584.16	404.	7.69	1.38	1.183E-02	583.14	86.000	2.792E-01	TL208
610.27	288.	10.00	1.26	1.143E-02	609.32	46.090	3.805E-01	BI214
728.20	122.	16.35	1.72	9.954E-03	727.17	11.800	7.357E-01	BI212
861.47	45.	28.81	0.91	8.761E-03				
912.63	272.	9.17	1.69	8.391E-03	911.07	29.000	7.853E-01	AC228
965.67	33.	35.65	1.54	8.044E-03	964.00	14.580	PBC<MDA	EU152
970.60	158.	9.60	1.54	8.014E-03				
1094.56	58.	35.63	1.07	7.336E-03				
1121.71	92.	24.52	1.12	7.205E-03	1120.28	15.040	5.902E-01	BI214

1463.18	1350.	2.79	1.79	5.925E-03	1460.75	10.700	1.494E+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	
258.49	129.66	569.	97.	0.049	108.46	0.697	AC-228	s
419.84	210.34	361.	99.	0.049	90.76	1.261	TH-227	s
540.88	270.87	316.	86.	0.043	99.33	1.003	AC-228	
600.77	300.81	155.	83.	0.041	71.65	1.025	PB-212	M
1721.99	861.47	52.	45.	0.023	86.42	0.912	TL-208	sM
1940.60	970.79	64.	156.	0.078	32.41	1.385	J-135	M
2188.10	1094.56	96.	58.	0.029	106.90	1.070	-	s
2242.89	1121.71	56.	66.	0.033	60.26	1.635	TA-182	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-212	148.79	74.81	324.	141.	0.070	58.57	0.993D
PB-212	153.39	77.11	326.	177.	0.088	38.14	0.995A
RA-226	372.27	186.56	737.	103.	0.052	101.96	1.500s
PB-212	477.37	239.10	683.	1150.	0.575	14.39	1.163
RA-224	483.19	242.02	752.	104.	0.052	115.62	1.500s
PB-214	590.42	295.64	188.	177.	0.089	39.40	0.914
AC-228	676.88	338.87	248.	197.	0.099	39.74	1.500
PB-214	704.00	352.43	237.	377.	0.189	24.87	1.184
SB-125	927.26	464.07	144.	69.	0.035	80.03	1.500s
TL-208	1022.78	511.83	167.	183.	0.091	36.42	1.747s
TL-208	1167.42	584.16	156.	399.	0.200	23.06	1.376
BI-214	1219.64	610.27	157.	282.	0.141	30.01	1.264s
Ag-108M	1223.60	612.25	289.	-81.	-0.041	94.94	1.500s
BI-212	1455.47	728.20	92.	122.	0.061	49.06	1.724s
AC-228	1824.36	912.66	58.	221.	0.111	24.43	1.505
EU-152	1931.93	966.46	40.	43.	0.022	75.64	1.538s
BI-214	2239.53	1120.28	72.	57.	0.028	72.21	1.634D
K-40	2925.27	1463.20	31.	1322.	0.661	8.27	1.845

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	Peak Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		7.1460E-02					
			477.56	7.146E-02	%(	3.062E-01 9.08E-02	G
K-40		1.4830E+01					
			1460.75	1.483E+01	(P	3.223E-01 4.15E-01	G
MN-54		-4.5525E-03					
			834.81	-4.553E-03	&(P	3.364E-02 9.71E-03	G
CO-57		1.2759E-02					
			122.07	1.276E-02	&(P	4.190E-02 1.26E-02	G K
			136.43	3.841E-02	&	3.578E-01 1.07E-01	G
CO-60		-6.0418E-03					
			1332.51	-6.042E-03	&(P	3.391E-02 9.19E-03	G K
			1173.23	4.324E-03	& P	4.387E-02 1.26E-02	G K
Sr-85		7.8942E-03					
			514.00	7.894E-03	&(	3.873E-02 1.15E-02	G
Kr-85		1.8113E+02					
			513.99	1.811E+02	&(	8.847E+02 2.62E+02	G
Y-88		7.2942E-03					
			1836.01	7.294E-03	%(P	1.221E-02 4.09E-03	G K
			898.02	-1.190E-02	% P	4.418E-02 1.30E-02	G
NB-94		0.0000E+00					
			871.10	0.000E+00	%(	4.191E-02 1.20E-02	G K
			702.50	-5.056E-03	&	3.742E-02 1.09E-02	G K
Ag-108M		-5.6695E-03					
			722.95	-5.670E-03	%(	3.940E-02 1.15E-02	G K
			614.37	-5.627E-02	+ P	5.675E-02 1.78E-02	G
			433.93	1.546E-03	%	2.965E-02 8.61E-03	G
CD-109		1.0510E+00					
			88.04	1.051E+00	&(	1.753E+00 5.34E-01	G
SN-113		6.0147E-03					
			391.71	6.015E-03	%(	4.740E-02 1.40E-02	G K
			255.04	-2.416E-01	%	1.427E+00 4.25E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.7662E-02						
		427.95	1.325E-02	%(P	9.653E-02	2.84E-02	G K
		600.77	2.746E-02	% P	1.747E-01	5.12E-02	G
		636.15	5.593E-02	% P	2.608E-01	7.64E-02	G
		463.51	3.475E-01	@(P	2.933E-01	9.44E-02	G
		176.29	-1.213E-02	&	4.442E-01	1.31E-01	G
I-131	7.1862E-03						
		364.48	7.186E-03	&(P	3.864E-02	1.14E-02	G K
		636.97	-1.026E-02	&	4.483E-01	1.29E-01	G
		284.29	9.276E-02	% P	5.580E-01	1.66E-01	G
CS-134	-5.9065E-03						
		604.66	-5.907E-03	%(	3.716E-02	1.09E-02	G K
		795.76	2.507E-02	% P	4.103E-02	1.26E-02	G
		569.29	-1.405E-02	% P	1.851E-01	5.28E-02	G
		801.84	-6.223E-03	% P	3.218E-01	8.94E-02	G
CS-137	4.9682E-03						
		661.62	4.968E-03	&(P	3.296E-02	9.52E-03	G
CE-139	9.7967E-03						
		165.85	9.797E-03	%(	4.408E-02	1.32E-02	G
EU-152	1.0782E-01						
		121.78	3.011E-02	&(P	1.361E-01	4.08E-02	G K
		344.30	-2.279E-02	% P	1.077E-01	3.20E-02	G
		1408.08	0.000E+00	%	1.526E-01	4.18E-02	G
		964.00	2.637E-01	?(P	1.955E-01	6.73E-02	G
		1112.07	-5.755E-03	%	2.919E-01	8.29E-02	G
		778.90	4.920E-02	%	2.204E-01	6.44E-02	G
EU-154	-9.9203E-03						
		123.10	-9.920E-03	&(	1.073E-01	3.21E-02	G K
		1274.80	-1.506E-02	%	1.083E-01	3.11E-02	G
		723.30	0.000E+00	%	2.776E-01	8.13E-02	G
		1004.80	2.340E-02	%	1.636E-01	4.67E-02	G
EU-155	1.2880E-01						
		86.45	1.288E-01	%(	2.222E-01	6.76E-02	G K
		105.31	-3.449E-03	%	2.270E-01	6.76E-02	G
HG-203	-6.1610E-03						
		279.17	-6.161E-03	%(P	4.027E-02	1.20E-02	G K
		72.87	7.457E-01	& P	1.569E+00	4.76E-01	G
		70.83	-6.089E-02	%	4.538E+00	1.35E+00	G
		82.50	-6.030E-01	%	3.195E+00	9.57E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7923E-01						
		583.14	2.792E-01	(P	4.251E-02	2.17E-02	G
		510.72	4.387E-01	+ P	1.513E-01	6.11E-02	G
PB-212	7.9973E-01						
		238.63	8.191E-01	(P	8.863E-02	3.97E-02	G K
							Energy duplication
		77.11	7.111E-01	} P	3.494E-01	9.04E-02	G
		74.81	1.151E+00	+ P	7.098E-01	2.30E-01	G
PB-214	4.0771E-01						
		351.99	4.077E-01	(P	8.045E-02	3.43E-02	G K
		295.22	3.246E-01	- P	1.219E-01	4.37E-02	G
							Energy duplication
		77.11	0.000E+00	} P	7.730E-01	0.00E+00	G
		241.92	3.591E-01	%	5.546E-01	1.69E-01	G
BI-212	7.3573E-01						
		727.17	7.357E-01	*(P	2.878E-01	1.21E-01	G K
		1620.56	-5.284E-02	% P	1.088E+00	2.95E-01	G
		785.42	4.034E-02	&	1.472E+00	4.18E-01	G
BI-214	3.7831E-01						
		609.32	3.805E-01	@(P	8.258E-02	3.90E-02	G K
		1764.51	-2.846E-02	% P	9.689E-02	8.70E-03	G
		1120.28	3.717E-01	(P	2.771E-01	9.25E-02	G
RA-224	8.2309E-01						
		241.00	8.231E-01	?(	1.032E+00	3.17E-01	G
RA-226	8.7485E-01						
		185.99	8.748E-01	(P	1.093E+00	3.35E-01	G
AC-228	6.4469E-01						
		911.07	6.468E-01	(P	1.120E-01	5.35E-02	G K
		968.90	-1.279E-01	% P	3.056E-01	9.21E-02	G
		338.40	6.397E-01	(P	2.464E-01	8.52E-02	G
TH-227	1.7396E-02						
		236.00	1.740E-02	%(	6.003E-01	1.80E-01	G K
		256.25	-2.779E-02	& P	4.269E-01	1.26E-01	G
PA-234	-1.0091E-02						
		98.44	-1.009E-02	%(P	2.124E-01	6.33E-02	G K
		946.00	3.722E-02	& P	1.570E-01	4.59E-02	G
		131.28	8.899E-03	& P	1.679E-01	4.99E-02	G
		94.67	-7.287E-03	& P	3.369E-01	1.00E-01	G
		883.24	6.553E-02	&	2.655E-01	7.79E-02	G
		926.70	-4.030E-02	%	2.801E-01	8.06E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.914E-02 % P 2.836E-01 8.11E-02 G

TH-234       4.2119E-01
                           63.29 4.212E-01 &(P 6.184E+00 1.84E+00 G K
                           92.80 1.478E+00 % P 2.054E+00 6.26E-01 G
                           92.38-1.008E-01 % P 2.522E+00 7.47E-01 G

AM-241      -1.7332E-03
                           59.54-1.733E-03 %(P 1.098E+00 3.26E-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:                      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 - 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 *****

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	7.0573E-02	7.1460E-02	2.7233E-01	2.7236E-01	3.024E-01
K-40		1.4830E+01	1.4830E+01	1.2436E+00	1.5126E+00	3.223E-01
MN-54	#A	-4.5428E-03	-4.5525E-03	3.3002E-02	3.3003E-02	3.356E-02
CO-57	#B	1.2728E-02	1.2759E-02	3.7809E-02	3.7815E-02	4.180E-02
CO-60	#B	-6.0397E-03	-6.0418E-03	8.0896E-02	8.0897E-02	3.389E-02

Sr-85	#A	7.8134E-03	7.8942E-03	3.4469E-02	3.4472E-02	3.833E-02
Kr-85	#A	1.8113E+02	1.8113E+02	7.8750E+02	7.8757E+02	8.847E+02
Y-88	#B	7.2487E-03	7.2942E-03	1.2277E-02	1.2284E-02	1.213E-02
NB-94	#B	0.0000E+00	0.0000E+00	3.6134E-02	3.6134E-02	4.191E-02
Ag-108M	#B	-5.6695E-03	-5.6695E-03	3.4517E-02	3.4518E-02	3.940E-02
CD-109	#A	1.0495E+00	1.0510E+00	1.6024E+00	1.6035E+00	1.750E+00
SN-113	#B	5.9800E-03	6.0147E-03	4.1909E-02	4.1911E-02	4.712E-02
SB-125	#F	9.7598E-02	9.7662E-02	7.9596E-02	7.9798E-02	9.646E-02
I-131	#B	6.6143E-03	7.1862E-03	3.4311E-02	3.4313E-02	3.556E-02
CS-134	#B	-5.9013E-03	-5.9065E-03	3.2782E-02	3.2784E-02	3.712E-02
CS-137	#A	4.9679E-03	4.9682E-03	2.8559E-02	2.8560E-02	3.296E-02
CE-139	#A	9.7493E-03	9.7967E-03	3.9668E-02	3.9672E-02	4.387E-02
EU-152	#B	1.0780E-01	1.0782E-01	8.2580E-02	8.2797E-02	1.360E-01
EU-154	#B	-9.9181E-03	-9.9203E-03	9.6185E-02	9.6187E-02	1.073E-01
EU-155	#B	1.2875E-01	1.2880E-01	2.0293E-01	2.0305E-01	2.221E-01
HG-203	#B	-6.0734E-03	-6.1610E-03	3.6139E-02	3.6140E-02	3.970E-02
TL-208		2.7923E-01	2.7923E-01	6.5078E-02	6.7067E-02	
PB-212		7.9973E-01	7.9973E-01	1.1626E-01	1.2519E-01	
PB-214		4.0771E-01	4.0771E-01	1.0291E-01	1.0560E-01	
BI-212	#	7.3573E-01	7.3573E-01	3.6240E-01	3.6491E-01	
BI-214		3.7831E-01	3.7831E-01	1.1613E-01	1.1819E-01	
RA-224	#A	8.2309E-01	8.2309E-01	9.5169E-01	9.5288E-01	1.032E+00
RA-226	#A	8.7485E-01	8.7485E-01	1.0037E+00	1.0050E+00	1.093E+00
AC-228		6.4469E-01	6.4469E-01	1.5159E-01	1.5614E-01	1.120E-01
TH-227	#B	1.7396E-02	1.7396E-02	5.4018E-01	5.4018E-01	6.003E-01
PA-234	#B	-1.0091E-02	-1.0091E-02	2.5800E-01	2.5801E-01	2.124E-01
TH-234	#B	4.2119E-01	4.2119E-01	5.5156E+00	5.5156E+00	6.184E+00
AM-241	#A	-1.7332E-03	-1.7332E-03	3.8861E-01	3.8861E-01	1.098E+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 (1460.6 to 2000.7 keV) 1.8075016E+01 pCi/gm
Total Decayed Activity (1460.6 to 2000.7 keV) 1.8075016E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_1JUNE2006_0928.An1

Sample description
FSS-NOL-05-01-005-F-RC

Spectrum Filename: C:\GammaVision\Spectra\103F_1JUNE2006_0928.An1

Acquisition information
Start time: 01-Jun-2006 09:29:26
Live time: 2000
Real time: 2002
Dead time: 0.10 %
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/channel^2

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: 1.8980E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8980E+03) =
5.2687E+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	31-May-2006 09:45:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5467

***** 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	104.	26.06	0.99	9.052E-03	74.81	9.600	8.501E-01	PB212
77.33	176.	13.94	0.99	1.011E-02	77.11	17.500	8.877E-01	PB212
					77.11	10.700	1.452E+00	PB214
87.48	103.	41.07	1.50	1.472E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	1.316E+00	CD109
129.26	108.	33.58	1.02	2.439E-02				
186.54	179.	22.96	1.16	2.565E-02	185.99	3.280	1.403E+00	RA226
209.91	126.	31.31	0.98	2.468E-02				
239.13	1131.	3.43	1.09	2.317E-02	238.63	43.100	7.966E-01	PB212
241.92	139.	20.17	1.10	2.302E-02	241.00	3.900	1.103E+00	RA224
					241.92	7.470	5.772E-01	PB214
270.51	83.	29.48	1.26	2.150E-02				
295.67	222.	12.05	1.13	2.023E-02	295.22	19.200	3.999E-01	PB214
300.72	52.	40.34	1.37	1.998E-02				
338.99	255.	11.94	0.98	1.828E-02	338.40	12.010	8.218E-01	AC228
352.54	383.	6.75	1.24	1.773E-02	351.99	37.100	4.076E-01	PB214
463.16	76.	23.67	0.91	1.426E-02				
463.16	76.	23.67	0.91	1.426E-02	463.51	10.000	3.737E-01	SB125
511.71	178.	16.61	1.50	1.315E-02	510.72	22.500	3.623E-01	TL208
584.06	362.	7.81	1.45	1.183E-02	583.14	86.000	2.497E-01	TL208
610.27	296.	8.61	0.94	1.143E-02	609.32	46.090	3.910E-01	BI214
728.09	84.	21.56	0.94	9.955E-03	727.17	11.800	5.050E-01	BI212
796.45	36.	40.86	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
836.81	38.	32.72	1.50	8.970E-03	834.81	99.978	PBC<MDA	MN54
912.66	259.	9.47	1.93	8.390E-03	911.07	29.000	7.476E-01	AC228
966.30	51.	21.52	1.54	8.042E-03				
969.06	12.	13.59	1.54	8.026E-03	968.90	17.460	6.008E-02	AC228

970.69	158.	9.98	1.54	8.015E-03				
1121.98	67.	26.70	1.42	7.204E-03	1120.28	15.040	4.280E-01	BI214
1463.27	1479.	2.66	1.95	5.924E-03	1460.75	10.700	1.638E+01	K40
1767.11	62.	12.70	0.78	5.136E-03	1764.51	15.920	5.108E-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	
257.68	129.26	529.	130.	0.065	79.51	1.016	AC-228	
418.97	209.91	554.	126.	0.063	93.92	0.981	NP-239	s
540.17	270.51	244.	83.	0.041	88.43	1.264	AC-228	
600.59	300.72	194.	52.	0.026	121.02	1.371	PB-212	sM
1824.36	912.66	101.	259.	0.130	24.85	1.928	AC-228	sM
1931.62	966.33	35.	51.	0.026	64.56	1.539	TB-160	D
1940.39	970.72	45.	158.	0.079	29.95	1.542	AC-228	D
2243.77	1121.98	42.	61.	0.031	59.17	1.635	TA-182	D
3533.00	1767.11	4.	57.	0.029	42.28	2.035	XE-138	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-212	148.79	74.81	337.	104.	0.052	78.17	0.993D
PB-212	153.39	77.11	368.	176.	0.088	41.82	0.995A
CD-109	174.12	87.48	842.	103.	0.051	123.20	1.500s
RA-226	372.04	186.44	674.	149.	0.074	71.45	1.500s
PB-212	477.47	239.16	498.	1176.	0.588	12.63	1.075
RA-224	483.59	242.22	557.	126.	0.063	84.16	1.500
PB-214	482.92	241.88	268.	60.	0.030	113.73	1.166
PB-214	590.49	295.67	230.	218.	0.109	36.16	1.130
AC-228	676.94	338.90	244.	255.	0.128	31.89	1.500
PB-214	704.22	352.54	141.	377.	0.189	20.24	1.241
SB-125	925.70	463.29	90.	57.	0.028	78.99	1.500
TL-208	1022.54	511.71	224.	151.	0.075	49.82	1.505s
TL-208	1167.23	584.06	141.	357.	0.179	23.44	1.448
BI-214	1219.63	610.27	132.	290.	0.145	25.82	0.944
Ag-108M	1224.07	612.49	253.	-67.	-0.033	107.55	1.500s
BI-212	1455.25	728.09	91.	83.	0.042	64.68	0.936s
CS-134	1591.97	796.45	88.	36.	0.018	122.59	1.500
MN-54	1672.66	836.81	61.	38.	0.019	98.15	1.500
AC-228	1937.14	969.06	-5.	12.	0.006	40.77	1.541
K-40	2925.44	1463.29	40.	1420.	0.710	8.03	1.845

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3527.77	1764.51	8.	42.	0.021	49.29	2.033D

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-2.2136E-02					
			477.56	-2.214E-02	%(	2.954E-01 8.62E-02	G
K-40		1.5926E+01					
			1460.75	1.593E+01	(P	3.606E-01 4.32E-01	G
MN-54		3.0496E-02					
			834.81	3.050E-02	(P	3.114E-02 1.01E-02	G
CO-57		-1.0857E-03					
			122.07	-1.086E-03	%(P	4.741E-02 1.41E-02	G K
			136.43	4.695E-02	%	3.662E-01 1.10E-01	G
CO-60		4.0220E-03					
			1332.51	4.022E-03	%(P	3.569E-02 9.97E-03	G K
			1173.23	-1.858E-03	& P	4.141E-02 1.16E-02	G K
Sr-85		-1.0797E-02					
			514.00	-1.080E-02	%(	4.154E-02 1.24E-02	G
Kr-85		-2.4666E+02					
			513.99	-2.467E+02	%(	9.489E+02 2.83E+02	G
Y-88		5.7788E-03					
			1836.01	5.779E-03	&(P	2.273E-02 6.39E-03	G K
			898.02	-4.115E-03	& P	3.874E-02 1.11E-02	G
NB-94		9.5516E-03					
			871.10	9.552E-03	%(	3.331E-02 9.84E-03	G K
			702.50	6.395E-03	&	2.997E-02 8.78E-03	G K
Ag-108M		-7.6998E-03					
			722.95	-7.700E-03	%(	3.938E-02 1.16E-02	G K
			614.37	-4.635E-02	+ P	5.326E-02 1.66E-02	G
			433.93	1.182E-02	%	3.110E-02 9.34E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.3156E+00						
		88.04	1.316E+00	(	1.763E+00	5.40E-01	G
SN-113	1.2114E-02						
		391.71	1.211E-02	%(	3.984E-02	1.19E-02	G K
		255.04	-9.512E-02	&	1.240E+00	3.65E-01	G
SB-125	8.1790E-02						
		427.95	1.327E-02	%(P	9.287E-02	2.73E-02	G K
		600.77	-4.712E-02	% P	1.788E-01	5.30E-02	G
		636.15	9.458E-02	% P	2.921E-01	8.70E-02	G
		463.51	2.846E-01	(P	2.341E-01	7.66E-02	G
		176.29	1.903E-03	%	5.536E-01	1.64E-01	G
I-131	9.6397E-03						
		364.48	9.640E-03	%(P	4.005E-02	1.19E-02	G K
		636.97	0.000E+00	%	5.406E-01	1.56E-01	G
		284.29	-1.424E-02	& P	5.334E-01	1.57E-01	G
CS-134	1.2830E-02						
		604.66	-3.866E-03	&(	3.241E-02	9.44E-03	G K
		795.76	3.191E-02	(P	4.174E-02	1.31E-02	G
		569.29	-1.182E-02	% P	1.761E-01	5.00E-02	G
		801.84	-1.003E-01	% P	4.224E-01	1.23E-01	G
CS-137	-8.4050E-03						
		661.62	-8.405E-03	%(P	3.874E-02	1.13E-02	G
CE-139	-1.0191E-02						
		165.85	-1.019E-02	&(	4.482E-02	1.35E-02	G
EU-152	-1.0361E-02						
		121.78	-1.036E-02	%(P	1.436E-01	4.28E-02	G K
		344.30	-1.884E-02	% P	1.146E-01	3.40E-02	G
		1408.08	-2.032E-02	&	1.566E-01	4.43E-02	G
		964.00	-3.051E-02	% P	2.791E-01	8.05E-02	G
		1112.07	6.579E-02	&	3.208E-01	9.40E-02	G
		778.90	-5.601E-02	%	2.679E-01	7.86E-02	G
EU-154	2.3128E-02						
		123.10	2.313E-02	&(	9.822E-02	2.95E-02	G K
		1274.80	3.744E-02	%	1.106E-01	3.28E-02	G
		723.30	7.186E-02	%	1.315E-01	4.03E-02	G
		1004.80	4.223E-02	&	2.010E-01	5.86E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.4797E-01						
		86.45	1.480E-01	&(	2.135E-01	6.53E-02	G K
		105.31	7.642E-02	%	2.162E-01	6.52E-02	G
HG-203	-7.9309E-03						
		279.17	-7.931E-03	%(P	3.714E-02	1.11E-02	G K
		72.87	-4.886E-02	& P	1.503E+00	4.45E-01	G
		70.83	5.585E-01	%	3.899E+00	1.17E+00	G
		82.50	-8.228E-01	&	3.727E+00	1.12E+00	G
TL-208	2.4973E-01						
		583.14	2.497E-01	(P	4.053E-02	1.98E-02	G
		510.72	3.623E-01	+ P	1.741E-01	7.09E-02	G
PB-212	8.5160E-01						
		238.63	8.373E-01	(P	7.599E-02	3.57E-02	G K
							Energy duplication
		77.11	7.060E-01	} P	3.706E-01	9.84E-02	G
		74.81	8.501E-01	(P	7.234E-01	2.28E-01	G
PB-214	4.0497E-01						
		351.99	4.076E-01	(P	6.273E-02	2.79E-02	G K
		295.22	3.999E-01	(P	1.343E-01	4.92E-02	G
							Energy duplication
		77.11	1.255E-01	} P	9.008E-01	2.16E-01	G
		241.92	2.480E-01	-	3.271E-01	9.40E-02	G
BI-212	5.0503E-01						
		727.17	5.050E-01	@(P	2.850E-01	1.10E-01	G K
		1620.56	1.730E-01	% P	7.752E-01	2.16E-01	G
		785.42	0.000E+00	&	1.780E+00	5.09E-01	G
BI-214	3.8486E-01						
		609.32	3.910E-01	(P	7.609E-02	3.44E-02	G K
		1764.51	3.671E-01	(P	1.414E-01	6.50E-02	G
		1120.28	-1.637E-02	% P	3.179E-01	9.03E-02	G
RA-224	9.9343E-01						
		241.00	9.934E-01	(	8.921E-01	2.79E-01	G
RA-226	1.2583E+00						
		185.99	1.258E+00	*(P	1.046E+00	3.26E-01	G
AC-228	1.8288E-01						
		911.07	-9.836E-03	%(P	1.399E-01	3.93E-02	G K
		968.90	6.008E-02	(P	3.745E-02	8.27E-03	G
		338.40	8.268E-01	(P	2.446E-01	8.83E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.1597E-02
                          236.00-1.160E-02 %(  5.899E-01 1.77E-01 G K
                          256.25 3.418E-02 & P 3.644E-01 1.07E-01 G

PA-234      -1.1829E-03
                           98.44-1.183E-03 %(P 2.069E-01 6.15E-02 G K
                          946.00 2.553E-02 % P 1.669E-01 4.82E-02 G
                          131.28-3.253E-02 & P 2.039E-01 6.10E-02 G
                           94.67-1.378E-01 % P 3.947E-01 1.19E-01 G
                          883.24 0.000E+00 %   2.624E-01 7.40E-02 G
                          926.70 2.693E-02 %   3.173E-01 9.10E-02 G
                          569.26-8.502E-02 % P 2.899E-01 8.52E-02 G

TH-234       6.9065E-01
                           63.29 6.906E-01 %(P 6.107E+00 1.82E+00 G K
                           92.80 1.210E+00 % P 2.050E+00 6.21E-01 G
                           92.38-2.817E-01 & P 2.426E+00 7.15E-01 G

AM-241       1.8906E-01
                           59.54 1.891E-01 %(P 1.045E+00 3.12E-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:                      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 - 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	-2.1853E-02	-2.2136E-02	2.5847E-01	2.5847E-01	2.916E-01
K-40		1.5926E+01	1.5926E+01	1.2950E+00	1.5912E+00	3.606E-01
MN-54	A	3.0429E-02	3.0496E-02	3.0212E-02	3.0264E-02	3.107E-02
CO-57	#B	-1.0830E-03	-1.0857E-03	5.6218E-02	5.6218E-02	4.729E-02
CO-60	#B	4.0206E-03	4.0220E-03	2.9906E-02	2.9907E-02	3.568E-02
Sr-85	#A	-1.0683E-02	-1.0797E-02	3.7186E-02	3.7191E-02	4.110E-02
Kr-85	#A	-2.4666E+02	-2.4666E+02	8.4945E+02	8.4957E+02	9.489E+02
Y-88	#B	5.7418E-03	5.7788E-03	1.9166E-02	1.9169E-02	2.258E-02
NB-94	#B	9.5516E-03	9.5516E-03	2.9524E-02	2.9529E-02	3.331E-02
Ag-108M	#B	-7.6997E-03	-7.6998E-03	3.4710E-02	3.4713E-02	3.938E-02
CD-109	#A	1.3136E+00	1.3156E+00	1.6209E+00	1.6226E+00	1.760E+00
SN-113	#B	1.2042E-02	1.2114E-02	3.5648E-02	3.5655E-02	3.961E-02
SB-125	#B	8.1734E-02	8.1790E-02	6.6053E-02	6.6223E-02	9.280E-02
I-131	#B	8.8517E-03	9.6397E-03	3.5750E-02	3.5754E-02	3.678E-02
CS-134	#B	1.2818E-02	1.2830E-02	1.5766E-02	1.5784E-02	3.238E-02
CS-137	#A	-8.4044E-03	-8.4050E-03	4.3964E-02	4.3967E-02	3.874E-02
CE-139	#A	-1.0141E-02	-1.0191E-02	4.0350E-02	4.0355E-02	4.460E-02
EU-152	#B	-1.0360E-02	-1.0361E-02	1.5574E-01	1.5574E-01	1.436E-01
EU-154	#B	2.3123E-02	2.3128E-02	8.8470E-02	8.8479E-02	9.820E-02
EU-155	#B	1.4792E-01	1.4797E-01	1.9589E-01	1.9606E-01	2.134E-01
HG-203	#B	-7.8151E-03	-7.9309E-03	3.3360E-02	3.3363E-02	3.659E-02
TL-208		2.4973E-01	2.4973E-01	5.9237E-02	6.0986E-02	
PB-212		8.5160E-01	8.5160E-01	1.0865E-01	1.1937E-01	
PB-214		4.0497E-01	4.0497E-01	8.3203E-02	8.6462E-02	
BI-212	#	5.0503E-01	5.0503E-01	3.2857E-01	3.2988E-01	
BI-214		3.8486E-01	3.8486E-01	1.0157E-01	1.0400E-01	
RA-224		9.9343E-01	9.9343E-01	8.3609E-01	8.3808E-01	8.921E-01
RA-226	#	1.2583E+00	1.2583E+00	9.7727E-01	9.8000E-01	1.046E+00
AC-228	F	1.8288E-01	1.8288E-01	5.8566E-02	5.9521E-02	1.399E-01
TH-227	#B	-1.1597E-02	-1.1597E-02	5.3060E-01	5.3060E-01	5.899E-01
PA-234	#B	-1.1829E-03	-1.1829E-03	1.4152E+00	1.4152E+00	2.069E-01
TH-234	#B	6.9065E-01	6.9065E-01	5.4565E+00	5.4567E+00	6.107E+00
AM-241	#A	1.8906E-01	1.8906E-01	9.3737E-01	9.3743E-01	1.045E+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

YAEC Chemistry Lab Spectrum name: 103F_1JUNE2006_0928.An1

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

Total Activity (1766.6 to 2000.7 keV) 1.9529013E+01 pCi/gm
Total Decayed Activity (1766.6 to 2000.7 keV) 1.9529081E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_5JUNE2006_1417.An1

Sample description
FSS-NOL-05-01-001-F

Spectrum Filename: C:\GammaVision\Spectra\103F_5JUNE2006_1417.An1

Acquisition information
Start time: 05-Jun-2006 14:19:16
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/channel^2

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: 1.8690E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8690E+03) =
5.3505E+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	31-May-2006 19:50:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5857

***** 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
74.64	113.	23.30	0.99	9.100E-03	74.81	9.600	9.104E-01	PB212
77.37	248.	12.03	0.99	1.036E-02	77.11	17.500	1.002E+00	PB212
					77.11	10.700	1.638E+00	PB214
93.11	102.	36.46	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.12	101.	36.74	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.20	140.	23.75	1.31	2.566E-02	185.99	3.280	1.095E+00	RA226
209.74	83.	36.69	1.07	2.469E-02				
239.08	1121.	3.50	1.09	2.317E-02	238.63	43.100	8.018E-01	PB212
241.78	197.	14.32	1.09	2.303E-02	241.00	3.900	1.582E+00	RA224
					241.92	7.470	8.277E-01	PB214
270.52	86.	29.00	1.12	2.150E-02				
295.45	246.	12.82	1.06	2.024E-02	295.22	19.200	4.498E-01	PB214
300.67	88.	27.45	1.59	1.999E-02				
328.43	72.	28.18	0.99	1.872E-02				
339.00	258.	11.08	1.17	1.828E-02	338.40	12.010	8.438E-01	AC228
352.36	442.	8.02	1.33	1.774E-02	351.99	37.100	4.785E-01	PB214
463.35	75.	26.93	1.08	1.425E-02				
463.35	75.	26.93	1.08	1.425E-02	463.51	10.000	3.754E-01	SB125
511.83	182.	15.00	1.78	1.315E-02	510.72	22.500	3.784E-01	TL208
583.71	378.	8.02	1.31	1.184E-02	583.14	86.000	2.650E-01	TL208
609.95	316.	8.71	1.39	1.143E-02	609.32	46.090	4.239E-01	BI214
728.16	80.	21.47	1.25	9.954E-03	723.30	19.700	2.941E-01	EU154
					727.17	11.800	4.895E-01	BI212
795.52	60.	35.90	1.32	9.303E-03				
795.52	60.	35.90	1.32	9.303E-03	795.76	85.400	5.523E-02	CS134

861.61	78.	23.88	1.06	8.759E-03				
912.35	243.	8.53	1.82	8.392E-03	911.07	29.000	7.123E-01	AC228
966.32	48.	24.06	1.54	8.041E-03	964.00	14.580	2.948E-01	EU152
970.02	141.	10.15	1.54	8.019E-03	968.90	17.460	7.271E-01	AC228
1121.31	79.	18.49	1.81	7.207E-03	1120.28	15.040	5.167E-01	BI214
1462.46	1145.	3.08	1.78	5.927E-03	1460.75	10.700	1.283E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1622.48	26.	28.04	1.20	5.488E-03	1620.56	2.750	1.263E+00	BI212
1766.52	56.	13.36	1.86	5.137E-03				

********** 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	
418.64	209.74	388.	83.	0.042	110.06	1.070	NP-239	s
540.19	270.52	258.	86.	0.043	87.01	1.116	AC-228	s
600.48	300.67	209.	88.	0.044	82.36	1.590	PB-212	s
655.99	328.43	163.	72.	0.036	84.55	0.989	RH-106M	
1722.26	861.61	73.	78.	0.039	57.36	1.060	TL-208	s
1931.73	966.36	45.	47.	0.023	75.60	1.539	TB-160	D
3531.95	1766.52	0.	55.	0.028	40.39	2.035	XE-138	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	148.79	74.81	332.	124.	0.062	66.25	0.993D
PB-212	153.39	77.11	359.	191.	0.095	46.04	0.995A
RA-226	371.67	186.25	686.	130.	0.065	80.86	1.500s
PB-212	477.40	239.12	508.	1212.	0.606	12.29	1.053
RA-224	483.01	241.93	636.	163.	0.082	69.63	1.500
PB-214	483.01	241.93	713.	148.	0.074	80.63	1.500
PB-214	590.04	295.45	281.	242.	0.121	38.47	1.057
AC-228	677.13	339.00	215.	257.	0.128	33.25	1.167s
PB-214	703.85	352.36	268.	436.	0.218	24.07	1.335
SB-125	926.61	463.74	134.	66.	0.033	81.28	1.500
TL-208	1022.81	511.85	195.	160.	0.080	44.17	1.787s
TL-208	1166.51	583.71	163.	373.	0.187	24.05	1.313
BI-214	1219.00	609.95	140.	309.	0.155	26.13	1.391
BI-212	1455.39	728.16	80.	80.	0.040	64.42	1.254
CS-134	1590.57	795.76	78.	39.	0.020	106.16	1.500
AC-228	1823.73	912.35	68.	240.	0.120	25.58	1.819s
EU-152	1931.07	966.03	46.	53.	0.026	67.36	1.538s
AC-228	1936.81	968.90	119.	63.	0.031	82.41	1.541D
BI-214	2241.58	1121.31	50.	78.	0.039	55.46	1.814
K-40	2923.79	1462.46	39.	1117.	0.558	9.17	1.775
BI-212	3243.76	1622.48	7.	26.	0.013	84.11	1.196s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	%(	3.600E-01 1.05E-01	G
K-40		1.2719E+01					
			1460.75	1.272E+01	(P	3.642E-01 3.95E-01	G
MN-54		-8.0345E-03					
			834.81	-8.035E-03	%(P	3.970E-02 1.16E-02	G
CO-57		2.1837E-02					
			122.07	2.184E-02	&(P	4.751E-02 1.44E-02	G K
			136.43	-8.511E-02	%	3.850E-01 1.16E-01	G
CO-60		-6.6722E-03					
			1332.51	-6.672E-03	%(P	3.741E-02 1.03E-02	G K
			1173.23	2.353E-02	% P	4.376E-02 1.33E-02	G K
Sr-85		-4.3421E-03					
			514.00	-4.342E-03	&(	4.019E-02 1.18E-02	G
Kr-85		-9.5070E+01					
			513.99	-9.507E+01	&(	8.818E+02 2.59E+02	G
Y-88		-2.2586E-03					
			1836.01	-2.259E-03	%(P	2.371E-02 6.20E-03	G K
			898.02	8.761E-03	% P	3.547E-02 1.04E-02	G
NB-94		-5.9518E-03					
			871.10	-5.952E-03	%(	3.023E-02 8.78E-03	G K
			702.50	6.516E-03	%	3.099E-02 9.08E-03	G K
Ag-108M		-1.4370E-04					
			722.95	-1.437E-04	%(	2.861E-02 8.03E-03	G K
			614.37	-1.048E-02	% P	4.178E-02 1.24E-02	G
			433.93	4.764E-04	%	3.345E-02 9.72E-03	G
CD-109		1.1116E-01					
			88.04	1.112E-01	&(	2.006E+00 5.99E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-8.1289E-03						
		391.71	-8.129E-03	%(	4.484E-02	1.32E-02	G K
		255.04	3.682E-02	%	1.634E+00	4.83E-01	G
SB-125	9.9935E-02						
		427.95	2.008E-02	&(P	1.091E-01	3.23E-02	G K
		600.77	3.206E-02	& P	1.491E-01	4.37E-02	G
		636.15	-2.426E-03	% P	2.471E-01	6.99E-02	G
		463.51	3.363E-01	(P	2.884E-01	9.29E-02	G
		176.29	-9.457E-03	&	5.479E-01	1.63E-01	G
I-131	6.4810E-03						
		364.48	6.481E-03	&(P	5.658E-02	1.67E-02	G K
		636.97	2.028E-01	%	5.402E-01	1.62E-01	G
		284.29	-1.401E-02	& P	6.367E-01	1.86E-01	G
CS-134	1.7811E-02						
		604.66	1.920E-03	%(	3.413E-02	9.89E-03	G K
		795.76	3.597E-02	(P	4.004E-02	1.28E-02	G
		569.29	-6.828E-03	& P	1.790E-01	5.06E-02	G
		801.84	-7.964E-02	% P	3.872E-01	1.12E-01	G
CS-137	2.3405E-02						
		661.62	2.341E-02	%(P	4.435E-02	1.35E-02	G
CE-139	-8.4437E-03						
		165.85	-8.444E-03	%(	4.374E-02	1.31E-02	G
EU-152	1.4995E-01						
		121.78	6.221E-02	&(P	1.378E-01	4.17E-02	G K
		344.30	-2.993E-02	& P	1.171E-01	3.49E-02	G
		1408.08	0.000E+00	%	1.170E-01	3.09E-02	G
		964.00	3.259E-01	?(P	2.111E-01	7.39E-02	G
		1112.07	6.485E-02	&	3.068E-01	8.98E-02	G
		778.90	3.495E-02	%	2.431E-01	7.04E-02	G
EU-154	4.1059E-02						
		123.10	4.106E-02	&(	1.024E-01	3.10E-02	G K
		1274.80	3.488E-02	%	1.227E-01	3.62E-02	G
		723.30	1.215E-03	%	1.549E-01	4.40E-02	G
		1004.80	-3.623E-02	&	2.469E-01	7.19E-02	G
EU-155	3.7188E-02						
		86.45	3.719E-02	%(	2.047E-01	6.13E-02	G K
		105.31	8.413E-02	%	2.204E-01	6.66E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-4.0776E-03						
		279.17	-4.078E-03	&(P	4.458E-02	1.32E-02	G K
		72.87	-5.335E-01	% P	2.212E+00	6.65E-01	G
		70.83	-2.238E+00	&	4.299E+00	1.31E+00	G
		82.50	-8.117E-01	&	3.892E+00	1.17E+00	G
TL-208	2.6496E-01						
		583.14	2.650E-01	(P	4.411E-02	2.15E-02	G
		510.72	3.911E-01	+ P	1.652E-01	6.72E-02	G
PB-212	9.3039E-01						
		238.63	8.765E-01	(P	7.791E-02	3.64E-02	G K
							Energy duplication
		77.11	7.802E-01	} P	3.718E-01	1.20E-01	G
		74.81	1.030E+00	(P	7.293E-01	2.33E-01	G
PB-214	4.6869E-01						
		351.99	4.785E-01	(P	8.674E-02	3.89E-02	G K
		295.22	4.498E-01	(P	1.504E-01	5.87E-02	G
							Energy duplication
		77.11	3.129E-01	} P	8.808E-01	2.21E-01	G
		241.92	6.207E-01	+	5.346E-01	1.67E-01	G
BI-212	4.8950E-01						
		727.17	4.895E-01	(P	2.736E-01	1.06E-01	G K
		1620.56	1.263E+00	+ P	7.054E-01	3.55E-01	G
		785.42	9.257E-01	%	1.888E+00	5.73E-01	G
BI-214	4.4674E-01						
		609.32	4.239E-01	(P	7.930E-02	3.77E-02	G K
		1764.51	-2.885E-02	% P	1.836E-01	4.29E-02	G
		1120.28	5.167E-01	(P	2.388E-01	9.79E-02	G
RA-224	1.3115E+00						
		241.00	1.312E+00	(	9.661E-01	3.04E-01	G
RA-226	1.1184E+00						
		185.99	1.118E+00	*(P	1.072E+00	3.31E-01	G
AC-228	7.5084E-01						
		911.07	7.123E-01	(P	1.221E-01	6.17E-02	G K
		968.90	3.250E-01	- P	2.763E-01	8.95E-02	G
		338.40	8.438E-01	@(P	2.339E-01	9.40E-02	G
TH-227	1.0667E-01						
		236.00	1.067E-01	&(	2.519E-01	7.61E-02	G K
		256.25	2.009E-02	% P	4.493E-01	1.33E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234      -4.8825E-02
                           98.44-4.882E-02 %(P 2.189E-01 6.57E-02 G K
                          946.00 4.423E-02 & P 1.768E-01 5.19E-02 G
                          131.28 2.658E-02 & P 2.042E-01 6.11E-02 G
                           94.67 4.650E-03 % P 3.484E-01 1.04E-01 G
                          883.24-4.195E-02 %   2.892E-01 8.38E-02 G
                          926.70-7.150E-02 %   3.019E-01 8.84E-02 G
                          569.26-7.879E-03 & P 3.011E-01 8.60E-02 G

TH-234       2.8957E+00
                           63.29 2.896E+00 %(P 6.107E+00 1.85E+00 G K
                           92.80 1.490E+00 % P 2.093E+00 6.38E-01 G
                           92.38 1.746E+00 % P 2.474E+00 7.53E-01 G

AM-241       2.0429E-01
                           59.54 2.043E-01 %(P 1.099E+00 3.29E-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:                      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 - 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 *****

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	0.0000E+00	0.0000E+00	3.1454E-01	3.1454E-01	3.384E-01
K-40		1.2719E+01	1.2719E+01	1.1856E+00	1.3968E+00	
MN-54	#A	-7.9499E-03	-8.0345E-03	3.7524E-02	3.7527E-02	3.928E-02
CO-57	#B	2.1572E-02	2.1837E-02	4.3186E-02	4.3203E-02	4.693E-02
CO-60	#B	-6.6608E-03	-6.6722E-03	8.1871E-02	8.1871E-02	3.735E-02
Sr-85	#A	-4.1263E-03	-4.3421E-03	3.5474E-02	3.5475E-02	3.819E-02
Kr-85	#A	-9.5067E+01	-9.5070E+01	7.7821E+02	7.7823E+02	8.817E+02
Y-88	#B	-2.1897E-03	-2.2586E-03	2.0239E-02	2.0239E-02	2.299E-02
NB-94	#B	-5.9518E-03	-5.9518E-03	2.6330E-02	2.6332E-02	3.023E-02
Ag-108M	#B	-1.4369E-04	-1.4370E-04	2.4099E-02	2.4099E-02	2.861E-02
CD-109	#A	1.1035E-01	1.1116E-01	1.7982E+00	1.7982E+00	1.992E+00
SN-113	#B	-7.8987E-03	-8.1289E-03	3.9733E-02	3.9736E-02	4.357E-02
SB-125	#B	9.9609E-02	9.9935E-02	8.2794E-02	8.2997E-02	1.088E-01
I-131	#B	4.2957E-03	6.4810E-03	5.0009E-02	5.0011E-02	3.750E-02
CS-134	#B	1.7733E-02	1.7811E-02	1.8951E-02	1.8979E-02	3.398E-02
CS-137	#A	2.3398E-02	2.3405E-02	4.0441E-02	4.0464E-02	4.434E-02
CE-139	#A	-8.2431E-03	-8.4437E-03	3.9295E-02	3.9298E-02	4.270E-02
EU-152	#F	1.4985E-01	1.4995E-01	1.0206E-01	1.0240E-01	1.377E-01
EU-154	#B	4.1015E-02	4.1059E-02	9.2888E-02	9.2916E-02	1.023E-01
EU-155	#B	3.7120E-02	3.7188E-02	1.8397E-01	1.8399E-01	2.044E-01
HG-203	#B	-3.7983E-03	-4.0776E-03	4.0020E-02	4.0021E-02	4.153E-02
TL-208		2.6496E-01	2.6496E-01	6.4453E-02	6.6263E-02	
PB-212		9.3039E-01	9.3039E-01	1.1546E-01	1.2747E-01	
PB-214		4.6869E-01	4.6869E-01	1.0801E-01	1.1139E-01	
BI-212		4.8950E-01	4.8950E-01	3.1729E-01	3.1856E-01	
BI-214		4.4674E-01	4.4674E-01	1.1919E-01	1.2198E-01	
RA-224		1.3115E+00	1.3115E+00	9.1322E-01	9.1639E-01	9.661E-01
RA-226	#	1.1184E+00	1.1184E+00	9.9435E-01	9.9647E-01	1.072E+00
AC-228		7.5084E-01	7.5084E-01	1.5873E-01	1.6461E-01	
TH-227	#B	1.0667E-01	1.0667E-01	2.2840E-01	2.2849E-01	2.519E-01
PA-234	#B	-4.8825E-02	-4.8825E-02	2.1005E-01	2.1006E-01	2.189E-01
TH-234	#B	2.8957E+00	2.8957E+00	5.5447E+00	5.5470E+00	6.107E+00
AM-241	#A	2.0429E-01	2.0429E-01	9.8678E-01	9.8684E-01	1.099E+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

YAEC Chemistry Lab Spectrum name: 103F_5JUNE2006_1417.An1

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

Total Activity (1766.1 to 2000.7 keV) 1.7381971E+01 pCi/gm
Total Decayed Activity (1766.1 to 2000.7 keV) 1.7381971E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_7JUNE2006_1035.An1

Sample description
FSS-NOL-05-01-021-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_7JUNE2006_1035.An1

Acquisition information
Start time: 07-Jun-2006 10:37:30
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/channel^2

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: 1.9920E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9920E+03) =
5.0201E+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	06-Jun-2006 11:32:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.6111

***** 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
75.04	87.	31.17	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
77.42	184.	15.39	0.99	1.033E-02	77.11	17.500	6.950E-01	PB212
186.64	170.	23.94	1.08	2.565E-02	185.99	3.280	1.270E+00	RA226
209.73	75.	35.04	1.03	2.469E-02				
239.22	1103.	3.53	1.09	2.317E-02	238.63	43.100	7.402E-01	PB212
241.96	130.	22.62	1.10	2.302E-02	241.92	7.470	5.132E-01	PB214
270.83	81.	29.00	1.51	2.148E-02				
295.64	251.	9.07	1.13	2.023E-02	295.22	19.200	4.311E-01	PB214
300.24	85.	21.27	1.13	2.001E-02				
328.38	67.	37.21	1.11	1.872E-02				
338.76	251.	13.02	1.13	1.829E-02	338.40	12.010	7.707E-01	AC228
352.44	358.	10.67	0.95	1.774E-02	351.99	37.100	3.629E-01	PB214
409.96	50.	39.32	0.89	1.573E-02				
463.39	95.	26.65	1.36	1.425E-02				
463.39	95.	26.65	1.36	1.425E-02	463.51	10.000	4.466E-01	SB125
511.80	185.	15.26	0.92	1.315E-02	510.72	22.500	3.624E-01	TL208
583.84	409.	6.88	1.31	1.183E-02	583.14	86.000	2.696E-01	TL208
610.06	252.	10.45	1.49	1.143E-02	609.32	46.090	3.154E-01	BI214
663.48	95.	21.02	1.68	1.070E-02	661.62	84.620	7.022E-02	CS137
728.21	65.	19.97	1.39	9.952E-03	727.17	11.800	3.726E-01	BI212
768.99	46.	37.36	1.15	9.547E-03				
796.13	49.	26.77	1.31	9.298E-03	795.76	85.400	4.198E-02	CS134
861.61	61.	20.14	1.81	8.759E-03				
912.47	212.	9.43	1.45	8.392E-03	911.07	29.000	5.818E-01	AC228
970.32	144.	12.16	1.35	8.017E-03	968.90	17.460	6.988E-01	AC228
1121.52	80.	21.07	1.76	7.206E-03	1120.28	15.040	4.885E-01	BI214
1174.81	35.	36.71	1.67	6.972E-03	1173.23	99.860	PBC<MDA	CO60

1379.12	41.	32.87	0.79	6.190E-03				
1462.56	1266.	2.88	1.87	5.927E-03	1460.75	10.700	1.333E+01	K40
1766.67	61.	14.01	1.61	5.137E-03	1764.51	15.920	4.784E-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
418.61	209.73	322.	75.	0.037	105.12	1.031	NP-239
483.08	241.94	368.	130.	0.065	67.85	1.095	PB-214 lD
540.81	270.83	227.	81.	0.041	87.00	1.507	AC-228 s
599.55	300.20	273.	68.	0.034	118.64	0.747	PB-212
655.90	328.38	231.	67.	0.034	111.62	1.114	RH-106M
819.04	409.96	150.	50.	0.025	117.97	0.893	AC-228
1537.05	768.99	88.	46.	0.023	112.08	1.146	BI-214 M
1722.26	861.61	38.	61.	0.031	60.42	1.811	TL-208 s
2757.14	1379.12	34.	41.	0.020	98.60	0.787	BI-214 s
3532.15	1766.67	2.	55.	0.027	42.40	2.035	XE-138 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-212	148.79	74.81	348.	87.	0.043	93.52	0.993D
PB-212	153.39	77.11	326.	180.	0.090	48.28	0.995A
RA-226	371.71	186.27	763.	118.	0.059	92.75	1.500s
PB-212	477.71	239.28	700.	1067.	0.534	15.41	1.077
PB-214	590.34	295.60	272.	218.	0.109	39.09	1.131
AC-228	676.66	338.76	282.	250.	0.125	39.06	1.132
PB-214	704.01	352.44	321.	352.	0.176	32.02	0.949
SB-125	926.52	463.70	167.	75.	0.038	79.29	1.500s
TL-208	1022.72	511.80	207.	158.	0.079	45.78	0.924s
TL-208	1166.77	583.84	117.	405.	0.202	20.64	1.311
BI-214	1219.21	610.06	140.	245.	0.123	31.36	1.490
Ag-108M	1223.37	612.14	220.	-65.	-0.033	103.28	1.500s
CS-137	1323.98	662.45	106.	45.	0.022	104.03	1.500s
BI-212	1453.41	727.17	68.	36.	0.018	106.68	1.392D
CS-134	1591.32	796.13	61.	40.	0.020	96.10	1.500
AC-228	1823.96	912.47	73.	209.	0.104	28.28	1.451s
AC-228	1938.53	969.76	90.	208.	0.104	32.34	1.373
BI-214	2242.02	1121.52	70.	78.	0.039	63.20	1.757
CO-60	2348.58	1174.81	77.	35.	0.018	110.13	1.667s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2923.98	1462.56	35.	1247.	0.624	8.63	1.871
BI-214	3527.77	1764.51	8.	43.	0.021	48.75	2.033D

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-9.3339E-04					
			477.56	-9.334E-04	%(	2.898E-01 8.40E-02	G
K-40		1.3329E+01					
			1460.75	1.333E+01	(P	3.233E-01 3.89E-01	G
MN-54		-4.6026E-03					
			834.81	-4.603E-03	&(P	3.356E-02 9.71E-03	G
CO-57		-4.3438E-03					
			122.07	-4.344E-03	%(P	4.549E-02 1.36E-02	G K
			136.43	8.176E-02	%	3.649E-01 1.10E-01	G
CO-60		2.5321E-02					
			1332.51	1.620E-02	%(P	3.378E-02 1.01E-02	G K
			1173.23	3.445E-02	&(P	4.250E-02 1.33E-02	G K
Sr-85		-8.7023E-03					
			514.00	-8.702E-03	%(	3.788E-02 1.13E-02	G
Kr-85		-1.9832E+02					
			513.99	-1.983E+02	%(	8.654E+02 2.57E+02	G
Y-88		1.3167E-03					
			1836.01	1.317E-03	&(P	1.781E-02 4.47E-03	G K
			898.02	-8.117E-03	& P	4.056E-02 1.18E-02	G
NB-94		-4.2520E-03					
			871.10	-4.252E-03	%(	3.355E-02 9.71E-03	G K
			702.50	7.589E-03	%	2.883E-02 8.51E-03	G K
Ag-108M		-1.2775E-03					
			722.95	-1.278E-03	%(	3.004E-02 8.56E-03	G K
			614.37	-4.322E-02	& P	4.748E-02 1.49E-02	G
			433.93	1.654E-02	%	3.225E-02 9.81E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	4.5403E-01						
		88.04	4.540E-01	%(	1.752E+00	5.27E-01	G
SN-113	7.5954E-03						
		391.71	7.595E-03	%(	3.729E-02	1.10E-02	G K
		255.04	-9.314E-02	&	1.544E+00	4.58E-01	G
SB-125	9.0146E-02						
		427.95	-2.912E-04	%(P	8.188E-02	2.36E-02	G K
		600.77	-3.378E-02	% P	1.658E-01	4.88E-02	G
		636.15	-8.023E-02	% P	2.741E-01	8.11E-02	G
		463.51	3.578E-01	*(P	2.997E-01	9.62E-02	G
		176.29	-7.459E-02	%	5.411E-01	1.62E-01	G
I-131	-4.4396E-03						
		364.48	-4.440E-03	%(P	3.906E-02	1.15E-02	G K
		636.97	0.000E+00	%	5.383E-01	1.56E-01	G
		284.29	9.771E-02	& P	5.256E-01	1.56E-01	G
CS-134	1.7613E-02						
		604.66	3.375E-03	&(	2.973E-02	8.64E-03	G K
		795.76	3.389E-02	(P	3.348E-02	1.09E-02	G
		569.29	5.984E-02	& P	1.741E-01	5.18E-02	G
		801.84	6.204E-02	% P	3.299E-01	9.54E-02	G
CS-137	3.3400E-02						
		661.62	3.340E-02	&(P	3.788E-02	1.19E-02	G
CE-139	-2.4082E-03						
		165.85	-2.408E-03	%(	3.530E-02	1.05E-02	G
EU-152	-1.3489E-02						
		121.78	-1.349E-02	%(P	1.332E-01	3.97E-02	G K
		344.30	-1.924E-02	% P	1.096E-01	3.25E-02	G
		1408.08	7.896E-04	%	1.665E-01	4.62E-02	G
		964.00	-1.172E-02	% P	2.435E-01	6.92E-02	G
		1112.07	9.884E-02	%	2.480E-01	7.43E-02	G
		778.90	5.018E-02	%	2.262E-01	6.62E-02	G
EU-154	7.5592E-04						
		123.10	7.559E-04	%(	1.034E-01	3.08E-02	G K
		1274.80	-2.708E-02	%	1.211E-01	3.55E-02	G
		723.30	-2.267E-04	%	1.180E-01	3.30E-02	G
		1004.80	4.241E-03	%	1.607E-01	4.49E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-2.4613E-02						
		86.45	-2.461E-02	%(	2.144E-01	6.41E-02	G K
		105.31	-7.220E-04	&	1.896E-01	5.63E-02	G
HG-203	2.2568E-02						
		279.17	2.257E-02	&(P	3.294E-02	1.01E-02	G K
		72.87	-3.096E-01	% P	1.872E+00	5.61E-01	G
		70.83	-6.801E-01	%	2.978E+00	8.92E-01	G
		82.50	-5.825E-01	%	3.507E+00	1.05E+00	G
TL-208	2.6965E-01						
		583.14	2.696E-01	(P	3.539E-02	1.88E-02	G
		510.72	3.624E-01	+ P	1.595E-01	6.47E-02	G
PB-212	7.1096E-01						
		238.63	7.241E-01	(P	8.548E-02	3.76E-02	G K
							Energy duplication
		77.11	6.887E-01	} P	3.328E-01	1.11E-01	G
		74.81	6.754E-01	(P	7.003E-01	2.18E-01	G
PB-214	3.6898E-01						
		351.99	3.629E-01	(P	8.874E-02	3.94E-02	G K
		295.22	3.807E-01	(P	1.388E-01	5.06E-02	G
							Energy duplication
		77.11	0.000E+00	} P	7.892E-01	0.00E+00	G
		241.92	3.239E-01	%	5.066E-01	1.55E-01	G
BI-212	2.0944E-01						
		727.17	2.094E-01	(P	2.368E-01	7.55E-02	G K
		1620.56	-7.185E-02	% P	8.555E-01	2.29E-01	G
		785.42	7.741E-01	%	1.417E+00	4.34E-01	G
BI-214	3.2572E-01						
		609.32	3.154E-01	(P	7.440E-02	3.39E-02	G K
		1764.51	3.556E-01	(P	1.340E-01	6.22E-02	G
		1120.28	4.885E-01	+ P	2.606E-01	1.05E-01	G
RA-224	2.0654E-01						
		241.00	2.065E-01	%(	7.512E-01	2.25E-01	G
RA-226	9.4823E-01						
		185.99	9.482E-01	(P	1.059E+00	3.25E-01	G
AC-228	5.8176E-01						
		911.07	5.818E-01	@(P	1.185E-01	5.58E-02	G K
		968.90	1.008E+00	+ P	2.270E-01	1.09E-01	G
		338.40	7.707E-01	+ P	2.500E-01	1.01E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227       3.8674E-02
                          236.00 3.867E-02 %(  6.066E-01 1.82E-01 G K
                          256.25-1.707E-02 & P 4.435E-01 1.31E-01 G

PA-234       8.3134E-02
                           98.44 8.313E-02 &(P 1.995E-01 6.03E-02 G K
                          946.00 4.439E-02 & P 1.585E-01 4.67E-02 G
                          131.28 3.860E-02 % P 2.010E-01 6.03E-02 G
                           94.67 7.680E-04 % P 3.345E-01 9.94E-02 G
                          883.24 2.497E-02 %   2.214E-01 6.31E-02 G
                          926.70 1.771E-02 %   2.556E-01 7.24E-02 G
                          569.26 9.285E-02 & P 2.561E-01 7.63E-02 G

TH-234       1.7199E+00
                           63.29 1.720E+00 %(P 5.699E+00 1.71E+00 G K
                           92.80 9.435E-01 % P 1.983E+00 5.99E-01 G
                           92.38 1.264E+00 & P 2.352E+00 7.12E-01 G

AM-241      -1.6383E-01
                           59.54-1.638E-01 &(P 1.056E+00 3.16E-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:                      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 - 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	-9.2181E-04	-9.3339E-04	2.5209E-01	2.5209E-01	2.862E-01
K-40		1.3329E+01	1.3329E+01	1.1675E+00	1.4006E+00	
MN-54	#A	-4.5928E-03	-4.6026E-03	3.2774E-02	3.2776E-02	3.348E-02
CO-57	#B	-4.3331E-03	-4.3438E-03	4.3565E-02	4.3565E-02	4.538E-02
CO-60	#B	2.5312E-02	2.5321E-02	2.7885E-02	2.7923E-02	3.377E-02
Sr-85	#A	-8.6133E-03	-8.7023E-03	3.3800E-02	3.3804E-02	3.749E-02
Kr-85	#A	-1.9832E+02	-1.9832E+02	7.7220E+02	7.7228E+02	8.654E+02
Y-88	#B	1.3085E-03	1.3167E-03	1.3400E-02	1.3400E-02	1.770E-02
NB-94	#B	-4.2520E-03	-4.2520E-03	2.9137E-02	2.9138E-02	3.355E-02
Ag-108M	#B	-1.2775E-03	-1.2775E-03	2.5668E-02	2.5668E-02	3.004E-02
CD-109	#A	4.5337E-01	4.5403E-01	1.5809E+00	1.5811E+00	1.749E+00
SN-113	#B	7.5515E-03	7.5954E-03	3.3021E-02	3.3023E-02	3.707E-02
SB-125	#F	9.0086E-02	9.0146E-02	7.2690E-02	7.2878E-02	8.182E-02
I-131	#B	-4.0862E-03	-4.4396E-03	4.0572E-02	4.0572E-02	3.595E-02
CS-134	#B	1.7598E-02	1.7613E-02	1.6963E-02	1.6994E-02	2.970E-02
CS-137	#A	3.3398E-02	3.3400E-02	3.5825E-02	3.5877E-02	3.788E-02
CE-139	#A	-2.3966E-03	-2.4082E-03	3.1441E-02	3.1441E-02	3.513E-02
EU-152	#B	-1.3487E-02	-1.3489E-02	1.3720E-01	1.3720E-01	1.332E-01
EU-154	#B	7.5575E-04	7.5592E-04	9.2408E-02	9.2408E-02	1.034E-01
EU-155	#B	-2.4604E-02	-2.4613E-02	1.9241E-01	1.9242E-01	2.143E-01
HG-203	#B	2.2247E-02	2.2568E-02	3.0376E-02	3.0404E-02	3.248E-02
TL-208		2.6965E-01	2.6965E-01	5.6252E-02	5.8390E-02	
PB-212		7.1096E-01	7.1096E-01	1.1080E-01	1.1824E-01	
PB-214		3.6898E-01	3.6898E-01	9.4860E-02	9.7249E-02	
BI-212	A	2.0944E-01	2.0944E-01	2.2647E-01	2.2680E-01	
BI-214		3.2572E-01	3.2572E-01	1.0025E-01	1.0202E-01	
RA-224	A	2.0654E-01	2.0654E-01	6.7573E-01	6.7584E-01	7.512E-01
RA-226	#A	9.4823E-01	9.4823E-01	9.7631E-01	9.7787E-01	1.059E+00
AC-228		5.8176E-01	5.8176E-01	1.6717E-01	1.7055E-01	
TH-227	#B	3.8674E-02	3.8674E-02	5.4669E-01	5.4669E-01	6.066E-01
PA-234	#B	8.3134E-02	8.3134E-02	1.8100E-01	1.8106E-01	1.995E-01
TH-234	#B	1.7199E+00	1.7199E+00	5.1343E+00	5.1351E+00	5.699E+00
AM-241	#A	-1.6383E-01	-1.6383E-01	9.6663E-01	9.6667E-01	1.056E+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 (1766.6 to 2000.7 keV) 1.5828598E+01 pCi/gm
Total Decayed Activity (1766.6 to 2000.7 keV) 1.5828600E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13JUN2006_1626.An1

Sample description
FSS-NOL-05-01-034-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_13JUN2006_1626.An1

Acquisition information
Start time: 13-Jun-2006 16:26:52
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/channel^2

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: 1.8890E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8890E+03) =
5.2938E+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	08-Jun-2006 15:00:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5105

***** 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
74.96	138.	19.22	0.99	9.100E-03	74.81	9.600	1.114E+00	PB212
77.29	222.	13.57	0.99	1.017E-02	77.11	17.500	8.870E-01	PB212
					77.11	10.700	1.451E+00	PB214
87.20	88.	33.40	1.00	1.451E-02				
87.20	88.	33.40	1.00	1.451E-02	88.04	3.790	1.137E+00	CD109
93.35	107.	27.18	1.00	1.674E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.26	115.	32.89	1.42	2.428E-02				
186.39	141.	26.89	1.25	2.565E-02	185.99	3.280	1.090E+00	RA226
209.67	87.	35.46	0.80	2.470E-02				
239.09	929.	4.32	1.50	2.302E-02	238.63	43.100	6.563E-01	PB212
					241.92	7.470	3.866E+00	PB214
239.10	1181.	3.38	1.09	2.317E-02	238.63	43.100	8.362E-01	PB212
					241.92	7.470	4.911E+00	PB214
270.58	98.	29.88	0.82	2.149E-02				
295.52	198.	15.05	1.29	2.023E-02	295.22	19.200	3.569E-01	PB214
300.62	51.	40.42	1.03	1.999E-02				
328.37	94.	26.20	0.79	1.873E-02				
338.98	287.	12.40	1.20	1.828E-02	338.40	12.010	9.305E-01	AC228
352.11	463.	7.39	1.08	1.775E-02	351.99	37.100	4.968E-01	PB214
463.14	70.	28.52	1.39	1.426E-02				
463.14	70.	28.52	1.39	1.426E-02	463.51	10.000	3.483E-01	SB125
510.88	180.	15.50	1.65	1.317E-02	510.72	22.500	3.701E-01	TL208
583.64	394.	6.32	1.21	1.184E-02	583.14	86.000	2.734E-01	TL208
609.79	292.	9.64	1.40	1.143E-02	609.32	46.090	3.877E-01	BI214
661.92	88.	20.40	1.12	1.072E-02	661.62	84.620	6.863E-02	CS137
727.35	77.	22.50	1.81	9.963E-03	727.17	11.800	4.642E-01	BI212

795.36	69.	18.49	1.62	9.305E-03				
795.36	69.	18.49	1.62	9.305E-03	795.76	85.400	6.208E-02	CS134
861.08	49.	30.99	1.57	8.764E-03				
911.98	292.	9.63	1.71	8.395E-03	911.07	29.000	8.487E-01	AC228
965.10	46.	23.60	1.54	8.049E-03				
969.88	167.	9.40	1.54	8.019E-03	968.90	17.460	8.528E-01	AC228
1121.66	56.	26.38	2.02	7.212E-03	1120.28	15.040	3.687E-01	BI214
1333.93	25.	37.25	1.77	6.349E-03	1332.51	99.980	PBC<MDA	CO60
1462.03	1154.	3.06	1.86	5.928E-03	1460.75	10.700	1.280E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1621.95	22.	37.46	0.52	5.488E-03	1620.56	2.750	1.031E+00	BI212
1766.16	58.	13.13	1.13	5.138E-03	1764.51	15.920	4.783E-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	
173.57	87.48	388.	88.	0.044	100.20	1.001	PB-214	lD
418.50	209.67	415.	87.	0.044	106.37	0.802	NP-239	
483.96	242.42	277.	141.	0.070	56.31	1.095	XE-138	lD
540.30	270.58	318.	98.	0.049	89.64	0.819	AC-228	s
600.38	300.62	187.	51.	0.025	121.27	1.030	PB-212	
655.88	328.37	216.	94.	0.047	78.61	0.785	RH-106M	
1721.19	861.08	66.	49.	0.024	92.96	1.568	TL-208	
1931.10	965.18	39.	42.	0.021	77.82	1.539	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	148.79	74.81	340.	136.	0.068	61.59	0.993D
PB-212	153.39	77.11	347.	176.	0.088	40.59	0.995A
TH-234	185.52	93.17	955.	114.	0.057	101.81	1.500s
RA-226	371.76	186.30	648.	174.	0.087	61.16	1.500
PB-212	477.41	239.13	743.	1133.	0.566	14.98	1.029
RA-224	483.31	242.08	665.	134.	0.067	85.69	1.500s
PB-214	477.34	239.09	343.	929.	0.465	12.97	1.500s
PB-214	590.18	295.52	280.	194.	0.097	45.15	1.288s
AC-228	677.10	338.98	289.	286.	0.143	37.20	1.199s
PB-214	703.35	352.11	242.	457.	0.229	22.17	1.077
SB-125	925.95	463.41	155.	64.	0.032	88.67	1.500
TL-208	1020.88	510.88	214.	153.	0.077	46.50	1.652s
TL-208	1166.38	583.64	91.	389.	0.195	18.95	1.215
BI-214	1218.68	609.79	158.	286.	0.143	28.91	1.399s
CS-137	1322.92	661.92	86.	87.	0.044	61.21	1.122s
BI-212	1453.78	727.35	80.	76.	0.038	67.50	1.810s
CS-134	1590.09	795.52	39.	63.	0.031	56.67	1.500s
AC-228	1822.99	911.98	135.	289.	0.145	28.88	1.709s
AC-228	1936.81	968.90	42.	167.	0.083	28.49	1.541D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2242.30	1121.66	69.	56.	0.028	79.15	2.017s
CO-60	2666.77	1333.93	42.	25.	0.012	111.76	1.765s
K-40	2922.92	1462.03	43.	1135.	0.568	9.19	1.857
BI-212	3242.71	1621.95	10.	22.	0.011	112.37	0.521s
BI-214	3531.07	1766.16	3.	55.	0.027	39.39	1.125s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		2.1777E-02					
			477.56	2.178E-02	%(	3.380E-01 9.88E-02	G
K-40		1.2795E+01					
			1460.75	1.280E+01	(P	3.738E-01 3.99E-01	G
MN-54		-1.5862E-02					
			834.81	-1.586E-02	&(P	4.355E-02 1.30E-02	G
CO-57		3.2896E-03					
			122.07	3.290E-03	&(P	4.935E-02 1.47E-02	G K
			136.43	-6.214E-02	%	3.799E-01 1.14E-01	G
CO-60		2.8213E-02					
			1332.51	2.821E-02	*(P	3.708E-02 1.16E-02	G K
			1173.23	2.314E-02	% P	4.806E-02 1.45E-02	G K
Sr-85		-1.2570E-02					
			514.00	-1.257E-02	%(	4.531E-02 1.35E-02	G
Kr-85		-2.7493E+02					
			513.99	-2.749E+02	%(	9.909E+02 2.96E+02	G
Y-88		-1.0168E-03					
			1836.01	-1.017E-03	%(P	2.647E-02 6.88E-03	G K
			898.02	7.266E-03	& P	3.389E-02 9.84E-03	G
NB-94		6.5764E-03					
			871.10	6.576E-03	%(	2.994E-02 8.72E-03	G K
			702.50	-9.043E-03	%	3.583E-02 1.06E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.0381E-02						
		722.95	-1.038E-02	&(	4.400E-02	1.30E-02	G K
		614.37	-1.982E-02	& P	4.714E-02	1.42E-02	G
		433.93	4.564E-03	%	3.023E-02	8.88E-03	G
CD-109	1.0248E+00						
		88.04	1.025E+00	%(	1.899E+00	5.77E-01	G
SN-113	-7.9693E-03						
		391.71	-7.969E-03	&(	5.299E-02	1.57E-02	G K
		255.04	1.377E-02	%	1.541E+00	4.55E-01	G
SB-125	9.5076E-02						
		427.95	1.800E-02	&(P	8.296E-02	2.45E-02	G K
		600.77	8.969E-03	% P	1.815E-01	5.26E-02	G
		636.15	3.680E-02	& P	2.569E-01	7.45E-02	G
		463.51	3.232E-01	(P	3.065E-01	9.74E-02	G
		176.29	-5.296E-02	&	5.482E-01	1.63E-01	G
I-131	1.6024E-02						
		364.48	1.602E-02	%(P	5.554E-02	1.66E-02	G K
		636.97	1.597E-02	%	6.409E-01	1.84E-01	G
		284.29	-9.728E-02	% P	8.437E-01	2.50E-01	G
CS-134	2.3233E-02						
		604.66	-6.153E-03	%(	3.458E-02	1.02E-02	G K
		795.76	5.682E-02	(P	2.885E-02	1.07E-02	G
		569.29	-2.144E-02	& P	2.229E-01	6.45E-02	G
		801.84	-5.092E-03	& P	3.967E-01	1.12E-01	G
CS-137	6.8627E-02						
		661.62	6.863E-02	*(P	3.622E-02	1.42E-02	G
CE-139	-2.5858E-03						
		165.85	-2.586E-03	&(	4.726E-02	1.41E-02	G
EU-152	1.0066E-02						
		121.78	1.007E-02	&(P	1.429E-01	4.26E-02	G K
		344.30	-2.637E-02	% P	1.135E-01	3.38E-02	G
		1408.08	0.000E+00	%	1.575E-01	4.32E-02	G
		964.00	-2.494E-02	% P	2.570E-01	7.36E-02	G
		1112.07	8.936E-02	&	3.027E-01	8.96E-02	G
		778.90	-3.930E-02	%	2.566E-01	7.46E-02	G
EU-154	-7.2436E-03						
		123.10	-7.244E-03	%(	1.085E-01	3.24E-02	G K
		1274.80	-1.568E-02	&	1.208E-01	3.48E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-4.961E-02	%	1.986E-01	5.88E-02	G
		1004.80	-4.102E-02	%	1.955E-01	5.69E-02	G
EU-155	-1.0176E-02						
		86.45	-1.018E-02	&(	1.930E-01	5.74E-02	G K
		105.31	2.712E-02	&	2.206E-01	6.59E-02	G
HG-203	1.7273E-02						
		279.17	1.727E-02	&(P	3.952E-02	1.20E-02	G K
		72.87	-6.312E-01	% P	2.016E+00	6.07E-01	G
		70.83	1.879E+00	%	3.729E+00	1.13E+00	G
		82.50	2.499E-01	%	3.984E+00	1.19E+00	G
TL-208	2.7339E-01						
		583.14	2.734E-01	(P	3.307E-02	1.75E-02	G
		510.72	3.701E-01	+ P	1.710E-01	6.74E-02	G
PB-212	8.3258E-01						
		238.63	8.103E-01	(P	9.285E-02	4.09E-02	G K
							Energy duplication
		77.11	7.130E-01	} P	3.620E-01	9.65E-02	G
		74.81	1.118E+00	+ P	7.299E-01	2.35E-01	G
PB-214	4.9677E-01						
		351.99	4.968E-01	(P	8.162E-02	3.72E-02	G K
		295.22	3.569E-01	- P	1.485E-01	5.49E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.796E-01	0.00E+00	G
		241.92	3.866E+00	+	3.701E-01	1.67E-01	G
BI-212	4.6424E-01						
		727.17	4.642E-01	(P	2.696E-01	1.05E-01	G K
		1620.56	1.031E+00	+ P	8.355E-01	3.87E-01	G
		785.42	4.407E-03	%	1.768E+00	5.05E-01	G
BI-214	4.0271E-01						
		609.32	3.877E-01	@(P	8.322E-02	3.82E-02	G K
		1764.51	4.783E-01	(P	9.735E-02	6.66E-02	G
		1120.28	3.687E-01	(P	2.733E-01	1.01E-01	G
RA-224	1.0648E+00						
		241.00	1.065E+00	&(	9.768E-01	3.04E-01	G
RA-226	1.4811E+00						
		185.99	1.481E+00	(P	1.031E+00	3.24E-01	G
AC-228	8.6622E-01						
		911.07	8.487E-01	@(P	1.669E-01	8.27E-02	G K
		968.90	8.511E-01	(P	1.685E-01	8.09E-02	G
		338.40	9.305E-01	*(P	2.667E-01	1.16E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.4460E-01
                          236.00-1.446E-01 %(  3.698E-01 1.12E-01 G K
                          256.25-1.638E-04 % P 4.730E-01 1.40E-01 G

PA-234      -5.3545E-03
                           98.44-5.355E-03 %(P 1.834E-01 5.44E-02 G K
                          946.00-6.630E-02 & P 1.898E-01 5.66E-02 G
                          131.28-3.715E-02 & P 2.187E-01 6.56E-02 G
                           94.67-1.022E-01 & P 3.887E-01 1.17E-01 G
                          883.24-7.664E-02 %   2.961E-01 8.72E-02 G
                          926.70 3.745E-02 %   2.769E-01 7.95E-02 G
                          569.26-3.166E-02 & P 3.292E-01 9.53E-02 G

TH-234       1.4799E+00
                           63.29 1.343E+00 %(P 5.818E+00 1.74E+00 G K
                           92.80 1.658E+00  (P 2.127E+00 6.49E-01 G
                           92.38 1.635E+00 & P 2.554E+00 7.76E-01 G

AM-241      -2.3579E-01
                           59.54-2.358E-01 %(P 1.057E+00 3.17E-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:                      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 - 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	2.0392E-02	2.1777E-02	2.9636E-01	2.9636E-01	3.165E-01
K-40		1.2795E+01	1.2795E+01	1.1954E+00	1.4075E+00	
MN-54	#A	-1.5685E-02	-1.5862E-02	4.0529E-02	4.0540E-02	4.307E-02
CO-57	#B	3.2472E-03	3.2896E-03	4.4158E-02	4.4158E-02	4.872E-02
CO-60	#B	2.8161E-02	2.8213E-02	3.4869E-02	3.4908E-02	3.702E-02
Sr-85	#A	-1.1908E-02	-1.2570E-02	4.0636E-02	4.0642E-02	4.292E-02
Kr-85	#A	-2.7492E+02	-2.7493E+02	8.8872E+02	8.8886E+02	9.909E+02
Y-88	#B	-9.8390E-04	-1.0168E-03	2.4860E-02	2.4860E-02	2.561E-02
NB-94	#B	6.5764E-03	6.5764E-03	2.6171E-02	2.6174E-02	2.994E-02
Ag-108M	#B	-1.0381E-02	-1.0381E-02	3.9068E-02	3.9073E-02	4.400E-02
CD-109	#A	1.0169E+00	1.0248E+00	1.7321E+00	1.7330E+00	1.885E+00
SN-113	#B	-7.7302E-03	-7.9693E-03	4.7043E-02	4.7046E-02	5.140E-02
SB-125	#F	9.4747E-02	9.5076E-02	8.5977E-02	8.6154E-02	8.267E-02
I-131	#B	1.0359E-02	1.6024E-02	4.9736E-02	4.9745E-02	3.590E-02
CS-134	#B	2.3125E-02	2.3233E-02	1.3184E-02	1.3253E-02	3.442E-02
CS-137	#	6.8605E-02	6.8627E-02	4.2674E-02	4.2860E-02	
CE-139	#A	-2.5207E-03	-2.5858E-03	4.2252E-02	4.2252E-02	4.607E-02
EU-152	#B	1.0058E-02	1.0066E-02	1.2789E-01	1.2789E-01	1.428E-01
EU-154	#B	-7.2354E-03	-7.2436E-03	9.7165E-02	9.7166E-02	1.084E-01
EU-155	#B	-1.0156E-02	-1.0176E-02	1.7229E-01	1.7229E-01	1.926E-01
HG-203	#B	1.6021E-02	1.7273E-02	3.5858E-02	3.5872E-02	3.665E-02
TL-208		2.7339E-01	2.7339E-01	5.2386E-02	5.4738E-02	
PB-212		8.3258E-01	8.3258E-01	1.2604E-01	1.3499E-01	
PB-214		4.9677E-01	4.9677E-01	1.1150E-01	1.1517E-01	
BI-212		4.6424E-01	4.6424E-01	3.1537E-01	3.1652E-01	
BI-214		4.0271E-01	4.0271E-01	1.1908E-01	1.2135E-01	
RA-224	#	1.0648E+00	1.0648E+00	9.1247E-01	9.1456E-01	9.768E-01
RA-226	#	1.4811E+00	1.4811E+00	9.7317E-01	9.7696E-01	1.031E+00
AC-228		8.6622E-01	8.6622E-01	1.5975E-01	1.6748E-01	
TH-227	#B	-1.4460E-01	-1.4460E-01	3.3529E-01	3.3540E-01	3.698E-01
PA-234	#B	-5.3545E-03	-5.3545E-03	2.9545E-01	2.9545E-01	1.834E-01
TH-234	#B	1.4799E+00	1.4799E+00	1.7392E+00	1.7411E+00	5.818E+00
AM-241	#A	-2.3578E-01	-2.3579E-01	9.6436E-01	9.6444E-01	1.057E+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

YAEC Chemistry Lab Spectrum name: 103F_13JUN2006_1626.An1

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

Total Activity (1120.0 to 2000.7 keV) 1.6199917E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.6199938E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13JUN2006_1709.An1

Sample description
FSS-NOL-05-01-024-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_13JUN2006_1709.An1

Acquisition information
Start time: 13-Jun-2006 17:09:12
Live time: 2000
Real time: 2007
Dead time: 0.36 %
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/channel^2

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: 1.9840E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9840E+03) =
5.0403E+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	08-Jun-2006 09:50:00
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: 0.4574

***** 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
77.17	135.	35.07	0.99	1.011E-02	77.11	17.500	8.983E-01	PB212
					77.11	10.700	PBC<MDA	PB214
87.32	208.	38.63	1.03	1.444E-02	86.45	32.740	3.074E-01	EU155
					88.04	3.790	2.560E+00	CD109
93.94	155.	41.65	1.04	1.684E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
186.65	283.	30.06	1.12	2.565E-02	185.99	3.280	PBC<MDA	RA226
210.62	243.	31.36	1.11	2.465E-02				
239.12	1186.	4.98	1.09	2.318E-02	238.63	43.100	7.996E-01	PB212
242.05	180.	28.11	1.10	2.302E-02	241.92	7.470	7.141E-01	PB214
295.72	268.	21.30	0.97	2.022E-02	295.22	19.200	4.624E-01	PB214
300.75	148.	37.52	0.91	1.998E-02				
338.40	331.	16.40	1.40	1.830E-02	338.40	12.010	1.023E+00	AC228
352.26	476.	12.23	1.08	1.774E-02	351.99	37.100	4.866E-01	PB214
511.39	257.	18.14	1.56	1.316E-02	510.72	22.500	5.284E-01	TL208
583.69	502.	10.42	1.35	1.184E-02	583.14	86.000	3.325E-01	TL208
609.71	340.	11.96	1.45	1.143E-02	604.66	97.600	2.071E-01	CS134
					609.32	46.090	4.306E-01	BI214
662.21	20716.	0.73	1.39	1.071E-02	661.62	84.620	1.556E+01	CS137
727.61	92.	22.40	0.81	9.960E-03	727.17	11.800	5.295E-01	BI212
796.45	72.	20.64	2.04	9.295E-03	795.76	85.400	6.154E-02	CS134
860.86	73.	20.73	1.82	8.765E-03				
911.94	258.	8.08	1.33	8.395E-03	911.07	29.000	7.119E-01	AC228
965.41	38.	35.10	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152
969.09	228.	10.84	1.93	8.025E-03	968.90	17.460	1.109E+00	AC228
1121.45	106.	22.24	2.36	7.206E-03	1120.28	15.040	6.506E-01	BI214

1174.21	131.	15.63	1.35	6.967E-03	1173.23	99.860	1.265E-01	CO60
1333.51	102.	13.15	1.48	6.346E-03	1332.51	99.980	1.068E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1462.05	1190.	2.96	1.98	5.928E-03	1460.75	10.700	1.257E+01	K40
1766.31	64.	12.86	2.18	5.142E-03	1764.51	15.920	5.286E-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	
173.81	87.32	2499.	208.	0.104	115.88	1.029	PB-214	l
187.06	93.94	1913.	155.	0.078	124.94	1.041	TH-227	l
420.41	210.62	2314.	243.	0.121	94.07	1.115	TH-227	s
483.26	241.97	1195.	180.	0.090	84.34	1.095	PB-214	lD
600.65	300.75	1268.	148.	0.074	112.56	0.910	PB-212	s
1720.77	860.86	52.	73.	0.036	62.19	1.825	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	153.39	77.11	1129.	135.	0.067	105.21	0.995A
PB-212	477.31	239.08	2202.	1263.	0.632	19.33	1.068
PB-214	590.59	295.72	1304.	264.	0.132	63.89	0.970s
AC-228	675.94	338.40	1140.	330.	0.165	49.20	1.399s
PB-214	703.65	352.26	1219.	471.	0.235	36.68	1.084
TL-208	1021.90	511.39	761.	230.	0.115	54.41	1.562s
TL-208	1166.49	583.69	642.	497.	0.249	31.27	1.349s
BI-214	1218.51	609.71	459.	333.	0.167	35.88	1.452
Ag-108M	1222.70	611.80	493.	-125.	-0.062	80.07	1.500s
CS-137	1323.51	662.21	513.	20714.	10.357	2.19	1.385
BI-212	1454.30	727.61	108.	91.	0.046	67.21	0.813s
CS-134	1590.99	795.96	68.	59.	0.029	70.85	1.500s
AC-228	1822.92	911.94	66.	255.	0.127	24.24	1.330
EU-152	1929.83	965.41	72.	38.	0.019	105.31	1.538
AC-228	1937.20	969.09	99.	228.	0.114	32.52	1.933s
BI-214	2241.87	1121.45	110.	104.	0.052	66.71	2.360s
CO-60	2347.39	1174.21	98.	129.	0.065	46.88	1.348
CO-60	2665.92	1333.51	29.	99.	0.050	39.46	1.481s
K-40	2922.96	1462.05	32.	1171.	0.586	8.89	1.983
BI-214	3531.38	1766.31	5.	64.	0.032	38.59	2.182

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		6.6032E-04					
			477.56	6.603E-04	%(	9.617E-01 2.88E-01	G
K-40		1.2571E+01					
			1460.75	1.257E+01	(P	3.098E-01 3.79E-01	G
MN-54		-2.6192E-03					
			834.81	-2.619E-03	&(P	3.622E-02 1.04E-02	G
CO-57		1.5828E-02					
			122.07	1.583E-02	%(P	8.374E-02 2.52E-02	G K
			136.43	-3.752E-02	%	7.139E-01 2.15E-01	G
CO-60		1.1665E-01					
			1332.51	1.068E-01	@(P	2.973E-02 1.44E-02	G K
			1173.23	1.265E-01	(P	4.786E-02 2.01E-02	G K
Sr-85		-2.4439E-02					
			514.00	-2.444E-02	%(	8.454E-02 2.55E-02	G
Kr-85		-5.3289E+02					
			513.99	-5.329E+02	%(	1.844E+03 5.56E+02	G
Y-88		-1.7487E-03					
			1836.01	-1.749E-03	&(P	2.884E-02 7.72E-03	G K
			898.02	-8.902E-03	& P	4.041E-02 1.18E-02	G
NB-94		6.7399E-03					
			871.10	6.740E-03	%(	2.328E-02 6.82E-03	G K
			702.50	-3.495E-04	%	2.436E-02 6.86E-03	G K
Ag-108M		5.3440E-04					
			722.95	5.344E-04	%(	3.770E-02 1.08E-02	G K
			614.37	-8.288E-02	& P	7.042E-02 2.21E-02	G
			433.93	-2.046E-02	&	9.564E-02 2.88E-02	G
CD-109		1.4342E+00					
			88.04	1.434E+00	&(	3.032E+00 9.20E-01	G
SN-113		-1.4299E-03					
			391.71	-1.430E-03	%(	1.246E-01 3.73E-02	G K
			255.04	-3.672E-01	%	3.341E+00 1.00E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	4.7947E-02						
		427.95	4.795E-02	%(P	2.908E-01	8.74E-02	G K
		600.77	-3.829E-03	& P	2.452E-01	7.18E-02	G
		636.15	-4.129E-03	% P	5.243E-01	1.54E-01	G
		463.51	3.567E-01	% P	9.500E-01	2.87E-01	G
		176.29	1.637E-01	%	1.055E+00	3.18E-01	G
I-131	-3.3945E-02						
		364.48	-3.394E-02	%(P	1.446E-01	4.35E-02	G K
		636.97	1.606E-01	&	1.150E+00	3.41E-01	G
		284.29	-1.473E-01	% P	1.539E+00	4.61E-01	G
CS-134	2.4565E-02						
		604.66	1.652E-03	%(	5.302E-02	1.56E-02	G K
		795.76	5.075E-02	*(P	3.535E-02	1.20E-02	G
		569.29	3.467E-02	& P	3.881E-01	1.15E-01	G
		801.84	-1.145E-01	% P	3.538E-01	1.03E-01	G
CS-137	1.5555E+01						
		661.62	1.556E+01	(P	8.129E-02	1.14E-01	G
CE-139	3.9306E-03						
		165.85	3.931E-03	%(	8.783E-02	2.64E-02	G
EU-152	7.6529E-02						
		121.78	5.324E-03	%(P	2.609E-01	7.84E-02	G K
		344.30	3.237E-02	& P	2.636E-01	7.91E-02	G
		1408.08	-3.807E-02	&	1.723E-01	5.00E-02	G
		964.00	2.193E-01	(P	2.451E-01	7.81E-02	G
		1112.07	5.015E-02	%	2.373E-01	6.89E-02	G
		778.90	5.625E-02	%	2.468E-01	7.25E-02	G
EU-154	3.2934E-02						
		123.10	3.293E-02	&(	1.908E-01	5.75E-02	G K
		1274.80	4.165E-02	%	9.856E-02	2.96E-02	G
		723.30	-1.876E-02	%	1.922E-01	5.61E-02	G
		1004.80	6.080E-02	&	1.800E-01	5.35E-02	G
EU-155	1.5698E-01						
		86.45	1.570E-01	%(	3.846E-01	1.17E-01	G K
		105.31	4.036E-02	%	4.037E-01	1.22E-01	G
HG-203	-1.7317E-02						
		279.17	-1.732E-02	%(P	9.136E-02	2.75E-02	G K
		72.87	-5.567E-01	% P	3.654E+00	1.10E+00	G
		70.83	-1.829E+00	&	7.026E+00	2.12E+00	G
		82.50	-2.680E+00	%	6.946E+00	2.10E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.3245E-01						
		583.14	3.325E-01	@(P	8.075E-02	3.50E-02	G
		510.72	5.284E-01	+ P	3.017E-01	1.07E-01	G
PB-212	8.7134E-01						
		238.63	8.604E-01	(P	1.508E-01	5.61E-02	G K
							Energy duplication
		77.11	5.179E-01	} P	6.128E-01	1.82E-01	G
		74.81	5.621E-01	% P	2.016E+00	6.09E-01	G
PB-214	4.7838E-01						
		351.99	4.866E-01	(P	1.711E-01	6.02E-02	G K
		295.22	4.624E-01	@(P	2.996E-01	1.00E-01	G
							Energy duplication
		77.11	2.395E-01	} P	1.594E+00	3.26E-01	G
		241.92	-9.891E-02	%	9.969E-01	3.00E-01	G
BI-212	5.2948E-01						
		727.17	5.295E-01	(P	2.957E-01	1.19E-01	G K
		1620.56	-1.297E-01	% P	9.576E-01	2.64E-01	G
		785.42	6.127E-01	%	1.663E+00	4.98E-01	G
BI-214	4.5578E-01						
		609.32	4.306E-01	(P	1.324E-01	5.25E-02	G K
		1764.51	5.286E-01	(P	1.133E-01	7.16E-02	G
		1120.28	6.506E-01	+ P	3.245E-01	1.47E-01	G
RA-224	-1.3551E-01						
		241.00	-1.355E-01	&(	1.882E+00	5.66E-01	G
RA-226	1.6135E+00						
		185.99	1.614E+00	%(P	2.213E+00	6.74E-01	G
AC-228	7.1187E-01						
		911.07	7.119E-01	(P	1.137E-01	5.83E-02	G K
		968.90	1.109E+00	+ P	2.383E-01	1.20E-01	G
		338.40	1.023E+00	+ P	4.960E-01	1.68E-01	G
TH-227	3.3584E-02						
		236.00	3.358E-02	%(	6.249E-01	1.88E-01	G K
		256.25	-2.761E-01	% P	1.032E+00	3.12E-01	G
PA-234	-7.6251E-02						
		98.44	-7.625E-02	%(P	3.966E-01	1.20E-01	G K
		946.00	4.650E-03	% P	1.458E-01	4.10E-02	G
		131.28	1.464E-01	& P	3.488E-01	1.06E-01	G
		94.67	4.056E-01	% P	6.151E-01	1.87E-01	G
		883.24	-3.596E-02	&	2.922E-01	8.46E-02	G
		926.70	1.022E-01	%	2.571E-01	7.70E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 5.124E-02 & P 5.730E-01 1.70E-01 G

TH-234      -3.0290E+00
                           63.29-3.029E+00 %(P 1.120E+01 3.38E+00 G K
                           92.80 1.805E+00 & P 3.655E+00 1.11E+00 G
                           92.38 1.998E+00 & P 4.202E+00 1.27E+00 G

AM-241       2.9976E-01
                           59.54 2.998E-01 %(P 1.938E+00 5.83E-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:                      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 - 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 *****

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	6.1638E-04	6.6032E-04	8.6300E-01	8.6300E-01	8.977E-01
K-40		1.2571E+01	1.2571E+01	1.1354E+00	1.3498E+00	
MN-54	#A	-2.5886E-03	-2.6192E-03	3.8615E-02	3.8615E-02	3.580E-02
CO-57	#B	1.5614E-02	1.5828E-02	7.5712E-02	7.5717E-02	8.261E-02
CO-60		1.1643E-01	1.1665E-01	3.6449E-02	3.7073E-02	

Sr-85	#A	-2.3091E-02	-2.4439E-02	7.6406E-02	7.6419E-02	7.988E-02
Kr-85	#A	-5.3287E+02	-5.3289E+02	1.6667E+03	1.6670E+03	1.844E+03
Y-88	#B	-1.6894E-03	-1.7487E-03	2.5660E-02	2.5660E-02	2.786E-02
NB-94	#B	6.7399E-03	6.7399E-03	2.0455E-02	2.0459E-02	2.328E-02
Ag-108M	#B	5.3436E-04	5.3440E-04	3.2528E-02	3.2528E-02	3.770E-02
CD-109	#A	1.4226E+00	1.4342E+00	2.7591E+00	2.7602E+00	3.008E+00
SN-113	#B	-1.3850E-03	-1.4299E-03	1.1182E-01	1.1182E-01	1.207E-01
SB-125	#B	4.7773E-02	4.7947E-02	2.6229E-01	2.6230E-01	2.898E-01
I-131	#B	-2.1485E-02	-3.3945E-02	1.3473E-01	1.3474E-01	9.153E-02
CS-134	#B	2.4445E-02	2.4565E-02	1.7429E-02	1.7487E-02	5.276E-02
CS-137		1.5550E+01	1.5555E+01	3.4027E-01	9.6509E-01	
CE-139	#A	3.8269E-03	3.9306E-03	7.9214E-02	7.9214E-02	8.552E-02
EU-152	#B	7.6469E-02	7.6529E-02	8.1756E-02	8.1867E-02	2.607E-01
EU-154	#B	3.2895E-02	3.2934E-02	1.7256E-01	1.7257E-01	1.906E-01
EU-155	#B	1.5666E-01	1.5698E-01	3.4955E-01	3.4966E-01	3.839E-01
HG-203	#B	-1.6002E-02	-1.7317E-02	8.2685E-02	8.2692E-02	8.443E-02
TL-208	#	3.3245E-01	3.3245E-01	1.0486E-01	1.0662E-01	
PB-212		8.7134E-01	8.7134E-01	1.7004E-01	1.7740E-01	
PB-214		4.7838E-01	4.7838E-01	1.7756E-01	1.7971E-01	
BI-212		5.2948E-01	5.2948E-01	3.5780E-01	3.5911E-01	
BI-214		4.5578E-01	4.5578E-01	1.2449E-01	1.2727E-01	
RA-224	#A	-1.3551E-01	-1.3551E-01	1.6975E+00	1.6975E+00	1.882E+00
RA-226	#A	1.6135E+00	1.6135E+00	2.0219E+00	2.0240E+00	2.213E+00
AC-228		7.1187E-01	7.1187E-01	1.7480E-01	1.7962E-01	
TH-227	#B	3.3584E-02	3.3584E-02	5.6324E-01	5.6324E-01	6.249E-01
PA-234	#B	-7.6251E-02	-7.6251E-02	3.7290E-01	3.7293E-01	3.966E-01
TH-234	#B	-3.0290E+00	-3.0290E+00	1.1844E+01	1.1845E+01	1.120E+01
AM-241	#A	2.9975E-01	2.9976E-01	1.7505E+00	1.7506E+00	1.938E+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 (86.9 to 2000.7 keV) 3.1617085E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 3.1622509E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13JUNE2006_1324.An1

Sample description
FSS-NOL-05-01-026-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_13JUNE2006_1324.An1

Acquisition information
Start time: 13-Jun-2006 13:27:03
Live time: 2000
Real time: 2003
Dead time: 0.13 %
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/channel^2

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: 1.8740E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8740E+03) =
5.3362E+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	08-Jun-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. 21 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3996

***** 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
74.97	100.	30.06	0.99	9.052E-03	74.81	9.600	8.293E-01	PB212
77.27	125.	23.90	0.99	1.011E-02	77.11	17.500	6.605E-01	PB212
					77.11	10.700	1.080E+00	PB214
186.47	143.	27.34	1.28	2.565E-02	185.99	3.280	PBC<MDA	RA226
239.09	1060.	3.95	1.09	2.318E-02	238.63	43.100	7.560E-01	PB212
242.24	130.	21.00	1.10	2.301E-02	241.00	3.900	1.045E+00	RA224
					241.92	7.470	5.467E-01	PB214
295.37	239.	13.32	1.05	2.024E-02	295.22	19.200	4.350E-01	PB214
300.51	102.	28.90	0.84	1.999E-02				
328.23	84.	28.92	1.01	1.873E-02				
338.49	235.	15.21	1.02	1.830E-02	338.40	12.010	7.687E-01	AC228
352.10	451.	9.45	1.17	1.775E-02	351.99	37.100	4.876E-01	PB214
463.55	80.	30.62	1.18	1.425E-02	463.51	10.000	PBC<MDA	SB125
510.63	158.	18.07	1.79	1.317E-02	510.72	22.500	3.193E-01	TL208
583.68	323.	8.59	1.41	1.184E-02	583.14	86.000	2.257E-01	TL208
609.72	303.	9.96	1.32	1.143E-02	609.32	46.090	4.056E-01	BI214
662.13	2992.	2.01	1.34	1.072E-02	661.62	84.620	2.377E+00	CS137
727.68	85.	17.01	1.71	9.959E-03	727.17	11.800	5.207E-01	BI212
769.97	58.	28.14	0.77	9.537E-03				
795.61	37.	30.58	1.50	9.301E-03	795.76	85.400	3.401E-02	CS134
861.23	69.	22.59	1.25	8.762E-03				
911.86	219.	8.86	1.38	8.396E-03	911.07	29.000	6.388E-01	AC228
964.99	48.	22.42	1.54	8.050E-03	964.00	14.580	2.939E-01	EU152
969.74	152.	10.01	1.54	8.021E-03	968.90	17.460	7.822E-01	AC228
1121.13	90.	19.40	1.53	7.208E-03	1120.28	15.040	5.831E-01	BI214
1173.97	55.	22.16	2.28	6.972E-03	1173.23	99.860	5.692E-02	CO60
1333.00	54.	31.00	1.33	6.348E-03	1332.51	99.980	5.844E-02	CO60

1461.86	1208.	2.94	1.90	5.929E-03	1460.75	10.700	1.351E+01	K40
1590.31	52.	20.72	1.55	5.566E-03				
1621.78	38.	19.28	0.95	5.484E-03	1620.56	2.750	1.795E+00	BI212
1765.59	48.	14.00	2.15	5.142E-03	1764.51	15.920	4.205E-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	
600.16	300.51	352.	102.	0.051	86.71	0.841	PB-212	
655.60	328.23	253.	84.	0.042	86.75	1.011	AC-228	
1539.01	769.97	76.	58.	0.029	84.42	0.767	-	sM
1721.50	861.23	57.	69.	0.035	67.77	1.251	TL-208	s
1930.49	964.99	31.	52.	0.026	61.30	1.539	AC-228	D
3179.44	1590.31	13.	52.	0.026	62.17	1.545	AC-228	

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	431.	100.	0.050	90.17	0.993D
PB-212	153.39	77.11	439.	125.	0.063	71.69	0.995A
RA-226	371.90	186.37	1080.	136.	0.068	96.52	1.500s
PB-212	477.32	239.08	696.	1080.	0.540	14.54	1.073
PB-214	483.57	242.20	359.	63.	0.031	123.76	1.716s
PB-214	589.88	295.37	354.	235.	0.117	39.95	1.047
AC-228	676.12	338.49	389.	234.	0.117	45.63	1.022
PB-214	703.34	352.10	447.	445.	0.223	28.36	1.171s
SB-125	925.90	463.39	320.	81.	0.041	97.75	1.500
TL-208	1020.36	510.63	270.	131.	0.066	54.22	1.790s
TL-208	1166.47	583.68	158.	319.	0.159	25.76	1.412s
BI-214	1218.53	609.72	190.	297.	0.148	29.87	1.318
CS-137	1323.35	662.13	169.	2990.	1.495	6.03	1.336
BI-212	1454.44	727.68	55.	85.	0.042	51.03	1.708s
CS-134	1590.27	795.61	47.	37.	0.019	91.74	1.500s
AC-228	1822.75	911.86	64.	216.	0.108	26.58	1.381
EU-152	1929.78	965.38	57.	48.	0.024	78.60	1.538s
AC-228	1936.81	968.90	33.	152.	0.076	29.11	1.541D
BI-214	2241.23	1121.13	66.	88.	0.044	58.20	1.526s
CO-60	2346.90	1173.97	46.	55.	0.027	66.49	2.281s
CO-60	2664.91	1333.00	61.	51.	0.026	93.00	1.333s
K-40	2922.60	1461.86	32.	1189.	0.594	8.81	1.902
BI-212	3242.37	1621.78	3.	38.	0.019	57.84	0.951s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3529.94	1765.59	3.	48.	0.024	42.01	2.150

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.2869E-01					
			477.56	1.287E-01	%(	4.714E-01 1.41E-01	G
K-40		1.3506E+01					
			1460.75	1.351E+01	(P	3.313E-01 4.03E-01	G
MN-54		-4.1664E-04					
			834.81	-4.166E-04	%(P	3.466E-02 9.83E-03	G
CO-57		2.1072E-03					
			122.07	2.107E-03	%(P	5.848E-02 1.75E-02	G K
			136.43	2.793E-02	%	4.474E-01 1.34E-01	G
CO-60		5.7683E-02					
			1332.51	5.844E-02	*(P	4.438E-02 1.91E-02	G K
			1173.23	5.692E-02	*(P	3.566E-02 1.31E-02	G K
Sr-85		-1.8980E-02					
			514.00	-1.898E-02	%(	5.270E-02 1.59E-02	G
Kr-85		-4.1525E+02					
			513.99	-4.153E+02	%(	1.152E+03 3.47E+02	G
Y-88		-9.4791E-05					
			1836.01	-9.479E-05	%(P	2.464E-02 6.22E-03	G K
			898.02	-5.899E-04	& P	4.611E-02 1.32E-02	G
NB-94		7.7980E-03					
			871.10	7.798E-03	%(	3.346E-02 9.81E-03	G K
			702.50	-5.403E-03	%	3.315E-02 9.68E-03	G K
Ag-108M		-9.7473E-03					
			722.95	-9.747E-03	%(	4.011E-02 1.19E-02	G K
			614.37	-1.616E-02	& P	4.740E-02 1.42E-02	G
			433.93	7.042E-03	&	4.725E-02 1.40E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.2363E+00						
		88.04	1.236E+00	%(	2.024E+00	6.17E-01	G
SN-113	-4.6756E-03						
		391.71	-4.676E-03	%(	6.629E-02	1.96E-02	G K
		255.04	-1.035E-01	&	2.014E+00	5.99E-01	G
SB-125	1.0779E-01						
		427.95	5.077E-03	%(P	1.503E-01	4.44E-02	G K
		600.77	-3.768E-02	% P	2.140E-01	6.32E-02	G
		636.15	-1.582E-02	& P	3.881E-01	1.13E-01	G
		463.51	4.118E-01	(P	4.372E-01	1.36E-01	G
		176.29	4.717E-03	&	6.399E-01	1.91E-01	G
I-131	-7.3833E-04						
		364.48	-7.383E-04	%(P	7.503E-02	2.21E-02	G K
		636.97	2.251E-01	%	7.180E-01	2.14E-01	G
		284.29	-1.733E-01	% P	1.024E+00	3.06E-01	G
CS-134	1.6236E-02						
		604.66	6.866E-04	%(	5.336E-02	1.57E-02	G K
		795.76	3.401E-02	*(P	3.152E-02	1.04E-02	G
		569.29	-6.570E-03	% P	2.480E-01	7.17E-02	G
		801.84	8.222E-02	% P	3.796E-01	1.11E-01	G
CS-137	2.3773E+00						
		661.62	2.377E+00	(P	5.029E-02	4.78E-02	G
CE-139	1.6081E-03						
		165.85	1.608E-03	%(	5.620E-02	1.68E-02	G
EU-152	9.8418E-02						
		121.78	1.204E-04	%(P	1.699E-01	5.07E-02	G K
		344.30	3.051E-02	% P	9.938E-02	2.97E-02	G
		1408.08	-1.829E-02	%	1.446E-01	4.06E-02	G
		964.00	2.956E-01	?(P	2.337E-01	7.83E-02	G
		1112.07	-3.492E-02	%	2.881E-01	8.30E-02	G
		778.90	-5.585E-02	&	2.797E-01	8.21E-02	G
EU-154	-5.0796E-03						
		123.10	-5.080E-03	%(	1.180E-01	3.52E-02	G K
		1274.80	5.668E-02	%	9.933E-02	3.06E-02	G
		723.30	-3.897E-02	%	1.938E-01	5.71E-02	G
		1004.80	-8.294E-03	&	1.884E-01	5.33E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.5909E-01						
		86.45	1.591E-01	%(	2.534E-01	7.72E-02	G K
		105.31	3.356E-02	&	2.398E-01	7.18E-02	G
HG-203	-2.9822E-03						
		279.17	-2.982E-03	&(P	5.312E-02	1.58E-02	G K
		72.87	-5.879E-01	% P	2.306E+00	6.94E-01	G
		70.83	1.069E+00	%	4.555E+00	1.37E+00	G
		82.50	-1.355E+00	%	4.576E+00	1.38E+00	G
TL-208	2.2568E-01						
		583.14	2.257E-01	@(P	4.341E-02	1.97E-02	G
		510.72	3.193E-01	+ P	1.928E-01	6.94E-02	G
PB-212	7.8810E-01						
		238.63	7.789E-01	(P	9.062E-02	3.83E-02	G K
							Energy duplication
		77.11	5.100E-01	} P	4.088E-01	1.22E-01	G
		74.81	8.293E-01	(P	8.254E-01	2.57E-01	G
PB-214	4.6968E-01						
		351.99	4.876E-01	@(P	1.108E-01	4.67E-02	G K
		295.22	4.350E-01	(P	1.678E-01	5.90E-02	G
							Energy duplication
		77.11	3.062E-02	} P	1.007E+00	2.39E-01	G
		241.92	2.637E-01	-	3.816E-01	1.09E-01	G
BI-212	5.2070E-01						
		727.17	5.207E-01	(P	2.287E-01	8.91E-02	G K
		1620.56	1.795E+00	+ P	5.428E-01	3.47E-01	G
		785.42	-8.171E-02	%	1.437E+00	4.08E-01	G
BI-214	4.0939E-01						
		609.32	4.056E-01	(P	9.167E-02	4.13E-02	G K
		1764.51	4.205E-01	(P	9.813E-02	6.29E-02	G
		1120.28	5.831E-01	+ P	2.703E-01	1.16E-01	G
RA-224	-6.6749E-01						
		241.00	-6.675E-01	%(	1.152E+00	3.51E-01	G
RA-226	1.1609E+00						
		185.99	1.161E+00	*(P	1.335E+00	4.09E-01	G
AC-228	7.0827E-01						
		911.07	6.388E-01	(P	1.185E-01	5.75E-02	G K
		968.90	7.821E-01	(P	1.518E-01	7.60E-02	G
		338.40	7.687E-01	(P	3.103E-01	1.17E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227       8.0410E-02
                          236.00 8.041E-02 &(  3.381E-01 1.01E-01 G K
                          256.25 1.944E-01 % P 5.915E-01 1.78E-01 G

PA-234      -3.6464E-02
                           98.44-3.646E-02 &(P 2.281E-01 6.83E-02 G K
                          946.00 7.572E-03 & P 1.330E-01 3.72E-02 G
                          131.28-6.202E-05 & P 2.292E-01 6.83E-02 G
                           94.67-5.673E-03 % P 4.002E-01 1.19E-01 G
                          883.24-4.376E-02 %   2.970E-01 8.62E-02 G
                          926.70 2.903E-02 &   2.824E-01 8.06E-02 G
                          569.26-9.701E-03 % P 3.662E-01 1.06E-01 G

TH-234       6.9553E-01
                           63.29 6.955E-01 %(P 7.413E+00 2.21E+00 G K
                           92.80 9.889E-01 % P 2.433E+00 7.34E-01 G
                           92.38 1.142E+00 % P 2.882E+00 8.69E-01 G

AM-241      -1.3938E-01
                           59.54-1.394E-01 %(P 1.158E+00 3.46E-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:                      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 - 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	1.2037E-01	1.2869E-01	4.2336E-01	4.2343E-01	4.410E-01
K-40		1.3506E+01	1.3506E+01	1.2086E+00	1.4407E+00	
MN-54	#A	-4.1190E-04	-4.1664E-04	1.6607E-01	1.6607E-01	3.427E-02
CO-57	#B	2.0796E-03	2.1072E-03	5.2404E-02	5.2404E-02	5.771E-02
CO-60	#	5.7576E-02	5.7683E-02	3.4492E-02	3.4654E-02	
Sr-85	#A	-1.7965E-02	-1.8980E-02	4.7596E-02	4.7609E-02	4.988E-02
Kr-85	#A	-4.1524E+02	-4.1525E+02	1.0401E+03	1.0404E+03	1.152E+03
Y-88	#B	-9.1673E-05	-9.4791E-05	2.3491E-03	2.3491E-03	2.383E-02
NB-94	#B	7.7980E-03	7.7980E-03	2.9425E-02	2.9428E-02	3.346E-02
Ag-108M	#B	-9.7465E-03	-9.7473E-03	3.5552E-02	3.5557E-02	4.011E-02
CD-109	#A	1.2266E+00	1.2363E+00	1.8501E+00	1.8514E+00	2.008E+00
SN-113	#B	-4.5330E-03	-4.6756E-03	5.8852E-02	5.8852E-02	6.426E-02
SB-125	#B	1.0741E-01	1.0779E-01	1.0702E-01	1.0720E-01	1.497E-01
I-131	#B	-4.7387E-04	-7.3833E-04	4.4729E-01	4.4729E-01	4.815E-02
CS-134	#B	1.6160E-02	1.6236E-02	1.4931E-02	1.4961E-02	5.311E-02
CS-137		2.3765E+00	2.3773E+00	1.4332E-01	1.9898E-01	
CE-139	#A	1.5670E-03	1.6081E-03	5.0344E-02	5.0344E-02	5.476E-02
EU-152	#B	9.8343E-02	9.8418E-02	7.8234E-02	7.8424E-02	1.698E-01
EU-154	#B	-5.0737E-03	-5.0796E-03	1.0575E-01	1.0575E-01	1.179E-01
EU-155	#B	1.5878E-01	1.5909E-01	2.3170E-01	2.3187E-01	2.529E-01
HG-203	#B	-2.7625E-03	-2.9822E-03	4.7930E-02	4.7930E-02	4.921E-02
TL-208	#	2.2568E-01	2.2568E-01	5.8908E-02	6.0348E-02	
PB-212		7.8810E-01	7.8810E-01	1.1588E-01	1.2458E-01	
PB-214		4.6968E-01	4.6968E-01	1.1687E-01	1.2001E-01	
BI-212		5.2070E-01	5.2070E-01	2.6723E-01	2.6894E-01	
BI-214		4.0939E-01	4.0939E-01	1.1111E-01	1.1363E-01	
RA-224	#A	-6.6749E-01	-6.6749E-01	1.0526E+00	1.0533E+00	1.152E+00
RA-226	#A	1.1609E+00	1.1609E+00	1.2276E+00	1.2295E+00	1.335E+00
AC-228		7.0827E-01	7.0827E-01	1.4321E-01	1.4900E-01	
TH-227	#B	8.0410E-02	8.0410E-02	3.0431E-01	3.0435E-01	3.381E-01
PA-234	#B	-3.6464E-02	-3.6464E-02	2.2320E-01	2.2321E-01	2.281E-01
TH-234	#B	6.9553E-01	6.9553E-01	6.6411E+00	6.6412E+00	7.413E+00
AM-241	#A	-1.3937E-01	-1.3938E-01	1.0641E+00	1.0642E+00	1.158E+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

YAEC Chemistry Lab Spectrum name: 103F_13JUNE2006_1324.An1

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

Total Activity (1120.0 to 2000.7 keV) 1.9061544E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.9062422E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_25MAY2006_0845.An1

Sample description
FSS-NOL-05-01-013-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\103F_25MAY2006_0845.An1

Acquisition information
Start time: 25-May-2006 08:47:04
Live time: 2000
Real time: 2003
Dead time: 0.13 %
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/channel^2

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: 1.9950E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9950E+03) =
5.0125E+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	24-May-2006 16:11:00
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: 0.3105

***** 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	132.	21.94	0.99	9.052E-03	74.81	9.600	1.028E+00	PB212
77.23	189.	16.13	0.99	1.011E-02	77.11	17.500	9.424E-01	PB212
					77.11	10.700	1.541E+00	PB214
93.14	103.	39.06	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.03	153.	26.26	1.23	2.567E-02	185.99	3.280	1.127E+00	RA226
209.59	127.	23.71	1.01	2.470E-02				
238.88	1156.	3.55	1.09	2.319E-02	238.63	43.100	7.749E-01	PB212
241.70	159.	16.54	1.09	2.304E-02	241.00	3.900	1.194E+00	RA224
					241.92	7.470	6.245E-01	PB214
270.33	123.	24.20	1.48	2.151E-02				
295.32	296.	11.88	1.10	2.024E-02	295.22	19.200	5.094E-01	PB214
300.46	82.	25.17	0.93	2.000E-02				
328.27	86.	33.89	0.70	1.873E-02				
338.69	268.	11.01	1.20	1.829E-02	338.40	12.010	8.225E-01	AC228
352.21	420.	6.97	1.16	1.774E-02	351.99	37.100	4.264E-01	PB214
463.35	112.	21.72	1.09	1.425E-02				
463.35	112.	21.72	1.09	1.425E-02	463.51	10.000	5.267E-01	SB125
511.41	163.	16.63	1.31	1.316E-02	510.72	22.500	3.111E-01	TL208
583.38	400.	6.60	1.25	1.184E-02	583.14	86.000	2.635E-01	TL208
609.66	346.	8.73	1.37	1.143E-02	609.32	46.090	4.369E-01	BI214
661.84	79.	23.77	0.80	1.072E-02	661.62	84.620	5.780E-02	CS137
727.91	97.	18.93	1.43	9.957E-03	727.17	11.800	5.582E-01	BI212
795.79	65.	24.26	1.28	9.301E-03	795.76	85.400	5.539E-02	CS134
861.20	56.	24.11	1.86	8.763E-03				
911.68	260.	9.36	1.44	8.397E-03	911.07	29.000	7.135E-01	AC228
965.34	63.	19.41	1.54	8.047E-03	964.00	14.580	3.597E-01	EU152

969.57	180.	9.50	1.54	8.021E-03	968.90	17.460	8.687E-01	AC228
1121.07	84.	18.83	1.94	7.208E-03	1120.28	15.040	5.115E-01	BI214
1461.73	1378.	2.82	2.02	5.929E-03	1460.75	10.700	1.451E+01	K40
1621.62	16.	34.26	0.83	5.488E-03	1620.56	2.750	7.117E-01	BI212
1765.31	78.	11.32	1.98	5.140E-03	1764.51	15.920	6.184E-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
418.34	209.59	390.	127.	0.064	71.14	1.014	NP-239
539.81	270.33	333.	123.	0.062	72.59	1.483	AC-228 s
600.07	300.46	172.	82.	0.041	75.51	0.933	PB-212
655.68	328.27	286.	86.	0.043	101.68	0.705	RH-106M s
1721.44	861.20	48.	56.	0.028	72.33	1.857	TL-208 s
1929.96	965.47	44.	62.	0.031	59.84	1.539	TB-160 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	148.79	74.81	374.	132.	0.066	65.83	0.993D
PB-212	153.39	77.11	393.	189.	0.094	48.38	0.995A
RA-226	371.77	186.31	783.	121.	0.060	91.91	1.500
PB-212	476.93	238.88	706.	1067.	0.533	14.76	0.935
RA-224	482.82	241.83	787.	136.	0.068	90.93	1.500
PB-214	589.78	295.32	341.	292.	0.146	35.63	1.105
AC-228	676.52	338.69	233.	267.	0.133	33.04	1.196
PB-214	703.55	352.21	195.	415.	0.207	20.90	1.163
SB-125	925.63	463.26	145.	87.	0.043	66.06	1.500s
TL-208	1021.93	511.41	205.	136.	0.068	49.89	1.310s
TL-208	1165.87	583.38	115.	396.	0.198	19.80	1.255
BI-214	1218.41	609.66	169.	340.	0.170	26.19	1.369
CS-137	1322.77	661.84	99.	77.	0.039	71.32	0.797s
BI-212	1454.89	727.91	84.	97.	0.048	56.78	1.430s
CS-134	1590.05	795.50	69.	51.	0.025	81.38	1.500
AC-228	1822.40	911.68	98.	257.	0.128	28.09	1.441
AC-228	1936.81	968.90	92.	140.	0.070	38.58	1.541D
BI-214	2241.12	1121.07	63.	82.	0.041	56.50	1.936
K-40	2922.33	1461.73	49.	1360.	0.680	8.47	2.017
BI-212	3242.04	1621.62	5.	16.	0.008	102.77	0.833s
BI-214	3529.38	1765.31	3.	75.	0.037	33.97	1.980

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		6.3001E-02					
			477.56	6.300E-02	%(	2.992E-01 8.86E-02	G
K-40		1.4510E+01					
			1460.75	1.451E+01	(P	3.782E-01 4.15E-01	G
MN-54		-7.6373E-03					
			834.81	-7.637E-03	%(P	3.621E-02 1.06E-02	G
CO-57		-3.3592E-03					
			122.07	-3.359E-03	%(P	4.654E-02 1.39E-02	G K
			136.43	7.132E-02	%	3.591E-01 1.08E-01	G
CO-60		1.5848E-02					
			1332.51	1.585E-02	%(P	3.247E-02 9.72E-03	G K
			1173.23	8.607E-03	% P	4.482E-02 1.31E-02	G K
Sr-85		-9.3149E-03					
			514.00	-9.315E-03	&(	3.884E-02 1.16E-02	G
Kr-85		-2.1322E+02					
			513.99	-2.132E+02	&(	8.901E+02 2.65E+02	G
Y-88		-1.8978E-04					
			1836.01	-1.898E-04	%(P	2.349E-02 5.99E-03	G K
			898.02	-5.390E-04	% P	3.137E-02 8.77E-03	G
NB-94		-5.7989E-05					
			871.10	-5.799E-05	&(	2.881E-02 8.10E-03	G K
			702.50	2.024E-03	%	2.741E-02 7.86E-03	G K
Ag-108M		-1.1280E-02					
			722.95	-1.128E-02	%(	4.043E-02 1.20E-02	G K
			614.37	-1.819E-02	% P	4.210E-02 1.27E-02	G
			433.93	-4.216E-03	&	3.218E-02 9.47E-03	G
CD-109		8.4719E-01					
			88.04	8.472E-01	&(	1.763E+00 5.35E-01	G
SN-113		-7.6372E-03					
			391.71	-7.637E-03	%(	4.605E-02 1.36E-02	G K
			255.04	6.308E-02	&	1.507E+00 4.46E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.8313E-02						
		427.95	-7.724E-03	%(P	1.012E-01	2.97E-02	G K
		600.77	4.893E-04	% P	1.473E-01	4.21E-02	G
		636.15	-3.935E-02	% P	2.838E-01	8.26E-02	G
		463.51	4.122E-01	*(P	2.796E-01	9.21E-02	G
		176.29	-7.701E-02	&	5.449E-01	1.63E-01	G
I-131	1.1884E-02						
		364.48	1.188E-02	&(P	3.347E-02	1.00E-02	G K
		636.97	-8.805E-02	%	4.995E-01	1.47E-01	G
		284.29	-3.985E-04	% P	5.043E-01	1.48E-01	G
CS-134	1.5947E-02						
		604.66	-7.877E-03	%(	3.206E-02	9.49E-03	G K
		795.76	4.317E-02	(P	3.541E-02	1.17E-02	G
		569.29	2.744E-02	& P	2.128E-01	6.22E-02	G
		801.84	-1.172E-01	% P	4.132E-01	1.21E-01	G
CS-137	5.7796E-02						
		661.62	5.780E-02	(P	3.657E-02	1.40E-02	G
CE-139	-9.0608E-03						
		165.85	-9.061E-03	%(	4.377E-02	1.31E-02	G
EU-152	-9.0952E-03						
		121.78	-9.095E-03	%(P	1.455E-01	4.34E-02	G K
		344.30	-2.163E-02	% P	1.122E-01	3.34E-02	G
		1408.08	6.494E-02	&	1.516E-01	4.56E-02	G
		964.00	-1.444E-02	% P	3.154E-01	9.11E-02	G
		1112.07	1.356E-03	%	2.597E-01	7.32E-02	G
		778.90	-3.690E-02	%	2.545E-01	7.41E-02	G
EU-154	1.3613E-02						
		123.10	1.361E-02	%(	1.030E-01	3.08E-02	G K
		1274.80	-2.612E-03	&	1.057E-01	2.98E-02	G
		723.30	-6.053E-02	%	1.889E-01	5.64E-02	G
		1004.80	-1.550E-04	&	2.228E-01	6.36E-02	G
EU-155	-3.1236E-03						
		86.45	-3.124E-03	%(	2.379E-01	7.10E-02	G K
		105.31	7.036E-02	%	2.257E-01	6.80E-02	G
HG-203	2.4811E-02						
		279.17	2.481E-02	&(P	3.488E-02	1.07E-02	G K
		72.87	-3.285E-01	% P	2.189E+00	6.57E-01	G
		70.83	-1.059E+00	%	4.067E+00	1.22E+00	G
		82.50	-5.607E-01	%	3.596E+00	1.08E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7334E-01						
		583.14	2.635E-01	(P	3.500E-02	1.76E-02	G
		510.72	3.111E-01	*(P	1.586E-01	6.19E-02	G
PB-212	7.2253E-01						
		238.63	7.225E-01	(P	8.575E-02	3.60E-02	G K
							Energy duplication
		77.11	7.225E-01	} P	3.638E-01	1.17E-01	G
		74.81	1.028E+00	+ P	7.237E-01	2.31E-01	G
PB-214	4.5466E-01						
		351.99	4.264E-01	(P	6.979E-02	3.01E-02	G K
		295.22	5.094E-01	(P	1.546E-01	6.14E-02	G
							Energy duplication
		77.11	5.085E-02	} P	8.722E-01	2.17E-01	G
		241.92	7.886E-02	%	5.751E-01	1.72E-01	G
BI-212	5.8725E-01						
		727.17	5.582E-01	@(P	2.618E-01	1.06E-01	G K
		1620.56	7.117E-01	(P	5.961E-01	2.45E-01	G
		785.42	9.144E-01	%	1.501E+00	4.63E-01	G
BI-214	4.5522E-01						
		609.32	4.369E-01	(P	8.131E-02	3.89E-02	G K
		1764.51	6.184E-01	+ P	9.218E-02	7.31E-02	G
		1120.28	5.115E-01	(P	2.481E-01	9.86E-02	G
RA-224	1.0273E+00						
		241.00	1.027E+00	&(	1.005E+00	3.11E-01	G
RA-226	9.7040E-01						
		185.99	9.704E-01	(P	1.071E+00	3.29E-01	G
AC-228	7.2469E-01						
		911.07	7.135E-01	(P	1.360E-01	6.77E-02	G K
		968.90	6.760E-01	(P	2.293E-01	8.70E-02	G
		338.40	8.225E-01	(P	2.276E-01	9.10E-02	G
TH-227	-7.2409E-02						
		236.00	-7.241E-02	%(	3.407E-01	1.02E-01	G K
		256.25	-8.308E-02	% P	4.745E-01	1.42E-01	G
PA-234	1.2054E-02						
		98.44	1.205E-02	%(P	1.911E-01	5.69E-02	G K
		946.00	-1.781E-02	& P	1.599E-01	4.59E-02	G
		131.28	-2.889E-02	% P	2.131E-01	6.38E-02	G
		94.67	-5.801E-02	% P	3.248E-01	9.72E-02	G
		883.24	2.781E-03	&	2.371E-01	6.67E-02	G
		926.70	7.309E-02	%	2.682E-01	7.88E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 4.068E-02 & P 3.156E-01 9.23E-02 G

TH-234       1.2872E+00
                           63.29 1.287E+00 &(P 6.063E+00 1.82E+00 G K
                           92.80 1.408E+00 % P 2.119E+00 6.44E-01 G
                           92.38 1.549E+00 & P 2.530E+00 7.68E-01 G

AM-241      -1.8993E-01
                           59.54-1.899E-01 %(P 1.080E+00 3.23E-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:                      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 - 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 *****

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	6.2438E-02	6.3001E-02	2.6581E-01	2.6584E-01	2.966E-01
K-40		1.4510E+01	1.4510E+01	1.2453E+00	1.5035E+00	
MN-54	#A	-7.6256E-03	-7.6373E-03	3.4179E-02	3.4182E-02	3.616E-02
CO-57	#B	-3.3532E-03	-3.3592E-03	4.5426E-02	4.5426E-02	4.646E-02
CO-60	#B	1.5844E-02	1.5848E-02	2.9156E-02	2.9170E-02	3.246E-02

Sr-85	#A	-9.2463E-03	-9.3149E-03	3.4710E-02	3.4714E-02	3.856E-02
Kr-85	#A	-2.1322E+02	-2.1322E+02	7.9535E+02	7.9545E+02	8.901E+02
Y-88	#B	-1.8892E-04	-1.8978E-04	4.8078E-02	4.8078E-02	2.338E-02
NB-94	#B	-5.7989E-05	-5.7989E-05	2.4311E-02	2.4311E-02	2.881E-02
Ag-108M	#B	-1.1280E-02	-1.1280E-02	3.6031E-02	3.6037E-02	4.043E-02
CD-109	#A	8.4629E-01	8.4719E-01	1.6047E+00	1.6054E+00	1.762E+00
SN-113	#B	-7.6054E-03	-7.6372E-03	4.0877E-02	4.0879E-02	4.586E-02
SB-125	#B	9.8267E-02	9.8313E-02	6.5900E-02	6.6147E-02	1.012E-01
I-131	#B	1.1196E-02	1.1884E-02	3.0104E-02	3.0112E-02	3.153E-02
CS-134	#B	1.5937E-02	1.5947E-02	1.3001E-02	1.3034E-02	3.204E-02
CS-137		5.7793E-02	5.7796E-02	4.1960E-02	4.2094E-02	
CE-139	#A	-9.0293E-03	-9.0608E-03	3.9381E-02	3.9384E-02	4.361E-02
EU-152	#B	-9.0942E-03	-9.0952E-03	1.6044E-01	1.6044E-01	1.455E-01
EU-154	#B	1.3610E-02	1.3613E-02	9.2461E-02	9.2464E-02	1.029E-01
EU-155	#B	-3.1228E-03	-3.1236E-03	2.1308E-01	2.1308E-01	2.379E-01
HG-203	#B	2.4557E-02	2.4811E-02	3.2185E-02	3.2217E-02	3.452E-02
TL-208		2.7334E-01	2.7334E-01	5.4715E-02	5.6970E-02	
PB-212		7.2253E-01	7.2253E-01	1.0783E-01	1.1570E-01	
PB-214		4.5466E-01	4.5466E-01	9.5188E-02	9.8781E-02	
BI-212		5.8725E-01	5.8725E-01	3.3514E-01	3.3687E-01	
BI-214		4.5522E-01	4.5522E-01	1.2151E-01	1.2435E-01	
RA-224	#	1.0273E+00	1.0273E+00	9.3413E-01	9.3603E-01	1.005E+00
RA-226	#A	9.7040E-01	9.7040E-01	9.8772E-01	9.8933E-01	1.071E+00
AC-228		7.2469E-01	7.2469E-01	1.4089E-01	1.4704E-01	
TH-227	#B	-7.2409E-02	-7.2409E-02	3.0657E-01	3.0660E-01	3.407E-01
PA-234	#B	1.2054E-02	1.2054E-02	1.7077E-01	1.7077E-01	1.911E-01
TH-234	#B	1.2872E+00	1.2872E+00	5.4453E+00	5.4457E+00	6.063E+00
AM-241	#A	-1.8993E-01	-1.8993E-01	9.8707E-01	9.8712E-01	1.080E+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) 1.7785797E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.7785799E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_30MAY2006_0841.An1

Sample description
FSS-NOL-05-01-014-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30MAY2006_0841.An1

Acquisition information
Start time: 30-May-2006 08:42:08
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/channel^2

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: 1.9340E+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	23-May-2006 10:30:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4524

***** 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	119.	21.83	0.99	9.052E-03	74.81	9.600	9.592E-01	PB212
77.21	110.	21.10	0.99	1.011E-02	77.11	17.500	6.419E-01	PB212
					77.11	10.700	1.050E+00	PB214
186.54	157.	22.03	1.25	2.565E-02	185.99	3.280	1.195E+00	RA226
209.75	70.	35.33	1.08	2.471E-02				
239.15	902.	3.99	1.09	2.317E-02	238.63	43.100	6.217E-01	PB212
242.38	142.	17.55	1.10	2.299E-02	241.00	3.900	1.102E+00	RA224
					241.92	7.470	5.767E-01	PB214
277.78	95.	29.21	1.27	2.112E-02				
295.53	230.	15.23	1.10	2.023E-02	295.22	19.200	4.063E-01	PB214
301.02	62.	39.14	0.99	1.997E-02				
338.80	206.	12.87	1.13	1.828E-02	338.40	12.010	6.501E-01	AC228
352.25	438.	7.86	1.04	1.774E-02	351.99	37.100	4.592E-01	PB214
462.54	85.	24.34	1.57	1.427E-02				
462.54	85.	24.34	1.57	1.427E-02	463.51	10.000	4.116E-01	SB125
511.35	156.	17.65	1.43	1.316E-02	510.72	22.500	3.040E-01	TL208
583.59	308.	8.24	1.25	1.184E-02	583.14	86.000	2.083E-01	TL208
609.79	286.	8.15	1.49	1.143E-02	609.32	46.090	3.702E-01	BI214
661.52	53.	36.55	1.08	1.072E-02				
661.52	53.	36.55	1.08	1.072E-02	661.62	84.620	3.961E-02	CS137
728.24	93.	18.46	1.67	9.953E-03	727.17	11.800	5.497E-01	BI212
795.65	66.	25.61	1.09	9.302E-03				
795.65	66.	25.61	1.09	9.302E-03	795.76	85.400	5.817E-02	CS134
911.98	191.	9.64	1.46	8.395E-03	911.07	29.000	5.370E-01	AC228
969.84	171.	12.69	1.38	8.020E-03	968.90	17.460	8.519E-01	AC228
1121.68	87.	19.07	1.63	7.205E-03	1120.28	15.040	5.489E-01	BI214
1462.08	1134.	3.03	1.90	5.928E-03	1460.75	10.700	1.228E+01	K40

1622.45	34.	23.41	1.27	5.488E-03	1620.56	2.750	1.581E+00	BI212
1765.79	68.	12.13	1.33	5.139E-03	1764.51	15.920	5.525E-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	
417.87	209.36	296.	67.	0.033	112.51	0.871	AC-228	s
554.70	277.78	261.	95.	0.048	78.26	1.266	NP-239	s
601.19	301.02	223.	62.	0.031	117.43	0.989	PB-212	s
1322.12	661.52	110.	53.	0.026	109.64	1.076	CS-137	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

********** 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	299.	119.	0.060	65.48	0.993D
PB-212	153.39	77.11	324.	110.	0.055	63.29	0.995A
RA-226	372.11	186.47	659.	132.	0.066	78.59	1.500s
PB-212	477.46	239.15	599.	863.	0.431	16.81	1.103
RA-224	483.29	242.07	593.	128.	0.064	84.84	1.500
PB-214	590.22	295.53	348.	226.	0.113	45.68	1.099
AC-228	676.75	338.80	191.	205.	0.102	38.62	1.129s
PB-214	703.64	352.25	247.	433.	0.216	23.57	1.043
SB-125	926.00	463.44	154.	55.	0.027	101.58	1.500s
TL-208	1021.81	511.35	193.	129.	0.064	52.96	1.432s
TL-208	1166.27	583.59	116.	304.	0.152	24.72	1.248
BI-214	1218.68	609.79	102.	279.	0.140	24.46	1.493
BI-212	1455.55	728.24	72.	93.	0.046	55.37	1.667s
CS-134	1590.63	795.79	54.	47.	0.024	79.18	1.500
AC-228	1822.99	911.98	58.	187.	0.094	28.91	1.462
AC-228	1938.70	969.84	81.	171.	0.085	38.06	1.378
BI-214	2242.34	1121.68	63.	85.	0.043	57.21	1.626s
K-40	2923.03	1462.08	32.	1116.	0.558	9.10	1.902
BI-212	3243.71	1622.45	7.	34.	0.017	70.24	1.267s
BI-214	3530.33	1765.79	3.	65.	0.032	36.38	1.333s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		8.5903E-02					
			477.56	8.590E-02	%(	3.069E-01 9.13E-02	G
K-40		1.2283E+01					
			1460.75	1.228E+01	(P	3.210E-01 3.79E-01	G
MN-54		6.0479E-03					
			834.81	6.048E-03	%(P	3.091E-02 8.99E-03	G
CO-57		5.6997E-03					
			122.07	5.700E-03	%(P	4.691E-02 1.40E-02	G K
			136.43	1.175E-03	%	2.995E-01 8.87E-02	G
CO-60		-2.9205E-03					
			1332.51	-2.920E-03	%(P	2.805E-02 7.17E-03	G K
			1173.23	1.819E-02	% P	4.588E-02 1.37E-02	G K
Sr-85		-6.4623E-03					
			514.00	-6.462E-03	%(	3.540E-02 1.04E-02	G
Kr-85		-1.1166E+02					
			513.99	-1.117E+02	%(	7.410E+02 2.18E+02	G
Y-88		-1.8667E-03					
			1836.01	-1.867E-03	&(P	3.009E-02 8.07E-03	G K
			898.02	1.244E-02	% P	3.347E-02 9.96E-03	G
NB-94		4.5284E-03					
			871.10	4.528E-03	%(	2.712E-02 7.81E-03	G K
			702.50	-4.043E-04	&	3.125E-02 8.94E-03	G K
Ag-108M		-1.3870E-02					
			722.95	-1.387E-02	%(	3.951E-02 1.18E-02	G K
			614.37	-1.401E-02	& P	4.118E-02 1.23E-02	G
			433.93	-2.247E-03	&	3.313E-02 9.69E-03	G
CD-109		1.0803E+00					
			88.04	1.080E+00	%(	1.745E+00 5.32E-01	G
SN-113		-6.7070E-03					
			391.71	-6.707E-03	%(	4.914E-02 1.45E-02	G K
			255.04	-3.346E-01	%	1.388E+00 4.15E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	4.3237E-02						
		427.95	-3.366E-02	%(P	1.012E-01	3.03E-02	G K
		600.77	3.155E-02	& P	1.386E-01	4.07E-02	G
		636.15	7.415E-03	% P	2.703E-01	7.75E-02	G
		463.51	2.709E-01	(P	2.988E-01	9.38E-02	G
		176.29	1.855E-02	&	4.271E-01	1.26E-01	G
I-131	-1.7512E-02						
		364.48	-1.751E-02	&(P	6.624E-02	1.97E-02	G K
		636.97	-2.708E-02	&	7.850E-01	2.26E-01	G
		284.29	1.075E-01	% P	7.921E-01	2.34E-01	G
CS-134	1.5807E-02						
		604.66	-6.966E-03	%(	2.931E-02	8.64E-03	G K
		795.76	4.183E-02	(P	3.285E-02	1.11E-02	G
		569.29	3.574E-02	% P	1.919E-01	5.61E-02	G
		801.84	-1.425E-02	% P	3.574E-01	1.00E-01	G
CS-137	2.4630E-02						
		661.62	2.463E-02	%(P	3.935E-02	1.21E-02	G
CE-139	4.2950E-03						
		165.85	4.295E-03	%(	4.160E-02	1.24E-02	G
EU-152	1.2412E-02						
		121.78	1.241E-02	%(P	1.246E-01	3.71E-02	G K
		344.30	-2.177E-02	% P	1.045E-01	3.10E-02	G
		1408.08	3.361E-02	%	1.244E-01	3.59E-02	G
		964.00	-5.214E-02	% P	2.429E-01	7.06E-02	G
		1112.07	6.925E-02	%	2.564E-01	7.53E-02	G
		778.90	6.494E-02	%	1.910E-01	5.66E-02	G
EU-154	2.0044E-02						
		123.10	2.004E-02	&(	9.510E-02	2.85E-02	G K
		1274.80	-1.469E-02	&	1.204E-01	3.47E-02	G
		723.30	-8.716E-02	%	2.021E-01	6.10E-02	G
		1004.80	-5.933E-02	&	2.187E-01	6.46E-02	G
EU-155	1.6149E-02						
		86.45	1.615E-02	&(	2.212E-01	6.61E-02	G K
		105.31	-1.696E-03	%	2.135E-01	6.35E-02	G
HG-203	-1.9679E-05						
		279.17	-1.968E-05	&(P	4.044E-02	1.19E-02	G K
		72.87	-1.250E+00	& P	2.178E+00	6.63E-01	G
		70.83	1.970E+00	%	3.747E+00	1.14E+00	G
		82.50	-2.323E-01	%	3.474E+00	1.03E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.0832E-01						
		583.14	2.083E-01	(P	3.633E-02	1.74E-02	G
		510.72	3.040E-01	+ P	1.590E-01	6.48E-02	G
PB-212	6.1420E-01						
		238.63	6.030E-01	(P	8.161E-02	3.43E-02	G K
							Energy duplication
		77.11	4.340E-01	} P	3.420E-01	9.16E-02	G
		74.81	9.592E-01	+ P	6.694E-01	2.15E-01	G
PB-214	4.4116E-01						
		351.99	4.592E-01	(P	8.059E-02	3.66E-02	G K
		295.22	4.063E-01	(P	1.611E-01	6.30E-02	G
							Energy duplication
		77.11	3.055E-01	} P	8.162E-01	1.97E-01	G
		241.92	-4.325E-03	%	5.034E-01	1.49E-01	G
BI-212	5.4971E-01						
		727.17	5.497E-01	*(P	2.519E-01	1.02E-01	G K
		1620.56	1.581E+00	+ P	6.900E-01	3.71E-01	G
		785.42	-3.119E-01	&	1.577E+00	4.61E-01	G
BI-214	3.7019E-01						
		609.32	3.702E-01	(P	6.586E-02	3.09E-02	G K
		1764.51	5.525E-01	+ P	9.509E-02	7.04E-02	G
		1120.28	5.489E-01	+ P	2.553E-01	1.07E-01	G
RA-224	9.9526E-01						
		241.00	9.953E-01	&(	9.021E-01	2.81E-01	G
RA-226	1.0934E+00						
		185.99	1.093E+00	*(P	1.015E+00	3.15E-01	G
AC-228	5.7011E-01						
		911.07	5.370E-01	(P	1.093E-01	5.27E-02	G K
		968.90	8.519E-01	+ P	2.228E-01	1.08E-01	G
		338.40	6.501E-01	*(P	2.136E-01	8.42E-02	G
TH-227	5.6906E-03						
		236.00	5.691E-03	&(	5.415E-01	1.62E-01	G K
		256.25	2.189E-02	& P	4.026E-01	1.19E-01	G
PA-234	-3.0287E-02						
		98.44	-3.029E-02	%(P	2.146E-01	6.42E-02	G K
		946.00	2.298E-02	% P	1.320E-01	3.79E-02	G
		131.28	1.058E-01	% P	1.756E-01	5.35E-02	G
		94.67	-2.353E-03	& P	3.408E-01	1.01E-01	G
		883.24	7.209E-03	%	2.924E-01	8.35E-02	G
		926.70	4.280E-02	&	2.756E-01	7.94E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 5.269E-02 % P 2.828E-01 8.27E-02 G

TH-234       7.1187E-01
                           63.29 7.119E-01 %(P 5.060E+00 1.50E+00 G K
                           92.80 8.256E-01 % P 2.019E+00 6.08E-01 G
                           92.38 8.749E-01 % P 2.415E+00 7.26E-01 G

AM-241      -1.0182E-01
                           59.54-1.018E-01 &(P 9.917E-01 2.95E-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:                      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 - 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 *****

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	7.8518E-02	8.5903E-02	2.7388E-01	2.7393E-01	2.805E-01
K-40		1.2283E+01	1.2283E+01	1.1366E+00	1.3418E+00	
MN-54	#A	5.9556E-03	6.0479E-03	2.6963E-02	2.6965E-02	3.044E-02
CO-57	#B	5.5993E-03	5.6997E-03	4.2047E-02	4.2048E-02	4.608E-02
CO-60	#B	-2.9132E-03	-2.9205E-03	1.1386E-01	1.1386E-01	2.798E-02

Sr-85	#A	-6.0011E-03	-6.4623E-03	3.1340E-02	3.1342E-02	3.287E-02
Kr-85	#A	-1.1166E+02	-1.1166E+02	6.5361E+02	6.5364E+02	7.409E+02
Y-88	#B	-1.7845E-03	-1.8667E-03	2.6732E-02	2.6732E-02	2.877E-02
NB-94	#B	4.5284E-03	4.5284E-03	2.3418E-02	2.3419E-02	2.712E-02
Ag-108M	#B	-1.3868E-02	-1.3870E-02	3.5457E-02	3.5466E-02	3.951E-02
CD-109	#A	1.0689E+00	1.0803E+00	1.5961E+00	1.5972E+00	1.726E+00
SN-113	#B	-6.4331E-03	-6.7070E-03	4.3511E-02	4.3513E-02	4.714E-02
SB-125	#B	4.3032E-02	4.3237E-02	4.4939E-02	4.5009E-02	1.007E-01
I-131	#B	-9.6396E-03	-1.7512E-02	6.3498E-02	6.3506E-02	3.646E-02
CS-134	#B	1.5707E-02	1.5807E-02	1.2540E-02	1.2573E-02	2.913E-02
CS-137	#A	2.4619E-02	2.4630E-02	3.6256E-02	3.6284E-02	3.934E-02
CE-139	#A	4.1477E-03	4.2950E-03	3.7198E-02	3.7199E-02	4.017E-02
EU-152	#B	1.2399E-02	1.2412E-02	1.1138E-01	1.1138E-01	1.245E-01
EU-154	#B	2.0013E-02	2.0044E-02	8.5550E-02	8.5557E-02	9.495E-02
EU-155	#B	1.6106E-02	1.6149E-02	1.9818E-01	1.9819E-01	2.206E-01
HG-203	#B	-1.7752E-05	-1.9679E-05	5.8318E-01	5.8318E-01	3.648E-02
TL-208		2.0832E-01	2.0832E-01	5.2222E-02	5.3604E-02	
PB-212		6.1420E-01	6.1420E-01	1.0465E-01	1.1056E-01	
PB-214		4.4116E-01	4.4116E-01	1.0535E-01	1.0842E-01	
BI-212	#	5.4971E-01	5.4971E-01	3.0599E-01	3.0765E-01	
BI-214		3.7019E-01	3.7019E-01	9.2633E-02	9.5093E-02	
RA-224	#	9.9526E-01	9.9526E-01	8.4442E-01	8.4639E-01	9.021E-01
RA-226	#	1.0933E+00	1.0934E+00	9.4382E-01	9.4595E-01	1.015E+00
AC-228		5.7011E-01	5.7011E-01	1.3889E-01	1.4278E-01	
TH-227	#B	5.6906E-03	5.6906E-03	4.8655E-01	4.8655E-01	5.415E-01
PA-234	#B	-3.0287E-02	-3.0287E-02	2.1278E-01	2.1279E-01	2.146E-01
TH-234	#B	7.1187E-01	7.1187E-01	4.5106E+00	4.5108E+00	5.060E+00
AM-241	#A	-1.0182E-01	-1.0182E-01	9.1611E-01	9.1612E-01	9.917E-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 (87.4 to 2000.7 keV) 1.5036695E+01 pCi/gm
Total Decayed Activity (87.4 to 2000.7 keV) 1.5036695E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_30MAY2006_0919.An1

Sample description
FSS-NOL-05-01-007-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30MAY2006_0919.An1

Acquisition information
Start time: 30-May-2006 09:20:35
Live time: 2000
Real time: 2002
Dead time: 0.10 %
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/channel^2

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: 1.9160E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9160E+03) =
5.2192E+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	23-May-2006 07:40:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3969

***** 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
75.01	81.	32.29	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
77.31	149.	18.11	0.99	1.011E-02	77.11	17.500	7.672E-01	PB212
					77.11	10.700	1.255E+00	PB214
87.26	80.	40.74	0.96	1.442E-02	86.45	32.740	1.225E-01	EU155
					88.04	3.790	1.022E+00	CD109
92.75	160.	25.32	1.64	1.643E-02	92.38	2.570	2.399E+00	TH234
					92.80	3.000	2.037E+00	TH234
185.97	192.	19.08	1.48	2.567E-02				
185.97	192.	19.08	1.48	2.567E-02	185.99	3.280	1.503E+00	RA226
239.15	1008.	3.68	1.09	2.317E-02	238.63	43.100	7.023E-01	PB212
241.49	111.	35.47	1.09	2.304E-02	241.00	3.900	8.692E-01	RA224
					241.92	7.470	4.548E-01	PB214
270.55	95.	30.87	1.58	2.149E-02				
295.32	299.	10.60	0.93	2.024E-02	295.22	19.200	5.354E-01	PB214
300.42	59.	32.73	1.66	2.000E-02				
338.53	177.	16.54	1.16	1.830E-02	338.40	12.010	5.645E-01	AC228
352.21	447.	7.07	1.06	1.774E-02	351.99	37.100	4.726E-01	PB214
463.37	67.	36.69	1.03	1.425E-02				
463.37	67.	36.69	1.03	1.425E-02	463.51	10.000	3.260E-01	SB125
511.09	174.	14.75	1.44	1.316E-02	510.72	22.500	3.511E-01	TL208
583.81	364.	7.21	1.24	1.183E-02	583.14	86.000	2.490E-01	TL208
609.90	319.	7.74	1.14	1.143E-02	609.32	46.090	4.185E-01	BI214
727.45	97.	20.97	1.05	9.962E-03	727.17	11.800	5.789E-01	BI212
755.84	43.	31.85	0.74	9.673E-03				
769.02	55.	29.92	1.07	9.546E-03				
786.94	32.	39.21	1.19	9.380E-03				
796.36	53.	26.06	1.48	9.296E-03	795.76	85.400	4.729E-02	CS134

861.29	50.	22.90	1.27	8.762E-03				
912.01	235.	10.48	1.28	8.395E-03	911.07	29.000	6.714E-01	AC228
969.10	180.	11.10	1.90	8.025E-03	968.90	17.460	9.042E-01	AC228
1121.28	82.	16.16	1.55	7.207E-03	1120.28	15.040	5.189E-01	BI214
1238.07	71.	25.77	1.38	6.702E-03				
1462.07	1141.	3.11	1.72	5.928E-03	1460.75	10.700	1.247E+01	K40
1766.00	74.	11.62	2.30	5.138E-03	1764.51	15.920	6.094E-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	
173.69	87.26	491.	80.	0.040	122.21	0.963	PB-214	l
540.25	270.55	306.	95.	0.047	92.61	1.578	AC-228	s
599.98	300.42	157.	59.	0.030	98.20	1.655	PB-212	s
925.86	463.37	172.	67.	0.033	110.06	1.030	SB-125	l
1510.75	755.84	54.	43.	0.021	95.54	0.740	AC-228	sM
1537.09	769.02	74.	55.	0.027	89.76	1.074	BI-214	M
1572.94	786.94	42.	40.	0.020	84.70	1.186	PA-234	M
1721.62	861.29	35.	50.	0.025	68.71	1.275	TL-208	
2475.08	1238.07	81.	71.	0.035	77.32	1.380	BI-214	s

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	329.	81.	0.040	96.88	0.993D
PB-212	153.39	77.11	317.	149.	0.075	54.34	0.995A
TH-234	185.52	93.17	819.	112.	0.056	96.00	1.500s
TH-234	185.50	93.17	796.	115.	0.058	92.93	1.500s
RA-226	371.96	186.40	650.	144.	0.072	72.26	1.500s
PB-212	477.46	239.15	704.	942.	0.471	17.10	1.066
RA-224	483.56	242.20	580.	132.	0.066	81.44	1.500
PB-214	483.73	242.28	603.	129.	0.064	85.02	1.500
PB-214	589.79	295.32	266.	295.	0.148	31.80	0.934
AC-228	676.20	338.53	244.	176.	0.088	49.63	1.158
PB-214	703.56	352.21	210.	441.	0.221	21.20	1.060
TL-208	1021.30	511.09	178.	148.	0.074	44.24	1.440s
TL-208	1166.72	583.81	109.	360.	0.180	21.64	1.238
BI-214	1218.89	609.90	107.	313.	0.156	23.23	1.136
Ag-108M	1222.83	611.87	232.	-81.	-0.041	86.25	1.500s
BI-212	1453.98	727.45	99.	97.	0.048	62.91	1.049
CS-134	1591.14	796.04	58.	32.	0.016	112.68	1.500s
AC-228	1823.05	912.01	99.	232.	0.116	31.45	1.278
AC-228	1937.21	969.10	68.	180.	0.090	33.29	1.899s
BI-214	2241.52	1121.28	42.	80.	0.040	48.49	1.554

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2923.01	1462.07	43.	1122.	0.561	9.34	1.724
BI-214	3530.76	1766.00	3.	71.	0.035	34.87	2.300s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-2.4851E-02					
			477.56	-2.485E-02	%(	3.169E-01 9.25E-02	G
K-40		1.2471E+01					
			1460.75	1.247E+01	(P	3.686E-01 3.95E-01	G
MN-54		-1.1193E-02					
			834.81	-1.119E-02	%(P	3.822E-02 1.13E-02	G
CO-57		1.0007E-02					
			122.07	1.001E-02	&(P	4.678E-02 1.40E-02	G K
			136.43	-2.876E-03	&	3.834E-01 1.14E-01	G
CO-60		4.8593E-03					
			1332.51	4.859E-03	%(P	2.778E-02 7.66E-03	G K
			1173.23	-1.047E-03	% P	3.722E-02 1.03E-02	G K
Sr-85		-1.6975E-02					
			514.00	-1.698E-02	%(	4.104E-02 1.24E-02	G
Kr-85		-3.6337E+02					
			513.99	-3.634E+02	%(	8.784E+02 2.65E+02	G
Y-88		-3.9019E-03					
			1836.01	-3.902E-03	%(P	2.624E-02 7.13E-03	G K
			898.02	-5.008E-03	& P	3.621E-02 1.04E-02	G
NB-94		7.4221E-03					
			871.10	7.422E-03	%(	2.986E-02 8.75E-03	G K
			702.50	1.766E-03	%	3.121E-02 8.97E-03	G K
Ag-108M		-4.6661E-03					
			722.95	-4.666E-03	&(	3.833E-02 1.12E-02	G K
			614.37	-5.586E-02	+ P	5.062E-02 1.60E-02	G
			433.93	-5.080E-03	%	3.064E-02 9.02E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.1852E+00						
		88.04	1.185E+00	%(	1.693E+00	5.18E-01	G
SN-113	-5.3759E-03						
		391.71	-5.376E-03	&(	4.845E-02	1.43E-02	G K
		255.04	4.648E-01	%	1.449E+00	4.35E-01	G
SB-125	1.2362E-02						
		427.95	1.236E-02	%(P	9.657E-02	2.84E-02	G K
		600.77	6.105E-02	& P	1.485E-01	4.47E-02	G
		636.15	-1.396E-02	& P	2.890E-01	8.31E-02	G
		463.51	2.027E-01	% P	2.979E-01	9.18E-02	G
		176.29	-6.035E-02	%	5.449E-01	1.63E-01	G
I-131	-6.0765E-03						
		364.48	-6.076E-03	%(P	5.935E-02	1.74E-02	G K
		636.97	-3.727E-02	&	8.133E-01	2.35E-01	G
		284.29	2.908E-01	% P	8.509E-01	2.56E-01	G
CS-134	1.0434E-02						
		604.66	-5.782E-03	&(	3.337E-02	9.79E-03	G K
		795.76	2.897E-02	@(P	3.423E-02	1.09E-02	G
		569.29	3.949E-02	% P	1.194E-01	3.50E-02	G
		801.84	-6.441E-02	% P	3.607E-01	1.03E-01	G
CS-137	2.0028E-02						
		661.62	2.003E-02	%(P	3.275E-02	1.01E-02	G
CE-139	8.8499E-03						
		165.85	8.850E-03	%(	4.554E-02	1.36E-02	G
EU-152	2.8312E-02						
		121.78	2.831E-02	&(P	1.349E-01	4.04E-02	G K
		344.30	1.102E-02	% P	1.046E-01	3.08E-02	G
		1408.08	5.920E-04	%	1.648E-01	4.56E-02	G
		964.00	-7.056E-02	% P	2.849E-01	8.37E-02	G
		1112.07	1.570E-02	%	2.725E-01	7.75E-02	G
		778.90	9.908E-04	&	2.425E-01	6.89E-02	G
EU-154	1.7531E-02						
		123.10	1.753E-02	%(	9.207E-02	2.76E-02	G K
		1274.80	-2.184E-02	&	1.166E-01	3.39E-02	G
		723.30	-3.520E-02	&	1.961E-01	5.77E-02	G
		1004.80	-5.266E-02	&	2.256E-01	6.63E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	0.0000E+00						
		86.45	0.000E+00	%(	2.214E-01	6.59E-02	G K
		105.31	3.315E-02	&	2.088E-01	6.25E-02	G
HG-203	2.5416E-02						
		279.17	2.542E-02	&(P	3.931E-02	1.20E-02	G K
		72.87	-3.233E-01	& P	2.172E+00	6.50E-01	G
		70.83	-7.013E-01	%	3.851E+00	1.15E+00	G
		82.50	-6.996E-01	%	3.604E+00	1.08E+00	G
TL-208	2.4905E-01						
		583.14	2.490E-01	(P	3.561E-02	1.82E-02	G
		510.72	3.511E-01	+ P	1.546E-01	6.12E-02	G
PB-212	6.8922E-01						
		238.63	6.648E-01	(P	8.910E-02	3.84E-02	G K
							Energy duplication
		77.11	5.947E-01	} P	3.416E-01	1.08E-01	G
		74.81	6.567E-01	(P	7.081E-01	2.20E-01	G
PB-214	4.9812E-01						
		351.99	4.726E-01	(P	7.515E-02	3.38E-02	G K
		295.22	5.354E-01	(P	1.428E-01	5.76E-02	G
							Energy duplication
		77.11	1.233E-01	} P	8.233E-01	1.91E-01	G
		241.92	5.288E-01	(	4.805E-01	1.50E-01	G
BI-212	5.7886E-01						
		727.17	5.789E-01	(P	2.951E-01	1.22E-01	G K
		1620.56	-6.719E-02	& P	1.076E+00	2.93E-01	G
		785.42	-4.595E-01	%	1.604E+00	4.75E-01	G
BI-214	4.1848E-01						
		609.32	4.185E-01	(P	6.816E-02	3.31E-02	G K
		1764.51	6.094E-01	+ P	9.598E-02	7.42E-02	G
		1120.28	5.189E-01	+ P	2.145E-01	8.59E-02	G
RA-224	1.0382E+00						
		241.00	1.038E+00	(	9.010E-01	2.82E-01	G
RA-226	1.2074E+00						
		185.99	1.207E+00	*(P	1.018E+00	3.17E-01	G
AC-228	6.4009E-01						
		911.07	6.714E-01	(P	1.421E-01	7.15E-02	G K
		968.90	9.042E-01	+ P	2.075E-01	1.00E-01	G
		338.40	5.645E-01	(P	2.423E-01	9.40E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.4360E-02
                          236.00-1.436E-02 %(  5.654E-01 1.69E-01 G K
                          256.25 1.555E-01 & P 3.959E-01 1.19E-01 G

PA-234      -6.5422E-02
                           98.44-6.542E-02 &(P 1.806E-01 5.44E-02 G K
                          946.00-4.258E-02 & P 1.823E-01 5.35E-02 G
                          131.28-2.187E-02 % P 1.850E-01 5.52E-02 G
                           94.67-2.359E-02 % P 3.612E-01 1.08E-01 G
                          883.24-2.012E-02 &   2.502E-01 7.13E-02 G
                          926.70 1.482E-03 &   2.757E-01 7.74E-02 G
                          569.26-7.244E-03 % P 2.496E-01 7.05E-02 G

TH-234       9.5049E-01
                           63.29-2.038E-01 %(P 4.432E+00 1.30E+00 G K
                           92.80 1.644E+00 *(P 1.918E+00 5.87E-01 G
                           92.38 1.892E+00 *(P 2.290E+00 7.01E-01 G

AM-241      -9.5246E-03
                           59.54-9.525E-03 &(P 8.305E-01 2.45E-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:                      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 - 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	-2.2672E-02	-2.4851E-02	2.7738E-01	2.7738E-01	2.891E-01
K-40		1.2471E+01	1.2471E+01	1.1838E+00	1.3876E+00	
MN-54	#A	-1.1019E-02	-1.1193E-02	3.5714E-02	3.5720E-02	3.762E-02
CO-57	#B	9.8267E-03	1.0007E-02	4.2089E-02	4.2092E-02	4.594E-02
CO-60	#B	4.8470E-03	4.8593E-03	2.2966E-02	2.2967E-02	2.771E-02
Sr-85	#A	-1.5740E-02	-1.6975E-02	3.7140E-02	3.7153E-02	3.805E-02
Kr-85	#A	-3.6335E+02	-3.6337E+02	7.9503E+02	7.9531E+02	8.784E+02
Y-88	#B	-3.7266E-03	-3.9019E-03	2.2438E-02	2.2439E-02	2.507E-02
NB-94	#B	7.4221E-03	7.4221E-03	2.6240E-02	2.6244E-02	2.986E-02
Ag-108M	#B	-4.6656E-03	-4.6661E-03	3.3469E-02	3.3470E-02	3.833E-02
CD-109	#A	1.1725E+00	1.1852E+00	1.5540E+00	1.5554E+00	1.674E+00
SN-113	#B	-5.1519E-03	-5.3759E-03	4.2776E-02	4.2778E-02	4.643E-02
SB-125	#B	1.2303E-02	1.2362E-02	8.5069E-02	8.5072E-02	9.611E-02
I-131	#B	-3.3033E-03	-6.0765E-03	6.4187E-02	6.4188E-02	3.226E-02
CS-134	#B	1.0366E-02	1.0434E-02	1.1789E-02	1.1804E-02	3.315E-02
CS-137	#A	2.0020E-02	2.0028E-02	3.0179E-02	3.0202E-02	3.273E-02
CE-139	#A	8.5400E-03	8.8499E-03	4.0943E-02	4.0946E-02	4.395E-02
EU-152	#B	2.8283E-02	2.8312E-02	1.2135E-01	1.2136E-01	1.348E-01
EU-154	#B	1.7503E-02	1.7531E-02	8.2709E-02	8.2714E-02	9.193E-02
EU-155	#B	0.0000E+00	0.0000E+00	1.9775E-01	1.9775E-01	2.208E-01
HG-203	#B	2.2878E-02	2.5416E-02	3.6139E-02	3.6169E-02	3.539E-02
TL-208		2.4905E-01	2.4905E-01	5.4543E-02	5.6427E-02	
PB-212		6.8922E-01	6.8922E-01	1.1936E-01	1.2589E-01	
PB-214		4.9812E-01	4.9812E-01	1.0695E-01	1.1079E-01	
BI-212		5.7886E-01	5.7886E-01	3.6605E-01	3.6759E-01	
BI-214		4.1848E-01	4.1848E-01	9.9226E-02	1.0216E-01	
RA-224		1.0382E+00	1.0382E+00	8.4549E-01	8.4763E-01	9.010E-01
RA-226	#	1.2074E+00	1.2074E+00	9.5087E-01	9.5345E-01	1.018E+00
AC-228		6.4009E-01	6.4009E-01	1.8967E-01	1.9327E-01	
TH-227	#B	-1.4360E-02	-1.4360E-02	5.0841E-01	5.0841E-01	5.654E-01
PA-234	#B	-6.5422E-02	-6.5422E-02	1.7099E-01	1.7103E-01	1.806E-01
TH-234	#B	9.5049E-01	9.5049E-01	1.0188E+00	1.0202E+00	4.432E+00
AM-241	#A	-9.5243E-03	-9.5246E-03	1.0583E+00	1.0583E+00	8.304E-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

YAEC Chemistry Lab Spectrum name: 103F_30MAY2006_0919.An1

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

Total Activity (86.9 to 2000.7 keV) 1.6582645E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 1.6582645E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-NOL-05-01-015-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30MAY2006_1011.An1

Acquisition information

Start time:	30-May-2006 10:13:01
Live time:	2000
Real time:	2002
Dead time:	0.12 %
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/channel^2

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:	1.8280E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8280E+03) = 5.4705E+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	23-May-2006 10:50:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5238

***** 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
74.96	101.	27.76	0.99	9.052E-03	74.81	9.600	8.597E-01	PB212
76.71	294.	14.80	0.96	9.931E-03	77.11	17.500	1.215E+00	PB212
86.98	91.	33.02	1.00	1.429E-02	86.45	32.740	1.465E-01	EU155
93.28	96.	31.25	1.00	1.660E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.79	105.	35.07	0.82	2.445E-02				
186.39	167.	23.71	0.96	2.565E-02	185.99	3.280	1.356E+00	RA226
209.77	109.	33.06	1.13	2.469E-02				
239.16	1052.	3.66	1.09	2.317E-02	238.63	43.100	7.693E-01	PB212
242.50	153.	17.77	1.10	2.299E-02	241.92	7.470	6.591E-01	PB214
270.52	129.	23.82	1.10	2.150E-02				
277.82	58.	38.48	1.07	2.112E-02				
295.45	306.	10.73	0.97	2.024E-02	295.22	19.200	5.749E-01	PB214
300.95	68.	35.32	1.28	1.997E-02				
328.09	95.	28.92	1.69	1.874E-02				
338.57	222.	14.33	1.19	1.829E-02	338.40	12.010	7.430E-01	AC228
352.17	528.	7.81	1.08	1.775E-02	351.99	37.100	5.863E-01	PB214
463.23	109.	19.52	1.36	1.425E-02				
463.23	109.	19.52	1.36	1.425E-02	463.51	10.000	5.627E-01	SB125
510.97	170.	15.62	1.53	1.317E-02	510.72	22.500	3.570E-01	TL208
583.76	346.	7.73	1.17	1.183E-02	583.14	86.000	2.478E-01	TL208
609.87	354.	6.43	1.46	1.143E-02	609.32	46.090	4.880E-01	BI214
662.33	226.	11.63	1.26	1.071E-02	661.62	84.620	1.828E-01	CS137
728.05	90.	17.81	1.27	9.955E-03	727.17	11.800	5.596E-01	BI212
769.10	75.	28.77	1.27	9.546E-03				
795.23	40.	35.36	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
861.12	80.	23.31	1.47	8.763E-03				

882.56	32.	41.66	0.79	8.603E-03				
912.10	231.	9.80	1.66	8.394E-03	911.07	29.000	6.904E-01	AC228
965.17	59.	20.13	1.54	8.049E-03	964.00	14.580	3.682E-01	EU152
969.90	161.	9.35	1.54	8.020E-03	968.90	17.460	8.490E-01	AC228
1121.18	90.	16.96	1.97	7.208E-03	1120.28	15.040	5.978E-01	BI214
1174.61	151.	17.26	1.24	6.966E-03	1173.23	99.860	1.587E-01	CO60
1239.91	65.	29.39	1.55	6.695E-03				
1333.37	125.	12.34	1.76	6.346E-03	1332.51	99.980	1.426E-01	CO60
1462.12	1368.	2.88	1.75	5.928E-03	1460.75	10.700	1.571E+01	K40
1766.14	65.	13.14	1.93	5.138E-03	1764.51	15.920	5.548E-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	
185.09	93.23	410.	89.	0.045	101.45	1.004	U-235	D
418.70	209.77	516.	109.	0.054	99.17	1.129	NP-239	
484.15	242.42	295.	153.	0.077	53.32	1.095	XE-138	lD
540.19	270.52	337.	129.	0.064	71.46	1.097	AC-228	s
554.79	277.82	218.	60.	0.030	111.32	1.074	NP-239	
601.04	300.95	218.	68.	0.034	105.95	1.285	PB-212	
655.32	328.09	264.	95.	0.047	86.77	1.694	AC-228	s
1537.26	769.10	117.	75.	0.037	86.30	1.268	BI-214	M
1721.28	861.12	86.	80.	0.040	69.92	1.470	TL-208	
1764.15	882.56	58.	32.	0.016	124.97	0.792	PA-234	l
1931.11	965.19	54.	46.	0.023	80.45	1.539	AC-228	D
2478.76	1239.91	89.	65.	0.033	88.16	1.545	CO-56	

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	369.	101.	0.051	83.28	0.993D
PB-212	153.39	77.11	373.	188.	0.094	46.61	0.995A
EU-155	173.68	87.25	969.	131.	0.066	103.95	1.500
TH-234	185.44	93.13	964.	115.	0.058	101.42	1.500s
TH-234	185.37	93.10	963.	114.	0.057	102.62	1.500s
RA-226	371.97	186.41	737.	162.	0.081	69.09	1.500s
PB-212	477.53	239.19	741.	1039.	0.519	15.69	1.127
PB-214	590.05	295.45	302.	302.	0.151	32.18	0.969s
AC-228	676.28	338.57	305.	221.	0.110	43.00	1.190
PB-214	703.48	352.17	341.	522.	0.261	23.43	1.081
SB-125	926.16	463.52	144.	97.	0.049	59.56	1.500s
TL-208	1021.04	510.97	199.	143.	0.072	46.87	1.529s
TL-208	1166.62	583.76	132.	341.	0.171	23.20	1.166
BI-214	1218.84	609.87	78.	348.	0.174	19.28	1.455
Ag-108M	1222.93	611.92	250.	-93.	-0.046	78.99	1.500s
CS-137	1323.75	662.33	142.	224.	0.112	34.88	1.260
BI-212	1455.18	728.05	72.	89.	0.045	53.42	1.271

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	1589.51	795.23	79.	40.	0.020	106.08	1.500s
AC-228	1823.22	912.10	88.	228.	0.114	29.39	1.664
AC-228	1936.81	968.90	38.	160.	0.080	28.86	1.541D
BI-214	2241.33	1121.18	56.	88.	0.044	50.89	1.970s
CO-60	2348.18	1174.61	134.	149.	0.075	51.77	1.239
CO-60	2665.65	1333.37	34.	122.	0.061	37.02	1.757
K-40	2923.12	1462.12	55.	1349.	0.675	8.63	1.746
BI-214	3531.03	1766.14	6.	61.	0.031	39.42	1.926

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	Peak Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm		COMMENTS
BE-7		6.2508E-02						
			477.56	6.251E-02	%(	3.341E-01	9.85E-02	G
K-40		1.5715E+01						
			1460.75	1.571E+01	(P	4.330E-01	4.59E-01	G
MN-54		-4.8008E-03						
			834.81	-4.801E-03	%(P	4.047E-02	1.17E-02	G
CO-57		-1.0198E-02						
			122.07	-1.020E-02	%(P	5.538E-02	1.66E-02	G K
			136.43	9.789E-02	%	4.022E-01	1.21E-01	G
CO-60		1.5064E-01						
			1332.51	1.426E-01	(P	3.481E-02	1.80E-02	G K
			1173.23	1.587E-01	(P	6.030E-02	2.78E-02	G K
Sr-85		-1.8917E-02						
			514.00	-1.892E-02	&(	4.884E-02	1.47E-02	G
Kr-85		-4.0536E+02						
			513.99	-4.054E+02	&(	1.046E+03	3.15E+02	G
Y-88		1.8296E-03						
			1836.01	1.830E-03	&(P	2.588E-02	6.77E-03	G K
			898.02	-8.446E-03	% P	4.446E-02	1.29E-02	G
NB-94		-6.3375E-03						
			871.10	-6.338E-03	%(	3.652E-02	1.06E-02	G K
			702.50	0.000E+00	%	4.033E-02	1.16E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-6.5284E-03						
		722.95	-6.528E-03	%(	4.635E-02	1.36E-02	G K
		614.37	-6.664E-02	+ P	5.501E-02	1.75E-02	G
		433.93	-6.743E-03	%	3.617E-02	1.07E-02	G
CD-109	-2.4273E-02						
		88.04	-2.427E-02	&(	1.684E+00	5.00E-01	G
SN-113	-1.5621E-02						
		391.71	-1.562E-02	&(	5.853E-02	1.75E-02	G K
		255.04	-5.237E-02	&	1.430E+00	4.21E-01	G
SB-125	1.5086E-01						
		427.95	3.020E-02	%(P	1.123E-01	3.35E-02	G K
		600.77	3.665E-03	% P	1.975E-01	5.72E-02	G
		636.15	4.127E-02	% P	3.063E-01	8.93E-02	G
		463.51	5.080E-01	@(P	3.056E-01	1.02E-01	G
		176.29	6.761E-02	&	5.721E-01	1.71E-01	G
I-131	3.6543E-04						
		364.48	3.654E-04	%(P	7.998E-02	2.35E-02	G K
		636.97	3.305E-02	&	8.658E-01	2.50E-01	G
		284.29	-1.204E-01	% P	9.290E-01	2.75E-01	G
CS-134	1.6589E-02						
		604.66	-1.477E-03	%(	3.570E-02	1.03E-02	G K
		795.76	3.723E-02	*(P	4.143E-02	1.32E-02	G
		569.29	1.756E-03	% P	2.341E-01	6.76E-02	G
		801.84	-1.848E-02	& P	3.542E-01	9.87E-02	G
CS-137	1.8284E-01						
		661.62	1.828E-01	(P	4.742E-02	2.14E-02	G
CE-139	1.3872E-02						
		165.85	1.387E-02	%(	4.715E-02	1.42E-02	G
EU-152	-2.9951E-02						
		121.78	-2.995E-02	%(P	1.597E-01	4.79E-02	G K
		344.30	5.075E-02	% P	1.165E-01	3.52E-02	G
		1408.08	6.033E-02	&	1.355E-01	4.09E-02	G
		964.00	1.719E-02	% P	3.160E-01	9.12E-02	G
		1112.07	0.000E+00	%	3.201E-01	9.10E-02	G
		778.90	-7.409E-02	%	2.869E-01	8.48E-02	G
EU-154	-2.2317E-02						
		123.10	-2.232E-02	&(	1.125E-01	3.38E-02	G K
		1274.80	0.000E+00	%	1.423E-01	4.06E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-3.796E-02	%	2.197E-01	6.47E-02	G
		1004.80	8.873E-02	&	1.682E-01	5.15E-02	G
EU-155	2.1078E-01						
		86.45	2.108E-01	(	2.372E-01	7.30E-02	G K
		105.31	4.235E-02	%	2.393E-01	7.17E-02	G
HG-203	-1.0361E-03						
		279.17	-1.036E-03	&(P	4.825E-02	1.43E-02	G K
		72.87	-5.527E-01	& P	2.455E+00	7.38E-01	G
		70.83	-7.535E-01	%	4.305E+00	1.29E+00	G
		82.50	-1.179E+00	%	4.234E+00	1.27E+00	G
TL-208	2.4776E-01						
		583.14	2.478E-01	(P	4.076E-02	1.94E-02	G
		510.72	3.570E-01	+ P	1.707E-01	6.62E-02	G
PB-212	7.8469E-01						
		238.63	7.680E-01	(P	9.581E-02	4.07E-02	G K
							Energy duplication
		77.11	7.847E-01	} P	3.873E-01	1.22E-01	G
		74.81	8.597E-01	(P	7.845E-01	2.46E-01	G
PB-214	5.8242E-01						
		351.99	5.863E-01	(P	9.958E-02	4.63E-02	G K
		295.22	5.749E-01	@(P	1.591E-01	6.25E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.002E-01	0.00E+00	G
		241.92	5.250E-02	%	6.263E-01	1.87E-01	G
BI-212	5.5958E-01						
		727.17	5.596E-01	(P	2.656E-01	1.00E-01	G K
		1620.56	-1.570E-01	& P	1.234E+00	3.45E-01	G
		785.42	1.873E-03	%	1.825E+00	5.21E-01	G
BI-214	5.2321E-01						
		609.32	4.880E-01	(P	6.150E-02	3.20E-02	G K
		1764.51	5.548E-01	(P	1.238E-01	7.68E-02	G
		1120.28	5.978E-01	*(P	2.568E-01	1.04E-01	G
RA-224	-1.7491E-02						
		241.00	-1.749E-02	%(	1.029E+00	3.06E-01	G
RA-226	1.4225E+00						
		185.99	1.423E+00	@(P	1.135E+00	3.54E-01	G
AC-228	7.4649E-01						
		911.07	6.904E-01	(P	1.412E-01	6.87E-02	G K
		968.90	8.421E-01	(P	1.666E-01	8.11E-02	G
		338.40	7.430E-01	(P	2.829E-01	1.07E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227       2.7093E-02
                          236.00 2.709E-02 %(  6.313E-01 1.89E-01 G K
                          256.25 6.220E-02 % P 4.822E-01 1.43E-01 G

PA-234      -1.8727E-02
                           98.44-1.873E-02 &(P 2.311E-01 6.90E-02 G K
                          946.00 4.805E-03 % P 2.346E-01 6.76E-02 G
                          131.28-4.248E-02 % P 2.133E-01 6.40E-02 G
                           94.67-5.346E-02 & P 3.444E-01 1.03E-01 G
                          883.24 3.223E-02 %   2.883E-01 8.30E-02 G
                          926.70-9.045E-02 &   3.947E-01 1.16E-01 G
                          569.26 2.588E-03 % P 3.450E-01 9.97E-02 G

TH-234       1.2166E+00
                           63.29 3.001E-01 &(P 6.619E+00 1.97E+00 G K
                           92.80 1.705E+00  (P 2.207E+00 6.74E-01 G
                           92.38 2.037E+00  (P 2.600E+00 7.94E-01 G

AM-241      -1.9945E-02
                           59.54-1.995E-02 &(P 1.179E+00 3.50E-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:                      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 - 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	5.7098E-02	6.2508E-02	2.9564E-01	2.9567E-01	3.052E-01
K-40		1.5715E+01	1.5715E+01	1.3747E+00	1.6499E+00	
MN-54	#A	-4.7271E-03	-4.8008E-03	3.9880E-02	3.9881E-02	3.984E-02
CO-57	#B	-1.0017E-02	-1.0198E-02	5.1430E-02	5.1433E-02	5.440E-02
CO-60		1.5026E-01	1.5064E-01	4.8700E-02	4.9479E-02	
Sr-85	#A	-1.7558E-02	-1.8917E-02	4.4150E-02	4.4164E-02	4.533E-02
Kr-85	#A	-4.0534E+02	-4.0536E+02	9.4604E+02	9.4633E+02	1.046E+03
Y-88	#B	1.7485E-03	1.8296E-03	2.0320E-02	2.0321E-02	2.474E-02
NB-94	#B	-6.3375E-03	-6.3375E-03	3.1915E-02	3.1918E-02	3.652E-02
Ag-108M	#B	-6.5278E-03	-6.5284E-03	4.0781E-02	4.0783E-02	4.635E-02
CD-109	#A	-2.4016E-02	-2.4273E-02	1.5011E+00	1.5011E+00	1.666E+00
SN-113	#B	-1.4978E-02	-1.5621E-02	5.2471E-02	5.2479E-02	5.613E-02
SB-125	#F	1.5014E-01	1.5086E-01	9.1022E-02	9.1442E-02	1.118E-01
I-131	#B	2.0030E-04	3.6543E-04	7.0430E-02	7.0430E-02	4.384E-02
CS-134	#B	1.6483E-02	1.6589E-02	1.7636E-02	1.7662E-02	3.547E-02
CS-137		1.8276E-01	1.8284E-01	6.4174E-02	6.5046E-02	
CE-139	#A	1.3393E-02	1.3872E-02	4.2566E-02	4.2573E-02	4.552E-02
EU-152	#B	-2.9920E-02	-2.9951E-02	1.5394E-01	1.5395E-01	1.596E-01
EU-154	#B	-2.2282E-02	-2.2317E-02	1.0127E-01	1.0128E-01	1.123E-01
EU-155	#A	2.1022E-01	2.1078E-01	2.1910E-01	2.1941E-01	2.366E-01
HG-203	#B	-9.3401E-04	-1.0361E-03	4.4353E-02	4.4353E-02	4.350E-02
TL-208		2.4776E-01	2.4776E-01	5.8211E-02	5.9962E-02	
PB-212		7.8469E-01	7.8469E-01	1.2454E-01	1.3261E-01	
PB-214		5.8242E-01	5.8242E-01	1.1737E-01	1.2214E-01	
BI-212		5.5958E-01	5.5958E-01	3.0057E-01	3.0232E-01	
BI-214		5.2321E-01	5.2321E-01	1.0274E-01	1.0714E-01	
RA-224	#A	-1.7491E-02	-1.7491E-02	9.1705E-01	9.1705E-01	1.029E+00
RA-226	#	1.4225E+00	1.4225E+00	1.0615E+00	1.0647E+00	1.135E+00
AC-228		7.4649E-01	7.4649E-01	1.4912E-01	1.5529E-01	
TH-227	#B	2.7093E-02	2.7093E-02	5.6837E-01	5.6837E-01	6.313E-01
PA-234	#B	-1.8727E-02	-1.8727E-02	2.4546E-01	2.4546E-01	2.311E-01
TH-234	#B	1.2166E+00	1.2166E+00	1.4224E+00	1.4240E+00	6.619E+00
AM-241	#A	-1.9944E-02	-1.9945E-02	1.2597E+00	1.2597E+00	1.178E+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

YAEC Chemistry Lab Spectrum name: 103F_30MAY2006_1011.An1

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

Total Activity (1120.0 to 2000.7 keV) 1.9491953E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.9492411E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_30MAY2006_1052.An1

Sample description
FSS-NOL-05-01-009-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30MAY2006_1052.An1

Acquisition information
Start time: 30-May-2006 10:53:54
Live time: 2000
Real time: 2003
Dead time: 0.13 %
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/channel^2

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: 2.0040E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0040E+03) =
4.9900E+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	23-May-2006 09:40:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5013

***** 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
74.95	131.	23.62	0.99	9.052E-03	74.81	9.600	1.017E+00	PB212
77.25	139.	19.30	0.99	1.011E-02	77.11	17.500	8.027E-01	PB212
					77.11	10.700	1.313E+00	PB214
87.33	147.	20.90	1.00	1.448E-02	86.45	32.740	2.153E-01	EU155
					88.04	3.790	1.796E+00	CD109
90.33	88.	35.75	1.00	1.561E-02				
92.97	116.	27.02	1.00	1.654E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
186.34	236.	18.96	0.99	2.566E-02	185.99	3.280	1.791E+00	RA226
209.83	176.	26.44	0.98	2.469E-02				
239.16	1382.	3.13	1.09	2.317E-02	238.63	43.100	9.243E-01	PB212
					241.92	7.470	5.421E+00	PB214
239.15	1126.	3.91	1.50	2.302E-02	238.63	43.100	7.515E-01	PB212
					241.92	7.470	4.416E+00	PB214
270.36	147.	24.44	1.11	2.150E-02				
295.53	293.	9.56	1.13	2.023E-02	295.22	19.200	5.012E-01	PB214
300.42	109.	26.78	0.95	2.000E-02				
328.13	92.	35.21	1.53	1.874E-02				
338.72	297.	10.57	1.24	1.829E-02	338.40	12.010	9.091E-01	AC228
352.26	541.	5.89	1.16	1.774E-02	351.99	37.100	5.484E-01	PB214
410.13	71.	36.79	1.45	1.573E-02				
464.18	99.	25.58	0.93	1.423E-02	463.51	10.000	4.638E-01	SB125
511.03	206.	12.68	1.51	1.317E-02	510.72	22.500	4.071E-01	TL208
583.68	458.	7.40	1.35	1.184E-02	583.14	86.000	3.007E-01	TL208
609.90	394.	6.47	1.23	1.143E-02	609.32	46.090	4.956E-01	BI214
727.81	168.	16.10	1.34	9.958E-03	727.17	11.800	9.606E-01	BI212

769.17	47.	40.00	1.16	9.545E-03				
796.06	103.	18.83	1.91	9.299E-03	795.76	85.400	8.811E-02	CS134
862.37	99.	20.47	1.88	8.754E-03				
912.15	309.	7.65	1.59	8.394E-03	911.07	29.000	8.462E-01	AC228
935.27	40.	37.38	0.63	8.239E-03				
965.46	87.	14.33	1.54	8.047E-03				
969.94	194.	8.78	1.54	8.019E-03	968.90	17.460	9.330E-01	AC228
1121.50	120.	18.30	1.50	7.206E-03	1120.28	15.040	7.312E-01	BI214
1462.22	1379.	2.80	1.71	5.928E-03	1460.75	10.700	1.445E+01	K40
1731.04	37.	22.37	1.13	5.218E-03				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1766.20	66.	14.66	2.04	5.142E-03	1764.51	15.920	5.439E-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	
179.84	90.41	452.	88.	0.044	107.26	1.003	PB-214	lD
185.28	93.05	439.	110.	0.055	85.50	1.004	TH-234	D
418.82	209.83	736.	176.	0.088	79.33	0.982	NP-239	s
484.13	242.42	373.	175.	0.087	52.09	1.095	XE-138	lD
539.88	270.36	440.	147.	0.073	73.33	1.107	AC-228	s
599.99	300.42	311.	109.	0.055	80.34	0.953	PB-212	
655.40	328.13	342.	92.	0.046	105.64	1.527	AC-228	s
819.40	410.13	228.	71.	0.036	110.38	1.448	AC-228	s
1537.41	769.17	116.	47.	0.024	120.01	1.155	BI-214	s
1591.18	796.06	137.	52.	0.026	103.63	1.911	PA-234	s
1723.79	862.37	86.	104.	0.052	48.12	1.885	TL-208	s
1869.56	935.27	68.	40.	0.020	112.15	0.632	BI-214	s
1929.98	965.48	35.	87.	0.044	42.92	1.539	TB-160	D
3460.86	1731.04	7.	37.	0.019	67.11	1.126	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	438.	131.	0.066	70.85	0.993D
PB-212	153.39	77.11	462.	139.	0.069	57.91	0.995A
CD-109	173.60	87.21	978.	143.	0.072	95.88	1.500
TH-234	185.39	93.11	1088.	115.	0.057	107.86	1.500s
PA-234	185.38	93.11	834.	128.	0.064	99.35	1.500s
RA-226	371.81	186.33	877.	185.	0.092	66.51	1.500s
TH-227	472.19	236.52	1210.	-152.	-0.076	100.04	1.500s
PB-212	477.59	239.22	821.	1328.	0.664	13.29	1.106
RA-224	483.44	242.14	859.	163.	0.081	80.06	1.500
PB-214	477.46	239.15	408.	1126.	0.563	11.74	1.500s
PB-214	590.20	295.53	250.	289.	0.144	28.69	1.132
AC-228	676.57	338.72	267.	296.	0.148	31.71	1.240
PB-214	703.66	352.26	212.	536.	0.268	17.67	1.161
SB-125	925.94	463.41	177.	76.	0.038	80.29	1.500s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1021.18	511.03	190.	179.	0.089	38.03	1.509s
TL-208	1166.47	583.68	202.	454.	0.227	22.19	1.348
BI-214	1218.89	609.90	108.	388.	0.194	19.40	1.229
Ag-108M	1223.76	612.33	211.	-56.	-0.028	116.89	1.500s
BI-212	1454.69	727.81	141.	168.	0.084	48.31	1.338s
CS-134	1590.55	795.74	74.	66.	0.033	66.57	1.500s
AC-228	1823.32	912.15	79.	306.	0.153	22.96	1.587
AC-228	1936.81	968.90	133.	102.	0.051	56.34	1.541D
BI-214	2241.98	1121.50	104.	118.	0.059	54.90	1.500s
K-40	2923.31	1462.22	45.	1342.	0.671	8.41	1.710
BI-214	3531.16	1766.20	12.	66.	0.033	43.98	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	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		7.9675E-02					
			477.56	7.968E-02	&(	2.977E-01 8.85E-02	G
K-40		1.4260E+01					
			1460.75	1.426E+01	(P	3.599E-01 4.05E-01	G
MN-54		5.3977E-04					
			834.81	5.398E-04	%(P	3.418E-02 9.76E-03	G
CO-57		-6.7446E-03					
			122.07	-6.745E-03	&(P	5.105E-02 1.53E-02	G K
			136.43	-4.790E-02	%	3.378E-01 1.01E-01	G
CO-60		8.0871E-03					
			1332.51	8.087E-03	%(P	3.639E-02 1.04E-02	G K
			1173.23	-2.803E-03	% P	3.523E-02 9.75E-03	G K
Sr-85		-1.3663E-02					
			514.00	-1.366E-02	%(	4.421E-02 1.32E-02	G
Kr-85		-2.9254E+02					
			513.99	-2.925E+02	%(	9.465E+02 2.84E+02	G
Y-88		-2.1671E-03					
			1836.01	-2.167E-03	%(P	2.731E-02 7.30E-03	G K
			898.02	-6.747E-03	% P	3.850E-02 1.12E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-9.1954E-03						
		871.10	-9.195E-03	&(	3.527E-02	1.04E-02	G K
		702.50	1.507E-02	%	3.079E-02	9.35E-03	G K
Ag-108M	5.9841E-03						
		722.95	5.984E-03	%(	3.608E-02	1.06E-02	G K
		614.37	-3.687E-02	+ P	4.617E-02	1.43E-02	G
		433.93	2.965E-04	%	2.826E-02	8.17E-03	G
CD-109	1.7517E+00						
		88.04	1.752E+00	(	1.814E+00	5.60E-01	G
SN-113	9.1744E-03						
		391.71	9.174E-03	%(	4.900E-02	1.45E-02	G K
		255.04	-2.653E-01	%	1.669E+00	4.98E-01	G
SB-125	6.8835E-02						
		427.95	-3.015E-02	%(P	1.020E-01	3.05E-02	G K
		600.77	3.343E-03	% P	1.738E-01	5.02E-02	G
		636.15	-4.306E-02	% P	3.156E-01	9.23E-02	G
		463.51	3.618E-01	@(P	3.076E-01	9.85E-02	G
		176.29	6.683E-02	%	5.941E-01	1.78E-01	G
I-131	1.8499E-02						
		364.48	1.850E-02	%(P	5.728E-02	1.71E-02	G K
		636.97	-9.903E-02	%	8.572E-01	2.51E-01	G
		284.29	-1.939E-01	% P	1.040E+00	3.10E-01	G
CS-134	2.2472E-02						
		604.66	-7.169E-03	&(	3.506E-02	1.04E-02	G K
		795.76	5.635E-02	*(P	3.667E-02	1.25E-02	G
		569.29	2.098E-02	% P	2.323E-01	6.79E-02	G
		801.84	-1.720E-01	% P	3.987E-01	1.19E-01	G
CS-137	1.6003E-02						
		661.62	1.600E-02	%(P	3.630E-02	1.09E-02	G
CE-139	1.0099E-04						
		165.85	1.010E-04	%(	4.712E-02	1.40E-02	G
EU-152	-2.1845E-02						
		121.78	-2.185E-02	&(P	1.516E-01	4.54E-02	G K
		344.30	-2.323E-02	% P	1.189E-01	3.54E-02	G
		1408.08	-1.338E-03	%	1.162E-01	3.11E-02	G
		964.00	-6.905E-04	% P	1.984E-01	5.53E-02	G
		1112.07	6.493E-02	%	3.040E-01	8.92E-02	G
		778.90	-8.919E-04	%	2.434E-01	6.94E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	1.3721E-02						
		123.10	1.372E-02	%(	1.065E-01	3.19E-02	G K
		1274.80	-6.390E-04	%	1.211E-01	3.44E-02	G
		723.30	7.295E-03	%	3.147E-01	9.28E-02	G
		1004.80	-8.729E-02	&	2.284E-01	6.85E-02	G
EU-155	6.2343E-03						
		86.45	6.234E-03	&(	2.481E-01	7.42E-02	G K
		105.31	8.485E-02	&	2.391E-01	7.22E-02	G
HG-203	-1.4109E-03						
		279.17	-1.411E-03	&(P	4.485E-02	1.33E-02	G K
		72.87	2.024E-02	% P	2.654E+00	7.94E-01	G
		70.83	-1.658E+00	%	4.487E+00	1.36E+00	G
		82.50	-4.861E-01	%	4.156E+00	1.24E+00	G
TL-208	3.0067E-01						
		583.14	3.007E-01	(P	4.562E-02	2.25E-02	G
		510.72	4.071E-01	+ P	1.523E-01	5.93E-02	G
PB-212	8.6872E-01						
		238.63	8.955E-01	(P	9.189E-02	4.01E-02	G K
							Energy duplication
		77.11	5.285E-01	} P	3.920E-01	1.02E-01	G
		74.81	1.017E+00	+ P	7.778E-01	2.46E-01	G
PB-214	5.3231E-01						
		351.99	5.484E-01	(P	7.230E-02	3.27E-02	G K
		295.22	5.012E-01	(P	1.325E-01	4.86E-02	G
							Energy duplication
		77.11	4.223E-01	} P	9.724E-01	2.23E-01	G
		241.92	4.416E+00	+	3.797E-01	1.73E-01	G
BI-212	9.6062E-01						
		727.17	9.606E-01	@(P	3.334E-01	1.55E-01	G K
		1620.56	2.858E-01	& P	1.117E+00	3.23E-01	G
		785.42	9.330E-01	&	1.421E+00	4.41E-01	G
BI-214	5.0804E-01						
		609.32	4.956E-01	(P	6.554E-02	3.26E-02	G K
		1764.51	5.439E-01	(P	1.552E-01	8.38E-02	G
		1120.28	7.312E-01	+ P	3.129E-01	1.36E-01	G
RA-224	1.2181E+00						
		241.00	1.218E+00	(	1.044E+00	3.25E-01	G
RA-226	1.4818E+00						
		185.99	1.482E+00	(P	1.127E+00	3.52E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AC-228       8.6460E-01
                          911.07 8.462E-01  (P 1.223E-01 6.55E-02 G K
                          968.90 4.907E-01 - P 2.717E-01 9.23E-02 G
                          338.40 9.091E-01  (P 2.418E-01 9.65E-02 G

TH-227      -3.9226E-01
                          236.00-3.923E-01 ?(  4.251E-01 1.31E-01 G K
                          256.25-1.273E-01 % P 4.362E-01 1.31E-01 G

PA-234       1.1107E-01
                           98.44-2.100E-02 &(P 2.291E-01 6.85E-02 G K
                          946.00 4.295E-02 % P 1.437E-01 4.24E-02 G
                          131.28-5.386E-03 & P 2.188E-01 6.53E-02 G
                           94.67 3.250E-01 ?(P 3.496E-01 1.08E-01 G
                          883.24-8.943E-02 %   2.650E-01 7.89E-02 G
                          926.70 6.094E-02 %   2.912E-01 8.50E-02 G
                          569.26 3.082E-02 % P 3.424E-01 1.00E-01 G

TH-234       1.7905E+00
                           63.29 1.960E+00 %(P 6.448E+00 1.94E+00 G K
                           92.80 1.571E+00 *(P 2.137E+00 6.51E-01 G
                           92.38 1.776E+00 % P 2.552E+00 7.77E-01 G

AM-241      -8.9314E-03
                           59.54-8.931E-03 %(P 8.436E-01 2.49E-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:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
```

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

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	7.2706E-02	7.9675E-02	2.6541E-01	2.6545E-01	2.717E-01
K-40		1.4260E+01	1.4260E+01	1.2156E+00	1.4707E+00	
MN-54	#A	5.3138E-04	5.3977E-04	2.9269E-02	2.9269E-02	3.365E-02
CO-57	#B	-6.6236E-03	-6.7446E-03	4.7900E-02	4.7902E-02	5.014E-02
CO-60	#B	8.0666E-03	8.0871E-03	3.1316E-02	3.1319E-02	3.629E-02
Sr-85	#A	-1.2671E-02	-1.3663E-02	3.9743E-02	3.9751E-02	4.100E-02
Kr-85	#A	-2.9252E+02	-2.9254E+02	8.5091E+02	8.5108E+02	9.464E+02
Y-88	#B	-2.0699E-03	-2.1671E-03	2.3807E-02	2.3807E-02	2.609E-02
NB-94	#B	-9.1954E-03	-9.1954E-03	3.1243E-02	3.1247E-02	3.527E-02
Ag-108M	#B	5.9835E-03	5.9841E-03	3.1656E-02	3.1658E-02	3.608E-02
CD-109	#A	1.7329E+00	1.7517E+00	1.6795E+00	1.6823E+00	1.794E+00
SN-113	#B	8.7930E-03	9.1744E-03	4.3595E-02	4.3599E-02	4.696E-02
SB-125	#B	6.8503E-02	6.8835E-02	5.6193E-02	5.6335E-02	1.015E-01
I-131	#B	1.0072E-02	1.8499E-02	5.1378E-02	5.1389E-02	3.119E-02
CS-134	#B	2.2326E-02	2.2472E-02	1.4979E-02	1.5036E-02	3.483E-02
CS-137	#A	1.5995E-02	1.6003E-02	3.2781E-02	3.2794E-02	3.629E-02
CE-139	#A	9.7462E-05	1.0099E-04	4.2073E-02	4.2073E-02	4.547E-02
EU-152	#B	-2.1822E-02	-2.1845E-02	1.4844E-01	1.4845E-01	1.514E-01
EU-154	#B	1.3700E-02	1.3721E-02	9.5710E-02	9.5714E-02	1.064E-01
EU-155	#B	6.2175E-03	6.2343E-03	2.2249E-01	2.2249E-01	2.475E-01
HG-203	#B	-1.2704E-03	-1.4109E-03	4.0784E-02	4.0784E-02	4.038E-02
TL-208		3.0067E-01	3.0067E-01	6.7339E-02	6.9565E-02	
PB-212		8.6872E-01	8.6872E-01	1.1652E-01	1.2697E-01	
PB-214		5.3231E-01	5.3231E-01	9.0850E-02	9.5962E-02	
BI-212	#	9.6062E-01	9.6062E-01	4.6548E-01	4.6881E-01	
BI-214		5.0804E-01	5.0804E-01	1.0019E-01	1.0444E-01	
RA-224		1.2181E+00	1.2181E+00	9.7518E-01	9.7774E-01	1.044E+00
RA-226	#	1.4818E+00	1.4818E+00	1.0546E+00	1.0581E+00	1.127E+00
AC-228		8.6460E-01	8.6460E-01	1.7028E-01	1.7753E-01	
TH-227	#A	-3.9226E-01	-3.9226E-01	3.9243E-01	3.9309E-01	4.251E-01
PA-234	#B	1.1107E-01	1.1107E-01	1.1064E-01	1.1081E-01	2.291E-01
TH-234	#B	1.7905E+00	1.7905E+00	2.2278E+00	2.2300E+00	6.448E+00
AM-241	#A	-8.9312E-03	-8.9314E-03	1.0847E+00	1.0847E+00	8.436E-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 (1070.5 to 2000.7 keV) 1.9513363E+01 pCi/gm
Total Decayed Activity (1070.5 to 2000.7 keV) 1.9513363E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_30MAY2006_1131.An1

Sample description
FSS-NOL-05-01-010-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30MAY2006_1131.An1

Acquisition information
Start time: 30-May-2006 11:32:46
Live time: 2000
Real time: 2003
Dead time: 0.14 %
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/channel^2

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: 2.1830E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1830E+03) =
4.5809E+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	23-May-2006 13:00:00
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: 0.5568

***** 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
74.96	131.	23.74	0.99	9.052E-03	74.81	9.600	9.348E-01	PB212
77.26	225.	14.09	0.99	1.011E-02	77.11	17.500	9.687E-01	PB212
186.44	160.	20.56	1.24	2.565E-02	185.99	3.280	1.080E+00	RA226
209.98	143.	24.81	1.01	2.468E-02				
239.17	1381.	3.15	1.09	2.317E-02	238.63	43.100	8.478E-01	PB212
241.77	199.	16.91	1.09	2.303E-02	241.00	3.900	1.368E+00	RA224
					241.92	7.470	7.159E-01	PB214
271.12	167.	20.79	1.75	2.147E-02				
277.58	52.	38.69	1.07	2.113E-02				
295.34	337.	10.54	1.06	2.024E-02	295.22	19.200	5.298E-01	PB214
301.03	96.	28.60	1.35	1.997E-02				
328.12	98.	29.12	1.33	1.874E-02				
338.78	300.	11.34	1.09	1.829E-02	338.40	12.010	8.421E-01	AC228
352.30	539.	6.02	1.15	1.774E-02	351.99	37.100	5.011E-01	PB214
463.34	87.	26.81	1.57	1.425E-02				
463.34	87.	26.81	1.57	1.425E-02	463.51	10.000	3.760E-01	SB125
511.18	237.	12.95	1.30	1.316E-02	510.72	22.500	4.395E-01	TL208
583.74	492.	6.83	1.28	1.183E-02	583.14	86.000	2.963E-01	TL208
609.89	391.	6.91	1.27	1.143E-02	609.32	46.090	4.517E-01	BI214
661.86	77.	26.73	1.55	1.072E-02	661.62	84.620	5.134E-02	CS137
728.06	114.	20.15	1.32	9.955E-03	727.17	11.800	5.986E-01	BI212
796.03	55.	29.50	1.62	9.299E-03	795.76	85.400	4.338E-02	CS134
861.16	61.	25.51	1.42	8.763E-03				
912.10	329.	6.97	1.38	8.394E-03	911.07	29.000	8.269E-01	AC228
965.54	44.	27.38	1.54	8.047E-03				
969.93	197.	8.43	1.54	8.020E-03	968.90	17.460	8.717E-01	AC228
1121.14	132.	17.05	1.27	7.208E-03	1120.28	15.040	7.425E-01	BI214

1462.24	1553.	2.61	1.90	5.928E-03	1460.75	10.700	1.496E+01	K40
1589.94	66.	20.86	1.42	5.567E-03				
1766.40	85.	10.85	1.88	5.137E-03	1764.51	15.920	6.181E-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	
419.13	209.98	509.	143.	0.072	74.44	1.012	NP-239	s
541.39	271.12	402.	167.	0.084	62.38	1.746	AC-228	s
554.30	277.58	197.	51.	0.026	123.68	1.075	NP-239	
601.21	301.03	289.	96.	0.048	85.80	1.347	PB-212	s
655.39	328.12	284.	98.	0.049	87.37	1.325	AC-228	s
1721.36	861.16	66.	61.	0.030	76.52	1.418	TL-208	
1930.08	965.53	50.	43.	0.022	82.67	1.539	TB-160	D
3178.71	1589.94	25.	66.	0.033	62.58	1.417	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

********** 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	444.	131.	0.066	71.22	0.993D
PB-212	153.39	77.11	426.	225.	0.113	42.28	0.995A
RA-226	372.19	186.52	934.	186.	0.093	68.03	1.500
PB-212	477.45	239.15	962.	1272.	0.636	14.50	1.125
RA-224	483.33	242.09	896.	173.	0.086	77.04	1.500
PB-214	483.51	242.18	993.	148.	0.074	93.55	1.500
PB-214	589.82	295.34	359.	333.	0.166	31.62	1.056s
AC-228	676.69	338.78	319.	299.	0.150	34.02	1.093s
PB-214	703.74	352.30	220.	533.	0.267	18.07	1.155
SB-125	926.08	463.48	204.	75.	0.038	86.21	1.500s
TL-208	1021.47	511.18	241.	210.	0.105	38.85	1.300s
TL-208	1166.59	583.74	198.	487.	0.244	20.50	1.280
BI-214	1218.88	609.89	132.	385.	0.192	20.73	1.271
CS-137	1323.35	662.13	123.	49.	0.024	102.13	1.500
BI-212	1455.19	728.06	130.	114.	0.057	60.45	1.323s
CS-134	1591.15	796.05	65.	44.	0.022	89.88	1.500s
AC-228	1823.23	912.10	74.	325.	0.163	20.91	1.383
AC-228	1936.81	968.90	128.	105.	0.053	53.96	1.541D
BI-214	2241.26	1121.14	106.	130.	0.065	51.14	1.266
K-40	2923.35	1462.24	51.	1519.	0.760	7.98	1.902
BI-214	3531.34	1766.29	8.	71.	0.035	36.98	2.033

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.2444E-02					
			477.56	-1.244E-02	%(	2.659E-01 7.72E-02	G
K-40		1.4817E+01					
			1460.75	1.482E+01	(P	3.501E-01 3.99E-01	G
MN-54		3.0092E-03					
			834.81	3.009E-03	&(P	3.217E-02 9.29E-03	G
CO-57		8.3664E-03					
			122.07	8.366E-03	&(P	4.650E-02 1.39E-02	G K
			136.43	-8.174E-02	%	3.792E-01 1.14E-01	G
CO-60		8.1438E-03					
			1332.51	8.144E-03	%(P	3.050E-02 8.77E-03	G K
			1173.23	-1.023E-02	% P	4.677E-02 1.36E-02	G K
Sr-85		-1.9109E-02					
			514.00	-1.911E-02	&(	4.126E-02 1.25E-02	G
Kr-85		-4.0975E+02					
			513.99	-4.098E+02	&(	8.844E+02 2.68E+02	G
Y-88		-6.6708E-03					
			1836.01	-6.671E-03	%(P	3.188E-02 9.08E-03	G K
			898.02	-5.244E-04	% P	3.437E-02 9.72E-03	G
NB-94		8.1905E-03					
			871.10	8.191E-03	%(	3.031E-02 8.95E-03	G K
			702.50	9.682E-03	&	2.923E-02 8.72E-03	G K
Ag-108M		-7.2750E-04					
			722.95	-7.275E-04	%(	5.118E-02 1.50E-02	G K
			614.37	-9.009E-03	& P	3.918E-02 1.16E-02	G
			433.93	6.698E-04	%	2.887E-02 8.40E-03	G
CD-109		1.0977E+00					
			88.04	1.098E+00	%(	1.821E+00 5.55E-01	G
SN-113		9.0259E-03					
			391.71	9.026E-03	&(	4.962E-02 1.47E-02	G K
			255.04	7.903E-02	&	1.554E+00 4.61E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0329E-01						
		427.95	2.741E-02	%(P	9.506E-02	2.84E-02	G K
		600.77	4.451E-02	& P	1.564E-01	4.65E-02	G
		636.15	-2.968E-02	& P	2.921E-01	8.51E-02	G
		463.51	3.279E-01	(P	3.024E-01	9.58E-02	G
		176.29	3.959E-02	%	5.510E-01	1.65E-01	G
I-131	-1.2778E-02						
		364.48	-1.278E-02	&(P	6.348E-02	1.88E-02	G K
		636.97	-9.070E-02	&	7.958E-01	2.33E-01	G
		284.29	-2.681E-01	% P	9.095E-01	2.73E-01	G
CS-134	1.6340E-02						
		604.66	5.904E-04	&(	4.150E-02	1.22E-02	G K
		795.76	3.434E-02	*(P	3.148E-02	1.03E-02	G
		569.29	3.046E-02	& P	2.082E-01	6.11E-02	G
		801.84	-3.898E-03	& P	3.072E-01	8.62E-02	G
CS-137	3.3354E-02						
		661.62	3.335E-02	(P	3.707E-02	1.17E-02	G
CE-139	7.8267E-03						
		165.85	7.827E-03	%(	4.483E-02	1.34E-02	G
EU-152	2.2009E-02						
		121.78	2.201E-02	&(P	1.343E-01	4.03E-02	G K
		344.30	-2.607E-02	% P	1.116E-01	3.33E-02	G
		1408.08	2.286E-02	%	9.822E-02	2.79E-02	G
		964.00	-3.304E-02	% P	2.733E-01	7.94E-02	G
		1112.07	1.277E-01	%	2.659E-01	8.07E-02	G
		778.90	6.039E-02	%	2.247E-01	6.64E-02	G
EU-154	-9.8812E-03						
		123.10	-9.881E-03	%(	1.031E-01	3.09E-02	G K
		1274.80	2.675E-02	%	1.093E-01	3.21E-02	G
		723.30	-6.696E-03	%	2.713E-01	7.99E-02	G
		1004.80	4.600E-02	&	1.675E-01	4.93E-02	G
EU-155	8.2576E-02						
		86.45	8.258E-02	%(	1.850E-01	5.61E-02	G K
		105.31	8.460E-02	%	2.178E-01	6.58E-02	G
HG-203	4.1045E-04						
		279.17	4.105E-04	&(P	4.000E-02	1.18E-02	G K
		72.87	2.001E-02	& P	1.749E+00	5.20E-01	G
		70.83	1.316E-01	%	4.398E+00	1.31E+00	G
		82.50	-1.631E+00	%	3.919E+00	1.19E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9625E-01						
		583.14	2.963E-01	(P	4.145E-02	2.04E-02	G
		510.72	4.395E-01	+ P	1.566E-01	6.42E-02	G
PB-212	7.8735E-01						
		238.63	7.874E-01	(P	9.117E-02	3.84E-02	G K
							Energy duplication
		77.11	7.874E-01	} P	3.459E-01	1.11E-01	G
		74.81	9.348E-01	+ P	7.191E-01	2.27E-01	G
PB-214	5.1352E-01						
		351.99	5.011E-01	(P	6.749E-02	3.05E-02	G K
		295.22	5.298E-01	@(P	1.450E-01	5.65E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.203E-01	0.00E+00	G
		241.92	5.332E-01	(	5.383E-01	1.66E-01	G
BI-212	5.9862E-01						
		727.17	5.986E-01	*(P	2.943E-01	1.21E-01	G K
		1620.56	-7.527E-02	& P	9.096E-01	2.48E-01	G
		785.42	-3.098E-01	%	1.625E+00	4.77E-01	G
BI-214	4.7351E-01						
		609.32	4.517E-01	(P	6.611E-02	3.18E-02	G K
		1764.51	5.366E-01	(P	1.203E-01	6.92E-02	G
		1120.28	7.425E-01	+ P	2.891E-01	1.28E-01	G
RA-224	1.1876E+00						
		241.00	1.188E+00	(	9.785E-01	3.05E-01	G
RA-226	1.3697E+00						
		185.99	1.370E+00	(P	1.067E+00	3.32E-01	G
AC-228	8.3133E-01						
		911.07	8.269E-01	(P	1.084E-01	5.83E-02	G K
		968.90	4.656E-01	- P	2.445E-01	8.39E-02	G
		338.40	8.421E-01	@(P	2.420E-01	9.59E-02	G
TH-227	1.2604E-02						
		236.00	1.260E-02	&(	5.924E-01	1.78E-01	G K
		256.25	-1.095E-02	& P	4.631E-01	1.37E-01	G
PA-234	-2.1521E-02						
		98.44	-2.152E-02	%(P	2.016E-01	6.03E-02	G K
		946.00	2.541E-02	% P	1.146E-01	3.31E-02	G
		131.28	1.219E-02	& P	2.006E-01	6.00E-02	G
		94.67	9.158E-03	% P	3.898E-01	1.16E-01	G
		883.24	-4.302E-02	&	2.440E-01	7.10E-02	G
		926.70	8.050E-03	%	1.782E-01	4.91E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 4.501E-02 & P 3.068E-01 9.01E-02 G

TH-234       1.1841E+00
                           63.29 1.184E+00 %(P 4.749E+00 1.42E+00 G K
                           92.80 1.196E+00 & P 2.070E+00 6.28E-01 G
                           92.38 1.079E+00 & P 2.400E+00 7.24E-01 G

AM-241       1.2074E-01
                           59.54 1.207E-01 %(P 1.028E+00 3.07E-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:                      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 - 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 *****

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	-1.1372E-02	-1.2444E-02	2.3156E-01	2.3156E-01	2.430E-01
K-40		1.4817E+01	1.4817E+01	1.1965E+00	1.4737E+00	
MN-54	#A	2.9632E-03	3.0092E-03	2.7874E-02	2.7875E-02	3.168E-02
CO-57	#B	8.2187E-03	8.3664E-03	4.1841E-02	4.1844E-02	4.568E-02
CO-60	#B	8.1235E-03	8.1438E-03	2.6303E-02	2.6307E-02	3.042E-02

Sr-85	#A	-1.7742E-02	-1.9109E-02	3.7492E-02	3.7509E-02	3.831E-02
Kr-85	#A	-4.0973E+02	-4.0975E+02	8.0371E+02	8.0406E+02	8.844E+02
Y-88	#B	-6.3765E-03	-6.6708E-03	2.7908E-02	2.7911E-02	3.048E-02
NB-94	#B	8.1905E-03	8.1905E-03	2.6836E-02	2.6840E-02	3.031E-02
Ag-108M	#B	-7.2743E-04	-7.2750E-04	4.4957E-02	4.4957E-02	5.117E-02
CD-109	#A	1.0861E+00	1.0977E+00	1.6637E+00	1.6648E+00	1.802E+00
SN-113	#B	8.6565E-03	9.0259E-03	4.4224E-02	4.4227E-02	4.759E-02
SB-125	#F	1.0280E-01	1.0329E-01	9.0559E-02	9.0757E-02	9.461E-02
I-131	#B	-7.0248E-03	-1.2778E-02	6.1609E-02	6.1614E-02	3.490E-02
CS-134	#B	1.6236E-02	1.6340E-02	1.4715E-02	1.4746E-02	4.124E-02
CS-137	#A	3.3340E-02	3.3354E-02	3.5034E-02	3.5087E-02	3.706E-02
CE-139	#A	7.5576E-03	7.8267E-03	4.0324E-02	4.0326E-02	4.329E-02
EU-152	#B	2.1987E-02	2.2009E-02	1.2077E-01	1.2078E-01	1.342E-01
EU-154	#B	-9.8660E-03	-9.8812E-03	9.2566E-02	9.2568E-02	1.029E-01
EU-155	#B	8.2357E-02	8.2576E-02	1.6816E-01	1.6822E-01	1.846E-01
HG-203	#B	3.7019E-04	4.1045E-04	3.5447E-02	3.5447E-02	3.607E-02
TL-208		2.9625E-01	2.9625E-01	6.1267E-02	6.3636E-02	
PB-212		7.8735E-01	7.8735E-01	1.1524E-01	1.2397E-01	
PB-214		5.1352E-01	5.1352E-01	9.3758E-02	9.8384E-02	
BI-212	#	5.9862E-01	5.9862E-01	3.6345E-01	3.6511E-01	
BI-214		4.7351E-01	4.7351E-01	9.9820E-02	1.0354E-01	
RA-224		1.1876E+00	1.1876E+00	9.1496E-01	9.1756E-01	9.785E-01
RA-226	#	1.3697E+00	1.3697E+00	9.9659E-01	9.9975E-01	1.067E+00
AC-228		8.3133E-01	8.3133E-01	1.6692E-01	1.7376E-01	
TH-227	#B	1.2604E-02	1.2604E-02	5.3372E-01	5.3372E-01	5.924E-01
PA-234	#B	-2.1521E-02	-2.1521E-02	2.0477E-01	2.0477E-01	2.016E-01
TH-234	#B	1.1841E+00	1.1841E+00	4.2620E+00	4.2626E+00	4.749E+00
AM-241	#A	1.2073E-01	1.2074E-01	9.2142E-01	9.2144E-01	1.028E+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 (1766.1 to 2000.7 keV) 1.9505434E+01 pCi/gm
Total Decayed Activity (1766.1 to 2000.7 keV) 1.9505434E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-NOL-05-01-006-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30MAY2006_1401.An1

Acquisition information

Start time:	30-May-2006 14:03:43
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/channel^2

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:	1.9040E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.9040E+03) = 5.2521E+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	23-May-2006 11:05:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.6201

***** 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	132.	21.21	0.99	9.052E-03	74.81	9.600	1.078E+00	PB212
77.30	173.	13.73	0.99	1.011E-02	77.11	17.500	8.470E-01	PB212
					77.11	10.700	1.385E+00	PB214
87.18	98.	31.00	1.00	1.443E-02	86.45	32.740	1.503E-01	EU155
					88.04	3.790	1.254E+00	CD109
93.37	85.	34.69	1.00	1.668E-02	92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
129.78	138.	32.14	1.12	2.445E-02				
186.54	139.	22.83	0.94	2.565E-02	185.99	3.280	PBC<MDA	RA226
209.50	95.	30.09	1.18	2.470E-02				
239.05	1097.	3.62	1.09	2.318E-02	238.63	43.100	7.699E-01	PB212
242.65	157.	17.23	1.10	2.298E-02	241.00	3.900	1.238E+00	RA224
					241.92	7.470	6.475E-01	PB214
270.92	94.	30.71	1.33	2.148E-02				
295.66	302.	11.62	1.13	2.023E-02	295.22	19.200	5.432E-01	PB214
300.46	65.	32.45	1.27	2.000E-02				
338.89	214.	11.63	1.06	1.828E-02	338.40	12.010	6.881E-01	AC228
352.34	462.	8.00	1.02	1.774E-02	351.99	37.100	4.919E-01	PB214
414.87	44.	35.93	1.53	1.558E-02				
463.90	89.	22.08	1.35	1.424E-02	463.51	10.000	4.382E-01	SB125
511.24	228.	13.58	1.62	1.316E-02	510.72	22.500	4.819E-01	TL208
583.94	351.	8.70	1.44	1.183E-02	583.14	86.000	2.413E-01	TL208
609.97	385.	6.85	1.36	1.143E-02	609.32	46.090	5.101E-01	BI214
662.66	121.	21.09	1.58	1.071E-02	661.62	84.620	9.353E-02	CS137
728.30	104.	19.33	1.53	9.953E-03	727.17	11.800	6.272E-01	BI212
912.21	292.	7.83	1.54	8.393E-03	911.07	29.000	8.414E-01	AC228
965.83	60.	20.36	1.54	8.045E-03				

970.16	155.	10.04	1.54	8.018E-03	968.90	17.460	7.829E-01	AC228
1121.67	100.	19.36	1.78	7.205E-03	1120.28	15.040	6.407E-01	BI214
1334.32	49.	28.67	1.65	6.343E-03	1332.51	99.980	5.173E-02	CO60
1462.55	1301.	2.80	1.78	5.927E-03	1460.75	10.700	1.434E+01	K40
1766.60	64.	13.62	1.55	5.137E-03	1764.51	15.920	5.265E-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	
258.74	129.78	772.	123.	0.062	99.20	1.121	AC-228	s
418.16	209.50	361.	95.	0.047	90.26	1.182	AC-228	s
540.99	270.92	308.	94.	0.047	92.12	1.326	AC-228	s
600.08	300.46	190.	65.	0.032	97.36	1.275	PB-212	
828.88	414.87	103.	44.	0.022	107.80	1.526	SB-126	s
1930.56	965.77	47.	59.	0.030	62.38	1.539	TB-160	D
2667.55	1334.32	43.	49.	0.024	86.00	1.650	CO-60	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

********** 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	346.	132.	0.066	63.64	0.993D
PB-212	153.39	77.11	349.	173.	0.086	41.19	0.995A
EU-155	174.00	87.41	964.	118.	0.059	115.46	1.500s
CD-109	174.10	87.46	945.	125.	0.062	107.97	1.500s
PA-234	185.47	93.15	727.	106.	0.053	111.81	1.500
RA-226	372.16	186.50	760.	169.	0.085	67.43	1.500
PB-212	477.25	239.05	823.	1085.	0.542	16.07	0.993
RA-224	483.16	242.00	704.	185.	0.093	64.57	1.500
PB-214	484.47	242.66	427.	87.	0.044	102.86	0.880
PB-214	590.46	295.66	347.	298.	0.149	34.87	1.127
AC-228	676.92	338.89	186.	213.	0.107	34.90	1.064s
PB-214	703.81	352.34	298.	456.	0.228	24.00	1.021
SB-125	926.07	463.47	161.	64.	0.032	89.83	1.500s
TL-208	1021.59	511.24	224.	201.	0.101	40.73	1.618s
TL-208	1166.99	583.94	175.	346.	0.173	26.09	1.436
BI-214	1219.04	609.97	122.	379.	0.189	20.56	1.363s
CS-137	1323.92	662.42	149.	89.	0.045	79.33	1.530s
BI-212	1455.68	728.30	95.	104.	0.052	57.98	1.529s
AC-228	1823.45	912.21	86.	289.	0.144	23.50	1.541
AC-228	1936.81	968.90	144.	68.	0.034	82.83	1.541D
BI-214	2242.32	1121.67	90.	98.	0.049	58.07	1.781s
K-40	2924.01	1462.57	32.	1260.	0.630	8.47	1.845
BI-214	3531.76	1766.50	9.	47.	0.024	46.83	2.033s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm		COMMENTS
BE-7		3.3899E-02						
			477.56	3.390E-02	%(	3.511E-01	1.03E-01	G
K-40		1.4088E+01						
			1460.75	1.409E+01	(P	3.237E-01	4.04E-01	G
MN-54		-4.1613E-03						
			834.81	-4.161E-03	%(P	3.688E-02	1.07E-02	G
CO-57		-4.0475E-04						
			122.07	-4.048E-04	%(P	4.934E-02	1.47E-02	G K
			136.43	-6.258E-02	%	4.124E-01	1.24E-01	G
CO-60		-5.1004E-03						
			1332.51	-5.100E-03	&(P	4.135E-02	1.14E-02	G K
			1173.23	-6.217E-03	& P	4.778E-02	1.37E-02	G K
Sr-85		-1.0862E-02						
			514.00	-1.086E-02	%(	4.349E-02	1.30E-02	G
Kr-85		-2.3235E+02						
			513.99	-2.324E+02	%(	9.303E+02	2.77E+02	G
Y-88		-1.3036E-03						
			1836.01	-1.304E-03	%(P	2.318E-02	5.93E-03	G K
			898.02	-7.236E-03	% P	4.279E-02	1.24E-02	G
NB-94		7.0516E-03						
			871.10	7.052E-03	&(	3.090E-02	9.03E-03	G K
			702.50	-2.579E-05	&	3.555E-02	1.02E-02	G K
Ag-108M		-7.8294E-03						
			722.95	-7.829E-03	%(	3.732E-02	1.10E-02	G K
			614.37	-3.831E-02	& P	5.246E-02	1.62E-02	G
			433.93	-2.471E-03	%	3.154E-02	9.21E-03	G
CD-109		1.6035E+00						
			88.04	1.603E+00	*(	1.877E+00	5.77E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-4.8963E-03						
		391.71	-4.896E-03	%(	5.304E-02	1.56E-02	G K
		255.04	2.947E-01	%	1.628E+00	4.86E-01	G
SB-125	8.1234E-02						
		427.95	-2.917E-05	%(P	1.017E-01	2.96E-02	G K
		600.77	1.674E-02	& P	1.912E-01	5.58E-02	G
		636.15	-4.078E-02	& P	3.044E-01	8.86E-02	G
		463.51	3.218E-01	@(P	3.097E-01	9.83E-02	G
		176.29	1.585E-01	%	5.475E-01	1.65E-01	G
I-131	1.6955E-02						
		364.48	1.696E-02	%(P	6.408E-02	1.91E-02	G K
		636.97	-1.313E-01	%	8.843E-01	2.59E-01	G
		284.29	-1.883E-01	% P	9.736E-01	2.90E-01	G
CS-134	-1.2103E-02						
		604.66	-1.210E-02	&(	4.073E-02	1.22E-02	G K
		795.76	2.779E-02	% P	4.080E-02	1.27E-02	G
		569.29	-3.228E-02	& P	2.348E-01	6.85E-02	G
		801.84	-1.735E-02	% P	3.875E-01	1.09E-01	G
CS-137	6.9974E-02						
		661.62	6.997E-02	@(P	4.658E-02	1.88E-02	G
CE-139	-3.4968E-03						
		165.85	-3.497E-03	%(	4.880E-02	1.46E-02	G
EU-152	-3.3733E-02						
		121.78	-3.373E-02	%(P	1.325E-01	3.98E-02	G K
		344.30	1.242E-02	% P	1.135E-01	3.35E-02	G
		1408.08	-7.798E-03	%	1.621E-01	4.52E-02	G
		964.00	-8.381E-02	% P	3.043E-01	8.99E-02	G
		1112.07	1.439E-01	%	3.082E-01	9.33E-02	G
		778.90	4.680E-02	&	2.830E-01	8.28E-02	G
EU-154	-9.7623E-05						
		123.10	-9.762E-05	%(	9.513E-02	2.83E-02	G K
		1274.80	3.364E-02	%	1.132E-01	3.34E-02	G
		723.30	-3.188E-02	%	1.734E-01	5.08E-02	G
		1004.80	2.231E-03	&	2.208E-01	6.29E-02	G
EU-155	1.8111E-01						
		86.45	1.811E-01	&(	2.272E-01	6.97E-02	G K
		105.31	-2.221E-02	&	2.294E-01	6.86E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	4.4650E-03						
		279.17	4.465E-03	%(P	4.377E-02	1.30E-02	G K
		72.87	-1.092E-02	% P	2.649E+00	7.91E-01	G
		70.83	2.265E-01	%	3.092E+00	9.17E-01	G
		82.50	-2.037E+00	&	3.687E+00	1.12E+00	G
TL-208	2.4128E-01						
		583.14	2.413E-01	(P	4.480E-02	2.13E-02	G
		510.72	4.819E-01	+ P	1.734E-01	7.41E-02	G
PB-212	7.9221E-01						
		238.63	7.700E-01	(P	9.683E-02	4.17E-02	G K
							Energy duplication
		77.11	6.920E-01	} P	3.598E-01	9.50E-02	G
		74.81	1.078E+00	+ P	7.301E-01	2.34E-01	G
PB-214	5.0938E-01						
		351.99	4.919E-01	(P	8.954E-02	3.99E-02	G K
		295.22	5.432E-01	(P	1.635E-01	6.41E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.646E-01	0.00E+00	G
		241.92	3.607E-01	-	4.084E-01	1.23E-01	G
BI-212	6.2718E-01						
		727.17	6.272E-01	@(P	2.907E-01	1.22E-01	G K
		1620.56	1.704E-02	& P	1.043E+00	2.79E-01	G
		785.42	-1.769E-01	%	1.816E+00	5.27E-01	G
BI-214	5.1010E-01						
		609.32	5.101E-01	@(P	7.296E-02	3.56E-02	G K
		1764.51	4.106E-01	- P	1.460E-01	6.85E-02	G
		1120.28	6.407E-01	+ P	3.072E-01	1.27E-01	G
RA-224	1.4626E+00						
		241.00	1.463E+00	(	9.965E-01	3.15E-01	G
RA-226	1.4267E+00						
		185.99	1.427E+00	(P	1.106E+00	3.45E-01	G
AC-228	8.4141E-01						
		911.07	8.414E-01	(P	1.339E-01	6.67E-02	G K
		968.90	3.452E-01	- P	2.968E-01	9.55E-02	G
		338.40	6.881E-01	- P	2.139E-01	8.05E-02	G
TH-227	-6.7837E-02						
		236.00	-6.784E-02	%(	3.574E-01	1.07E-01	G K
		256.25	-1.062E-01	% P	5.071E-01	1.52E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234       1.0692E-01
                           98.44-1.886E-03 &(P 2.288E-01 6.81E-02 G K
                          946.00 1.226E-02 % P 1.825E-01 5.23E-02 G
                          131.28 2.035E-02 & P 2.166E-01 6.48E-02 G
                           94.67 2.831E-01 &(P 3.441E-01 1.06E-01 G
                          883.24 0.000E+00 %   3.364E-01 9.64E-02 G
                          926.70 1.482E-03 &   3.130E-01 8.86E-02 G
                          569.26-4.781E-02 & P 3.461E-01 1.01E-01 G

TH-234       4.6501E-01
                           63.29 4.650E-01 %(P 6.082E+00 1.81E+00 G K
                           92.80 1.060E+00 % P 2.155E+00 6.51E-01 G
                           92.38 1.812E-02 & P 2.391E+00 7.08E-01 G

AM-241      -1.6690E-01
                           59.54-1.669E-01 %(P 1.087E+00 3.25E-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:                      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 - 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 *****

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	3.0905E-02	3.3899E-02	3.0897E-01	3.0898E-01	3.201E-01
K-40		1.4088E+01	1.4088E+01	1.2116E+00	1.4619E+00	3.237E-01
MN-54	#A	-4.0960E-03	-4.1613E-03	3.6716E-02	3.6716E-02	3.630E-02
CO-57	#B	-3.9742E-04	-4.0475E-04	9.8804E-02	9.8804E-02	4.844E-02
CO-60	#B	-5.0874E-03	-5.1004E-03	1.2978E-01	1.2978E-01	4.124E-02
Sr-85	#A	-1.0066E-02	-1.0862E-02	3.8886E-02	3.8891E-02	4.030E-02
Kr-85	#A	-2.3234E+02	-2.3235E+02	8.3191E+02	8.3202E+02	9.303E+02
Y-88	#B	-1.2446E-03	-1.3036E-03	2.0569E-02	2.0569E-02	2.213E-02
NB-94	#B	7.0516E-03	7.0516E-03	2.7088E-02	2.7091E-02	3.090E-02
Ag-108M	#B	-7.8285E-03	-7.8294E-03	3.2894E-02	3.2897E-02	3.732E-02
CD-109	#A	1.5861E+00	1.6035E+00	1.7312E+00	1.7335E+00	1.856E+00
SN-113	#B	-4.6907E-03	-4.8963E-03	4.6878E-02	4.6879E-02	5.081E-02
SB-125	#B	8.0838E-02	8.1234E-02	7.4423E-02	7.4572E-02	1.012E-01
I-131	#B	9.1742E-03	1.6955E-02	5.7248E-02	5.7257E-02	3.467E-02
CS-134	#B	-1.2024E-02	-1.2103E-02	3.6477E-02	3.6483E-02	4.047E-02
CS-137	#	6.9942E-02	6.9974E-02	5.6374E-02	5.6521E-02	
CE-139	#A	-3.3735E-03	-3.4968E-03	4.3682E-02	4.3683E-02	4.707E-02
EU-152	#B	-3.3697E-02	-3.3733E-02	1.2652E-01	1.2654E-01	1.324E-01
EU-154	#B	-9.7468E-05	-9.7623E-05	8.4781E-02	8.4781E-02	9.498E-02
EU-155	#A	1.8061E-01	1.8111E-01	2.0911E-01	2.0935E-01	2.265E-01
HG-203	#B	4.0160E-03	4.4650E-03	3.8949E-02	3.8949E-02	3.936E-02
TL-208		2.4128E-01	2.4128E-01	6.3743E-02	6.5264E-02	
PB-212		7.9221E-01	7.9221E-01	1.2868E-01	1.3665E-01	
PB-214		5.0938E-01	5.0938E-01	1.0924E-01	1.1317E-01	
BI-212	#	6.2718E-01	6.2718E-01	3.6537E-01	3.6718E-01	
BI-214	#	5.1010E-01	5.1010E-01	1.0666E-01	1.1069E-01	
RA-224		1.4626E+00	1.4626E+00	9.4447E-01	9.4828E-01	9.965E-01
RA-226	#	1.4266E+00	1.4267E+00	1.0356E+00	1.0389E+00	1.106E+00
AC-228		8.4141E-01	8.4141E-01	2.0006E-01	2.0594E-01	
TH-227	#B	-6.7837E-02	-6.7837E-02	3.2124E-01	3.2126E-01	3.574E-01
PA-234	#B	1.0692E-01	1.0692E-01	1.1993E-01	1.2008E-01	2.288E-01
TH-234	#B	4.6501E-01	4.6501E-01	5.4256E+00	5.4257E+00	6.082E+00
AM-241	#A	-1.6689E-01	-1.6690E-01	9.9486E-01	9.9491E-01	1.087E+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

YAEC Chemistry Lab Spectrum name: 103F_30MAY2006_1401.An1

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

Total Activity (1120.0 to 2000.7 keV) 1.9142168E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.9142199E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_30MAY2006_1442.An1

Sample description
FSS-NOL-05-01-018-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30MAY2006_1442.An1

Acquisition information
Start time: 30-May-2006 14:43:26
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/channel^2

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: 1.9260E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9260E+03) =
5.1921E+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	23-May-2006 10:40:00
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: 0.6503

***** 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
74.85	135.	19.92	0.99	9.330E-03	74.81	9.600	1.065E+00	PB212
77.39	237.	12.58	0.99	1.050E-02	77.11	17.500	9.282E-01	PB212
87.15	87.	33.12	1.00	1.435E-02				
87.15	87.	33.12	1.00	1.435E-02	88.04	3.790	1.110E+00	CD109
93.25	125.	23.65	1.00	1.658E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.56	138.	32.57	0.73	2.443E-02				
186.68	127.	24.56	1.19	2.564E-02	185.99	3.280	PBC<MDA	RA226
209.96	134.	30.26	0.91	2.468E-02				
239.10	1172.	3.44	1.09	2.318E-02	238.63	43.100	8.143E-01	PB212
					241.92	7.470	4.783E+00	PB214
295.70	299.	7.79	1.13	2.023E-02	295.22	19.200	5.331E-01	PB214
300.44	79.	23.96	1.13	2.000E-02				
328.61	88.	29.39	0.82	1.871E-02				
338.69	204.	17.57	1.18	1.829E-02	338.40	12.010	6.477E-01	AC228
352.29	508.	7.67	1.09	1.774E-02	351.99	37.100	5.346E-01	PB214
409.83	59.	32.70	1.18	1.574E-02				
463.79	95.	20.98	1.16	1.424E-02	463.51	10.000	4.639E-01	SB125
511.40	159.	18.80	1.57	1.316E-02	510.72	22.500	3.133E-01	TL208
583.89	384.	7.12	1.18	1.183E-02	583.14	86.000	2.618E-01	TL208
609.98	389.	7.66	1.33	1.143E-02	609.32	46.090	5.085E-01	BI214
662.67	83.	28.91	1.40	1.071E-02	661.62	84.620	6.314E-02	CS137
728.09	139.	18.07	1.99	9.955E-03	727.17	11.800	8.247E-01	BI212
786.11	60.	30.33	1.13	9.394E-03	785.42	2.000	2.248E+00	BI212
795.91	51.	27.19	1.50	9.301E-03	795.76	85.400	4.499E-02	CS134
861.62	55.	29.49	1.52	8.759E-03				
912.42	280.	9.85	1.36	8.392E-03	911.07	29.000	7.967E-01	AC228

965.86	46.	26.49	1.54	8.044E-03				
965.86	46.	26.49	1.54	8.044E-03	968.90	17.460	2.306E-01	AC228
970.41	129.	11.65	1.54	8.016E-03				
1121.66	103.	20.29	1.85	7.205E-03	1120.28	15.040	6.566E-01	BI214
1462.80	1434.	2.71	1.97	5.926E-03	1460.75	10.700	1.564E+01	K40
1622.26	23.	27.10	0.81	5.488E-03	1620.56	2.750	1.077E+00	BI212
1767.20	70.	12.82	1.83	5.136E-03				

********** 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	
173.47	87.08	375.	87.	0.044	99.36	1.001	PB-214	lD
258.30	129.56	753.	138.	0.069	88.39	0.725	AC-228	s
419.08	209.96	579.	134.	0.067	90.79	0.906	NP-239	
484.08	242.42	297.	131.	0.065	61.69	1.095	XE-138	lD
599.92	300.39	158.	72.	0.036	80.87	1.278	PB-212	
656.37	328.61	230.	88.	0.044	88.16	0.824	RH-106M	s
818.79	409.83	135.	59.	0.029	98.11	1.177	AC-228	s
1722.28	861.62	80.	55.	0.027	88.46	1.517	TL-208	
1930.80	965.86	51.	47.	0.023	78.43	1.539	TB-160	D
1939.91	970.42	52.	126.	0.063	36.16	1.542	AC-228	D
3533.34	1767.20	4.	74.	0.037	36.66	2.035	XE-138	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	148.79	74.81	353.	136.	0.068	62.44	0.993D
PB-212	153.39	77.11	371.	192.	0.096	45.35	0.995A
TH-234	185.48	93.15	995.	118.	0.059	101.37	1.500s
TH-234	185.52	93.17	967.	120.	0.060	98.53	1.500s
RA-226	372.05	186.44	741.	163.	0.081	68.90	1.500
PB-212	477.32	239.08	772.	1082.	0.541	15.38	1.044
PB-214	477.39	239.12	338.	1003.	0.501	12.26	1.500s
PB-214	590.46	295.66	233.	292.	0.146	29.05	1.242
AC-228	676.52	338.69	361.	203.	0.101	52.70	1.181
PB-214	703.72	352.29	331.	502.	0.251	23.02	1.087s
SB-125	926.78	463.83	160.	88.	0.044	67.65	1.500s
TL-208	1021.91	511.40	243.	132.	0.066	56.40	1.567s
TL-208	1166.87	583.89	122.	380.	0.190	21.36	1.185
BI-214	1219.06	609.98	153.	382.	0.191	22.98	1.326s
Ag-108M	1223.91	612.41	259.	-66.	-0.033	109.45	1.500s
CS-137	1324.43	662.67	155.	82.	0.041	86.73	1.402
BI-212	1455.26	728.09	133.	138.	0.069	54.21	1.987s
BI-212	1571.28	786.11	83.	60.	0.030	91.00	1.129s
CS-134	1590.88	795.91	70.	51.	0.025	81.56	1.500s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1823.87	912.42	123.	277.	0.138	29.54	1.361
BI-214	2242.29	1121.66	95.	102.	0.051	60.88	1.852
K-40	2924.45	1462.79	45.	1391.	0.695	8.14	1.845
BI-212	3243.32	1622.26	5.	23.	0.012	81.29	0.806s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-4.4080E-04					
			477.56	-4.408E-04	%(	3.181E-01 9.21E-02	G
K-40		1.5376E+01					
			1460.75	1.538E+01	(P	3.739E-01 4.23E-01	G
MN-54		1.0900E-02					
			834.81	1.090E-02	&(P	3.349E-02 9.94E-03	G
CO-57		1.6744E-02					
			122.07	1.674E-02	%(P	4.890E-02 1.47E-02	G K
			136.43	8.653E-02	%	3.908E-01 1.17E-01	G
CO-60		-5.0348E-03					
			1332.51	-5.035E-03	%(P	3.954E-02 1.09E-02	G K
			1173.23	1.731E-02	% P	4.074E-02 1.22E-02	G K
Sr-85		-1.1684E-02					
			514.00	-1.168E-02	&(	4.353E-02 1.30E-02	G
Kr-85		-2.4984E+02					
			513.99	-2.498E+02	&(	9.309E+02 2.78E+02	G
Y-88		3.9753E-03					
			1836.01	3.975E-03	%(P	2.099E-02 5.68E-03	G K
			898.02	-5.816E-04	% P	4.225E-02 1.20E-02	G
NB-94		-7.6856E-05					
			871.10	-7.686E-05	%(	3.606E-02 1.03E-02	G K
			702.50	1.042E-02	&	3.656E-02 1.09E-02	G K
Ag-108M		-1.8994E-05					
			722.95	-1.899E-05	%(	3.120E-02 8.83E-03	G K
			614.37	-4.533E-02	+ P	5.308E-02 1.65E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	-5.530E-04	&	3.406E-02	9.92E-03	G
CD-109	1.2694E+00						
		88.04	1.269E+00	%(	1.861E+00	5.69E-01	G
SN-113	-8.0689E-03						
		391.71	-8.069E-03	%(	5.189E-02	1.54E-02	G K
		255.04	3.125E-01	%	1.533E+00	4.58E-01	G
SB-125	1.0715E-01						
		427.95	-3.898E-03	%(P	9.969E-02	2.91E-02	G K
		600.77	-2.903E-02	% P	1.664E-01	4.88E-02	G
		636.15	-3.292E-03	% P	3.037E-01	8.73E-02	G
		463.51	4.358E-01	(P	3.047E-01	9.97E-02	G
		176.29	9.614E-02	&	5.638E-01	1.69E-01	G
I-131	-1.8355E-02						
		364.48	-1.835E-02	%(P	7.147E-02	2.13E-02	G K
		636.97	-1.167E-02	%	7.573E-01	2.17E-01	G
		284.29	-1.492E-01	% P	9.728E-01	2.89E-01	G
CS-134	2.5430E-02						
		604.66	8.313E-03	%(	3.338E-02	9.88E-03	G K
		795.76	4.499E-02	(P	3.700E-02	1.23E-02	G
		569.29	-1.476E-02	& P	2.284E-01	6.61E-02	G
		801.84	2.633E-02	& P	3.632E-01	1.04E-01	G
CS-137	6.3140E-02						
		661.62	6.314E-02	(P	4.704E-02	1.86E-02	G
CE-139	-9.7387E-03						
		165.85	-9.739E-03	&(	4.845E-02	1.45E-02	G
EU-152	4.7721E-02						
		121.78	4.772E-02	%(P	1.410E-01	4.25E-02	G K
		344.30	7.508E-03	% P	1.223E-01	3.61E-02	G
		1408.08	-2.797E-02	%	1.682E-01	4.82E-02	G
		964.00	-3.259E-03	% P	2.999E-01	8.59E-02	G
		1112.07	-3.882E-03	&	3.247E-01	9.28E-02	G
		778.90	-8.942E-03	%	2.317E-01	6.60E-02	G
EU-154	4.2969E-03						
		123.10	4.297E-03	&(	1.050E-01	3.13E-02	G K
		1274.80	-3.703E-03	%	1.336E-01	3.82E-02	G
		723.30	-1.554E-03	%	1.561E-01	4.45E-02	G
		1004.80	5.667E-03	%	1.954E-01	5.54E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.9577E-03						
		86.45	1.958E-03	%(	2.115E-01	6.30E-02	G K
		105.31	5.043E-02	&	2.306E-01	6.93E-02	G
HG-203	-4.5268E-03						
		279.17	-4.527E-03	%(P	4.216E-02	1.25E-02	G K
		72.87	-5.564E-01	% P	2.301E+00	6.92E-01	G
		70.83	-6.968E-02	%	4.640E+00	1.38E+00	G
		82.50	-6.231E-01	&	4.139E+00	1.24E+00	G
TL-208	2.7248E-01						
		583.14	2.618E-01	(P	3.731E-02	1.89E-02	G
		510.72	3.133E-01	*(P	1.783E-01	7.08E-02	G
PB-212	7.5937E-01						
		238.63	7.594E-01	(P	9.275E-02	3.94E-02	G K
							Energy duplication
		77.11	7.594E-01	} P	3.667E-01	1.15E-01	G
		74.81	1.099E+00	+ P	7.288E-01	2.34E-01	G
PB-214	5.3211E-01						
		351.99	5.346E-01	@(P	9.322E-02	4.15E-02	G K
		295.22	5.273E-01	(P	1.332E-01	5.18E-02	G
							Energy duplication
		77.11	5.667E-03	} P	8.037E-01	1.87E-01	G
		241.92	4.090E+00	+	3.607E-01	1.67E-01	G
BI-212	8.7230E-01						
		727.17	8.247E-01	(P	3.366E-01	1.50E-01	G K
		1620.56	1.077E+00	(P	6.029E-01	2.93E-01	G
		785.42	2.248E+00	+	1.685E+00	6.82E-01	G
BI-214	5.0853E-01						
		609.32	5.085E-01	@(P	8.028E-02	3.97E-02	G K
		1764.51	-6.030E-02	% P	2.277E-01	6.04E-02	G
		1120.28	6.566E-01	+ P	3.121E-01	1.36E-01	G
RA-224	-4.3123E-01						
		241.00	-4.312E-01	&(	1.080E+00	3.26E-01	G
RA-226	1.3584E+00						
		185.99	1.358E+00	(P	1.080E+00	3.37E-01	G
AC-228	7.9666E-01						
		911.07	7.967E-01	(P	1.569E-01	7.95E-02	G K
		968.90	4.734E-02	% P	7.916E-02	2.51E-02	G
		338.40	6.477E-01	- P	2.913E-01	1.14E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227       1.1428E-02
                          236.00 1.143E-02 %(  5.881E-01 1.76E-01 G K
                          256.25-9.021E-02 % P 4.787E-01 1.43E-01 G

PA-234      -3.0075E-02
                           98.44-3.008E-02 &(P 2.078E-01 6.21E-02 G K
                          946.00-3.719E-02 % P 1.789E-01 5.23E-02 G
                          131.28-2.637E-02 & P 1.831E-01 5.47E-02 G
                           94.67-5.113E-02 & P 3.914E-01 1.17E-01 G
                          883.24 1.101E-01 %   2.660E-01 8.00E-02 G
                          926.70 3.179E-03 %   2.359E-01 6.54E-02 G
                          569.26-4.209E-02 & P 3.256E-01 9.46E-02 G

TH-234       1.8381E+00
                           63.29 1.856E+00 %(P 5.936E+00 1.78E+00 G K
                           92.80 1.702E+00  (P 2.099E+00 6.42E-01 G
                           92.38 1.969E+00  (P 2.506E+00 7.65E-01 G

AM-241      -5.4095E-01
                           59.54-5.409E-01 %(P 1.179E+00 3.57E-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:                      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 - 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	-4.0163E-04	-4.4080E-04	2.7635E-01	2.7635E-01	2.898E-01
K-40		1.5376E+01	1.5376E+01	1.2678E+00	1.5505E+00	3.739E-01
MN-54	#A	1.0727E-02	1.0900E-02	2.9832E-02	2.9839E-02	3.296E-02
CO-57	#B	1.6439E-02	1.6744E-02	4.4247E-02	4.4256E-02	4.801E-02
CO-60	#B	-5.0218E-03	-5.0348E-03	1.2393E-01	1.2393E-01	3.943E-02
Sr-85	#A	-1.0822E-02	-1.1684E-02	3.8992E-02	3.8998E-02	4.032E-02
Kr-85	#A	-2.4983E+02	-2.4984E+02	8.3380E+02	8.3392E+02	9.309E+02
Y-88	#B	3.7942E-03	3.9753E-03	1.7043E-02	1.7045E-02	2.003E-02
NB-94	#B	-7.6856E-05	-7.6856E-05	3.0847E-02	3.0847E-02	3.606E-02
Ag-108M	#B	-1.8992E-05	-1.8994E-05	2.6493E-02	2.6493E-02	3.119E-02
CD-109	#A	1.2555E+00	1.2694E+00	1.7061E+00	1.7076E+00	1.841E+00
SN-113	#B	-7.7280E-03	-8.0689E-03	4.6070E-02	4.6072E-02	4.970E-02
SB-125	#F	1.0662E-01	1.0715E-01	7.3532E-02	7.3795E-02	9.920E-02
I-131	#B	-9.8931E-03	-1.8355E-02	6.8442E-02	6.8450E-02	3.852E-02
CS-134	#B	2.5263E-02	2.5430E-02	2.0777E-02	2.0829E-02	3.316E-02
CS-137		6.3112E-02	6.3140E-02	5.5694E-02	5.5814E-02	
CE-139	#A	-9.3930E-03	-9.7387E-03	4.3605E-02	4.3609E-02	4.673E-02
EU-152	#B	4.7670E-02	4.7721E-02	1.2754E-01	1.2757E-01	1.408E-01
EU-154	#B	4.2900E-03	4.2969E-03	9.3937E-02	9.3938E-02	1.048E-01
EU-155	#B	1.9524E-03	1.9577E-03	1.8886E-01	1.8886E-01	2.109E-01
HG-203	#B	-4.0689E-03	-4.5268E-03	3.7802E-02	3.7803E-02	3.790E-02
TL-208		2.7248E-01	2.7248E-01	5.8856E-02	6.0945E-02	
PB-212		7.5937E-01	7.5937E-01	1.1808E-01	1.2604E-01	
PB-214		5.3211E-01	5.3211E-01	9.9875E-02	1.0454E-01	
BI-212		8.7230E-01	8.7230E-01	4.2720E-01	4.3019E-01	
BI-214		5.0853E-01	5.0853E-01	1.1886E-01	1.2247E-01	
RA-224	#A	-4.3123E-01	-4.3123E-01	9.7944E-01	9.7976E-01	1.080E+00
RA-226	#	1.3584E+00	1.3584E+00	1.0104E+00	1.0134E+00	1.080E+00
AC-228		7.9666E-01	7.9666E-01	2.3818E-01	2.4262E-01	
TH-227	#B	1.1428E-02	1.1428E-02	5.2907E-01	5.2907E-01	5.881E-01
PA-234	#B	-3.0075E-02	-3.0075E-02	2.0614E-01	2.0615E-01	2.078E-01
TH-234	#B	1.8381E+00	1.8381E+00	2.0274E+00	2.0299E+00	5.936E+00
AM-241	#A	-5.4093E-01	-5.4095E-01	1.0789E+00	1.0793E+00	1.179E+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

YAEC Chemistry Lab Spectrum name: 103F_30MAY2006_1442.An1

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

Total Activity (1767.1 to 2000.7 keV) 1.9180361E+01 pCi/gm
Total Decayed Activity (1767.1 to 2000.7 keV) 1.9180389E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107_8JUN2006_1031.An1

Sample description
NOL-05-01-27-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\107_8JUN2006_1031.An1

Acquisition information
Start time: 08-Jun-2006 10:31:53
Live time: 2000
Real time: 2003
Dead time: 0.17 %
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/channel^2

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: 2.1540E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1540E+03) =
4.6425E+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	08-Jun-2006 09:50:00
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: 0.1605

***** 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
74.81	314.	15.36	1.18	2.849E-02	74.81	9.600	7.211E-01	PB212
77.11	333.	12.56	1.18	2.957E-02	77.11	17.500	6.338E-01	PB212
					77.11	10.700	1.027E+00	PB214
77.16	179.	30.76	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
87.04	175.	40.57	1.15	3.300E-02	86.45	32.740	1.020E-01	EU155
92.94	124.	39.09	1.19	3.441E-02	88.04	3.790	PBC<MDA	CD109
					92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.10	279.	22.90	1.29	3.609E-02	185.99	3.280	1.479E+00	RA226
209.23	132.	30.87	1.18	3.429E-02				
239.13	1631.	4.28	1.35	3.185E-02	238.63	43.100	7.372E-01	PB212
242.03	168.	23.73	1.30	3.163E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	4.453E-01	PB214
270.29	103.	36.10	1.35	2.944E-02				
295.40	289.	10.94	1.34	2.766E-02	295.22	19.200	3.360E-01	PB214
300.04	80.	33.41	1.34	2.735E-02				
338.52	276.	15.83	1.42	2.500E-02	338.40	12.010	5.689E-01	AC228
352.20	573.	8.59	1.83	2.425E-02	351.99	37.100	3.956E-01	PB214
462.81	112.	33.97	1.11	1.955E-02				
462.81	112.	33.97	1.11	1.955E-02	463.51	10.000	3.514E-01	SB125
510.63	195.	19.02	1.69	1.808E-02	510.72	22.500	2.482E-01	TL208
583.19	480.	9.03	1.60	1.629E-02	583.14	86.000	2.129E-01	TL208
609.32	526.	7.32	1.76	1.574E-02	609.32	46.090	4.511E-01	BI214
661.81	4028.	1.71	1.81	1.477E-02	661.62	84.620	2.020E+00	CS137
727.06	124.	16.13	1.87	1.374E-02	727.17	11.800	4.747E-01	BI212
769.79	111.	20.82	0.80	1.316E-02				

794.87	45.	35.28	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
860.54	72.	21.95	1.88	1.211E-02				
911.41	316.	7.97	1.96	1.160E-02	911.07	29.000	5.818E-01	AC228
964.73	52.	25.60	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152
969.24	152.	11.45	1.80	1.109E-02	968.90	17.460	4.845E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.64	140.	18.13	1.31	9.968E-03	1120.28	15.040	5.821E-01	BI214
1173.20	75.	27.57	1.79	9.637E-03	1173.23	99.860	4.905E-02	CO60
1238.61	64.	27.52	1.03	9.260E-03				
1333.30	61.	22.07	1.42	8.773E-03	1332.51	99.980	4.380E-02	CO60
1460.95	1624.	2.54	2.14	8.190E-03	1460.75	10.700	1.159E+01	K40
1621.23	34.	20.35	0.63	7.569E-03	1620.56	2.750	1.028E+00	BI212
1764.70	108.	9.58	2.84	7.084E-03	1764.51	15.920	6.014E-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	
173.74	87.04	1867.	175.	0.087	121.71	1.155	BI-207	l
418.10	209.23	733.	132.	0.066	92.62	1.175	AC-228	
540.20	270.29	555.	103.	0.051	108.29	1.348	AC-228	
599.69	300.09	319.	80.	0.040	100.23	1.341	PB-212	lD
1539.14	769.79	113.	111.	0.055	49.82	0.802	BI-214	s
1720.65	860.54	69.	72.	0.036	65.84	1.885	TL-208	s
1929.21	964.50	61.	52.	0.026	75.77	1.796	AC-228	D
2476.79	1238.61	92.	64.	0.032	82.55	1.033	CO-56	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	149.29	74.81	1040.	314.	0.157	46.08	1.178D
PB-212	153.89	77.11	1090.	333.	0.167	37.69	1.179A
PB-214	153.89	77.11	1935.	179.	0.090	92.28	1.500A
RA-226	371.84	186.10	1361.	279.	0.140	68.71	1.293s
PB-212	476.89	238.63	538.	1323.	0.661	10.94	1.297D
PB-214	483.47	241.92	722.	168.	0.084	71.18	1.299D
PB-214	590.38	295.38	723.	365.	0.183	40.73	1.722s
AC-228	676.66	338.52	564.	272.	0.136	47.48	1.419s
PB-214	704.00	352.20	582.	567.	0.284	25.76	1.831s
SB-125	926.09	463.25	465.	79.	0.039	116.35	1.500s
TL-208	1020.86	510.63	401.	161.	0.080	57.07	1.687s
TL-208	1165.96	583.19	346.	475.	0.238	27.09	1.599s
BI-214	1218.22	609.32	256.	522.	0.261	21.97	1.759
CS-137	1323.20	661.81	201.	4024.	2.012	5.14	1.808
BI-212	1453.69	727.06	93.	123.	0.061	48.39	1.874s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	1589.30	794.87	106.	45.	0.022	105.85	1.684
AC-228	1822.39	911.41	101.	312.	0.156	23.90	1.957
AC-228	1937.36	968.90	84.	150.	0.075	35.14	1.799D
BI-214	2240.84	1120.64	127.	139.	0.070	54.38	1.309s
CO-60	2345.97	1173.20	122.	75.	0.038	82.71	1.789s
CO-60	2666.18	1333.30	48.	61.	0.031	66.21	1.422s
K-40	2921.50	1460.95	21.	1619.	0.809	7.63	2.139
BI-212	3242.08	1621.23	4.	34.	0.017	61.04	0.626s
BI-214	3529.06	1764.70	1.	108.	0.054	28.73	2.836s

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	Peak Energy keV	Peak Activity pCi/gm	Code	Peak MDA Value pCi/gm		COMMENTS
BE-7		-6.3779E-02						
			477.56	-6.378E-02	%(	2.940E-01	8.78E-02	G
K-40		1.1588E+01						
			1460.75	1.159E+01	(P	1.727E-01	2.96E-01	G
MN-54		6.9392E-03						
			834.81	6.939E-03	%(P	2.781E-02	8.23E-03	G
CO-57		4.7141E-03						
			122.07	4.714E-03	%(P	3.637E-02	1.09E-02	G K
			136.43	2.735E-03	% P	2.835E-01	8.48E-02	G
CO-60		4.6423E-02						
			1332.51	4.380E-02	(P	2.497E-02	1.03E-02	G K
			1173.23	4.905E-02	*(P	3.529E-02	1.43E-02	G K
Sr-85		-1.3169E-02						
			514.00	-1.317E-02	&(	3.597E-02	1.08E-02	G
Kr-85		-3.2814E+02						
			513.99	-3.281E+02	&(P	8.329E+02	2.50E+02	G
Y-88		-1.7446E-04						
			1836.01	-1.745E-04	%(P	1.715E-02	4.35E-03	G K
			898.02	-6.626E-03	& P	2.733E-02	7.97E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-3.6430E-03						
		871.10	-3.643E-03	&(P	2.431E-02	7.08E-03	G K
		702.50	-3.632E-03	% P	2.128E-02	6.20E-03	G K
Ag-108M	-6.8904E-03						
		722.95	-6.890E-03	%(	3.101E-02	9.19E-03	G K
		614.37	-1.525E-03	%	3.676E-02	1.08E-02	G
		433.93	8.157E-03	% P	3.331E-02	9.96E-03	G
CD-109	1.9563E-01						
		88.04	1.956E-01	%(P	9.221E-01	2.77E-01	G
SN-113	-8.2887E-03						
		391.71	-8.289E-03	%(P	4.475E-02	1.33E-02	G K
		255.04	-2.356E-01	%	1.278E+00	3.83E-01	G
SB-125	7.0129E-02						
		427.95	8.101E-03	%(P	9.773E-02	2.89E-02	G K
		600.77	1.875E-04	% P	1.424E-01	4.14E-02	G
		636.15	-1.975E-02	& P	2.352E-01	6.87E-02	G
		463.51	2.537E-01	(P	3.315E-01	1.02E-01	G
		176.29	-1.430E-01	% P	4.768E-01	1.44E-01	G
I-131	-2.5279E-04						
		364.48	-2.528E-04	%(	3.127E-02	9.22E-03	G K
		636.97	1.147E-01	%	3.706E-01	1.11E-01	G
		284.29	-9.590E-02	%	4.528E-01	1.36E-01	G
CS-134	1.3197E-02						
		604.66	2.288E-03	%(P	2.327E-02	6.79E-03	G K
		795.76	2.567E-02	(P	2.901E-02	9.16E-03	G
		569.29	6.013E-02	&	1.350E-01	4.08E-02	G
		801.84	-1.505E-03	& P	3.808E-01	1.11E-01	G
CS-137	2.0199E+00						
		661.62	2.020E+00	(P	3.449E-02	3.46E-02	G
CE-139	-4.9835E-03						
		165.85	-4.983E-03	%(P	3.698E-02	1.11E-02	G
EU-152	7.7621E-03						
		121.78	7.762E-03	%(P	1.107E-01	3.32E-02	G K
		344.30	-2.683E-02	% P	9.024E-02	2.70E-02	G
		1408.08	5.873E-02	% P	9.548E-02	2.96E-02	G
		964.00	-7.383E-02	& P	2.650E-01	7.90E-02	G
		1112.07	-2.362E-03	% P	2.591E-01	7.47E-02	G
		778.90	4.101E-02	% P	1.678E-01	4.94E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	8.2489E-03						
		123.10	8.249E-03	%(P	7.994E-02	2.40E-02	G K
		1274.80	2.580E-02	& P	6.872E-02	2.05E-02	G
		723.30	-2.991E-02	% P	1.368E-01	4.04E-02	G
		1004.80	-3.945E-02	% P	1.703E-01	5.02E-02	G
EU-155	6.3050E-02						
		86.45	6.305E-02	%(	1.274E-01	3.87E-02	G K
		105.31	1.782E-02	% P	1.590E-01	4.77E-02	G
HG-203	-5.3850E-03						
		279.17	-5.385E-03	%(P	3.559E-02	1.06E-02	G K
		72.87	-6.276E-01	& P	9.198E-01	2.80E-01	G
		70.83	-9.628E-01	%	1.489E+00	4.54E-01	G
		82.50	-5.688E-01	%	1.906E+00	5.75E-01	G
TL-208	2.2024E-01						
		583.14	2.129E-01	@(P	4.001E-02	1.94E-02	G
		510.72	2.482E-01	*(P	1.481E-01	5.71E-02	G
PB-212	6.1240E-01						
		238.63	6.037E-01	(P	5.057E-02	2.23E-02	G K
							Energy duplication
		77.11	4.041E-01	}	1.898E-01	5.08E-02	G
		74.81	7.211E-01	+ P	3.508E-01	1.12E-01	G
PB-214	4.1223E-01						
		351.99	3.956E-01	@(P	8.022E-02	3.43E-02	G K
		295.22	4.315E-01	(P	1.511E-01	5.93E-02	G
							Energy duplication
		77.11	3.557E-01	} P	4.118E-01	1.09E-01	G
		241.92	4.453E-01	(P	3.397E-01	1.07E-01	G
BI-212	4.7474E-01						
		727.17	4.747E-01	*(P	1.846E-01	7.74E-02	G K
		1620.56	1.028E+00	+ P	3.591E-01	2.12E-01	G
		785.42	4.003E-01	% P	1.191E+00	3.54E-01	G
BI-214	4.5108E-01						
		609.32	4.511E-01	(P	6.686E-02	3.33E-02	G K
		1764.51	6.014E-01	+ P	4.100E-02	5.81E-02	G
		1120.28	5.821E-01	+ P	2.310E-01	1.06E-01	G
RA-224	-1.1327E-02						
		241.00	-1.133E-02	%(P	8.654E-01	2.58E-01	G
RA-226	1.4792E+00						
		185.99	1.479E+00	*(	9.251E-01	3.39E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AC-228       5.7799E-01
                          911.07 5.818E-01  (P 9.226E-02 4.70E-02 G K
                          968.90 4.845E-01 - P 1.475E-01 5.76E-02 G
                          338.40 5.689E-01 *(P 2.368E-01 9.11E-02 G

TH-227      -8.8203E-03
                          236.00-8.820E-03 %(P 2.794E-01 8.34E-02 G K
                          256.25 1.902E-02 % P 4.282E-01 1.28E-01 G

PA-234      -5.4660E-03
                           98.44-5.466E-03 &(  1.386E-01 4.15E-02 G K
                          946.00-2.456E-02 %   1.112E-01 3.25E-02 G
                          131.28-7.613E-04 &   1.476E-01 4.41E-02 G
                           94.67-6.171E-02 %   2.514E-01 7.58E-02 G
                          883.24 3.675E-04 &   1.957E-01 5.58E-02 G
                          926.70-6.345E-02 %   2.504E-01 7.41E-02 G
                          569.26 7.160E-03 &   2.266E-01 6.60E-02 G

TH-234       1.2396E-01
                           63.29 1.240E-01 %(P 1.601E+00 4.79E-01 G K
                           92.80 8.377E-01 % P 1.289E+00 3.92E-01 G
                           92.38-1.174E-01 % P 1.561E+00 4.67E-01 G

AM-241      -2.1517E-03
                           59.54-2.152E-03 &(P 2.098E-01 6.28E-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
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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	-6.3755E-02	-6.3779E-02	2.6333E-01	2.6335E-01	2.939E-01
K-40		1.1588E+01	1.1588E+01	8.8730E-01	1.1206E+00	
MN-54	#A	6.9388E-03	6.9392E-03	2.4701E-02	2.4704E-02	2.781E-02
CO-57	#B	4.7137E-03	4.7141E-03	3.2757E-02	3.2758E-02	3.636E-02
CO-60		4.6423E-02	4.6423E-02	2.6012E-02	2.6156E-02	
Sr-85	#A	-1.3165E-02	-1.3169E-02	3.2532E-02	3.2541E-02	3.596E-02
Kr-85	#A	-3.2814E+02	-3.2814E+02	8.7067E+02	8.7089E+02	8.329E+02
Y-88	#B	-1.7442E-04	-1.7446E-04	2.0984E-02	2.0984E-02	1.714E-02
NB-94	#B	-3.6430E-03	-3.6430E-03	2.2071E-02	2.2072E-02	2.431E-02
Ag-108M	#B	-6.8904E-03	-6.8904E-03	2.7560E-02	2.7563E-02	3.101E-02
CD-109	#A	1.9562E-01	1.9563E-01	8.3245E-01	8.3252E-01	9.220E-01
SN-113	#B	-8.2872E-03	-8.2887E-03	4.8431E-02	4.8434E-02	4.475E-02
SB-125	#B	7.0128E-02	7.0129E-02	8.4499E-02	8.4601E-02	9.772E-02
I-131	#B	-2.5216E-04	-2.5279E-04	2.7672E-02	2.7672E-02	3.119E-02
CS-134	#B	1.3197E-02	1.3197E-02	1.4134E-02	1.4156E-02	2.327E-02
CS-137		2.0199E+00	2.0199E+00	1.0386E-01	1.5817E-01	
CE-139	#A	-4.9827E-03	-4.9835E-03	3.4257E-02	3.4259E-02	3.698E-02
EU-152	#B	7.7621E-03	7.7621E-03	9.9630E-02	9.9631E-02	1.107E-01
EU-154	#B	8.2488E-03	8.2489E-03	7.1982E-02	7.1983E-02	7.994E-02
EU-155	#B	6.3050E-02	6.3050E-02	1.1603E-01	1.1608E-01	1.274E-01
HG-203	#B	-5.3827E-03	-5.3850E-03	3.6289E-02	3.6291E-02	3.557E-02
TL-208	#	2.2024E-01	2.2024E-01	6.0222E-02	6.1611E-02	
PB-212		6.1240E-01	6.1240E-01	6.7805E-02	7.6848E-02	
PB-214		4.1223E-01	4.1223E-01	1.0714E-01	1.0987E-01	
BI-212	#	4.7474E-01	4.7474E-01	2.3212E-01	2.3381E-01	
BI-214		4.5108E-01	4.5108E-01	9.9916E-02	1.0341E-01	
RA-224	#A	-1.1327E-02	-1.1327E-02	3.4590E+00	3.4590E+00	8.654E-01
RA-226	#	1.4792E+00	1.4792E+00	1.0164E+00	1.0202E+00	
AC-228		5.7799E-01	5.7799E-01	1.3999E-01	1.4409E-01	
TH-227	#B	-8.8203E-03	-8.8203E-03	2.7896E-01	2.7896E-01	2.794E-01
PA-234	#B	-5.4660E-03	-5.4660E-03	1.2458E-01	1.2458E-01	1.386E-01
TH-234	#B	1.2396E-01	1.2396E-01	1.4382E+00	1.4382E+00	1.601E+00
AM-241	#A	-2.1517E-03	-2.1517E-03	3.6540E-01	3.6540E-01	2.098E-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) 1.7882446E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.7882450E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107_8JUN2006_1210.An1

Sample description
NOL-05-01-28-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\107_8JUN2006_1210.An1

Acquisition information
Start time: 08-Jun-2006 12:10:39
Live time: 2000
Real time: 2005
Dead time: 0.25 %
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/channel^2

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: 1.9660E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9660E+03) =
5.0865E+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	08-Jun-2006 11:34:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2101

***** 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
74.04	226.	23.23	1.18	2.823E-02				
74.04	226.	23.23	1.18	2.823E-02	74.81	9.600	PBC<MDA	PB212
77.24	492.	10.67	1.18	2.974E-02	77.11	10.700	1.059E+00	PB214
					77.11	17.500	6.541E-01	PB212
93.22	166.	38.72	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.29	160.	29.70	1.26	3.606E-02	185.99	3.280	9.308E-01	RA226
209.31	132.	39.86	0.90	3.428E-02				
239.18	1376.	6.27	1.43	3.185E-02	238.63	43.100	6.800E-01	PB212
270.31	180.	32.00	1.40	2.944E-02				
295.40	291.	15.19	1.50	2.766E-02	295.22	19.200	3.706E-01	PB214
338.21	275.	15.93	1.69	2.501E-02	338.40	12.010	6.221E-01	AC228
352.09	507.	11.96	1.68	2.425E-02	351.99	37.100	3.833E-01	PB214
510.92	224.	16.82	1.27	1.808E-02	510.72	22.500	3.213E-01	TL208
583.06	461.	9.42	1.96	1.629E-02	583.14	86.000	2.239E-01	TL208
609.48	441.	11.52	1.56	1.574E-02	609.32	46.090	4.135E-01	BI214
661.81	12776.	0.92	1.75	1.477E-02	661.62	84.620	7.024E+00	CS137
727.51	114.	21.80	1.38	1.374E-02	727.17	11.800	4.756E-01	BI212
795.27	72.	24.76	1.37	1.284E-02				
795.27	72.	24.76	1.37	1.284E-02	795.76	85.400	4.493E-02	CS134
911.49	270.	8.02	1.80	1.160E-02	911.07	29.000	5.418E-01	AC228
968.53	215.	12.11	1.45	1.110E-02	968.90	17.460	7.554E-01	AC228
1119.83	123.	18.13	2.12	9.970E-03	1120.28	15.040	5.653E-01	BI214
1173.50	86.	16.45	2.84	9.637E-03	1173.23	99.860	HL>Cutoff	CO60
1332.99	155.	14.26	1.55	8.771E-03	1332.51	99.980	HL>Cutoff	CO60
1461.04	1402.	2.75	2.24	8.190E-03	1460.75	10.700	1.096E+01	K40
1587.81	59.	13.02	1.62	7.689E-03				

1621.63	19.	28.28	2.43	7.569E-03	1620.56	2.750	6.439E-01	BI212
1764.78	96.	11.18	1.76	7.084E-03	1764.51	15.920	5.833E-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	
147.74	74.28	1260.	226.	0.113	69.69	1.177	BI-207	D
154.15	77.49	1136.	492.	0.246	32.02	1.179	PB-214	D
372.22	186.60	1054.	160.	0.080	89.09	1.259	PA-234	lD
418.26	209.31	1247.	132.	0.066	119.57	0.904	AC-228	
477.98	239.18	3031.	241.	0.120	98.98	1.434	PB-212	s
540.26	270.31	1161.	180.	0.090	96.01	1.396	AC-228	s
3175.24	1587.81	0.	59.	0.030	39.06	1.625	AC-228	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	149.08	74.71	2952.	232.	0.116	99.55	1.500s
PB-214	153.89	77.11	2616.	447.	0.223	50.06	1.500D
PB-212	153.89	77.11	2611.	451.	0.226	50.06	1.500D
PB-212	477.11	238.74	1824.	1089.	0.545	18.65	1.500s
PB-214	590.40	295.39	1167.	293.	0.147	51.59	1.500
AC-228	676.03	338.21	718.	272.	0.136	47.80	1.686s
PB-214	703.93	352.16	929.	450.	0.225	31.60	1.500s
TL-208	1021.42	510.92	493.	190.	0.095	50.47	1.271s
TL-208	1165.70	583.06	400.	456.	0.228	28.25	1.959s
BI-214	1218.54	609.48	491.	436.	0.218	34.57	1.563s
Ag-108M	1224.96	612.69	393.	-77.	-0.039	113.71	1.561s
CS-137	1323.20	661.81	303.	12773.	6.386	2.77	1.753
BI-212	1454.60	727.51	144.	112.	0.056	65.40	1.380s
CS-134	1590.33	795.38	55.	58.	0.029	66.44	1.684
AC-228	1822.54	911.49	73.	265.	0.133	24.07	1.805
AC-228	1936.62	968.53	121.	213.	0.106	36.34	1.453s
BI-214	2239.23	1119.83	102.	123.	0.062	54.40	2.125
CO-60	2346.57	1173.50	57.	86.	0.043	49.36	2.835s
CO-60	2665.56	1332.99	64.	151.	0.076	42.79	1.549s
K-40	2921.67	1461.04	26.	1398.	0.699	8.24	2.241
BI-212	3242.88	1621.63	5.	19.	0.010	84.85	2.434
BI-214	3529.22	1764.78	6.	96.	0.048	33.53	1.764

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	Peak Energy keV	Activity pCi/gm	Code	MDA Value pCi/gm		COMMENTS
BE-7		5.1718E-02						
			477.56	5.172E-02	%(	4.306E-01	1.29E-01	G
K-40		1.0962E+01						
			1460.75	1.096E+01	(P	2.088E-01	3.02E-01	G
MN-54		9.5984E-03						
			834.81	9.598E-03	%(P	2.795E-02	8.34E-03	G
CO-57		-1.6364E-03						
			122.07	-1.636E-03	%(P	4.904E-02	1.47E-02	G K
			136.43	-1.853E-03	% P	3.886E-01	1.17E-01	G
CO-60		1.1868E-01						
			1332.51	1.187E-01	*(P	3.124E-02	1.74E-02	G K
			1173.23	6.167E-02	- P	2.699E-02	1.06E-02	G K
Sr-85		-2.4488E-02						
			514.00	-2.449E-02	%(	4.744E-02	1.44E-02	G
Kr-85		-5.8683E+02						
			513.99	-5.868E+02	%(P	1.097E+03	3.33E+02	G
Y-88		-1.4048E-03						
			1836.01	-1.405E-03	&(P	1.762E-02	4.40E-03	G K
			898.02	1.136E-02	% P	2.528E-02	7.60E-03	G
NB-94		-1.8348E-04						
			871.10	-1.835E-04	&(P	2.454E-02	6.97E-03	G K
			702.50	-2.598E-04	% P	2.309E-02	6.59E-03	G K
Ag-108M		-1.5696E-02						
			722.95	-1.570E-02	&(	3.628E-02	1.10E-02	G K
			614.37	-3.767E-02	+	4.621E-02	1.43E-02	G
			433.93	-4.668E-03	% P	5.254E-02	1.57E-02	G
CD-109		-9.3553E-03						
			88.04	-9.355E-03	&(P	1.304E+00	3.91E-01	G
SN-113		-1.8571E-03						
			391.71	-1.857E-03	%(P	6.723E-02	2.00E-02	G K
			255.04	1.100E-01	%	1.948E+00	5.83E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.7893E-03						
		427.95	7.789E-03	&(P	1.601E-01	4.77E-02	G K
		600.77	-4.702E-02	% P	2.016E-01	6.00E-02	G
		636.15	-3.618E-03	% P	3.086E-01	9.03E-02	G
		463.51	-3.613E-02	% P	5.601E-01	1.67E-01	G
		176.29	-1.039E-01	& P	6.180E-01	1.86E-01	G
I-131	-8.6879E-03						
		364.48	-8.688E-03	%(	4.750E-02	1.42E-02	G K
		636.97	-6.814E-02	%	4.163E-01	1.23E-01	G
		284.29	-5.556E-02	%	6.576E-01	1.97E-01	G
CS-134	1.6682E-02						
		604.66	-4.888E-04	&(P	3.953E-02	1.16E-02	G K
		795.76	3.631E-02	(P	2.338E-02	8.11E-03	G
		569.29	-4.363E-02	%	2.367E-01	7.05E-02	G
		801.84	9.404E-03	% P	2.435E-01	6.92E-02	G
CS-137	7.0240E+00						
		661.62	7.024E+00	(P	4.611E-02	6.49E-02	G
CE-139	2.6219E-03						
		165.85	2.622E-03	%(P	4.018E-02	1.20E-02	G
EU-152	3.3638E-02						
		121.78	3.364E-02	%(P	1.409E-01	4.25E-02	G K
		344.30	3.602E-02	% P	1.492E-01	4.48E-02	G
		1408.08	1.173E-02	% P	1.102E-01	3.08E-02	G
		964.00	-9.041E-03	% P	2.790E-01	8.14E-02	G
		1112.07	1.237E-02	% P	2.249E-01	6.45E-02	G
		778.90	7.334E-02	% P	1.803E-01	5.41E-02	G
EU-154	-7.7059E-03						
		123.10	-7.706E-03	%(P	1.029E-01	3.09E-02	G K
		1274.80	-1.236E-03	& P	7.638E-02	2.14E-02	G
		723.30	-2.843E-02	& P	9.509E-02	2.79E-02	G
		1004.80	-3.871E-02	% P	1.687E-01	4.96E-02	G
EU-155	9.0351E-02						
		86.45	9.035E-02	%(	1.563E-01	4.75E-02	G K
		105.31	4.194E-02	% P	1.980E-01	5.97E-02	G
HG-203	1.4369E-02						
		279.17	1.437E-02	&(P	4.225E-02	1.27E-02	G K
		72.87	-2.973E-02	% P	9.586E-01	2.88E-01	G
		70.83	6.943E-01	&	1.490E+00	4.52E-01	G
		82.50	-4.709E-01	&	2.218E+00	6.68E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2386E-01						
		583.14	2.239E-01	*(P	4.704E-02	2.13E-02	G
		510.72	3.213E-01	+ P	1.794E-01	6.36E-02	G
PB-212	5.6363E-01						
		238.63	5.447E-01	@(P	1.009E-01	3.44E-02	G K
							Energy duplication
		77.11	5.995E-01	*(	3.199E-01	1.00E-01	G
		74.81	5.833E-01	*(P	6.430E-01	1.97E-01	G
PB-214	3.5610E-01						
		351.99	3.441E-01	@(P	1.105E-01	3.66E-02	G K
		295.22	3.794E-01	(P	2.094E-01	6.62E-02	G
							Energy duplication
		77.11	9.702E-01	+ P	5.236E-01	1.64E-01	G
		241.92	-9.748E-02	& P	6.603E-01	1.99E-01	G
BI-212	5.0743E-01						
		727.17	4.756E-01	(P	2.483E-01	1.05E-01	G K
		1620.56	6.439E-01	(P	4.160E-01	1.87E-01	G
		785.42	-6.505E-02	% P	1.259E+00	3.59E-01	G
BI-214	4.1350E-01						
		609.32	4.135E-01	@(P	1.003E-01	4.81E-02	G K
		1764.51	5.833E-01	+ P	8.779E-02	6.58E-02	G
		1120.28	5.653E-01	+ P	2.278E-01	1.03E-01	G
RA-224	1.5410E-01						
		241.00	1.541E-01	&(P	1.226E+00	3.69E-01	G
RA-226	8.8577E-01						
		185.99	8.858E-01	%(	1.283E+00	3.91E-01	G
AC-228	5.6535E-01						
		911.07	5.418E-01	(P	8.663E-02	4.42E-02	G K
		968.90	7.554E-01	+ P	1.917E-01	9.24E-02	G
		338.40	6.221E-01	(P	2.921E-01	1.00E-01	G
TH-227	-2.8549E-01						
		236.00	-2.855E-01	%(P	4.176E-01	1.27E-01	G K
		256.25	-1.145E-02	% P	4.756E-01	1.41E-01	G
PA-234	1.6443E-03						
		98.44	1.644E-03	&(	1.732E-01	5.20E-02	G K
		946.00	0.000E+00	%	1.522E-01	4.37E-02	G
		131.28	8.907E-02	&	1.841E-01	5.59E-02	G
		94.67	-1.012E-01	%	2.993E-01	9.05E-02	G
		883.24	1.924E-02	%	1.697E-01	4.85E-02	G
		926.70	-6.404E-02	%	2.296E-01	6.78E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-6.473E-02 %   3.512E-01 1.05E-01 G

TH-234       5.3280E-01
                           63.29 5.328E-01 %(P 1.921E+00 5.79E-01 G K
                           92.80 1.105E+00 % P 1.574E+00 4.79E-01 G
                           92.38 4.229E-03 & P 1.826E+00 5.47E-01 G

AM-241       2.9640E-02
                           59.54 2.964E-02 %(P 2.223E-01 6.67E-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 - 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 *****

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	5.1701E-02	5.1718E-02	3.8551E-01	3.8552E-01	4.304E-01
K-40		1.0962E+01	1.0962E+01	9.0585E-01	1.1134E+00	
MN-54	#A	9.5978E-03	9.5984E-03	2.5030E-02	2.5036E-02	2.795E-02
CO-57	#B	-1.6363E-03	-1.6364E-03	4.7421E-02	4.7422E-02	4.903E-02
CO-60	#H	1.1867E-01	1.1868E-01	5.2045E-02	5.2515E-02	

Sr-85	#A	-2.4481E-02	-2.4488E-02	4.3231E-02	4.3255E-02	4.742E-02
Kr-85	#A	-5.8683E+02	-5.8683E+02	1.0922E+03	1.0927E+03	1.097E+03
Y-88	#B	-1.4046E-03	-1.4048E-03	5.0176E-02	5.0176E-02	1.761E-02
NB-94	#B	-1.8348E-04	-1.8348E-04	5.1797E-02	5.1797E-02	2.454E-02
Ag-108M	#B	-1.5696E-02	-1.5696E-02	3.2874E-02	3.2887E-02	3.628E-02
CD-109	#A	-9.3549E-03	-9.3553E-03	1.7114E+00	1.7114E+00	1.304E+00
SN-113	#B	-1.8568E-03	-1.8571E-03	1.6588E-01	1.6588E-01	6.722E-02
SB-125	#B	7.7892E-03	7.7893E-03	1.4324E-01	1.4324E-01	1.601E-01
I-131	#B	-8.6689E-03	-8.6879E-03	4.2688E-02	4.2691E-02	4.739E-02
CS-134	#B	1.6681E-02	1.6682E-02	1.1184E-02	1.1228E-02	3.953E-02
CS-137		7.0240E+00	7.0240E+00	1.9461E-01	4.5822E-01	
CE-139	#A	2.6215E-03	2.6219E-03	3.6087E-02	3.6087E-02	4.017E-02
EU-152	#B	3.3638E-02	3.3638E-02	1.2751E-01	1.2752E-01	1.409E-01
EU-154	#B	-7.7058E-03	-7.7059E-03	9.8736E-02	9.8737E-02	1.029E-01
EU-155	#B	9.0350E-02	9.0351E-02	1.4257E-01	1.4266E-01	1.563E-01
HG-203	#B	1.4364E-02	1.4369E-02	3.8229E-02	3.8238E-02	4.223E-02
TL-208	#	2.2386E-01	2.2386E-01	6.3881E-02	6.5235E-02	
PB-212	#	5.6363E-01	5.6363E-01	1.0666E-01	1.1173E-01	1.009E-01
PB-214	#	3.5610E-01	3.5610E-01	1.0925E-01	1.1126E-01	1.105E-01
BI-212		5.0743E-01	5.0743E-01	2.7737E-01	2.7899E-01	
BI-214		4.1350E-01	4.1350E-01	1.4436E-01	1.4641E-01	
RA-224	#A	1.5410E-01	1.5410E-01	1.1057E+00	1.1057E+00	1.226E+00
RA-226	#A	8.8577E-01	8.8577E-01	1.1735E+00	1.1746E+00	1.283E+00
AC-228		5.6535E-01	5.6535E-01	1.3826E-01	1.4224E-01	
TH-227	#B	-2.8549E-01	-2.8549E-01	3.8337E-01	3.8374E-01	4.176E-01
PA-234	#B	1.6443E-03	1.6443E-03	1.5585E-01	1.5585E-01	1.732E-01
TH-234	#B	5.3280E-01	5.3280E-01	1.7368E+00	1.7371E+00	1.921E+00
AM-241	#A	2.9640E-02	2.9640E-02	2.0020E-01	2.0021E-01	2.223E-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 (86.2 to 2000.1 keV) 1.9814363E+01 pCi/gm
Total Decayed Activity (86.2 to 2000.1 keV) 1.9814375E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107_8JUN2006_1335.An1

Sample description
NOL-05-01-032-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\107_8JUN2006_1335.An1

Acquisition information
Start time: 08-Jun-2006 13:35:33
Live time: 2000
Real time: 2004
Dead time: 0.19 %
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/channel^2

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: 2.1560E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1560E+03) =
4.6382E+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	08-Jun-2006 13:20:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2284

***** 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	362.	19.52	1.50	2.849E-02				
74.89	362.	19.52	1.50	2.849E-02	74.81	9.600	8.301E-01	PB212
77.07	483.	14.32	1.50	2.957E-02	77.11	17.500	5.854E-01	PB212
					77.11	10.700	9.481E-01	PB214
77.07	479.	14.32	1.50	2.957E-02	77.11	17.500	5.797E-01	PB212
					77.11	10.700	9.481E-01	PB214
87.88	180.	36.20	0.92	3.322E-02	86.45	32.740	1.049E-01	EU155
					88.04	3.790	PBC<MDA	CD109
186.25	227.	26.10	1.42	3.608E-02	185.99	3.280	1.204E+00	RA226
209.34	176.	31.56	1.64	3.428E-02				
238.74	1342.	3.60	1.30	3.189E-02	238.63	43.100	6.047E-01	PB212
241.76	213.	17.83	1.30	3.165E-02	241.00	3.900	1.067E+00	RA224
270.67	173.	25.20	1.72	2.941E-02				
295.41	301.	10.63	1.34	2.767E-02	295.22	19.200	3.493E-01	PB214
300.75	100.	37.25	1.62	2.731E-02				
338.62	305.	11.97	1.66	2.499E-02	338.40	12.010	6.299E-01	AC228
352.06	543.	6.67	1.47	2.425E-02	351.99	37.100	3.745E-01	PB214
462.93	175.	24.08	1.64	1.955E-02				
462.93	175.	24.08	1.64	1.955E-02	463.51	10.000	5.540E-01	SB125
511.08	243.	15.69	1.14	1.807E-02	510.72	22.500	3.222E-01	TL208
583.29	503.	6.64	1.87	1.629E-02	583.14	86.000	2.230E-01	TL208
609.56	504.	8.05	1.73	1.574E-02	604.66	97.600	2.042E-01	CS134
					609.32	46.090	4.317E-01	BI214
661.84	3083.	2.12	1.80	1.477E-02	661.62	84.620	1.544E+00	CS137
727.77	127.	20.03	2.05	1.373E-02	727.17	11.800	4.843E-01	BI212
795.16	38.	37.87	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
911.46	340.	7.34	1.89	1.160E-02	911.07	29.000	6.252E-01	AC228

964.60	74.	20.76	1.80	1.113E-02				
969.24	171.	10.50	1.80	1.109E-02	968.90	17.460	5.452E-01	AC228
1120.89	170.	16.69	2.26	9.966E-03	1120.28	15.040	7.052E-01	BI214
1173.72	200.	15.99	1.91	9.634E-03	1173.23	99.860	1.275E-01	CO60
1332.57	178.	12.88	1.97	8.773E-03	1332.51	99.980	1.244E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.07	1778.	2.41	2.22	8.190E-03	1460.75	10.700	1.268E+01	K40
1621.78	38.	18.63	1.73	7.569E-03	1620.56	2.750	1.153E+00	BI212
1764.82	91.	11.61	2.22	7.084E-03	1764.51	15.920	5.030E-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	
175.42	87.88	1694.	180.	0.090	108.60	0.917	PB-214	l
418.32	209.34	1076.	176.	0.088	94.67	1.637	AC-228	s
477.12	238.66	497.	1342.	0.671	10.81	1.297	PB-212	D
483.16	241.68	613.	213.	0.106	53.49	1.299	PB-214	D
540.97	270.67	641.	173.	0.087	75.61	1.722	AC-228	s
601.12	300.75	520.	100.	0.050	111.76	1.620	PB-212	s
925.45	462.93	566.	97.	0.048	108.97	1.635	AC-228	s
1929.55	964.71	74.	81.	0.041	55.70	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
PB-212	149.45	74.89	2374.	362.	0.181	58.55	1.500s
PB-212	153.89	77.11	2155.	483.	0.242	42.97	1.500D
PB-214	153.89	77.11	2160.	479.	0.239	42.97	1.500D
RA-226	372.15	186.25	1221.	227.	0.114	78.30	1.423
PB-212	477.08	238.73	1305.	1281.	0.640	14.41	1.500s
PB-214	590.40	295.39	651.	318.	0.159	37.42	1.500s
AC-228	676.86	338.62	414.	302.	0.151	35.91	1.660s
PB-214	703.79	352.09	450.	532.	0.266	21.11	1.500s
SB-125	925.70	463.05	389.	76.	0.038	110.93	1.500s
TL-208	1021.74	511.08	389.	209.	0.105	47.06	1.141s
TL-208	1166.15	583.29	209.	498.	0.249	19.92	1.875s
BI-214	1218.70	609.56	297.	500.	0.250	24.15	1.726s
Ag-108M	1223.98	612.20	342.	-86.	-0.043	96.78	1.561s
CS-137	1323.25	661.84	285.	3080.	1.540	6.35	1.799
BI-212	1455.12	727.77	158.	125.	0.063	60.08	2.051s
CS-134	1589.88	795.16	85.	38.	0.019	113.60	1.684
AC-228	1822.49	911.46	98.	336.	0.168	22.01	1.886
AC-228	1937.36	968.90	95.	169.	0.084	33.10	1.799D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2241.35	1120.89	151.	169.	0.084	50.07	2.260s
CO-60	2347.01	1173.72	191.	196.	0.098	47.97	1.914
CO-60	2664.73	1332.57	76.	174.	0.087	38.64	1.974s
K-40	2921.74	1461.07	16.	1774.	0.887	7.23	2.216
BI-212	3243.18	1621.78	4.	38.	0.019	55.88	1.734
BI-214	3529.29	1764.82	6.	91.	0.045	34.84	2.216

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.3839E-01					
			477.56	1.384E-01	%(	2.908E-01 8.82E-02	G
K-40		1.2684E+01					
			1460.75	1.268E+01	(P	1.545E-01 3.06E-01	G
MN-54		-2.1691E-04					
			834.81	-2.169E-04	%(P	2.300E-02 6.55E-03	G
CO-57		5.5625E-03					
			122.07	5.563E-03	%(P	3.703E-02 1.11E-02	G K
			136.43	-3.287E-02	& P	2.946E-01 8.84E-02	G
CO-60		1.2596E-01					
			1332.51	1.244E-01	(P	3.096E-02 1.64E-02	G K
			1173.23	1.275E-01	(P	4.373E-02 2.08E-02	G K
Sr-85		-1.4881E-02					
			514.00	-1.488E-02	%(	3.496E-02 1.06E-02	G
Kr-85		-3.6800E+02					
			513.99	-3.680E+02	%(P	8.098E+02 2.44E+02	G
Y-88		-1.2023E-03					
			1836.01	-1.202E-03	&(P	2.064E-02 5.42E-03	G K
			898.02	-6.525E-03	% P	2.865E-02 8.36E-03	G
NB-94		-6.2432E-04					
			871.10	-6.243E-04	%(P	2.425E-02 6.95E-03	G K
			702.50	-1.041E-03	% P	2.715E-02 7.88E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	1.7233E-03						
		722.95	1.723E-03	%(	2.879E-02	8.38E-03	G K
		614.37	-3.813E-02	+	3.940E-02	1.23E-02	G
		433.93	-2.096E-04	% P	3.656E-02	1.08E-02	G
CD-109	6.1646E-01						
		88.04	6.165E-01	%(P	1.043E+00	3.17E-01	G
SN-113	-6.6192E-03						
		391.71	-6.619E-03	%(P	4.427E-02	1.31E-02	G K
		255.04	-2.723E-01	%	1.248E+00	3.74E-01	G
SB-125	7.9445E-02						
		427.95	2.381E-02	%(P	9.692E-02	2.90E-02	G K
		600.77	-5.286E-03	% P	1.498E-01	4.36E-02	G
		636.15	-5.990E-02	& P	2.568E-01	7.62E-02	G
		463.51	2.441E-01	*(P	3.036E-01	9.36E-02	G
		176.29	-1.614E-03	& P	4.532E-01	1.35E-01	G
I-131	7.1288E-03						
		364.48	7.129E-03	&(	3.360E-02	1.00E-02	G K
		636.97	1.270E-02	&	3.520E-01	1.03E-01	G
		284.29	7.780E-02	%	4.557E-01	1.36E-01	G
CS-134	9.7887E-03						
		604.66	-4.118E-04	&(P	2.738E-02	7.97E-03	G K
		795.76	2.145E-02	(P	2.615E-02	8.24E-03	G
		569.29	1.448E-03	%	1.736E-01	5.07E-02	G
		801.84	-3.245E-03	% P	2.833E-01	8.13E-02	G
CS-137	1.5444E+00						
		661.62	1.544E+00	(P	4.082E-02	3.28E-02	G
CE-139	-3.3748E-03						
		165.85	-3.375E-03	&(P	3.630E-02	1.09E-02	G
EU-152	6.3798E-03						
		121.78	6.380E-03	%(P	1.071E-01	3.21E-02	G K
		344.30	-3.505E-02	& P	9.802E-02	2.95E-02	G
		1408.08	1.644E-02	& P	1.117E-01	3.18E-02	G
		964.00	-5.090E-02	& P	2.589E-01	7.67E-02	G
		1112.07	9.001E-02	% P	2.070E-01	6.23E-02	G
		778.90	-1.011E-02	% P	1.913E-01	5.52E-02	G
EU-154	1.0433E-02						
		123.10	1.043E-02	%(P	7.599E-02	2.28E-02	G K
		1274.80	6.160E-03	% P	7.612E-02	2.17E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-1.020E-03	& P	2.430E-01	7.18E-02	G
		1004.80	2.176E-02	% P	1.655E-01	4.82E-02	G
EU-155	6.3821E-02						
		86.45	6.382E-02	&(	1.292E-01	3.92E-02	G K
		105.31	1.527E-02	& P	1.479E-01	4.44E-02	G
HG-203	-1.2366E-03						
		279.17	-1.237E-03	&(P	2.727E-02	8.06E-03	G K
		72.87	-5.359E-01	% P	9.100E-01	2.77E-01	G
		70.83	6.439E-01	%	1.185E+00	3.60E-01	G
		82.50	-6.591E-02	%	1.967E+00	5.90E-01	G
TL-208	2.2301E-01						
		583.14	2.230E-01	(P	3.132E-02	1.49E-02	G
		510.72	3.222E-01	+ P	1.458E-01	5.87E-02	G
PB-212	5.8435E-01						
		238.63	5.839E-01	@(P	7.799E-02	2.84E-02	G K
							Energy duplication
		77.11	5.854E-01	*(	2.653E-01	8.39E-02	G
		74.81	8.301E-01	+ P	5.264E-01	1.64E-01	G
PB-214	3.7188E-01						
		351.99	3.704E-01	@(P	7.077E-02	2.63E-02	G K
		295.22	3.747E-01	@(P	1.434E-01	4.74E-02	G
							Energy duplication
		77.11	9.481E-01	+ P	4.344E-01	1.37E-01	G
		241.92	2.419E-02	% P	3.526E-01	1.05E-01	G
BI-212	4.8435E-01						
		727.17	4.843E-01	(P	2.367E-01	9.80E-02	G K
		1620.56	1.153E+00	+ P	3.516E-01	2.18E-01	G
		785.42	5.758E-01	% P	1.232E+00	3.72E-01	G
BI-214	4.5004E-01						
		609.32	4.317E-01	@(P	7.175E-02	3.51E-02	G K
		1764.51	5.030E-01	(P	8.108E-02	5.90E-02	G
		1120.28	7.052E-01	+ P	2.509E-01	1.18E-01	G
RA-224	3.1290E-01						
		241.00	3.129E-01	%(P	9.695E-01	2.93E-01	G
RA-226	1.2037E+00						
		185.99	1.204E+00	(	8.761E-01	3.14E-01	G
AC-228	6.0273E-01						
		911.07	6.252E-01	(P	9.104E-02	4.65E-02	G K
		968.90	5.468E-01	(P	1.558E-01	6.11E-02	G
		338.40	6.299E-01	(P	2.036E-01	7.62E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.4047E-01
                          236.00-2.405E-01 %(P 3.371E-01 1.03E-01 G K
                          256.25-8.095E-03 & P 4.105E-01 1.22E-01 G

PA-234      -1.7299E-02
                           98.44-1.730E-02 %(  1.356E-01 4.07E-02 G K
                          946.00 2.373E-02 &   1.437E-01 4.21E-02 G
                          131.28 8.492E-02 &   1.311E-01 4.00E-02 G
                           94.67-7.526E-02 %   2.497E-01 7.54E-02 G
                          883.24 5.296E-02 %   1.954E-01 5.77E-02 G
                          926.70 0.000E+00 %   2.712E-01 7.82E-02 G
                          569.26 1.471E-03 %   2.576E-01 7.52E-02 G

TH-234       6.6441E-01
                           63.29 6.644E-01 %(P 1.545E+00 4.67E-01 G K
                           92.80 7.326E-01 % P 1.307E+00 3.96E-01 G
                           92.38-1.703E-01 % P 1.530E+00 4.58E-01 G

AM-241      -5.8430E-02
                           59.54-5.843E-02 &(P 2.170E-01 6.54E-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 - 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	1.3837E-01	1.3839E-01	2.6446E-01	2.6459E-01	2.907E-01
K-40		1.2684E+01	1.2684E+01	9.1921E-01	1.1858E+00	
MN-54	#A	-2.1691E-04	-2.1691E-04	5.2514E+01	5.2514E+01	2.300E-02
CO-57	#B	5.5624E-03	5.5625E-03	3.3381E-02	3.3382E-02	3.703E-02
CO-60		1.2596E-01	1.2596E-01	3.9622E-02	4.0314E-02	
Sr-85	#A	-1.4880E-02	-1.4881E-02	3.1714E-02	3.1726E-02	3.496E-02
Kr-85	#A	-3.6800E+02	-3.6800E+02	8.3535E+02	8.3564E+02	8.098E+02
Y-88	#B	-1.2023E-03	-1.2023E-03	6.9728E-02	6.9728E-02	2.064E-02
NB-94	#B	-6.2432E-04	-6.2432E-04	2.6190E-02	2.6190E-02	2.425E-02
Ag-108M	#B	1.7233E-03	1.7233E-03	2.5125E-02	2.5126E-02	2.879E-02
CD-109	#A	6.1645E-01	6.1646E-01	9.5227E-01	9.5288E-01	1.043E+00
SN-113	#B	-6.6187E-03	-6.6192E-03	5.0185E-02	5.0186E-02	4.427E-02
SB-125	#B	7.9444E-02	7.9445E-02	9.1391E-02	9.1512E-02	9.692E-02
I-131	#B	7.1221E-03	7.1288E-03	3.0130E-02	3.0133E-02	3.356E-02
CS-134	#B	9.7886E-03	9.7887E-03	1.1276E-02	1.1291E-02	2.738E-02
CS-137		1.5444E+00	1.5444E+00	9.8259E-02	1.3407E-01	
CE-139	#A	-3.3746E-03	-3.3748E-03	3.4037E-02	3.4038E-02	3.630E-02
EU-152	#B	6.3798E-03	6.3798E-03	9.6241E-02	9.6242E-02	1.071E-01
EU-154	#B	1.0433E-02	1.0433E-02	6.8455E-02	6.8457E-02	7.599E-02
EU-155	#B	6.3821E-02	6.3821E-02	1.1759E-01	1.1764E-01	1.292E-01
HG-203	#B	-1.2364E-03	-1.2366E-03	4.2961E-02	4.2961E-02	2.727E-02
TL-208		2.2301E-01	2.2301E-01	4.4819E-02	4.6714E-02	
PB-212	#	5.8435E-01	5.8435E-01	8.5210E-02	9.1934E-02	7.799E-02
PB-214	#	3.7188E-01	3.7188E-01	7.9254E-02	8.2241E-02	7.077E-02
BI-212		4.8435E-01	4.8435E-01	2.9397E-01	2.9535E-01	
BI-214		4.5004E-01	4.5004E-01	9.6296E-02	9.9897E-02	
RA-224	#A	3.1290E-01	3.1290E-01	8.7806E-01	8.7825E-01	9.695E-01
RA-226		1.2037E+00	1.2037E+00	9.4253E-01	9.4521E-01	
AC-228		6.0273E-01	6.0273E-01	1.0891E-01	1.1458E-01	
TH-227	#B	-2.4047E-01	-2.4047E-01	3.0997E-01	3.1030E-01	3.371E-01
PA-234	#B	-1.7299E-02	-1.7299E-02	1.2216E-01	1.2216E-01	1.356E-01
TH-234	#B	6.6441E-01	6.6441E-01	1.4011E+00	1.4016E+00	1.545E+00
AM-241	#A	-5.8430E-02	-5.8430E-02	2.0096E-01	2.0099E-01	2.170E-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) 1.7317986E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.7317986E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107_8JUN2006_1545.An1

Sample description
NOL-05-01-35-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\107_8JUN2006_1545.An1

Acquisition information
Start time: 08-Jun-2006 15:45:46
Live time: 2000
Real time: 2003
Dead time: 0.13 %
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/channel^2

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: 2.0070E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0070E+03) =
4.9826E+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	08-Jun-2006 15:04:00
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: 0.1934

***** 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
74.82	271.	23.34	1.50	2.849E-02	74.81	9.600	6.662E-01	PB212
77.09	404.	15.13	1.50	2.957E-02	77.11	10.700	8.606E-01	PB214
					77.11	17.500	5.262E-01	PB212
77.09	409.	15.13	1.50	2.957E-02	77.11	10.700	8.606E-01	PB214
					77.11	17.500	5.324E-01	PB212
87.88	140.	40.59	1.41	3.322E-02	86.45	32.740	8.780E-02	EU155
					88.04	3.790	PBC<MDA	CD109
92.95	166.	34.33	1.53	3.442E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.36	198.	24.12	1.86	3.607E-02	185.99	3.280	1.124E+00	RA226
209.53	83.	36.96	0.68	3.427E-02				
238.81	1234.	3.65	1.30	3.188E-02	238.63	43.100	5.968E-01	PB212
238.94	899.	5.84	1.50	3.163E-02	238.63	43.100	4.402E-01	PB212
241.46	239.	18.37	1.30	3.167E-02	241.00	3.900	1.287E+00	RA224
270.67	139.	24.02	0.88	2.941E-02				
277.06	71.	33.92	1.00	2.895E-02				
295.43	277.	9.58	1.34	2.766E-02	295.22	19.200	3.455E-01	PB214
300.36	90.	24.37	1.34	2.733E-02				
328.25	77.	24.71	1.36	2.560E-02				
338.64	258.	12.98	1.41	2.499E-02	338.40	12.010	5.722E-01	AC228
352.26	615.	6.13	1.49	2.424E-02	351.99	37.100	4.563E-01	PB214
463.65	134.	18.94	1.56	1.952E-02	463.51	10.000	4.524E-01	SB125
510.66	250.	12.10	2.33	1.808E-02	510.72	22.500	3.581E-01	TL208
583.35	454.	6.23	1.68	1.629E-02	583.14	86.000	2.162E-01	TL208
609.66	405.	6.75	1.22	1.574E-02	609.32	46.090	3.718E-01	BI214
661.82	549.	6.27	1.65	1.477E-02	661.62	84.620	2.936E-01	CS137
727.91	146.	14.56	1.36	1.373E-02	727.17	11.800	5.988E-01	BI212

785.85	63.	30.84	1.25	1.296E-02	785.42	2.000	1.613E+00	BI212
795.38	51.	26.19	1.68	1.284E-02	795.76	85.400	3.142E-02	CS134
860.94	60.	32.26	1.62	1.211E-02				
911.56	346.	7.57	1.84	1.160E-02	911.07	29.000	6.836E-01	AC228
968.31	239.	9.67	2.32	1.110E-02	964.00	14.580	9.891E-01	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					968.90	17.460	8.217E-01	AC228
1120.66	160.	17.48	1.55	9.967E-03	1120.28	15.040	7.136E-01	BI214
1461.18	1406.	2.77	2.31	8.189E-03	1460.75	10.700	1.076E+01	K40
1620.82	22.	29.50	0.96	7.569E-03	1620.56	2.750	7.084E-01	BI212
1765.31	70.	12.52	2.25	7.084E-03	1764.51	15.920	4.168E-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	
175.42	87.88	1291.	140.	0.070	121.76	1.407	PB-214	l
418.69	209.53	429.	83.	0.041	110.88	0.679	AC-228	s
477.27	238.84	399.	1231.	0.616	10.97	1.297	PB-212	D
540.97	270.67	378.	139.	0.070	72.06	0.882	AC-228	s
600.31	300.34	326.	123.	0.061	76.26	1.427	PB-212	
656.11	328.13	143.	77.	0.039	74.12	1.361	AC-228	D
1721.43	860.94	94.	60.	0.030	79.18	1.625	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	149.31	74.82	1918.	271.	0.135	70.01	1.500s
PB-214	153.89	77.11	1717.	404.	0.202	45.39	1.500D
PB-212	153.89	77.11	1712.	409.	0.205	45.39	1.500D
TH-234	185.76	93.05	1525.	158.	0.079	95.41	1.500s
RA-226	372.36	186.36	768.	198.	0.099	72.37	1.856s
TH-227	472.43	236.40	1449.	-174.	-0.087	95.96	1.500s
PB-212	477.27	238.82	890.	1192.	0.596	13.51	1.500s
RA-224	481.63	241.00	1285.	209.	0.105	74.79	1.299D
PB-214	477.51	238.94	933.	899.	0.449	17.52	1.500s
PB-214	590.48	295.43	371.	301.	0.150	31.67	1.500s
AC-228	676.90	338.64	313.	255.	0.128	38.95	1.407
PB-214	703.89	352.14	279.	556.	0.278	17.81	1.500s
SB-125	925.97	463.19	147.	87.	0.043	65.22	1.500s
TL-208	1020.91	510.66	224.	216.	0.108	36.30	2.329s
TL-208	1166.28	583.35	124.	450.	0.225	18.69	1.680s
BI-214	1218.91	609.66	118.	401.	0.200	20.25	1.225s
CS-137	1323.21	661.82	166.	545.	0.273	18.80	1.649

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	1455.40	727.91	106.	144.	0.072	43.67	1.364s
BI-212	1571.27	785.85	98.	62.	0.031	92.51	1.249s
CS-134	1590.33	795.38	66.	51.	0.026	78.56	1.684
AC-228	1822.69	911.56	91.	342.	0.171	22.70	1.839s
AC-228	1936.18	968.31	89.	236.	0.118	29.01	2.316s
BI-214	2240.89	1120.66	130.	159.	0.079	52.43	1.547s
K-40	2921.95	1461.18	24.	1401.	0.701	8.31	2.313
BI-212	3241.26	1620.82	6.	22.	0.011	88.51	0.962s
BI-214	3530.28	1765.31	3.	70.	0.035	37.55	2.249

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		8.2468E-02					
			477.56	8.247E-02	%(	2.005E-01 6.04E-02 G	
K-40		1.0764E+01					
			1460.75	1.076E+01	(P	1.959E-01 2.99E-01 G	
MN-54		1.0511E-02					
			834.81	1.051E-02	&(P	2.444E-02 7.36E-03 G	
CO-57		3.7169E-03					
			122.07	3.717E-03	%(P	3.145E-02 9.41E-03 G K	
			136.43	4.224E-02	& P	2.547E-01 7.64E-02 G	
CO-60		1.3341E-02					
			1332.51	1.334E-02	%(P	2.911E-02 8.68E-03 G K	
			1173.23	1.568E-02	% P	3.715E-02 1.11E-02 G K	
Sr-85		-1.6787E-02					
			514.00	-1.679E-02	%(	3.092E-02 9.42E-03 G	
Kr-85		-4.1346E+02					
			513.99	-4.135E+02	%(P	7.171E+02 2.17E+02 G	
Y-88		-8.0315E-04					
			1836.01	-8.032E-04	%(P	1.684E-02 4.11E-03 G K	
			898.02	-1.947E-04	& P	2.804E-02 7.96E-03 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	1.1104E-02						
		871.10	1.110E-02	%(P	2.007E-02	6.15E-03	G K
		702.50	-3.571E-03	& P	2.750E-02	8.04E-03	G K
Ag-108M	-1.2449E-04						
		722.95	-1.245E-04	%(	3.040E-02	8.78E-03	G K
		614.37	-1.873E-02	%	3.128E-02	9.58E-03	G
		433.93	-8.629E-04	% P	2.358E-02	6.83E-03	G
CD-109	6.8042E-01						
		88.04	6.804E-01	%(P	9.770E-01	2.98E-01	G
SN-113	6.5677E-03						
		391.71	6.568E-03	%(P	3.641E-02	1.08E-02	G K
		255.04	1.676E-01	%	9.978E-01	2.97E-01	G
SB-125	6.0082E-02						
		427.95	-2.063E-02	%(P	7.351E-02	2.18E-02	G K
		600.77	-6.039E-04	% P	1.235E-01	3.55E-02	G
		636.15	-1.648E-02	& P	2.106E-01	6.10E-02	G
		463.51	2.990E-01	*(P	2.045E-01	6.71E-02	G
		176.29	-1.499E-01	% P	4.255E-01	1.28E-01	G
I-131	3.8081E-03						
		364.48	3.808E-03	&(	2.511E-02	7.42E-03	G K
		636.97	-4.436E-02	&	3.610E-01	1.06E-01	G
		284.29	8.344E-03	%	4.116E-01	1.22E-01	G
CS-134	1.3515E-02						
		604.66	-2.151E-03	&(P	5.068E-02	1.50E-02	G K
		795.76	3.142E-02	(P	2.496E-02	8.31E-03	G
		569.29	-3.444E-02	%	1.529E-01	4.53E-02	G
		801.84	-5.760E-02	% P	2.718E-01	7.95E-02	G
CS-137	2.9362E-01						
		661.62	2.936E-01	(P	3.380E-02	1.85E-02	G
CE-139	4.0222E-04						
		165.85	4.022E-04	%(P	3.311E-02	9.87E-03	G
EU-152	5.9398E-03						
		121.78	5.940E-03	%(P	9.837E-02	2.94E-02	G K
		344.30	-7.883E-04	& P	8.794E-02	2.58E-02	G
		1408.08	3.639E-02	% P	1.180E-01	3.46E-02	G
		964.00	-1.169E-01	% P	3.023E-01	9.10E-02	G
		1112.07	-5.927E-02	% P	2.368E-01	6.96E-02	G
		778.90	-1.706E-02	% P	1.888E-01	5.44E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	1.5356E-03						
		123.10	1.536E-03	%(P	6.176E-02	1.84E-02	G K
		1274.80	2.107E-02	& P	8.469E-02	2.49E-02	G
		723.30	-4.063E-02	% P	7.917E-02	2.40E-02	G
		1004.80	2.811E-02	& P	1.489E-01	4.34E-02	G
EU-155	8.3105E-02						
		86.45	8.310E-02	&(	1.191E-01	3.64E-02	G K
		105.31	4.829E-02	% P	1.388E-01	4.19E-02	G
HG-203	-5.3234E-03						
		279.17	-5.323E-03	%(P	3.027E-02	9.02E-03	G K
		72.87	-9.394E-02	% P	8.061E-01	2.42E-01	G
		70.83	-8.621E-01	&	1.515E+00	4.61E-01	G
		82.50	-5.378E-01	%	1.762E+00	5.32E-01	G
TL-208	2.1616E-01						
		583.14	2.162E-01	*(P	2.627E-02	1.36E-02	G
		510.72	3.581E-01	+ P	1.198E-01	5.01E-02	G
PB-212	5.6897E-01						
		238.63	5.838E-01	*(P	6.942E-02	2.66E-02	G K
							Energy duplication
		77.11	5.324E-01	*(	2.544E-01	8.06E-02	G
		74.81	6.662E-01	+ P	5.090E-01	1.58E-01	G
PB-214	4.0387E-01						
		351.99	4.157E-01	@(P	6.025E-02	2.49E-02	G K
		295.22	3.810E-01	(P	1.172E-01	4.08E-02	G
							Energy duplication
		77.11	8.606E-01	+ P	4.166E-01	1.32E-01	G
		241.92	2.561E+00	+ P	4.133E-01	1.50E-01	G
BI-212	6.1949E-01						
		727.17	5.988E-01	@(P	2.103E-01	8.80E-02	G K
		1620.56	7.084E-01	(P	4.600E-01	2.14E-01	G
		785.42	1.613E+00	+ P	1.267E+00	5.08E-01	G
BI-214	3.8337E-01						
		609.32	3.718E-01	@(P	4.956E-02	2.54E-02	G K
		1764.51	4.168E-01	(P	6.592E-02	5.28E-02	G
		1120.28	7.136E-01	+ P	2.508E-01	1.25E-01	G
RA-224	1.1389E+00						
		241.00	1.139E+00	(P	9.244E-01	2.87E-01	G
RA-226	1.1236E+00						
		185.99	1.124E+00	*(	7.499E-01	2.71E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AC-228       7.3550E-01
                          911.07 6.836E-01 @(P 9.445E-02 5.24E-02 G K
                          968.90 8.217E-01 *(P 1.620E-01 8.02E-02 G
                          338.40 5.722E-01 - P 1.909E-01 7.53E-02 G

TH-227      -3.2492E-01
                          236.00-3.249E-01 ?(P 3.372E-01 1.04E-01 G K
                          256.25-3.862E-02 & P 3.467E-01 1.03E-01 G

PA-234      -1.2483E-02
                           98.44-1.248E-02 %(  1.167E-01 3.49E-02 G K
                          946.00-7.165E-04 &   1.364E-01 3.90E-02 G
                          131.28-2.812E-03 &   1.444E-01 4.31E-02 G
                           94.67-9.009E-02 %   2.138E-01 6.47E-02 G
                          883.24 6.015E-02 &   1.773E-01 5.27E-02 G
                          926.70-1.501E-02 &   1.554E-01 4.37E-02 G
                          569.26-5.110E-02 %   2.269E-01 6.71E-02 G

TH-234       4.6356E-01
                           63.29 2.780E-02 %(P 1.495E+00 4.46E-01 G K
                           92.80 1.030E+00  (P 1.205E+00 3.69E-01 G
                           92.38-2.073E-01 % P 1.466E+00 4.39E-01 G

AM-241       3.9750E-02
                           59.54 3.975E-02 %(P 1.992E-01 5.99E-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
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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	8.2436E-02	8.2468E-02	1.8124E-01	1.8130E-01	2.004E-01
K-40		1.0764E+01	1.0764E+01	8.9772E-01	1.1000E+00	
MN-54	#A	1.0510E-02	1.0511E-02	2.2077E-02	2.2086E-02	2.444E-02
CO-57	#B	3.7166E-03	3.7169E-03	2.8243E-02	2.8244E-02	3.145E-02
CO-60	#B	1.3341E-02	1.3341E-02	2.6031E-02	2.6043E-02	2.911E-02
Sr-85	#A	-1.6782E-02	-1.6787E-02	2.8246E-02	2.8264E-02	3.091E-02
Kr-85	#A	-4.1346E+02	-4.1346E+02	7.3952E+02	7.3992E+02	7.171E+02
Y-88	#B	-8.0300E-04	-8.0315E-04	2.0061E-02	2.0061E-02	1.684E-02
NB-94	#B	1.1104E-02	1.1104E-02	1.8462E-02	1.8473E-02	2.007E-02
Ag-108M	#B	-1.2449E-04	-1.2449E-04	2.6355E-02	2.6355E-02	3.040E-02
CD-109	#A	6.8039E-01	6.8042E-01	8.9474E-01	8.9553E-01	9.770E-01
SN-113	#B	6.5666E-03	6.5677E-03	3.2364E-02	3.2366E-02	3.640E-02
SB-125	#B	6.0081E-02	6.0082E-02	4.0459E-02	4.0614E-02	7.351E-02
I-131	#B	3.7986E-03	3.8081E-03	2.2262E-02	2.2263E-02	2.504E-02
CS-134	#B	1.3515E-02	1.3515E-02	1.0727E-02	1.0757E-02	5.068E-02
CS-137		2.9362E-01	2.9362E-01	5.5559E-02	5.8203E-02	
CE-139	#A	4.0216E-04	4.0222E-04	2.9601E-02	2.9601E-02	3.311E-02
EU-152	#B	5.9398E-03	5.9398E-03	8.8239E-02	8.8239E-02	9.837E-02
EU-154	#B	1.5356E-03	1.5356E-03	5.5197E-02	5.5197E-02	6.176E-02
EU-155	#B	8.3104E-02	8.3105E-02	1.0906E-01	1.0916E-01	1.191E-01
HG-203	#B	-5.3211E-03	-5.3234E-03	3.1114E-02	3.1115E-02	3.026E-02
TL-208	#	2.1616E-01	2.1616E-01	4.0818E-02	4.2768E-02	
PB-212	#	5.6897E-01	5.6897E-01	7.7863E-02	8.4805E-02	6.942E-02
PB-214	#	4.0387E-01	4.0387E-01	7.2593E-02	7.6411E-02	6.025E-02
BI-212		6.1949E-01	6.1949E-01	2.7293E-01	2.7538E-01	
BI-214		3.8337E-01	3.8337E-01	7.8453E-02	8.1655E-02	
RA-224		1.1389E+00	1.1389E+00	8.6083E-01	8.6345E-01	
RA-226	#	1.1236E+00	1.1236E+00	8.1315E-01	8.1586E-01	
AC-228		7.3550E-01	7.3550E-01	1.3690E-01	1.4362E-01	
TH-227	#A	-3.2492E-01	-3.2492E-01	3.1227E-01	3.1286E-01	3.372E-01
PA-234	#B	-1.2483E-02	-1.2483E-02	1.0482E-01	1.0482E-01	1.167E-01
TH-234	#B	4.6356E-01	4.6356E-01	4.9755E-01	4.9822E-01	1.495E+00
AM-241	#A	3.9750E-02	3.9750E-02	1.7959E-01	1.7960E-01	1.992E-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 (338.2 to 2000.1 keV) 1.5274332E+01 pCi/gm
Total Decayed Activity (338.2 to 2000.1 keV) 1.5274332E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107_8JUN2006_1627.An1

Sample description
NOL-05-01-33-F-I WET

Spectrum Filename: C:\GammaVision\Spectra\107_8JUN2006_1627.An1

Acquisition information
Start time: 08-Jun-2006 16:28:00
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/channel^2

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: 2.0500E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0500E+03) =
4.8780E+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	08-Jun-2006 14:55:00
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. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1382

***** 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
74.78	314.	14.41	1.18	2.849E-02	74.81	9.600	7.559E-01	PB212
87.35	176.	35.36	1.03	3.308E-02	86.45	32.740	1.079E-01	EU155
					88.04	3.790	PBC<MDA	CD109
93.59	156.	35.66	1.23	3.455E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.15	197.	21.96	1.87	3.609E-02	185.99	3.280	1.094E+00	RA226
209.40	98.	32.56	1.50	3.428E-02				
239.12	1678.	4.58	1.32	3.186E-02	238.63	43.100	7.973E-01	PB212
242.10	176.	20.38	1.30	3.163E-02	241.00	3.900	9.404E-01	RA224
					241.92	7.470	4.921E-01	PB214
270.35	111.	34.91	0.73	2.944E-02				
277.12	101.	33.16	1.42	2.894E-02				
295.52	316.	8.55	1.34	2.767E-02	295.22	19.200	3.868E-01	PB214
300.63	81.	27.18	1.34	2.733E-02				
327.72	71.	37.27	0.97	2.562E-02				
338.41	332.	15.95	1.70	2.500E-02	338.40	12.010	7.228E-01	AC228
352.13	608.	6.85	1.54	2.425E-02	351.99	37.100	4.416E-01	PB214
463.60	118.	20.06	1.37	1.952E-02	463.51	10.000	3.882E-01	SB125
511.02	245.	13.95	1.61	1.807E-02	510.72	22.500	3.418E-01	TL208
583.42	471.	6.53	1.65	1.628E-02	583.14	86.000	2.193E-01	TL208
609.65	448.	8.07	1.72	1.574E-02	609.32	46.090	4.029E-01	BI214
661.83	227.	10.21	1.66	1.477E-02	661.62	84.620	1.181E-01	CS137
727.23	126.	22.80	1.75	1.374E-02	727.17	11.800	5.070E-01	BI212
795.49	60.	29.77	1.42	1.284E-02				
795.49	60.	29.77	1.42	1.284E-02	795.76	85.400	3.564E-02	CS134
860.83	64.	28.78	0.97	1.211E-02				
911.36	409.	7.34	1.75	1.161E-02	911.07	29.000	7.926E-01	AC228

964.55	61.	26.30	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152
969.44	202.	9.31	1.80	1.109E-02	968.90	17.460	6.801E-01	AC228
1120.78	135.	13.22	2.70	9.970E-03	1120.28	15.040	5.953E-01	BI214
1173.64	128.	16.90	2.23	9.635E-03	1173.23	99.860	HL>Cutoff	CO60
1331.47	163.	12.50	2.30	8.778E-03	1332.51	99.980	HL>Cutoff	CO60
1461.26	1949.	2.32	2.28	8.189E-03	1460.75	10.700	1.462E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1765.38	86.	11.46	1.84	7.081E-03	1764.51	15.920	4.981E-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	
174.36	87.35	1479.	176.	0.088	106.09	1.031	PB-214	l
418.44	209.40	460.	98.	0.049	97.67	1.502	AC-228	
540.33	270.35	517.	111.	0.056	104.72	0.734	AC-228	s
600.52	300.45	229.	77.	0.038	90.12	1.772	PB-212	sM
655.05	327.72	270.	71.	0.035	111.82	0.972	AC-228	s
1721.23	860.83	88.	64.	0.032	86.35	0.968	TL-208	s
1930.20	964.80	87.	73.	0.037	64.51	1.797	AC-228	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-212	149.29	74.81	892.	314.	0.157	43.24	1.178D
PB-212	153.89	77.11	903.	531.	0.266	20.87	1.179A
TH-234	186.06	93.20	1542.	209.	0.104	79.37	1.500s
TH-234	186.05	93.19	1629.	195.	0.097	81.88	1.500s
RA-226	371.94	186.15	694.	197.	0.098	65.87	1.870s
TH-227	471.87	236.12	1370.	-151.	-0.076	106.67	1.500s
PB-212	476.89	238.63	360.	1337.	0.668	10.02	1.297D
PB-214	483.47	241.92	570.	176.	0.088	61.15	1.299D
PB-214	590.47	295.43	547.	412.	0.206	34.24	1.368
AC-228	676.43	338.41	608.	329.	0.165	47.84	1.697s
PB-214	703.88	352.13	357.	603.	0.301	20.55	1.536s
SB-125	926.35	463.38	176.	91.	0.045	67.16	1.500s
TL-208	1021.63	511.02	282.	211.	0.105	41.84	1.609s
TL-208	1166.43	583.42	158.	466.	0.233	19.60	1.648
BI-214	1218.88	609.65	237.	443.	0.222	24.22	1.716
Ag-108M	1223.41	611.92	375.	-118.	-0.059	74.96	1.561s
CS-137	1323.23	661.83	119.	224.	0.112	30.64	1.656s
BI-212	1454.03	727.23	190.	125.	0.062	68.40	1.746
CS-134	1590.04	795.24	108.	48.	0.024	99.72	1.684
AC-228	1822.28	911.36	127.	405.	0.202	22.02	1.746s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1937.36	968.90	105.	200.	0.100	29.98	1.799D
BI-214	2241.12	1120.78	71.	135.	0.068	39.65	2.699s
CO-60	2346.85	1173.64	113.	124.	0.062	50.69	2.230s
CO-60	2662.52	1331.47	60.	159.	0.080	37.49	2.301s
K-40	2922.11	1461.26	28.	1944.	0.972	6.97	2.285
BI-214	3530.40	1765.38	4.	85.	0.043	34.39	1.837s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		4.6128E-02					
			477.56	4.613E-02	&(	1.816E-01 5.38E-02	G
K-40		1.4623E+01					
			1460.75	1.462E+01	(P	2.053E-01 3.40E-01	G
MN-54		-3.6293E-03					
			834.81	-3.629E-03	%(P	3.099E-02 9.06E-03	G
CO-57		-6.8405E-03					
			122.07	-6.840E-03	%(P	3.194E-02 9.60E-03	G K
			136.43	3.397E-02	& P	2.427E-01 7.27E-02	G
CO-60		1.1968E-01					
			1332.51	1.197E-01	*(P	2.911E-02 1.53E-02	G K
			1173.23	8.469E-02	- P	3.584E-02 1.48E-02	G K
Sr-85		-1.3157E-02					
			514.00	-1.316E-02	%(	3.220E-02 9.72E-03	G
Kr-85		-3.2914E+02					
			513.99	-3.291E+02	%(P	7.460E+02 2.24E+02	G
Y-88		-2.3078E-03					
			1836.01	-2.308E-03	%(P	1.974E-02 5.19E-03	G K
			898.02	-4.134E-03	& P	3.369E-02 9.77E-03	G
NB-94		-7.4711E-05					
			871.10	-7.471E-05	%(P	2.780E-02 7.98E-03	G K
			702.50	9.953E-03	% P	2.334E-02 7.03E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	3.8672E-04						
		722.95	3.867E-04	%(	3.492E-02	1.02E-02	G K
		614.37	-5.496E-02	+	4.333E-02	1.37E-02	G
		433.93	-2.926E-03	% P	2.383E-02	6.97E-03	G
CD-109	3.9317E-01						
		88.04	3.932E-01	%(P	1.035E+00	3.13E-01	G
SN-113	3.2409E-04						
		391.71	3.241E-04	&(P	3.194E-02	9.30E-03	G K
		255.04	-1.717E-01	%	1.163E+00	3.47E-01	G
SB-125	7.4785E-02						
		427.95	-3.585E-03	%(P	7.174E-02	2.09E-02	G K
		600.77	2.651E-02	% P	1.191E-01	3.50E-02	G
		636.15	-6.345E-02	& P	2.304E-01	6.84E-02	G
		463.51	3.068E-01	*(P	2.178E-01	7.08E-02	G
		176.29	1.148E-01	& P	3.761E-01	1.13E-01	G
I-131	-2.7961E-03						
		364.48	-2.796E-03	%(	2.843E-02	8.40E-03	G K
		636.97	0.000E+00	&	3.877E-01	1.13E-01	G
		284.29	-4.046E-03	%	3.738E-01	1.10E-01	G
CS-134	1.3175E-02						
		604.66	-6.939E-04	%(P	5.433E-02	1.61E-02	G K
		795.76	2.903E-02	(P	3.071E-02	9.75E-03	G
		569.29	1.741E-02	&	1.383E-01	4.04E-02	G
		801.84	-1.063E-01	% P	3.191E-01	9.52E-02	G
CS-137	1.1806E-01						
		661.62	1.181E-01	*(P	2.825E-02	1.23E-02	G
CE-139	1.1158E-03						
		165.85	1.116E-03	%(P	2.994E-02	8.92E-03	G
EU-152	-1.5715E-02						
		121.78	-1.572E-02	%(P	9.628E-02	2.89E-02	G K
		344.30	5.852E-03	% P	8.748E-02	2.58E-02	G
		1408.08	4.068E-02	% P	1.251E-01	3.69E-02	G
		964.00	3.077E-03	& P	3.438E-01	1.01E-01	G
		1112.07	5.487E-02	% P	2.334E-01	6.87E-02	G
		778.90	-5.610E-04	% P	2.031E-01	5.83E-02	G
EU-154	-1.4684E-02						
		123.10	-1.468E-02	%(P	6.299E-02	1.89E-02	G K
		1274.80	2.008E-02	& P	7.704E-02	2.26E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-1.934E-03	& P	1.380E-01	3.98E-02	G
		1004.80	3.524E-02	& P	1.389E-01	4.08E-02	G
EU-155	7.1320E-02						
		86.45	7.132E-02	%(	1.211E-01	3.69E-02	G K
		105.31	5.289E-02	% P	1.413E-01	4.27E-02	G
HG-203	-6.8362E-03						
		279.17	-6.836E-03	&(P	3.248E-02	9.71E-03	G K
		72.87	-4.998E-01	% P	9.060E-01	2.75E-01	G
		70.83	-4.707E-02	&	1.018E+00	3.04E-01	G
		82.50	2.464E-01	%	1.471E+00	4.41E-01	G
TL-208	2.1935E-01						
		583.14	2.193E-01	(P	2.882E-02	1.45E-02	G
		510.72	3.418E-01	+ P	1.312E-01	5.53E-02	G
PB-212	6.7656E-01						
		238.63	6.410E-01	(P	4.372E-02	2.17E-02	G K
							Energy duplication
		77.11	6.766E-01	}	1.818E-01	4.71E-02	G
		74.81	7.559E-01	(P	3.420E-01	1.10E-01	G
PB-214	4.6846E-01						
		351.99	4.416E-01	*(P	6.649E-02	3.05E-02	G K
		295.22	5.112E-01	(P	1.386E-01	5.90E-02	G
							Energy duplication
		77.11	0.000E+00	} P	3.884E-01	0.00E+00	G
		241.92	4.921E-01	(P	3.178E-01	1.01E-01	G
BI-212	5.0695E-01						
		727.17	5.070E-01	(P	2.723E-01	1.17E-01	G K
		1620.56	5.127E-03	% P	7.572E-01	2.03E-01	G
		785.42	6.696E-01	% P	1.460E+00	4.41E-01	G
BI-214	4.2734E-01						
		609.32	4.029E-01	(P	6.758E-02	3.29E-02	G K
		1764.51	4.981E-01	@(P	6.891E-02	5.77E-02	G
		1120.28	5.953E-01	+ P	1.840E-01	7.92E-02	G
RA-224	3.0709E-01						
		241.00	3.071E-01	&(P	8.865E-01	2.68E-01	G
RA-226	1.0945E+00						
		185.99	1.094E+00	*(	6.987E-01	2.40E-01	G
AC-228	7.4475E-01						
		911.07	7.926E-01	@(P	1.082E-01	5.88E-02	G K
		968.90	6.803E-01	(P	1.718E-01	6.87E-02	G
		338.40	7.228E-01	(P	2.581E-01	1.16E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.7772E-01
                          236.00-2.777E-01 &(P 3.212E-01 9.86E-02 G K
                          256.25-1.261E-02 % P 3.183E-01 9.38E-02 G

PA-234      -2.8829E-02
                           98.44-2.883E-02 &(  1.181E-01 3.55E-02 G K
                          946.00 4.304E-02 %   9.672E-02 2.92E-02 G
                          131.28 5.772E-02 &   1.336E-01 4.05E-02 G
                           94.67-6.210E-02 %   2.132E-01 6.43E-02 G
                          883.24 4.144E-02 %   2.318E-01 6.80E-02 G
                          926.70-1.903E-02 %   2.853E-01 8.29E-02 G
                          569.26 2.489E-02 &   2.054E-01 6.00E-02 G

TH-234       9.8449E-01
                           63.29 4.038E-01 %(P 1.491E+00 4.48E-01 G K
                           92.80 1.246E+00  (P 1.219E+00 3.74E-01 G
                           92.38 1.561E+00 &(P 1.389E+00 4.29E-01 G

AM-241      -2.4526E-02
                           59.54-2.453E-02 %(P 1.994E-01 5.98E-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 - 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	4.6090E-02	4.6128E-02	1.6142E-01	1.6144E-01	1.814E-01
K-40		1.4623E+01	1.4623E+01	1.0212E+00	1.3374E+00	
MN-54	#A	-3.6288E-03	-3.6293E-03	3.0813E-02	3.0813E-02	3.099E-02
CO-57	#B	-6.8394E-03	-6.8405E-03	2.9263E-02	2.9265E-02	3.193E-02
CO-60	#H	1.1967E-01	1.1968E-01	4.5931E-02	4.6472E-02	
Sr-85	#A	-1.3148E-02	-1.3157E-02	2.9161E-02	2.9171E-02	3.217E-02
Kr-85	#A	-3.2914E+02	-3.2914E+02	7.8572E+02	7.8596E+02	7.460E+02
Y-88	#B	-2.3069E-03	-2.3078E-03	3.1671E-02	3.1671E-02	1.973E-02
NB-94	#B	-7.4711E-05	-7.4711E-05	6.5124E-03	6.5124E-03	2.780E-02
Ag-108M	#B	3.8672E-04	3.8672E-04	3.0522E-02	3.0522E-02	3.492E-02
CD-109	#A	3.9313E-01	3.9317E-01	9.3915E-01	9.3940E-01	1.035E+00
SN-113	#B	3.2397E-04	3.2409E-04	2.7901E-02	2.7901E-02	3.192E-02
SB-125	#F	7.4782E-02	7.4785E-02	5.1779E-02	5.1967E-02	7.174E-02
I-131	#B	-2.7806E-03	-2.7961E-03	2.5202E-02	2.5203E-02	2.827E-02
CS-134	#B	1.3174E-02	1.3175E-02	1.3282E-02	1.3305E-02	5.433E-02
CS-137	#	1.1806E-01	1.1806E-01	3.6750E-02	3.7405E-02	
CE-139	#A	1.1154E-03	1.1158E-03	2.6752E-02	2.6752E-02	2.993E-02
EU-152	#B	-1.5715E-02	-1.5715E-02	8.7578E-02	8.7582E-02	9.628E-02
EU-154	#B	-1.4684E-02	-1.4684E-02	5.8586E-02	5.8592E-02	6.299E-02
EU-155	#B	7.1318E-02	7.1320E-02	1.1056E-01	1.1063E-01	1.211E-01
HG-203	#B	-6.8296E-03	-6.8362E-03	3.2403E-02	3.2405E-02	3.245E-02
TL-208		2.1935E-01	2.1935E-01	4.3416E-02	4.5307E-02	
PB-212		6.7656E-01	6.7656E-01	6.8610E-02	7.9398E-02	
PB-214		4.6846E-01	4.6846E-01	9.7081E-02	1.0095E-01	
BI-212		5.0695E-01	5.0695E-01	3.5034E-01	3.5161E-01	
BI-214		4.2734E-01	4.2734E-01	9.0796E-02	9.4239E-02	
RA-224	#A	3.0709E-01	3.0709E-01	8.0282E-01	8.0303E-01	8.865E-01
RA-226	#	1.0945E+00	1.0945E+00	7.2087E-01	7.2377E-01	
AC-228		7.4475E-01	7.4475E-01	1.5196E-01	1.5820E-01	
TH-227	#A	-2.7772E-01	-2.7772E-01	2.9678E-01	2.9724E-01	3.212E-01
PA-234	#B	-2.8829E-02	-2.8829E-02	1.0658E-01	1.0660E-01	1.181E-01
TH-234	#B	9.8449E-01	9.8449E-01	8.1126E-01	8.1309E-01	1.491E+00
AM-241	#A	-2.4526E-02	-2.4526E-02	1.9025E-01	1.9026E-01	1.994E-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) 1.8998396E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.8998400E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107F_13JUN2006_1624.An1

Sample description
FSS-NOL-05-01-029-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_13JUN2006_1624.An1

Acquisition information
Start time: 13-Jun-2006 16:24:10
Live time: 2000
Real time: 2003
Dead time: 0.15 %
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/channel^2

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: 1.9260E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9260E+03) =
5.1921E+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	08-Jun-2006 11:36:00
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: 0.1395

***** 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
74.79	292.	15.26	1.18	2.849E-02	74.81	9.600	7.483E-01	PB212
77.09	439.	8.29	1.18	2.957E-02	77.11	10.700	1.021E+00	PB214
					77.11	17.500	6.307E-01	PB212
87.99	138.	30.78	1.19	3.334E-02	86.45	32.740	9.038E-02	EU155
					88.04	3.790	PBC<MDA	CD109
92.97	211.	19.27	1.19	3.449E-02	92.38	2.570	1.613E+00	TH234
					92.80	3.000	PBC<MDA	TH234
186.44	205.	21.27	1.73	3.607E-02	185.99	3.280	1.216E+00	RA226
238.84	1159.	4.16	1.30	3.187E-02	238.63	43.100	5.837E-01	PB212
241.59	215.	17.36	1.30	3.165E-02	241.00	3.900	1.207E+00	RA224
					241.92	7.470	6.339E-01	PB214
295.44	287.	9.97	1.34	2.768E-02	295.22	19.200	3.726E-01	PB214
300.14	73.	33.95	1.34	2.736E-02				
338.71	272.	12.99	1.73	2.499E-02	338.40	12.010	6.271E-01	AC228
352.02	538.	8.34	1.35	2.426E-02	351.99	37.100	4.157E-01	PB214
463.45	150.	22.65	1.24	1.953E-02				
463.45	150.	22.65	1.24	1.953E-02	463.51	10.000	5.318E-01	SB125
510.96	191.	19.02	1.87	1.807E-02	510.72	22.500	2.710E-01	TL208
583.45	467.	7.89	1.50	1.628E-02	583.14	86.000	2.315E-01	TL208
609.57	433.	7.05	1.76	1.574E-02	609.32	46.090	4.145E-01	BI214
661.90	2434.	2.44	1.92	1.477E-02	661.62	84.620	1.365E+00	CS137
727.47	135.	15.87	1.21	1.374E-02	727.17	11.800	5.785E-01	BI212
795.50	43.	34.40	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
860.77	80.	25.81	1.40	1.211E-02				
911.56	379.	7.74	1.80	1.160E-02	911.07	29.000	7.815E-01	AC228
964.35	37.	36.70	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152
969.30	161.	10.81	1.80	1.109E-02	968.90	17.460	5.751E-01	AC228

1120.60	116.	19.45	2.17	9.968E-03	1120.28	15.040	5.377E-01	BI214
1173.54	38.	40.78	1.93	9.637E-03	1173.23	99.860	PBC<MDA	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.55	27.	32.59	2.03	8.773E-03	1332.51	99.980	PBC<MDA	CO60
1461.17	1706.	2.59	2.37	8.189E-03	1460.75	10.700	1.362E+01	K40
1764.80	93.	11.57	2.24	7.084E-03	1764.51	15.920	5.768E-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	
175.64	88.34	836.	138.	0.069	92.34	1.187	PB-214	lD
599.47	299.92	320.	77.	0.038	106.77	1.965	TH-227	sM
1721.11	860.77	104.	80.	0.040	77.43	1.401	TL-208	s
1929.51	964.62	66.	45.	0.023	88.23	1.796	AC-228	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-212	149.29	74.81	873.	292.	0.146	45.78	1.178D
PB-212	153.89	77.11	899.	439.	0.219	24.87	1.179A
TH-234	185.82	93.08	1733.	165.	0.083	97.33	1.500s
RA-226	371.98	186.17	989.	178.	0.089	78.18	1.500s
TH-227	471.72	236.04	1624.	-167.	-0.084	104.84	1.500s
PB-212	476.89	238.63	532.	1137.	0.569	12.16	1.297D
PB-214	483.47	241.92	659.	188.	0.094	61.36	1.299D
PB-214	590.08	295.23	481.	280.	0.140	41.21	1.300
AC-228	677.04	338.71	378.	268.	0.134	38.97	1.730s
PB-214	703.66	352.02	482.	533.	0.267	25.02	1.354s
SB-125	926.31	463.36	339.	98.	0.049	82.58	1.500s
TL-208	1021.50	510.96	365.	157.	0.079	57.06	1.873s
TL-208	1166.49	583.45	245.	462.	0.231	23.67	1.499s
BI-214	1218.72	609.57	170.	429.	0.214	21.14	1.757
CS-137	1323.37	661.90	249.	2430.	1.215	7.33	1.924s
BI-212	1454.51	727.47	109.	134.	0.067	47.61	1.206s
CS-134	1590.56	795.50	93.	43.	0.022	103.19	1.684s
AC-228	1822.69	911.56	122.	375.	0.187	23.23	1.799
AC-228	1937.36	968.90	77.	159.	0.079	32.83	1.799D
BI-214	2240.77	1120.60	116.	115.	0.057	58.36	2.166s
CO-60	2664.67	1332.55	39.	27.	0.013	97.76	2.031

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2921.94	1461.17	47.	1701.	0.850	7.76	2.375
BI-214	3529.26	1764.80	5.	93.	0.046	34.72	2.236

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-5.3843E-02					
			477.56	-5.384E-02	%(	3.194E-01 9.49E-02	G
K-40		1.3617E+01					
			1460.75	1.362E+01	(P	2.775E-01 3.53E-01	G
MN-54		-2.8940E-03					
			834.81	-2.894E-03	%(P	2.617E-02 7.55E-03	G
CO-57		9.1733E-03					
			122.07	9.173E-03	&(P	3.806E-02 1.15E-02	G K
			136.43	-8.303E-02	% P	2.978E-01 8.97E-02	G
CO-60		2.1611E-02					
			1332.51	2.161E-02	(P	2.535E-02 8.02E-03	G K
			1173.23	2.743E-02	% P	4.048E-02 1.24E-02	G K
Sr-85		-1.6547E-02					
			514.00	-1.655E-02	%(	3.864E-02 1.17E-02	G
Kr-85		-3.8886E+02					
			513.99	-3.889E+02	%(P	8.470E+02 2.55E+02	G
Y-88		-8.6555E-04					
			1836.01	-8.655E-04	%(P	1.815E-02 4.43E-03	G K
			898.02	7.727E-03	& P	3.014E-02 8.86E-03	G
NB-94		-1.4865E-03					
			871.10	-1.486E-03	%(P	2.172E-02 6.17E-03	G K
			702.50	3.550E-03	% P	2.523E-02 7.36E-03	G K
Ag-108M		1.2251E-02					
			722.95	1.225E-02	%(	2.082E-02 6.42E-03	G K
			614.37	-2.250E-02	%	3.890E-02 1.19E-02	G
			433.93	8.334E-03	% P	3.317E-02 9.90E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	2.2090E-02						
		88.04	2.209E-02	%(P	1.189E+00	3.56E-01	G
SN-113	-5.1523E-03						
		391.71	-5.152E-03	&(P	4.886E-02	1.45E-02	G K
		255.04	-2.820E-01	%	1.352E+00	4.05E-01	G
SB-125	9.1067E-02						
		427.95	2.268E-03	%(P	1.013E-01	2.98E-02	G K
		600.77	3.889E-03	% P	1.388E-01	4.02E-02	G
		636.15	3.469E-02	& P	2.317E-01	6.79E-02	G
		463.51	3.539E-01	*(P	3.189E-01	1.00E-01	G
		176.29	-1.580E-02	& P	4.853E-01	1.45E-01	G
I-131	-8.5836E-03						
		364.48	-8.584E-03	%(	5.298E-02	1.58E-02	G K
		636.97	1.783E-02	&	5.828E-01	1.69E-01	G
		284.29	-4.223E-02	%	7.333E-01	2.18E-01	G
CS-134	-2.3204E-02						
		604.66	-2.320E-02	%(P	3.616E-02	1.11E-02	G K
		795.76	2.793E-02	+ P	3.062E-02	9.72E-03	G
		569.29	-1.463E-02	%	1.842E-01	5.40E-02	G
		801.84	-7.392E-02	& P	3.161E-01	9.31E-02	G
CS-137	1.3648E+00						
		661.62	1.365E+00	(P	4.277E-02	3.34E-02	G
CE-139	5.9956E-03						
		165.85	5.996E-03	%(P	3.937E-02	1.18E-02	G
EU-152	2.6102E-03						
		121.78	2.610E-03	&(P	1.105E-01	3.30E-02	G K
		344.30	-5.699E-03	% P	1.050E-01	3.10E-02	G
		1408.08	6.759E-03	% P	1.181E-01	3.28E-02	G
		964.00	-3.887E-02	% P	2.893E-01	8.52E-02	G
		1112.07	7.667E-04	% P	2.882E-01	8.32E-02	G
		778.90	-4.987E-03	% P	1.849E-01	5.26E-02	G
EU-154	-2.6809E-03						
		123.10	-2.681E-03	%(P	7.989E-02	2.39E-02	G K
		1274.80	-2.058E-03	% P	9.202E-02	2.61E-02	G
		723.30	-8.364E-02	% P	1.951E-01	5.89E-02	G
		1004.80	2.596E-02	& P	1.399E-01	4.06E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	8.6711E-02						
		86.45	8.671E-02	%(	1.307E-01	3.98E-02	G K
		105.31	1.971E-02	% P	1.632E-01	4.90E-02	G
HG-203	-6.8038E-03						
		279.17	-6.804E-03	&(P	3.854E-02	1.15E-02	G K
		72.87	-1.280E-01	% P	8.927E-01	2.68E-01	G
		70.83	-4.231E-01	%	1.681E+00	5.07E-01	G
		82.50	-3.759E-01	%	2.137E+00	6.43E-01	G
TL-208	2.3967E-01						
		583.14	2.315E-01	@(P	3.788E-02	1.84E-02	G
		510.72	2.710E-01	*(P	1.582E-01	6.26E-02	G
PB-212	5.9491E-01						
		238.63	5.804E-01	(P	5.624E-02	2.39E-02	G K
							Energy duplication
		77.11	5.949E-01	}	1.931E-01	4.93E-02	G
		74.81	7.483E-01	+ P	3.602E-01	1.16E-01	G
PB-214	3.9986E-01						
		351.99	4.157E-01	(P	8.186E-02	3.50E-02	G K
		295.22	3.693E-01	(P	1.386E-01	5.15E-02	G
							Energy duplication
		77.11	3.879E-02	} P	4.292E-01	1.15E-01	G
		241.92	5.588E-01	+ P	3.632E-01	1.15E-01	G
BI-212	5.7853E-01						
		727.17	5.785E-01	*(P	2.225E-01	9.27E-02	G K
		1620.56	3.810E-01	% P	6.194E-01	1.95E-01	G
		785.42	4.958E-01	% P	1.299E+00	3.88E-01	G
BI-214	4.1454E-01						
		609.32	4.145E-01	(P	6.143E-02	2.95E-02	G K
		1764.51	5.768E-01	+ P	8.358E-02	6.74E-02	G
		1120.28	5.377E-01	+ P	2.476E-01	1.05E-01	G
RA-224	4.0215E-01						
		241.00	4.022E-01	&(P	1.019E+00	3.08E-01	G
RA-226	1.0561E+00						
		185.99	1.056E+00	*(	8.846E-01	2.75E-01	G
AC-228	7.8154E-01						
		911.07	7.815E-01	(P	1.129E-01	6.12E-02	G K
		968.90	5.755E-01	- P	1.581E-01	6.39E-02	G
		338.40	6.271E-01	- P	2.179E-01	8.25E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -3.2678E-01
                          236.00-3.268E-01 &(P 3.717E-01 1.14E-01 G K
                          256.25 2.518E-02 % P 4.090E-01 1.22E-01 G

PA-234      -1.6785E-03
                           98.44-1.678E-03 %(  1.465E-01 4.38E-02 G K
                          946.00-4.189E-02 %   1.684E-01 4.99E-02 G
                          131.28 7.025E-02 %   1.414E-01 4.29E-02 G
                           94.67-8.102E-02 %   2.600E-01 7.85E-02 G
                          883.24 7.365E-02 %   1.904E-01 5.70E-02 G
                          926.70 3.417E-02 %   2.411E-01 7.00E-02 G
                          569.26-2.057E-02 %   2.718E-01 7.97E-02 G

TH-234       9.3828E-01
                           63.29 7.941E-01 %(P 1.666E+00 5.04E-01 G K
                           92.80 1.126E+00  (P 1.338E+00 4.09E-01 G
                           92.38-1.143E-01 % P 1.593E+00 4.76E-01 G

AM-241      -5.0622E-02
                           59.54-5.062E-02 &(P 2.108E-01 6.34E-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 - 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	-5.0328E-02	-5.3843E-02	2.8468E-01	2.8470E-01	2.986E-01
K-40		1.3617E+01	1.3617E+01	1.0597E+00	1.3303E+00	
MN-54	#A	-2.8608E-03	-2.8940E-03	2.6863E-02	2.6863E-02	2.587E-02
CO-57	#B	9.0517E-03	9.1733E-03	3.4369E-02	3.4372E-02	3.755E-02
CO-60	#B	2.1570E-02	2.1611E-02	2.4075E-02	2.4109E-02	2.531E-02
Sr-85	#A	-1.5652E-02	-1.6547E-02	3.5044E-02	3.5058E-02	3.655E-02
Kr-85	#A	-3.8884E+02	-3.8886E+02	8.8022E+02	8.8052E+02	8.470E+02
Y-88	#B	-8.3677E-04	-8.6555E-04	2.1620E-02	2.1620E-02	1.755E-02
NB-94	#B	-1.4865E-03	-1.4865E-03	2.0607E-02	2.0607E-02	2.172E-02
Ag-108M	#B	1.2250E-02	1.2251E-02	1.9252E-02	1.9265E-02	2.082E-02
CD-109	#A	2.1915E-02	2.2090E-02	1.0689E+00	1.0689E+00	1.179E+00
SN-113	#B	-4.9935E-03	-5.1523E-03	6.2132E-02	6.2133E-02	4.735E-02
SB-125	#B	9.0743E-02	9.1067E-02	7.7359E-02	7.7546E-02	1.009E-01
I-131	#B	-5.4824E-03	-8.5836E-03	4.7294E-02	4.7297E-02	3.384E-02
CS-134	#B	-2.3094E-02	-2.3204E-02	3.3906E-02	3.3933E-02	3.599E-02
CS-137		1.3643E+00	1.3648E+00	1.0018E-01	1.2858E-01	
CE-139	#A	5.8405E-03	5.9956E-03	3.5431E-02	3.5433E-02	3.835E-02
EU-152	#B	2.6081E-03	2.6102E-03	9.9137E-02	9.9137E-02	1.104E-01
EU-154	#B	-2.6778E-03	-2.6809E-03	8.6219E-02	8.6219E-02	7.980E-02
EU-155	#B	8.6539E-02	8.6711E-02	1.1951E-01	1.1961E-01	1.304E-01
HG-203	#B	-6.2973E-03	-6.8038E-03	3.9045E-02	3.9047E-02	3.567E-02
TL-208	#	2.3967E-01	2.3967E-01	5.7285E-02	5.9008E-02	
PB-212		5.9491E-01	5.9491E-01	7.3368E-02	8.1347E-02	
PB-214		3.9986E-01	3.9986E-01	9.7776E-02	1.0059E-01	
BI-212	#	5.7853E-01	5.7853E-01	2.7809E-01	2.8018E-01	
BI-214		4.1454E-01	4.1454E-01	8.8520E-02	9.1844E-02	
RA-224	#A	4.0215E-01	4.0215E-01	9.2478E-01	9.2508E-01	1.019E+00
RA-226	#	1.0561E+00	1.0561E+00	8.2562E-01	8.2797E-01	8.846E-01
AC-228		7.8154E-01	7.8154E-01	1.8360E-01	1.8932E-01	
TH-227	#A	-3.2678E-01	-3.2678E-01	3.4315E-01	3.4369E-01	3.717E-01
PA-234	#B	-1.6785E-03	-1.6785E-03	1.3148E-01	1.3148E-01	1.465E-01
TH-234	#B	9.3828E-01	9.3828E-01	1.0221E+00	1.0234E+00	1.666E+00
AM-241	#A	-5.0621E-02	-5.0622E-02	1.9618E-01	1.9620E-01	2.108E-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) 1.7990641E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.7991089E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107F_13JUN2006_1706.An1

Sample description
FSS-NOL-05-01-025-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_13JUN2006_1706.An1

Acquisition information
Start time: 13-Jun-2006 17:06:18
Live time: 2000
Real time: 2006
Dead time: 0.28 %
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/channel^2

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: 1.8490E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8490E+03) =
5.4083E+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	08-Jun-2006 10:00:00
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: 0.2387

***** 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
74.78	364.	15.52	1.18	2.849E-02	72.87	6.400	1.638E+00	HG203
					74.81	9.600	9.729E-01	PB212
77.08	383.	12.30	1.18	2.957E-02	77.11	17.500	8.104E-01	PB212
					77.11	10.700	1.314E+00	PB214
77.27	168.	37.25	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
93.27	198.	35.49	1.68	3.448E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.90	241.	33.31	1.63	3.611E-02				
185.90	241.	33.31	1.63	3.611E-02	185.99	3.280	1.489E+00	RA226
238.79	1234.	4.54	1.30	3.189E-02	238.63	43.100	6.476E-01	PB212
					241.00	3.900	7.280E+00	RA224
241.83	238.	20.10	1.30	3.165E-02	241.92	7.470	7.323E-01	PB214
270.35	132.	33.45	2.03	2.944E-02				
295.47	333.	14.97	1.62	2.766E-02	295.22	19.200	4.512E-01	PB214
338.09	331.	19.27	1.67	2.502E-02	338.40	12.010	7.970E-01	AC228
352.23	621.	11.07	1.64	2.425E-02	351.99	37.100	4.998E-01	PB214
510.69	218.	20.01	2.29	1.808E-02	510.72	22.500	3.305E-01	TL208
583.40	506.	7.80	1.55	1.628E-02	583.14	86.000	2.614E-01	TL208
609.64	448.	7.37	1.78	1.574E-02	609.32	46.090	4.464E-01	BI214
661.89	14043.	0.91	1.84	1.477E-02	661.62	84.620	8.212E+00	CS137
727.21	151.	21.81	2.01	1.374E-02	727.17	11.800	6.756E-01	BI212
785.08	49.	38.12	1.53	1.297E-02	785.42	2.000	1.385E+00	BI212
795.27	89.	20.57	1.74	1.284E-02				
795.27	89.	20.57	1.74	1.284E-02	795.76	85.400	5.926E-02	CS134
911.41	409.	8.24	1.78	1.160E-02	911.07	29.000	8.784E-01	AC228
964.51	58.	23.42	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152

969.33	169.	10.54	1.80	1.109E-02	968.90	17.460	6.288E-01	AC228
1121.05	140.	20.09	1.88	9.965E-03	1120.28	15.040	6.790E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1173.48	116.	21.67	2.12	9.636E-03	1173.23	99.860	8.494E-02	CO60
1332.64	63.	20.91	2.03	8.773E-03	1332.51	99.980	5.225E-02	CO60
1461.20	1868.	2.40	2.42	8.189E-03	1460.75	10.700	1.554E+01	K40
1621.19	22.	29.50	1.86	7.569E-03	1620.56	2.750	7.689E-01	BI212
1765.03	97.	10.15	1.74	7.082E-03	1764.51	15.920	6.228E-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
540.32	270.35	861.	132.	0.066	100.34	2.026	AC-228 s
1929.48	964.63	56.	66.	0.033	60.38	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	1450.	364.	0.182	46.55	1.178D
PB-212	153.89	77.11	1480.	383.	0.192	36.89	1.179A
PB-214	153.89	77.11	2890.	168.	0.084	111.75	1.500A
TH-234	185.80	93.07	2978.	210.	0.105	107.99	1.500s
TH-234	185.77	93.05	2936.	202.	0.101	105.12	1.500s
RA-226	372.31	186.33	2537.	191.	0.096	113.87	1.500s
PB-212	476.89	238.63	969.	1219.	0.609	13.62	1.297D
PB-214	483.47	241.92	1139.	219.	0.109	68.04	1.299D
PB-214	590.56	295.47	938.	328.	0.164	44.91	1.618s
AC-228	675.80	338.09	1207.	327.	0.164	57.81	1.672s
PB-214	704.07	352.23	1286.	615.	0.308	33.20	1.639s
TL-208	1020.97	510.69	633.	184.	0.092	60.03	2.289s
TL-208	1166.38	583.40	379.	501.	0.251	23.39	1.549s
BI-214	1218.86	609.64	261.	443.	0.222	22.12	1.777s
Ag-108M	1223.57	611.99	418.	-73.	-0.037	123.35	1.561s
CS-137	1323.35	661.89	473.	14039.	7.020	2.72	1.841s
BI-212	1454.00	727.21	219.	150.	0.075	65.44	2.006s
BI-212	1569.74	785.08	98.	49.	0.025	114.37	1.534
CS-134	1589.98	795.21	65.	77.	0.038	55.63	1.684s
AC-228	1822.37	911.41	152.	405.	0.202	24.72	1.783s
AC-228	1937.36	968.90	88.	167.	0.084	32.67	1.799D
BI-214	2241.67	1121.05	153.	139.	0.070	60.26	1.877s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2346.44	1173.43	176.	78.	0.039	75.48	1.931s
CO-60	2664.86	1332.64	67.	63.	0.031	62.73	2.031s
K-40	2922.00	1461.20	33.	1864.	0.932	7.21	2.416s
BI-212	3242.01	1621.19	6.	22.	0.011	88.51	1.859
BI-214	3529.72	1765.03	1.	96.	0.048	30.46	1.737

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-1.2478E-01					
			477.56	-1.248E-01	%(	5.698E-01 1.71E-01 G	
K-40		1.5540E+01					
			1460.75	1.554E+01	@(P	2.473E-01 3.74E-01 G	
MN-54		-1.6071E-02					
			834.81	-1.607E-02	&(P	3.558E-02 1.07E-02 G	
CO-57		1.0643E-02					
			122.07	1.064E-02	%(P	5.416E-02 1.63E-02 G K	
			136.43	-2.723E-02	& P	4.370E-01 1.31E-01 G	
CO-60		5.5701E-02					
			1332.51	5.225E-02	*(P	3.407E-02 1.16E-02 G K	
			1173.23	5.915E-02	*(P	4.904E-02 1.57E-02 G K	
Sr-85		-3.3686E-02					
			514.00	-3.369E-02	%(	5.643E-02 1.72E-02 G	
Kr-85		-7.6315E+02					
			513.99	-7.632E+02	%(P	1.233E+03 3.75E+02 G	
Y-88		-9.0216E-04					
			1836.01	-9.022E-04	%(P	1.934E-02 4.75E-03 G K	
			898.02	1.608E-03	& P	3.233E-02 9.27E-03 G	
NB-94		4.0883E-03					
			871.10	4.088E-03	%(P	3.189E-02 9.31E-03 G K	
			702.50	3.439E-03	% P	2.919E-02 8.53E-03 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	9.6731E-04						
		722.95	9.673E-04	%(	3.439E-02	9.98E-03	G K
		614.37	-3.790E-02	+	5.064E-02	1.56E-02	G
		433.93	-9.792E-03	& P	6.241E-02	1.87E-02	G
CD-109	5.7205E-01						
		88.04	5.721E-01	%(P	1.499E+00	4.54E-01	G
SN-113	-9.1190E-03						
		391.71	-9.119E-03	%(P	7.990E-02	2.39E-02	G K
		255.04	-4.115E-01	%	2.221E+00	6.68E-01	G
SB-125	1.2707E-02						
		427.95	1.271E-02	%(P	1.712E-01	5.11E-02	G K
		600.77	9.484E-03	& P	2.285E-01	6.74E-02	G
		636.15	1.378E-01	% P	3.543E-01	1.07E-01	G
		463.51	1.705E-01	& P	5.961E-01	1.79E-01	G
		176.29	-9.710E-02	& P	6.106E-01	1.83E-01	G
I-131	2.5476E-02						
		364.48	2.548E-02	%(	9.254E-02	2.79E-02	G K
		636.97	3.272E-01	%	8.097E-01	2.44E-01	G
		284.29	5.361E-02	%	1.156E+00	3.46E-01	G
CS-134	2.3854E-02						
		604.66	-2.489E-04	&(P	6.921E-02	2.06E-02	G K
		795.76	5.140E-02	*(P	2.689E-02	9.60E-03	G
		569.29	2.134E-02	&	2.098E-01	6.18E-02	G
		801.84	1.728E-02	% P	3.077E-01	8.85E-02	G
CS-137	8.2118E+00						
		661.62	8.212E+00	@(P	6.084E-02	7.44E-02	G
CE-139	2.7602E-03						
		165.85	2.760E-03	%(P	5.847E-02	1.76E-02	G
EU-152	5.6463E-02						
		121.78	5.646E-02	%(P	1.597E-01	4.83E-02	G K
		344.30	-2.438E-02	% P	1.672E-01	5.01E-02	G
		1408.08	4.062E-02	% P	1.101E-01	3.25E-02	G
		964.00	-6.482E-03	& P	3.008E-01	8.77E-02	G
		1112.07	6.138E-02	& P	2.639E-01	7.77E-02	G
		778.90	2.256E-03	% P	1.857E-01	5.28E-02	G
EU-154	2.4959E-04						
		123.10	2.496E-04	&(P	1.132E-01	3.40E-02	G K
		1274.80	-3.985E-02	% P	1.108E-01	3.31E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30 1.913E-02 % P 1.604E-01 4.70E-02 G
                         1004.80 1.629E-02 & P 1.796E-01 5.19E-02 G

EU-155       1.0030E-01
                           86.45 1.003E-01 %(  1.750E-01 5.32E-02 G K
                          105.31-4.042E-02 & P 2.160E-01 6.51E-02 G

HG-203      -2.1961E-04
                          279.17-2.196E-04 &(P 4.607E-02 1.37E-02 G K
                           72.87 2.619E-01 % P 1.228E+00 3.70E-01 G
                           70.83-1.178E+00 &   2.220E+00 6.74E-01 G
                           82.50-3.850E-01 %   2.778E+00 8.36E-01 G

TL-208       2.6140E-01
                          583.14 2.614E-01 @(P 4.874E-02 2.06E-02 G
                          510.72 3.305E-01 + P 2.155E-01 7.82E-02 G

PB-212       6.4804E-01
                          238.63 6.480E-01  (P 7.857E-02 2.98E-02 G K
                                                          Energy duplication
                           77.11 5.412E-01 }   2.570E-01 6.65E-02 G
                           74.81 9.729E-01 + P 4.813E-01 1.53E-01 G

PB-214       4.8325E-01
                          351.99 4.998E-01 *(P 1.379E-01 5.58E-02 G K
                          295.22 4.512E-01 *(P 2.000E-01 6.85E-02 G
                                                          Energy duplication
                           77.11 3.892E-01 } P 5.848E-01 1.45E-01 G
                          241.92 6.769E-01 + P 4.949E-01 1.55E-01 G

BI-212       6.9326E-01
                          727.17 6.756E-01 *(P 3.231E-01 1.49E-01 G K
                         1620.56 7.689E-01  (P 4.994E-01 2.32E-01 G
                          785.42 1.385E+00 + P 1.376E+00 5.41E-01 G

BI-214       4.4641E-01
                          609.32 4.464E-01 @(P 7.854E-02 3.33E-02 G K
                         1764.51 6.228E-01 + P 4.776E-02 6.38E-02 G
                         1120.28 6.790E-01 + P 2.939E-01 1.37E-01 G

RA-224      -9.3401E-03
                          241.00-9.340E-03 &(P 1.291E+00 3.87E-01 G

RA-226       1.1800E+00
                          185.99 1.180E+00 *(  1.465E+00 4.48E-01 G

AC-228       8.5454E-01
                          911.07 8.784E-01 @(P 1.308E-01 7.32E-02 G K
                          968.90 6.310E-01 - P 1.750E-01 6.96E-02 G
                          338.40 7.970E-01 *(P 4.005E-01 1.55E-01 G
```

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.5283E-01
                          236.00-1.528E-01 %(P 4.107E-01 1.24E-01 G K
                          256.25-1.229E-01 & P 6.762E-01 2.03E-01 G

PA-234      -4.8821E-02
                           98.44-4.882E-02 %(  1.990E-01 6.01E-02 G K
                          946.00 2.539E-02 &   1.581E-01 4.62E-02 G
                          131.28 1.119E-02 %   1.939E-01 5.82E-02 G
                           94.67-5.201E-02 &   3.377E-01 1.02E-01 G
                          883.24 4.399E-03 &   2.139E-01 6.09E-02 G
                          926.70 6.079E-02 %   2.416E-01 7.11E-02 G
                          569.26 5.405E-02 &   3.203E-01 9.49E-02 G

TH-234       1.1756E+00
                           63.29 6.039E-01 %(P 2.177E+00 6.56E-01 G K
                           92.80 1.434E+00  (P 1.808E+00 5.51E-01 G
                           92.38 1.742E+00  (P 2.131E+00 6.51E-01 G

AM-241      -1.0530E-02
                           59.54-1.053E-02 %(P 2.630E-01 7.88E-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 - 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	-1.1649E-01	-1.2478E-01	5.1334E-01	5.1339E-01	5.320E-01
K-40	#	1.5540E+01	1.5540E+01	1.1229E+00	1.4503E+00	
MN-54	#A	-1.5884E-02	-1.6071E-02	3.3266E-02	3.3280E-02	3.516E-02
CO-57	#B	1.0499E-02	1.0643E-02	4.8971E-02	4.8975E-02	5.343E-02
CO-60	#	5.5595E-02	5.5701E-02	2.8871E-02	2.9058E-02	3.400E-02
Sr-85	#A	-3.1831E-02	-3.3686E-02	5.1595E-02	5.1633E-02	5.332E-02
Kr-85	#A	-7.6312E+02	-7.6315E+02	1.2122E+03	1.2130E+03	1.233E+03
Y-88	#B	-8.7162E-04	-9.0216E-04	2.3178E-02	2.3178E-02	1.868E-02
NB-94	#B	4.0883E-03	4.0883E-03	2.7929E-02	2.7930E-02	3.189E-02
Ag-108M	#B	9.6723E-04	9.6731E-04	2.9953E-02	2.9953E-02	3.439E-02
CD-109	#A	5.6744E-01	5.7205E-01	1.3614E+00	1.3618E+00	1.487E+00
SN-113	#B	-8.8328E-03	-9.1190E-03	8.8424E-02	8.8426E-02	7.739E-02
SB-125	#B	1.2661E-02	1.2707E-02	1.5329E-01	1.5329E-01	1.706E-01
I-131	#B	1.6138E-02	2.5476E-02	8.3596E-02	8.3610E-02	5.862E-02
CS-134	#B	2.3738E-02	2.3854E-02	1.3362E-02	1.3436E-02	6.887E-02
CS-137	#	8.2091E+00	8.2118E+00	2.2302E-01	5.3381E-01	
CE-139	#A	2.6875E-03	2.7602E-03	5.2670E-02	5.2671E-02	5.693E-02
EU-152	#B	5.6418E-02	5.6463E-02	1.4489E-01	1.4492E-01	1.595E-01
EU-154	#B	2.4929E-04	2.4959E-04	1.0191E-01	1.0191E-01	1.131E-01
EU-155	#B	1.0010E-01	1.0030E-01	1.5955E-01	1.5965E-01	1.746E-01
HG-203	#B	-2.0297E-04	-2.1961E-04	1.2433E-01	1.2433E-01	4.258E-02
TL-208	#	2.6140E-01	2.6140E-01	6.1695E-02	6.3597E-02	
PB-212		6.4804E-01	6.4804E-01	8.9395E-02	9.7244E-02	
PB-214		4.8325E-01	4.8325E-01	1.3656E-01	1.3951E-01	
BI-212		6.9326E-01	6.9326E-01	3.8839E-01	3.9054E-01	
BI-214		4.4641E-01	4.4641E-01	9.9713E-02	1.0314E-01	
RA-224	#A	-9.3401E-03	-9.3401E-03	6.7838E+00	6.7838E+00	1.291E+00
RA-226	#A	1.1800E+00	1.1800E+00	1.3436E+00	1.3454E+00	1.465E+00
AC-228		8.5454E-01	8.5454E-01	2.1348E-01	2.1936E-01	
TH-227	#B	-1.5283E-01	-1.5283E-01	3.7538E-01	3.7549E-01	4.107E-01
PA-234	#B	-4.8821E-02	-4.8821E-02	1.8017E-01	1.8019E-01	1.990E-01
TH-234	#B	1.1756E+00	1.1756E+00	1.3177E+00	1.3193E+00	2.177E+00
AM-241	#A	-1.0530E-02	-1.0530E-02	2.7550E-01	2.7550E-01	2.630E-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 (1007.7 to 2000.1 keV) 2.7136259E+01 pCi/gm
Total Decayed Activity (1007.7 to 2000.1 keV) 2.7139002E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107F_13DEC2005_1838.An1

Sample description
FSS-NOL-05-02-107-F-I-SS-001

Spectrum Filename: C:\GammaVision\Spectra\107F_13DEC2005_1838.An1

Acquisition information

Start time:	13-Dec-2005 18:38:47
Live time:	2000
Real time:	2004
Dead time:	0.18 %
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/channel^2

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:	1.8400E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8400E+03) = 5.4348E+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	12-Dec-2005 13:38:00
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: 0.3954

***** 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
74.62	344.	14.54	1.18	2.842E-02	74.81	9.600	9.134E-01	PB212
76.99	579.	9.04	1.18	2.954E-02	77.11	10.700	1.333E+00	PB214
					77.11	17.500	8.220E-01	PB212
87.61	159.	37.34	1.04	3.315E-02	86.45	32.740	1.087E-01	EU155
					88.04	3.790	PBC<MDA	CD109
92.86	172.	32.25	1.84	3.440E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.73	293.	17.46	1.51	3.612E-02	185.99	3.280	1.820E+00	RA226
209.46	126.	39.23	0.91	3.427E-02				
238.94	1892.	4.00	1.77	3.187E-02	238.63	43.100	1.003E+00	PB212
241.83	197.	20.14	1.30	3.163E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.127E-01	PB214
270.00	152.	26.85	1.24	2.946E-02				
276.81	96.	33.69	2.22	2.896E-02				
294.86	372.	13.02	1.75	2.770E-02	295.22	19.200	5.076E-01	PB214
328.11	105.	28.55	1.78	2.560E-02				
338.14	395.	13.29	1.72	2.502E-02	338.40	12.010	9.582E-01	AC228
351.66	648.	7.77	1.71	2.428E-02	351.99	37.100	5.249E-01	PB214
510.32	278.	14.38	2.01	1.809E-02	510.72	22.500	4.415E-01	TL208
582.95	559.	6.21	1.88	1.629E-02	583.14	86.000	2.908E-01	TL208
608.87	513.	8.52	1.98	1.575E-02	609.32	46.090	5.149E-01	BI214
661.34	653.	6.55	1.99	1.478E-02	661.62	84.620	3.819E-01	CS137
726.64	144.	22.91	2.65	1.375E-02	727.17	11.800	6.454E-01	BI212
794.88	101.	25.07	1.35	1.285E-02				
794.88	101.	25.07	1.35	1.285E-02	795.76	85.400	6.737E-02	CS134
903.82	38.	41.16	1.76	1.168E-02				
910.77	379.	6.90	1.76	1.161E-02	911.07	29.000	8.184E-01	AC228

967.30	346.	10.89	1.56	1.111E-02	968.90	17.460	1.304E+00	AC228
1119.45	126.	23.76	2.21	9.975E-03	1120.28	15.040	6.128E-01	BI214
1172.52	1154.	4.03	2.21	9.642E-03	1173.23	99.860	8.776E-01	CO60
1331.66	1025.	3.55	2.49	8.777E-03	1332.51	99.980	8.555E-01	CO60
1459.88	2201.	2.17	2.24	8.195E-03	1460.75	10.700	1.840E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1619.81	16.	37.26	2.21	7.569E-03	1620.56	2.750	PBC<MDA	BI212
1763.24	101.	10.59	1.16	7.084E-03	1764.51	15.920	6.558E-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	
418.56	209.46	934.	126.	0.063	117.69	0.913	AC-228	s
539.63	270.00	602.	152.	0.076	80.56	1.238	AC-228	s
553.24	276.81	402.	130.	0.065	70.31	2.224	TL-208	s
655.85	328.11	364.	105.	0.053	85.64	1.776	AC-228	s
1807.19	903.80	103.	38.	0.019	123.47	1.756	KR-89	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 keV
PB-212	149.29	74.81	1082.	342.	0.171	43.38	1.178D
PB-212	153.89	77.11	1081.	529.	0.265	25.59	1.179A
EU-155	174.26	87.30	2217.	179.	0.089	113.88	1.500
TH-234	185.53	92.93	2046.	228.	0.114	83.62	1.500s
TH-234	185.50	92.92	1974.	219.	0.110	80.91	1.500s
RA-226	371.10	185.73	972.	293.	0.147	52.39	1.509s
TH-227	471.60	235.98	1926.	-199.	-0.099	96.19	1.500s
PB-212	476.89	238.63	671.	1351.	0.676	11.35	1.297D
PB-214	483.47	241.92	702.	197.	0.099	60.42	1.299D
PB-214	589.35	294.86	685.	367.	0.184	39.07	1.750s
AC-228	675.90	338.14	678.	392.	0.196	39.88	1.717s
PB-214	702.93	351.66	578.	643.	0.322	23.31	1.708s
TL-208	1020.23	510.32	422.	245.	0.122	43.14	2.009s
TL-208	1165.49	582.95	244.	555.	0.277	18.63	1.876s
BI-214	1217.32	608.87	382.	509.	0.254	25.57	1.976s
Ag-108M	1222.75	611.58	331.	-81.	-0.040	101.04	1.561s
CS-137	1322.26	661.34	322.	650.	0.325	19.65	1.986s
BI-212	1452.84	726.64	286.	143.	0.071	68.72	2.649s
CS-134	1588.66	794.55	172.	60.	0.030	98.81	1.684s
AC-228	1821.02	910.73	337.	469.	0.235	28.12	2.065
AC-228	1934.15	967.30	285.	344.	0.172	32.66	1.557s
BI-214	2238.47	1119.45	221.	125.	0.063	71.27	2.214s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2344.60	1172.52	238.	1150.	0.575	12.09	2.207s
CO-60	2662.90	1331.66	85.	1021.	0.511	10.65	2.489s
K-40	2919.35	1459.88	27.	2196.	1.098	6.52	2.239
BI-212	3239.25	1619.81	11.	16.	0.008	111.77	2.206s
BI-214	3526.13	1763.24	5.	101.	0.050	31.76	1.156s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-4.4633E-02					
			477.56	-4.463E-02	%(	3.015E-01 8.93E-02 G	
K-40		1.8401E+01					
			1460.75	1.840E+01	(P	2.261E-01 4.00E-01 G	
MN-54		7.7342E-03					
			834.81	7.734E-03	%(P	4.372E-02 1.30E-02 G	
CO-57		-3.7035E-03					
			122.07	-3.703E-03	%(P	4.105E-02 1.23E-02 G K	
			136.43	-5.374E-02	& P	3.518E-01 1.06E-01 G	
CO-60		8.6655E-01					
			1332.51	8.555E-01	(P	3.821E-02 3.05E-02 G K	
			1173.23	8.776E-01	*(P	5.701E-02 3.55E-02 G K	
Sr-85		-1.9478E-02					
			514.00	-1.948E-02	%(	4.305E-02 1.30E-02 G	
Kr-85		-4.7265E+02					
			513.99	-4.727E+02	%(P	9.842E+02 2.97E+02 G	
Y-88		-5.2367E-03					
			1836.01	-5.237E-03	&(P	2.690E-02 7.46E-03 G K	
			898.02	1.289E-03	% P	5.048E-02 1.48E-02 G	
NB-94		5.5190E-04					
			871.10	5.519E-04	&(P	4.324E-02 1.26E-02 G K	
			702.50	3.213E-04	% P	3.629E-02 1.06E-02 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	8.6217E-04						
		722.95	8.622E-04	&(	4.743E-02	1.39E-02	G K
		614.37	-4.201E-02	&	4.542E-02	1.42E-02	G
		433.93	1.198E-03	% P	3.742E-02	1.10E-02	G
CD-109	1.0374E-01						
		88.04	1.037E-01	%(P	1.351E+00	4.06E-01	G
SN-113	1.1825E-02						
		391.71	1.182E-02	%(P	3.702E-02	1.11E-02	G K
		255.04	-2.005E-01	&	1.568E+00	4.69E-01	G
SB-125	8.1970E-03						
		427.95	8.197E-03	%(P	9.078E-02	2.67E-02	G K
		600.77	2.559E-02	& P	1.893E-01	5.59E-02	G
		636.15	-8.714E-02	% P	3.318E-01	9.89E-02	G
		463.51	5.438E-03	% P	3.471E-01	1.02E-01	G
		176.29	-1.675E-01	% P	5.589E-01	1.68E-01	G
I-131	1.1626E-04						
		364.48	1.163E-04	&(	3.871E-02	1.14E-02	G K
		636.97	9.872E-02	&	4.758E-01	1.41E-01	G
		284.29	1.281E-01	%	5.690E-01	1.71E-01	G
CS-134	1.7111E-02						
		604.66	-3.398E-03	%(P	8.075E-02	2.41E-02	G K
		795.76	4.055E-02	*(P	4.278E-02	1.35E-02	G
		569.29	3.117E-03	&	2.336E-01	6.86E-02	G
		801.84	2.513E-02	& P	4.382E-01	1.28E-01	G
CS-137	3.8187E-01						
		661.62	3.819E-01	*(P	5.074E-02	2.51E-02	G
CE-139	-2.6390E-03						
		165.85	-2.639E-03	%(P	4.390E-02	1.31E-02	G
EU-152	-6.0654E-03						
		121.78	-6.065E-03	%(P	1.270E-01	3.80E-02	G K
		344.30	-2.619E-02	% P	1.172E-01	3.50E-02	G
		1408.08	1.447E-02	% P	1.366E-01	3.87E-02	G
		964.00	1.402E-01	& P	4.390E-01	1.32E-01	G
		1112.07	1.578E-01	& P	3.200E-01	9.71E-02	G
		778.90	-2.995E-03	& P	2.902E-01	8.44E-02	G
EU-154	-9.2968E-03						
		123.10	-9.297E-03	%(P	9.176E-02	2.75E-02	G K
		1274.80	-3.134E-02	% P	1.344E-01	3.97E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-9.498E-04 & P 1.800E-01 5.24E-02 G
                         1004.80-4.337E-02 % P 2.887E-01 8.54E-02 G

EU-155       1.2228E-01
                           86.45 1.223E-01  (  1.518E-01 4.64E-02 G K
                          105.31 6.915E-02 % P 1.743E-01 5.27E-02 G

HG-203      -1.3273E-02
                          279.17-1.327E-02 &(P 4.247E-02 1.28E-02 G K
                           72.87-1.301E-01 % P 1.024E+00 3.08E-01 G
                           70.83 8.615E-03 %   2.023E+00 6.07E-01 G
                           82.50-4.347E-01 %   2.267E+00 6.83E-01 G

TL-208       2.9083E-01
                          583.14 2.908E-01 @(P 3.960E-02 1.82E-02 G
                          510.72 4.415E-01 + P 1.778E-01 7.22E-02 G

PB-212       7.5087E-01
                          238.63 7.220E-01  (P 6.592E-02 2.76E-02 G K
                                                          Energy duplication
                           77.11 7.509E-01 }   2.213E-01 6.40E-02 G
                           74.81 9.184E-01 + P 4.188E-01 1.34E-01 G

PB-214       5.2997E-01
                          351.99 5.249E-01 *(P 9.362E-02 4.11E-02 G K
                          295.22 5.076E-01 *(P 1.723E-01 6.69E-02 G
                                                          Energy duplication
                           77.11 1.010E-01 } P 4.824E-01 1.33E-01 G
                          241.92 6.127E-01  (P 3.922E-01 1.24E-01 G

BI-212       6.2986E-01
                          727.17 6.454E-01  (P 3.695E-01 1.49E-01 G K
                         1620.56 5.631E-01 ?(P 6.429E-01 2.16E-01 G
                          785.42-3.580E-02 % P 2.080E+00 6.06E-01 G

BI-214       5.3899E-01
                          609.32 5.149E-01 *(P 9.498E-02 4.42E-02 G K
                         1764.51 6.558E-01 + P 8.749E-02 7.00E-02 G
                         1120.28 6.128E-01 *(P 3.525E-01 1.47E-01 G

RA-224       1.8768E-01
                          241.00 1.877E-01 %(P 1.174E+00 3.53E-01 G

RA-226       1.8197E+00
                          185.99 1.820E+00 *(  9.177E-01 3.18E-01 G

AC-228       1.0941E+00
                          911.07 1.024E+00  (P 1.925E-01 9.68E-02 G K
                          968.90 1.304E+00 @(P 3.086E-01 1.43E-01 G
                          338.40 9.582E-01 *(P 3.034E-01 1.28E-01 G
```

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -4.0590E-01
                          236.00-4.059E-01 ?(P 4.232E-01 1.30E-01 G K
                          256.25-7.837E-03 & P 4.840E-01 1.44E-01 G

PA-234       4.0071E-02
                           98.44 4.007E-02 %(  1.577E-01 4.75E-02 G K
                          946.00-3.403E-02 %   2.465E-01 7.29E-02 G
                          131.28-8.619E-03 &   1.897E-01 5.69E-02 G
                           94.67-1.729E-01 %   2.977E-01 9.05E-02 G
                          883.24 3.422E-02 %   3.536E-01 1.04E-01 G
                          926.70 0.000E+00 &   4.509E-01 1.32E-01 G
                          569.26 4.619E-03 &   3.462E-01 1.02E-01 G

TH-234       1.3902E+00
                           63.29 9.259E-01 %(P 1.798E+00 5.45E-01 G K
                           92.80 1.560E+00  (P 1.493E+00 4.59E-01 G
                           92.38 1.897E+00  (P 1.779E+00 5.47E-01 G

AM-241      -1.7448E-02
                           59.54-1.745E-02 %(P 2.389E-01 7.16E-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 - 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	-4.3938E-02	-4.4633E-02	2.6797E-01	2.6798E-01	2.968E-01
K-40		1.8401E+01	1.8401E+01	1.2019E+00	1.6204E+00	
MN-54	#A	7.7135E-03	7.7342E-03	3.8853E-02	3.8856E-02	4.360E-02
CO-57	#B	-3.6920E-03	-3.7035E-03	3.8179E-02	3.8180E-02	4.092E-02
CO-60		8.6617E-01	8.6655E-01	7.0066E-02	8.6767E-02	
Sr-85	#A	-1.9228E-02	-1.9478E-02	3.9114E-02	3.9131E-02	4.250E-02
Kr-85	#A	-4.7265E+02	-4.7265E+02	1.0054E+03	1.0058E+03	9.842E+02
Y-88	#B	-5.1957E-03	-5.2367E-03	3.1465E-02	3.1466E-02	2.669E-02
NB-94	#B	5.5190E-04	5.5190E-04	3.7893E-02	3.7893E-02	4.324E-02
Ag-108M	#B	8.6215E-04	8.6217E-04	4.1786E-02	4.1786E-02	4.743E-02
CD-109	#A	1.0355E-01	1.0374E-01	1.2176E+00	1.2176E+00	1.348E+00
SN-113	#B	1.1739E-02	1.1825E-02	3.3197E-02	3.3204E-02	3.675E-02
SB-125	#B	8.1902E-03	8.1970E-03	8.0141E-02	8.0142E-02	9.070E-02
I-131	#B	1.0475E-04	1.1626E-04	3.4200E-02	3.4200E-02	3.488E-02
CS-134	#B	1.7092E-02	1.7111E-02	1.7056E-02	1.7085E-02	8.066E-02
CS-137	#	3.8185E-01	3.8187E-01	7.5458E-02	7.8757E-02	
CE-139	#A	-2.6229E-03	-2.6390E-03	4.2029E-02	4.2029E-02	4.363E-02
EU-152	#B	-6.0643E-03	-6.0654E-03	1.1761E-01	1.1761E-01	1.269E-01
EU-154	#B	-9.2943E-03	-9.2968E-03	8.7307E-02	8.7308E-02	9.173E-02
EU-155	#A	1.2223E-01	1.2228E-01	1.3926E-01	1.3942E-01	1.517E-01
HG-203	#B	-1.3036E-02	-1.3273E-02	4.0796E-02	4.0804E-02	4.172E-02
TL-208	#	2.9083E-01	2.9083E-01	5.4628E-02	5.7265E-02	
PB-212		7.5087E-01	7.5087E-01	8.6236E-02	9.6971E-02	
PB-214		5.2997E-01	5.2997E-01	1.2454E-01	1.2841E-01	
BI-212	#	6.2986E-01	6.2986E-01	4.2369E-01	4.2532E-01	
BI-214		5.3899E-01	5.3899E-01	1.3898E-01	1.4258E-01	
RA-224	#A	1.8768E-01	1.8768E-01	1.0585E+00	1.0585E+00	1.174E+00
RA-226	#	1.8197E+00	1.8197E+00	9.5336E-01	9.5940E-01	
AC-228		1.0941E+00	1.0941E+00	2.1584E-01	2.2531E-01	
TH-227	#A	-4.0590E-01	-4.0590E-01	3.9098E-01	3.9172E-01	4.232E-01
PA-234	#B	4.0071E-02	4.0071E-02	1.4261E-01	1.4263E-01	1.577E-01
TH-234	#B	1.3902E+00	1.3902E+00	9.9826E-01	1.0012E+00	1.798E+00
AM-241	#A	-1.7448E-02	-1.7448E-02	2.3552E-01	2.3552E-01	2.389E-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 (269.7 to 2000.1 keV) 2.5303249E+01 pCi/gm
Total Decayed Activity (269.7 to 2000.1 keV) 2.5303659E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_17NOV2005_1546.An1

Sample description
NOL-05-02-004-C

Spectrum Filename: C:\GammaVision\Spectra\101_17NOV2005_1546.An1

Acquisition information
Start time: 17-Nov-2005 15:46:30
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/channel^2

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: 1.9060E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9060E+03) =
5.2466E+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	17-Nov-2005 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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1129

***** 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
74.85	239.	12.98	1.00	1.654E-02	74.81	9.600	1.069E+00	PB212
77.15	230.	11.04	1.01	1.720E-02	77.11	17.500	6.374E-01	PB212
86.93	145.	31.05	1.50	1.910E-02				
86.93	145.	31.05	1.50	1.910E-02	86.45	32.740	PBC<MDA	EU155
89.96	81.	33.52	1.02	1.957E-02	88.04	3.790	PBC<MDA	CD109
93.02	120.	23.62	1.02	1.992E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.27	87.	41.23	0.91	1.857E-02	185.99	3.280	1.010E+00	RA226
238.82	655.	4.69	1.12	1.557E-02	238.63	43.100	6.851E-01	PB212
241.65	107.	20.98	1.12	1.542E-02	241.00	3.900	1.256E+00	RA224
					241.92	7.470	6.581E-01	PB214
269.79	81.	28.43	1.42	1.402E-02				
295.26	190.	12.10	1.25	1.292E-02	295.22	19.200	5.394E-01	PB214
301.20	82.	25.76	1.30	1.268E-02				
328.27	51.	32.77	1.17	1.169E-02				
339.05	152.	15.89	1.15	1.133E-02	338.40	12.010	7.782E-01	AC228
352.06	278.	9.84	1.34	1.092E-02	351.99	37.100	4.820E-01	PB214
463.26	42.	31.90	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125
510.73	123.	19.26	1.84	7.590E-03	510.72	22.500	4.449E-01	TL208
583.60	199.	10.85	1.22	6.679E-03	583.14	86.000	2.424E-01	TL208
609.41	196.	11.94	1.00	6.412E-03	609.32	46.090	4.670E-01	BI214
662.08	41.	31.85	0.72	5.934E-03	661.62	84.620	5.689E-02	CS137
727.47	36.	26.00	1.43	5.441E-03	727.17	11.800	3.877E-01	BI212
911.41	135.	11.52	1.58	4.445E-03	911.07	29.000	7.309E-01	AC228
964.44	33.	25.65	1.61	4.229E-03				
969.18	81.	14.84	1.62	4.211E-03	968.90	17.460	7.751E-01	AC228
1120.68	66.	25.06	1.82	3.711E-03	1120.28	15.040	8.374E-01	BI214

1460.90	658.	4.04	1.98	2.942E-03	1460.75	10.700	1.475E+01	K40
1764.77	19.	27.03	2.11	2.481E-03	1764.51	15.920	3.456E-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
179.49	89.95	327.	81.	0.040	100.56	1.016	PB-214 lD
539.31	269.79	186.	81.	0.040	85.29	1.416	AC-228 s
602.14	301.20	141.	82.	0.041	77.27	1.298	PB-212 s
656.31	328.27	106.	51.	0.026	98.31	1.165	RH-106M s
1324.25	662.08	47.	41.	0.021	95.56	0.724	CS-137 l
1929.76	964.45	18.	34.	0.017	73.90	1.613	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	149.19	74.81	388.	239.	0.120	38.95	1.005D
PB-212	153.79	77.11	436.	230.	0.115	33.11	1.007A
EU-155	173.44	86.93	935.	145.	0.072	93.14	1.499
TH-234	185.23	92.83	891.	115.	0.057	103.81	1.499s
TH-234	185.25	92.83	855.	124.	0.062	98.76	1.499s
RA-226	371.61	185.98	483.	78.	0.039	123.85	1.499
PB-212	476.96	238.63	151.	649.	0.324	14.08	1.122D
RA-224	483.20	241.75	480.	82.	0.041	116.83	1.499
PB-214	483.54	241.92	158.	94.	0.047	64.43	1.124D
PB-214	590.27	295.26	138.	189.	0.094	36.31	1.250s
AC-228	677.88	339.05	150.	150.	0.075	47.66	1.146s
PB-214	703.92	352.06	163.	276.	0.138	29.52	1.335
SB-125	926.42	463.26	76.	42.	0.021	95.69	1.499s
TL-208	1021.41	510.73	135.	107.	0.054	57.77	1.839s
TL-208	1167.21	583.60	88.	197.	0.098	32.55	1.216s
BI-214	1218.86	609.41	104.	195.	0.097	35.82	0.996
BI-212	1455.09	727.47	25.	35.	0.018	77.99	1.432
AC-228	1823.16	911.41	34.	133.	0.066	34.55	1.576s
AC-228	1938.21	968.90	32.	81.	0.040	44.42	1.616D
BI-214	2241.95	1120.68	57.	66.	0.033	75.19	1.816s
K-40	2922.82	1460.90	13.	655.	0.328	12.11	1.983
BI-214	3530.98	1764.77	5.	19.	0.010	81.09	2.106

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		2.2451E-01					
			477.56	2.245E-01	%(	3.486E-01 1.08E-01	G
K-40		1.4755E+01					
			1460.75	1.475E+01	(P	4.362E-01 5.98E-01	G
MN-54		8.7215E-03					
			834.81	8.721E-03	%(P	5.375E-02 1.55E-02	G
CO-57		4.6697E-04					
			122.07	4.670E-04	&(	4.457E-02 1.32E-02	G K
			136.43	-5.953E-02	&	3.605E-01 1.08E-01	G
CO-60		3.1024E-02					
			1332.51	3.102E-02	%(P	5.745E-02 1.77E-02	G K
			1173.23	2.757E-02	% P	5.785E-02 1.75E-02	G K
Sr-85		-1.7577E-02					
			514.00	-1.758E-02	%(	5.696E-02 1.70E-02	G
Kr-85		-4.3044E+02					
			513.99	-4.304E+02	%(P	1.316E+03 3.91E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	4.954E-02 1.26E-02	G K
			898.02	-2.168E-03	& P	6.539E-02 1.85E-02	G
NB-94		1.1481E-02					
			871.10	1.148E-02	&(P	4.360E-02 1.27E-02	G K
			702.50	-2.014E-03	% P	4.731E-02 1.34E-02	G K
Ag-108M		-1.6064E-03					
			722.95	-1.606E-03	&(	3.700E-02 1.02E-02	G K
			614.37	-1.024E-03	% P	5.548E-02 1.58E-02	G
			433.93	9.384E-03	&	4.529E-02 1.33E-02	G
CD-109		7.5654E-03					
			88.04	7.565E-03	&(P	1.478E+00 4.41E-01	G
SN-113		-3.5923E-03					
			391.71	-3.592E-03	%(	6.411E-02 1.86E-02	G K
			255.04	2.456E-01	% P	1.873E+00 5.54E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.2658E-02						
		427.95	-2.375E-02	%(P	1.292E-01	3.78E-02	G K
		600.77	-3.372E-02	% P	2.758E-01	7.99E-02	G
		636.15	-2.922E-03	% P	3.808E-01	1.07E-01	G
		463.51	3.580E-01	*(P	3.689E-01	1.18E-01	G
		176.29	9.421E-02	& P	6.236E-01	1.86E-01	G
I-131	-8.9901E-04						
		364.48	-8.990E-04	&(	4.882E-02	1.41E-02	G K
		636.97	2.835E-01	%	5.151E-01	1.58E-01	G
		284.29	7.823E-04	%	6.755E-01	1.98E-01	G
CS-134	-6.9555E-04						
		604.66	-6.955E-04	%(P	8.809E-02	2.58E-02	G K
		795.76	3.362E-02	% P	4.743E-02	1.50E-02	G
		569.29	5.380E-02	& P	2.729E-01	7.95E-02	G
		801.84	-7.745E-04	%	5.238E-01	1.46E-01	G
CS-137	2.8506E-02						
		661.62	2.851E-02	%(P	4.498E-02	1.39E-02	G
CE-139	-4.4762E-03						
		165.85	-4.476E-03	&(P	5.125E-02	1.52E-02	G
EU-152	3.9784E-02						
		121.78	3.978E-02	%(P	1.317E-01	3.96E-02	G K
		344.30	-3.446E-02	% P	1.567E-01	4.64E-02	G
		1408.08	4.914E-02	% P	2.176E-01	6.14E-02	G
		964.00	2.551E-02	% P	2.772E-01	7.62E-02	G
		1112.07	-5.293E-02	% P	4.944E-01	1.41E-01	G
		778.90	-3.986E-02	& P	3.293E-01	9.33E-02	G
EU-154	-8.4332E-03						
		123.10	-8.433E-03	&(P	1.038E-01	3.09E-02	G K
		1274.80	-1.338E-04	% P	2.333E-01	6.59E-02	G
		723.30	-1.268E-01	& P	3.182E-01	9.54E-02	G
		1004.80	8.243E-02	& P	3.163E-01	9.23E-02	G
EU-155	1.6396E-01						
		86.45	1.640E-01	(	1.647E-01	5.09E-02	G K
		105.31	7.003E-02	%	1.928E-01	5.82E-02	G
HG-203	-1.1215E-02						
		279.17	-1.121E-02	%(	5.278E-02	1.57E-02	G K
		72.87	-6.265E-01	& P	1.232E+00	3.74E-01	G
		70.83	4.456E-01	%	1.971E+00	5.92E-01	G
		82.50	-9.018E-01	%	2.581E+00	7.79E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.4238E-01						
		583.14	2.424E-01	@(P	5.740E-02	2.66E-02	G
		510.72	4.449E-01	+ P	2.359E-01	9.85E-02	G
PB-212	6.7129E-01						
		238.63	6.850E-01	(P	6.338E-02	3.25E-02	G K
							Energy duplication
		77.11	5.422E-01	}	2.356E-01	5.98E-02	G
		74.81	1.069E+00	+ P	4.217E-01	1.42E-01	G
PB-214	5.1034E-01						
		351.99	4.820E-01	(P	1.090E-01	4.78E-02	G K
		295.22	5.394E-01	@(P	1.644E-01	6.59E-02	G
							Energy duplication
		77.11	0.000E+00	} P	5.245E-01	0.00E+00	G
		241.92	5.767E-01	(P	3.782E-01	1.25E-01	G
BI-212	3.8772E-01						
		727.17	3.877E-01	(P	2.865E-01	1.03E-01	G K
		1620.56	5.137E-01	%	1.345E+00	3.97E-01	G
		785.42	1.498E+00	% P	2.231E+00	6.98E-01	G
BI-214	4.6703E-01						
		609.32	4.670E-01	(P	1.207E-01	5.61E-02	G K
		1764.51	3.456E-01	- P	2.311E-01	9.55E-02	G
		1120.28	8.374E-01	+ P	4.817E-01	2.11E-01	G
RA-224	9.6646E-01						
		241.00	9.665E-01	(P	1.233E+00	3.80E-01	G
RA-226	9.1040E-01						
		185.99	9.104E-01	(	1.223E+00	3.76E-01	G
AC-228	7.5419E-01						
		911.07	7.309E-01	*(P	1.644E-01	8.54E-02	G K
		968.90	7.763E-01	(P	2.821E-01	1.16E-01	G
		338.40	7.782E-01	*(P	3.113E-01	1.26E-01	G
TH-227	-1.6071E-01						
		236.00	-1.607E-01	%(P	4.507E-01	1.36E-01	G K
		256.25	1.142E-01	& P	5.453E-01	1.62E-01	G
PA-234	-3.7395E-02						
		98.44	-3.739E-02	%(	1.714E-01	5.14E-02	G K
		946.00	0.000E+00	%	3.183E-01	8.98E-02	G
		131.28	-7.630E-03	&	2.012E-01	5.98E-02	G
		94.67	-6.576E-02	%	3.204E-01	9.62E-02	G
		883.24	3.969E-02	&	3.546E-01	9.96E-02	G
		926.70	2.741E-02	&	4.633E-01	1.30E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 8.437E-02 &   4.035E-01 1.18E-01 G

TH-234       1.1464E+00
                           63.29 6.035E-01 %(P 2.120E+00 6.36E-01 G K
                           92.80 1.469E+00  (P 1.651E+00 5.08E-01 G
                           92.38 1.593E+00  (P 1.971E+00 6.04E-01 G

AM-241      -6.2415E-02
                           59.54-6.242E-02 &(P 2.959E-01 8.86E-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 - 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 *****

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	2.2378E-01	2.2451E-01	3.2412E-01	3.2436E-01	3.475E-01
K-40		1.4755E+01	1.4755E+01	1.7935E+00	1.9778E+00	
MN-54	#A	8.7166E-03	8.7215E-03	4.6463E-02	4.6466E-02	5.372E-02
CO-57	#B	4.6667E-04	4.6697E-04	3.9628E-02	3.9628E-02	4.454E-02
CO-60	#B	3.1021E-02	3.1024E-02	5.3003E-02	5.3032E-02	5.745E-02

Sr-85	#A	-1.7530E-02	-1.7577E-02	5.1008E-02	5.1018E-02	5.681E-02
Kr-85	#A	-4.3044E+02	-4.3044E+02	1.3236E+03	1.3239E+03	1.316E+03
Y-88	#B	0.0000E+00	0.0000E+00	3.7729E-02	3.7729E-02	4.946E-02
NB-94	#B	1.1481E-02	1.1481E-02	3.8017E-02	3.8022E-02	4.360E-02
Ag-108M	#B	-1.6064E-03	-1.6064E-03	3.0492E-02	3.0492E-02	3.700E-02
CD-109	#A	7.5625E-03	7.5654E-03	1.3222E+00	1.3222E+00	1.478E+00
SN-113	#B	-3.5868E-03	-3.5923E-03	5.5922E-02	5.5922E-02	6.402E-02
SB-125	#B	7.2646E-02	7.2658E-02	7.1916E-02	7.2033E-02	1.291E-01
I-131	#B	-8.7976E-04	-8.9901E-04	4.2443E-02	4.2443E-02	4.777E-02
CS-134	#B	-6.9539E-04	-6.9555E-04	9.5629E-02	9.5629E-02	8.807E-02
CS-137	#A	2.8506E-02	2.8506E-02	4.1837E-02	4.1868E-02	4.498E-02
CE-139	#A	-4.4705E-03	-4.4762E-03	4.8842E-02	4.8842E-02	5.119E-02
EU-152	#B	3.9783E-02	3.9784E-02	1.1876E-01	1.1878E-01	1.317E-01
EU-154	#B	-8.4328E-03	-8.4332E-03	1.1093E-01	1.1093E-01	1.038E-01
EU-155	#A	1.6395E-01	1.6396E-01	1.5271E-01	1.5298E-01	1.647E-01
HG-203	#B	-1.1173E-02	-1.1215E-02	4.7162E-02	4.7166E-02	5.258E-02
TL-208	#	2.4238E-01	2.4238E-01	7.9856E-02	8.1021E-02	
PB-212		6.7129E-01	6.7129E-01	9.5440E-02	1.0270E-01	
PB-214		5.1034E-01	5.1034E-01	1.3652E-01	1.3953E-01	
BI-212		3.8772E-01	3.8772E-01	3.0822E-01	3.0900E-01	
BI-214		4.6703E-01	4.6703E-01	1.6826E-01	1.7032E-01	
RA-224	#A	9.6646E-01	9.6646E-01	1.1389E+00	1.1402E+00	1.233E+00
RA-226	#A	9.1040E-01	9.1040E-01	1.1276E+00	1.1287E+00	1.223E+00
AC-228		7.5419E-01	7.5419E-01	1.8771E-01	1.9248E-01	
TH-227	#B	-1.6071E-01	-1.6071E-01	4.1637E-01	4.1647E-01	4.507E-01
PA-234	#B	-3.7395E-02	-3.7395E-02	1.5414E-01	1.5416E-01	1.714E-01
TH-234	#B	1.1464E+00	1.1464E+00	1.1888E+00	1.1905E+00	2.120E+00
AM-241	#A	-6.2415E-02	-6.2415E-02	2.8381E-01	2.8383E-01	2.959E-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 1999.1 keV) 1.7787909E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 1.7787909E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_17NOV2005_1637.An1

Sample description
NOL-05-02-016-C

Spectrum Filename: C:\GammaVision\Spectra\101_17NOV2005_1637.An1

Acquisition information
Start time: 17-Nov-2005 16:37:08
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/channel^2

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: 1.6120E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6120E+03) =
6.2035E+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	17-Nov-2005 09:35:00
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: 0.1195

***** 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	153.	27.62	1.50	1.654E-02				
74.89	153.	27.62	1.50	1.654E-02	74.81	9.600	8.052E-01	PB212
77.05	230.	18.40	1.50	1.720E-02	77.11	17.500	6.394E-01	PB212
					77.11	10.700	1.029E+00	PB214
77.05	226.	18.40	1.50	1.720E-02	77.11	17.500	6.290E-01	PB212
					77.11	10.700	1.029E+00	PB214
92.92	87.	40.70	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.98	101.	36.34	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.14	95.	28.58	0.92	1.857E-02	185.99	3.280	1.309E+00	RA226
209.25	64.	31.56	1.49	1.722E-02				
238.76	553.	5.11	1.12	1.557E-02	238.63	43.100	6.830E-01	PB212
241.73	89.	23.71	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.00	62.	28.93	0.91	1.401E-02				
295.29	107.	15.40	1.16	1.292E-02	295.22	19.200	3.565E-01	PB214
299.93	48.	28.30	1.16	1.273E-02				
338.58	87.	16.77	1.19	1.135E-02	338.40	12.010	5.216E-01	AC228
351.94	246.	11.03	1.06	1.093E-02				
351.94	246.	11.03	1.06	1.093E-02	351.99	37.100	5.047E-01	PB214
510.22	76.	23.61	1.78	7.598E-03	510.72	22.500	2.954E-01	TL208
583.11	172.	11.04	1.18	6.685E-03	583.14	86.000	2.475E-01	TL208
609.56	212.	9.40	1.18	6.410E-03	609.32	46.090	5.967E-01	BI214
661.83	99.	16.42	1.27	5.936E-03	661.62	84.620	1.637E-01	CS137
728.02	33.	32.57	1.03	5.437E-03	727.17	11.800	4.219E-01	BI212
911.50	131.	14.70	1.96	4.445E-03	911.07	29.000	8.421E-01	AC228

969.26	76.	17.92	1.61	4.211E-03	968.90	17.460	8.615E-01	AC228
1120.10	40.	30.36	1.71	3.711E-03	1120.28	15.040	6.071E-01	BI214
1173.32	48.	24.78	1.75	3.565E-03	1173.23	99.860	1.127E-01	CO60
1332.78	47.	19.56	1.85	3.190E-03	1332.51	99.980	1.243E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.93	526.	4.58	1.90	2.942E-03	1460.75	10.700	1.393E+01	K40
1765.03	26.	19.61	0.87	2.481E-03	1764.51	15.920	5.425E-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	
418.18	209.25	172.	64.	0.032	94.68	1.492	AC-228	s
477.21	238.68	124.	553.	0.277	15.34	1.122	PB-212	D
483.17	241.65	176.	89.	0.044	71.13	1.124	PB-214	D
539.72	270.00	116.	62.	0.031	86.80	0.905	AC-228	s
599.70	299.97	134.	52.	0.026	114.34	1.099	TH-227	
1456.19	728.02	33.	33.	0.016	97.70	1.030	J-132	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

********** 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	149.34	74.89	876.	153.	0.076	82.86	1.499s
PB-212	153.79	77.11	778.	230.	0.115	55.20	1.499D
PB-214	153.79	77.11	781.	226.	0.113	55.20	1.499D
TH-234	185.55	92.98	707.	101.	0.050	109.03	1.499s
RA-226	371.88	186.11	326.	78.	0.039	103.85	1.499s
PB-212	477.15	238.73	336.	484.	0.242	20.76	1.499
RA-224	483.13	241.71	362.	77.	0.039	108.86	1.499
PB-214	590.22	295.24	169.	116.	0.058	54.25	1.499
AC-228	676.74	338.48	123.	80.	0.040	65.64	1.499
PB-214	703.79	352.00	89.	211.	0.106	27.69	1.499
TL-208	1020.38	510.22	96.	60.	0.030	70.82	1.778s
TL-208	1166.23	583.11	63.	170.	0.085	33.12	1.184s
BI-214	1219.16	609.56	54.	210.	0.105	28.20	1.175s
CS-137	1323.74	661.83	58.	98.	0.049	49.26	1.272
AC-228	1823.02	911.33	48.	94.	0.047	42.78	1.578s
AC-228	1938.68	969.13	34.	77.	0.038	46.26	1.616
BI-214	2240.79	1120.10	36.	40.	0.020	91.08	1.709s
CO-60	2347.30	1173.32	47.	48.	0.024	74.35	1.746s
CO-60	2666.41	1332.78	19.	47.	0.024	58.69	1.846
K-40	2922.88	1460.93	14.	523.	0.262	13.75	1.900
BI-214	3531.50	1765.03	0.	26.	0.013	58.83	0.874s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-1.0400E-01					
			477.56	-1.040E-01	%(	4.576E-01 1.35E-01	G
K-40		1.3934E+01					
			1460.75	1.393E+01	(P	5.311E-01 6.41E-01	G
MN-54		-8.4418E-03					
			834.81	-8.442E-03	%(P	5.600E-02 1.59E-02	G
CO-57		-5.6902E-03					
			122.07	-5.690E-03	%(	5.206E-02 1.55E-02	G K
			136.43	6.614E-02	&	4.182E-01 1.25E-01	G
CO-60		1.1846E-01					
			1332.51	1.243E-01	(P	6.097E-02 2.44E-02	G K
			1173.23	1.127E-01	*(P	8.153E-02 2.80E-02	G K
Sr-85		-2.0558E-02					
			514.00	-2.056E-02	%(	6.097E-02 1.82E-02	G
Kr-85		-5.0353E+02					
			513.99	-5.035E+02	%(P	1.409E+03 4.19E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	&(	2.605E-02 3.53E-03	G K
			898.02	-2.186E-04	& P	5.296E-02 1.44E-02	G
NB-94		6.9667E-03					
			871.10	6.967E-03	&(P	5.211E-02 1.47E-02	G K
			702.50	-3.692E-03	& P	5.037E-02 1.42E-02	G K
Ag-108M		1.9204E-02					
			722.95	1.920E-02	&(	5.365E-02 1.59E-02	G K
			614.37	-1.659E-02	% P	6.211E-02 1.83E-02	G
			433.93	9.237E-03	%	5.291E-02 1.55E-02	G
CD-109		-7.1397E-03					
			88.04	-7.140E-03	%(P	1.576E+00 4.69E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	2.9071E-04						
		391.71	2.907E-04	%(	6.521E-02	1.87E-02	G K
		255.04	-5.932E-01	% P	2.076E+00	6.20E-01	G
SB-125	2.3249E-02						
		427.95	2.325E-02	&(P	1.561E-01	4.56E-02	G K
		600.77	4.515E-02	& P	2.395E-01	6.92E-02	G
		636.15	9.219E-02	% P	3.700E-01	1.07E-01	G
		463.51	3.140E-01	% P	4.488E-01	1.39E-01	G
		176.29	1.683E-01	& P	5.793E-01	1.73E-01	G
I-131	2.3908E-03						
		364.48	2.391E-03	&(	5.442E-02	1.58E-02	G K
		636.97	-1.422E-01	&	7.115E-01	2.07E-01	G
		284.29	-2.275E-01	%	7.745E-01	2.32E-01	G
CS-134	-2.3104E-02						
		604.66	-2.310E-02	%(P	5.853E-02	1.75E-02	G K
		795.76	3.141E-02	% P	5.846E-02	1.79E-02	G
		569.29	-4.716E-02	% P	2.594E-01	7.42E-02	G
		801.84	-6.955E-02	%	5.447E-01	1.54E-01	G
CS-137	1.6371E-01						
		661.62	1.637E-01	(P	6.368E-02	2.71E-02	G
CE-139	-1.0270E-02						
		165.85	-1.027E-02	%(P	5.192E-02	1.55E-02	G
EU-152	-1.7885E-02						
		121.78	-1.789E-02	%(P	1.514E-01	4.50E-02	G K
		344.30	4.365E-03	& P	1.194E-01	3.41E-02	G
		1408.08	-2.550E-02	& P	2.556E-01	6.87E-02	G
		964.00	-6.271E-03	% P	1.034E+00	3.02E-01	G
		1112.07	1.418E-01	& P	5.467E-01	1.60E-01	G
		778.90	1.373E-01	% P	3.322E-01	9.95E-02	G
EU-154	1.6792E-02						
		123.10	1.679E-02	%(P	9.170E-02	2.73E-02	G K
		1274.80	1.487E-02	% P	1.642E-01	4.51E-02	G
		723.30	3.573E-02	& P	2.856E-01	8.18E-02	G
		1004.80	1.870E-03	% P	3.197E-01	8.75E-02	G
EU-155	1.0190E-01						
		86.45	1.019E-01	%(	1.684E-01	5.14E-02	G K
		105.31	4.871E-02	%	2.139E-01	6.41E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	9.1071E-03						
		279.17	9.107E-03	%(	4.921E-02	1.45E-02	G K
		72.87	-5.706E-01	& P	1.319E+00	3.99E-01	G
		70.83	5.716E-01	&	1.823E+00	5.48E-01	G
		82.50	-5.444E-01	%	2.613E+00	7.83E-01	G
TL-208	2.5743E-01						
		583.14	2.475E-01	@(P	5.801E-02	2.77E-02	G
		510.72	2.954E-01	*(P	2.372E-01	8.82E-02	G
PB-212	6.1421E-01						
		238.63	6.040E-01	(P	1.100E-01	4.23E-02	G K
							Energy duplication
		77.11	6.394E-01	@(	3.694E-01	1.18E-01	G
		74.81	8.052E-01	& P	7.423E-01	2.30E-01	G
PB-214	4.2111E-01						
		351.99	4.365E-01	(P	9.642E-02	4.07E-02	G K
		295.22	3.913E-01	(P	2.139E-01	7.19E-02	G
							Energy duplication
		77.11	1.029E+00	+ P	6.056E-01	1.92E-01	G
		241.92	-9.066E-05	% P	8.169E-01	2.42E-01	G
BI-212	2.8672E-01						
		727.17	2.867E-01	%(P	4.092E-01	1.28E-01	G K
		1620.56	8.626E-01	%	1.777E+00	5.45E-01	G
		785.42	7.690E-01	% P	2.647E+00	7.76E-01	G
BI-214	5.8755E-01						
		609.32	5.967E-01	@(P	1.045E-01	5.64E-02	G K
		1764.51	5.425E-01	(P	1.564E-01	1.08E-01	G
		1120.28	6.071E-01	*(P	4.582E-01	1.86E-01	G
RA-224	1.0748E+00						
		241.00	1.075E+00	(P	1.271E+00	3.94E-01	G
RA-226	1.0737E+00						
		185.99	1.074E+00	*(	1.195E+00	3.72E-01	G
AC-228	7.1203E-01						
		911.07	6.130E-01	@(P	2.271E-01	8.91E-02	G K
		968.90	8.766E-01	(P	3.385E-01	1.36E-01	G
		338.40	4.924E-01	- P	3.345E-01	1.11E-01	G
TH-227	2.7132E-02						
		236.00	2.713E-02	%(P	3.245E-01	9.52E-02	G K
		256.25	1.986E-02	% P	4.967E-01	1.44E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234      -3.7946E-02
                           98.44-3.795E-02 %(  1.950E-01 5.84E-02 G K
                          946.00 1.108E-02 %   4.136E-01 1.18E-01 G
                          131.28-8.628E-03 &   2.276E-01 6.75E-02 G
                           94.67-1.551E-02 &   3.396E-01 1.01E-01 G
                          883.24 3.069E-02 %   4.146E-01 1.15E-01 G
                          926.70-1.060E-01 &   6.270E-01 1.81E-01 G
                          569.26-6.470E-02 %   3.828E-01 1.10E-01 G

TH-234       9.0010E-01
                           63.29 5.042E-01 %(P 2.263E+00 6.76E-01 G K
                           92.80 1.415E+00  (P 1.779E+00 5.46E-01 G
                           92.38 1.432E+00 % P 2.151E+00 6.55E-01 G

AM-241       1.8359E-02
                           59.54 1.836E-02 %(P 3.114E-01 9.25E-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 - 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 *****

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	-1.0361E-01	-1.0400E-01	4.0365E-01	4.0369E-01	4.559E-01
K-40		1.3934E+01	1.3934E+01	1.9243E+00	2.0791E+00	
MN-54	#A	-8.4363E-03	-8.4418E-03	5.6741E-02	5.6743E-02	5.596E-02
CO-57	#B	-5.6859E-03	-5.6902E-03	4.6506E-02	4.6507E-02	5.202E-02
CO-60	#	1.1845E-01	1.1846E-01	5.6255E-02	5.6651E-02	6.097E-02
Sr-85	#A	-2.0494E-02	-2.0558E-02	5.4669E-02	5.4682E-02	6.078E-02
Kr-85	#A	-5.0353E+02	-5.0353E+02	1.4198E+03	1.4201E+03	1.409E+03
Y-88	#B	0.0000E+00	0.0000E+00	1.0604E-02	1.0606E-02	2.600E-02
NB-94	#B	6.9667E-03	6.9667E-03	4.4227E-02	4.4229E-02	5.211E-02
Ag-108M	#B	1.9203E-02	1.9204E-02	4.7830E-02	4.7842E-02	5.365E-02
CD-109	#A	-7.1365E-03	-7.1397E-03	9.9278E+00	9.9278E+00	1.575E+00
SN-113	#B	2.9020E-04	2.9071E-04	5.6116E-02	5.6116E-02	6.509E-02
SB-125	#B	2.3245E-02	2.3249E-02	1.3673E-01	1.3673E-01	1.561E-01
I-131	#B	2.3311E-03	2.3908E-03	4.7299E-02	4.7299E-02	5.306E-02
CS-134	#B	-2.3097E-02	-2.3104E-02	5.6284E-02	5.6299E-02	5.851E-02
CS-137		1.6371E-01	1.6371E-01	8.1378E-02	8.1902E-02	
CE-139	#A	-1.0255E-02	-1.0270E-02	4.8065E-02	4.8069E-02	5.184E-02
EU-152	#B	-1.7884E-02	-1.7885E-02	1.5223E-01	1.5223E-01	1.514E-01
EU-154	#B	1.6791E-02	1.6792E-02	8.1932E-02	8.1937E-02	9.170E-02
EU-155	#B	1.0188E-01	1.0190E-01	1.5406E-01	1.5416E-01	1.684E-01
HG-203	#B	9.0675E-03	9.1071E-03	4.3645E-02	4.3648E-02	4.899E-02
TL-208	#	2.5743E-01	2.5743E-01	8.6441E-02	8.7657E-02	
PB-212	#	6.1421E-01	6.1421E-01	1.2914E-01	1.3372E-01	1.100E-01
PB-214	#	4.2111E-01	4.2111E-01	1.1770E-01	1.2008E-01	9.642E-02
BI-212	#B	2.8672E-01	2.8672E-01	3.8529E-01	3.8563E-01	4.092E-01
BI-214	#	5.8755E-01	5.8755E-01	1.6656E-01	1.6984E-01	
RA-224	#A	1.0748E+00	1.0748E+00	1.1809E+00	1.1824E+00	1.271E+00
RA-226	#A	1.0737E+00	1.0737E+00	1.1150E+00	1.1167E+00	1.195E+00
AC-228	#	7.1203E-01	7.1203E-01	2.2750E-01	2.3103E-01	2.271E-01
TH-227	#B	2.7132E-02	2.7132E-02	2.8556E-01	2.8556E-01	3.245E-01
PA-234	#B	-3.7946E-02	-3.7946E-02	1.7508E-01	1.7510E-01	1.950E-01
TH-234	#B	9.0010E-01	9.0010E-01	1.0416E+00	1.0428E+00	2.263E+00
AM-241	#A	1.8359E-02	1.8359E-02	2.7757E-01	2.7757E-01	3.114E-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 (269.6 to 1999.1 keV) 1.4942691E+01 pCi/gm
Total Decayed Activity (269.6 to 1999.1 keV) 1.4942694E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_17NOV2005_1718.An1

Sample description
NOL-05-02-005-C

Spectrum Filename: C:\GammaVision\Spectra\101_17NOV2005_1718.An1

Acquisition information
Start time: 17-Nov-2005 17:18:42
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/channel^2

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: 1.8290E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8290E+03) =
5.4675E+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	17-Nov-2005 09:50:00
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: 0.0700

***** 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
74.70	178.	25.15	1.50	1.654E-02				
74.70	178.	25.15	1.50	1.654E-02	74.81	9.600	8.285E-01	PB212
77.05	253.	17.85	1.50	1.720E-02	77.11	10.700	1.016E+00	PB214
					77.11	17.500	6.214E-01	PB212
77.05	257.	17.85	1.50	1.720E-02	77.11	10.700	1.016E+00	PB214
					77.11	17.500	6.305E-01	PB212
87.12	103.	29.87	1.01	1.921E-02	86.45	32.740	1.215E-01	EU155
89.62	92.	32.94	1.02	1.954E-02	88.04	3.790	PBC<MDA	CD109
93.24	129.	22.46	1.02	1.995E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.37	106.	27.08	1.57	1.856E-02	185.99	3.280	1.290E+00	RA226
209.19	95.	24.35	1.20	1.722E-02				
238.78	823.	3.96	1.12	1.556E-02	238.63	43.100	8.993E-01	PB212
241.87	106.	18.83	1.12	1.540E-02	241.00	3.900	1.290E+00	RA224
					241.92	7.470	PBC<MDA	PB214
270.24	75.	28.22	1.47	1.400E-02				
295.38	142.	12.56	1.16	1.290E-02	295.22	19.200	4.179E-01	PB214
299.97	48.	32.08	1.16	1.272E-02				
327.97	63.	28.21	1.62	1.170E-02				
338.37	162.	15.00	1.08	1.135E-02	338.40	12.010	8.662E-01	AC228
351.83	198.	12.86	1.02	1.093E-02				
351.83	198.	12.86	1.02	1.093E-02	351.99	37.100	3.573E-01	PB214
409.60	45.	33.29	1.17	9.417E-03				
463.12	43.	29.55	1.20	8.348E-03				
463.12	43.	29.55	1.20	8.348E-03	463.51	10.000	PBC<MDA	SB125
511.12	89.	19.05	0.95	7.585E-03	510.72	22.500	3.166E-01	TL208
583.12	315.	8.10	1.30	6.685E-03	583.14	86.000	4.018E-01	TL208

609.56	195.	10.58	1.67	6.410E-03	609.32	46.090	4.857E-01	BI214
860.09	34.	29.15	1.44	4.679E-03				
911.02	170.	11.44	1.97	4.447E-03	911.07	29.000	9.657E-01	AC228
968.14	120.	13.46	1.20	4.215E-03	968.90	17.460	1.198E+00	AC228
1120.89	47.	35.47	1.35	3.709E-03	1120.28	15.040	6.158E-01	BI214
1460.88	687.	3.98	1.71	2.942E-03	1460.75	10.700	1.607E+01	K40
1764.76	26.	19.61	2.00	2.481E-03	1764.51	15.920	4.781E-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	
173.81	87.21	420.	103.	0.051	89.62	1.014	PB-214	lD
178.81	89.71	409.	92.	0.046	98.81	1.015	PB-214	lD
418.06	209.19	220.	95.	0.047	73.04	1.202	AC-228	
477.25	238.84	120.	823.	0.412	11.88	1.122	PB-212	D
483.44	241.94	146.	106.	0.053	56.49	1.124	PB-214	D
540.21	270.24	161.	75.	0.037	84.66	1.472	AC-228	s
599.69	300.30	96.	48.	0.024	96.23	1.165	PB-212	lD
655.71	327.97	109.	63.	0.031	84.64	1.621	AC-228	s
819.05	409.60	78.	45.	0.023	99.87	1.174	AC-228	
1720.48	860.09	27.	34.	0.017	87.44	1.436	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	148.96	74.70	977.	178.	0.089	75.46	1.499s
PB-214	153.79	77.11	927.	253.	0.127	53.55	1.499D
PB-212	153.79	77.11	923.	257.	0.128	53.55	1.499D
TH-234	185.86	93.14	931.	131.	0.065	94.25	1.499s
TH-234	185.88	93.15	879.	146.	0.073	85.92	1.499s
RA-226	371.73	186.04	407.	109.	0.054	83.76	1.499s
PB-212	477.31	238.80	406.	690.	0.345	16.68	1.499
RA-224	483.12	241.71	469.	82.	0.041	116.38	1.499
PB-214	590.43	295.34	214.	114.	0.057	60.31	1.499
AC-228	676.53	338.37	155.	160.	0.080	45.00	1.078
PB-214	703.75	351.97	115.	181.	0.090	33.20	1.499
SB-125	926.09	463.10	85.	42.	0.021	99.95	1.499
TL-208	1022.17	511.12	93.	73.	0.037	57.16	0.952s
TL-208	1166.25	583.12	86.	313.	0.156	24.30	1.296s
BI-214	1219.16	609.56	74.	194.	0.097	31.75	1.666s
AC-228	1822.38	911.02	49.	169.	0.084	34.31	1.973s
AC-228	1936.70	968.14	45.	119.	0.060	40.37	1.201s
BI-214	2242.36	1120.89	62.	47.	0.023	106.40	1.350s
K-40	2922.79	1460.88	14.	685.	0.342	11.94	1.711
BI-214	3530.96	1764.76	0.	26.	0.013	58.83	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 - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		6.7140E-02					
			477.56	6.714E-02	&(	4.029E-01 1.18E-01	G
K-40		1.6068E+01					
			1460.75	1.607E+01	(P	4.768E-01 6.41E-01	G
MN-54		-7.4345E-03					
			834.81	-7.435E-03	%(P	5.457E-02 1.56E-02	G
CO-57		-4.3476E-04					
			122.07	-4.348E-04	%(	5.066E-02 1.50E-02	G K
			136.43	1.069E-03	%	4.119E-01 1.22E-01	G
CO-60		1.5941E-02					
			1332.51	1.594E-02	%(P	5.537E-02 1.61E-02	G K
			1173.23	1.722E-02	% P	6.906E-02 2.01E-02	G K
Sr-85		-1.8399E-02					
			514.00	-1.840E-02	%(	5.834E-02 1.74E-02	G
Kr-85		-4.5018E+02					
			513.99	-4.502E+02	%(P	1.348E+03 4.01E+02	G
Y-88		8.4276E-03					
			1836.01	8.428E-03	&(	4.991E-02 1.36E-02	G K
			898.02	-3.109E-04	% P	5.376E-02 1.48E-02	G
NB-94		-2.5059E-03					
			871.10	-2.506E-03	&(P	4.718E-02 1.31E-02	G K
			702.50	-5.845E-05	& P	5.439E-02 1.54E-02	G K
Ag-108M		5.3628E-05					
			722.95	5.363E-05	%(	6.197E-02 1.76E-02	G K
			614.37	-1.328E-02	% P	5.977E-02 1.76E-02	G
			433.93	-1.521E-04	&	4.112E-02 1.17E-02	G
CD-109		-8.6672E-02					
			88.04	-8.667E-02	&(P	1.474E+00 4.40E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	1.1569E-02						
		391.71	1.157E-02	&(	5.687E-02	1.67E-02	G K
		255.04	-1.772E-02	% P	1.778E+00	5.20E-01	G
SB-125	9.0748E-02						
		427.95	-4.317E-03	%(P	1.292E-01	3.70E-02	G K
		600.77	-9.331E-03	% P	2.416E-01	6.85E-02	G
		636.15	-7.924E-02	& P	4.692E-01	1.36E-01	G
		463.51	3.721E-01	(P	4.035E-01	1.28E-01	G
		176.29	6.022E-02	% P	6.154E-01	1.83E-01	G
I-131	-7.4947E-04						
		364.48	-7.495E-04	%(	5.137E-02	1.49E-02	G K
		636.97	-8.625E-02	&	7.479E-01	2.16E-01	G
		284.29	-5.694E-02	%	6.472E-01	1.90E-01	G
CS-134	4.9677E-03						
		604.66	4.968E-03	&(P	4.252E-02	1.21E-02	G K
		795.76	3.699E-02	% P	5.517E-02	1.72E-02	G
		569.29	-9.168E-02	& P	2.706E-01	8.00E-02	G
		801.84	-5.478E-02	&	5.907E-01	1.68E-01	G
CS-137	1.8536E-02						
		661.62	1.854E-02	%(P	6.127E-02	1.81E-02	G
CE-139	-4.4376E-03						
		165.85	-4.438E-03	&(P	5.010E-02	1.49E-02	G
EU-152	-2.2088E-03						
		121.78	-2.209E-03	%(P	1.495E-01	4.44E-02	G K
		344.30	2.766E-02	% P	1.321E-01	3.89E-02	G
		1408.08	1.845E-02	% P	2.190E-01	5.87E-02	G
		964.00	-3.316E-02	% P	5.077E-01	1.45E-01	G
		1112.07	-1.937E-02	% P	3.057E-01	8.21E-02	G
		778.90	-1.088E-03	% P	4.826E-01	1.37E-01	G
EU-154	-4.1913E-03						
		123.10	-4.191E-03	%(P	9.775E-02	2.90E-02	G K
		1274.80	-1.395E-04	% P	2.111E-01	5.89E-02	G
		723.30	5.290E-03	% P	2.874E-01	8.17E-02	G
		1004.80	4.391E-02	& P	2.729E-01	7.73E-02	G
EU-155	1.1171E-01						
		86.45	1.117E-01	&(	1.737E-01	5.30E-02	G K
		105.31	5.516E-02	%	2.106E-01	6.33E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	9.1234E-03						
		279.17	9.123E-03	%(	4.925E-02	1.46E-02	G K
		72.87	-6.438E-01	& P	1.267E+00	3.84E-01	G
		70.83	-1.026E-02	&	2.121E+00	6.32E-01	G
		82.50	-8.934E-01	%	2.651E+00	8.00E-01	G
TL-208	4.0180E-01						
		583.14	4.018E-01	@(P	5.915E-02	3.28E-02	G
		510.72	3.166E-01	- P	2.060E-01	7.36E-02	G
PB-212	7.7162E-01						
		238.63	7.589E-01	(P	1.064E-01	4.26E-02	G K
							Energy duplication
		77.11	6.305E-01	-	3.541E-01	1.13E-01	G
		74.81	8.285E-01	?(P	6.903E-01	2.15E-01	G
PB-214	3.3279E-01						
		351.99	3.297E-01	(P	9.611E-02	3.69E-02	G K
		295.22	3.389E-01	(P	2.110E-01	6.92E-02	G
							Energy duplication
		77.11	1.016E+00	+ P	5.802E-01	1.84E-01	G
		241.92	-2.142E-01	% P	7.625E-01	2.29E-01	G
BI-212	3.3633E-01						
		727.17	3.363E-01	%(P	4.740E-01	1.48E-01	G K
		1620.56	4.417E-01	%	1.509E+00	4.30E-01	G
		785.42	3.264E-01	% P	2.420E+00	6.91E-01	G
BI-214	5.0953E-01						
		609.32	4.857E-01	*(P	1.068E-01	5.17E-02	G K
		1764.51	4.781E-01	(P	1.378E-01	9.54E-02	G
		1120.28	6.158E-01	*(P	5.235E-01	2.20E-01	G
RA-224	9.9981E-01						
		241.00	9.998E-01	(P	1.270E+00	3.91E-01	G
RA-226	1.3188E+00						
		185.99	1.319E+00	(	1.172E+00	3.68E-01	G
AC-228	1.0147E+00						
		911.07	9.657E-01	@(P	2.033E-01	1.12E-01	G K
		968.90	1.198E+00	@(P	3.403E-01	1.62E-01	G
		338.40	8.662E-01	(P	3.293E-01	1.32E-01	G
TH-227	-3.2171E-02						
		236.00	-3.217E-02	%(P	4.566E-01	1.36E-01	G K
		256.25	4.701E-02	& P	5.797E-01	1.71E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234      -3.0844E-02
                           98.44-3.084E-02 &(  1.687E-01 5.04E-02 G K
                          946.00 5.605E-02 %   2.628E-01 7.59E-02 G
                          131.28 0.000E+00 &   2.298E-01 6.83E-02 G
                           94.67-5.259E-02 %   3.508E-01 1.05E-01 G
                          883.24 1.045E-01 &   2.974E-01 8.76E-02 G
                          926.70 8.475E-02 %   4.345E-01 1.25E-01 G
                          569.26-1.309E-01 &   3.998E-01 1.19E-01 G

TH-234       1.1932E+00
                           63.29 2.587E-01 %(P 2.295E+00 6.84E-01 G K
                           92.80 1.806E+00  (P 1.744E+00 5.39E-01 G
                           92.38 1.896E+00  (P 2.099E+00 6.45E-01 G

AM-241       8.4404E-02
                           59.54 8.440E-02 %(P 3.053E-01 9.18E-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 - 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 *****

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	6.6869E-02	6.7140E-02	3.5261E-01	3.5263E-01	4.013E-01
K-40		1.6068E+01	1.6068E+01	1.9242E+00	2.1276E+00	
MN-54	#A	-7.4294E-03	-7.4345E-03	5.5551E-02	5.5553E-02	5.453E-02
CO-57	#B	-4.3441E-04	-4.3476E-04	4.5129E-02	4.5129E-02	5.062E-02
CO-60	#B	1.5939E-02	1.5941E-02	4.8230E-02	4.8238E-02	5.537E-02
Sr-85	#A	-1.8338E-02	-1.8399E-02	5.2268E-02	5.2279E-02	5.815E-02
Kr-85	#A	-4.5018E+02	-4.5018E+02	1.3549E+03	1.3551E+03	1.348E+03
Y-88	#B	8.4106E-03	8.4276E-03	4.0760E-02	4.0763E-02	4.981E-02
NB-94	#B	-2.5059E-03	-2.5059E-03	4.6664E-02	4.6664E-02	4.718E-02
Ag-108M	#B	5.3628E-05	5.3628E-05	5.2747E-02	5.2747E-02	6.197E-02
CD-109	#A	-8.6631E-02	-8.6672E-02	1.4720E+00	1.4720E+00	1.473E+00
SN-113	#B	1.1547E-02	1.1569E-02	5.0119E-02	5.0124E-02	5.677E-02
SB-125	#B	9.0728E-02	9.0748E-02	9.3824E-02	9.3964E-02	1.292E-01
I-131	#B	-7.2960E-04	-7.4947E-04	4.4656E-02	4.4656E-02	5.001E-02
CS-134	#B	4.9663E-03	4.9677E-03	3.6443E-02	3.6444E-02	4.251E-02
CS-137	#A	1.8536E-02	1.8536E-02	5.4293E-02	5.4303E-02	6.126E-02
CE-139	#A	-4.4306E-03	-4.4376E-03	4.7846E-02	4.7846E-02	5.002E-02
EU-152	#B	-2.2087E-03	-2.2088E-03	3.2934E-01	3.2934E-01	1.495E-01
EU-154	#B	-4.1910E-03	-4.1913E-03	1.2722E-01	1.2722E-01	9.774E-02
EU-155	#B	1.1170E-01	1.1171E-01	1.5899E-01	1.5911E-01	1.737E-01
HG-203	#B	9.0812E-03	9.1234E-03	4.3823E-02	4.3826E-02	4.903E-02
TL-208	#	4.0180E-01	4.0180E-01	9.8379E-02	1.0096E-01	
PB-212	#	7.7162E-01	7.7162E-01	1.2986E-01	1.3698E-01	1.064E-01
PB-214	#	3.3279E-01	3.3279E-01	1.1168E-01	1.1326E-01	9.611E-02
BI-212	#B	3.3633E-01	3.3633E-01	4.4337E-01	4.4377E-01	4.740E-01
BI-214		5.0953E-01	5.0953E-01	1.6271E-01	1.6524E-01	
RA-224	#A	9.9981E-01	9.9981E-01	1.1738E+00	1.1751E+00	1.270E+00
RA-226	#	1.3188E+00	1.3188E+00	1.1047E+00	1.1072E+00	1.172E+00
AC-228		1.0147E+00	1.0147E+00	2.3758E-01	2.4440E-01	
TH-227	#B	-3.2171E-02	-3.2171E-02	4.5570E-01	4.5570E-01	4.566E-01
PA-234	#B	-3.0844E-02	-3.0844E-02	1.5134E-01	1.5135E-01	1.687E-01
TH-234	#B	1.1932E+00	1.1932E+00	1.0686E+00	1.0707E+00	2.295E+00
AM-241	#A	8.4404E-02	8.4404E-02	2.7529E-01	2.7533E-01	3.053E-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 (270.1 to 1999.1 keV) 1.7994469E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.7994469E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_17NOV2005_1757.An1

Sample description
NOL-05-02-011-C

Spectrum Filename: C:\GammaVision\Spectra\101_17NOV2005_1757.An1

Acquisition information
Start time: 17-Nov-2005 17:57:26
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/channel^2

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: 1.6710E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6710E+03) =
5.9844E+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	17-Nov-2005 10:00:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0862

***** 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
74.76	199.	14.78	1.00	1.654E-02	74.81	9.600	1.016E+00	PB212
77.06	304.	8.91	1.01	1.720E-02	77.11	10.700	1.351E+00	PB214
					77.11	17.500	8.361E-01	PB212
87.28	103.	40.79	1.50	1.910E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
93.06	138.	27.50	1.50	1.989E-02	92.38	2.570	2.191E+00	TH234
					92.80	3.000	1.872E+00	TH234
93.08	110.	33.74	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.50	131.	27.31	1.49	1.855E-02	185.99	3.280	1.734E+00	RA226
209.27	67.	40.18	0.97	1.722E-02				
238.85	803.	5.52	1.07	1.556E-02	238.63	43.100	9.601E-01	PB212
242.06	77.	25.70	1.12	1.540E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.423E-01	PB214
270.71	74.	35.38	0.98	1.398E-02				
295.23	132.	20.24	0.97	1.292E-02	295.22	19.200	4.248E-01	PB214
327.94	58.	33.14	1.54	1.170E-02				
338.27	160.	18.41	1.18	1.135E-02	338.40	12.010	9.387E-01	AC228
351.98	262.	10.23	1.03	1.093E-02	351.99	37.100	5.188E-01	PB214
463.04	34.	37.80	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125
510.94	112.	16.12	1.78	7.587E-03	510.72	22.500	4.526E-01	TL208
583.18	206.	9.92	1.44	6.684E-03	583.14	86.000	2.865E-01	TL208
609.37	182.	10.16	1.51	6.412E-03	609.32	46.090	4.947E-01	BI214
726.92	63.	29.40	1.63	5.445E-03	727.17	11.800	7.847E-01	BI212
911.09	151.	11.26	2.08	4.446E-03	911.07	29.000	9.366E-01	AC228
968.51	99.	16.49	1.76	4.214E-03	968.90	17.460	1.083E+00	AC228
1120.68	47.	30.00	2.03	3.711E-03	1120.28	15.040	6.755E-01	BI214

1172.91	51.	33.83	2.16	3.565E-03	1173.23	99.860	1.160E-01	CO60
1332.96	43.	29.66	2.10	3.190E-03	1332.51	99.980	1.093E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.87	580.	4.24	2.00	2.942E-03	1460.75	10.700	1.483E+01	K40
1764.72	29.	18.57	1.67	2.481E-03	1764.51	15.920	5.847E-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	
418.22	209.27	276.	67.	0.034	120.55	0.966	AC-228	s
541.15	270.71	228.	74.	0.037	106.15	0.982	AC-228	s
655.65	327.94	122.	58.	0.029	99.42	1.541	AC-228	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	149.19	74.81	361.	199.	0.100	44.34	1.005D
PB-212	153.79	77.11	372.	304.	0.152	26.72	1.006A
EU-155	174.13	87.28	828.	103.	0.051	122.36	1.499
TH-234	185.75	93.08	777.	110.	0.055	101.21	1.499s
TH-234	185.70	93.06	722.	138.	0.069	82.50	1.499s
RA-226	372.11	186.23	464.	98.	0.049	98.07	1.499s
PB-212	476.96	238.63	144.	681.	0.340	13.55	1.122D
PB-214	483.54	241.92	162.	77.	0.039	77.10	1.124D
PB-214	590.21	295.23	218.	130.	0.065	60.73	0.975
AC-228	676.33	338.27	200.	158.	0.079	55.22	1.178s
PB-214	703.75	351.98	149.	260.	0.130	30.68	1.029
SB-125	925.98	463.04	75.	34.	0.017	113.41	1.499s
TL-208	1021.81	510.94	78.	96.	0.048	48.37	1.778s
TL-208	1166.36	583.18	68.	204.	0.102	29.75	1.445
BI-214	1218.77	609.37	56.	181.	0.090	30.49	1.510
BI-212	1453.98	726.92	81.	62.	0.031	88.19	1.635s
AC-228	1822.52	911.09	43.	149.	0.075	33.78	2.084s
AC-228	1937.43	968.51	48.	98.	0.049	49.48	1.762s
BI-214	2241.94	1120.68	46.	47.	0.023	90.00	2.032s
CO-60	2346.47	1172.91	64.	51.	0.026	101.49	2.155s
CO-60	2666.76	1332.96	29.	43.	0.022	88.98	2.095
K-40	2922.75	1460.87	9.	578.	0.289	12.72	1.998
BI-214	3530.88	1764.72	0.	29.	0.014	55.71	1.666

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm		COMMENTS
BE-7		2.2084E-02						
			477.56	2.208E-02	&(	4.263E-01	1.22E-01	G
K-40		1.4834E+01						
			1460.75	1.483E+01	(P	4.382E-01	6.31E-01	G
MN-54		-9.7774E-03						
			834.81	-9.777E-03	&(P	5.867E-02	1.68E-02	G
CO-57		7.1549E-03						
			122.07	7.155E-03	%(	5.314E-02	1.59E-02	G K
			136.43	-6.045E-05	%	3.732E-01	1.10E-01	G
CO-60		1.1266E-01						
			1332.51	1.093E-01	(P	7.038E-02	3.25E-02	G K
			1173.23	1.160E-01	(P	9.083E-02	3.93E-02	G K
Sr-85		-1.2908E-02						
			514.00	-1.291E-02	%(	4.718E-02	1.39E-02	G
Kr-85		-3.2555E+02						
			513.99	-3.256E+02	%(P	1.093E+03	3.21E+02	G
Y-88		-4.3576E-03						
			1836.01	-4.358E-03	&(	5.661E-02	1.49E-02	G K
			898.02	6.412E-03	% P	5.562E-02	1.57E-02	G
NB-94		-2.7572E-03						
			871.10	-2.757E-03	&(P	4.681E-02	1.29E-02	G K
			702.50	1.378E-02	% P	4.512E-02	1.33E-02	G K
Ag-108M		-1.2998E-02						
			722.95	-1.300E-02	%(	7.913E-02	2.31E-02	G K
			614.37	-1.295E-02	% P	5.628E-02	1.65E-02	G
			433.93	1.792E-02	%	4.332E-02	1.30E-02	G
CD-109		-5.1792E-03						
			88.04	-5.179E-03	%(P	1.631E+00	4.86E-01	G
SN-113		-1.9220E-02						
			391.71	-1.922E-02	%(	7.390E-02	2.19E-02	G K
			255.04	-2.385E-01	% P	1.993E+00	5.88E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.2422E-02						
		427.95	-1.907E-03	%(P	1.401E-01	4.00E-02	G K
		600.77	-4.027E-02	% P	2.414E-01	6.94E-02	G
		636.15	-3.333E-03	& P	5.115E-01	1.45E-01	G
		463.51	3.320E-01	(P	4.166E-01	1.31E-01	G
		176.29	3.704E-02	& P	5.522E-01	1.63E-01	G
I-131	-1.1221E-02						
		364.48	-1.122E-02	&(	5.298E-02	1.56E-02	G K
		636.97	2.682E-01	&	5.997E-01	1.81E-01	G
		284.29	-5.890E-02	&	7.634E-01	2.25E-01	G
CS-134	-2.1593E-03						
		604.66	-2.159E-03	&(P	1.083E-01	3.18E-02	G K
		795.76	1.624E-02	% P	6.868E-02	2.00E-02	G
		569.29	1.064E-01	& P	3.114E-01	9.26E-02	G
		801.84	2.730E-01	%	4.215E-01	1.33E-01	G
CS-137	8.7836E-03						
		661.62	8.784E-03	&(P	6.142E-02	1.77E-02	G
CE-139	-1.0455E-02						
		165.85	-1.046E-02	&(P	5.497E-02	1.64E-02	G
EU-152	-3.2616E-02						
		121.78	-3.262E-02	%(P	1.512E-01	4.52E-02	G K
		344.30	-3.502E-03	% P	1.291E-01	3.69E-02	G
		1408.08	-5.502E-03	% P	2.016E-01	5.07E-02	G
		964.00	-1.091E-01	% P	5.611E-01	1.63E-01	G
		1112.07	5.105E-02	% P	3.855E-01	1.08E-01	G
		778.90	1.256E-01	& P	3.064E-01	9.17E-02	G
EU-154	1.3686E-02						
		123.10	1.369E-02	&(P	1.071E-01	3.19E-02	G K
		1274.80	1.298E-02	% P	1.825E-01	5.06E-02	G
		723.30	-6.965E-02	& P	3.671E-01	1.07E-01	G
		1004.80	-2.202E-02	& P	4.046E-01	1.15E-01	G
EU-155	1.3300E-01						
		86.45	1.330E-01	(	1.769E-01	5.42E-02	G K
		105.31	7.950E-02	%	2.188E-01	6.60E-02	G
HG-203	-5.8327E-03						
		279.17	-5.833E-03	%(	5.712E-02	1.69E-02	G K
		72.87	-5.612E-01	% P	1.338E+00	4.04E-01	G
		70.83	5.255E-01	%	2.003E+00	6.02E-01	G
		82.50	-8.422E-01	%	2.726E+00	8.21E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-208       2.8645E-01
                          583.14 2.865E-01  (P 5.802E-02 2.87E-02 G
                          510.72 4.526E-01 + P 2.082E-01 8.52E-02 G

PB-212       8.2466E-01
                          238.63 8.200E-01  (P 7.067E-02 3.74E-02 G K
                                                          Energy duplication
                           77.11 8.161E-01 }   2.486E-01 7.27E-02 G
                           74.81 1.016E+00 + P 4.645E-01 1.54E-01 G

PB-214       4.9328E-01
                          351.99 5.188E-01  (P 1.189E-01 5.35E-02 G K
                          295.22 4.248E-01  (P 2.330E-01 8.72E-02 G
                                                          Energy duplication
                           77.11 0.000E+00 } P 5.831E-01 0.00E+00 G
                          241.92 5.423E-01  (P 4.358E-01 1.41E-01 G

BI-212       7.8473E-01
                          727.17 7.847E-01 *(P 5.612E-01 2.33E-01 G K
                         1620.56 1.776E-01 %   1.646E+00 4.32E-01 G
                          785.42 1.016E+00 % P 2.598E+00 7.76E-01 G

BI-214       5.1780E-01
                          609.32 4.947E-01  (P 1.030E-01 5.06E-02 G K
                         1764.51 5.847E-01  (P 1.509E-01 1.10E-01 G
                         1120.28 6.755E-01 + P 4.991E-01 2.04E-01 G

RA-224       6.3429E-01
                          241.00 6.343E-01 %(P 1.477E+00 4.47E-01 G

RA-226       1.3006E+00
                          185.99 1.301E+00 *(  1.368E+00 4.25E-01 G

AC-228       9.8070E-01
                          911.07 9.366E-01  (P 2.079E-01 1.07E-01 G K
                          968.90 1.083E+00 *(P 3.830E-01 1.80E-01 G
                          338.40 9.387E-01 *(P 4.069E-01 1.75E-01 G

TH-227      -2.0039E-03
                          236.00-2.004E-03 %(P 4.998E-01 1.48E-01 G K
                          256.25-9.383E-02 % P 6.050E-01 1.79E-01 G

PA-234      -4.7892E-02
                           98.44-4.789E-02 &(  1.872E-01 5.62E-02 G K
                          946.00 0.000E+00 %   3.630E-01 1.02E-01 G
                          131.28-2.044E-03 &   2.368E-01 7.03E-02 G
                           94.67-2.941E-02 %   2.989E-01 8.90E-02 G
                          883.24 1.067E-01 %   4.064E-01 1.18E-01 G
                          926.70 5.835E-02 &   4.794E-01 1.35E-01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.711E-01 &   4.567E-01 1.37E-01 G

TH-234       1.3467E+00
                           63.29 6.840E-01 %(P 2.402E+00 7.21E-01 G K
                           92.80 1.872E+00  (P 1.734E+00 5.38E-01 G
                           92.38 1.739E+00 &(P 2.102E+00 6.45E-01 G

AM-241      -7.6968E-02
                           59.54-7.697E-02 %(P 2.891E-01 8.66E-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 - 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 *****

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	2.1989E-02	2.2084E-02	3.6674E-01	3.6674E-01	4.245E-01
K-40		1.4834E+01	1.4834E+01	1.8943E+00	2.0714E+00	
MN-54	#A	-9.7703E-03	-9.7774E-03	5.8244E-02	5.8247E-02	5.862E-02
CO-57	#B	7.1488E-03	7.1549E-03	4.7578E-02	4.7579E-02	5.309E-02
CO-60		1.1264E-01	1.1266E-01	7.6219E-02	7.6484E-02	

Sr-85	#A	-1.2862E-02	-1.2908E-02	4.1816E-02	4.1823E-02	4.702E-02
Kr-85	#A	-3.2555E+02	-3.2555E+02	1.1521E+03	1.1523E+03	1.093E+03
Y-88	#B	-4.3482E-03	-4.3576E-03	4.4648E-02	4.4649E-02	5.649E-02
NB-94	#B	-2.7572E-03	-2.7572E-03	4.5879E-02	4.5879E-02	4.681E-02
Ag-108M	#B	-1.2998E-02	-1.2998E-02	6.9408E-02	6.9412E-02	7.913E-02
CD-109	#A	-5.1766E-03	-5.1792E-03	1.3660E+00	1.3660E+00	1.630E+00
SN-113	#B	-1.9182E-02	-1.9220E-02	6.5825E-02	6.5834E-02	7.375E-02
SB-125	#B	8.2403E-02	8.2422E-02	9.7425E-02	9.7536E-02	1.400E-01
I-131	#B	-1.0905E-02	-1.1221E-02	4.6897E-02	4.6901E-02	5.149E-02
CS-134	#B	-2.1587E-03	-2.1593E-03	2.0625E-01	2.0625E-01	1.083E-01
CS-137	#A	8.7834E-03	8.7836E-03	5.2962E-02	5.2964E-02	6.142E-02
CE-139	#A	-1.0438E-02	-1.0455E-02	5.0854E-02	5.0858E-02	5.487E-02
EU-152	#B	-3.2614E-02	-3.2616E-02	1.4454E-01	1.4456E-01	1.512E-01
EU-154	#B	1.3685E-02	1.3686E-02	9.5759E-02	9.5762E-02	1.071E-01
EU-155	#A	1.3299E-01	1.3300E-01	1.6274E-01	1.6290E-01	1.769E-01
HG-203	#B	-5.8040E-03	-5.8327E-03	5.0574E-02	5.0575E-02	5.684E-02
TL-208		2.8645E-01	2.8645E-01	8.6202E-02	8.7709E-02	
PB-212		8.2466E-01	8.2466E-01	1.1278E-01	1.2203E-01	
PB-214		4.9328E-01	4.9328E-01	1.5247E-01	1.5499E-01	
BI-212	#	7.8473E-01	7.8473E-01	6.9959E-01	7.0100E-01	
BI-214		5.1780E-01	5.1780E-01	1.5883E-01	1.6150E-01	
RA-224	#A	6.3429E-01	6.3429E-01	1.3404E+00	1.3409E+00	1.477E+00
RA-226	#A	1.3006E+00	1.3006E+00	1.2755E+00	1.2776E+00	1.368E+00
AC-228		9.8070E-01	9.8070E-01	2.6934E-01	2.7498E-01	
TH-227	#B	-2.0039E-03	-2.0039E-03	3.8686E-01	3.8686E-01	4.998E-01
PA-234	#B	-4.7892E-02	-4.7892E-02	1.6854E-01	1.6856E-01	1.872E-01
TH-234	#B	1.3467E+00	1.3467E+00	1.1607E+00	1.1631E+00	2.402E+00
AM-241	#A	-7.6968E-02	-7.6968E-02	2.7606E-01	2.7609E-01	2.891E-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 (270.6 to 1999.1 keV) 1.8834467E+01 pCi/gm
Total Decayed Activity (270.6 to 1999.1 keV) 1.8834480E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_17NOV2005_1833.An1

Sample description
NOL-05-02-009-C

Spectrum Filename: C:\GammaVision\Spectra\101_17NOV2005_1833.An1

Acquisition information
Start time: 17-Nov-2005 18:33:59
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/channel^2

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: 1.8650E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8650E+03) =
5.3619E+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	17-Nov-2005 10:45:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0501

***** 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	213.	22.87	1.50	1.654E-02				
74.92	213.	22.87	1.50	1.654E-02	74.81	9.600	9.727E-01	PB212
77.07	309.	15.53	1.50	1.720E-02	77.11	10.700	1.218E+00	PB214
					77.11	17.500	7.448E-01	PB212
77.07	313.	15.53	1.50	1.720E-02	77.11	10.700	1.218E+00	PB214
					77.11	17.500	7.537E-01	PB212
93.12	103.	40.09	1.50	1.989E-02	92.80	3.000	PBC<MDA	TH234
129.36	124.	32.08	0.99	2.109E-02				
135.81	85.	40.09	1.34	2.096E-02				
209.35	85.	27.57	1.15	1.721E-02				
238.76	838.	4.02	1.12	1.557E-02	238.63	43.100	8.981E-01	PB212
241.72	107.	22.20	1.12	1.541E-02	241.00	3.900	1.277E+00	RA224
					241.92	7.470	PBC<MDA	PB214
295.16	140.	15.20	1.12	1.292E-02				
295.16	140.	15.20	1.12	1.292E-02	295.22	19.200	4.043E-01	PB214
300.22	57.	38.91	0.79	1.272E-02				
328.20	48.	31.90	1.25	1.169E-02				
338.52	171.	15.33	1.18	1.135E-02	338.40	12.010	8.974E-01	AC228
351.97	235.	14.90	1.12	1.093E-02				
351.97	235.	14.90	1.12	1.093E-02	351.99	37.100	4.160E-01	PB214
363.11	34.	31.73	1.41	1.060E-02				
463.20	51.	27.21	1.42	8.347E-03				
463.20	51.	27.21	1.42	8.347E-03	463.51	10.000	PBC<MDA	SB125
477.95	61.	32.65	1.12	8.095E-03	477.56	10.300	5.284E-01	BE7
511.20	116.	19.87	1.36	7.584E-03	510.72	22.500	4.220E-01	TL208
583.29	238.	10.10	1.51	6.683E-03	583.14	86.000	2.976E-01	TL208
609.32	170.	10.90	1.64	6.413E-03	609.32	46.090	4.150E-01	BI214

661.95	41.	25.62	1.21	5.935E-03	661.62	84.620	5.786E-02	CS137
727.21	74.	19.77	1.58	5.443E-03	727.17	11.800	8.216E-01	BI212
794.81	32.	30.06	1.50	5.016E-03	795.76	85.400	5.416E-02	CS134
911.11	162.	9.51	1.74	4.446E-03	911.07	29.000	8.998E-01	AC228
968.94	118.	17.08	1.13	4.212E-03	968.90	17.460	1.156E+00	AC228
1120.12	48.	23.86	0.81	3.711E-03	1120.28	15.040	6.182E-01	BI214
1332.81	21.	35.59	1.85	3.190E-03	1332.51	99.980	PBC<MDA	CO60
1460.87	599.	4.31	2.13	2.942E-03	1460.75	10.700	1.374E+01	K40
1764.47	33.	17.41	1.73	2.481E-03	1764.51	15.920	5.973E-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	
258.33	129.36	562.	165.	0.083	65.23	0.990	AC-228	s
418.38	209.35	232.	85.	0.043	82.70	1.155	AC-228	s
477.23	238.73	148.	838.	0.419	12.05	1.122	PB-212	D
483.15	241.69	228.	107.	0.053	66.60	1.124	PB-214	D
600.20	300.22	174.	57.	0.028	106.00	0.787	PB-212	s
656.17	328.20	97.	48.	0.024	95.69	1.252	AC-228	
955.82	477.95	103.	61.	0.030	97.95	1.116	BE-7	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

********** 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	149.40	74.92	1144.	213.	0.107	68.62	1.499s
PB-214	153.79	77.11	1030.	309.	0.155	46.60	1.499D
PB-212	153.79	77.11	1026.	313.	0.157	46.60	1.499D
PB-212	477.21	238.76	441.	662.	0.331	17.61	1.499
RA-224	483.55	241.92	471.	95.	0.048	100.71	1.499
PB-214	590.23	295.24	211.	134.	0.067	52.02	1.499s
AC-228	676.83	338.52	174.	169.	0.084	45.98	1.185
PB-214	704.02	352.11	161.	203.	0.101	33.49	1.499
SB-125	926.04	463.07	103.	50.	0.025	93.78	1.499
TL-208	1022.34	511.20	134.	99.	0.050	59.61	1.358s
TL-208	1166.59	583.29	106.	236.	0.118	30.29	1.515
BI-214	1218.68	609.32	66.	169.	0.085	32.69	1.645
CS-137	1323.88	661.90	44.	34.	0.017	94.21	1.499
BI-212	1454.58	727.21	48.	73.	0.036	59.32	1.581
CS-134	1589.84	794.81	32.	32.	0.016	90.19	1.502s
AC-228	1822.56	911.11	29.	160.	0.080	28.54	1.744s
AC-228	1938.29	968.94	73.	117.	0.059	51.23	1.135
BI-214	2240.83	1120.12	32.	48.	0.024	71.59	0.811s
CO-60	2666.47	1332.81	18.	21.	0.011	106.77	1.846s
K-40	2922.75	1460.87	15.	597.	0.298	12.94	2.129
BI-214	3530.38	1764.47	0.	33.	0.016	52.22	1.732

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		3.1536E-01					
			477.56	3.154E-01	%(	4.267E-01 1.33E-01	G
K-40		1.3735E+01					
			1460.75	1.374E+01	(P	4.802E-01 5.95E-01	G
MN-54		2.8134E-02					
			834.81	2.813E-02	%(P	4.825E-02 1.49E-02	G
CO-57		4.2639E-04					
			122.07	4.264E-04	%(	5.404E-02 1.61E-02	G K
			136.43	7.013E-02	%	3.977E-01 1.19E-01	G
CO-60		4.8097E-02					
			1332.51	4.810E-02	@(P	5.117E-02 1.72E-02	G K
			1173.23	4.411E-02	% P	6.601E-02 2.06E-02	G K
Sr-85		-1.6170E-02					
			514.00	-1.617E-02	%(	5.763E-02 1.72E-02	G
Kr-85		-4.0125E+02					
			513.99	-4.012E+02	%(P	1.331E+03 3.95E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	9.303E-02 2.57E-02	G K
			898.02	-9.580E-03	% P	5.628E-02 1.61E-02	G
NB-94		1.6596E-02					
			871.10	1.660E-02	%(P	4.476E-02 1.33E-02	G K
			702.50	-5.733E-05	% P	5.393E-02 1.53E-02	G K
Ag-108M		-1.8511E-02					
			722.95	-1.851E-02	%(	6.515E-02 1.93E-02	G K
			614.37	1.666E-03	% P	6.029E-02 1.73E-02	G
			433.93	5.976E-03	%	4.306E-02 1.25E-02	G
CD-109		2.8924E-01					
			88.04	2.892E-01	%(P	1.493E+00 4.48E-01	G
SN-113		2.9425E-03					
			391.71	2.942E-03	%(	5.566E-02 1.61E-02	G K
			255.04	-3.722E-01	% P	2.015E+00 5.99E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.5379E-02						
		427.95	-1.802E-02	%(P	1.507E-01	4.40E-02	G K
		600.77	-5.237E-02	% P	2.345E-01	6.83E-02	G
		636.15	-3.885E-02	% P	3.846E-01	1.10E-01	G
		463.51	4.310E-01	(P	4.350E-01	1.39E-01	G
		176.29	3.931E-02	% P	6.495E-01	1.93E-01	G
I-131	-1.2688E-02						
		364.48	-1.269E-02	&(	5.166E-02	1.53E-02	G K
		636.97	5.603E-02	&	5.691E-01	1.62E-01	G
		284.29	1.058E-01	&	6.521E-01	1.93E-01	G
CS-134	2.4241E-02						
		604.66	-1.935E-03	&(P	9.529E-02	2.80E-02	G K
		795.76	5.416E-02	*(P	4.899E-02	1.65E-02	G
		569.29	7.773E-02	% P	2.423E-01	7.16E-02	G
		801.84	8.283E-02	&	4.425E-01	1.26E-01	G
CS-137	4.9195E-02						
		661.62	4.919E-02	?(P	4.837E-02	1.58E-02	G
CE-139	1.9870E-03						
		165.85	1.987E-03	&(P	5.351E-02	1.59E-02	G
EU-152	1.7122E-02						
		121.78	1.712E-02	%(P	1.528E-01	4.56E-02	G K
		344.30	-3.132E-02	% P	1.656E-01	4.89E-02	G
		1408.08	1.296E-01	% P	2.145E-01	6.75E-02	G
		964.00	1.636E-01	% P	4.130E-01	1.23E-01	G
		1112.07	2.240E-01	& P	4.547E-01	1.38E-01	G
		778.90	1.515E-02	% P	3.244E-01	9.03E-02	G
EU-154	-1.9312E-02						
		123.10	-1.931E-02	&(P	1.110E-01	3.32E-02	G K
		1274.80	2.329E-02	% P	1.781E-01	5.04E-02	G
		723.30	-8.843E-02	% P	2.970E-01	8.78E-02	G
		1004.80	-4.501E-02	% P	3.116E-01	8.87E-02	G
EU-155	-9.8710E-03						
		86.45	-9.871E-03	%(	1.917E-01	5.73E-02	G K
		105.31	1.943E-02	%	2.169E-01	6.48E-02	G
HG-203	0.0000E+00						
		279.17	0.000E+00	%(	5.491E-02	1.61E-02	G K
		72.87	-5.309E-01	% P	1.319E+00	3.99E-01	G
		70.83	-1.140E+00	&	2.330E+00	7.07E-01	G
		82.50	-6.368E-01	%	2.351E+00	7.07E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9762E-01						
		583.14	2.976E-01	(P	6.385E-02	3.04E-02	G
		510.72	4.220E-01	+ P	2.400E-01	9.75E-02	G
PB-212	7.2559E-01						
		238.63	7.142E-01	(P	1.085E-01	4.23E-02	G K
							Energy duplication
		77.11	7.537E-01	@(	3.658E-01	1.17E-01	G
		74.81	9.727E-01	& P	7.316E-01	2.28E-01	G
PB-214	3.7237E-01						
		351.99	3.625E-01	(P	1.105E-01	4.09E-02	G K
		295.22	3.914E-01	*(P	2.057E-01	6.88E-02	G
							Energy duplication
		77.11	1.218E+00	+ P	5.994E-01	1.91E-01	G
		241.92	-1.136E-01	% P	8.224E-01	2.46E-01	G
BI-212	8.2156E-01						
		727.17	8.216E-01	(P	3.955E-01	1.64E-01	G K
		1620.56	4.814E-01	%	1.353E+00	3.95E-01	G
		785.42	8.395E-01	% P	2.495E+00	7.39E-01	G
BI-214	4.1503E-01						
		609.32	4.150E-01	(P	9.925E-02	4.55E-02	G K
		1764.51	5.973E-01	+ P	1.352E-01	1.05E-01	G
		1120.28	6.182E-01	+ P	3.795E-01	1.49E-01	G
RA-224	1.1445E+00						
		241.00	1.145E+00	(P	1.249E+00	3.87E-01	G
RA-226	9.5313E-01						
		185.99	9.531E-01	%(	1.310E+00	4.02E-01	G
AC-228	8.9910E-01						
		911.07	8.998E-01	@(P	1.559E-01	8.66E-02	G K
		968.90	1.156E+00	+ P	4.182E-01	1.99E-01	G
		338.40	8.974E-01	(P	3.413E-01	1.39E-01	G
TH-227	-6.1776E-03						
		236.00	-6.178E-03	%(P	4.615E-01	1.37E-01	G K
		256.25	-4.599E-02	% P	6.278E-01	1.85E-01	G
PA-234	3.1960E-04						
		98.44	3.196E-04	&(	1.965E-01	5.85E-02	G K
		946.00	-4.483E-02	%	3.092E-01	8.91E-02	G
		131.28	-1.005E-01	%	2.428E-01	7.35E-02	G
		94.67	-1.295E-01	%	3.374E-01	1.02E-01	G
		883.24	-1.420E-02	%	3.860E-01	1.07E-01	G
		926.70	1.994E-01	%	4.289E-01	1.30E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.197E-01 %   3.579E-01 1.06E-01 G

TH-234       5.9873E-01
                           63.29 5.987E-01 %(P 2.274E+00 6.82E-01 G K
                           92.80 1.252E+00 % P 1.741E+00 5.32E-01 G
                           92.38 1.015E+00 & P 1.858E+00 5.63E-01 G

AM-241      -2.2575E-02
                           59.54-2.258E-02 &(P 3.183E-01 9.49E-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:                      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 - 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 *****

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	3.1403E-01	3.1536E-01	3.9923E-01	3.9963E-01	4.249E-01
K-40		1.3735E+01	1.3735E+01	1.7837E+00	1.9453E+00	
MN-54	#A	2.8113E-02	2.8134E-02	4.4608E-02	4.4636E-02	4.821E-02
CO-57	#B	4.2603E-04	4.2639E-04	4.8230E-02	4.8230E-02	5.400E-02
CO-60	#B	4.8092E-02	4.8097E-02	5.1564E-02	5.1635E-02	5.116E-02

Sr-85	#A	-1.6114E-02	-1.6170E-02	5.1463E-02	5.1471E-02	5.743E-02
Kr-85	#A	-4.0124E+02	-4.0125E+02	1.3505E+03	1.3507E+03	1.331E+03
Y-88	#B	0.0000E+00	0.0000E+00	7.7154E-02	7.7154E-02	9.283E-02
NB-94	#B	1.6596E-02	1.6596E-02	3.9892E-02	3.9903E-02	4.476E-02
Ag-108M	#B	-1.8511E-02	-1.8511E-02	5.7850E-02	5.7859E-02	6.515E-02
CD-109	#A	2.8909E-01	2.8924E-01	1.3445E+00	1.3446E+00	1.492E+00
SN-113	#B	2.9367E-03	2.9425E-03	4.8153E-02	4.8154E-02	5.555E-02
SB-125	#B	9.5358E-02	9.5379E-02	9.2055E-02	9.2212E-02	1.507E-01
I-131	#B	-1.2337E-02	-1.2688E-02	4.5986E-02	4.5991E-02	5.023E-02
CS-134	#B	2.4234E-02	2.4241E-02	2.2148E-02	2.2190E-02	9.526E-02
CS-137	#	4.9194E-02	4.9195E-02	4.7545E-02	4.7626E-02	4.837E-02
CE-139	#A	1.9837E-03	1.9870E-03	4.7661E-02	4.7662E-02	5.342E-02
EU-152	#B	1.7121E-02	1.7122E-02	1.3688E-01	1.3688E-01	1.528E-01
EU-154	#B	-1.9311E-02	-1.9312E-02	1.0794E-01	1.0794E-01	1.110E-01
EU-155	#B	-9.8698E-03	-9.8710E-03	1.7198E-01	1.7198E-01	1.917E-01
HG-203	#B	0.0000E+00	0.0000E+00	4.8369E-02	4.8369E-02	5.464E-02
TL-208		2.9762E-01	2.9762E-01	9.1071E-02	9.2610E-02	
PB-212	#	7.2559E-01	7.2559E-01	1.2897E-01	1.3533E-01	1.085E-01
PB-214	#	3.7237E-01	3.7237E-01	1.1660E-01	1.1848E-01	1.105E-01
BI-212		8.2156E-01	8.2156E-01	4.9192E-01	4.9410E-01	
BI-214		4.1503E-01	4.1503E-01	1.3657E-01	1.3857E-01	
RA-224	#A	1.1445E+00	1.1445E+00	1.1613E+00	1.1631E+00	1.249E+00
RA-226	#A	9.5313E-01	9.5313E-01	1.2064E+00	1.2076E+00	1.310E+00
AC-228		8.9910E-01	8.9910E-01	2.4637E-01	2.5156E-01	
TH-227	#B	-6.1776E-03	-6.1776E-03	7.4599E-01	7.4599E-01	4.615E-01
PA-234	#B	3.1960E-04	3.1960E-04	1.7540E-01	1.7540E-01	1.965E-01
TH-234	#B	5.9873E-01	5.9873E-01	2.0461E+00	2.0464E+00	2.274E+00
AM-241	#A	-2.2575E-02	-2.2575E-02	3.4227E-01	3.4227E-01	3.183E-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 (270.1 to 1999.1 keV) 1.6217806E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.6217808E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_17NOV2005_1910.An1

Sample description
NOL-05-02-008-C

Spectrum Filename: C:\GammaVision\Spectra\101_17NOV2005_1910.An1

Acquisition information
Start time: 17-Nov-2005 19:10:29
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/channel^2

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: 1.8910E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8910E+03) =
5.2882E+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	17-Nov-2005 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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0805

***** 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
74.82	251.	13.41	1.00	1.651E-02	74.81	9.600	1.104E+00	PB212
75.85	116.	2.58	1.50	1.720E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
					77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
93.05	138.	29.96	1.50	1.989E-02	88.04	3.790	PBC<MDA	CD109
					92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.06	134.	30.27	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.68	102.	30.30	1.10	2.110E-02				
185.82	142.	24.69	0.78	1.859E-02				
185.82	142.	24.69	0.78	1.859E-02	185.99	3.280	1.665E+00	RA226
209.22	72.	34.22	1.09	1.722E-02				
238.74	809.	4.11	1.12	1.557E-02	238.63	43.100	8.547E-01	PB212
242.18	101.	20.91	1.12	1.539E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.251E-01	PB214
295.40	118.	17.92	1.26	1.291E-02	295.22	19.200	3.348E-01	PB214
338.37	170.	15.81	1.03	1.135E-02	338.40	12.010	8.798E-01	AC228
351.98	258.	9.44	1.04	1.092E-02	351.99	37.100	4.505E-01	PB214
510.28	103.	21.10	1.26	7.597E-03	510.72	22.500	3.652E-01	TL208
583.31	249.	9.83	1.17	6.683E-03	583.14	86.000	3.066E-01	TL208
609.08	176.	9.91	1.57	6.415E-03	609.32	46.090	4.238E-01	BI214
726.89	106.	16.77	1.52	5.445E-03	722.95	90.499	1.530E-01	Ag108M
					723.30	19.700	7.007E-01	EU154
					727.17	11.800	1.172E+00	BI212
795.10	32.	29.71	1.50	5.016E-03	795.76	85.400	5.281E-02	CS134

911.17	150.	9.72	1.61	4.446E-03	911.07	29.000	8.209E-01	AC228
969.24	92.	15.87	1.27	4.211E-03	968.90	17.460	8.831E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.28	52.	26.12	2.03	3.711E-03	1120.28	15.040	6.635E-01	BI214
1460.80	599.	4.35	2.01	2.942E-03	1460.75	10.700	1.354E+01	K40
1764.52	41.	15.62	1.27	2.481E-03	1764.51	15.920	7.338E-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	
153.78	77.00	437.	326.	0.163	31.92	1.006	PB-214	lD
418.11	209.22	258.	72.	0.036	102.65	1.087	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

********** 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	146.53	73.48	1083.	-155.	-0.078	93.23	1.499s
PB-212	149.19	74.81	379.	246.	0.123	37.75	1.005D
PB-212	153.79	77.11	436.	327.	0.164	25.99	1.006A
PB-214	153.79	77.11	572.	116.	0.058	7.75	1.499A
TH-234	185.71	93.06	896.	134.	0.067	90.80	1.499s
TH-234	185.69	93.05	868.	138.	0.069	89.88	1.499s
RA-226	372.06	186.20	531.	111.	0.056	92.44	1.499
PB-212	476.96	238.63	157.	802.	0.401	12.37	1.122D
RA-224	483.47	241.89	513.	83.	0.041	119.92	1.499s
PB-214	483.54	241.92	151.	111.	0.055	54.77	1.124D
PB-214	590.54	295.40	145.	116.	0.058	53.75	1.257
AC-228	676.52	338.37	186.	168.	0.084	47.42	1.032
PB-214	703.76	351.98	135.	256.	0.128	28.33	1.042
TL-208	1020.50	510.28	129.	87.	0.044	63.31	1.260s
TL-208	1166.64	583.31	102.	247.	0.123	29.49	1.170
BI-214	1218.19	609.08	51.	175.	0.088	29.72	1.568s
BI-212	1453.93	726.89	61.	105.	0.053	50.31	1.523s
CS-134	1590.43	795.10	30.	32.	0.016	89.14	1.502s
AC-228	1822.68	911.17	26.	148.	0.074	29.15	1.611
AC-228	1938.90	969.24	38.	91.	0.045	47.61	1.273
BI-214	2241.16	1120.28	42.	52.	0.026	78.37	2.030s
K-40	2922.63	1460.80	18.	597.	0.298	13.05	2.010
BI-214	3530.47	1764.52	0.	41.	0.020	46.85	1.274s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		2.7241E-01					
			477.56	2.724E-01	%(	3.652E-01 1.14E-01	G
K-40		1.3544E+01					
			1460.75	1.354E+01	(P	5.137E-01 5.91E-01	G
MN-54		-7.6587E-03					
			834.81	-7.659E-03	%(P	5.048E-02 1.44E-02	G
CO-57		-1.5705E-03					
			122.07	-1.570E-03	%(	4.560E-02 1.35E-02	G K
			136.43	8.575E-03	%	3.737E-01 1.11E-01	G
CO-60		3.5951E-02					
			1332.51	3.595E-02	%(P	4.905E-02 1.58E-02	G K
			1173.23	4.110E-02	% P	6.067E-02 1.90E-02	G K
Sr-85		-1.4227E-02					
			514.00	-1.423E-02	%(	5.214E-02 1.55E-02	G
Kr-85		-3.5321E+02					
			513.99	-3.532E+02	%(P	1.205E+03 3.56E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	4.996E-02 1.27E-02	G K
			898.02	1.108E-03	& P	4.747E-02 1.31E-02	G
NB-94		-2.4989E-03					
			871.10	-2.499E-03	&(P	4.864E-02 1.36E-02	G K
			702.50	3.804E-03	& P	3.835E-02 1.08E-02	G K
Ag-108M		7.0886E-03					
			722.95	7.089E-03	%(	7.107E-02 2.06E-02	G K
			614.37	-1.518E-04	& P	2.451E-02 6.40E-03	G
			433.93	0.000E+00	%	4.957E-02 1.43E-02	G
CD-109		1.5010E-02					
			88.04	1.501E-02	&(P	1.318E+00 3.92E-01	G
SN-113		-6.0865E-03					
			391.71	-6.087E-03	%(	6.063E-02 1.77E-02	G K
			255.04	5.285E-02	% P	1.544E+00 4.51E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	2.7205E-02						
		427.95	2.721E-02	%(P	1.220E-01	3.58E-02	G K
		600.77	-4.271E-02	& P	2.261E-01	6.55E-02	G
		636.15	5.617E-02	& P	3.593E-01	1.03E-01	G
		463.51	2.076E-01	% P	3.933E-01	1.20E-01	G
		176.29	-8.249E-02	& P	6.110E-01	1.81E-01	G
I-131	-6.3291E-04						
		364.48	-6.329E-04	%(	4.569E-02	1.32E-02	G K
		636.97	1.809E-01	%	5.744E-01	1.70E-01	G
		284.29	-1.485E-02	%	6.812E-01	2.00E-01	G
CS-134	2.0703E-02						
		604.66	-7.388E-03	&(P	5.048E-02	1.46E-02	G K
		795.76	5.281E-02	*(P	4.695E-02	1.59E-02	G
		569.29	5.214E-02	& P	2.630E-01	7.65E-02	G
		801.84	0.000E+00	&	5.023E-01	1.39E-01	G
CS-137	-1.2575E-03						
		661.62	-1.257E-03	%(P	6.290E-02	1.78E-02	G
CE-139	-1.5105E-02						
		165.85	-1.511E-02	%(P	5.206E-02	1.56E-02	G
EU-152	-1.2245E-02						
		121.78	-1.224E-02	%(P	1.484E-01	4.42E-02	G K
		344.30	-2.206E-02	% P	1.441E-01	4.22E-02	G
		1408.08	3.489E-02	& P	2.333E-01	6.46E-02	G
		964.00	-8.020E-02	% P	4.015E-01	1.16E-01	G
		1112.07	-1.226E-03	& P	4.024E-01	1.10E-01	G
		778.90	2.416E-02	& P	3.582E-01	1.01E-01	G
EU-154	3.9299E-02						
		123.10	3.930E-02	%(P	1.047E-01	3.16E-02	G K
		1274.80	3.868E-02	% P	1.626E-01	4.69E-02	G
		723.30	1.859E-01	% P	2.947E-01	9.09E-02	G
		1004.80	-6.193E-04	% P	4.011E-01	1.13E-01	G
EU-155	8.8889E-02						
		86.45	8.889E-02	%(	1.734E-01	5.27E-02	G K
		105.31	7.374E-02	&	1.929E-01	5.82E-02	G
HG-203	-4.9270E-03						
		279.17	-4.927E-03	%(	5.184E-02	1.53E-02	G K
		72.87	-5.160E-01	% P	1.122E+00	3.39E-01	G
		70.83	-2.091E+00	+	2.105E+00	6.50E-01	G
		82.50	-5.486E-01	&	2.559E+00	7.68E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.1873E-01						
		583.14	3.066E-01	(P	6.198E-02	3.04E-02	G
		510.72	3.652E-01	@(P	2.326E-01	9.11E-02	G
PB-212	8.3110E-01						
		238.63	8.533E-01	(P	6.506E-02	3.55E-02	G K
							Energy duplication
		77.11	7.765E-01	}	2.374E-01	6.73E-02	G
		74.81	1.107E+00	+ P	4.206E-01	1.42E-01	G
PB-214	4.5053E-01						
		351.99	4.505E-01	(P	1.004E-01	4.29E-02	G K
		295.22	3.348E-01	- P	1.693E-01	6.09E-02	G
							Energy duplication
		77.11	4.505E-01	} P	4.431E-01	1.16E-02	G
		241.92	6.869E-01	+ P	3.730E-01	1.26E-01	G
BI-212	1.1719E+00						
		727.17	1.172E+00	*(P	4.340E-01	1.98E-01	G K
		1620.56	-1.240E-01	&	1.595E+00	4.19E-01	G
		785.42	4.792E-01	% P	2.537E+00	7.35E-01	G
BI-214	4.2383E-01						
		609.32	4.238E-01	*(P	8.679E-02	4.22E-02	G K
		1764.51	7.338E-01	+ P	1.333E-01	1.16E-01	G
		1120.28	6.635E-01	+ P	4.222E-01	1.75E-01	G
RA-224	9.7863E-01						
		241.00	9.786E-01	&(P	1.283E+00	3.95E-01	G
RA-226	1.3030E+00						
		185.99	1.303E+00	(	1.291E+00	4.02E-01	G
AC-228	8.5159E-01						
		911.07	8.209E-01	(P	1.464E-01	8.08E-02	G K
		968.90	8.831E-01	(P	3.059E-01	1.41E-01	G
		338.40	8.798E-01	(P	3.476E-01	1.41E-01	G
TH-227	-1.8159E-01						
		236.00	-1.816E-01	&(P	4.527E-01	1.37E-01	G K
		256.25	-1.461E-02	% P	6.083E-01	1.79E-01	G
PA-234	-2.4740E-03						
		98.44	-2.474E-03	&(	1.855E-01	5.52E-02	G K
		946.00	6.959E-02	&	2.352E-01	6.89E-02	G
		131.28	-6.298E-02	%	2.269E-01	6.82E-02	G
		94.67	-1.085E-01	%	3.177E-01	9.58E-02	G
		883.24	-7.676E-02	%	4.451E-01	1.28E-01	G
		926.70	0.000E+00	&	6.006E-01	1.70E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 8.210E-02 &   3.886E-01 1.13E-01 G

TH-234       1.1813E+00
                           63.29 3.628E-01 &(P 2.222E+00 6.64E-01 G K
                           92.80 1.653E+00 @(P 1.676E+00 5.17E-01 G
                           92.38 1.873E+00 &(P 1.992E+00 6.13E-01 G

AM-241       2.3418E-02
                           59.54 2.342E-02 %(P 3.025E-01 9.02E-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 - 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 *****

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	2.7126E-01	2.7241E-01	3.4348E-01	3.4382E-01	3.637E-01
K-40		1.3544E+01	1.3544E+01	1.7743E+00	1.9323E+00	
MN-54	#A	-7.6531E-03	-7.6587E-03	5.0826E-02	5.0828E-02	5.044E-02
CO-57	#B	-1.5691E-03	-1.5705E-03	4.0612E-02	4.0612E-02	4.556E-02
CO-60	#B	3.5947E-02	3.5951E-02	4.7456E-02	4.7499E-02	4.904E-02

Sr-85	#A	-1.4177E-02	-1.4227E-02	4.6450E-02	4.6457E-02	5.196E-02
Kr-85	#A	-3.5321E+02	-3.5321E+02	1.2378E+03	1.2380E+03	1.205E+03
Y-88	#B	0.0000E+00	0.0000E+00	3.8047E-02	3.8047E-02	4.985E-02
NB-94	#B	-2.4989E-03	-2.4989E-03	4.8120E-02	4.8120E-02	4.864E-02
Ag-108M	#B	7.0886E-03	7.0886E-03	6.1894E-02	6.1895E-02	7.107E-02
CD-109	#A	1.5002E-02	1.5010E-02	1.1763E+00	1.1763E+00	1.317E+00
SN-113	#B	-6.0745E-03	-6.0865E-03	5.2990E-02	5.2992E-02	6.051E-02
SB-125	#B	2.7199E-02	2.7205E-02	1.0750E-01	1.0752E-01	1.220E-01
I-131	#B	-6.1533E-04	-6.3291E-04	3.9543E-02	3.9543E-02	4.442E-02
CS-134	#B	2.0697E-02	2.0703E-02	1.8698E-02	1.8735E-02	5.047E-02
CS-137	#A	-1.2575E-03	-1.2575E-03	9.4518E-02	9.4518E-02	6.290E-02
CE-139	#A	-1.5081E-02	-1.5105E-02	4.7855E-02	4.7862E-02	5.198E-02
EU-152	#B	-1.2244E-02	-1.2245E-02	1.5385E-01	1.5385E-01	1.484E-01
EU-154	#B	3.9296E-02	3.9299E-02	9.4842E-02	9.4867E-02	1.047E-01
EU-155	#B	8.8877E-02	8.8889E-02	1.5798E-01	1.5805E-01	1.734E-01
HG-203	#B	-4.9031E-03	-4.9270E-03	4.5911E-02	4.5912E-02	5.159E-02
TL-208		3.1873E-01	3.1873E-01	9.4892E-02	9.6585E-02	
PB-212		8.3110E-01	8.3110E-01	1.0361E-01	1.1376E-01	
PB-214		4.5053E-01	4.5053E-01	1.2862E-01	1.3111E-01	
BI-212	#	1.1719E+00	1.1719E+00	5.9337E-01	5.9705E-01	
BI-214		4.2383E-01	4.2383E-01	1.2675E-01	1.2900E-01	
RA-224	#A	9.7863E-01	9.7863E-01	1.1838E+00	1.1851E+00	1.283E+00
RA-226	#	1.3030E+00	1.3030E+00	1.2046E+00	1.2068E+00	1.291E+00
AC-228		8.5159E-01	8.5159E-01	2.1015E-01	2.1559E-01	
TH-227	#B	-1.8159E-01	-1.8159E-01	4.1813E-01	4.1826E-01	4.527E-01
PA-234	#B	-2.4740E-03	-2.4740E-03	1.6551E-01	1.6551E-01	1.855E-01
TH-234	#B	1.1813E+00	1.1813E+00	1.1093E+00	1.1112E+00	2.222E+00
AM-241	#A	2.3418E-02	2.3418E-02	2.7054E-01	2.7054E-01	3.025E-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 (295.1 to 1999.1 keV) 1.7591843E+01 pCi/gm
Total Decayed Activity (295.1 to 1999.1 keV) 1.7591843E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_18NOV2005_1025.An1

Sample description
NOL-05-02-014-C

Spectrum Filename: C:\GammaVision\Spectra\101_18NOV2005_1025.An1

Acquisition information
Start time: 18-Nov-2005 10:27:55
Live time: 2000
Real time: 2003
Dead time: 0.17 %
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/channel^2

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: 2.4620E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.4620E+03) =
4.0617E+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	17-Nov-2005 08:06:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1677

***** 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
74.78	254.	14.39	1.00	1.654E-02	72.87	6.400	1.395E+00	HG203
					74.81	9.600	8.793E-01	PB212
92.97	139.	37.28	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.98	130.	40.96	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.08	141.	29.84	1.52	1.858E-02	185.99	3.280	1.270E+00	RA226
238.75	879.	4.40	1.12	1.558E-02	238.63	43.100	7.140E-01	PB212
241.74	139.	21.21	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.611E-01	PB214
270.33	64.	37.53	1.05	1.400E-02				
295.28	195.	16.68	1.06	1.292E-02	295.22	19.200	4.275E-01	PB214
300.36	64.	38.73	1.15	1.271E-02				
338.82	202.	17.96	1.08	1.134E-02	338.40	12.010	8.042E-01	AC228
351.98	311.	12.53	1.16	1.092E-02	351.99	37.100	4.190E-01	PB214
462.85	50.	39.70	1.50	8.342E-03				
462.85	50.	39.70	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125
510.39	135.	23.13	1.26	7.595E-03	510.72	22.500	3.824E-01	TL208
583.06	286.	8.91	1.22	6.685E-03	583.14	86.000	2.705E-01	TL208
609.50	210.	10.18	1.24	6.411E-03	609.32	46.090	3.887E-01	BI214
661.26	157.	20.75	1.23	5.940E-03	661.62	84.620	1.706E-01	CS137
727.41	44.	33.34	1.00	5.441E-03	727.17	11.800	PBC<MDA	BI212
911.02	183.	13.20	1.80	4.447E-03	911.07	29.000	7.723E-01	AC228
967.38	175.	18.77	1.53	4.218E-03	968.90	17.460	1.300E+00	AC228
1120.30	61.	31.41	3.20	3.711E-03	1120.28	15.040	5.962E-01	BI214
1173.11	848.	4.08	1.83	3.565E-03	1173.23	99.860	1.308E+00	CO60
1284.85	40.	29.38	0.97	3.293E-03				

1332.31	798.	4.00	1.59	3.191E-03	1332.51	99.980	1.374E+00	CO60
1460.66	814.	3.65	1.90	2.943E-03	1460.75	10.700	1.414E+01	K40
1764.41	24.	23.01	0.86	2.481E-03	1764.51	15.920	3.371E-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
540.38	270.33	269.	64.	0.032	112.60	1.046	AC-228
600.47	300.36	263.	64.	0.032	116.18	1.154	PB-212
2570.49	1284.85	30.	40.	0.020	88.13	0.969	- 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	149.19	74.81	573.	254.	0.127	43.17	1.005D
PB-212	153.79	77.11	601.	387.	0.193	25.70	1.006A
TH-234	185.53	92.97	1499.	139.	0.070	111.83	1.499
RA-226	371.54	185.94	852.	122.	0.061	105.08	1.499s
PB-212	476.96	238.63	314.	874.	0.437	13.17	1.122D
PB-214	483.54	241.92	307.	130.	0.065	62.57	1.124D
PB-214	590.30	295.28	347.	193.	0.097	50.03	1.055s
AC-228	677.41	338.82	361.	200.	0.100	53.88	1.080s
PB-214	703.75	351.98	393.	309.	0.155	37.59	1.165s
SB-125	925.60	462.85	183.	50.	0.025	119.10	1.499s
TL-208	1020.69	510.37	246.	104.	0.052	74.12	1.252s
TL-208	1166.14	583.06	137.	283.	0.142	26.74	1.220
BI-214	1219.03	609.50	105.	209.	0.105	30.55	1.237
Ag-108M	1223.66	611.81	146.	-49.	-0.024	113.74	1.499s
CS-137	1322.61	661.26	233.	156.	0.078	62.26	1.228s
BI-212	1454.97	727.41	81.	43.	0.022	100.03	0.997
AC-228	1822.40	911.02	141.	181.	0.091	39.60	1.803s
AC-228	1935.17	967.38	221.	174.	0.087	56.30	1.533s
BI-214	2241.18	1120.30	102.	61.	0.030	94.22	3.201s
CO-60	2346.87	1173.11	106.	848.	0.424	12.24	1.829
CO-60	2665.47	1332.31	49.	798.	0.399	12.00	1.588
K-40	2922.33	1460.66	20.	811.	0.406	10.95	1.901
BI-214	3530.26	1764.41	3.	24.	0.012	69.02	0.857s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.1804E-01					
			477.56	1.180E-01	%(	4.613E-01 1.37E-01	G
K-40		1.4144E+01					
			1460.75	1.414E+01	(P	4.076E-01 5.18E-01	G
MN-54		1.0426E-02					
			834.81	1.043E-02	%(P	6.960E-02 2.05E-02	G
CO-57		-1.2775E-02					
			122.07	-1.277E-02	%(	5.285E-02 1.59E-02	G K
			136.43	1.183E-01	%	4.019E-01 1.21E-01	G
CO-60		1.3409E+00					
			1332.51	1.374E+00	(P	6.087E-02 5.49E-02	G K
			1173.23	1.308E+00	(P	7.817E-02 5.34E-02	G K
Sr-85		-1.3068E-02					
			514.00	-1.307E-02	%(	5.207E-02 1.55E-02	G
Kr-85		-3.1807E+02					
			513.99	-3.181E+02	%(P	1.191E+03 3.54E+02	G
Y-88		8.9577E-04					
			1836.01	8.958E-04	%(	3.561E-02 9.01E-03	G K
			898.02	1.213E-02	% P	7.173E-02 2.11E-02	G
NB-94		1.6637E-02					
			871.10	1.664E-02	%(P	6.594E-02 1.95E-02	G K
			702.50	-3.619E-04	% P	4.635E-02 1.33E-02	G K
Ag-108M		1.6841E-02					
			722.95	1.684E-02	&(	6.194E-02 1.84E-02	G K
			614.37	-4.656E-02	+ P	5.636E-02 1.76E-02	G
			433.93	1.048E-02	%	5.223E-02 1.55E-02	G
CD-109		-1.0740E-01					
			88.04	-1.074E-01	%(P	1.456E+00 4.36E-01	G
SN-113		5.6633E-03					
			391.71	5.663E-03	&(	6.921E-02 2.04E-02	G K
			255.04	-3.476E-01	% P	2.138E+00 6.39E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.4031E-02						
		427.95	1.519E-03	%(P	1.594E-01	4.67E-02	G K
		600.77	2.607E-02	& P	2.778E-01	8.12E-02	G
		636.15	-2.263E-03	& P	4.745E-01	1.37E-01	G
		463.51	3.283E-01	(P	4.331E-01	1.34E-01	G
		176.29	-3.128E-02	& P	6.638E-01	1.98E-01	G
I-131	9.4947E-03						
		364.48	9.495E-03	&(	5.815E-02	1.73E-02	G K
		636.97	2.035E-01	&	7.284E-01	2.16E-01	G
		284.29	-7.593E-02	&	7.634E-01	2.27E-01	G
CS-134	-9.0283E-04						
		604.66	-9.028E-04	&(P	5.992E-02	1.74E-02	G K
		795.76	3.391E-02	% P	6.649E-02	2.02E-02	G
		569.29	9.374E-02	% P	3.352E-01	9.98E-02	G
		801.84	7.738E-02	&	7.244E-01	2.12E-01	G
CS-137	1.7056E-01						
		661.62	1.706E-01	*(P	8.066E-02	3.56E-02	G
CE-139	-1.4728E-02						
		165.85	-1.473E-02	%(P	5.108E-02	1.54E-02	G
EU-152	-3.9975E-02						
		121.78	-3.997E-02	%(P	1.591E-01	4.79E-02	G K
		344.30	-3.515E-02	% P	1.647E-01	4.91E-02	G
		1408.08	6.150E-02	% P	1.668E-01	4.91E-02	G
		964.00	-1.702E-02	& P	4.561E-01	1.31E-01	G
		1112.07	-5.705E-02	& P	5.976E-01	1.74E-01	G
		778.90	1.587E-02	& P	3.498E-01	1.00E-01	G
EU-154	-3.1006E-02						
		123.10	-3.101E-02	&(P	1.054E-01	3.17E-02	G K
		1274.80	-1.036E-04	% P	2.499E-01	7.20E-02	G
		723.30	7.255E-02	& P	2.795E-01	8.28E-02	G
		1004.80	1.130E-01	% P	3.650E-01	1.09E-01	G
EU-155	2.0273E-03						
		86.45	2.027E-03	%(	1.491E-01	4.45E-02	G K
		105.31	3.461E-02	%	2.068E-01	6.21E-02	G
HG-203	8.4462E-03						
		279.17	8.446E-03	&(	5.268E-02	1.57E-02	G K
		72.87	-3.910E-01	& P	1.131E+00	3.41E-01	G
		70.83	8.542E-02	&	1.532E+00	4.57E-01	G
		82.50	4.721E-01	%	2.398E+00	7.21E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8372E-01						
		583.14	2.705E-01	(P	5.460E-02	2.43E-02	G
		510.72	3.342E-01	*(P	2.436E-01	9.52E-02	G
PB-212	7.1660E-01						
		238.63	7.151E-01	(P	6.968E-02	3.16E-02	G K
							Energy duplication
		77.11	7.049E-01	}	2.132E-01	6.04E-02	G
		74.81	8.793E-01	+ P	3.950E-01	1.29E-01	G
PB-214	4.2193E-01						
		351.99	4.190E-01	@(P	1.287E-01	5.28E-02	G K
		295.22	4.275E-01	@(P	1.980E-01	7.20E-02	G
							Energy duplication
		77.11	0.000E+00	} P	5.189E-01	0.00E+00	G
		241.92	6.204E-01	+ P	4.025E-01	1.30E-01	G
BI-212	3.6767E-01						
		727.17	3.677E-01	(P	3.815E-01	1.25E-01	G K
		1620.56	3.343E-01	%	1.378E+00	3.90E-01	G
		785.42	5.330E-01	% P	3.020E+00	8.88E-01	G
BI-214	3.7544E-01						
		609.32	3.887E-01	(P	9.359E-02	3.98E-02	G K
		1764.51	3.371E-01	(P	1.448E-01	7.90E-02	G
		1120.28	5.962E-01	+ P	4.904E-01	1.88E-01	G
RA-224	9.2534E-01						
		241.00	9.253E-01	&(P	1.311E+00	4.01E-01	G
RA-226	1.0985E+00						
		185.99	1.098E+00	*(	1.249E+00	3.85E-01	G
AC-228	7.8163E-01						
		911.07	7.723E-01	(P	2.467E-01	1.03E-01	G K
		968.90	1.300E+00	+ P	5.370E-01	2.45E-01	G
		338.40	8.042E-01	@(P	3.676E-01	1.46E-01	G
TH-227	-2.8340E-01						
		236.00	-2.834E-01	%(P	4.872E-01	1.48E-01	G K
		256.25	-8.922E-02	% P	6.226E-01	1.86E-01	G
PA-234	-2.3266E-03						
		98.44	-2.327E-03	%(	1.868E-01	5.58E-02	G K
		946.00	5.965E-02	&	4.185E-01	1.23E-01	G
		131.28	-1.950E-02	&	2.270E-01	6.80E-02	G
		94.67	-9.461E-02	%	3.167E-01	9.55E-02	G
		883.24	8.512E-03	%	5.596E-01	1.62E-01	G
		926.70	6.598E-02	%	6.815E-01	1.99E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.423E-01 %   4.839E-01 1.44E-01 G

TH-234       8.2269E-01
                           63.29 3.784E-01 %(P 2.199E+00 6.60E-01 G K
                           92.80 1.194E+00 % P 1.679E+00 5.12E-01 G
                           92.38 1.497E+00  (P 1.970E+00 6.02E-01 G

AM-241       3.6867E-02
                           59.54 3.687E-02 %(P 2.954E-01 8.85E-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 - 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 *****

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	1.1636E-01	1.1804E-01	4.1217E-01	4.1223E-01	4.547E-01
K-40		1.4144E+01	1.4144E+01	1.5528E+00	1.7464E+00	
MN-54	#A	1.0400E-02	1.0426E-02	6.1383E-02	6.1386E-02	6.943E-02
CO-57	#B	-1.2739E-02	-1.2775E-02	4.7732E-02	4.7737E-02	5.270E-02
CO-60		1.3404E+00	1.3409E+00	1.1492E-01	1.3765E-01	

Sr-85	#A	-1.2915E-02	-1.3068E-02	4.6524E-02	4.6530E-02	5.146E-02
Kr-85	#A	-3.1806E+02	-3.1807E+02	1.2033E+03	1.2034E+03	1.191E+03
Y-88	#B	8.8939E-04	8.9577E-04	2.7033E-02	2.7033E-02	3.536E-02
NB-94	#B	1.6637E-02	1.6637E-02	5.8627E-02	5.8634E-02	6.594E-02
Ag-108M	#B	1.6841E-02	1.6841E-02	5.5202E-02	5.5210E-02	6.194E-02
CD-109	#A	-1.0722E-01	-1.0740E-01	1.3981E+00	1.3982E+00	1.453E+00
SN-113	#B	5.6260E-03	5.6633E-03	6.1218E-02	6.1219E-02	6.875E-02
SB-125	#B	8.3968E-02	8.4031E-02	1.0299E-01	1.0310E-01	1.593E-01
I-131	#B	8.6368E-03	9.4947E-03	5.1793E-02	5.1796E-02	5.290E-02
CS-134	#B	-9.0191E-04	-9.0283E-04	2.0737E-01	2.0737E-01	5.986E-02
CS-137	#	1.7055E-01	1.7056E-01	1.0680E-01	1.0724E-01	
CE-139	#A	-1.4647E-02	-1.4728E-02	4.6862E-02	4.6869E-02	5.080E-02
EU-152	#B	-3.9968E-02	-3.9975E-02	1.4885E-01	1.4887E-01	1.591E-01
EU-154	#B	-3.0998E-02	-3.1006E-02	9.8901E-02	9.8916E-02	1.053E-01
EU-155	#B	2.0265E-03	2.0273E-03	1.3360E-01	1.3360E-01	1.490E-01
HG-203	#B	8.3092E-03	8.4462E-03	4.7129E-02	4.7131E-02	5.183E-02
TL-208		2.8372E-01	2.8372E-01	7.6492E-02	7.8153E-02	
PB-212		7.1660E-01	7.1660E-01	9.5065E-02	1.0333E-01	
PB-214		4.2193E-01	4.2193E-01	1.3310E-01	1.3521E-01	
BI-212	A	3.6767E-01	3.6767E-01	3.7359E-01	3.7416E-01	
BI-214		3.7544E-01	3.7544E-01	1.1530E-01	1.1724E-01	
RA-224	#A	9.2534E-01	9.2534E-01	1.2025E+00	1.2037E+00	1.311E+00
RA-226	#A	1.0985E+00	1.0985E+00	1.1542E+00	1.1559E+00	1.249E+00
AC-228	#	7.8163E-01	7.8163E-01	2.6415E-01	2.6782E-01	
TH-227	#B	-2.8340E-01	-2.8340E-01	4.4904E-01	4.4932E-01	4.872E-01
PA-234	#B	-2.3266E-03	-2.3266E-03	1.6749E-01	1.6749E-01	1.868E-01
TH-234	#B	8.2269E-01	8.2269E-01	9.9183E-01	9.9288E-01	2.199E+00
AM-241	#A	3.6867E-02	3.6867E-02	2.6561E-01	2.6562E-01	2.954E-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 (270.1 to 1999.1 keV) 1.8602102E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.8602646E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_18NOV2005_1108.An1

Sample description
NOL-05-02-013-C

Spectrum Filename: C:\GammaVision\Spectra\101_18NOV2005_1108.An1

Acquisition information
Start time: 18-Nov-2005 11:09:19
Live time: 2000
Real time: 2003
Dead time: 0.14 %
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/channel^2

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: 2.3970E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.3970E+03) =
4.1719E+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	17-Nov-2005 09:07:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1984

***** 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
74.31	158.	23.99	1.00	1.651E-02				
74.31	158.	23.99	1.00	1.651E-02	74.81	9.600	PBC<MDA	PB212
77.25	359.	10.34	1.01	1.735E-02	77.11	10.700	1.088E+00	PB214
					77.11	17.500	6.721E-01	PB212
92.85	137.	33.80	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.98	123.	38.09	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					98.44	25.100	PBC<MDA	PA234
186.12	126.	30.02	1.43	1.858E-02	185.99	3.280	1.165E+00	RA226
209.47	94.	35.05	1.23	1.721E-02				
238.75	880.	4.10	1.12	1.557E-02	238.63	43.100	7.340E-01	PB212
241.70	131.	19.58	1.12	1.541E-02	241.00	3.900	1.224E+00	RA224
					241.92	7.470	PBC<MDA	PB214
270.38	84.	21.91	1.14	1.400E-02				
294.89	193.	14.43	1.16	1.293E-02				
294.89	193.	14.43	1.16	1.293E-02	295.22	19.200	4.346E-01	PB214
300.75	74.	29.79	1.31	1.270E-02				
338.71	172.	14.07	1.20	1.134E-02	338.40	12.010	7.044E-01	AC228
351.93	303.	9.56	1.46	1.093E-02				
351.93	303.	9.56	1.46	1.093E-02	351.99	37.100	4.183E-01	PB214
463.01	90.	19.95	1.59	8.350E-03				
463.01	90.	19.95	1.59	8.350E-03	463.51	10.000	6.010E-01	SB125
510.73	96.	19.61	1.17	7.590E-03	510.72	22.500	2.633E-01	TL208
583.05	265.	9.04	1.26	6.685E-03	583.14	86.000	2.578E-01	TL208
609.28	255.	8.33	1.25	6.413E-03	609.32	46.090	4.851E-01	BI214
662.14	65.	27.90	1.68	5.933E-03	661.62	84.620	7.240E-02	CS137

726.73	65.	29.88	1.47	5.446E-03	727.17	11.800	5.629E-01	BI212
794.68	30.	34.82	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134
910.98	157.	13.73	1.74	4.447E-03	911.07	29.000	6.791E-01	AC228
968.81	128.	15.23	1.00	4.212E-03	968.90	17.460	9.757E-01	AC228
1120.87	62.	25.27	1.40	3.709E-03	1120.28	15.040	6.204E-01	BI214
1332.57	26.	33.81	1.85	3.190E-03	1332.51	99.980	PBC<MDA	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.54	795.	3.63	1.85	2.943E-03	1460.75	10.700	1.420E+01	K40
1764.04	46.	14.74	2.23	2.481E-03	1764.51	15.920	6.502E-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	
148.19	74.72	635.	158.	0.079	71.98	1.004	BI-207	D
154.07	77.65	509.	359.	0.179	31.02	1.007	PB-214	D
418.61	209.47	413.	94.	0.047	105.14	1.229	AC-228	
477.21	238.76	213.	880.	0.440	12.31	1.122	PB-212	D
483.10	241.71	266.	131.	0.066	58.73	1.124	PB-214	D
540.35	270.31	203.	95.	0.048	74.68	1.064	AC-228	
601.25	300.75	181.	74.	0.037	84.28	1.312	PB-212	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	149.24	74.84	1396.	184.	0.092	86.19	1.499s
PB-214	153.79	77.11	1225.	391.	0.195	40.49	1.499D
PB-212	153.79	77.11	1221.	395.	0.197	40.49	1.499D
TH-234	185.27	92.85	1185.	137.	0.068	101.39	1.499s
TH-234	185.54	92.98	1151.	123.	0.061	114.26	1.499s
RA-226	371.61	185.98	613.	105.	0.052	104.29	1.499s
PB-212	477.14	238.72	554.	706.	0.353	17.90	1.499
RA-224	483.10	241.70	653.	98.	0.049	113.73	1.499
PB-214	590.40	295.32	255.	166.	0.083	46.35	1.499s
AC-228	677.20	338.71	169.	170.	0.085	42.20	1.196s
PB-214	703.88	352.04	147.	271.	0.135	26.10	1.499s
SB-125	926.03	463.07	91.	74.	0.037	63.58	1.499s
TL-208	1021.40	510.73	111.	80.	0.040	58.82	1.170s
TL-208	1166.11	583.05	99.	263.	0.131	27.12	1.257
BI-214	1218.60	609.28	63.	254.	0.127	24.99	1.254
CS-137	1324.37	662.14	84.	65.	0.032	83.70	1.675
BI-212	1453.62	726.73	92.	64.	0.032	89.64	1.467
CS-134	1589.59	794.68	42.	30.	0.015	104.45	1.502s
AC-228	1822.30	910.98	88.	155.	0.078	41.20	1.745s
AC-228	1938.04	968.81	64.	127.	0.064	45.69	0.997s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2242.34	1120.87	56.	61.	0.031	75.82	1.401
CO-60	2665.99	1332.57	26.	26.	0.013	101.42	1.846
K-40	2922.10	1460.54	12.	793.	0.397	10.90	1.854s
BI-214	3529.51	1764.04	0.	46.	0.023	44.23	2.232

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.3441E-01					
			477.56	1.344E-01	%(	2.990E-01 9.04E-02	G
K-40		1.4202E+01					
			1460.75	1.420E+01	@(P	3.361E-01 5.18E-01	G
MN-54		-1.6423E-02					
			834.81	-1.642E-02	&(P	5.461E-02 1.62E-02	G
CO-57		-7.3491E-03					
			122.07	-7.349E-03	%(	4.722E-02 1.42E-02	G K
			136.43	1.021E-01	&	3.733E-01 1.12E-01	G
CO-60		4.5775E-02					
			1332.51	4.578E-02	(P	4.652E-02 1.55E-02	G K
			1173.23	3.682E-02	% P	6.821E-02 2.08E-02	G K
Sr-85		-1.1482E-02					
			514.00	-1.148E-02	%(	4.604E-02 1.37E-02	G
Kr-85		-2.8271E+02					
			513.99	-2.827E+02	%(P	1.055E+03 3.12E+02	G
Y-88		6.5000E-03					
			1836.01	6.500E-03	%(	3.142E-02 8.53E-03	G K
			898.02	7.273E-03	% P	3.995E-02 1.14E-02	G
NB-94		2.8744E-04					
			871.10	2.874E-04	&(P	4.265E-02 1.19E-02	G K
			702.50	5.133E-03	& P	4.440E-02 1.28E-02	G K
Ag-108M		-1.0405E-02					
			722.95	-1.041E-02	%(	5.128E-02 1.50E-02	G K
			614.37	-1.827E-02	% P	4.505E-02 1.35E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	0.000E+00	%	4.416E-02	1.28E-02	G
CD-109	-3.6147E-03						
		88.04	-3.615E-03	%(P	1.333E+00	3.98E-01	G
SN-113	9.5665E-04						
		391.71	9.566E-04	&(	5.474E-02	1.59E-02	G K
		255.04	2.720E-01	% P	1.698E+00	5.05E-01	G
SB-125	1.3821E-01						
		427.95	1.638E-02	%(P	1.248E-01	3.66E-02	G K
		600.77	-2.384E-02	& P	1.993E-01	5.75E-02	G
		636.15	1.642E-01	% P	2.946E-01	9.03E-02	G
		463.51	4.988E-01	*(P	3.187E-01	1.08E-01	G
		176.29	4.585E-03	% P	5.678E-01	1.68E-01	G
I-131	-2.5115E-03						
		364.48	-2.512E-03	%(	4.453E-02	1.30E-02	G K
		636.97	1.986E-01	%	4.899E-01	1.47E-01	G
		284.29	2.453E-01	&	5.714E-01	1.73E-01	G
CS-134	1.6835E-02						
		604.66	-3.412E-03	%(P	8.823E-02	2.61E-02	G K
		795.76	3.997E-02	*(P	4.354E-02	1.41E-02	G
		569.29	5.580E-03	% P	2.397E-01	6.85E-02	G
		801.84	0.000E+00	%	5.199E-01	1.47E-01	G
CS-137	7.2397E-02						
		661.62	7.240E-02	(P	5.111E-02	2.05E-02	G
CE-139	1.4127E-03						
		165.85	1.413E-03	%(P	4.656E-02	1.39E-02	G
EU-152	-1.6967E-04						
		121.78	-1.697E-04	%(P	1.116E-01	3.31E-02	G K
		344.30	-3.747E-02	% P	1.279E-01	3.81E-02	G
		1408.08	2.887E-02	% P	1.864E-01	5.17E-02	G
		964.00	-4.417E-03	% P	3.917E-01	1.11E-01	G
		1112.07	7.061E-02	% P	3.832E-01	1.11E-01	G
		778.90	4.213E-02	% P	2.892E-01	8.29E-02	G
EU-154	-1.8917E-02						
		123.10	-1.892E-02	%(P	9.011E-02	2.70E-02	G K
		1274.80	3.594E-02	& P	1.573E-01	4.57E-02	G
		723.30	-1.903E-03	& P	3.479E-01	1.01E-01	G
		1004.80	-3.585E-02	% P	2.589E-01	7.40E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-2.1537E-03						
		86.45	-2.154E-03	%(	1.568E-01	4.69E-02	G K
		105.31	3.772E-02	&	1.716E-01	5.15E-02	G
HG-203	-3.8854E-03						
		279.17	-3.885E-03	&(	4.239E-02	1.25E-02	G K
		72.87	-2.814E-01	& P	1.090E+00	3.28E-01	G
		70.83	-6.093E-01	%	1.817E+00	5.48E-01	G
		82.50	-1.017E+00	%	2.289E+00	6.94E-01	G
TL-208	2.5891E-01						
		583.14	2.578E-01	(P	4.817E-02	2.35E-02	G
		510.72	2.633E-01	*(P	1.712E-01	6.20E-02	G
PB-212	6.0435E-01						
		238.63	5.931E-01	(P	9.437E-02	3.57E-02	G K
							Energy duplication
		77.11	7.390E-01	+	3.100E-01	9.97E-02	G
		74.81	6.549E-01	&(P	6.277E-01	1.94E-01	G
PB-214	3.7735E-01						
		351.99	3.769E-01	(P	8.249E-02	3.30E-02	G K
		295.22	3.782E-01	@(P	1.754E-01	5.91E-02	G
							Energy duplication
		77.11	1.197E+00	+ P	5.078E-01	1.63E-01	G
		241.92	-2.305E-02	% P	6.893E-01	2.05E-01	G
BI-212	5.6285E-01						
		727.17	5.629E-01	(P	4.159E-01	1.70E-01	G K
		1620.56	3.609E-01	%	1.132E+00	3.26E-01	G
		785.42	3.164E-01	% P	1.870E+00	5.38E-01	G
BI-214	4.8505E-01						
		609.32	4.851E-01	(P	7.556E-02	4.06E-02	G K
		1764.51	6.502E-01	+ P	1.052E-01	9.68E-02	G
		1120.28	6.204E-01	+ P	3.783E-01	1.58E-01	G
RA-224	9.1830E-01						
		241.00	9.183E-01	(P	1.140E+00	3.51E-01	G
RA-226	9.7092E-01						
		185.99	9.709E-01	(	1.093E+00	3.38E-01	G
AC-228	6.8653E-01						
		911.07	6.791E-01	@(P	2.026E-01	9.44E-02	G K
		968.90	9.757E-01	+ P	3.059E-01	1.49E-01	G
		338.40	7.044E-01	@(P	2.615E-01	1.00E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -8.7703E-02
                          236.00-8.770E-02 &(P 4.029E-01 1.21E-01 G K
                          256.25 8.178E-02 % P 5.025E-01 1.49E-01 G

PA-234      -1.5823E-02
                           98.44-1.582E-02 %(  1.283E-01 3.82E-02 G K
                          946.00 2.865E-02 &   1.922E-01 5.47E-02 G
                          131.28-6.746E-02 %   2.064E-01 6.23E-02 G
                           94.67-9.231E-02 %   2.942E-01 8.88E-02 G
                          883.24 1.101E-01 %   2.879E-01 8.58E-02 G
                          926.70 1.136E-01 &   3.263E-01 9.65E-02 G
                          569.26 1.118E-02 %   3.406E-01 9.73E-02 G

TH-234       9.9746E-01
                           63.29 5.314E-01 %(P 1.946E+00 5.85E-01 G K
                           92.80 1.161E+00  (P 1.519E+00 4.65E-01 G
                           92.38 1.513E+00  (P 1.803E+00 5.52E-01 G

AM-241       5.9699E-02
                           59.54 5.970E-02 &(P 2.244E-01 6.74E-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 - 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	1.3253E-01	1.3441E-01	2.7110E-01	2.7120E-01	2.949E-01
K-40	#	1.4202E+01	1.4202E+01	1.5529E+00	1.7480E+00	
MN-54	#A	-1.6384E-02	-1.6423E-02	5.1467E-02	5.1476E-02	5.448E-02
CO-57	#B	-7.3287E-03	-7.3491E-03	4.2467E-02	4.2469E-02	4.709E-02
CO-60	#B	4.5757E-02	4.5775E-02	4.6579E-02	4.6650E-02	4.651E-02
Sr-85	#A	-1.1349E-02	-1.1482E-02	4.1011E-02	4.1016E-02	4.551E-02
Kr-85	#A	-2.8271E+02	-2.8271E+02	1.0818E+03	1.0820E+03	1.055E+03
Y-88	#B	6.4543E-03	6.5000E-03	2.5603E-02	2.5605E-02	3.120E-02
NB-94	#B	2.8744E-04	2.8744E-04	3.5844E-02	3.5844E-02	4.265E-02
Ag-108M	#B	-1.0405E-02	-1.0405E-02	4.5079E-02	4.5083E-02	5.128E-02
CD-109	#A	-3.6087E-03	-3.6147E-03	1.1195E+00	1.1195E+00	1.330E+00
SN-113	#B	9.5042E-04	9.5665E-04	4.7704E-02	4.7704E-02	5.439E-02
SB-125	#F	1.3810E-01	1.3821E-01	8.9592E-02	8.9932E-02	1.248E-01
I-131	#B	-2.2872E-03	-2.5115E-03	3.8976E-02	3.8976E-02	4.056E-02
CS-134	#B	1.6818E-02	1.6835E-02	1.7826E-02	1.7852E-02	8.815E-02
CS-137		7.2392E-02	7.2397E-02	6.1425E-02	6.1561E-02	
CE-139	#A	1.4050E-03	1.4127E-03	4.1551E-02	4.1551E-02	4.630E-02
EU-152	#B	-1.6964E-04	-1.6967E-04	1.6111E-01	1.6111E-01	1.116E-01
EU-154	#B	-1.8912E-02	-1.8917E-02	8.6361E-02	8.6367E-02	9.008E-02
EU-155	#B	-2.1528E-03	-2.1537E-03	1.4063E-01	1.4063E-01	1.568E-01
HG-203	#B	-3.8232E-03	-3.8854E-03	3.7557E-02	3.7558E-02	4.171E-02
TL-208		2.5891E-01	2.5891E-01	7.0863E-02	7.2358E-02	
PB-212	#	6.0435E-01	6.0435E-01	1.0915E-01	1.1437E-01	9.437E-02
PB-214	#	3.7735E-01	3.7735E-01	9.9214E-02	1.0148E-01	8.249E-02
BI-212		5.6285E-01	5.6285E-01	5.0986E-01	5.1085E-01	
BI-214		4.8505E-01	4.8505E-01	1.2173E-01	1.2478E-01	
RA-224	#A	9.1830E-01	9.1830E-01	1.0520E+00	1.0532E+00	1.140E+00
RA-226	#A	9.7092E-01	9.7092E-01	1.0126E+00	1.0141E+00	1.093E+00
AC-228		6.8653E-01	6.8653E-01	2.0496E-01	2.0860E-01	
TH-227	#B	-8.7703E-02	-8.7703E-02	3.7397E-01	3.7400E-01	4.029E-01
PA-234	#B	-1.5823E-02	-1.5823E-02	1.1475E-01	1.1475E-01	1.283E-01
TH-234	#B	9.9746E-01	9.9746E-01	1.0915E+00	1.0929E+00	1.946E+00
AM-241	#A	5.9698E-02	5.9699E-02	2.0217E-01	2.0219E-01	2.244E-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 (270.1 to 1999.1 keV) 1.6267570E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.6267574E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_18NOV2005_1146.An1

Sample description
NOL-05-02-001-C

Spectrum Filename: C:\GammaVision\Spectra\101_18NOV2005_1146.An1

Acquisition information
Start time: 18-Nov-2005 11:47:57
Live time: 2000
Real time: 2003
Dead time: 0.13 %
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/channel^2

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: 1.9520E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9520E+03) =
5.1230E+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	17-Nov-2005 09:17:00
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: 0.1561

***** 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
74.38	154.	22.75	1.00	1.651E-02				
74.38	154.	22.75	1.00	1.651E-02	74.81	9.600	PBC<MDA	PB212
77.17	351.	9.55	1.01	1.731E-02	77.11	10.700	1.304E+00	PB214
					77.11	17.500	8.061E-01	PB212
92.96	129.	32.08	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.96	137.	30.92	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.17	65.	39.96	0.75	2.109E-02				
154.45	89.	40.98	1.13	2.028E-02				
186.09	108.	29.77	1.12	1.858E-02	185.99	3.280	1.231E+00	RA226
208.66	132.	26.77	1.06	1.725E-02				
238.76	819.	4.09	1.12	1.557E-02	238.63	43.100	8.385E-01	PB212
241.71	134.	17.37	1.12	1.541E-02	241.00	3.900	1.535E+00	RA224
					241.92	7.470	8.039E-01	PB214
270.42	101.	25.50	1.39	1.400E-02				
295.13	129.	15.98	1.08	1.292E-02				
295.13	129.	15.98	1.08	1.292E-02	295.22	19.200	3.562E-01	PB214
300.22	49.	40.31	1.21	1.272E-02				
328.04	62.	35.54	1.24	1.169E-02				
338.37	154.	15.43	1.14	1.135E-02	338.40	12.010	7.695E-01	AC228
351.99	242.	11.79	1.48	1.092E-02				
351.99	242.	11.79	1.48	1.092E-02	351.99	37.100	4.103E-01	PB214
462.90	51.	28.02	1.32	8.352E-03				
462.90	51.	28.02	1.32	8.352E-03	463.51	10.000	4.082E-01	SB125
510.96	132.	16.48	1.44	7.587E-03	510.72	22.500	4.709E-01	TL208
583.09	263.	8.10	1.38	6.685E-03	583.14	86.000	3.134E-01	TL208

609.39	177.	12.35	1.10	6.412E-03	609.32	46.090	4.125E-01	BI214
661.75	28.	40.17	1.50	5.937E-03	661.62	84.620	PBC<MDA	CS137
727.52	89.	23.90	1.34	5.441E-03	727.17	11.800	9.499E-01	BI212
785.92	30.	38.80	1.93	5.075E-03	785.42	2.000	PBC<MDA	BI212
794.68	24.	35.67	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134
911.07	149.	10.23	1.87	4.446E-03	911.07	29.000	7.899E-01	AC228
968.41	127.	18.35	1.34	4.214E-03	964.00	14.580	1.423E+00	EU152
					968.90	17.460	1.191E+00	AC228
1120.54	47.	22.94	1.77	3.711E-03	1120.28	15.040	5.845E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.58	552.	4.30	1.89	2.943E-03	1460.75	10.700	1.209E+01	K40
1764.91	30.	18.26	0.83	2.481E-03	1764.51	15.920	5.181E-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	
148.33	74.72	540.	154.	0.077	68.26	1.005	BI-207	D
153.91	77.51	385.	351.	0.175	28.65	1.007	PB-214	D
257.94	129.17	322.	84.	0.042	96.09	0.747	AC-228	
308.54	154.45	512.	89.	0.044	122.94	1.128	XE-138	
416.99	208.66	415.	132.	0.066	80.30	1.055	LU-177	s
477.22	238.77	152.	819.	0.410	12.28	1.122	PB-212	D
483.13	241.72	205.	134.	0.067	52.10	1.124	PB-214	D
540.56	270.42	214.	101.	0.050	76.50	1.387	AC-228	s
600.18	300.22	152.	49.	0.024	116.13	1.215	PB-212	
655.86	328.04	166.	62.	0.031	106.62	1.236	AC-228	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	149.14	74.78	1192.	169.	0.084	87.09	1.499s
PB-214	153.79	77.11	1102.	263.	0.131	55.84	1.499D
PB-212	153.79	77.11	1098.	267.	0.133	55.84	1.499D
TH-234	185.50	92.96	946.	129.	0.064	96.23	1.499s
TH-234	185.50	92.96	919.	137.	0.069	92.77	1.499s
RA-226	371.92	186.13	521.	88.	0.044	114.22	1.499
PB-212	477.09	238.70	432.	635.	0.317	18.08	1.499
RA-224	483.03	241.67	491.	113.	0.056	87.52	1.499s
PB-214	590.16	295.21	169.	135.	0.067	47.73	1.499
AC-228	676.52	338.37	153.	152.	0.076	46.28	1.142
PB-214	703.78	351.99	157.	214.	0.107	31.85	1.499D
SB-125	925.69	462.90	85.	54.	0.027	80.83	1.499s
TL-208	1021.87	510.96	117.	116.	0.058	49.45	1.437s
TL-208	1166.19	583.09	62.	260.	0.130	24.31	1.379s
BI-214	1218.81	609.39	90.	176.	0.088	37.06	1.097s
CS-137	1323.58	661.75	53.	28.	0.014	120.50	1.499
BI-212	1455.19	727.52	96.	88.	0.044	71.71	1.339s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	1572.05	785.92	36.	30.	0.015	116.40	1.928s
CS-134	1589.59	794.68	26.	24.	0.012	107.02	1.502s
AC-228	1822.49	911.07	34.	147.	0.074	30.68	1.869
AC-228	1937.23	968.41	90.	126.	0.063	55.04	1.343
BI-214	2241.66	1120.54	29.	47.	0.024	68.82	1.766
K-40	2922.18	1460.58	5.	550.	0.275	12.90	1.888
BI-214	3531.26	1764.91	0.	30.	0.015	54.77	0.833s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-1.1530E-01					
			477.56	-1.153E-01	%(	4.023E-01 1.19E-01	G
K-40		1.2090E+01					
			1460.75	1.209E+01	(P	2.928E-01 5.22E-01	G
MN-54		-1.2536E-03					
			834.81	-1.254E-03	%(P	4.734E-02 1.31E-02	G
CO-57		-9.6688E-03					
			122.07	-9.669E-03	%(	5.163E-02 1.55E-02	G K
			136.43	1.149E-01	%	3.988E-01 1.20E-01	G
CO-60		3.4455E-02					
			1332.51	3.445E-02	%(P	4.901E-02 1.57E-02	G K
			1173.23	3.557E-02	% P	5.916E-02 1.83E-02	G K
Sr-85		-1.9566E-02					
			514.00	-1.957E-02	%(	5.943E-02 1.78E-02	G
Kr-85		-4.7168E+02					
			513.99	-4.717E+02	%(P	1.360E+03 4.06E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	7.843E-02 2.14E-02	G K
			898.02	-2.128E-03	% P	6.614E-02 1.88E-02	G
NB-94		-3.4624E-03					
			871.10	-3.462E-03	%(P	4.099E-02 1.14E-02	G K
			702.50	8.185E-03	% P	4.689E-02 1.36E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.9728E-02						
		722.95	-1.973E-02	%(	6.635E-02	1.97E-02	G K
		614.37	-9.900E-03	% P	5.070E-02	1.48E-02	G
		433.93	6.883E-03	%	4.046E-02	1.18E-02	G
CD-109	5.1020E-01						
		88.04	5.102E-01	&(P	1.388E+00	4.19E-01	G
SN-113	5.4492E-03						
		391.71	5.449E-03	%(	6.098E-02	1.78E-02	G K
		255.04	-1.489E-01	& P	1.957E+00	5.78E-01	G
SB-125	1.2796E-01						
		427.95	2.015E-02	&(P	1.387E-01	4.06E-02	G K
		600.77	7.249E-02	& P	1.852E-01	5.53E-02	G
		636.15	-7.800E-02	& P	3.475E-01	1.01E-01	G
		463.51	4.471E-01	(P	3.787E-01	1.24E-01	G
		176.29	7.965E-02	% P	6.550E-01	1.95E-01	G
I-131	-7.0363E-03						
		364.48	-7.036E-03	&(	5.506E-02	1.62E-02	G K
		636.97	2.430E-01	%	6.523E-01	1.95E-01	G
		284.29	3.505E-01	%	5.390E-01	1.66E-01	G
CS-134	7.4285E-03						
		604.66	-2.009E-02	%(P	5.638E-02	1.68E-02	G K
		795.76	3.888E-02	*(P	4.299E-02	1.41E-02	G
		569.29	2.352E-02	% P	2.572E-01	7.36E-02	G
		801.84	-1.237E-01	%	5.497E-01	1.60E-01	G
CS-137	3.8491E-02						
		661.62	3.849E-02	(P	5.069E-02	1.60E-02	G
CE-139	3.2440E-03						
		165.85	3.244E-03	%(P	5.278E-02	1.57E-02	G
EU-152	-3.2718E-02						
		121.78	-3.272E-02	%(P	1.513E-01	4.54E-02	G K
		344.30	-2.308E-02	% P	1.530E-01	4.50E-02	G
		1408.08	4.013E-02	% P	1.582E-01	4.41E-02	G
		964.00	2.293E-02	& P	4.940E-01	1.41E-01	G
		1112.07	-2.047E-02	% P	4.403E-01	1.23E-01	G
		778.90	1.480E-01	% P	3.075E-01	9.33E-02	G
EU-154	-2.4615E-03						
		123.10	-2.462E-03	%(P	1.030E-01	3.06E-02	G K
		1274.80	3.716E-02	% P	1.549E-01	4.47E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-9.548E-02	% P	3.078E-01	9.13E-02	G
		1004.80	1.069E-01	% P	3.111E-01	9.22E-02	G
EU-155	-9.4902E-04						
		86.45	-9.490E-04	%(	1.431E-01	4.25E-02	G K
		105.31	5.336E-02	%	2.116E-01	6.36E-02	G
HG-203	-4.0950E-03						
		279.17	-4.095E-03	&(	5.066E-02	1.49E-02	G K
		72.87	-5.122E-01	% P	1.260E+00	3.81E-01	G
		70.83	-8.105E-01	%	2.066E+00	6.25E-01	G
		82.50	1.551E-01	%	2.533E+00	7.57E-01	G
TL-208	3.1338E-01						
		583.14	3.134E-01	@(P	4.737E-02	2.56E-02	G
		510.72	4.709E-01	+ P	2.152E-01	8.83E-02	G
PB-212	6.5545E-01						
		238.63	6.549E-01	(P	1.027E-01	3.99E-02	G K
							Energy duplication
		77.11	6.131E-01	@(	3.613E-01	1.14E-01	G
		74.81	7.352E-01	&(P	7.134E-01	2.20E-01	G
PB-214	3.6882E-01						
							Energy duplication
		351.99	3.653E-01	(P	1.042E-01	3.91E-02	G K
		295.22	3.757E-01	(P	1.767E-01	6.06E-02	G
							Energy duplication
		77.11	9.887E-01	+ P	5.919E-01	1.87E-01	G
		241.92	3.604E-01	% P	6.921E-01	2.10E-01	G
BI-212	9.4986E-01						
		727.17	9.499E-01	*(P	5.210E-01	2.29E-01	G K
		1620.56	0.000E+00	&	2.397E+00	6.50E-01	G
		785.42	2.023E+00	+ P	2.101E+00	7.92E-01	G
BI-214	4.6786E-01						
		609.32	4.125E-01	@(P	1.098E-01	5.13E-02	G K
		1764.51	5.181E-01	(P	1.292E-01	9.60E-02	G
		1120.28	5.845E-01	(P	3.443E-01	1.35E-01	G
RA-224	1.2941E+00						
		241.00	1.294E+00	(P	1.217E+00	3.80E-01	G
RA-226	1.0028E+00						
		185.99	1.003E+00	(	1.239E+00	3.82E-01	G
AC-228	7.8394E-01						
		911.07	7.899E-01	(P	1.601E-01	8.18E-02	G K
		968.90	1.191E+00	+ P	4.405E-01	2.20E-01	G
		338.40	7.695E-01	(P	3.070E-01	1.20E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.0381E-01
                          236.00-2.038E-01 &(P 4.665E-01 1.41E-01 G K
                          256.25 3.016E-02 & P 5.826E-01 1.72E-01 G

PA-234      -2.3776E-02
                           98.44-2.378E-02 %(  1.930E-01 5.77E-02 G K
                          946.00 5.989E-02 &   2.468E-01 7.17E-02 G
                          131.28-7.808E-02 %   2.232E-01 6.73E-02 G
                           94.67-8.734E-02 %   3.408E-01 1.03E-01 G
                          883.24 1.267E-02 %   2.429E-01 6.46E-02 G
                          926.70-6.972E-02 %   4.385E-01 1.25E-01 G
                          569.26 3.918E-02 %   3.799E-01 1.09E-01 G

TH-234       1.1146E+00
                           63.29 3.286E-01 %(P 2.238E+00 6.68E-01 G K
                           92.80 1.592E+00 @(P 1.670E+00 5.15E-01 G
                           92.38 1.750E+00 @(P 1.982E+00 6.08E-01 G

AM-241      -8.6391E-03
                           59.54-8.639E-03 &(P 3.010E-01 8.95E-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 - 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	-1.1366E-01	-1.1530E-01	3.5789E-01	3.5795E-01	3.965E-01
K-40		1.2090E+01	1.2090E+01	1.5658E+00	1.7083E+00	
MN-54	#A	-1.2505E-03	-1.2536E-03	1.1268E-01	1.1268E-01	4.722E-02
CO-57	#B	-9.6414E-03	-9.6688E-03	4.6419E-02	4.6422E-02	5.148E-02
CO-60	#B	3.4441E-02	3.4455E-02	4.7021E-02	4.7061E-02	4.899E-02
Sr-85	#A	-1.9337E-02	-1.9566E-02	5.3362E-02	5.3373E-02	5.873E-02
Kr-85	#A	-4.7168E+02	-4.7168E+02	1.3544E+03	1.3546E+03	1.360E+03
Y-88	#B	0.0000E+00	0.0000E+00	6.4164E-02	6.4164E-02	7.787E-02
NB-94	#B	-3.4624E-03	-3.4624E-03	3.8376E-02	3.8376E-02	4.099E-02
Ag-108M	#B	-1.9728E-02	-1.9728E-02	5.9094E-02	5.9105E-02	6.635E-02
CD-109	#A	5.0933E-01	5.1020E-01	1.2579E+00	1.2582E+00	1.386E+00
SN-113	#B	5.4131E-03	5.4492E-03	5.3306E-02	5.3306E-02	6.058E-02
SB-125	#B	1.2787E-01	1.2796E-01	1.0621E-01	1.0646E-01	1.386E-01
I-131	#B	-6.3970E-03	-7.0363E-03	4.8519E-02	4.8521E-02	5.006E-02
CS-134	#B	7.4210E-03	7.4285E-03	8.0881E-03	8.0990E-03	5.633E-02
CS-137	#A	3.8488E-02	3.8491E-02	4.7851E-02	4.7900E-02	5.068E-02
CE-139	#A	3.2260E-03	3.2440E-03	4.7094E-02	4.7095E-02	5.249E-02
EU-152	#B	-3.2713E-02	-3.2718E-02	1.4364E-01	1.4365E-01	1.513E-01
EU-154	#B	-2.4609E-03	-2.4615E-03	1.7057E-01	1.7057E-01	1.030E-01
EU-155	#B	-9.4862E-04	-9.4902E-04	1.2758E-01	1.2758E-01	1.430E-01
HG-203	#B	-4.0283E-03	-4.0950E-03	4.4818E-02	4.4819E-02	4.983E-02
TL-208	#	3.1338E-01	3.1338E-01	7.6867E-02	7.8880E-02	
PB-212	#	6.5545E-01	6.5545E-01	1.1967E-01	1.2527E-01	1.027E-01
PB-214	#	3.6882E-01	3.6882E-01	1.0708E-01	1.0909E-01	1.042E-01
BI-212		9.4986E-01	9.4986E-01	6.8639E-01	6.8848E-01	
BI-214		4.6786E-01	4.6786E-01	1.5035E-01	1.5265E-01	
RA-224	#	1.2941E+00	1.2941E+00	1.1397E+00	1.1421E+00	1.217E+00
RA-226	#A	1.0028E+00	1.0028E+00	1.1454E+00	1.1468E+00	1.239E+00
AC-228		7.8394E-01	7.8394E-01	2.2067E-01	2.2507E-01	
TH-227	#B	-2.0381E-01	-2.0381E-01	4.3060E-01	4.3075E-01	4.665E-01
PA-234	#B	-2.3776E-02	-2.3776E-02	1.7317E-01	1.7318E-01	1.930E-01
TH-234	#B	1.1146E+00	1.1146E+00	1.0806E+00	1.0824E+00	2.238E+00
AM-241	#A	-8.6391E-03	-8.6391E-03	4.2859E-01	4.2859E-01	3.010E-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 (270.1 to 1999.1 keV) 1.4604705E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.4604705E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101_18NOV2005_1622.An1

Sample description
NOL-05-02-020-C

Spectrum Filename: C:\GammaVision\Spectra\101_18NOV2005_1622.An1

Acquisition information
Start time: 18-Nov-2005 16:22:41
Live time: 2000
Real time: 2002
Dead time: 0.12 %
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/channel^2

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: 2.5730E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.5730E+03) =
3.8865E+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	17-Nov-2005 08:10:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0756

***** 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
77.05	338.	15.91	1.50	1.720E-02	72.87	6.400	1.767E+00	HG203
					77.11	17.500	5.900E-01	PB212
					77.11	10.700	9.543E-01	PB214
77.05	334.	15.91	1.50	1.720E-02	77.11	17.500	5.835E-01	PB212
					77.11	10.700	9.543E-01	PB214
86.82	102.	34.54	1.01	1.914E-02	86.45	32.740	8.570E-02	EU155
90.02	82.	40.57	1.02	1.957E-02	88.04	3.790	PBC<MDA	CD109
93.04	148.	33.35	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
208.86	115.	36.08	1.39	1.724E-02				
238.72	797.	4.38	1.12	1.557E-02	238.63	43.100	6.189E-01	PB212
242.06	110.	22.93	1.12	1.539E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
295.35	181.	16.75	1.19	1.292E-02	295.22	19.200	3.790E-01	PB214
300.49	66.	40.19	0.74	1.271E-02				
338.29	138.	15.76	1.09	1.135E-02	338.40	12.010	5.248E-01	AC228
351.99	289.	8.72	1.10	1.092E-02				
351.99	289.	8.72	1.10	1.092E-02	351.99	37.100	3.717E-01	PB214
510.59	140.	21.68	2.11	7.592E-03	510.72	22.500	3.809E-01	TL208
583.33	216.	10.08	1.44	6.682E-03	583.14	86.000	1.950E-01	TL208
609.34	236.	9.63	1.32	6.413E-03	609.32	46.090	4.176E-01	BI214
661.59	99.	21.39	2.09	5.938E-03	661.62	84.620	1.030E-01	CS137
727.43	95.	20.43	1.15	5.441E-03	727.17	11.800	7.705E-01	BI212
910.94	158.	14.87	1.42	4.447E-03	911.07	29.000	6.351E-01	AC228
969.11	71.	18.15	1.59	4.211E-03	968.90	17.460	5.012E-01	AC228
1173.22	276.	10.43	1.87	3.565E-03	1173.23	99.860	4.076E-01	CO60
1332.42	223.	8.26	1.67	3.190E-03	1332.51	99.980	3.676E-01	CO60

1460.82	764.	3.65	1.99	2.942E-03	1460.75	10.700	1.271E+01	K40
1764.34	49.	14.29	1.72	2.482E-03	1764.51	15.920	6.456E-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	
173.22	86.77	569.	102.	0.051	103.61	1.013	BI-207	lD
179.62	89.96	510.	82.	0.041	121.72	1.016	PB-214	lD
417.40	208.86	595.	115.	0.058	108.24	1.390	LU-177	s
477.14	238.71	210.	797.	0.399	13.13	1.122	PB-212	D
483.82	242.04	263.	110.	0.055	68.80	1.124	PB-214	D
600.73	300.49	255.	66.	0.033	120.56	0.737	PB-212	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	153.79	77.11	1279.	338.	0.169	47.73	1.499D
PB-214	153.79	77.11	1282.	334.	0.167	47.73	1.499D
TH-234	185.67	93.04	1258.	148.	0.074	100.06	1.499
PB-212	477.20	238.75	635.	636.	0.318	20.37	1.499
PB-214	590.37	295.31	317.	163.	0.081	51.38	1.499
AC-228	676.37	338.29	163.	136.	0.068	47.28	1.091
PB-214	703.78	351.99	165.	272.	0.136	26.81	1.499D
TL-208	1021.12	510.59	216.	124.	0.062	65.05	2.111s
TL-208	1166.66	583.33	98.	213.	0.107	30.23	1.435
BI-214	1218.71	609.34	98.	235.	0.117	28.89	1.316s
CS-137	1323.28	661.59	122.	99.	0.049	64.17	2.092s
BI-212	1455.02	727.43	86.	94.	0.047	61.28	1.150s
AC-228	1822.22	910.94	111.	156.	0.078	44.62	1.419s
AC-228	1938.64	969.11	46.	70.	0.035	54.45	1.591
CO-60	2347.09	1173.22	129.	276.	0.138	31.28	1.868
CO-60	2665.69	1332.42	31.	223.	0.112	24.79	1.673
K-40	2922.65	1460.82	5.	762.	0.381	10.94	1.990
BI-214	3530.12	1764.34	0.	49.	0.024	42.86	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 - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		6.3044E-02					
			477.56	6.304E-02	&(	3.615E-01 1.06E-01	G
K-40		1.2707E+01					
			1460.75	1.271E+01	(P	2.238E-01 4.65E-01	G
MN-54		7.9469E-03					
			834.81	7.947E-03	%(P	5.109E-02 1.49E-02	G
CO-57		8.8578E-03					
			122.07	8.858E-03	%(	4.303E-02 1.29E-02	G K
			136.43	-5.540E-02	%	3.701E-01 1.11E-01	G
CO-60		3.8758E-01					
			1332.51	3.676E-01	(P	4.713E-02 3.04E-02	G K
			1173.23	4.076E-01	(P	8.208E-02 4.25E-02	G K
Sr-85		-1.7129E-02					
			514.00	-1.713E-02	&(	5.169E-02 1.55E-02	G
Kr-85		-4.0917E+02					
			513.99	-4.092E+02	&(P	1.179E+03 3.53E+02	G
Y-88		-1.5685E-03					
			1836.01	-1.569E-03	%(	3.806E-02 9.89E-03	G K
			898.02	-4.916E-05	% P	5.347E-02 1.52E-02	G
NB-94		-8.2495E-04					
			871.10	-8.250E-04	%(P	3.761E-02 1.05E-02	G K
			702.50	-4.155E-05	% P	4.734E-02 1.36E-02	G K
Ag-108M		-5.6098E-03					
			722.95	-5.610E-03	%(	5.077E-02 1.47E-02	G K
			614.37	-2.231E-02	% P	5.158E-02 1.56E-02	G
			433.93	8.361E-04	%	4.010E-02 1.17E-02	G
CD-109		2.1885E-01					
			88.04	2.189E-01	%(P	1.236E+00 3.71E-01	G
SN-113		1.5541E-02					
			391.71	1.554E-02	%(	5.055E-02 1.51E-02	G K
			255.04	-1.382E-01	% P	1.658E+00 4.91E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	2.8813E-02						
		427.95	2.881E-02	%(P	1.154E-01	3.42E-02	G K
		600.77	8.886E-03	% P	1.948E-01	5.58E-02	G
		636.15	-2.651E-03	& P	3.815E-01	1.09E-01	G
		463.51	1.458E-01	% P	3.887E-01	1.17E-01	G
		176.29	3.178E-02	% P	5.541E-01	1.65E-01	G
I-131	-2.2039E-03						
		364.48	-2.204E-03	&(	4.578E-02	1.34E-02	G K
		636.97	1.442E-01	%	6.692E-01	1.97E-01	G
		284.29	5.981E-02	&	6.343E-01	1.88E-01	G
CS-134	1.8525E-02						
		604.66	1.852E-02	%(P	2.810E-02	8.75E-03	G K
		795.76	3.059E-02	% P	4.835E-02	1.50E-02	G
		569.29	1.060E-01	% P	2.488E-01	7.50E-02	G
		801.84	-6.668E-02	%	4.887E-01	1.41E-01	G
CS-137	1.0299E-01						
		661.62	1.030E-01	(P	5.675E-02	2.22E-02	G
CE-139	-9.9460E-03						
		165.85	-9.946E-03	%(P	4.687E-02	1.41E-02	G
EU-152	2.9022E-02						
		121.78	2.902E-02	%(P	1.283E-01	3.85E-02	G K
		344.30	2.550E-02	& P	1.284E-01	3.81E-02	G
		1408.08	9.371E-02	% P	1.578E-01	4.95E-02	G
		964.00	-2.918E-01	& P	5.290E-01	1.61E-01	G
		1112.07	1.596E-01	& P	3.495E-01	1.06E-01	G
		778.90	5.433E-02	% P	3.247E-01	9.43E-02	G
EU-154	2.0900E-02						
		123.10	2.090E-02	%(P	8.474E-02	2.55E-02	G K
		1274.80	-1.003E-02	% P	1.400E-01	3.94E-02	G
		723.30	-5.616E-02	% P	2.229E-01	6.55E-02	G
		1004.80	6.675E-02	% P	2.874E-01	8.41E-02	G
EU-155	1.0565E-01						
		86.45	1.057E-01	%(	1.461E-01	4.47E-02	G K
		105.31	4.056E-04	%	1.795E-01	5.35E-02	G
HG-203	1.0811E-03						
		279.17	1.081E-03	&(	4.159E-02	1.22E-02	G K
		72.87	-3.706E-01	% P	9.297E-01	2.81E-01	G
		70.83	2.750E-01	&	1.690E+00	5.07E-01	G
		82.50	-3.626E-01	%	2.270E+00	6.82E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.9499E-01						
		583.14	1.950E-01	(P	4.453E-02	1.99E-02	G
		510.72	3.809E-01	+ P	2.190E-01	9.33E-02	G
PB-212	5.2410E-01						
		238.63	4.974E-01	(P	9.398E-02	3.41E-02	G K
							Energy duplication
		77.11	5.900E-01	(	2.954E-01	9.39E-02	G
		74.81	3.661E-01	& P	6.178E-01	1.88E-01	G
PB-214	3.4992E-01						
							Energy duplication
		351.99	3.527E-01	(P	8.105E-02	3.17E-02	G K
		295.22	3.446E-01	(P	1.813E-01	5.97E-02	G
							Energy duplication
		77.11	9.543E-01	+ P	4.838E-01	1.54E-01	G
		241.92	-1.911E-03	% P	6.439E-01	1.92E-01	G
BI-212	7.7049E-01						
		727.17	7.705E-01	*(P	3.751E-01	1.59E-01	G K
		1620.56	2.436E-01	%	1.079E+00	3.00E-01	G
		785.42	3.852E-01	% P	2.341E+00	6.82E-01	G
BI-214	4.1758E-01						
		609.32	4.176E-01	@(P	8.679E-02	4.04E-02	G K
		1764.51	6.456E-01	+ P	9.799E-02	9.31E-02	G
		1120.28	2.577E-01	% P	3.696E-01	1.15E-01	G
RA-224	6.2726E-01						
		241.00	6.273E-01	%(P	1.144E+00	3.48E-01	G
RA-226	7.3848E-01						
		185.99	7.385E-01	%(	1.092E+00	3.34E-01	G
AC-228	5.7247E-01						
		911.07	6.351E-01	@(P	2.111E-01	9.56E-02	G K
		968.90	5.012E-01	(P	2.446E-01	9.19E-02	G
		338.40	5.248E-01	(P	2.395E-01	8.40E-02	G
TH-227	-1.5024E-01						
		236.00	-1.502E-01	%(P	3.839E-01	1.16E-01	G K
		256.25	3.828E-02	% P	5.051E-01	1.50E-01	G
PA-234	4.2539E-02						
		98.44	4.254E-02	&(	1.642E-01	4.94E-02	G K
		946.00	-1.370E-03	%	2.655E-01	7.56E-02	G
		131.28	1.327E-03	&	1.892E-01	5.64E-02	G
		94.67	-4.700E-02	%	2.957E-01	8.88E-02	G
		883.24	1.431E-02	&	3.648E-01	1.03E-01	G
		926.70	1.029E-01	&	3.963E-01	1.16E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.604E-01 %   3.679E-01 1.11E-01 G

TH-234       9.7247E-01
                           63.29 7.158E-01 %(P 1.862E+00 5.62E-01 G K
                           92.80 1.306E+00  (P 1.479E+00 4.54E-01 G
                           92.38-3.090E-01 & P 1.840E+00 5.50E-01 G

AM-241       4.0558E-03
                           59.54 4.056E-03 &(P 2.099E-01 6.24E-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 - 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 *****

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	6.1955E-02	6.3044E-02	3.1907E-01	3.1909E-01	3.553E-01
K-40		1.2707E+01	1.2707E+01	1.3941E+00	1.5681E+00	
MN-54	#A	7.9233E-03	7.9469E-03	4.4645E-02	4.4647E-02	5.094E-02
CO-57	#B	8.8273E-03	8.8578E-03	3.8758E-02	3.8761E-02	4.288E-02
CO-60		3.8740E-01	3.8758E-01	7.7380E-02	8.0419E-02	

Sr-85	#A	-1.6885E-02	-1.7129E-02	4.6497E-02	4.6507E-02	5.095E-02
Kr-85	#A	-4.0917E+02	-4.0917E+02	1.1615E+03	1.1617E+03	1.179E+03
Y-88	#B	-1.5549E-03	-1.5685E-03	2.9681E-02	2.9681E-02	3.772E-02
NB-94	#B	-8.2495E-04	-8.2495E-04	4.5654E-02	4.5654E-02	3.761E-02
Ag-108M	#B	-5.6097E-03	-5.6098E-03	4.4212E-02	4.4213E-02	5.076E-02
CD-109	#A	2.1841E-01	2.1885E-01	1.1143E+00	1.1143E+00	1.234E+00
SN-113	#B	1.5416E-02	1.5541E-02	4.5271E-02	4.5280E-02	5.015E-02
SB-125	#B	2.8786E-02	2.8813E-02	1.0264E-01	1.0266E-01	1.153E-01
I-131	#B	-1.9631E-03	-2.2039E-03	4.0158E-02	4.0158E-02	4.078E-02
CS-134	#B	1.8502E-02	1.8525E-02	2.6239E-02	2.6260E-02	2.806E-02
CS-137	#	1.0298E-01	1.0299E-01	6.6681E-02	6.6934E-02	
CE-139	#A	-9.8790E-03	-9.9460E-03	4.3128E-02	4.3132E-02	4.655E-02
EU-152	#B	2.9016E-02	2.9022E-02	1.1561E-01	1.1563E-01	1.282E-01
EU-154	#B	2.0893E-02	2.0900E-02	7.6376E-02	7.6385E-02	8.472E-02
EU-155	#B	1.0560E-01	1.0565E-01	1.3397E-01	1.3410E-01	1.460E-01
HG-203	#B	1.0597E-03	1.0811E-03	3.6736E-02	3.6736E-02	4.077E-02
TL-208		1.9499E-01	1.9499E-01	5.9599E-02	6.0609E-02	
PB-212	#	5.2410E-01	5.2410E-01	1.0779E-01	1.1178E-01	9.398E-02
PB-214	#	3.4992E-01	3.4992E-01	9.4481E-02	9.6527E-02	8.105E-02
BI-212	#	7.7049E-01	7.7049E-01	4.7552E-01	4.7751E-01	
BI-214		4.1758E-01	4.1758E-01	1.2123E-01	1.2350E-01	
RA-224	#A	6.2726E-01	6.2726E-01	1.0437E+00	1.0443E+00	1.144E+00
RA-226	#A	7.3848E-01	7.3848E-01	1.0023E+00	1.0031E+00	1.092E+00
AC-228		5.7247E-01	5.7247E-01	1.6385E-01	1.6701E-01	
TH-227	#B	-1.5024E-01	-1.5024E-01	3.5389E-01	3.5399E-01	3.839E-01
PA-234	#B	4.2539E-02	4.2539E-02	1.4828E-01	1.4830E-01	1.642E-01
TH-234	#B	9.7247E-01	9.7247E-01	1.0136E+00	1.0150E+00	1.862E+00
AM-241	#A	4.0557E-03	4.0558E-03	1.8707E-01	1.8707E-01	2.099E-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 (270.1 to 1999.1 keV) 1.5152502E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.5152699E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_13DEC2005_1346.An1

Sample description
FSS-NOL-05-02-024-F

Spectrum Filename: C:\GammaVision\Spectra\101F_13DEC2005_1346.An1

Acquisition information
Start time: 13-Dec-2005 13:47:48
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/channel^2

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: 2.0900E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0900E+03) =
4.7847E+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	08-Dec-2005 10:43:00
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: 0.0963

***** 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
74.75	200.	24.75	1.50	1.654E-02				
74.75	200.	24.75	1.50	1.654E-02	74.81	9.600	8.139E-01	PB212
77.13	322.	15.02	1.50	1.720E-02	77.11	17.500	6.910E-01	PB212
					77.11	10.700	1.117E+00	PB214
77.13	318.	15.02	1.50	1.720E-02	77.11	17.500	6.830E-01	PB212
					77.11	10.700	1.117E+00	PB214
87.38	82.	38.19	1.01	1.928E-02	86.45	32.740	8.522E-02	EU155
92.97	128.	23.04	1.02	1.994E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.72	96.	38.30	1.42	2.110E-02				
186.05	101.	32.64	1.50	1.858E-02				
186.05	101.	32.64	1.50	1.858E-02	185.99	3.280	PBC<MDA	RA226
208.98	82.	33.49	1.30	1.723E-02				
238.76	752.	4.43	1.12	1.557E-02	238.63	43.100	7.188E-01	PB212
241.58	93.	24.84	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.19	79.	35.29	0.79	1.401E-02				
295.40	147.	15.66	1.18	1.291E-02	295.22	19.200	3.785E-01	PB214
338.80	191.	14.67	1.21	1.134E-02	338.40	12.010	8.956E-01	AC228
352.13	253.	10.18	1.00	1.092E-02	351.99	37.100	4.000E-01	PB214
463.01	66.	28.19	1.90	8.350E-03				
463.01	66.	28.19	1.90	8.350E-03	463.51	10.000	5.029E-01	SB125
511.11	136.	16.89	1.31	7.585E-03	510.72	22.500	4.531E-01	TL208
583.06	271.	8.95	1.42	6.685E-03	583.14	86.000	3.026E-01	TL208
609.39	190.	12.45	1.37	6.412E-03	609.32	46.090	4.134E-01	BI214
661.57	31.	36.84	1.50	5.937E-03	661.62	84.620	PBC<MDA	CS137
727.95	81.	21.69	1.25	5.438E-03	727.17	11.800	8.086E-01	BI212

911.24	163.	11.34	1.42	4.446E-03	911.07	29.000	8.090E-01	AC228
968.37	115.	14.43	1.62	4.214E-03	968.90	17.460	1.008E+00	AC228
1119.78	61.	33.17	0.87	3.711E-03	1120.28	15.040	7.081E-01	BI214
1332.48	30.	28.37	1.62	3.190E-03				
1332.48	30.	28.37	1.62	3.190E-03	1332.51	99.980	6.014E-02	CO60
1460.69	720.	3.93	1.98	2.943E-03	1460.75	10.700	1.473E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.50	39.	16.01	0.92	2.481E-03	1764.51	15.920	6.312E-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	
174.34	87.70	452.	82.	0.041	114.56	1.014	PB-214	lD
257.05	128.72	522.	120.	0.060	85.37	1.423	AC-228	s
417.63	208.98	294.	82.	0.041	100.48	1.300	AC-228	s
477.21	238.75	180.	752.	0.376	13.29	1.122	PB-212	D
482.86	241.57	222.	93.	0.047	74.52	1.124	PB-214	D
540.11	270.19	267.	79.	0.039	105.88	0.790	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

********** 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	149.08	74.75	1191.	200.	0.100	74.25	1.499s
PB-212	153.79	77.11	1006.	322.	0.161	45.05	1.499D
PB-214	153.79	77.11	1010.	318.	0.159	45.05	1.499D
TH-234	185.48	92.95	1009.	126.	0.063	101.55	1.499s
TH-234	185.45	92.93	987.	129.	0.065	101.46	1.499s
RA-226	371.75	186.05	493.	101.	0.051	97.92	1.499s
PB-212	477.25	238.78	432.	629.	0.315	18.20	1.499
PB-214	590.42	295.34	264.	145.	0.073	52.82	1.499s
AC-228	677.39	338.80	200.	189.	0.094	44.01	1.205s
PB-214	703.87	352.04	121.	243.	0.121	26.94	1.499
SB-125	925.77	462.94	81.	47.	0.024	88.47	1.499s
TL-208	1022.15	511.11	121.	120.	0.060	50.67	1.311s
TL-208	1166.14	583.06	96.	269.	0.135	26.84	1.422
BI-214	1218.82	609.39	101.	189.	0.094	37.34	1.369
CS-137	1323.23	661.57	55.	31.	0.016	110.52	1.499s
BI-212	1456.06	727.95	70.	80.	0.040	65.07	1.247s
AC-228	1822.82	911.24	55.	161.	0.081	34.03	1.420
AC-228	1937.15	968.37	51.	115.	0.057	43.29	1.621
BI-214	2240.14	1119.78	83.	61.	0.031	99.52	0.874s
CO-60	2665.07	1332.11	18.	19.	0.010	113.92	1.846
K-40	2922.40	1460.69	20.	717.	0.359	11.78	1.984
BI-214	3530.44	1764.50	0.	39.	0.019	48.04	0.916s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm		COMMENTS
BE-7		0.0000E+00						
			477.56	0.000E+00	&(	4.439E-01	1.28E-01	G
K-40		1.4729E+01						
			1460.75	1.473E+01	(P	4.813E-01	5.80E-01	G
MN-54		1.8192E-03						
			834.81	1.819E-03	&(P	5.390E-02	1.53E-02	G
CO-57		3.7936E-03						
			122.07	3.794E-03	&(	4.336E-02	1.29E-02	G K
			136.43	1.556E-01	%	3.624E-01	1.10E-01	G
CO-60		3.9208E-02						
			1332.51	3.921E-02	(P	4.510E-02	1.50E-02	G K
			1173.23	4.958E-02	% P	7.359E-02	2.29E-02	G K
Sr-85		-1.5848E-02						
			514.00	-1.585E-02	%(	5.514E-02	1.64E-02	G
Kr-85		-3.7041E+02						
			513.99	-3.704E+02	%(P	1.210E+03	3.59E+02	G
Y-88		-5.1736E-03						
			1836.01	-5.174E-03	%(	4.296E-02	1.14E-02	G K
			898.02	-1.008E-02	% P	5.508E-02	1.59E-02	G
NB-94		1.4090E-02						
			871.10	1.409E-02	%(P	3.913E-02	1.16E-02	G K
			702.50	5.885E-03	% P	4.318E-02	1.24E-02	G K
Ag-108M		-1.7030E-02						
			722.95	-1.703E-02	%(	6.166E-02	1.83E-02	G K
			614.37	-3.382E-03	% P	4.730E-02	1.36E-02	G
			433.93	-9.553E-04	&	4.086E-02	1.18E-02	G
CD-109		1.8153E-01						
			88.04	1.815E-01	%(P	1.360E+00	4.07E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	1.8967E-02						
		391.71	1.897E-02	%(	5.945E-02	1.77E-02	G K
		255.04	-4.985E-01	% P	1.826E+00	5.46E-01	G
SB-125	1.0943E-01						
		427.95	2.174E-02	%(P	1.182E-01	3.46E-02	G K
		600.77	3.937E-02	% P	1.932E-01	5.61E-02	G
		636.15	1.108E-01	% P	3.419E-01	1.01E-01	G
		463.51	3.690E-01	*(P	3.472E-01	1.12E-01	G
		176.29	-1.190E-02	% P	5.721E-01	1.69E-01	G
I-131	1.2743E-02						
		364.48	1.274E-02	%(	7.411E-02	2.19E-02	G K
		636.97	2.768E-01	%	7.698E-01	2.29E-01	G
		284.29	2.552E-02	%	9.239E-01	2.71E-01	G
CS-134	-6.5275E-03						
		604.66	-6.527E-03	%(P	1.888E-02	5.35E-03	G K
		795.76	1.282E-02	& P	5.735E-02	1.67E-02	G
		569.29	2.507E-02	& P	2.649E-01	7.62E-02	G
		801.84	-6.658E-02	%	5.846E-01	1.68E-01	G
CS-137	4.0263E-02						
		661.62	4.026E-02	(P	4.797E-02	1.53E-02	G
CE-139	-4.5489E-03						
		165.85	-4.549E-03	&(P	5.035E-02	1.50E-02	G
EU-152	3.9878E-03						
		121.78	3.988E-03	&(P	1.305E-01	3.88E-02	G K
		344.30	-3.764E-02	% P	1.601E-01	4.76E-02	G
		1408.08	-8.779E-03	% P	2.140E-01	5.70E-02	G
		964.00	2.512E-01	% P	4.098E-01	1.26E-01	G
		1112.07	1.564E-02	& P	4.405E-01	1.24E-01	G
		778.90	-5.854E-02	% P	3.826E-01	1.11E-01	G
EU-154	-7.5326E-03						
		123.10	-7.533E-03	&(P	9.852E-02	2.93E-02	G K
		1274.80	2.987E-02	% P	1.659E-01	4.76E-02	G
		723.30	-8.928E-02	% P	2.858E-01	8.48E-02	G
		1004.80	4.877E-04	& P	2.750E-01	7.60E-02	G
EU-155	7.7215E-03						
		86.45	7.721E-03	&(	1.683E-01	5.03E-02	G K
		105.31	2.952E-02	%	1.918E-01	5.74E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-7.1083E-03						
		279.17	-7.108E-03	&(	5.370E-02	1.59E-02	G K
		72.87	-4.899E-01	% P	1.240E+00	3.75E-01	G
		70.83	-1.168E+00	%	2.050E+00	6.24E-01	G
		82.50	-4.600E-02	%	2.397E+00	7.14E-01	G
TL-208	3.0259E-01						
		583.14	3.026E-01	(P	5.440E-02	2.73E-02	G
		510.72	4.531E-01	+ P	2.046E-01	8.68E-02	G
PB-212	6.3076E-01						
		238.63	6.063E-01	(P	9.586E-02	3.71E-02	G K
							Energy duplication
		77.11	6.910E-01	(	3.233E-01	1.04E-01	G
		74.81	8.139E-01	+ P	6.660E-01	2.07E-01	G
PB-214	3.8464E-01						
		351.99	3.875E-01	(P	8.620E-02	3.51E-02	G K
		295.22	3.791E-01	@(P	2.044E-01	6.76E-02	G
							Energy duplication
		77.11	1.117E+00	+ P	5.297E-01	1.70E-01	G
		241.92	-6.647E-04	% P	6.733E-01	2.00E-01	G
BI-212	8.0862E-01						
		727.17	8.086E-01	*(P	4.189E-01	1.77E-01	G K
		1620.56	-7.430E-02	%	1.192E+00	3.01E-01	G
		785.42	1.039E+00	% P	2.077E+00	6.32E-01	G
BI-214	4.1345E-01						
		609.32	4.134E-01	(P	1.084E-01	5.18E-02	G K
		1764.51	6.312E-01	+ P	1.206E-01	1.02E-01	G
		1120.28	7.081E-01	+ P	5.229E-01	2.36E-01	G
RA-224	5.7889E-01						
		241.00	5.789E-01	%(P	1.184E+00	3.59E-01	G
RA-226	1.0720E+00						
		185.99	1.072E+00	(	1.127E+00	3.50E-01	G
AC-228	8.8628E-01						
		911.07	8.090E-01	(P	1.864E-01	9.28E-02	G K
		968.90	1.008E+00	(P	3.173E-01	1.46E-01	G
		338.40	8.956E-01	*(P	3.256E-01	1.33E-01	G
TH-227	-1.6021E-03						
		236.00	-1.602E-03	&(P	4.220E-01	1.25E-01	G K
		256.25	-1.420E-01	% P	5.043E-01	1.50E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	-3.8296E-02						
		98.44	-3.830E-02	&(	1.799E-01	5.40E-02	G K
		946.00	0.000E+00	%	3.140E-01	8.91E-02	G
		131.28	-3.932E-02	%	2.071E-01	6.21E-02	G
		94.67	-7.150E-02	%	3.185E-01	9.57E-02	G
		883.24	-1.306E-02	%	3.477E-01	9.66E-02	G
		926.70	1.513E-02	&	4.118E-01	1.15E-01	G
		569.26	4.016E-02	&	3.905E-01	1.13E-01	G
TH-234	1.1374E+00						
		63.29	6.360E-01	%(P	2.042E+00	6.14E-01	G K
		92.80	1.400E+00	(P	1.616E+00	4.96E-01	G
		92.38	1.592E+00	(P	1.911E+00	5.85E-01	G
AM-241	2.6467E-02						
		59.54	2.647E-02	%(P	2.735E-01	8.16E-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 - 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	0.0000E+00	0.0000E+00	3.8375E-01	3.8375E-01	4.153E-01
K-40		1.4729E+01	1.4729E+01	1.7407E+00	1.9294E+00	
MN-54	#A	1.7986E-03	1.8192E-03	4.5883E-02	4.5883E-02	5.329E-02
CO-57	#B	3.7440E-03	3.7936E-03	3.8739E-02	3.8740E-02	4.279E-02
CO-60	#B	3.9136E-02	3.9208E-02	4.4867E-02	4.4922E-02	4.502E-02
Sr-85	#A	-1.5003E-02	-1.5848E-02	4.9293E-02	4.9301E-02	5.220E-02
Kr-85	#A	-3.7039E+02	-3.7041E+02	1.2231E+03	1.2232E+03	1.210E+03
Y-88	#B	-5.0039E-03	-5.1736E-03	3.4142E-02	3.4144E-02	4.155E-02
NB-94	#B	1.4090E-02	1.4090E-02	3.4791E-02	3.4800E-02	3.913E-02
Ag-108M	#B	-1.7028E-02	-1.7030E-02	5.4778E-02	5.4786E-02	6.166E-02
CD-109	#A	1.8011E-01	1.8153E-01	1.2221E+00	1.2221E+00	1.349E+00
SN-113	#B	1.8390E-02	1.8967E-02	5.3243E-02	5.3254E-02	5.764E-02
SB-125	#B	1.0905E-01	1.0943E-01	9.9771E-02	9.9962E-02	1.178E-01
I-131	#B	8.1892E-03	1.2743E-02	6.5615E-02	6.5619E-02	4.763E-02
CS-134	#B	-6.4967E-03	-6.5275E-03	1.9515E-02	1.9518E-02	1.879E-02
CS-137	#A	4.0250E-02	4.0263E-02	4.5755E-02	4.5811E-02	4.796E-02
CE-139	#A	-4.4328E-03	-4.5489E-03	4.7783E-02	4.7784E-02	4.906E-02
EU-152	#B	3.9847E-03	3.9878E-03	1.1635E-01	1.1635E-01	1.304E-01
EU-154	#B	-7.5240E-03	-7.5326E-03	1.0581E-01	1.0581E-01	9.841E-02
EU-155	#B	7.7063E-03	7.7215E-03	1.5095E-01	1.5095E-01	1.680E-01
HG-203	#B	-6.5861E-03	-7.1083E-03	4.7760E-02	4.7762E-02	4.975E-02
TL-208		3.0259E-01	3.0259E-01	8.1935E-02	8.3700E-02	
PB-212	#	6.3076E-01	6.3076E-01	1.1590E-01	1.2126E-01	9.586E-02
PB-214	#	3.8464E-01	3.8464E-01	1.0446E-01	1.0670E-01	8.620E-02
BI-212	#	8.0862E-01	8.0862E-01	5.3063E-01	5.3260E-01	
BI-214		4.1345E-01	4.1345E-01	1.5527E-01	1.5702E-01	
RA-224	#A	5.7889E-01	5.7889E-01	1.0774E+00	1.0779E+00	1.184E+00
RA-226	#A	1.0720E+00	1.0720E+00	1.0497E+00	1.0514E+00	1.127E+00
AC-228		8.8628E-01	8.8628E-01	2.1024E-01	2.1612E-01	
TH-227	#B	-1.6021E-03	-1.6021E-03	3.2708E-01	3.2708E-01	4.220E-01
PA-234	#B	-3.8296E-02	-3.8296E-02	1.6204E-01	1.6206E-01	1.799E-01
TH-234	#B	1.1374E+00	1.1374E+00	1.2092E+00	1.2109E+00	2.042E+00
AM-241	#A	2.6466E-02	2.6467E-02	2.4485E-01	2.4485E-01	2.735E-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 (270.1 to 1999.1 keV) 1.7140150E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.7140150E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_13DEC2005_1453.An1

Sample description
FSS-NOL-05-02-003-F

Spectrum Filename: C:\GammaVision\Spectra\101F_13DEC2005_1453.An1

Acquisition information
Start time: 13-Dec-2005 14:55:21
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/channel^2

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: 2.0300E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0300E+03) =
4.9261E+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	08-Dec-2005 13:54:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1606

***** 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
74.77	230.	21.93	1.50	1.654E-02				
74.77	230.	21.93	1.50	1.654E-02	74.81	9.600	9.656E-01	PB212
77.10	284.	17.46	1.50	1.720E-02	77.11	10.700	1.029E+00	PB214
					77.11	17.500	6.289E-01	PB212
77.10	288.	17.46	1.50	1.720E-02	77.11	10.700	1.029E+00	PB214
					77.11	17.500	6.371E-01	PB212
87.41	144.	21.04	1.01	1.929E-02	86.45	32.740	1.531E-01	EU155
89.85	98.	30.90	1.02	1.960E-02				
93.21	168.	18.39	1.02	1.997E-02	92.38	2.570	2.050E+00	TH234
					92.80	3.000	1.804E+00	TH234
129.45	121.	35.15	1.07	2.109E-02				
129.45	121.	35.15	1.07	2.109E-02	131.28	20.000	1.912E-01	PA234
186.19	125.	28.37	1.24	1.857E-02	185.99	3.280	1.365E+00	RA226
209.11	138.	25.31	1.29	1.723E-02				
238.71	846.	4.08	1.12	1.557E-02	238.63	43.100	8.330E-01	PB212
241.82	103.	23.47	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
270.21	73.	31.51	0.94	1.400E-02				
295.30	163.	11.64	1.16	1.292E-02	295.22	19.200	4.314E-01	PB214
299.92	49.	32.61	1.16	1.273E-02				
328.24	49.	36.26	1.06	1.169E-02				
338.56	152.	20.87	1.13	1.134E-02	338.40	12.010	7.307E-01	AC228
352.01	290.	8.64	1.43	1.092E-02	351.99	37.100	4.731E-01	PB214
462.97	54.	24.71	1.37	8.351E-03				
462.97	54.	24.71	1.37	8.351E-03	463.51	10.000	4.208E-01	SB125
510.58	94.	24.12	1.03	7.593E-03	510.72	22.500	3.039E-01	TL208
583.15	244.	9.60	1.25	6.684E-03	583.14	86.000	2.801E-01	TL208
609.19	212.	10.29	1.42	6.414E-03	609.32	46.090	4.761E-01	BI214

661.32	50.	36.94	1.44	5.940E-03	661.62	84.620	6.483E-02	CS137
727.33	56.	27.78	1.94	5.442E-03	727.17	11.800	5.734E-01	BI212
838.99	16.	40.02	1.53	4.805E-03	834.81	99.978	PBC<MDA	MN54
860.31	48.	28.41	1.22	4.678E-03				
911.07	151.	10.24	1.34	4.446E-03	911.07	29.000	7.678E-01	AC228
967.92	142.	13.32	2.13	4.216E-03	968.90	17.460	1.277E+00	AC228
1120.27	68.	26.80	1.46	3.711E-03	1120.28	15.040	8.065E-01	BI214
1460.49	672.	4.00	2.06	2.943E-03	1460.75	10.700	1.415E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1763.41	27.	23.39	0.95	2.481E-03	1764.51	15.920	4.577E-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 Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
174.40	87.78	384.	144.	0.072	63.13	1.014	PB-214	lD
179.28	90.22	414.	98.	0.049	92.71	1.016	PB-214	lD
258.51	129.45	676.	120.	0.060	95.79	1.071	AC-228	s
417.89	209.11	416.	138.	0.069	75.92	1.293	AC-228	s
477.13	238.70	172.	846.	0.423	12.24	1.122	PB-212	D
483.34	241.81	242.	103.	0.052	70.42	1.124	PB-214	D
540.14	270.21	199.	73.	0.037	94.53	0.942	AC-228	
599.54	299.89	161.	57.	0.028	109.21	0.934	TH-227	s
656.25	328.24	129.	49.	0.025	108.78	1.056	AC-228	s
1671.58	835.65	19.	18.	0.009	121.81	1.198	AC-228	l
1720.91	860.31	46.	48.	0.024	85.24	1.224	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	149.11	74.77	1222.	230.	0.115	65.80	1.499
PB-214	153.79	77.11	1126.	284.	0.142	52.39	1.499D
PB-212	153.79	77.11	1122.	288.	0.144	52.39	1.499D
TH-234	185.76	93.09	1034.	165.	0.083	80.22	1.499s
TH-234	185.71	93.07	1000.	171.	0.085	78.95	1.499s
RA-226	371.69	186.02	528.	106.	0.053	96.37	1.499s
PB-212	477.08	238.69	486.	673.	0.337	17.87	1.499
PB-214	590.34	295.30	224.	149.	0.075	48.46	1.499
AC-228	676.91	338.56	268.	150.	0.075	62.61	1.127
PB-214	703.75	351.98	139.	296.	0.148	24.08	1.499
SB-125	925.81	462.96	86.	60.	0.030	74.71	1.499
TL-208	1021.09	510.58	156.	78.	0.039	72.36	1.032s
TL-208	1166.31	583.15	101.	242.	0.121	28.81	1.246
BI-214	1218.42	609.19	82.	211.	0.106	30.87	1.423s
CS-137	1322.74	661.32	91.	49.	0.024	110.82	1.441s
BI-212	1454.82	727.33	63.	55.	0.028	83.34	1.944s
MN-54	1678.24	838.99	14.	16.	0.008	120.06	1.528

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1822.49	911.07	38.	149.	0.074	30.73	1.339
AC-228	1936.26	967.92	52.	141.	0.071	39.97	2.134s
BI-214	2241.14	1120.27	66.	68.	0.034	80.39	1.463s
K-40	2922.00	1460.49	15.	669.	0.335	12.01	2.057
BI-214	3528.24	1763.41	5.	27.	0.014	70.17	0.952s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		6.4094E-03					
			477.56	6.409E-03	%(	4.029E-01 1.15E-01	G
K-40		1.4152E+01					
			1460.75	1.415E+01	(P	4.348E-01 5.68E-01	G
MN-54		2.2659E-02					
			834.81	2.266E-02	?(P	2.837E-02 9.30E-03	G
CO-57		1.3698E-02					
			122.07	1.370E-02	%(	4.694E-02 1.41E-02	G K
			136.43	-8.964E-04	&	3.699E-01 1.10E-01	G
CO-60		2.7680E-02					
			1332.51	2.768E-02	%(P	4.853E-02 1.51E-02	G K
			1173.23	3.056E-02	% P	6.627E-02 2.00E-02	G K
Sr-85		-2.8333E-02					
			514.00	-2.833E-02	&(	6.445E-02 1.95E-02	G
Kr-85		-6.4395E+02					
			513.99	-6.440E+02	&(P	1.414E+03 4.26E+02	G
Y-88		-3.3269E-03					
			1836.01	-3.327E-03	%(	4.003E-02 1.02E-02	G K
			898.02	8.261E-03	% P	2.810E-02 8.04E-03	G
NB-94		-6.4949E-03					
			871.10	-6.495E-03	&(P	5.198E-02 1.49E-02	G K
			702.50	2.407E-03	% P	4.532E-02 1.29E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-2.3176E-02						
		722.95	-2.318E-02	%(	6.849E-02	2.05E-02	G K
		614.37	-1.199E-02	% P	4.945E-02	1.45E-02	G
		433.93	7.713E-03	%	3.186E-02	9.34E-03	G
CD-109	-3.5301E-01						
		88.04	-3.530E-01	%(P	1.538E+00	4.63E-01	G
SN-113	2.8163E-03						
		391.71	2.816E-03	&(	6.111E-02	1.77E-02	G K
		255.04	-9.186E-04	% P	1.988E+00	5.85E-01	G
SB-125	1.3410E-01						
		427.95	1.831E-02	%(P	1.230E-01	3.59E-02	G K
		600.77	-4.418E-02	% P	2.522E-01	7.35E-02	G
		636.15	5.657E-02	% P	4.280E-01	1.24E-01	G
		463.51	4.768E-01	(P	3.684E-01	1.22E-01	G
		176.29	5.994E-02	& P	6.139E-01	1.82E-01	G
I-131	1.2742E-02						
		364.48	1.274E-02	&(	7.117E-02	2.10E-02	G K
		636.97	1.547E-01	%	1.002E+00	2.91E-01	G
		284.29	-3.531E-02	&	8.543E-01	2.50E-01	G
CS-134	-1.6298E-03						
		604.66	-1.630E-03	%(P	4.220E-02	1.19E-02	G K
		795.76	2.828E-02	% P	5.799E-02	1.76E-02	G
		569.29	7.325E-02	& P	2.200E-01	6.51E-02	G
		801.84	3.132E-02	%	5.055E-01	1.42E-01	G
CS-137	6.4832E-02						
		661.62	6.483E-02	@(P	6.254E-02	2.44E-02	G
CE-139	-1.3919E-04						
		165.85	-1.392E-04	&(P	4.605E-02	1.36E-02	G
EU-152	3.4658E-02						
		121.78	3.466E-02	%(P	1.408E-01	4.23E-02	G K
		344.30	-1.373E-02	& P	1.543E-01	4.52E-02	G
		1408.08	5.346E-02	% P	2.143E-01	6.11E-02	G
		964.00	2.907E-01	& P	4.232E-01	1.32E-01	G
		1112.07	-1.302E-01	% P	5.306E-01	1.56E-01	G
		778.90	-4.736E-02	% P	3.417E-01	9.78E-02	G
EU-154	3.9151E-05						
		123.10	3.915E-05	%(P	9.757E-02	2.90E-02	G K
		1274.80	-1.095E-04	% P	1.584E-01	4.34E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-6.758E-02	% P	3.229E-01	9.49E-02	G
		1004.80	1.022E-02	% P	3.099E-01	8.69E-02	G
EU-155	7.9494E-03						
		86.45	7.949E-03	&(	1.799E-01	5.38E-02	G K
		105.31	8.537E-02	%	2.030E-01	6.14E-02	G
HG-203	-5.1468E-03						
		279.17	-5.147E-03	&(	5.218E-02	1.54E-02	G K
		72.87	-2.398E-01	% P	1.229E+00	3.69E-01	G
		70.83	-1.553E+00	%	2.230E+00	6.81E-01	G
		82.50	-4.306E-01	%	2.687E+00	8.06E-01	G
TL-208	2.8508E-01						
		583.14	2.801E-01	(P	5.739E-02	2.72E-02	G
		510.72	3.039E-01	*(P	2.374E-01	8.84E-02	G
PB-212	6.5882E-01						
		238.63	6.676E-01	(P	1.045E-01	4.01E-02	G K
							Energy duplication
		77.11	6.371E-01	(	3.511E-01	1.11E-01	G
		74.81	9.656E-01	& P	6.943E-01	2.17E-01	G
PB-214	4.8649E-01						
		351.99	4.865E-01	(P	9.480E-02	3.93E-02	G K
		295.22	4.007E-01	- P	1.945E-01	6.55E-02	G
							Energy duplication
		77.11	1.029E+00	+ P	5.752E-01	1.82E-01	G
		241.92	-3.303E-01	% P	7.377E-01	2.23E-01	G
BI-212	5.7340E-01						
		727.17	5.734E-01	@(P	4.105E-01	1.61E-01	G K
		1620.56	2.400E-01	%	1.535E+00	4.18E-01	G
		785.42	8.822E-01	% P	2.467E+00	7.35E-01	G
BI-214	4.7140E-01						
		609.32	4.761E-01	@(P	1.009E-01	4.92E-02	G K
		1764.51	4.577E-01	(P	2.184E-01	1.09E-01	G
		1120.28	8.065E-01	+ P	4.852E-01	2.17E-01	G
RA-224	8.8740E-01						
		241.00	8.874E-01	%(P	1.288E+00	3.94E-01	G
RA-226	1.1588E+00						
		185.99	1.159E+00	*(	1.199E+00	3.72E-01	G
AC-228	7.5694E-01						
		911.07	7.678E-01	(P	1.628E-01	7.96E-02	G K
		968.90	1.277E+00	+ P	3.285E-01	1.71E-01	G
		338.40	7.307E-01	(P	3.861E-01	1.55E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -8.4531E-02
                          236.00-8.453E-02 &(P 4.393E-01 1.31E-01 G K
                          256.25-5.984E-02 % P 5.923E-01 1.75E-01 G

PA-234      -2.7909E-02
                           98.44-2.791E-02 &(  1.775E-01 5.31E-02 G K
                          946.00-4.770E-02 &   2.900E-01 8.39E-02 G
                          131.28 1.336E-03 %   2.073E-01 6.16E-02 G
                           94.67-1.589E-01 %   3.337E-01 1.01E-01 G
                          883.24-1.344E-02 &   4.484E-01 1.27E-01 G
                          926.70-8.773E-02 %   4.685E-01 1.35E-01 G
                          569.26 1.088E-01 &   3.244E-01 9.62E-02 G

TH-234       1.5378E+00
                           63.29 8.478E-01 %(P 2.170E+00 6.55E-01 G K
                           92.80 1.903E+00 *(P 1.674E+00 5.19E-01 G
                           92.38 2.158E+00 *(P 1.990E+00 6.15E-01 G

AM-241       2.9191E-02
                           59.54 2.919E-02 %(P 3.027E-01 9.04E-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 - 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	6.0033E-03	6.4094E-03	3.4648E-01	3.4648E-01	3.773E-01
K-40		1.4152E+01	1.4152E+01	1.7049E+00	1.8831E+00	
MN-54	#A	2.2407E-02	2.2659E-02	2.7908E-02	2.7937E-02	2.805E-02
CO-57	#B	1.3522E-02	1.3698E-02	4.2366E-02	4.2372E-02	4.634E-02
CO-60	#B	2.7629E-02	2.7680E-02	4.5174E-02	4.5201E-02	4.845E-02
Sr-85	#A	-2.6846E-02	-2.8333E-02	5.8447E-02	5.8468E-02	6.107E-02
Kr-85	#A	-6.4393E+02	-6.4395E+02	1.3781E+03	1.3786E+03	1.414E+03
Y-88	#B	-3.2196E-03	-3.3269E-03	3.0745E-02	3.0745E-02	3.874E-02
NB-94	#B	-6.4949E-03	-6.4949E-03	4.7360E-02	4.7361E-02	5.198E-02
Ag-108M	#B	-2.3174E-02	-2.3176E-02	6.1369E-02	6.1383E-02	6.849E-02
CD-109	#A	-3.5030E-01	-3.5301E-01	1.4219E+00	1.4220E+00	1.526E+00
SN-113	#B	2.7321E-03	2.8163E-03	5.3212E-02	5.3212E-02	5.928E-02
SB-125	#F	1.3364E-01	1.3410E-01	1.0262E-01	1.0290E-01	1.226E-01
I-131	#B	8.2496E-03	1.2742E-02	6.2936E-02	6.2940E-02	4.608E-02
CS-134	#B	-1.6222E-03	-1.6298E-03	8.3921E-02	8.3921E-02	4.200E-02
CS-137	#	6.4811E-02	6.4832E-02	7.3147E-02	7.3239E-02	
CE-139	#A	-1.3570E-04	-1.3919E-04	4.5294E+00	4.5294E+00	4.489E-02
EU-152	#B	3.4632E-02	3.4658E-02	1.2681E-01	1.2682E-01	1.407E-01
EU-154	#B	3.9107E-05	3.9151E-05	8.6881E-02	8.6881E-02	9.746E-02
EU-155	#B	7.9341E-03	7.9494E-03	1.6143E-01	1.6143E-01	1.796E-01
HG-203	#B	-4.7748E-03	-5.1468E-03	4.6232E-02	4.6233E-02	4.841E-02
TL-208		2.8508E-01	2.8508E-01	8.2927E-02	8.4477E-02	
PB-212	#	6.5882E-01	6.5882E-01	1.1883E-01	1.2453E-01	1.045E-01
PB-214	#	4.8649E-01	4.8649E-01	1.1794E-01	1.2110E-01	9.480E-02
BI-212	#	5.7340E-01	5.7340E-01	4.8371E-01	4.8479E-01	
BI-214		4.7140E-01	4.7140E-01	1.4629E-01	1.4869E-01	
RA-224	#A	8.8740E-01	8.8740E-01	1.1826E+00	1.1836E+00	1.288E+00
RA-226	#A	1.1588E+00	1.1588E+00	1.1167E+00	1.1186E+00	1.199E+00
AC-228		7.5694E-01	7.5694E-01	2.3552E-01	2.3937E-01	
TH-227	#B	-8.4531E-02	-8.4531E-02	4.0979E-01	4.0982E-01	4.393E-01
PA-234	#B	-2.7909E-02	-2.7909E-02	1.5944E-01	1.5944E-01	1.775E-01
TH-234	#B	1.5378E+00	1.5378E+00	1.2581E+00	1.2610E+00	2.170E+00
AM-241	#A	2.9190E-02	2.9191E-02	2.7125E-01	2.7125E-01	3.027E-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

YAEC Chemistry Lab Spectrum name: 101F_13DEC2005_1453.An1

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

Total Activity (270.1 to 1999.1 keV) 1.6325827E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.6326099E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_13DEC2005_1536.An1

Sample description
FSS-NOL-05-02-020-F

Spectrum Filename: C:\GammaVision\Spectra\101F_13DEC2005_1536.An1

Acquisition information
Start time: 13-Dec-2005 15:36:48
Live time: 2000
Real time: 2002
Dead time: 0.11 %
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/channel^2

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: 1.9720E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9720E+03) =
5.0710E+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	08-Dec-2005 11:45:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0967

***** 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
74.83	199.	25.39	1.50	1.654E-02				
74.83	199.	25.39	1.50	1.654E-02	74.81	9.600	8.575E-01	PB212
77.08	324.	15.35	1.50	1.720E-02	77.11	10.700	1.207E+00	PB214
					77.11	17.500	7.382E-01	PB212
77.08	328.	15.35	1.50	1.720E-02	77.11	10.700	1.207E+00	PB214
					77.11	17.500	7.467E-01	PB212
84.10	84.	36.82	0.76	1.872E-02				
87.14	159.	19.13	1.01	1.920E-02				
89.81	116.	25.48	1.02	1.956E-02				
93.59	143.	22.00	1.02	1.998E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.16	85.	30.39	1.00	1.857E-02	185.99	3.280	9.590E-01	RA226
209.51	124.	23.19	1.11	1.720E-02				
238.76	1035.	4.93	1.02	1.557E-02	238.63	43.100	1.051E+00	PB212
270.36	68.	30.31	0.82	1.400E-02				
295.37	163.	11.83	1.16	1.291E-02	295.22	19.200	4.455E-01	PB214
300.18	63.	25.67	1.16	1.272E-02				
328.23	78.	24.89	1.28	1.169E-02				
338.50	196.	13.90	1.09	1.135E-02	338.40	12.010	9.739E-01	AC228
352.03	291.	11.51	1.23	1.092E-02	351.99	37.100	4.890E-01	PB214
462.56	47.	39.13	1.75	8.358E-03				
462.56	47.	39.13	1.75	8.358E-03	463.51	10.000	PBC<MDA	SB125
510.47	123.	20.80	1.42	7.594E-03	510.72	22.500	4.292E-01	TL208
583.00	283.	8.76	1.41	6.686E-03	583.14	86.000	3.340E-01	TL208
609.36	180.	11.94	1.78	6.412E-03	609.32	46.090	4.148E-01	BI214
661.11	91.	22.76	1.72	5.942E-03				
661.11	91.	22.76	1.72	5.942E-03	661.62	84.620	1.224E-01	CS137

727.00	65.	26.47	0.67	5.444E-03	727.17	11.800	6.906E-01	BI212
768.77	48.	38.82	1.16	5.175E-03				
795.40	78.	18.96	1.12	5.018E-03				
795.40	78.	18.96	1.12	5.018E-03	795.76	85.400	1.247E-01	CS134
860.05	52.	29.04	0.97	4.679E-03				
911.12	195.	9.53	1.55	4.446E-03	911.07	29.000	1.026E+00	AC228
968.00	130.	14.67	1.77	4.216E-03	968.90	17.460	1.209E+00	AC228
1119.53	68.	30.41	1.47	3.711E-03	1120.28	15.040	8.327E-01	BI214
1173.07	79.	18.63	1.84	3.565E-03	1173.23	99.860	1.521E-01	CO60
1332.32	60.	17.80	1.63	3.191E-03	1332.51	99.980	1.290E-01	CO60
1460.46	808.	3.57	1.98	2.943E-03	1460.75	10.700	1.754E+01	K40
1763.36	39.	19.16	1.14	2.481E-03	1764.51	15.920	6.742E-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	
179.21	89.86	382.	116.	0.058	76.43	1.016	PB-214	lD
418.69	209.51	322.	124.	0.062	69.56	1.110	AC-228	s
477.21	238.76	1255.	271.	0.135	58.38	1.024	PB-212	
540.45	270.36	168.	68.	0.034	90.94	0.824	AC-228	
600.08	300.16	134.	70.	0.035	80.59	1.338	PB-212	
656.24	328.23	130.	78.	0.039	74.68	1.278	AC-228	
925.02	462.56	112.	47.	0.023	117.38	1.749	CS-138	l
1537.73	768.77	89.	48.	0.024	116.46	1.162	BI-214	sM
1591.03	795.40	71.	51.	0.025	82.01	1.116	CS-134	s
1720.39	860.05	55.	52.	0.026	87.11	0.974	TL-208	s

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	149.22	74.83	1244.	199.	0.099	76.17	1.499
PB-214	153.79	77.11	1108.	324.	0.162	46.06	1.499D
PB-212	153.79	77.11	1104.	328.	0.164	46.06	1.499D
TH-234	185.87	93.14	1082.	161.	0.081	83.85	1.499s
TH-234	185.83	93.12	1030.	169.	0.085	80.69	1.499s
RA-226	371.97	186.16	562.	97.	0.049	107.63	1.499
PB-212	477.17	238.74	526.	681.	0.341	18.14	1.499
PB-214	590.41	295.33	234.	153.	0.076	48.23	1.499
AC-228	676.78	338.50	190.	194.	0.097	41.70	1.091
PB-214	703.58	351.89	173.	217.	0.108	32.49	1.499
TL-208	1020.89	510.47	177.	107.	0.053	62.39	1.419s
TL-208	1166.01	583.00	106.	280.	0.140	26.29	1.406s
BI-214	1218.76	609.36	89.	179.	0.089	35.81	1.783s
CS-137	1323.39	661.65	96.	56.	0.028	82.48	1.499s
BI-212	1454.15	727.00	76.	65.	0.032	79.42	0.673s
AC-228	1822.58	911.12	52.	193.	0.097	28.58	1.553s
AC-228	1936.42	968.00	68.	130.	0.065	44.02	1.773s
BI-214	2239.64	1119.53	93.	68.	0.034	91.23	1.468s
CO-60	2346.79	1173.07	51.	79.	0.039	55.90	1.842

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2665.49	1332.32	18.	60.	0.030	53.39	1.625
K-40	2921.94	1460.46	9.	806.	0.403	10.70	1.979
BI-214	3528.16	1763.36	4.	39.	0.019	57.48	1.144s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.2490E-01					
			477.56	1.249E-01	%(	4.549E-01 1.35E-01 G	
K-40		1.7539E+01					
			1460.75	1.754E+01	(P	3.663E-01 6.27E-01 G	
MN-54		2.4072E-02					
			834.81	2.407E-02	&(P	4.749E-02 1.44E-02 G	
CO-57		8.7103E-03					
			122.07	8.710E-03	&(	5.316E-02 1.59E-02 G K	
			136.43	3.329E-03	&	4.446E-01 1.32E-01 G	
CO-60		1.4051E-01					
			1332.51	1.290E-01	(P	4.849E-02 2.30E-02 G K	
			1173.23	1.521E-01	(P	6.950E-02 2.84E-02 G K	
Sr-85		-1.4395E-02					
			514.00	-1.439E-02	%(	6.528E-02 1.94E-02 G	
Kr-85		-3.3902E+02					
			513.99	-3.390E+02	%(P	1.430E+03 4.23E+02 G	
Y-88		5.2101E-03					
			1836.01	5.210E-03	&(	5.178E-02 1.38E-02 G K	
			898.02	1.028E-02	& P	6.071E-02 1.75E-02 G	
NB-94		3.9573E-04					
			871.10	3.957E-04	%(P	5.129E-02 1.44E-02 G K	
			702.50	9.823E-03	% P	5.392E-02 1.57E-02 G K	
Ag-108M		3.6836E-04					
			722.95	3.684E-04	%(	4.050E-02 1.12E-02 G K	
			614.37	-2.313E-03	% P	5.915E-02 1.70E-02 G	
			433.93	1.106E-02	&	4.714E-02 1.39E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	7.0059E-01						
		88.04	7.006E-01	%(P	1.238E+00	3.77E-01	G
SN-113	9.5197E-03						
		391.71	9.520E-03	%(	6.969E-02	2.05E-02	G K
		255.04	4.528E-01	% P	1.577E+00	4.71E-01	G
SB-125	-4.4528E-02						
		427.95	-4.453E-02	&(P	1.682E-01	5.00E-02	G K
		600.77	5.734E-02	% P	2.516E-01	7.38E-02	G
		636.15	-2.833E-03	% P	4.844E-01	1.39E-01	G
		463.51	2.631E-01	% P	4.477E-01	1.37E-01	G
		176.29	-8.939E-02	% P	6.752E-01	2.01E-01	G
I-131	-3.3704E-03						
		364.48	-3.370E-03	%(	6.336E-02	1.83E-02	G K
		636.97	5.399E-03	%	1.032E+00	2.94E-01	G
		284.29	8.727E-03	%	8.596E-01	2.50E-01	G
CS-134	-1.8379E-03						
		604.66	-1.838E-03	%(P	9.978E-02	2.94E-02	G K
		795.76	4.299E-02	% P	6.243E-02	1.95E-02	G
		569.29	6.932E-02	& P	2.543E-01	7.48E-02	G
		801.84	-1.650E-03	%	5.768E-01	1.62E-01	G
CS-137	7.6914E-02						
		661.62	7.691E-02	*(P	6.605E-02	2.15E-02	G
CE-139	3.8406E-03						
		165.85	3.841E-03	%(P	5.627E-02	1.68E-02	G
EU-152	2.2032E-02						
		121.78	2.203E-02	&(P	1.499E-01	4.49E-02	G K
		344.30	-2.849E-02	% P	1.544E-01	4.56E-02	G
		1408.08	6.974E-02	% P	2.304E-01	6.68E-02	G
		964.00	2.196E-02	% P	6.341E-01	1.84E-01	G
		1112.07	1.493E-02	% P	6.777E-01	1.95E-01	G
		778.90	-1.009E-03	% P	3.950E-01	1.11E-01	G
EU-154	1.1439E-02						
		123.10	1.144E-02	%(P	1.049E-01	3.13E-02	G K
		1274.80	2.057E-02	% P	1.650E-01	4.66E-02	G
		723.30	3.244E-02	% P	2.824E-01	8.16E-02	G
		1004.80	3.285E-02	% P	2.991E-01	8.47E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-7.7530E-02						
		86.45	-7.753E-02	%(	1.822E-01	5.52E-02	G K
		105.31	9.446E-02	%	2.089E-01	6.33E-02	G
HG-203	-9.0024E-03						
		279.17	-9.002E-03	%(	5.834E-02	1.73E-02	G K
		72.87	-6.476E-01	% P	1.313E+00	3.98E-01	G
		70.83	7.802E-01	&	1.804E+00	5.46E-01	G
		82.50	-3.475E-01	&	2.751E+00	8.24E-01	G
TL-208	3.3404E-01						
		583.14	3.340E-01	@(P	6.036E-02	2.95E-02	G
		510.72	4.292E-01	+ P	2.597E-01	1.03E-01	G
PB-212	7.1038E-01						
		238.63	6.956E-01	(P	1.119E-01	4.24E-02	G K
							Energy duplication
		77.11	7.467E-01	(	3.586E-01	1.15E-01	G
		74.81	8.575E-01	& P	7.209E-01	2.23E-01	G
PB-214	3.8568E-01						
		351.99	3.667E-01	(P	1.083E-01	4.01E-02	G K
		295.22	4.224E-01	(P	2.043E-01	6.87E-02	G
							Energy duplication
		77.11	1.207E+00	+ P	5.875E-01	1.87E-01	G
		241.92	-4.207E-02	% P	7.408E-01	2.20E-01	G
BI-212	6.9056E-01						
		727.17	6.906E-01	(P	4.632E-01	1.85E-01	G K
		1620.56	2.893E-01	&	1.853E+00	5.13E-01	G
		785.42	8.350E-01	% P	2.369E+00	7.04E-01	G
BI-214	4.1477E-01						
		609.32	4.148E-01	(P	1.083E-01	4.98E-02	G K
		1764.51	6.742E-01	+ P	2.114E-01	1.31E-01	G
		1120.28	8.327E-01	+ P	5.856E-01	2.55E-01	G
RA-224	8.6587E-01						
		241.00	8.659E-01	%(P	1.355E+00	4.14E-01	G
RA-226	1.0954E+00						
		185.99	1.095E+00	(	1.273E+00	3.93E-01	G
AC-228	1.0702E+00						
		911.07	1.026E+00	@(P	1.928E-01	9.87E-02	G K
		968.90	1.209E+00	*(P	3.839E-01	1.78E-01	G
		338.40	9.739E-01	(P	3.368E-01	1.37E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.3903E-01
                          236.00-2.390E-01 %(P 5.210E-01 1.58E-01 G K
                          256.25-1.427E-01 % P 6.285E-01 1.87E-01 G

PA-234      -8.4136E-02
                           98.44-8.414E-02 &(  1.874E-01 5.68E-02 G K
                          946.00-9.196E-02 %   3.571E-01 1.05E-01 G
                          131.28-1.173E-02 %   1.841E-01 5.47E-02 G
                           94.67-3.977E-02 %   2.686E-01 8.03E-02 G
                          883.24 6.099E-04 %   3.835E-01 1.06E-01 G
                          926.70 6.239E-02 &   4.951E-01 1.42E-01 G
                          569.26 1.066E-01 &   3.743E-01 1.10E-01 G

TH-234       1.4412E+00
                           63.29 5.782E-01 %(P 2.233E+00 6.70E-01 G K
                           92.80 1.941E+00 *(P 1.748E+00 5.41E-01 G
                           92.38 2.167E+00 &(P 2.096E+00 6.46E-01 G

AM-241      -7.4167E-03
                           59.54-7.417E-03 &(P 3.189E-01 9.50E-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 - 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	1.1680E-01	1.2490E-01	4.0490E-01	4.0496E-01	4.255E-01
K-40		1.7539E+01	1.7539E+01	1.8822E+00	2.1271E+00	
MN-54	#A	2.3798E-02	2.4072E-02	4.3347E-02	4.3369E-02	4.695E-02
CO-57	#B	8.5956E-03	8.7103E-03	4.7772E-02	4.7774E-02	5.246E-02
CO-60		1.4025E-01	1.4051E-01	5.4397E-02	5.4974E-02	
Sr-85	#A	-1.3622E-02	-1.4395E-02	5.8131E-02	5.8137E-02	6.177E-02
Kr-85	#A	-3.3901E+02	-3.3902E+02	1.4708E+03	1.4710E+03	1.430E+03
Y-88	#B	5.0382E-03	5.2101E-03	4.1503E-02	4.1504E-02	5.007E-02
NB-94	#B	3.9573E-04	3.9573E-04	4.3073E-02	4.3073E-02	5.129E-02
Ag-108M	#B	3.6834E-04	3.6836E-04	3.3525E-02	3.3525E-02	4.050E-02
CD-109	#A	6.9508E-01	7.0059E-01	1.1306E+00	1.1313E+00	1.229E+00
SN-113	#B	9.2284E-03	9.5197E-03	6.1470E-02	6.1472E-02	6.756E-02
SB-125	#B	-4.4371E-02	-4.4528E-02	1.5579E-01	1.5581E-01	1.676E-01
I-131	#B	-2.1600E-03	-3.3704E-03	5.4957E-02	5.4957E-02	4.061E-02
CS-134	#B	-1.8292E-03	-1.8379E-03	1.9053E-01	1.9053E-01	9.931E-02
CS-137	#	7.6889E-02	7.6914E-02	6.4435E-02	6.4581E-02	6.602E-02
CE-139	#A	3.7420E-03	3.8406E-03	5.0278E-02	5.0279E-02	5.483E-02
EU-152	#B	2.2015E-02	2.2032E-02	1.3457E-01	1.3457E-01	1.498E-01
EU-154	#B	1.1426E-02	1.1439E-02	9.3924E-02	9.3926E-02	1.048E-01
EU-155	#B	-7.7377E-02	-7.7530E-02	1.6549E-01	1.6554E-01	1.818E-01
HG-203	#B	-8.3370E-03	-9.0024E-03	5.1992E-02	5.1994E-02	5.403E-02
TL-208	#	3.3404E-01	3.3404E-01	8.8576E-02	9.0565E-02	
PB-212	#	7.1038E-01	7.1038E-01	1.3000E-01	1.3606E-01	1.119E-01
PB-214	#	3.8568E-01	3.8568E-01	1.1336E-01	1.1543E-01	1.083E-01
BI-212		6.9056E-01	6.9056E-01	5.5418E-01	5.5556E-01	
BI-214		4.1477E-01	4.1477E-01	1.4944E-01	1.5127E-01	
RA-224	#A	8.6587E-01	8.6587E-01	1.2411E+00	1.2420E+00	1.355E+00
RA-226	#A	1.0954E+00	1.0954E+00	1.1789E+00	1.1805E+00	1.273E+00
AC-228		1.0702E+00	1.0702E+00	2.4117E-01	2.4863E-01	
TH-227	#B	-2.3903E-01	-2.3903E-01	4.8026E-01	4.8045E-01	5.210E-01
PA-234	#B	-8.4136E-02	-8.4136E-02	1.7034E-01	1.7041E-01	1.874E-01
TH-234	#B	1.4412E+00	1.4412E+00	1.2053E+00	1.2080E+00	2.233E+00
AM-241	#A	-7.4165E-03	-7.4167E-03	4.8982E-01	4.8982E-01	3.189E-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) 2.0188822E+01 pCi/gm
Total Decayed Activity (50.2 to 1999.1 keV) 2.0189083E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_13DEC2005_1613.An1

Sample description
FSS-NOL-05-02-001-F

Spectrum Filename: C:\GammaVision\Spectra\101F_13DEC2005_1613.An1

Acquisition information
Start time: 13-Dec-2005 16:13:43
Live time: 2000
Real time: 2002
Dead time: 0.11 %
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/channel^2

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: 2.0230E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0230E+03) =
4.9432E+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	08-Dec-2005 13:55:00
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. 23 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1554

***** 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
74.76	252.	14.51	1.00	1.651E-02	74.81	9.600	1.039E+00	PB212
77.12	385.	9.82	1.01	1.719E-02	77.11	17.500	8.533E-01	PB212
87.37	117.	38.77	1.21	1.923E-02	86.45	32.740	1.253E-01	EU155
					88.04	3.790	PBC<MDA	CD109
92.81	153.	30.25	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.82	147.	31.12	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.04	122.	32.79	1.87	2.110E-02				
186.30	137.	26.08	1.19	1.856E-02	185.99	3.280	1.499E+00	RA226
209.76	76.	40.05	1.08	1.719E-02				
238.70	902.	3.97	1.12	1.557E-02	238.63	43.100	8.916E-01	PB212
241.79	126.	19.55	1.12	1.541E-02	241.00	3.900	1.390E+00	RA224
					241.92	7.470	7.282E-01	PB214
269.97	97.	25.39	1.44	1.402E-02				
295.07	203.	12.73	1.18	1.293E-02	295.22	19.200	5.429E-01	PB214
327.83	67.	30.74	1.39	1.170E-02				
338.33	143.	16.51	1.10	1.135E-02	338.40	12.010	6.891E-01	AC228
351.88	260.	9.20	1.26	1.093E-02	351.99	37.100	4.261E-01	PB214
462.62	82.	26.83	1.43	8.357E-03				
462.62	82.	26.83	1.43	8.357E-03	463.51	10.000	6.473E-01	SB125
510.75	141.	15.99	1.67	7.590E-03	510.72	22.500	4.888E-01	TL208
583.21	270.	10.42	1.15	6.684E-03	583.14	86.000	3.109E-01	TL208
609.27	249.	11.31	1.41	6.413E-03	609.32	46.090	5.598E-01	BI214
662.11	112.	16.07	1.54	5.933E-03	661.62	84.620	1.475E-01	CS137
726.91	79.	26.64	1.92	5.445E-03	727.17	11.800	8.125E-01	BI212
794.45	57.	28.98	1.02	5.023E-03				

794.45	57.	28.98	1.02	5.023E-03	795.76	85.400	8.802E-02	CS134
910.91	209.	9.67	1.73	4.447E-03	911.07	29.000	1.073E+00	AC228
964.65	34.	28.32	1.61	4.228E-03				
968.89	82.	15.45	1.62	4.212E-03	968.90	17.460	7.410E-01	AC228
995.72	40.	36.00	0.68	4.113E-03				
1119.83	66.	19.03	1.23	3.712E-03	1120.28	15.040	7.854E-01	BI214
1172.57	151.	12.97	0.88	3.566E-03	1173.23	99.860	2.843E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.06	116.	12.39	1.84	3.191E-03	1332.51	99.980	2.426E-01	CO60
1460.46	734.	3.82	1.96	2.943E-03	1460.75	10.700	1.552E+01	K40
1620.04	13.	35.90	1.21	2.682E-03	1620.56	2.750	1.159E+00	BI212
1764.06	45.	17.92	0.91	2.481E-03	1764.51	15.920	7.535E-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	
174.31	87.37	869.	130.	0.065	100.00	1.209	PB-214	
257.68	129.04	602.	165.	0.082	67.34	1.871	AC-228	s
419.19	209.76	372.	76.	0.038	120.15	1.081	NP-239	s
539.66	269.97	224.	97.	0.049	76.18	1.441	AC-228	s
655.43	327.83	150.	67.	0.034	92.22	1.386	AC-228	
1929.71	964.66	28.	34.	0.017	85.01	1.613	AC-228	D
1991.89	995.72	49.	43.	0.022	81.96	0.678	EU-154	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	149.19	74.81	480.	249.	0.125	40.89	1.005D
PB-212	153.79	77.11	521.	376.	0.188	24.99	1.006A
TH-234	185.22	92.82	1141.	147.	0.074	93.36	1.499s
TH-234	185.20	92.81	1090.	153.	0.077	90.74	1.499s
RA-226	371.66	186.00	591.	119.	0.059	91.15	1.499s
PB-212	476.96	238.63	196.	896.	0.448	11.91	1.122D
RA-224	481.97	241.13	128.	81.	0.040	67.68	1.499
PB-214	483.54	241.92	195.	121.	0.060	55.69	1.124D
PB-214	589.88	295.07	196.	202.	0.101	38.19	1.185
AC-228	676.44	338.33	174.	141.	0.070	49.54	1.103
PB-214	703.55	351.88	138.	259.	0.129	27.60	1.265
SB-125	926.19	463.15	98.	59.	0.029	79.51	1.499
TL-208	1021.43	510.75	124.	125.	0.062	47.96	1.669s
TL-208	1166.44	583.21	129.	268.	0.134	31.26	1.149s
BI-214	1218.57	609.27	140.	248.	0.124	33.93	1.409
CS-137	1324.30	662.11	79.	111.	0.055	48.22	1.538s
BI-212	1453.98	726.91	96.	78.	0.039	79.91	1.921s
CS-134	1589.78	794.78	35.	39.	0.019	79.82	1.502s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1822.18	910.91	56.	207.	0.104	29.02	1.733s
AC-228	1938.21	968.90	40.	82.	0.041	46.36	1.616D
BI-214	2240.24	1119.83	34.	66.	0.033	57.10	1.230
CO-60	2345.78	1172.57	62.	151.	0.076	38.90	0.883s
CO-60	2664.97	1332.06	24.	116.	0.058	37.18	1.842
K-40	2921.93	1460.46	15.	731.	0.366	11.45	1.959
BI-212	3241.32	1620.04	3.	13.	0.006	107.71	1.209s
BI-214	3529.56	1764.06	4.	45.	0.022	53.75	0.906s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.0275E-01					
			477.56	1.027E-01	%(	4.495E-01 1.33E-01 G	
K-40		1.5516E+01					
			1460.75	1.552E+01	(P	4.363E-01 5.94E-01 G	
MN-54		1.1919E-02					
			834.81	1.192E-02	%(P	5.339E-02 1.56E-02 G	
CO-57		-7.1323E-03					
			122.07	-7.132E-03	&(	5.432E-02 1.63E-02 G K	
			136.43	-4.926E-02	%	4.131E-01 1.23E-01 G	
CO-60		2.6345E-01					
			1332.51	2.426E-01	(P	5.397E-02 3.01E-02 G K	
			1173.23	2.843E-01	@(P	7.394E-02 3.69E-02 G K	
Sr-85		-1.7521E-02					
			514.00	-1.752E-02	&(	5.972E-02 1.78E-02 G	
Kr-85		-4.0723E+02					
			513.99	-4.072E+02	&(P	1.310E+03 3.90E+02 G	
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	6.486E-02 1.73E-02 G K	
			898.02	-2.900E-04	& P	7.282E-02 2.07E-02 G	
NB-94		1.5005E-02					
			871.10	1.500E-02	&(P	4.423E-02 1.31E-02 G K	
			702.50	-1.697E-03	% P	3.667E-02 1.02E-02 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-2.0808E-02						
		722.95	-2.081E-02	%(	6.652E-02	1.98E-02	G K
		614.37	-9.970E-03	& P	5.757E-02	1.69E-02	G
		433.93	1.155E-02	%	4.837E-02	1.43E-02	G
CD-109	-1.4094E-02						
		88.04	-1.409E-02	%(P	1.630E+00	4.87E-01	G
SN-113	-5.1066E-03						
		391.71	-5.107E-03	%(	7.194E-02	2.11E-02	G K
		255.04	3.756E-01	% P	2.037E+00	6.07E-01	G
SB-125	1.4035E-01						
		427.95	2.881E-02	%(P	1.489E-01	4.39E-02	G K
		600.77	-4.033E-02	% P	2.508E-01	7.29E-02	G
		636.15	-1.120E-01	% P	4.066E-01	1.20E-01	G
		463.51	4.705E-01	(P	3.922E-01	1.28E-01	G
		176.29	-2.378E-01	% P	6.866E-01	2.07E-01	G
I-131	-1.1004E-02						
		364.48	-1.100E-02	%(	7.456E-02	2.19E-02	G K
		636.97	1.220E-01	%	8.078E-01	2.32E-01	G
		284.29	-1.154E-01	%	1.114E+00	3.30E-01	G
CS-134	2.2285E-02						
		604.66	-1.104E-02	&(P	5.188E-02	1.52E-02	G K
		795.76	6.037E-02	@(P	4.722E-02	1.62E-02	G
		569.29	7.618E-02	% P	2.676E-01	7.90E-02	G
		801.84	7.968E-02	&	5.349E-01	1.54E-01	G
CS-137	1.4751E-01						
		661.62	1.475E-01	@(P	5.872E-02	2.39E-02	G
CE-139	-8.4202E-03						
		165.85	-8.420E-03	%(P	5.370E-02	1.60E-02	G
EU-152	-1.2045E-03						
		121.78	-1.205E-03	&(P	1.259E-01	3.73E-02	G K
		344.30	1.423E-02	& P	1.467E-01	4.30E-02	G
		1408.08	4.734E-02	% P	2.236E-01	6.32E-02	G
		964.00	-2.767E-02	% P	5.325E-01	1.53E-01	G
		1112.07	1.249E-01	% P	4.350E-01	1.28E-01	G
		778.90	8.708E-03	% P	3.744E-01	1.06E-01	G
EU-154	-1.2149E-02						
		123.10	-1.215E-02	%(P	1.063E-01	3.17E-02	G K
		1274.80	7.449E-02	% P	1.626E-01	4.92E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-9.281E-02 % P 3.179E-01 9.42E-02 G
                         1004.80-7.268E-02 % P 3.392E-01 9.87E-02 G

EU-155      -1.2535E-02
                           86.45-1.254E-02 %(  1.872E-01 5.61E-02 G K
                          105.31 4.693E-02 %   2.148E-01 6.45E-02 G

HG-203       1.5280E-02
                          279.17 1.528E-02 &(  4.945E-02 1.48E-02 G K
                           72.87-3.945E-01 % P 1.354E+00 4.08E-01 G
                           70.83-4.651E-01 %   2.257E+00 6.79E-01 G
                           82.50 1.262E-03 %   2.332E+00 6.93E-01 G

TL-208       3.1086E-01
                          583.14 3.109E-01 @(P 6.476E-02 3.27E-02 G
                          510.72 4.888E-01 + P 2.136E-01 8.82E-02 G

PB-212       8.8091E-01
                          238.63 8.916E-01  (P 6.763E-02 3.56E-02 G K
                                                          Energy duplication
                           77.11 8.347E-01 }   2.420E-01 6.95E-02 G
                           74.81 1.049E+00 + P 4.408E-01 1.46E-01 G

PB-214       4.2608E-01
                          351.99 4.261E-01  (P 9.485E-02 3.95E-02 G K
                          295.22 5.429E-01 + P 1.831E-01 6.97E-02 G
                                                          Energy duplication
                           77.11 0.000E+00 } P 4.486E-01 0.00E+00 G
                          241.92 7.026E-01 + P 3.936E-01 1.31E-01 G

BI-212       8.7808E-01
                          727.17 8.125E-01 @(P 5.028E-01 2.18E-01 G K
                         1620.56 1.159E+00  (  1.001E+00 4.16E-01 G
                          785.42 1.009E+00 % P 2.124E+00 6.43E-01 G

BI-214       5.5981E-01
                          609.32 5.598E-01  (P 1.309E-01 6.36E-02 G K
                         1764.51 7.535E-01 + P 2.118E-01 1.36E-01 G
                         1120.28 7.854E-01 + P 3.595E-01 1.50E-01 G

RA-224       8.9357E-01
                          241.00 8.936E-01  (P 6.152E-01 2.03E-01 G

RA-226       1.3005E+00
                          185.99 1.300E+00 @(  1.271E+00 3.95E-01 G

AC-228       1.0730E+00
                          911.07 1.073E+00 *(P 1.945E-01 1.05E-01 G K
                          968.90 7.410E-01 - P 2.937E-01 1.16E-01 G
                          338.40 6.891E-01 - P 3.149E-01 1.16E-01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.4385E-01
                          236.00-1.438E-01 %(P 4.697E-01 1.41E-01 G K
                          256.25-7.040E-03 % P 5.375E-01 1.57E-01 G

PA-234      -2.5425E-02
                           98.44-2.542E-02 &(  1.843E-01 5.52E-02 G K
                          946.00-8.377E-02 &   3.401E-01 1.00E-01 G
                          131.28-7.006E-02 %   2.371E-01 7.14E-02 G
                           94.67-1.546E-01 %   3.286E-01 9.96E-02 G
                          883.24 1.610E-01 &   3.906E-01 1.17E-01 G
                          926.70-4.345E-04 %   4.971E-01 1.39E-01 G
                          569.26 1.167E-01 %   3.940E-01 1.17E-01 G

TH-234       1.4376E+00
                           63.29 9.011E-01 %(P 2.226E+00 6.72E-01 G K
                           92.80 1.716E+00  (P 1.752E+00 5.40E-01 G
                           92.38 1.927E+00  (P 2.097E+00 6.44E-01 G

AM-241       8.3215E-03
                           59.54 8.322E-03 %(P 3.111E-01 9.27E-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 - 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	9.6169E-02	1.0275E-01	3.9822E-01	3.9827E-01	4.208E-01
K-40		1.5516E+01	1.5516E+01	1.7827E+00	1.9866E+00	
MN-54	#A	1.1785E-02	1.1919E-02	4.6699E-02	4.6704E-02	5.279E-02
CO-57	#B	-7.0396E-03	-7.1323E-03	4.8781E-02	4.8783E-02	5.362E-02
CO-60		2.6296E-01	2.6345E-01	7.0947E-02	7.2492E-02	
Sr-85	#A	-1.6592E-02	-1.7521E-02	5.3459E-02	5.3468E-02	5.656E-02
Kr-85	#A	-4.0722E+02	-4.0723E+02	1.3166E+03	1.3168E+03	1.310E+03
Y-88	#B	0.0000E+00	0.0000E+00	5.1880E-02	5.1880E-02	6.274E-02
NB-94	#B	1.5005E-02	1.5005E-02	3.9241E-02	3.9250E-02	4.423E-02
Ag-108M	#B	-2.0806E-02	-2.0808E-02	5.9399E-02	5.9410E-02	6.651E-02
CD-109	#A	-1.3985E-02	-1.4094E-02	2.7482E+00	2.7482E+00	1.617E+00
SN-113	#B	-4.9523E-03	-5.1066E-03	6.3202E-02	6.3203E-02	6.976E-02
SB-125	#B	1.3986E-01	1.4035E-01	1.1435E-01	1.1462E-01	1.484E-01
I-131	#B	-7.0917E-03	-1.1004E-02	6.5819E-02	6.5822E-02	4.805E-02
CS-134	#B	2.2181E-02	2.2285E-02	1.7981E-02	1.8025E-02	5.163E-02
CS-137	#	1.4747E-01	1.4751E-01	7.1700E-02	7.2183E-02	
CE-139	#A	-8.2067E-03	-8.4202E-03	4.9802E-02	4.9804E-02	5.234E-02
EU-152	#B	-1.2036E-03	-1.2045E-03	6.4376E-01	6.4376E-01	1.258E-01
EU-154	#B	-1.2135E-02	-1.2149E-02	1.0712E-01	1.0712E-01	1.062E-01
EU-155	#B	-1.2511E-02	-1.2535E-02	1.6818E-01	1.6818E-01	1.869E-01
HG-203	#B	1.4164E-02	1.5280E-02	4.4431E-02	4.4439E-02	4.584E-02
TL-208	#	3.1086E-01	3.1086E-01	9.8044E-02	9.9605E-02	
PB-212		8.8091E-01	8.8091E-01	1.0561E-01	1.1675E-01	
PB-214		4.2608E-01	4.2608E-01	1.1851E-01	1.2093E-01	
BI-212		8.7808E-01	8.7808E-01	5.9064E-01	5.9272E-01	
BI-214		5.5981E-01	5.5981E-01	1.9078E-01	1.9338E-01	
RA-224		8.9357E-01	8.9357E-01	6.1009E-01	6.1217E-01	6.152E-01
RA-226	#	1.3005E+00	1.3005E+00	1.1853E+00	1.1876E+00	1.271E+00
AC-228		1.0730E+00	1.0730E+00	3.1422E-01	3.2001E-01	
TH-227	#B	-1.4385E-01	-1.4385E-01	4.3375E-01	4.3383E-01	4.697E-01
PA-234	#B	-2.5425E-02	-2.5425E-02	1.6550E-01	1.6551E-01	1.843E-01
TH-234	#B	1.4376E+00	1.4376E+00	1.2587E+00	1.2613E+00	2.226E+00
AM-241	#A	8.3214E-03	8.3215E-03	2.7813E-01	2.7813E-01	3.111E-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 (995.3 to 1999.1 keV) 2.0948940E+01 pCi/gm
Total Decayed Activity (995.3 to 1999.1 keV) 2.0949469E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_13DEC2005_1651.An1

Sample description
FSS-NOL-05-02-025-F

Spectrum Filename: C:\GammaVision\Spectra\101F_13DEC2005_1651.An1

Acquisition information

Start time:	13-Dec-2005 16:51:35
Live time:	2000
Real time:	2002
Dead time:	0.11 %
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/channel^2

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:	1.9740E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.9740E+03) = 5.0659E+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	08-Dec-2005 11:42:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2112

***** 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
74.65	231.	14.95	1.00	1.651E-02				
74.65	231.	14.95	1.00	1.651E-02	74.81	9.600	9.721E-01	PB212
77.02	280.	17.23	1.50	1.720E-02	77.11	17.500	6.370E-01	PB212
					77.11	10.700	1.028E+00	PB214
77.02	276.	17.23	1.50	1.720E-02	77.11	17.500	6.285E-01	PB212
					77.11	10.700	1.028E+00	PB214
77.99	97.	37.28	1.01	1.745E-02	77.11	17.500	2.202E-01	PB212
					77.11	10.700	PBC<MDA	PB214
84.21	74.	38.19	0.00	1.874E-02				
87.01	163.	18.29	1.01	1.919E-02	86.45	32.740	1.793E-01	EU155
90.10	100.	28.19	1.02	1.960E-02				
93.33	134.	23.33	1.02	1.995E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.05	73.	40.28	0.72	2.110E-02				
186.64	128.	27.38	0.81	1.855E-02	185.99	3.280	1.432E+00	RA226
209.35	82.	32.58	1.16	1.721E-02				
238.71	806.	4.23	1.12	1.557E-02	238.63	43.100	8.153E-01	PB212
241.76	118.	20.32	1.12	1.541E-02	241.00	3.900	1.327E+00	RA224
246.16	101.	21.11	1.50	1.540E-02	241.92	7.470	6.016E-01	PB214
270.55	113.	22.27	1.26	1.399E-02				
295.39	171.	17.10	1.18	1.291E-02	295.22	19.200	4.675E-01	PB214
300.45	44.	36.92	1.21	1.271E-02				
338.54	171.	14.51	1.14	1.135E-02	338.40	12.010	8.483E-01	AC228
351.90	271.	10.25	1.23	1.093E-02				
351.90	271.	10.25	1.23	1.093E-02	351.99	37.100	4.546E-01	PB214
409.23	53.	33.44	0.62	9.426E-03				
463.02	56.	31.21	1.24	8.350E-03				

463.02	56.	31.21	1.24	8.350E-03	463.51	10.000	4.460E-01	SB125
511.06	123.	16.84	2.04	7.586E-03	510.72	22.500	4.288E-01	TL208
					514.00	99.270	1.189E-01	Sr85
583.21	231.	10.53	1.49	6.684E-03	583.14	86.000	2.725E-01	TL208
609.26	166.	10.93	1.45	6.413E-03	609.32	46.090	3.828E-01	BI214
661.90	99.	18.57	1.45	5.935E-03	661.62	84.620	1.341E-01	CS137
726.98	68.	26.08	1.68	5.444E-03	727.17	11.800	7.176E-01	BI212
911.08	136.	13.15	1.23	4.446E-03	911.07	29.000	7.110E-01	AC228
968.27	119.	16.38	1.14	4.215E-03	968.90	17.460	1.103E+00	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.33	35.	33.21	1.88	3.711E-03	1120.28	15.040	4.320E-01	BI214
1173.15	134.	13.75	1.87	3.565E-03	1173.23	99.860	2.577E-01	CO60
1332.52	117.	15.84	1.39	3.190E-03	1332.51	99.980	2.512E-01	CO60
1460.47	742.	3.76	1.83	2.943E-03	1460.75	10.700	1.608E+01	K40
1764.09	34.	17.15	1.56	2.481E-03	1764.51	15.920	5.816E-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
179.77	90.15	346.	100.	0.050	84.57	1.016	PB-214 lD
418.38	209.35	299.	82.	0.041	97.73	1.162	AC-228 s
477.11	238.76	177.	806.	0.403	12.68	1.122	PB-212 D
483.21	241.81	226.	118.	0.059	60.96	1.124	PB-214 D
540.82	270.55	200.	113.	0.056	66.80	1.261	AC-228 s
600.66	300.45	113.	44.	0.022	110.75	1.212	PB-212
818.30	409.23	111.	53.	0.027	100.32	0.625	AC-228 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	149.15	74.79	1160.	211.	0.105	69.84	1.499
PB-212	153.79	77.11	1025.	280.	0.140	51.70	1.499D
PB-214	153.79	77.11	1029.	276.	0.138	51.70	1.499D
EU-155	173.89	87.16	991.	143.	0.072	96.65	1.499
TH-234	185.30	92.86	1031.	153.	0.077	85.69	1.499s
TH-234	185.31	92.86	976.	167.	0.084	79.45	1.499s
RA-226	372.22	186.28	531.	114.	0.057	90.28	1.499s
PB-212	477.13	238.71	429.	700.	0.350	16.74	1.499
RA-224	482.93	241.62	490.	105.	0.053	93.21	1.499
PB-214	492.02	246.16	181.	101.	0.051	63.32	1.499s
PB-214	590.37	295.31	231.	167.	0.083	44.58	1.499
AC-228	676.86	338.54	167.	169.	0.084	43.53	1.144
PB-214	703.72	351.96	138.	250.	0.125	27.24	1.499
SB-125	926.19	463.15	87.	37.	0.019	112.17	1.499
TL-208	1022.07	511.06	118.	107.	0.053	50.52	2.037s
TL-208	1166.43	583.21	95.	229.	0.114	31.60	1.492s
BI-214	1218.55	609.26	70.	165.	0.083	32.80	1.449

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	1323.88	661.90	79.	98.	0.049	55.72	1.452
BI-212	1454.12	726.98	78.	67.	0.034	78.23	1.678
AC-228	1822.50	911.08	59.	134.	0.067	39.45	1.233s
AC-228	1936.96	968.27	74.	118.	0.059	49.14	1.140s
BI-214	2241.26	1120.33	44.	35.	0.018	99.62	1.881s
CO-60	2346.95	1173.15	62.	134.	0.067	41.24	1.871s
CO-60	2665.89	1332.52	48.	117.	0.058	47.53	1.388
K-40	2921.96	1460.47	12.	740.	0.370	11.27	1.826
BI-214	3529.61	1764.09	0.	34.	0.017	51.45	1.561

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-9.0925E-03					
			477.56	-9.092E-03	&(	4.610E-01 1.33E-01 G	
K-40		1.6084E+01					
			1460.75	1.608E+01	(P	4.140E-01 6.06E-01 G	
MN-54		-8.2633E-04					
			834.81	-8.263E-04	&(P	5.388E-02 1.51E-02 G	
CO-57		7.8993E-03					
			122.07	7.899E-03	&(	4.945E-02 1.48E-02 G K	
			136.43	-7.087E-02	%	4.184E-01 1.25E-01 G	
CO-60		2.5444E-01					
			1332.51	2.512E-01	(P	7.539E-02 3.98E-02 G K	
			1173.23	2.577E-01	@(P	7.606E-02 3.55E-02 G K	
Sr-85		-2.0804E-02					
			514.00	-2.080E-02	%(	6.065E-02 1.82E-02 G	
Kr-85		-5.2631E+02					
			513.99	-5.263E+02	%(P	1.332E+03 3.99E+02 G	
Y-88		3.1448E-03					
			1836.01	3.145E-03	&(	5.565E-02 1.48E-02 G K	
			898.02	-4.235E-03	% P	5.670E-02 1.60E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-5.4369E-04						
		871.10	-5.437E-04	%(P	5.547E-02	1.56E-02	G K
		702.50	2.245E-02	% P	5.377E-02	1.62E-02	G K
Ag-108M	-1.5694E-02						
		722.95	-1.569E-02	%(	6.536E-02	1.93E-02	G K
		614.37	-1.724E-04	% P	5.449E-02	1.56E-02	G
		433.93	1.777E-02	%	4.366E-02	1.31E-02	G
CD-109	1.1594E-01						
		88.04	1.159E-01	%(P	1.603E+00	4.80E-01	G
SN-113	-1.0060E-04						
		391.71	-1.006E-04	&(	6.721E-02	1.95E-02	G K
		255.04	1.856E-01	% P	1.414E+00	4.15E-01	G
SB-125	8.7716E-02						
		427.95	1.377E-02	%(P	1.359E-01	3.95E-02	G K
		600.77	-1.251E-02	& P	2.712E-01	7.79E-02	G
		636.15	6.706E-02	& P	3.902E-01	1.13E-01	G
		463.51	3.066E-01	(P	3.796E-01	1.19E-01	G
		176.29	2.700E-01	% P	5.371E-01	1.63E-01	G
I-131	6.7116E-03						
		364.48	6.712E-03	&(	7.466E-02	2.18E-02	G K
		636.97	-1.831E-01	&	1.104E+00	3.22E-01	G
		284.29	1.004E-01	&	1.013E+00	2.99E-01	G
CS-134	-1.3632E-03						
		604.66	-1.363E-03	&(P	4.014E-02	1.13E-02	G K
		795.76	-3.965E-03	% P	6.010E-02	1.70E-02	G
		569.29	1.056E-01	% P	2.687E-01	8.05E-02	G
		801.84	1.516E-01	&	5.371E-01	1.58E-01	G
CS-137	1.3414E-01						
		661.62	1.341E-01	(P	6.000E-02	2.51E-02	G
CE-139	-1.2136E-02						
		165.85	-1.214E-02	%(P	5.534E-02	1.66E-02	G
EU-152	1.7832E-02						
		121.78	1.783E-02	%(P	1.481E-01	4.43E-02	G K
		344.30	-3.275E-02	% P	1.592E-01	4.71E-02	G
		1408.08	2.720E-02	% P	2.022E-01	5.51E-02	G
		964.00	1.724E-01	% P	5.041E-01	1.50E-01	G
		1112.07	9.729E-02	& P	4.440E-01	1.29E-01	G
		778.90	4.793E-02	% P	3.619E-01	1.04E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	1.6951E-02						
		123.10	1.695E-02	%(P	1.068E-01	3.20E-02	G K
		1274.80	-2.409E-02	% P	1.807E-01	5.14E-02	G
		723.30	-5.604E-02	% P	3.149E-01	9.20E-02	G
		1004.80	-1.170E-02	% P	3.892E-01	1.11E-01	G
EU-155	1.5700E-01						
		86.45	1.570E-01	(	1.639E-01	5.06E-02	G K
		105.31	6.209E-02	%	2.062E-01	6.21E-02	G
HG-203	-9.5800E-04						
		279.17	-9.580E-04	&(	5.091E-02	1.49E-02	G K
		72.87	-3.220E-01	& P	1.309E+00	3.94E-01	G
		70.83	-1.019E-01	%	1.594E+00	4.74E-01	G
		82.50	-1.216E+00	%	2.705E+00	8.20E-01	G
TL-208	2.7249E-01						
		583.14	2.725E-01	@(P	5.737E-02	2.90E-02	G
		510.72	4.288E-01	+ P	2.138E-01	8.31E-02	G
PB-212	6.9161E-01						
		238.63	7.138E-01	(P	1.012E-01	4.02E-02	G K
							Energy duplication
		77.11	6.370E-01	(	3.454E-01	1.10E-01	G
		74.81	9.082E-01	& P	6.961E-01	2.17E-01	G
PB-214	4.3514E-01						
		351.99	4.223E-01	(P	9.696E-02	3.86E-02	G K
		295.22	4.600E-01	(P	2.029E-01	6.91E-02	G
							Energy duplication
		77.11	1.028E+00	+ P	5.660E-01	1.80E-01	G
		241.92	6.016E-01	+ P	3.887E-01	1.28E-01	G
BI-212	7.1757E-01						
		727.17	7.176E-01	(P	4.666E-01	1.89E-01	G K
		1620.56	4.126E-01	%	1.530E+00	4.35E-01	G
		785.42	6.315E-01	% P	2.375E+00	6.96E-01	G
BI-214	3.9494E-01						
		609.32	3.828E-01	(P	9.639E-02	4.21E-02	G K
		1764.51	5.816E-01	+ P	1.277E-01	1.01E-01	G
		1120.28	4.320E-01	*(P	4.115E-01	1.45E-01	G
RA-224	1.1967E+00						
		241.00	1.197E+00	?(P	1.203E+00	3.74E-01	G
RA-226	1.2800E+00						
		185.99	1.280E+00	*(	1.237E+00	3.85E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AC-228       7.5124E-01
                          911.07 7.110E-01 @(P 2.045E-01 9.48E-02 G K
                          968.90 1.103E+00 + P 3.972E-01 1.82E-01 G
                          338.40 8.483E-01  (P 3.161E-01 1.25E-01 G

TH-227      -2.8123E-01
                          236.00-2.812E-01 %(P 4.981E-01 1.52E-01 G K
                          256.25-1.709E-01 & P 6.008E-01 1.80E-01 G

PA-234      -2.4605E-04
                           98.44-2.460E-04 &(  1.868E-01 5.56E-02 G K
                          946.00-2.506E-03 %   2.707E-01 7.57E-02 G
                          131.28-1.148E-02 &   2.244E-01 6.69E-02 G
                           94.67-1.552E-01 %   3.064E-01 9.30E-02 G
                          883.24-5.730E-02 %   4.783E-01 1.38E-01 G
                          926.70-5.566E-02 %   4.649E-01 1.32E-01 G
                          569.26 1.599E-01 %   3.956E-01 1.19E-01 G

TH-234       1.5379E+00
                           63.29 8.999E-01 %(P 2.228E+00 6.72E-01 G K
                           92.80 1.920E+00  (P 1.701E+00 5.27E-01 G
                           92.38 2.060E+00  (P 2.044E+00 6.30E-01 G

AM-241       4.3486E-02
                           59.54 4.349E-02 &(P 2.807E-01 8.39E-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
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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	-8.4973E-03	-9.0925E-03	3.9894E-01	3.9894E-01	4.308E-01
K-40		1.6084E+01	1.6084E+01	1.8183E+00	2.0327E+00	
MN-54	#A	-8.1682E-04	-8.2633E-04	2.8915E-01	2.8915E-01	5.326E-02
CO-57	#B	7.7942E-03	7.8993E-03	4.4383E-02	4.4385E-02	4.879E-02
CO-60		2.5396E-01	2.5444E-01	8.0126E-02	8.1406E-02	
Sr-85	#A	-1.9676E-02	-2.0804E-02	5.4522E-02	5.4535E-02	5.736E-02
Kr-85	#A	-5.2629E+02	-5.2631E+02	1.3152E+03	1.3155E+03	1.332E+03
Y-88	#B	3.0399E-03	3.1448E-03	4.4273E-02	4.4273E-02	5.379E-02
NB-94	#B	-5.4369E-04	-5.4369E-04	1.0021E-01	1.0021E-01	5.547E-02
Ag-108M	#B	-1.5693E-02	-1.5694E-02	5.7813E-02	5.7820E-02	6.536E-02
CD-109	#A	1.1502E-01	1.1594E-01	1.4393E+00	1.4393E+00	1.590E+00
SN-113	#B	-9.7493E-05	-1.0060E-04	5.8439E-02	5.8439E-02	6.513E-02
SB-125	#B	8.7403E-02	8.7716E-02	1.0222E-01	1.0234E-01	1.354E-01
I-131	#B	4.2812E-03	6.7116E-03	6.5466E-02	6.5467E-02	4.762E-02
CS-134	#B	-1.3567E-03	-1.3632E-03	9.9897E-02	9.9897E-02	3.994E-02
CS-137		1.3410E-01	1.3414E-01	7.5415E-02	7.5795E-02	
CE-139	#A	-1.1821E-02	-1.2136E-02	5.0964E-02	5.0969E-02	5.390E-02
EU-152	#B	1.7818E-02	1.7832E-02	1.3275E-01	1.3276E-01	1.480E-01
EU-154	#B	1.6931E-02	1.6951E-02	9.5911E-02	9.5916E-02	1.067E-01
EU-155	#A	1.5668E-01	1.5700E-01	1.5174E-01	1.5199E-01	1.636E-01
HG-203	#B	-8.8648E-04	-9.5800E-04	4.4764E-02	4.4764E-02	4.711E-02
TL-208	#	2.7249E-01	2.7249E-01	8.7006E-02	8.8358E-02	
PB-212	#	6.9161E-01	6.9161E-01	1.1681E-01	1.2317E-01	1.012E-01
PB-214	#	4.3514E-01	4.3514E-01	1.1480E-01	1.1740E-01	9.696E-02
BI-212		7.1757E-01	7.1757E-01	5.6698E-01	5.6843E-01	
BI-214		3.9494E-01	3.9494E-01	1.3042E-01	1.3231E-01	
RA-224	#A	1.1967E+00	1.1967E+00	1.1231E+00	1.1251E+00	1.203E+00
RA-226	#	1.2800E+00	1.2800E+00	1.1556E+00	1.1578E+00	1.237E+00
AC-228		7.5124E-01	7.5124E-01	2.2361E-01	2.2760E-01	
TH-227	#B	-2.8123E-01	-2.8123E-01	4.6020E-01	4.6047E-01	4.981E-01
PA-234	#B	-2.4605E-04	-2.4605E-04	1.6681E-01	1.6681E-01	1.868E-01
TH-234	#B	1.5379E+00	1.5379E+00	1.2670E+00	1.2698E+00	2.228E+00
AM-241	#A	4.3485E-02	4.3486E-02	2.5174E-01	2.5175E-01	2.807E-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 (270.1 to 1999.1 keV) 1.8608297E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.8608820E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_13DEC2005_1728.An1

Sample description
FSS-NOL-05-02-029-F

Spectrum Filename: C:\GammaVision\Spectra\101F_13DEC2005_1728.An1

Acquisition information
Start time: 13-Dec-2005 17:28:24
Live time: 2000
Real time: 2002
Dead time: 0.11 %
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/channel^2

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: 1.8350E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8350E+03) =
5.4496E+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	08-Dec-2005 10:58:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1243

***** 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
74.18	133.	23.84	1.00	1.635E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.15	384.	8.75	1.01	1.723E-02	77.11	10.700	1.523E+00	PB214
					77.11	17.500	9.401E-01	PB212
87.08	119.	38.62	1.50	1.910E-02	86.45	32.740	PBC<MDA	EU155
92.98	117.	34.96	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.98	122.	34.33	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.49	90.	36.46	0.94	1.861E-02				
185.49	90.	36.46	0.94	1.861E-02	185.99	3.280	1.083E+00	RA226
209.52	69.	37.08	0.97	1.720E-02				
238.65	833.	4.05	1.12	1.557E-02	238.63	43.100	9.076E-01	PB212
241.48	112.	20.19	1.12	1.542E-02	241.00	3.900	1.366E+00	RA224
					241.92	7.470	PBC<MDA	PB214
270.36	44.	36.54	0.93	1.400E-02				
295.23	129.	14.15	1.16	1.292E-02	295.22	19.200	3.781E-01	PB214
300.03	59.	28.34	1.16	1.273E-02				
328.27	77.	32.73	1.16	1.169E-02				
338.42	152.	15.68	1.27	1.135E-02	338.40	12.010	8.110E-01	AC228
351.83	266.	9.57	1.09	1.093E-02				
351.83	266.	9.57	1.09	1.093E-02	351.99	37.100	4.795E-01	PB214
462.15	46.	30.53	1.77	8.366E-03				
462.15	46.	30.53	1.77	8.366E-03	463.51	10.000	3.948E-01	SB125
510.27	101.	19.83	1.18	7.597E-03	510.72	22.500	3.664E-01	TL208
583.03	236.	8.37	1.11	6.686E-03	583.14	86.000	2.990E-01	TL208
609.17	158.	11.11	1.36	6.414E-03	609.32	46.090	3.909E-01	BI214

661.59	31.	39.25	1.44	5.938E-03				
661.59	31.	39.25	1.44	5.938E-03	661.62	84.620	PBC<MDA	CS137
726.96	42.	31.71	1.20	5.444E-03	727.17	11.800	4.704E-01	BI212
911.01	125.	11.39	1.46	4.447E-03	911.07	29.000	7.021E-01	AC228
967.76	120.	15.83	1.91	4.216E-03	968.90	17.460	1.195E+00	AC228
1119.92	60.	23.56	2.18	3.711E-03	1120.28	15.040	7.946E-01	BI214
1171.57	78.	22.55	1.41	3.569E-03	1173.23	99.860	1.622E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1331.64	21.	36.37	1.85	3.190E-03	1332.51	99.980	PBC<MDA	CO60
1460.43	681.	3.94	1.78	2.943E-03	1460.75	10.700	1.588E+01	K40
1763.84	38.	16.22	0.62	2.481E-03	1764.51	15.920	7.002E-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	
147.92	74.23	434.	133.	0.066	71.52	1.004	BI-207	D
153.88	77.20	374.	384.	0.192	26.26	1.007	PB-214	D
370.63	185.49	407.	90.	0.045	109.39	0.944	U-235	l
418.72	209.52	277.	69.	0.034	111.25	0.971	AC-228	
477.01	238.68	154.	833.	0.417	12.16	1.122	PB-212	D
540.44	270.36	122.	44.	0.022	109.63	0.929	AC-228	
599.80	300.02	136.	60.	0.030	93.63	1.394	PB-212	
656.31	328.27	186.	77.	0.038	98.18	1.164	RH-106M	
1323.28	661.59	49.	31.	0.015	117.74	1.439	CS-137	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

********** 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	149.03	74.73	1117.	152.	0.076	93.01	1.499s
PB-214	153.79	77.11	888.	343.	0.171	39.81	1.499D
PB-212	153.79	77.11	885.	347.	0.173	39.81	1.499D
EU-155	173.74	87.08	1005.	119.	0.060	115.85	1.499
TH-234	185.54	92.98	941.	117.	0.058	104.89	1.499s
TH-234	185.54	92.98	911.	122.	0.061	103.00	1.499s
PB-212	476.96	238.63	414.	617.	0.309	18.25	1.499
RA-224	481.70	241.00	380.	107.	0.054	81.84	1.123D
PB-214	590.19	295.22	217.	112.	0.056	61.44	1.499D
AC-228	676.62	338.42	157.	150.	0.075	47.03	1.266
PB-214	703.63	351.92	144.	223.	0.111	30.14	1.499
SB-125	925.13	462.62	63.	44.	0.022	84.81	1.499s
TL-208	1020.49	510.27	116.	85.	0.042	59.48	1.178s
TL-208	1166.07	583.03	62.	233.	0.117	25.12	1.107
BI-214	1218.37	609.17	61.	157.	0.078	33.32	1.361
BI-212	1454.08	726.96	50.	41.	0.021	95.12	1.203
AC-228	1822.36	911.01	34.	123.	0.061	34.17	1.464

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1935.94	967.76	60.	119.	0.060	47.50	1.908s
BI-214	2240.44	1119.92	50.	60.	0.030	70.68	2.179s
CO-60	2343.80	1171.57	62.	78.	0.039	67.64	1.411s
CO-60	2664.12	1331.64	19.	21.	0.011	109.12	1.846s
K-40	2921.88	1460.43	13.	679.	0.339	11.83	1.782
BI-214	3529.12	1763.84	0.	38.	0.019	48.67	0.618s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-8.7051E-03					
			477.56	-8.705E-03	%(	3.637E-01 1.03E-01	G
K-40		1.5880E+01					
			1460.75	1.588E+01	(P	4.576E-01 6.28E-01	G
MN-54		1.3528E-02					
			834.81	1.353E-02	&(P	6.044E-02 1.76E-02	G
CO-57		8.0601E-03					
			122.07	8.060E-03	%(	5.243E-02 1.57E-02	G K
			136.43	-1.411E-01	%	4.134E-01 1.25E-01	G
CO-60		1.0560E-01					
			1332.51	4.908E-02	?(P	5.382E-02 1.79E-02	G K
			1173.23	1.622E-01	*(P	8.152E-02 3.66E-02	G K
Sr-85		-2.7236E-02					
			514.00	-2.724E-02	&(	6.669E-02 2.01E-02	G
Kr-85		-6.2105E+02					
			513.99	-6.210E+02	&(P	1.460E+03 4.39E+02	G
Y-88		3.4836E-03					
			1836.01	3.484E-03	&(	5.205E-02 1.36E-02	G K
			898.02	7.493E-03	% P	5.851E-02 1.67E-02	G
NB-94		2.7247E-04					
			871.10	2.725E-04	%(P	3.983E-02 1.08E-02	G K
			702.50	4.543E-05	% P	5.034E-02 1.42E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-8.0771E-03						
		722.95	-8.077E-03	%(	5.781E-02	1.67E-02	G K
		614.37	7.558E-04	% P	5.800E-02	1.66E-02	G
		433.93	-9.802E-04	&	4.920E-02	1.42E-02	G
CD-109	2.5663E-01						
		88.04	2.566E-01	&(P	1.535E+00	4.60E-01	G
SN-113	-2.2400E-02						
		391.71	-2.240E-02	%(	6.653E-02	1.99E-02	G K
		255.04	-3.372E-02	& P	1.919E+00	5.62E-01	G
SB-125	6.5673E-02						
		427.95	-4.511E-02	%(P	1.589E-01	4.72E-02	G K
		600.77	3.829E-02	% P	2.353E-01	6.80E-02	G
		636.15	8.361E-03	% P	4.901E-01	1.40E-01	G
		463.51	3.936E-01	&(P	3.507E-01	1.15E-01	G
		176.29	-2.197E-02	& P	6.237E-01	1.84E-01	G
I-131	1.8003E-02						
		364.48	1.800E-02	&(	6.591E-02	1.95E-02	G K
		636.97	-3.348E-01	&	1.181E+00	3.50E-01	G
		284.29	-1.081E-01	%	9.988E-01	2.94E-01	G
CS-134	-2.2993E-02						
		604.66	-2.299E-02	%(P	6.430E-02	1.92E-02	G K
		795.76	3.322E-02	% P	5.499E-02	1.70E-02	G
		569.29	-3.117E-03	% P	3.542E-01	1.02E-01	G
		801.84	4.322E-02	%	5.797E-01	1.64E-01	G
CS-137	4.2623E-02						
		661.62	4.262E-02	%(P	6.088E-02	1.89E-02	G
CE-139	-2.5116E-03						
		165.85	-2.512E-03	%(P	5.305E-02	1.57E-02	G
EU-152	-2.0006E-03						
		121.78	-2.001E-03	%(P	1.138E-01	3.36E-02	G K
		344.30	8.069E-03	% P	1.579E-01	4.61E-02	G
		1408.08	4.926E-02	% P	2.452E-01	6.90E-02	G
		964.00	8.166E-03	& P	9.886E-01	2.90E-01	G
		1112.07	3.369E-01	% P	4.501E-01	1.43E-01	G
		778.90	-2.300E-03	% P	3.396E-01	9.39E-02	G
EU-154	2.3625E-02						
		123.10	2.363E-02	%(P	1.015E-01	3.04E-02	G K
		1274.80	-5.559E-04	% P	1.964E-01	5.45E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-6.290E-02	% P	2.945E-01	8.60E-02	G
		1004.80	-1.939E-03	% P	3.396E-01	9.46E-02	G
EU-155	1.4103E-01						
		86.45	1.410E-01	(	1.776E-01	5.45E-02	G K
		105.31	7.722E-02	&	2.066E-01	6.24E-02	G
HG-203	3.1158E-02						
		279.17	3.116E-02	&(	4.675E-02	1.44E-02	G K
		72.87	-6.075E-01	& P	1.376E+00	4.16E-01	G
		70.83	1.906E-01	%	2.145E+00	6.41E-01	G
		82.50	4.163E-01	%	2.772E+00	8.30E-01	G
TL-208	3.1300E-01						
		583.14	2.990E-01	(P	5.032E-02	2.53E-02	G
		510.72	3.664E-01	*(P	2.281E-01	8.63E-02	G
PB-212	6.8252E-01						
		238.63	6.774E-01	(P	1.070E-01	4.16E-02	G K
							Energy duplication
		77.11	8.478E-01	+	3.456E-01	1.13E-01	G
		74.81	7.057E-01	?(P	7.350E-01	2.26E-01	G
PB-214	3.8033E-01						
		351.99	4.047E-01	(P	1.067E-01	4.10E-02	G K
							Energy duplication
		295.22	3.332E-01	(P	2.121E-01	6.93E-02	G
							Energy duplication
		77.11	1.372E+00	+ P	5.665E-01	1.84E-01	G
		241.92	1.800E-01	% P	7.361E-01	2.21E-01	G
BI-212	4.7037E-01						
		727.17	4.704E-01	(P	4.088E-01	1.52E-01	G K
		1620.56	3.722E-01	%	1.160E+00	3.32E-01	G
		785.42	1.338E+00	% P	2.386E+00	7.33E-01	G
BI-214	3.9092E-01						
		609.32	3.909E-01	(P	9.752E-02	4.37E-02	G K
		1764.51	7.002E-01	+ P	1.374E-01	1.15E-01	G
		1120.28	7.946E-01	+ P	4.696E-01	1.88E-01	G
RA-224	1.3098E+00						
		241.00	1.310E+00	(P	1.143E+00	3.60E-01	G
RA-226	9.1488E-01						
		185.99	9.149E-01	%(	1.256E+00	3.86E-01	G
AC-228	7.3398E-01						
		911.07	7.021E-01	(P	1.708E-01	8.12E-02	G K
		968.90	1.195E+00	+ P	3.874E-01	1.90E-01	G
		338.40	8.110E-01	(P	3.300E-01	1.29E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -3.9988E-02
                          236.00-3.999E-02 &(P 4.536E-01 1.35E-01 G K
                          256.25 1.149E-01 & P 5.649E-01 1.68E-01 G

PA-234      -1.4170E-03
                           98.44-1.417E-03 %(  1.941E-01 5.77E-02 G K
                          946.00 9.253E-02 &   2.720E-01 8.06E-02 G
                          131.28-2.156E-02 &   2.306E-01 6.88E-02 G
                           94.67-1.008E-01 %   3.451E-01 1.04E-01 G
                          883.24 9.763E-02 %   4.078E-01 1.18E-01 G
                          926.70 1.291E-01 %   4.217E-01 1.24E-01 G
                          569.26 0.000E+00 %   5.219E-01 1.50E-01 G

TH-234       1.1927E+00
                           63.29 6.284E-01 %(P 2.264E+00 6.79E-01 G K
                           92.80 1.506E+00  (P 1.769E+00 5.43E-01 G
                           92.38 1.684E+00 &(P 2.102E+00 6.43E-01 G

AM-241      -8.0291E-04
                           59.54-8.029E-04 %(P 3.177E-01 9.44E-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 - 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	-8.1294E-03	-8.7051E-03	3.0902E-01	3.0902E-01	3.397E-01
K-40		1.5880E+01	1.5880E+01	1.8844E+00	2.0871E+00	
MN-54	#A	1.3371E-02	1.3528E-02	5.2930E-02	5.2936E-02	5.974E-02
CO-57	#B	7.9518E-03	8.0601E-03	4.7032E-02	4.7034E-02	5.172E-02
CO-60	#	1.0540E-01	1.0560E-01	6.8025E-02	6.8286E-02	5.372E-02
Sr-85	#A	-2.5743E-02	-2.7236E-02	6.0301E-02	6.0321E-02	6.303E-02
Kr-85	#A	-6.2102E+02	-6.2105E+02	1.4341E+03	1.4346E+03	1.460E+03
Y-88	#B	3.3662E-03	3.4836E-03	4.0727E-02	4.0728E-02	5.029E-02
NB-94	#B	2.7247E-04	2.7247E-04	3.2347E-02	3.2347E-02	3.983E-02
Ag-108M	#B	-8.0765E-03	-8.0771E-03	5.0052E-02	5.0054E-02	5.780E-02
CD-109	#A	2.5457E-01	2.5663E-01	1.3811E+00	1.3812E+00	1.523E+00
SN-113	#B	-2.1700E-02	-2.2400E-02	5.9670E-02	5.9684E-02	6.445E-02
SB-125	#B	6.5436E-02	6.5673E-02	5.7511E-02	5.7631E-02	1.583E-01
I-131	#B	1.1429E-02	1.8003E-02	5.8574E-02	5.8583E-02	4.184E-02
CS-134	#B	-2.2882E-02	-2.2993E-02	6.1337E-02	6.1351E-02	6.398E-02
CS-137	#A	4.2609E-02	4.2623E-02	5.6831E-02	5.6882E-02	6.086E-02
CE-139	#A	-2.4458E-03	-2.5116E-03	5.3502E-02	5.3502E-02	5.166E-02
EU-152	#B	-1.9991E-03	-2.0006E-03	2.7716E-01	2.7716E-01	1.138E-01
EU-154	#B	2.3598E-02	2.3625E-02	9.1247E-02	9.1256E-02	1.014E-01
EU-155	#A	1.4075E-01	1.4103E-01	1.6339E-01	1.6357E-01	1.772E-01
HG-203	#B	2.8808E-02	3.1158E-02	4.3192E-02	4.3228E-02	4.323E-02
TL-208		3.1300E-01	3.1300E-01	7.9414E-02	8.1360E-02	
PB-212	#	6.8252E-01	6.8252E-01	1.2580E-01	1.3158E-01	1.070E-01
PB-214	#	3.8033E-01	3.8033E-01	1.1564E-01	1.1762E-01	1.067E-01
BI-212		4.7037E-01	4.7037E-01	4.5480E-01	4.5558E-01	
BI-214		3.9092E-01	3.9092E-01	1.3118E-01	1.3303E-01	
RA-224		1.3098E+00	1.3098E+00	1.0791E+00	1.0817E+00	
RA-226	#A	9.1487E-01	9.1488E-01	1.1573E+00	1.1584E+00	1.256E+00
AC-228		7.3398E-01	7.3398E-01	2.1649E-01	2.2043E-01	
TH-227	#B	-3.9988E-02	-3.9988E-02	4.4292E-01	4.4292E-01	4.536E-01
PA-234	#B	-1.4170E-03	-1.4170E-03	1.7319E-01	1.7319E-01	1.941E-01
TH-234	#B	1.1927E+00	1.1927E+00	1.2907E+00	1.2924E+00	2.264E+00
AM-241	#A	-8.0289E-04	-8.0291E-04	6.3177E-01	6.3177E-01	3.177E-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 (270.1 to 1999.1 keV) 1.9203718E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.9203918E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_13DEC2005_1805.An1

Sample description
FSS-NOL-05-02-019-F

Spectrum Filename: C:\GammaVision\Spectra\101F_13DEC2005_1805.An1

Acquisition information
Start time: 13-Dec-2005 18:05:10
Live time: 2000
Real time: 2002
Dead time: 0.12 %
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/channel^2

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: 1.8450E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8450E+03) =
5.4201E+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	08-Dec-2005 11:52:00
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. 21 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1646

***** 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	157.	22.40	1.00	1.651E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.23	387.	8.62	1.01	1.732E-02	77.11	17.500	9.420E-01	PB212
					77.11	10.700	1.526E+00	PB214
87.14	97.	31.30	1.01	1.922E-02	86.45	32.740	1.143E-01	EU155
93.30	149.	19.97	1.02	1.996E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.749E+00	TH234
185.85	108.	26.98	1.53	1.859E-02				
185.85	108.	26.98	1.53	1.859E-02	185.99	3.280	1.303E+00	RA226
208.91	78.	37.14	0.89	1.724E-02				
238.68	787.	4.27	1.12	1.557E-02	238.63	43.100	8.519E-01	PB212
241.46	102.	21.44	1.12	1.543E-02	241.00	3.900	1.231E+00	RA224
270.05	65.	35.36	1.04	1.401E-02				
295.17	160.	13.07	1.11	1.292E-02				
295.17	160.	13.07	1.11	1.292E-02	295.22	19.200	4.672E-01	PB214
300.22	69.	30.63	0.82	1.272E-02				
338.35	199.	15.25	1.19	1.135E-02	338.40	12.010	1.055E+00	AC228
351.71	266.	8.70	1.10	1.093E-02				
351.71	266.	8.70	1.10	1.093E-02	351.99	37.100	4.771E-01	PB214
462.80	48.	31.46	1.46	8.354E-03				
462.80	48.	31.46	1.46	8.354E-03	463.51	10.000	4.102E-01	SB125
510.77	98.	17.88	2.00	7.590E-03	510.72	22.500	3.494E-01	TL208
582.94	240.	11.30	1.34	6.687E-03	583.14	86.000	3.033E-01	TL208
609.68	200.	9.89	1.45	6.409E-03	609.32	46.090	4.941E-01	BI214
661.55	48.	35.90	1.52	5.937E-03	661.62	84.620	7.017E-02	CS137
727.05	82.	21.89	1.14	5.444E-03	727.17	11.800	9.320E-01	BI212
794.34	33.	37.48	0.94	5.024E-03				

910.92	160.	14.67	1.41	4.447E-03	911.07	29.000	9.011E-01	AC228
968.27	122.	16.84	1.68	4.215E-03	968.90	17.460	1.208E+00	AC228
1120.23	41.	29.86	1.28	3.711E-03	1120.28	15.040	5.357E-01	BI214
1172.69	71.	26.71	1.31	3.565E-03	1173.23	99.860	1.473E-01	CO60
1331.78	56.	17.95	2.00	3.190E-03	1332.51	99.980	1.291E-01	CO60
1460.35	755.	3.71	1.91	2.943E-03	1460.75	10.700	1.751E+01	K40
1763.86	33.	17.41	1.57	2.481E-03	1764.51	15.920	6.037E-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	
148.37	74.72	544.	157.	0.079	67.20	1.005	BI-207	D
154.02	77.54	364.	387.	0.194	25.87	1.007	PB-214	D
173.85	87.29	415.	97.	0.049	93.89	1.014	PB-214	lD
417.50	208.91	333.	78.	0.039	111.43	0.890	AC-228	
477.07	238.65	171.	786.	0.393	12.82	1.122	PB-212	D
539.82	270.05	203.	65.	0.033	106.09	1.037	AC-228	s
600.19	300.22	155.	69.	0.034	85.18	0.820	PB-212	
1588.91	794.34	44.	37.	0.018	91.60	0.935	AC-228	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	149.50	74.97	1169.	163.	0.081	89.14	1.499s
PB-212	153.79	77.11	1021.	307.	0.153	47.39	1.499D
PB-214	153.79	77.11	1024.	303.	0.152	47.39	1.499D
TH-234	185.77	93.09	957.	155.	0.078	81.89	1.499s
TH-234	185.73	93.07	899.	189.	0.095	68.33	1.499s
RA-226	371.71	186.03	469.	110.	0.055	88.21	1.499s
PB-212	476.95	238.63	397.	609.	0.305	18.21	1.499
RA-224	481.70	241.00	407.	96.	0.048	93.58	1.123D
PB-214	590.26	295.26	200.	140.	0.070	49.14	1.499s
AC-228	676.48	338.35	227.	196.	0.098	45.74	1.190
PB-214	703.52	351.86	115.	249.	0.125	26.11	1.499s
SB-125	925.33	462.72	74.	45.	0.022	89.43	1.499
TL-208	1021.48	510.77	99.	81.	0.041	53.63	2.004s
TL-208	1165.89	582.94	130.	238.	0.119	33.90	1.343
BI-214	1219.39	609.68	68.	199.	0.100	29.68	1.448s
CS-137	1323.18	661.55	85.	48.	0.024	107.69	1.516s
BI-212	1454.24	727.05	74.	82.	0.041	65.66	1.140
AC-228	1822.18	910.92	89.	159.	0.079	44.00	1.410
AC-228	1936.95	968.27	76.	121.	0.061	50.51	1.679
BI-214	2241.05	1120.23	41.	41.	0.020	89.58	1.284
CO-60	2346.04	1172.69	76.	71.	0.036	80.12	1.306s
CO-60	2664.41	1331.78	14.	56.	0.028	53.84	2.001s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2921.71	1460.35	9.	753.	0.376	11.14	1.907
BI-214	3529.15	1763.86	0.	33.	0.016	52.22	1.566

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-2.2116E-02					
			477.56	-2.212E-02	&(	4.792E-01 1.38E-01	G
K-40		1.7511E+01					
			1460.75	1.751E+01	(P	3.933E-01 6.52E-01	G
MN-54		-6.4441E-04					
			834.81	-6.444E-04	%(P	5.572E-02 1.56E-02	G
CO-57		1.0095E-02					
			122.07	1.009E-02	%(	5.234E-02 1.57E-02	G K
			136.43	-4.010E-02	%	4.355E-01 1.30E-01	G
CO-60		1.3819E-01					
			1332.51	1.291E-01	(P	4.619E-02 2.32E-02	G K
			1173.23	1.473E-01	*(P	8.909E-02 3.94E-02	G K
Sr-85		-2.5203E-02					
			514.00	-2.520E-02	&(	6.618E-02 1.99E-02	G
Kr-85		-5.7658E+02					
			513.99	-5.766E+02	&(P	1.449E+03 4.34E+02	G
Y-88		1.0098E-02					
			1836.01	1.010E-02	%(	4.250E-02 1.17E-02	G K
			898.02	1.834E-02	& P	4.954E-02 1.47E-02	G
NB-94		-1.1669E-02					
			871.10	-1.167E-02	%(P	5.496E-02 1.59E-02	G K
			702.50	1.633E-02	& P	5.171E-02 1.53E-02	G K
Ag-108M		-3.8601E-02					
			722.95	-3.860E-02	%(	8.129E-02 2.46E-02	G K
			614.37	-1.834E-02	% P	6.592E-02 1.96E-02	G
			433.93	-3.518E-04	%	4.814E-02 1.39E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	2.3133E-01						
		88.04	2.313E-01	%(P	1.528E+00	4.58E-01	G
SN-113	-8.5335E-03						
		391.71	-8.533E-03	%(	7.243E-02	2.12E-02	G K
		255.04	4.433E-01	% P	1.937E+00	5.77E-01	G
SB-125	1.0366E-01						
		427.95	4.905E-03	%(P	1.350E-01	3.88E-02	G K
		600.77	2.406E-02	% P	2.540E-01	7.30E-02	G
		636.15	1.949E-02	& P	4.470E-01	1.28E-01	G
		463.51	3.960E-01	(P	3.767E-01	1.22E-01	G
		176.29	1.101E-02	% P	6.579E-01	1.95E-01	G
I-131	8.6331E-03						
		364.48	8.633E-03	&(	7.310E-02	2.14E-02	G K
		636.97	1.366E-01	&	1.036E+00	2.99E-01	G
		284.29	-2.360E-01	%	9.776E-01	2.91E-01	G
CS-134	-4.4500E-03						
		604.66	-4.450E-03	%(P	1.120E-01	3.31E-02	G K
		795.76	-1.693E-02	% P	7.660E-02	2.24E-02	G
		569.29	1.277E-01	% P	2.876E-01	8.67E-02	G
		801.84	4.338E-02	%	5.990E-01	1.70E-01	G
CS-137	7.0167E-02						
		661.62	7.017E-02	*(P	6.656E-02	2.56E-02	G
CE-139	3.5153E-04						
		165.85	3.515E-04	%(P	5.589E-02	1.66E-02	G
EU-152	3.0234E-02						
		121.78	3.023E-02	%(P	1.551E-01	4.65E-02	G K
		344.30	2.355E-02	% P	1.228E-01	3.60E-02	G
		1408.08	3.487E-02	% P	2.252E-01	6.21E-02	G
		964.00	9.541E-03	& P	6.698E-01	1.94E-01	G
		1112.07	1.360E-01	& P	4.861E-01	1.43E-01	G
		778.90	-6.669E-02	& P	4.153E-01	1.20E-01	G
EU-154	-4.3503E-03						
		123.10	-4.350E-03	%(P	1.098E-01	3.26E-02	G K
		1274.80	-2.684E-02	% P	2.257E-01	6.46E-02	G
		723.30	-1.702E-03	& P	2.895E-01	8.21E-02	G
		1004.80	4.454E-02	% P	2.974E-01	8.45E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	7.8734E-02						
		86.45	7.873E-02	%(	1.797E-01	5.44E-02	G K
		105.31	2.022E-02	%	2.267E-01	6.77E-02	G
HG-203	2.8950E-03						
		279.17	2.895E-03	&(	5.625E-02	1.65E-02	G K
		72.87	-1.817E-01	% P	1.402E+00	4.20E-01	G
		70.83	-8.003E-01	&	2.390E+00	7.21E-01	G
		82.50	-5.989E-01	&	2.886E+00	8.67E-01	G
TL-208	3.1284E-01						
		583.14	3.033E-01	(P	7.114E-02	3.46E-02	G
		510.72	3.494E-01	*(P	2.100E-01	7.48E-02	G
PB-212	6.9710E-01						
		238.63	6.650E-01	(P	1.042E-01	4.08E-02	G K
							Energy duplication
		77.11	7.464E-01	@(	3.688E-01	1.18E-01	G
		74.81	7.513E-01	&(P	7.474E-01	2.30E-01	G
PB-214	4.3747E-01						
		351.99	4.504E-01	@(P	9.537E-02	3.95E-02	G K
		295.22	4.125E-01	@(P	2.024E-01	6.84E-02	G
							Energy duplication
		77.11	1.206E+00	+ P	6.042E-01	1.93E-01	G
		241.92	6.500E-03	% P	6.689E-01	1.98E-01	G
BI-212	9.3196E-01						
		727.17	9.320E-01	(P	4.889E-01	2.06E-01	G K
		1620.56	7.579E-01	%	1.120E+00	3.77E-01	G
		785.42	1.350E-01	& P	2.502E+00	7.06E-01	G
BI-214	5.2488E-01						
		609.32	4.941E-01	@(P	1.017E-01	4.92E-02	G K
		1764.51	6.037E-01	(P	1.366E-01	1.06E-01	G
		1120.28	5.357E-01	(P	4.280E-01	1.61E-01	G
RA-224	1.1665E+00						
		241.00	1.167E+00	(P	1.176E+00	3.67E-01	G
RA-226	1.3236E+00						
		185.99	1.324E+00	@(	1.246E+00	3.89E-01	G
AC-228	1.0244E+00						
		911.07	9.011E-01	(P	2.656E-01	1.34E-01	G K
		968.90	1.208E+00	(P	4.308E-01	2.05E-01	G
		338.40	1.055E+00	(P	3.915E-01	1.63E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.9701E-01
                          236.00-1.970E-01 %(P 5.121E-01 1.55E-01 G K
                          256.25 5.634E-02 & P 6.177E-01 1.82E-01 G

PA-234       7.4139E-03
                           98.44 7.414E-03 %(  1.895E-01 5.64E-02 G K
                          946.00 3.828E-02 %   3.209E-01 9.22E-02 G
                          131.28-6.115E-02 %   2.446E-01 7.35E-02 G
                           94.67-1.342E-01 %   3.622E-01 1.09E-01 G
                          883.24-1.373E-01 %   5.270E-01 1.55E-01 G
                          926.70 7.033E-02 %   5.845E-01 1.68E-01 G
                          569.26 1.931E-01 %   4.233E-01 1.28E-01 G

TH-234       1.5388E+00
                           63.29 4.801E-01 %(P 2.348E+00 7.03E-01 G K
                           92.80 2.323E+00  (P 1.748E+00 5.46E-01 G
                           92.38 2.230E+00 &(P 2.109E+00 6.51E-01 G

AM-241      -3.5650E-02
                           59.54-3.565E-02 &(P 2.985E-01 8.90E-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 - 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	-2.0657E-02	-2.2116E-02	4.1534E-01	4.1535E-01	4.476E-01
K-40		1.7511E+01	1.7511E+01	1.9573E+00	2.1931E+00	
MN-54	#A	-6.3693E-04	-6.4441E-04	3.9050E-02	3.9050E-02	5.508E-02
CO-57	#B	9.9595E-03	1.0095E-02	4.7041E-02	4.7044E-02	5.164E-02
CO-60	#	1.3793E-01	1.3819E-01	6.6828E-02	6.7282E-02	
Sr-85	#A	-2.3825E-02	-2.5203E-02	5.9701E-02	5.9718E-02	6.256E-02
Kr-85	#A	-5.7656E+02	-5.7658E+02	1.4288E+03	1.4292E+03	1.449E+03
Y-88	#B	9.7586E-03	1.0098E-02	3.5212E-02	3.5217E-02	4.107E-02
NB-94	#B	-1.1669E-02	-1.1669E-02	4.9567E-02	4.9572E-02	5.496E-02
Ag-108M	#B	-3.8598E-02	-3.8601E-02	7.3919E-02	7.3951E-02	8.128E-02
CD-109	#A	2.2948E-01	2.3133E-01	1.3739E+00	1.3740E+00	1.516E+00
SN-113	#B	-8.2675E-03	-8.5335E-03	6.3712E-02	6.3714E-02	7.017E-02
SB-125	#B	1.0329E-01	1.0366E-01	9.5686E-02	9.5865E-02	1.345E-01
I-131	#B	5.4860E-03	8.6331E-03	6.4057E-02	6.4059E-02	4.645E-02
CS-134	#B	-4.4286E-03	-4.4500E-03	1.3760E-01	1.3760E-01	1.114E-01
CS-137	#	7.0143E-02	7.0167E-02	7.6953E-02	7.7055E-02	
CE-139	#A	3.4233E-04	3.5153E-04	4.9716E-02	4.9716E-02	5.443E-02
EU-152	#B	3.0211E-02	3.0234E-02	1.3940E-01	1.3941E-01	1.550E-01
EU-154	#B	-4.3452E-03	-4.3503E-03	1.4082E-01	1.4082E-01	1.096E-01
EU-155	#B	7.8576E-02	7.8734E-02	1.6328E-01	1.6334E-01	1.793E-01
HG-203	#B	2.6771E-03	2.8950E-03	4.9641E-02	4.9642E-02	5.202E-02
TL-208		3.1284E-01	3.1284E-01	1.0712E-01	1.0857E-01	
PB-212	#	6.9710E-01	6.9710E-01	1.2824E-01	1.3415E-01	1.042E-01
PB-214	#	4.3747E-01	4.3747E-01	1.1514E-01	1.1776E-01	9.537E-02
BI-212		9.3196E-01	9.3196E-01	6.1703E-01	6.1927E-01	
BI-214		5.2488E-01	5.2488E-01	1.5663E-01	1.5941E-01	
RA-224	A	1.1665E+00	1.1665E+00	1.0997E+00	1.1017E+00	
RA-226	#	1.3236E+00	1.3236E+00	1.1676E+00	1.1700E+00	1.246E+00
AC-228		1.0244E+00	1.0244E+00	2.7956E-01	2.8548E-01	
TH-227	#B	-1.9701E-01	-1.9701E-01	4.7240E-01	4.7253E-01	5.121E-01
PA-234	#B	7.4139E-03	7.4139E-03	1.6925E-01	1.6925E-01	1.895E-01
TH-234	#B	1.5388E+00	1.5388E+00	1.0857E+00	1.0891E+00	2.348E+00
AM-241	#A	-3.5649E-02	-3.5650E-02	3.0048E-01	3.0048E-01	2.985E-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 (269.6 to 1999.1 keV) 2.1679636E+01 pCi/gm
Total Decayed Activity (269.6 to 1999.1 keV) 2.1679922E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_13DEC2005_1843.An1

Sample description
FSS-NOL-05-02-200-F-I-SS-001

Spectrum Filename: C:\GammaVision\Spectra\101F_13DEC2005_1843.An1

Acquisition information

Start time:	13-Dec-2005 18:43:29
Live time:	2000
Real time:	2002
Dead time:	0.12 %
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/channel^2

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:	1.4870E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.4870E+03) = 6.7249E+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	12-Dec-2005 14:44:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2483

***** 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
74.61	246.	13.13	1.00	1.647E-02				
74.61	246.	13.13	1.00	1.647E-02	74.81	9.600	1.379E+00	PB212
74.75	215.	22.16	1.50	1.654E-02				
74.75	215.	22.16	1.50	1.654E-02	74.81	9.600	1.229E+00	PB212
77.06	285.	16.55	1.50	1.720E-02	77.11	10.700	1.389E+00	PB214
					77.11	17.500	8.603E-01	PB212
77.13	345.	9.70	1.01	1.720E-02	77.11	10.700	1.703E+00	PB214
					77.11	17.500	1.042E+00	PB212
86.86	90.	32.00	1.01	1.917E-02	86.45	32.740	1.306E-01	EU155
89.91	111.	25.42	1.02	1.958E-02				
93.23	145.	19.48	1.02	1.995E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.82	142.	21.46	1.06	1.859E-02				
185.82	142.	21.46	1.06	1.859E-02	185.99	3.280	2.125E+00	RA226
209.30	94.	31.27	0.95	1.721E-02				
238.71	787.	4.18	1.12	1.557E-02	238.63	43.100	1.058E+00	PB212
241.62	118.	20.03	1.12	1.542E-02	241.00	3.900	1.765E+00	RA224
					241.92	7.470	9.247E-01	PB214
270.09	73.	34.94	0.95	1.401E-02				
295.19	151.	15.19	1.17	1.292E-02	295.22	19.200	5.452E-01	PB214
300.68	67.	32.43	0.91	1.270E-02				
328.26	54.	36.98	0.88	1.169E-02				
338.22	166.	15.55	1.26	1.136E-02	338.40	12.010	1.093E+00	AC228
351.92	232.	10.72	1.16	1.093E-02	351.99	37.100	5.167E-01	PB214
463.24	74.	22.14	1.40	8.346E-03				
463.24	74.	22.14	1.40	8.346E-03	463.51	10.000	7.856E-01	SB125
511.11	116.	17.01	1.50	7.585E-03	510.72	22.500	5.330E-01	TL208

					513.99	0.004	3.222E+03	Kr85
					514.00	99.270	1.428E-01	Sr85
582.81	238.	9.57	1.53	6.688E-03	583.14	86.000	3.723E-01	TL208
609.24	184.	9.35	1.37	6.414E-03	609.32	46.090	5.611E-01	BI214
661.50	198.	11.51	1.28	5.938E-03	661.62	84.620	3.558E-01	CS137
727.03	46.	31.95	1.24	5.444E-03	727.17	11.800	6.427E-01	BI212
910.82	160.	9.76	1.69	4.448E-03	911.07	29.000	1.114E+00	AC228
967.59	124.	17.58	1.92	4.217E-03	968.90	17.460	1.530E+00	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.53	39.	29.96	1.67	3.711E-03	1120.28	15.040	6.288E-01	BI214
1173.19	107.	15.42	2.17	3.565E-03	1173.23	99.860	2.729E-01	CO60
1331.79	119.	12.47	2.10	3.192E-03	1332.51	99.980	3.395E-01	CO60
1460.29	689.	4.05	1.89	2.943E-03	1460.75	10.700	1.981E+01	K40
1763.80	33.	17.41	1.65	2.481E-03	1764.51	15.920	7.491E-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
148.78	74.59	400.	246.	0.123	39.40	1.005	BI-207 D
173.30	86.94	368.	90.	0.045	95.99	1.013	TB-160 lD
179.41	89.99	345.	111.	0.056	76.27	1.016	PB-214 lD
418.27	209.30	334.	94.	0.047	93.82	0.947	AC-228
477.11	238.63	149.	787.	0.394	12.55	1.122	PB-212 D
539.90	270.09	231.	73.	0.036	104.81	0.952	AC-228
601.12	300.68	162.	67.	0.034	97.28	0.905	PB-212 s
656.29	328.26	141.	54.	0.027	110.95	0.877	RH-106M 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	149.07	74.75	1082.	215.	0.107	66.47	1.499
PB-214	153.79	77.11	402.	345.	0.173	29.11	1.006D
PB-212	153.79	77.11	970.	285.	0.143	49.65	1.499D
TH-234	185.84	93.13	853.	139.	0.070	88.50	1.499
RA-226	371.70	186.02	437.	130.	0.065	72.94	1.499
PB-212	476.96	238.63	426.	657.	0.329	17.53	1.499D
RA-224	481.70	241.00	456.	81.	0.040	119.13	1.123D
PB-214	483.54	241.92	213.	68.	0.034	74.12	1.124A
PB-214	590.13	295.19	157.	149.	0.074	45.58	1.166
AC-228	676.23	338.22	175.	164.	0.082	46.66	1.257
PB-214	703.64	351.92	141.	230.	0.115	32.16	1.163
SB-125	925.97	463.04	88.	58.	0.029	77.21	1.499s
TL-208	1022.15	511.11	102.	100.	0.050	51.04	1.501s
TL-208	1165.63	582.81	87.	236.	0.118	28.72	1.533
BI-214	1218.51	609.24	52.	182.	0.091	28.04	1.365
CS-137	1323.09	661.50	87.	197.	0.098	34.53	1.275

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	1454.21	727.03	60.	45.	0.023	95.84	1.237
AC-228	1821.98	910.82	37.	158.	0.079	29.29	1.689
AC-228	1935.59	967.59	83.	124.	0.062	52.75	1.916
BI-214	2241.65	1120.53	39.	39.	0.019	89.87	1.670
CO-60	2347.04	1173.19	57.	107.	0.053	46.27	2.175s
CO-60	2664.43	1331.79	25.	119.	0.060	37.40	2.099s
K-40	2921.60	1460.29	23.	686.	0.343	12.15	1.890
BI-214	3529.03	1763.80	0.	33.	0.016	52.22	1.649

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.1983E-01					
			477.56	1.198E-01	%(	6.157E-01 1.81E-01	G
K-40		1.9810E+01					
			1460.75	1.981E+01	(P	7.188E-01 8.05E-01	G
MN-54		-1.0457E-03					
			834.81	-1.046E-03	%(P	5.859E-02 1.61E-02	G
CO-57		1.1786E-02					
			122.07	1.179E-02	&(	5.683E-02 1.70E-02	G K
			136.43	9.343E-02	%	5.063E-01 1.52E-01	G
CO-60		3.0623E-01					
			1332.51	3.395E-01	@(P	7.399E-02 4.23E-02	G K
			1173.23	2.729E-01	*(P	9.690E-02 4.21E-02	G K
Sr-85		-6.3352E-03					
			514.00	-6.335E-03	%(	5.946E-02 1.73E-02	G
Kr-85		-5.0245E+02					
			513.99	-5.025E+02	%(P	1.466E+03 4.35E+02	G
Y-88		4.8587E-03					
			1836.01	4.859E-03	&(	6.851E-02 1.81E-02	G K
			898.02	-1.542E-02	& P	7.935E-02 2.30E-02	G
NB-94		-1.0594E-03					
			871.10	-1.059E-03	&(P	6.917E-02 1.94E-02	G K
			702.50	1.423E-02	& P	5.889E-02 1.72E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	5.7934E-03						
		722.95	5.793E-03	&(	6.907E-02	1.97E-02	G K
		614.37	9.935E-03	% P	6.464E-02	1.87E-02	G
		433.93	-1.928E-03	%	6.261E-02	1.81E-02	G
CD-109	-2.2019E-01						
		88.04	-2.202E-01	%(P	1.508E+00	4.50E-01	G
SN-113	-1.3380E-02						
		391.71	-1.338E-02	%(	8.536E-02	2.51E-02	G K
		255.04	9.822E-01	% P	2.195E+00	6.64E-01	G
SB-125	2.0245E-01						
		427.95	5.772E-02	%(P	1.698E-01	5.07E-02	G K
		600.77	-8.147E-02	% P	3.404E-01	1.00E-01	G
		636.15	9.101E-02	% P	4.725E-01	1.37E-01	G
		463.51	6.309E-01	*(P	5.069E-01	1.66E-01	G
		176.29	-6.661E-02	% P	8.230E-01	2.44E-01	G
I-131	2.4385E-03						
		364.48	2.438E-03	&(	6.010E-02	1.74E-02	G K
		636.97	1.115E-01	%	8.196E-01	2.36E-01	G
		284.29	-1.273E-01	&	9.521E-01	2.82E-01	G
CS-134	2.1800E-03						
		604.66	2.180E-03	&(P	1.429E-01	4.22E-02	G K
		795.76	3.596E-04	& P	8.116E-02	2.29E-02	G
		569.29	1.106E-01	% P	3.774E-01	1.12E-01	G
		801.84	0.000E+00	%	8.724E-01	2.48E-01	G
CS-137	3.5584E-01						
		661.62	3.558E-01	(P	8.366E-02	4.11E-02	G
CE-139	-8.0672E-04						
		165.85	-8.067E-04	&(P	6.119E-02	1.81E-02	G
EU-152	3.3066E-02						
		121.78	3.307E-02	&(P	1.770E-01	5.30E-02	G K
		344.30	4.298E-02	& P	1.555E-01	4.61E-02	G
		1408.08	1.517E-01	% P	2.629E-01	8.22E-02	G
		964.00	3.736E-01	& P	5.888E-01	1.82E-01	G
		1112.07	-1.944E-03	& P	7.029E-01	1.98E-01	G
		778.90	-8.086E-02	% P	4.674E-01	1.35E-01	G
EU-154	-5.2001E-04						
		123.10	-5.200E-04	%(P	1.360E-01	4.04E-02	G K
		1274.80	-1.922E-02	% P	2.520E-01	7.11E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-1.322E-01	& P	4.241E-01	1.26E-01	G
		1004.80	7.687E-02	% P	4.270E-01	1.23E-01	G
EU-155	4.6441E-03						
		86.45	4.644E-03	%(	2.306E-01	6.88E-02	G K
		105.31	9.622E-03	%	2.520E-01	7.49E-02	G
HG-203	-6.3238E-04						
		279.17	-6.324E-04	&(	6.850E-02	2.01E-02	G K
		72.87	-3.968E-01	% P	1.583E+00	4.76E-01	G
		70.83	6.836E-02	%	2.465E+00	7.35E-01	G
		82.50	-7.251E-01	%	2.983E+00	8.96E-01	G
TL-208	3.7233E-01						
		583.14	3.723E-01	(P	7.318E-02	3.60E-02	G
		510.72	5.330E-01	+ P	2.646E-01	1.05E-01	G
PB-212	8.8115E-01						
							Energy duplication
		238.63	8.896E-01	(P	1.338E-01	5.25E-02	G K
							Energy duplication
		77.11	8.603E-01	(	4.463E-01	1.42E-01	G
		74.81	1.229E+00	& P	8.930E-01	2.79E-01	G
PB-214	5.3356E-01						
		351.99	5.167E-01	(P	1.300E-01	5.58E-02	G K
		295.22	5.452E-01	(P	2.240E-01	8.38E-02	G
							Energy duplication
		77.11	1.703E+00	+ P	4.746E-01	1.67E-01	G
		241.92	5.336E-01	} P	5.582E-01	1.32E-01	G
BI-212	6.4270E-01						
		727.17	6.427E-01	(P	5.473E-01	2.08E-01	G K
		1620.56	7.155E-01	%	1.680E+00	5.05E-01	G
		785.42	1.002E+00	% P	3.375E+00	9.96E-01	G
BI-214	5.7778E-01						
		609.32	5.611E-01	(P	1.112E-01	5.28E-02	G K
		1764.51	7.491E-01	+ P	1.695E-01	1.32E-01	G
		1120.28	6.288E-01	(P	5.203E-01	1.90E-01	G
RA-224	1.2178E+00						
							Derived Ave Activity
		241.00	1.218E+00	}(P	1.542E+00	4.93E-01	G
RA-226	1.9431E+00						
		185.99	1.943E+00	(	1.493E+00	4.72E-01	G
AC-228	1.1081E+00						
		911.07	1.114E+00	(P	2.185E-01	1.10E-01	G K
		968.90	1.530E+00	+ P	5.588E-01	2.70E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          338.40 1.093E+00  (P 4.292E-01 1.72E-01 G

TH-227      -2.2518E-03
                          236.00-2.252E-03 %(P 5.753E-01 1.70E-01 G K
                          256.25-2.827E-02 & P 7.891E-01 2.32E-01 G

PA-234      -2.4728E-02
                           98.44-2.473E-02 &(  2.424E-01 7.24E-02 G K
                          946.00 3.937E-02 %   3.320E-01 9.43E-02 G
                          131.28-8.316E-02 %   2.906E-01 8.75E-02 G
                           94.67-2.260E-01 %   4.387E-01 1.33E-01 G
                          883.24-6.321E-02 &   5.723E-01 1.63E-01 G
                          926.70 2.106E-01 %   6.644E-01 1.97E-01 G
                          569.26 1.694E-01 %   5.579E-01 1.65E-01 G

TH-234       1.4336E+00
                           63.29 9.059E-01 %(P 2.717E+00 8.17E-01 G K
                           92.80 2.120E+00  (P 2.114E+00 6.53E-01 G
                           92.38-1.934E-01 % P 2.498E+00 7.39E-01 G

AM-241      -1.2554E-02
                           59.54-1.255E-02 %(P 3.637E-01 1.08E-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:                      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
R - Coincidence Corrected
H - Halflife limit exceeded
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	1.1803E-01	1.1983E-01	5.4433E-01	5.4437E-01	6.064E-01
K-40		1.9810E+01	1.9810E+01	2.4159E+00	2.6626E+00	
MN-54	#A	-1.0430E-03	-1.0457E-03	3.5135E-01	3.5135E-01	5.844E-02
CO-57	#B	1.1751E-02	1.1786E-02	5.1023E-02	5.1027E-02	5.666E-02
CO-60	#	3.0610E-01	3.0623E-01	9.1198E-02	9.2825E-02	
Sr-85	#A	-6.2567E-03	-6.3352E-03	5.1786E-02	5.1787E-02	5.873E-02
Kr-85	#A	-5.0245E+02	-5.0245E+02	1.4881E+03	1.4884E+03	1.466E+03
Y-88	#B	4.8220E-03	4.8587E-03	5.4437E-02	5.4437E-02	6.799E-02
NB-94	#B	-1.0594E-03	-1.0594E-03	9.6381E-02	9.6381E-02	6.917E-02
Ag-108M	#B	5.7933E-03	5.7934E-03	5.9169E-02	5.9170E-02	6.907E-02
CD-109	#A	-2.1980E-01	-2.2019E-01	1.4245E+00	1.4245E+00	1.506E+00
SN-113	#B	-1.3287E-02	-1.3380E-02	7.5305E-02	7.5309E-02	8.476E-02
SB-125	#F	2.0229E-01	2.0245E-01	1.6022E-01	1.6062E-01	1.697E-01
I-131	#B	2.2052E-03	2.4385E-03	5.2079E-02	5.2079E-02	5.436E-02
CS-134	#B	2.1776E-03	2.1800E-03	1.2665E-01	1.2665E-01	1.428E-01
CS-137		3.5581E-01	3.5584E-01	1.2342E-01	1.2505E-01	
CE-139	#A	-8.0200E-04	-8.0672E-04	8.7686E-02	8.7686E-02	6.083E-02
EU-152	#B	3.3061E-02	3.3066E-02	1.5887E-01	1.5888E-01	1.770E-01
EU-154	#B	-5.1988E-04	-5.2001E-04	4.0139E-01	4.0139E-01	1.360E-01
EU-155	#B	4.6420E-03	4.6441E-03	2.0655E-01	2.0655E-01	2.305E-01
HG-203	#B	-6.2150E-04	-6.3238E-04	6.0350E-02	6.0350E-02	6.733E-02
TL-208		3.7233E-01	3.7233E-01	1.0801E-01	1.1004E-01	
PB-212	#	8.8115E-01	8.8115E-01	1.5593E-01	1.6369E-01	1.338E-01
PB-214		5.3356E-01	5.3356E-01	1.7304E-01	1.7565E-01	
BI-212		6.4270E-01	6.4270E-01	6.2518E-01	6.2623E-01	
BI-214		5.7778E-01	5.7778E-01	1.6299E-01	1.6623E-01	
RA-224	A	1.2178E+00	1.2178E+00	1.4636E+00	1.4652E+00	
RA-226	#	1.9431E+00	1.9431E+00	1.4173E+00	1.4215E+00	1.493E+00
AC-228		1.1081E+00	1.1081E+00	3.0919E-01	3.1547E-01	
TH-227	#B	-2.2518E-03	-2.2518E-03	4.4560E-01	4.4560E-01	5.753E-01
PA-234	#B	-2.4728E-02	-2.4728E-02	2.1725E-01	2.1725E-01	2.424E-01
TH-234	#B	1.4336E+00	1.4336E+00	1.3250E+00	1.3274E+00	2.717E+00
AM-241	#A	-1.2554E-02	-1.2554E-02	4.9354E-01	4.9354E-01	3.637E-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 (269.6 to 1999.1 keV) 2.4924410E+01 pCi/gm
Total Decayed Activity (269.6 to 1999.1 keV) 2.4924566E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_23FEB2006_0931.An1

Sample description
FSS-NOL-05-02-014-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\101F_23FEB2006_0931.An1

Acquisition information
Start time: 23-Feb-2006 09:33:03
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/channel^2

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: 1.7950E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7950E+03) =
5.5710E+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	21-Feb-2006 15:45:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3038

***** 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
74.35	130.	24.46	1.00	1.651E-02				
74.35	130.	24.46	1.00	1.651E-02	74.81	9.600	PBC<MDA	PB212
77.22	335.	9.32	1.01	1.733E-02	77.11	10.700	1.353E+00	PB214
					77.11	17.500	8.366E-01	PB212
92.90	148.	26.92	1.50	1.989E-02	88.04	3.790	PBC<MDA	CD109
					92.38	2.570	2.182E+00	TH234
					92.80	3.000	1.865E+00	TH234
92.92	139.	28.17	1.50	1.985E-02	92.38	2.570	2.051E+00	TH234
					92.80	3.000	PBC<MDA	TH234
186.10	131.	23.10	1.05	1.858E-02	185.99	3.280	1.619E+00	RA226
238.69	647.	4.76	1.12	1.557E-02				
238.69	647.	4.76	1.12	1.557E-02	238.63	43.100	7.192E-01	PB212
241.24	105.	27.13	1.12	1.544E-02	241.00	3.900	PBC<MDA	RA224
270.23	82.	27.27	1.68	1.400E-02				
276.98	73.	30.03	0.87	1.370E-02				
295.25	176.	14.12	1.19	1.292E-02	295.22	19.200	5.281E-01	PB214
300.47	81.	25.03	1.10	1.271E-02				
338.59	164.	14.81	1.24	1.134E-02	338.40	12.010	8.920E-01	AC228
351.84	282.	9.43	1.15	1.093E-02				
351.84	282.	9.43	1.15	1.093E-02	351.99	37.100	5.192E-01	PB214
462.56	46.	30.06	1.16	8.358E-03				
462.56	46.	30.06	1.16	8.358E-03	463.51	10.000	4.026E-01	SB125
511.00	119.	15.14	1.97	7.586E-03	510.72	22.500	4.548E-01	TL208
582.97	196.	9.65	1.08	6.686E-03	583.14	86.000	2.536E-01	TL208
609.11	178.	12.39	1.38	6.415E-03	609.32	46.090	4.493E-01	BI214
719.75	21.	31.61	1.50	5.470E-03	723.30	19.700	1.456E-01	EU154
727.61	41.	29.70	1.98	5.443E-03	727.17	11.800	4.820E-01	BI212

910.73	133.	11.43	1.70	4.448E-03	911.07	29.000	7.668E-01	AC228
964.07	38.	24.30	1.61	4.230E-03	964.00	14.580	4.554E-01	EU152
968.69	71.	15.53	1.62	4.213E-03	968.90	17.460	7.227E-01	AC228
1119.76	63.	27.20	1.57	3.712E-03	1120.28	15.040	8.433E-01	BI214
1460.19	690.	3.93	1.90	2.943E-03	1460.75	10.700	1.646E+01	K40
1763.78	41.	15.62	0.96	2.481E-03	1764.51	15.920	7.730E-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	
148.27	74.72	442.	130.	0.065	73.39	1.004	BI-207	D
154.00	77.58	319.	335.	0.167	27.96	1.007	PB-214	D
477.07	238.63	150.	647.	0.324	14.27	1.122	PB-212	D
482.17	241.18	357.	105.	0.053	81.39	1.123	RA-224	D
540.19	270.23	170.	82.	0.041	81.82	1.684	AC-228	s
553.69	276.98	159.	85.	0.042	70.94	0.870	TL-208	
600.68	300.47	132.	81.	0.041	75.09	1.096	PB-212	
1928.32	964.13	25.	36.	0.018	76.87	1.612	EU-152	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	149.17	74.80	950.	170.	0.085	77.86	1.499s
PB-214	153.79	77.11	863.	269.	0.135	49.03	1.499D
PB-212	153.79	77.11	859.	273.	0.137	49.03	1.499D
TH-234	185.42	92.92	827.	139.	0.069	84.51	1.499s
TH-234	185.38	92.90	789.	148.	0.074	80.75	1.499s
RA-226	372.00	186.17	452.	127.	0.063	75.89	1.499s
PB-212	476.96	238.63	420.	549.	0.274	20.12	1.499D
RA-224	483.05	241.67	496.	84.	0.042	116.66	1.499s
PB-214	590.37	295.31	158.	145.	0.073	43.74	1.499
AC-228	676.97	338.59	148.	162.	0.081	44.44	1.243
PB-214	703.70	351.95	103.	239.	0.119	26.22	1.499s
SB-125	925.73	462.92	80.	44.	0.022	93.76	1.499s
TL-208	1021.94	511.00	90.	103.	0.052	45.43	1.966s
TL-208	1165.94	582.97	56.	194.	0.097	28.96	1.084
BI-214	1218.26	609.11	89.	176.	0.088	37.17	1.383
EU-154	1439.65	719.75	12.	21.	0.010	94.84	1.499s
BI-212	1455.38	727.61	44.	41.	0.021	89.10	1.976s
AC-228	1821.82	910.73	33.	131.	0.066	34.29	1.698s
EU-152	1928.95	964.27	52.	30.	0.015	113.51	1.612
AC-228	1938.21	968.90	28.	70.	0.035	47.24	1.616D
BI-214	2240.10	1119.76	62.	63.	0.031	81.59	1.567s
K-40	2921.40	1460.19	13.	688.	0.344	11.80	1.900

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3529.00	1763.78	0.	41.	0.020	46.85	0.958s

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	Peak Energy keV	Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.7102E-02					
			477.56	1.710E-02	%(	3.548E-01 1.01E-01	G
K-40		1.6456E+01					
			1460.75	1.646E+01	(P	4.631E-01 6.49E-01	G
MN-54		2.1837E-02					
			834.81	2.184E-02	%(P	4.794E-02 1.45E-02	G
CO-57		-8.0113E-03					
			122.07	-8.011E-03	&(	5.351E-02 1.60E-02	G K
			136.43	-3.720E-02	%	4.184E-01 1.25E-01	G
CO-60		-2.4908E-03					
			1332.51	-2.491E-03	%(P	6.182E-02 1.70E-02	G K
			1173.23	6.889E-03	% P	7.034E-02 2.00E-02	G K
Sr-85		-1.6120E-02					
			514.00	-1.612E-02	%(	6.397E-02 1.90E-02	G
Kr-85		-3.9258E+02					
			513.99	-3.926E+02	%(P	1.455E+03 4.31E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	5.312E-02 1.35E-02	G K
			898.02	-7.578E-04	& P	5.393E-02 1.49E-02	G
NB-94		-1.5913E-02					
			871.10	-1.591E-02	&(P	6.123E-02 1.80E-02	G K
			702.50	9.985E-03	& P	4.995E-02 1.45E-02	G K
Ag-108M		-2.2106E-03					
			722.95	-2.211E-03	&(	5.155E-02 1.45E-02	G K
			614.37	-9.493E-03	% P	5.425E-02 1.58E-02	G
			433.93	1.382E-04	%	3.265E-02 9.14E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	2.8627E-01						
		88.04	2.863E-01	&(P	1.250E+00	3.75E-01	G
SN-113	9.8219E-04						
		391.71	9.822E-04	&(	5.607E-02	1.61E-02	G K
		255.04	4.250E-02	& P	1.974E+00	5.79E-01	G
SB-125	9.5941E-02						
		427.95	-6.640E-03	%(P	1.334E-01	3.83E-02	G K
		600.77	-1.412E-02	% P	2.714E-01	7.76E-02	G
		636.15	7.183E-02	& P	3.268E-01	9.43E-02	G
		463.51	3.996E-01	*(P	4.022E-01	1.29E-01	G
		176.29	-1.374E-01	& P	6.863E-01	2.05E-01	G
I-131	1.2339E-02						
		364.48	1.234E-02	%(	5.536E-02	1.64E-02	G K
		636.97	1.494E-01	&	5.475E-01	1.60E-01	G
		284.29	-2.444E-01	%	7.725E-01	2.31E-01	G
CS-134	3.0801E-03						
		604.66	3.080E-03	%(P	1.195E-01	3.53E-02	G K
		795.76	-7.351E-04	% P	6.477E-02	1.81E-02	G
		569.29	2.293E-02	& P	2.462E-01	6.99E-02	G
		801.84	-6.473E-02	%	5.524E-01	1.57E-01	G
CS-137	1.1056E-02						
		661.62	1.106E-02	%(P	5.850E-02	1.70E-02	G
CE-139	-9.2202E-05						
		165.85	-9.220E-05	&(P	5.345E-02	1.58E-02	G
EU-152	1.0727E-01						
		121.78	-2.168E-02	%(P	1.550E-01	4.63E-02	G K
		344.30	-2.688E-02	% P	1.542E-01	4.53E-02	G
		1408.08	4.621E-02	% P	2.231E-01	6.24E-02	G
		964.00	3.659E-01	&(P	4.415E-01	1.41E-01	G
		1112.07	-1.191E-02	& P	4.994E-01	1.40E-01	G
		778.90	-1.152E-02	% P	3.948E-01	1.11E-01	G
EU-154	3.8340E-02						
		123.10	-1.390E-02	%(P	1.054E-01	3.14E-02	G K
		1274.80	-1.422E-04	& P	2.151E-01	6.00E-02	G
		723.30	1.456E-01	&(P	1.328E-01	4.68E-02	G
		1004.80	3.850E-02	& P	3.307E-01	9.39E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.0030E-01						
		86.45	1.003E-01	%(	1.732E-01	5.27E-02	G K
		105.31	5.391E-02	%	2.138E-01	6.42E-02	G
HG-203	-1.1762E-02						
		279.17	-1.176E-02	&(	5.429E-02	1.62E-02	G K
		72.87	-5.993E-01	% P	1.272E+00	3.85E-01	G
		70.83	-1.389E+00	%	2.173E+00	6.63E-01	G
		82.50	-1.963E-02	&	2.603E+00	7.75E-01	G
TL-208	2.5357E-01						
		583.14	2.536E-01	(P	4.937E-02	2.48E-02	G
		510.72	4.548E-01	+ P	2.066E-01	7.96E-02	G
PB-212	6.3468E-01						
							Energy duplication
		238.63	6.152E-01	(P	1.102E-01	4.17E-02	G K
							Energy duplication
		77.11	6.827E-01	(	3.483E-01	1.12E-01	G
		74.81	8.052E-01	+ P	6.938E-01	2.15E-01	G
PB-214	4.4261E-01						
		351.99	4.439E-01	@(P	9.302E-02	3.91E-02	G K
		295.22	4.401E-01	(P	1.857E-01	6.50E-02	G
							Energy duplication
		77.11	1.101E+00	+ P	5.709E-01	1.83E-01	G
		241.92	2.369E-01	% P	4.364E-01	1.33E-01	G
BI-212	4.8202E-01						
		727.17	4.820E-01	(P	3.936E-01	1.46E-01	G K
		1620.56	5.933E-01	&	1.148E+00	3.61E-01	G
		785.42	5.640E-01	% P	2.303E+00	6.69E-01	G
BI-214	4.4930E-01						
		609.32	4.493E-01	(P	1.186E-01	5.60E-02	G K
		1764.51	7.730E-01	+ P	1.405E-01	1.22E-01	G
		1120.28	8.433E-01	+ P	5.334E-01	2.31E-01	G
RA-224	1.0449E+00						
		241.00	1.045E+00	(P	1.331E+00	4.10E-01	G
RA-226	1.5677E+00						
		185.99	1.568E+00	*(	1.257E+00	3.97E-01	G
AC-228	7.7838E-01						
		911.07	7.668E-01	(P	1.713E-01	8.89E-02	G K
		968.90	7.195E-01	(P	2.789E-01	1.14E-01	G
		338.40	8.920E-01	(P	3.286E-01	1.34E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.2072E-01
                          236.00-1.207E-01 %(P 5.083E-01 1.52E-01 G K
                          256.25-1.159E-02 % P 5.703E-01 1.67E-01 G

PA-234       4.6755E-02
                           98.44 4.675E-02 %(  1.883E-01 5.65E-02 G K
                          946.00-4.317E-02 &   3.337E-01 9.61E-02 G
                          131.28-3.280E-02 %   2.279E-01 6.81E-02 G
                           94.67-1.717E-01 %   3.580E-01 1.09E-01 G
                          883.24-1.072E-01 %   4.506E-01 1.31E-01 G
                          926.70 9.354E-02 %   4.580E-01 1.32E-01 G
                          569.26 2.426E-02 &   3.659E-01 1.04E-01 G

TH-234       1.2588E+00
                           63.29 2.701E-01 %(P 2.179E+00 6.49E-01 G K
                           92.80 1.865E+00  (P 1.685E+00 5.23E-01 G
                           92.38 2.051E+00  (P 2.017E+00 6.23E-01 G

AM-241       1.8505E-02
                           59.54 1.851E-02 %(P 3.054E-01 9.09E-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 - 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	1.6720E-02	1.7102E-02	3.0257E-01	3.0257E-01	3.468E-01
K-40		1.6456E+01	1.6456E+01	1.9484E+00	2.1589E+00	
MN-54	#A	2.1753E-02	2.1837E-02	4.3373E-02	4.3390E-02	4.776E-02
CO-57	#B	-7.9755E-03	-8.0113E-03	4.8004E-02	4.8006E-02	5.327E-02
CO-60	#B	-2.4893E-03	-2.4908E-03	5.9956E-02	5.9956E-02	6.178E-02
Sr-85	#A	-1.5822E-02	-1.6120E-02	5.7035E-02	5.7042E-02	6.279E-02
Kr-85	#A	-3.9257E+02	-3.9258E+02	1.4856E+03	1.4858E+03	1.455E+03
Y-88	#B	0.0000E+00	0.0000E+00	4.0452E-02	4.0453E-02	5.252E-02
NB-94	#B	-1.5913E-02	-1.5913E-02	5.5339E-02	5.5347E-02	6.123E-02
Ag-108M	#B	-2.2105E-03	-2.2106E-03	4.3528E-02	4.3528E-02	5.155E-02
CD-109	#A	2.8551E-01	2.8627E-01	1.1241E+00	1.1243E+00	1.247E+00
SN-113	#B	9.7194E-04	9.8219E-04	4.8187E-02	4.8187E-02	5.549E-02
SB-125	#B	9.5827E-02	9.5941E-02	9.2897E-02	9.3055E-02	1.332E-01
I-131	#B	1.0618E-02	1.2339E-02	4.9054E-02	4.9059E-02	4.764E-02
CS-134	#B	3.0751E-03	3.0801E-03	1.0596E-01	1.0596E-01	1.193E-01
CS-137	#A	1.1055E-02	1.1056E-02	5.0871E-02	5.0875E-02	5.849E-02
CE-139	#A	-9.1396E-05	-9.2202E-05	1.8122E-01	1.8122E-01	5.298E-02
EU-152	#B	1.0724E-01	1.0727E-01	1.2364E-01	1.2378E-01	1.549E-01
EU-154	#B	3.8325E-02	3.8340E-02	3.6997E-02	3.7058E-02	1.054E-01
EU-155	#B	1.0023E-01	1.0030E-01	1.5815E-01	1.5825E-01	1.730E-01
HG-203	#B	-1.1461E-02	-1.1762E-02	4.8472E-02	4.8477E-02	5.290E-02
TL-208		2.5357E-01	2.5357E-01	7.4336E-02	7.5704E-02	
PB-212	#	6.3468E-01	6.3468E-01	1.2910E-01	1.3399E-01	1.102E-01
PB-214	#	4.4261E-01	4.4261E-01	1.1414E-01	1.1685E-01	9.302E-02
BI-212		4.8202E-01	4.8202E-01	4.3655E-01	4.3740E-01	
BI-214		4.4930E-01	4.4930E-01	1.6807E-01	1.6998E-01	
RA-224	#A	1.0449E+00	1.0449E+00	1.2295E+00	1.2309E+00	1.331E+00
RA-226	#	1.5677E+00	1.5677E+00	1.1897E+00	1.1930E+00	1.257E+00
AC-228		7.7838E-01	7.7838E-01	1.9268E-01	1.9764E-01	
TH-227	#B	-1.2072E-01	-1.2072E-01	4.7144E-01	4.7149E-01	5.083E-01
PA-234	#B	4.6755E-02	4.6755E-02	1.6961E-01	1.6963E-01	1.883E-01
TH-234	#B	1.2588E+00	1.2588E+00	1.0590E+00	1.0613E+00	2.179E+00
AM-241	#A	1.8505E-02	1.8505E-02	2.7269E-01	2.7269E-01	3.054E-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

YAEC Chemistry Lab Spectrum name: 101F_23FEB2006_0931.An1

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

Total Activity (1120.2 to 1999.1 keV) 1.8419741E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 1.8419741E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_23FEB2006_1149.An1

Sample description
FSS-NOL-05-02-009-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\101F_23FEB2006_1149.An1

Acquisition information
Start time: 23-Feb-2006 11:51:14
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/channel^2

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: 1.7150E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7150E+03) =
5.8309E+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	21-Feb-2006 15:30:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2814

***** 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
74.32	166.	18.04	1.00	1.643E-02				
74.32	166.	18.04	1.00	1.643E-02	74.81	9.600	7.967E-01	PB212
77.30	296.	10.26	1.01	1.729E-02	77.11	10.700	1.252E+00	PB214
					77.11	17.500	7.750E-01	PB212
87.18	86.	32.10	1.01	1.923E-02				
93.20	118.	22.92	1.02	1.995E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.94	92.	32.39	1.12	1.859E-02				
185.94	92.	32.39	1.12	1.859E-02	185.99	3.280	1.195E+00	RA226
209.03	72.	33.32	1.71	1.723E-02				
238.69	642.	4.70	1.12	1.557E-02	238.63	43.100	7.469E-01	PB212
241.54	102.	20.96	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
295.21	156.	11.28	1.16	1.293E-02				
295.21	156.	11.28	1.16	1.293E-02	295.22	19.200	4.896E-01	PB214
299.51	46.	34.62	1.15	1.275E-02				
338.33	143.	13.70	1.37	1.135E-02	338.40	12.010	8.152E-01	AC228
351.86	265.	9.35	1.17	1.093E-02				
351.86	265.	9.35	1.17	1.093E-02	351.99	37.100	5.110E-01	PB214
462.94	57.	30.23	1.22	8.352E-03				
462.94	57.	30.23	1.22	8.352E-03	463.51	10.000	5.254E-01	SB125
510.75	116.	14.65	1.10	7.590E-03	510.72	22.500	4.631E-01	TL208
582.78	191.	10.26	1.07	6.688E-03	583.14	86.000	2.580E-01	TL208
609.06	205.	10.05	1.42	6.415E-03	609.32	46.090	5.441E-01	BI214
726.89	43.	33.56	1.01	5.445E-03				
726.89	43.	33.56	1.01	5.445E-03	727.17	11.800	5.192E-01	BI212
910.87	123.	13.01	1.24	4.447E-03	911.07	29.000	7.414E-01	AC228
967.92	99.	15.64	2.02	4.216E-03	964.00	14.580	1.259E+00	EU152

					968.90	17.460	1.053E+00	AC228
1119.45	54.	25.95	1.48	3.713E-03	1120.28	15.040	7.612E-01	BI214
1460.10	649.	4.03	1.87	2.944E-03	1460.75	10.700	1.620E+01	K40
1763.94	30.	18.26	2.08	2.481E-03	1764.51	15.920	5.897E-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	
148.21	74.46	364.	166.	0.083	54.11	1.004	BI-207	D
154.17	77.44	314.	296.	0.148	30.79	1.007	PB-214	D
173.93	87.36	337.	86.	0.043	96.30	1.014	PB-214	lD
417.73	209.03	232.	72.	0.036	99.96	1.712	AC-228	s
477.08	238.63	135.	642.	0.321	14.10	1.122	PB-212	D
482.78	241.48	180.	102.	0.051	62.89	1.124	PB-214	D
598.78	299.51	106.	46.	0.023	103.85	1.152	TH-227	

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	149.13	74.78	929.	177.	0.088	74.23	1.499
PB-214	153.79	77.11	817.	272.	0.136	47.50	1.499D
PB-212	153.79	77.11	813.	275.	0.138	47.50	1.499D
TH-234	185.38	92.90	852.	103.	0.052	111.63	1.499
TH-234	185.41	92.91	820.	113.	0.056	105.65	1.499
RA-226	371.80	186.07	397.	98.	0.049	91.20	1.499
PB-212	476.96	238.63	405.	533.	0.266	20.35	1.499D
PB-214	590.11	295.18	173.	149.	0.074	44.20	1.499
AC-228	676.45	338.33	103.	141.	0.071	41.11	1.368s
PB-214	703.68	351.94	117.	240.	0.120	26.91	1.499
SB-125	925.89	463.00	53.	54.	0.027	68.38	1.499
TL-208	1021.45	510.75	81.	100.	0.050	43.95	1.102s
TL-208	1165.56	582.78	71.	188.	0.094	30.77	1.068s
BI-214	1218.15	609.06	66.	204.	0.102	30.16	1.419
BI-212	1453.99	726.92	56.	30.	0.015	115.07	1.499s
AC-228	1822.10	910.87	44.	121.	0.061	39.03	1.239
AC-228	1936.25	967.92	45.	98.	0.049	46.93	2.016s
BI-214	2239.49	1119.45	44.	54.	0.027	77.84	1.485
K-40	2921.22	1460.10	10.	647.	0.324	12.10	1.865
BI-214	3529.32	1763.94	0.	30.	0.015	54.77	2.082

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.2668E-01					
			477.56	-1.267E-01	%(	4.285E-01 1.27E-01	G
K-40		1.6196E+01					
			1460.75	1.620E+01	(P	4.344E-01 6.55E-01	G
MN-54		-6.8803E-04					
			834.81	-6.880E-04	%(P	7.063E-02 2.00E-02	G
CO-57		-1.5709E-02					
			122.07	-1.571E-02	%(	5.574E-02 1.68E-02	G K
			136.43	-9.045E-02	%	3.662E-01 1.10E-01	G
CO-60		-2.1425E-04					
			1332.51	-2.142E-04	%(P	6.991E-02 1.92E-02	G K
			1173.23	1.719E-02	& P	7.761E-02 2.26E-02	G K
Sr-85		-2.7186E-02					
			514.00	-2.719E-02	%(	6.104E-02 1.84E-02	G
Kr-85		-6.4392E+02					
			513.99	-6.439E+02	%(P	1.387E+03 4.18E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	2.474E-02 3.36E-03	G K
			898.02	-8.721E-03	% P	6.552E-02 1.87E-02	G
NB-94		6.4865E-03					
			871.10	6.486E-03	%(P	5.529E-02 1.57E-02	G K
			702.50	-3.014E-03	% P	4.704E-02 1.33E-02	G K
Ag-108M		-1.7211E-02					
			722.95	-1.721E-02	%(	7.435E-02 2.19E-02	G K
			614.37	-7.106E-03	& P	5.380E-02 1.55E-02	G
			433.93	-5.465E-03	%	4.714E-02 1.37E-02	G
CD-109		1.0204E-01					
			88.04	1.020E-01	%(P	1.362E+00 4.06E-01	G
SN-113		-1.6625E-02					
			391.71	-1.662E-02	%(	7.018E-02 2.08E-02	G K
			255.04	-4.308E-01	% P	2.110E+00 6.28E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.6866E-01						
		427.95	5.442E-02	&(P	1.306E-01	3.93E-02	G K
		600.77	1.186E-02	% P	2.236E-01	6.30E-02	G
		636.15	-2.502E-02	% P	3.804E-01	1.07E-01	G
		463.51	5.068E-01	(P	3.453E-01	1.19E-01	G
		176.29	-1.319E-01	% P	6.795E-01	2.02E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	%(	5.972E-02	1.72E-02	G K
		636.97	-2.600E-02	%	7.691E-01	2.18E-01	G
		284.29	2.782E-01	%	8.126E-01	2.44E-01	G
CS-134	-1.2551E-03						
		604.66	-1.255E-03	%(P	6.208E-02	1.78E-02	G K
		795.76	3.456E-02	% P	4.915E-02	1.56E-02	G
		569.29	-7.812E-02	% P	3.191E-01	9.35E-02	G
		801.84	1.803E-02	&	5.311E-01	1.47E-01	G
CS-137	1.2583E-02						
		661.62	1.258E-02	&(P	6.621E-02	1.93E-02	G
CE-139	-1.2464E-02						
		165.85	-1.246E-02	%(P	5.478E-02	1.64E-02	G
EU-152	4.0870E-02						
		121.78	4.087E-02	%(P	1.449E-01	4.35E-02	G K
		344.30	3.668E-02	% P	1.515E-01	4.49E-02	G
		1408.08	3.158E-02	% P	2.296E-01	6.26E-02	G
		964.00	-2.846E-01	& P	6.765E-01	2.03E-01	G
		1112.07	-8.659E-02	% P	5.017E-01	1.44E-01	G
		778.90	4.382E-02	% P	4.014E-01	1.14E-01	G
EU-154	-3.6348E-02						
		123.10	-3.635E-02	%(P	1.150E-01	3.46E-02	G K
		1274.80	-1.488E-04	% P	2.887E-01	8.21E-02	G
		723.30	-1.374E-02	% P	3.230E-01	9.22E-02	G
		1004.80	-1.352E-02	% P	3.027E-01	8.36E-02	G
EU-155	3.4555E-02						
		86.45	3.455E-02	%(	1.582E-01	4.74E-02	G K
		105.31	4.743E-02	%	2.120E-01	6.36E-02	G
HG-203	3.0273E-02						
		279.17	3.027E-02	&(	4.441E-02	1.37E-02	G K
		72.87	-6.637E-01	& P	1.323E+00	4.01E-01	G
		70.83	-1.572E+00	%	2.177E+00	6.66E-01	G
		82.50	-1.646E-01	%	2.681E+00	8.00E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5800E-01						
		583.14	2.580E-01	@(P	5.745E-02	2.68E-02	G
		510.72	4.631E-01	+ P	2.056E-01	7.87E-02	G
PB-212	6.5306E-01						
							Energy duplication
		238.63	6.255E-01	(P	1.133E-01	4.29E-02	G K
							Energy duplication
		77.11	7.209E-01	@(	3.549E-01	1.14E-01	G
		74.81	8.774E-01	& P	7.182E-01	2.24E-01	G
PB-214	4.6906E-01						
		351.99	4.669E-01	(P	1.032E-01	4.22E-02	G K
		295.22	4.732E-01	(P	2.033E-01	7.05E-02	G
							Energy duplication
		77.11	1.163E+00	+ P	5.818E-01	1.87E-01	G
		241.92	1.033E-01	% P	5.761E-01	1.71E-01	G
BI-212	3.7126E-01						
		727.17	3.713E-01	@(P	4.596E-01	1.46E-01	G K
		1620.56	4.363E-02	&	1.907E+00	4.96E-01	G
		785.42	8.460E-01	% P	2.485E+00	7.35E-01	G
BI-214	5.5580E-01						
		609.32	5.441E-01	(P	1.081E-01	5.50E-02	G K
		1764.51	5.897E-01	(P	1.470E-01	1.09E-01	G
		1120.28	7.612E-01	+ P	4.751E-01	1.99E-01	G
RA-224	9.4249E-01						
		241.00	9.425E-01	%(P	1.359E+00	4.17E-01	G
RA-226	1.2702E+00						
		185.99	1.270E+00	(	1.235E+00	3.86E-01	G
AC-228	7.6302E-01						
		911.07	7.414E-01	(P	2.047E-01	9.79E-02	G K
		968.90	1.053E+00	+ P	3.629E-01	1.66E-01	G
		338.40	8.152E-01	@(P	2.890E-01	1.13E-01	G
TH-227	-1.4566E-01						
		236.00	-1.457E-01	%(P	5.227E-01	1.57E-01	G K
		256.25	-1.262E-01	% P	5.958E-01	1.77E-01	G
PA-234	-5.6334E-02						
		98.44	-5.633E-02	%(	1.983E-01	5.96E-02	G K
		946.00	1.871E-02	&	2.804E-01	7.87E-02	G
		131.28	2.783E-02	%	2.234E-01	6.67E-02	G
		94.67	-3.997E-02	%	3.526E-01	1.05E-01	G
		883.24	7.825E-02	&	4.590E-01	1.32E-01	G
		926.70	1.106E-01	%	4.247E-01	1.23E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-2.660E-03 %   4.385E-01 1.24E-01 G

TH-234       1.3030E+00
                           63.29 9.722E-01 %(P 2.267E+00 6.84E-01 G K
                           92.80 1.485E+00  (P 1.798E+00 5.52E-01 G
                           92.38 1.592E+00  (P 2.143E+00 6.55E-01 G

AM-241      -1.3032E-01
                           59.54-1.303E-01 %(P 3.310E-01 9.99E-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 - 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 *****

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	-1.2367E-01	-1.2668E-01	3.8105E-01	3.8111E-01	4.184E-01
K-40		1.6196E+01	1.6196E+01	1.9663E+00	2.1688E+00	
MN-54	#A	-6.8521E-04	-6.8803E-04	5.0197E-02	5.0197E-02	7.035E-02
CO-57	#B	-1.5634E-02	-1.5709E-02	5.0286E-02	5.0294E-02	5.548E-02
CO-60	#B	-2.1410E-04	-2.1425E-04	9.9613E-03	9.9613E-03	6.987E-02

Sr-85	#A	-2.6654E-02	-2.7186E-02	5.5347E-02	5.5369E-02	5.984E-02
Kr-85	#A	-6.4391E+02	-6.4392E+02	1.3691E+03	1.3696E+03	1.387E+03
Y-88	#B	0.0000E+00	0.0000E+00	1.0069E-02	1.0070E-02	2.444E-02
NB-94	#B	6.4865E-03	6.4865E-03	4.7160E-02	4.7162E-02	5.529E-02
Ag-108M	#B	-1.7210E-02	-1.7211E-02	6.5670E-02	6.5678E-02	7.435E-02
CD-109	#A	1.0175E-01	1.0204E-01	1.2171E+00	1.2171E+00	1.358E+00
SN-113	#B	-1.6441E-02	-1.6625E-02	6.2312E-02	6.2319E-02	6.940E-02
SB-125	#F	1.6845E-01	1.6866E-01	1.1845E-01	1.1883E-01	1.304E-01
I-131	#B	0.0000E+00	0.0000E+00	5.1717E-02	5.1717E-02	5.093E-02
CS-134	#B	-1.2530E-03	-1.2551E-03	2.2496E-01	2.2496E-01	6.197E-02
CS-137	#A	1.2581E-02	1.2583E-02	5.7797E-02	5.7801E-02	6.621E-02
CE-139	#A	-1.2348E-02	-1.2464E-02	5.0507E-02	5.0512E-02	5.427E-02
EU-152	#B	4.0859E-02	4.0870E-02	1.3056E-01	1.3058E-01	1.449E-01
EU-154	#B	-3.6333E-02	-3.6348E-02	1.0871E-01	1.0873E-01	1.150E-01
EU-155	#B	3.4530E-02	3.4555E-02	1.4233E-01	1.4234E-01	1.581E-01
HG-203	#B	2.9452E-02	3.0273E-02	4.1129E-02	4.1165E-02	4.321E-02
TL-208	#	2.5800E-01	2.5800E-01	8.0382E-02	8.1693E-02	
PB-212	#	6.5306E-01	6.5306E-01	1.3444E-01	1.3941E-01	1.133E-01
PB-214	#	4.6906E-01	4.6906E-01	1.2268E-01	1.2551E-01	1.032E-01
BI-212	#A	3.7126E-01	3.7126E-01	4.3676E-01	4.3726E-01	4.596E-01
BI-214		5.5580E-01	5.5580E-01	1.6853E-01	1.7143E-01	
RA-224	#A	9.4249E-01	9.4249E-01	1.2501E+00	1.2513E+00	1.359E+00
RA-226	#	1.2702E+00	1.2702E+00	1.1585E+00	1.1607E+00	1.235E+00
AC-228		7.6302E-01	7.6302E-01	2.1962E-01	2.2382E-01	
TH-227	#B	-1.4566E-01	-1.4566E-01	4.8361E-01	4.8368E-01	5.227E-01
PA-234	#B	-5.6334E-02	-5.6334E-02	1.7891E-01	1.7894E-01	1.983E-01
TH-234	#B	1.3030E+00	1.3030E+00	1.1671E+00	1.1693E+00	2.267E+00
AM-241	#A	-1.3031E-01	-1.3032E-01	3.1041E-01	3.1049E-01	3.310E-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 (270.1 to 1999.1 keV) 1.7772322E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.7772322E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_23FEB2006_1328.An1

Sample description
FSS-NOL-05-02-011-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\101F_23FEB2006_1328.An1

Acquisition information
Start time: 23-Feb-2006 13:29:51
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/channel^2

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: 1.6540E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6540E+03) =
6.0459E+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	21-Feb-2006 15:35:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4221

***** 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
74.73	167.	26.84	1.50	1.654E-02				
74.73	167.	26.84	1.50	1.654E-02	74.81	9.600	8.596E-01	PB212
77.17	270.	16.75	1.50	1.720E-02	77.11	10.700	1.199E+00	PB214
					77.11	17.500	7.328E-01	PB212
77.17	274.	16.75	1.50	1.720E-02	77.11	10.700	1.199E+00	PB214
					77.11	17.500	7.429E-01	PB212
86.57	93.	29.46	1.01	1.907E-02				
86.57	93.	29.46	1.01	1.907E-02	86.45	32.740	1.222E-01	EU155
90.11	101.	24.73	1.02	1.956E-02	88.04	3.790	PBC<MDA	CD109
93.29	155.	17.55	1.02	1.992E-02	92.38	2.570	2.307E+00	TH234
					92.80	3.000	2.036E+00	TH234
129.95	87.	34.33	0.73	2.108E-02				
129.95	87.	34.33	0.73	2.108E-02	131.28	20.000	1.680E-01	PA234
186.07	73.	31.63	1.45	1.858E-02	185.99	3.280	9.732E-01	RA226
209.29	74.	30.82	1.47	1.722E-02				
238.64	634.	4.65	1.12	1.558E-02				
238.64	634.	4.65	1.12	1.558E-02	238.63	43.100	7.647E-01	PB212
238.55	766.	3.75	1.50	1.540E-02				
238.55	766.	3.75	1.50	1.540E-02	238.63	43.100	9.319E-01	PB212
241.73	92.	22.46	1.12	1.542E-02	241.00	3.900	1.231E+00	RA224
277.39	41.	34.47	0.96	1.368E-02				
277.39	41.	34.47	0.96	1.368E-02	279.17	81.500	3.094E-02	HG203
295.19	151.	11.61	1.16	1.292E-02				
295.19	151.	11.61	1.16	1.292E-02	295.22	19.200	4.903E-01	PB214
300.13	42.	33.74	1.16	1.272E-02				
338.38	146.	16.47	1.40	1.135E-02	338.40	12.010	8.620E-01	AC228
351.85	300.	9.91	1.42	1.093E-02				

351.85	300.	9.91	1.42	1.093E-02	351.99	37.100	6.018E-01	PB214
462.60	57.	29.72	1.38	8.358E-03				
462.60	57.	29.72	1.38	8.358E-03	463.51	10.000	5.468E-01	SB125
510.36	102.	18.88	1.42	7.596E-03				
510.36	102.	18.88	1.42	7.596E-03	510.72	22.500	4.089E-01	TL208
582.70	212.	10.47	1.27	6.689E-03				
582.70	212.	10.47	1.27	6.689E-03	583.14	86.000	2.979E-01	TL208
608.94	180.	10.88	1.42	6.416E-03	609.32	46.090	4.951E-01	BI214
718.97	18.	38.74	1.50	5.472E-03	722.95	90.499	PBC<MDA	Ag108M
					723.30	19.700	PBC<MDA	EU154
726.38	32.	32.78	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
794.51	27.	31.44	1.50	5.016E-03	795.76	85.400	5.076E-02	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
910.68	136.	11.90	1.63	4.448E-03	911.07	29.000	8.499E-01	AC228
963.97	29.	30.65	1.61	4.230E-03	964.00	14.580	PBC<MDA	EU152
968.31	71.	15.39	1.62	4.214E-03	968.90	17.460	7.797E-01	AC228
1119.97	56.	26.67	2.13	3.711E-03	1120.28	15.040	8.171E-01	BI214
1459.89	656.	4.07	1.75	2.944E-03	1460.75	10.700	1.695E+01	K40
1763.62	28.	19.93	0.91	2.481E-03	1764.51	15.920	5.804E-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	
172.72	86.29	333.	93.	0.047	88.39	1.013	BI-207	lD
179.80	89.83	264.	101.	0.051	74.20	1.016	PB-214	lD
259.51	129.95	362.	87.	0.043	102.99	0.726	AC-228	l
371.79	186.07	239.	73.	0.036	94.90	1.454	PA-234	l
418.25	209.29	211.	74.	0.037	92.46	1.466	AC-228	s
476.99	238.45	118.	634.	0.317	13.95	1.121	PB-212	D
554.51	277.39	87.	41.	0.020	103.40	0.959	TL-208	l
599.94	300.09	140.	47.	0.023	116.55	0.902	PB-212	
1020.67	510.36	139.	43.	0.022	124.17	1.423	J-133	s
1927.60	964.11	29.	25.	0.013	108.92	1.612	EU-152	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	149.03	74.73	989.	167.	0.084	80.53	1.499
PB-214	153.79	77.11	919.	270.	0.135	50.26	1.499D
PB-212	153.79	77.11	915.	274.	0.137	50.26	1.499D
TH-234	185.80	93.11	797.	139.	0.070	82.98	1.499
TH-234	185.83	93.13	734.	154.	0.077	75.27	1.499
PB-212	476.92	238.61	317.	475.	0.238	20.68	1.499
RA-224	481.70	241.00	306.	90.	0.045	87.78	1.123D
PB-214	476.81	238.55	31.	766.	0.383	11.25	1.499s
PB-214	590.03	295.14	178.	140.	0.070	46.97	1.499
AC-228	676.55	338.38	146.	144.	0.072	49.40	1.404
PB-214	703.45	351.83	102.	265.	0.133	24.26	1.499
SB-125	925.73	462.92	74.	42.	0.021	94.58	1.499s
TL-208	1020.39	510.22	92.	42.	0.021	74.73	1.499s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1165.59	582.79	53.	170.	0.085	28.79	1.499
BI-214	1217.91	608.94	65.	179.	0.090	32.64	1.421
Ag-108M	1438.09	718.97	16.	18.	0.009	116.23	1.499s
BI-212	1452.91	726.38	41.	32.	0.016	98.33	1.499s
CS-134	1589.25	794.51	23.	27.	0.013	94.32	1.502s
AC-228	1821.71	910.68	44.	134.	0.067	35.71	1.635s
AC-228	1938.21	968.90	24.	70.	0.035	46.10	1.615D
BI-214	2240.54	1119.97	47.	56.	0.028	80.01	2.126s
K-40	2920.79	1459.89	14.	653.	0.327	12.20	1.754
BI-214	3528.68	1763.62	2.	28.	0.014	59.78	0.906s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.0028E-01					
			477.56	1.003E-01	&(	3.434E-01 1.01E-01	G
K-40		1.6954E+01					
			1460.75	1.695E+01	(P	5.176E-01 6.91E-01	G
MN-54		5.3009E-03					
			834.81	5.301E-03	%(P	5.832E-02 1.65E-02	G
CO-57		1.4894E-02					
			122.07	1.489E-02	%(	5.375E-02 1.61E-02	G K
			136.43	1.069E-01	%	4.086E-01 1.23E-01	G
CO-60		5.0128E-03					
			1332.51	5.013E-03	&(P	6.976E-02 1.94E-02	G K
			1173.23	-3.729E-03	% P	7.624E-02 2.14E-02	G K
Sr-85		-2.6720E-03					
			514.00	-2.672E-03	%(	5.729E-02 1.66E-02	G
Kr-85		-8.9980E+01					
			513.99	-8.998E+01	%(P	1.302E+03 3.75E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	2.566E-02 3.48E-03	G K
			898.02	1.261E-02	% P	4.148E-02 1.20E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	8.3437E-03						
		871.10	8.344E-03	&(P	3.732E-02	1.06E-02	G K
		702.50	2.727E-02	% P	4.249E-02	1.33E-02	G K
Ag-108M	3.0103E-02						
		722.95	3.010E-02	?(	3.509E-02	1.17E-02	G K
		614.37	-1.374E-02	% P	5.870E-02	1.72E-02	G
		433.93	-1.164E-03	&	4.224E-02	1.20E-02	G
CD-109	1.4581E-01						
		88.04	1.458E-01	&(P	1.624E+00	4.85E-01	G
SN-113	1.8635E-02						
		391.71	1.863E-02	%(	6.801E-02	2.02E-02	G K
		255.04	-7.985E-01	% P	2.144E+00	6.45E-01	G
SB-125	7.5203E-02						
		427.95	-3.884E-02	%(P	1.576E-01	4.65E-02	G K
		600.77	-1.694E-02	% P	2.524E-01	7.16E-02	G
		636.15	-1.032E-01	% P	4.517E-01	1.32E-01	G
		463.51	4.128E-01	@(P	4.194E-01	1.35E-01	G
		176.29	-3.632E-02	% P	6.865E-01	2.03E-01	G
I-131	-5.6815E-03						
		364.48	-5.682E-03	%(	7.036E-02	2.06E-02	G K
		636.97	-1.857E-01	%	8.293E-01	2.42E-01	G
		284.29	3.176E-02	&	8.005E-01	2.34E-01	G
CS-134	2.1784E-02						
		604.66	-3.567E-03	%(P	1.283E-01	3.79E-02	G K
		795.76	5.076E-02	*(P	4.780E-02	1.62E-02	G
		569.29	4.996E-03	% P	2.729E-01	7.65E-02	G
		801.84	0.000E+00	&	6.275E-01	1.75E-01	G
CS-137	1.2821E-02						
		661.62	1.282E-02	&(P	5.801E-02	1.68E-02	G
CE-139	1.6120E-02						
		165.85	1.612E-02	%(P	5.281E-02	1.59E-02	G
EU-152	3.9222E-02						
		121.78	3.922E-02	&(P	1.579E-01	4.74E-02	G K
		344.30	-2.131E-02	% P	1.637E-01	4.79E-02	G
		1408.08	1.178E-02	& P	2.449E-01	6.48E-02	G
		964.00	1.083E-03	& P	5.068E-01	1.43E-01	G
		1112.07	-7.322E-02	% P	4.886E-01	1.39E-01	G
		778.90	-1.203E-03	% P	5.338E-01	1.52E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	3.3560E-02						
		123.10	3.356E-02	%(P	1.059E-01	3.19E-02	G K
		1274.80	3.406E-02	% P	2.113E-01	6.04E-02	G
		723.30	2.571E-03	% P	2.112E-01	5.78E-02	G
		1004.80	-2.094E-02	% P	3.497E-01	9.79E-02	G
EU-155	1.5313E-02						
		86.45	1.531E-02	%(	1.950E-01	5.83E-02	G K
		105.31	-5.758E-03	&	2.374E-01	7.06E-02	G
HG-203	2.6584E-02						
		279.17	2.658E-02	&(	4.402E-02	1.35E-02	G K
		72.87	-5.053E-02	% P	1.199E+00	3.57E-01	G
		70.83	-7.325E-01	%	2.238E+00	6.75E-01	G
		82.50	-9.223E-01	%	2.828E+00	8.53E-01	G
TL-208	2.3371E-01						
		583.14	2.420E-01	(P	5.224E-02	2.36E-02	G
		510.72	2.019E-01	*(P	2.269E-01	6.94E-02	G
PB-212	5.7872E-01						
		238.63	5.787E-01	(P	1.042E-01	4.04E-02	G K
							Energy duplication
		77.11	7.429E-01	+	3.899E-01	1.24E-01	G
		74.81	8.596E-01	& P	7.679E-01	2.38E-01	G
PB-214	5.1009E-01						
		351.99	5.349E-01	(P	1.004E-01	4.36E-02	G K
		295.22	4.621E-01	(P	2.138E-01	7.33E-02	G
							Energy duplication
		77.11	1.199E+00	+ P	6.389E-01	2.04E-01	G
		241.92	5.438E+00	+ P	2.027E-01	2.04E-01	G
BI-212	4.0355E-01						
		727.17	4.036E-01	*(P	4.134E-01	1.35E-01	G K
		1620.56	0.000E+00	&	1.761E+00	4.43E-01	G
		785.42	-1.549E-01	% P	2.537E+00	7.09E-01	G
BI-214	5.1697E-01						
		609.32	4.951E-01	(P	1.113E-01	5.42E-02	G K
		1764.51	5.804E-01	(P	1.902E-01	1.17E-01	G
		1120.28	8.171E-01	+ P	5.083E-01	2.19E-01	G
RA-224	1.2177E+00						
		241.00	1.218E+00	(P	1.142E+00	3.59E-01	G
RA-226	9.8866E-01						
		185.99	9.887E-01	%(	1.402E+00	4.30E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AC-228       8.3019E-01
                          911.07 8.499E-01 *(P 2.127E-01 1.03E-01 G K
                          968.90 7.756E-01  (P 2.847E-01 1.20E-01 G
                          338.40 8.620E-01  (P 3.540E-01 1.44E-01 G

TH-227      -2.5955E-01
                          236.00-2.596E-01 %(P 4.961E-01 1.51E-01 G K
                          256.25-2.457E-01 % P 6.661E-01 2.00E-01 G

PA-234      -7.4307E-02
                           98.44-7.431E-02 %(  1.923E-01 5.81E-02 G K
                          946.00-2.274E-02 %   3.045E-01 8.59E-02 G
                          131.28 1.094E-01 &   1.945E-01 5.93E-02 G
                           94.67-1.065E-01 %   3.644E-01 1.10E-01 G
                          883.24 9.026E-02 %   4.339E-01 1.25E-01 G
                          926.70 5.442E-02 %   5.045E-01 1.42E-01 G
                          569.26-3.382E-05 %   3.908E-01 1.09E-01 G

TH-234       1.5566E+00
                           63.29 6.881E-01 &(P 2.356E+00 7.07E-01 G K
                           92.80 2.109E+00  (P 1.766E+00 5.50E-01 G
                           92.38 2.229E+00  (P 2.150E+00 6.65E-01 G

AM-241       6.6200E-03
                           59.54 6.620E-03 %(P 3.340E-01 9.93E-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
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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	9.7819E-02	1.0028E-01	3.0323E-01	3.0328E-01	3.350E-01
K-40		1.6954E+01	1.6954E+01	2.0748E+00	2.2853E+00	
MN-54	#A	5.2784E-03	5.3009E-03	4.9601E-02	4.9602E-02	5.808E-02
CO-57	#B	1.4821E-02	1.4894E-02	4.8447E-02	4.8454E-02	5.348E-02
CO-60	#B	5.0093E-03	5.0128E-03	5.8145E-02	5.8146E-02	6.971E-02
Sr-85	#A	-2.6179E-03	-2.6720E-03	4.9683E-02	4.9683E-02	5.613E-02
Kr-85	#A	-8.9978E+01	-8.9980E+01	2.2273E+03	2.2273E+03	1.302E+03
Y-88	#B	0.0000E+00	0.0000E+00	1.0444E-02	1.0446E-02	2.534E-02
NB-94	#B	8.3437E-03	8.3437E-03	3.1718E-02	3.1721E-02	3.732E-02
Ag-108M	#A	3.0102E-02	3.0103E-02	3.4990E-02	3.5031E-02	3.509E-02
CD-109	#A	1.4539E-01	1.4581E-01	1.4555E+00	1.4555E+00	1.619E+00
SN-113	#B	1.8421E-02	1.8635E-02	6.0532E-02	6.0541E-02	6.723E-02
SB-125	#B	7.5104E-02	7.5203E-02	7.3572E-02	7.3695E-02	1.574E-01
I-131	#B	-4.8177E-03	-5.6815E-03	6.1758E-02	6.1759E-02	5.967E-02
CS-134	#B	2.1746E-02	2.1784E-02	2.0871E-02	2.0907E-02	1.281E-01
CS-137	#A	1.2819E-02	1.2821E-02	5.0483E-02	5.0488E-02	5.801E-02
CE-139	#A	1.5965E-02	1.6120E-02	4.7588E-02	4.7597E-02	5.231E-02
EU-152	#B	3.9210E-02	3.9222E-02	1.4211E-01	1.4212E-01	1.579E-01
EU-154	#B	3.3546E-02	3.3560E-02	9.5568E-02	9.5586E-02	1.059E-01
EU-155	#B	1.5302E-02	1.5313E-02	1.7484E-01	1.7484E-01	1.949E-01
HG-203	#B	2.5838E-02	2.6584E-02	4.0510E-02	4.0538E-02	4.278E-02
TL-208	#	2.3371E-01	2.3371E-01	6.8234E-02	6.9500E-02	5.224E-02
PB-212	#	5.7872E-01	5.7872E-01	1.2125E-01	1.2558E-01	1.042E-01
PB-214	#	5.1009E-01	5.1009E-01	1.2468E-01	1.2797E-01	1.004E-01
BI-212	#A	4.0355E-01	4.0355E-01	4.0528E-01	4.0593E-01	4.134E-01
BI-214		5.1697E-01	5.1697E-01	1.6978E-01	1.7227E-01	
RA-224		1.2177E+00	1.2177E+00	1.0775E+00	1.0796E+00	
RA-226	#A	9.8866E-01	9.8866E-01	1.2908E+00	1.2920E+00	1.402E+00
AC-228		8.3019E-01	8.3019E-01	2.1426E-01	2.1933E-01	
TH-227	#B	-2.5955E-01	-2.5955E-01	4.5917E-01	4.5940E-01	4.961E-01
PA-234	#B	-7.4307E-02	-7.4307E-02	1.7425E-01	1.7430E-01	1.923E-01
TH-234	#B	1.5566E+00	1.5566E+00	1.2186E+00	1.2216E+00	2.356E+00
AM-241	#A	6.6199E-03	6.6200E-03	2.9777E-01	2.9777E-01	3.340E-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 1999.1 keV) 1.9518549E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 1.9518549E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_23FEB2006_1406.An1

Sample description
FSS-NOL-NOL-05-02-007-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\101F_23FEB2006_1406.An1

Acquisition information
Start time: 23-Feb-2006 14:08:29
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/channel^2

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: 1.7330E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7330E+03) =
5.7703E+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	21-Feb-2006 15:21:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2563

***** 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
74.80	224.	13.25	1.00	1.654E-02	74.81	9.600	1.101E+00	PB212
77.10	264.	9.52	1.01	1.720E-02	77.11	17.500	7.552E-01	PB212
93.02	143.	26.82	1.50	1.985E-02	92.38	2.570	2.190E+00	TH234
					92.80	3.000	PBC<MDA	TH234
93.06	119.	32.86	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.27	118.	27.00	1.12	1.857E-02	185.99	3.280	1.503E+00	RA226
209.69	86.	30.07	1.04	1.719E-02				
238.59	678.	4.56	1.12	1.558E-02	238.63	43.100	7.808E-01	PB212
241.87	115.	17.46	1.12	1.540E-02	241.00	3.900	1.482E+00	RA224
					241.92	7.470	7.762E-01	PB214
270.28	75.	29.79	0.96	1.400E-02				
277.14	49.	41.62	1.50	1.360E-02	279.17	81.500	PBC<MDA	HG203
295.09	184.	12.46	1.18	1.293E-02	295.22	19.200	5.715E-01	PB214
300.13	57.	36.46	0.96	1.272E-02				
338.11	177.	15.64	1.19	1.136E-02	338.40	12.010	1.001E+00	AC228
351.97	250.	10.39	1.13	1.093E-02	351.99	37.100	4.762E-01	PB214
463.54	47.	33.32	1.06	8.341E-03	463.51	10.000	4.255E-01	SB125
510.85	115.	15.66	1.75	7.589E-03	510.72	22.500	4.510E-01	TL208
582.83	192.	10.56	1.42	6.688E-03	583.14	86.000	2.576E-01	TL208
609.05	189.	10.43	1.44	6.415E-03	609.32	46.090	4.947E-01	BI214
727.44	61.	26.77	1.29	5.441E-03	727.17	11.800	7.312E-01	BI212
794.35	28.	29.98	1.50	5.016E-03	795.76	85.400	5.140E-02	CS134
910.66	127.	11.88	1.56	4.448E-03	911.07	29.000	7.567E-01	AC228
968.06	91.	21.69	1.62	4.215E-03	968.90	17.460	9.530E-01	AC228
1119.63	76.	23.35	1.71	3.713E-03	1120.28	15.040	1.062E+00	BI214
1384.64	20.	26.88	0.56	3.085E-03				

1459.89	632.	4.10	1.72	2.944E-03	1460.75	10.700	1.560E+01	K40
1763.43	24.	20.41	1.22	2.481E-03	1764.51	15.920	4.651E-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
419.06	209.69	252.	86.	0.043	90.22	1.044	NP-239 s
540.28	270.28	178.	75.	0.038	89.38	0.961	AC-228
600.00	300.13	150.	57.	0.029	109.39	0.964	PB-212
2770.19	1384.64	2.	20.	0.010	80.64	0.558	AG-110M 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	149.19	74.81	353.	224.	0.112	39.74	1.005D
PB-212	153.79	77.11	366.	264.	0.132	28.55	1.006A
TH-234	185.62	93.02	788.	143.	0.072	80.46	1.499s
TH-234	185.71	93.06	795.	119.	0.060	98.59	1.499s
RA-226	371.57	185.96	398.	100.	0.050	89.51	1.499s
PB-212	476.96	238.63	146.	672.	0.336	13.68	1.121D
RA-224	483.42	241.86	489.	87.	0.044	111.21	1.499
PB-214	483.54	241.92	146.	114.	0.057	52.61	1.124D
HG-203	554.00	277.14	186.	49.	0.025	124.85	1.499s
PB-214	589.92	295.09	143.	182.	0.091	37.37	1.175
AC-228	676.01	338.11	187.	175.	0.088	46.93	1.187
PB-214	703.74	351.97	138.	248.	0.124	31.18	1.126
SB-125	925.96	463.03	63.	35.	0.018	103.79	1.499s
TL-208	1021.63	510.85	83.	99.	0.049	46.97	1.746s
TL-208	1165.67	582.83	69.	190.	0.095	31.68	1.416
BI-214	1218.13	609.05	70.	187.	0.094	31.29	1.443
BI-212	1455.03	727.44	63.	60.	0.030	80.32	1.291
CS-134	1588.93	794.35	23.	28.	0.014	89.94	1.502s
AC-228	1821.68	910.66	38.	125.	0.063	35.65	1.563
AC-228	1936.53	968.06	71.	90.	0.045	65.08	1.621
BI-214	2239.85	1119.63	58.	76.	0.038	70.06	1.708s
K-40	2920.80	1459.89	10.	630.	0.315	12.31	1.723
BI-214	3528.29	1763.43	0.	24.	0.012	61.24	1.224s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-1.9432E-02					
			477.56	-1.943E-02	%(	3.680E-01 1.05E-01	G
K-40		1.5596E+01					
			1460.75	1.560E+01	(P	4.372E-01 6.42E-01	G
MN-54		1.8113E-02					
			834.81	1.811E-02	%(P	5.419E-02 1.60E-02	G
CO-57		9.2156E-04					
			122.07	9.216E-04	%(	5.313E-02 1.58E-02	G K
			136.43	8.356E-02	%	3.930E-01 1.18E-01	G
CO-60		1.4274E-02					
			1332.51	1.427E-02	%(P	5.688E-02 1.63E-02	G K
			1173.23	2.389E-03	& P	9.151E-02 2.61E-02	G K
Sr-85		-1.7377E-02					
			514.00	-1.738E-02	%(	5.738E-02 1.71E-02	G
Kr-85		-4.2118E+02					
			513.99	-4.212E+02	%(P	1.303E+03 3.86E+02	G
Y-88		-5.0065E-03					
			1836.01	-5.006E-03	%(	5.823E-02 1.55E-02	G K
			898.02	3.762E-03	& P	4.733E-02 1.31E-02	G
NB-94		-5.5512E-03					
			871.10	-5.551E-03	%(P	4.793E-02 1.35E-02	G K
			702.50	9.145E-03	% P	5.192E-02 1.50E-02	G K
Ag-108M		-2.2278E-02					
			722.95	-2.228E-02	&(	7.165E-02 2.13E-02	G K
			614.37	-1.488E-02	% P	6.378E-02 1.88E-02	G
			433.93	1.038E-03	&	5.389E-02 1.56E-02	G
CD-109		-2.4900E-02					
			88.04	-2.490E-02	%(P	1.549E+00 4.61E-01	G
SN-113		-3.8345E-03					
			391.71	-3.834E-03	&(	7.012E-02 2.04E-02	G K
			255.04	1.883E-01	& P	1.992E+00 5.87E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.6801E-02						
		427.95	-3.512E-02	%(P	1.517E-01	4.47E-02	G K
		600.77	-5.657E-02	% P	2.688E-01	7.84E-02	G
		636.15	-7.053E-02	% P	4.318E-01	1.25E-01	G
		463.51	3.289E-01	*(P	3.723E-01	1.18E-01	G
		176.29	-1.110E-01	% P	6.972E-01	2.07E-01	G
I-131	1.3992E-02						
		364.48	1.399E-02	%(	5.323E-02	1.58E-02	G K
		636.97	2.605E-01	%	6.881E-01	2.05E-01	G
		284.29	-4.154E-03	%	6.760E-01	1.96E-01	G
CS-134	2.2172E-02						
		604.66	-3.404E-03	&(P	1.316E-01	3.89E-02	G K
		795.76	5.140E-02	@(P	4.560E-02	1.56E-02	G
		569.29	5.645E-02	& P	2.483E-01	7.21E-02	G
		801.84	1.081E-02	%	6.589E-01	1.86E-01	G
CS-137	2.8708E-02						
		661.62	2.871E-02	%(P	5.811E-02	1.76E-02	G
CE-139	2.1764E-03						
		165.85	2.176E-03	&(P	4.735E-02	1.40E-02	G
EU-152	2.1187E-02						
		121.78	2.119E-02	%(P	1.512E-01	4.51E-02	G K
		344.30	2.502E-02	% P	1.354E-01	3.97E-02	G
		1408.08	-2.947E-04	% P	2.525E-01	6.65E-02	G
		964.00	1.694E-03	& P	6.927E-01	2.00E-01	G
		1112.07	-1.235E-01	& P	5.677E-01	1.65E-01	G
		778.90	-4.976E-02	% P	4.336E-01	1.24E-01	G
EU-154	-2.5586E-02						
		123.10	-2.559E-02	%(P	1.168E-01	3.50E-02	G K
		1274.80	1.691E-02	% P	2.165E-01	6.12E-02	G
		723.30	-1.162E-01	% P	3.509E-01	1.04E-01	G
		1004.80	-4.040E-02	% P	3.511E-01	9.97E-02	G
EU-155	1.7273E-02						
		86.45	1.727E-02	%(	1.940E-01	5.80E-02	G K
		105.31	8.515E-02	%	2.018E-01	6.10E-02	G
HG-203	3.5680E-02						
		279.17	3.568E-02	&(	4.794E-02	1.48E-02	G K
		72.87	-4.298E-01	% P	1.217E+00	3.67E-01	G
		70.83	-1.328E+00	&	2.297E+00	6.99E-01	G
		82.50	1.168E-01	%	2.570E+00	7.65E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-208       2.5762E-01
                          583.14 2.576E-01  (P 5.621E-02 2.75E-02 G
                          510.72 4.510E-01 + P 2.065E-01 8.21E-02 G

PB-212       7.7344E-01
                          238.63 7.808E-01  (P 6.848E-02 3.59E-02 G K
                                                          Energy duplication
                           77.11 6.832E-01 }   2.381E-01 6.50E-02 G
                           74.81 1.101E+00 + P 4.431E-01 1.49E-01 G

PB-214       5.0872E-01
                          351.99 4.762E-01  (P 1.107E-01 4.99E-02 G K
                          295.22 5.715E-01  (P 1.838E-01 7.19E-02 G
                                                          Energy duplication
                           77.11 0.000E+00 } P 5.183E-01 0.00E+00 G
                          241.92 7.733E-01 + P 3.999E-01 1.36E-01 G

BI-212       7.3116E-01
                          727.17 7.312E-01  (P 4.812E-01 1.98E-01 G K
                         1620.56 2.925E-01 &   1.690E+00 4.61E-01 G
                          785.42 1.493E+00 % P 2.743E+00 8.40E-01 G

BI-214       4.8707E-01
                          609.32 4.947E-01  (P 1.097E-01 5.19E-02 G K
                         1764.51 4.651E-01  (P 1.455E-01 9.66E-02 G
                         1120.28 1.062E+00 + P 5.336E-01 2.49E-01 G

RA-224       1.1303E+00
                          241.00 1.130E+00  (P 1.369E+00 4.22E-01 G

RA-226       1.2833E+00
                          185.99 1.283E+00 *(  1.224E+00 3.83E-01 G

AC-228       8.6554E-01
                          911.07 7.567E-01  (P 1.898E-01 9.12E-02 G K
                          968.90 9.530E-01  (P 4.454E-01 2.08E-01 G
                          338.40 1.001E+00  (P 3.800E-01 1.59E-01 G

TH-227      -2.2135E-01
                          236.00-2.213E-01 &(P 4.984E-01 1.51E-01 G K
                          256.25 4.283E-02 & P 5.901E-01 1.73E-01 G

PA-234      -8.4019E-03
                           98.44-8.402E-03 &(  2.017E-01 6.01E-02 G K
                          946.00 1.438E-02 %   2.458E-01 6.81E-02 G
                          131.28 9.298E-03 %   2.323E-01 6.91E-02 G
                           94.67-3.686E-02 &   3.483E-01 1.04E-01 G
                          883.24 0.000E+00 %   3.310E-01 8.88E-02 G
                          926.70 1.819E-01 &   4.163E-01 1.25E-01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 9.062E-02 &   3.646E-01 1.06E-01 G

TH-234       1.3105E+00
                           63.29 5.391E-01 %(P 2.243E+00 6.71E-01 G K
                           92.80 1.560E+00  (P 1.752E+00 5.39E-01 G
                           92.38 2.190E+00 &(P 2.041E+00 6.32E-01 G

AM-241      -5.4201E-02
                           59.54-5.420E-02 &(P 3.243E-01 9.70E-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 - 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 *****

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	-1.8946E-02	-1.9432E-02	3.1409E-01	3.1409E-01	3.588E-01
K-40		1.5596E+01	1.5596E+01	1.9261E+00	2.1181E+00	
MN-54	#A	1.8035E-02	1.8113E-02	4.8052E-02	4.8063E-02	5.395E-02
CO-57	#B	9.1696E-04	9.2156E-04	4.7343E-02	4.7343E-02	5.287E-02
CO-60	#B	1.4264E-02	1.4274E-02	4.9014E-02	4.9020E-02	5.684E-02

Sr-85	#A	-1.7019E-02	-1.7377E-02	5.1262E-02	5.1272E-02	5.619E-02
Kr-85	#A	-4.2117E+02	-4.2118E+02	1.3259E+03	1.3261E+03	1.303E+03
Y-88	#B	-4.9434E-03	-5.0065E-03	4.6452E-02	4.6453E-02	5.749E-02
NB-94	#B	-5.5512E-03	-5.5512E-03	4.3815E-02	4.3816E-02	4.793E-02
Ag-108M	#B	-2.2277E-02	-2.2278E-02	6.3872E-02	6.3885E-02	7.165E-02
CD-109	#A	-2.4826E-02	-2.4900E-02	2.0806E+00	2.0806E+00	1.544E+00
SN-113	#B	-3.7897E-03	-3.8345E-03	6.1115E-02	6.1115E-02	6.931E-02
SB-125	#B	5.6725E-02	5.6801E-02	6.1383E-02	6.1467E-02	1.515E-01
I-131	#B	1.1828E-02	1.3992E-02	4.7260E-02	4.7267E-02	4.499E-02
CS-134	#B	2.2132E-02	2.2172E-02	2.0238E-02	2.0277E-02	1.314E-01
CS-137	#A	2.8704E-02	2.8708E-02	5.2824E-02	5.2849E-02	5.810E-02
CE-139	#A	2.1551E-03	2.1764E-03	4.1982E-02	4.1983E-02	4.688E-02
EU-152	#B	2.1181E-02	2.1187E-02	1.3542E-01	1.3543E-01	1.512E-01
EU-154	#B	-2.5575E-02	-2.5586E-02	1.1207E-01	1.1208E-01	1.168E-01
EU-155	#B	1.7260E-02	1.7273E-02	1.7413E-01	1.7414E-01	1.939E-01
HG-203	#A	3.4660E-02	3.5680E-02	4.4548E-02	4.4593E-02	4.657E-02
TL-208		2.5762E-01	2.5762E-01	8.2640E-02	8.3912E-02	
PB-212		7.7344E-01	7.7344E-01	1.0681E-01	1.1540E-01	
PB-214		5.0872E-01	5.0872E-01	1.2492E-01	1.2818E-01	
BI-212		7.3116E-01	7.3116E-01	5.9385E-01	5.9529E-01	
BI-214		4.8707E-01	4.8707E-01	1.5331E-01	1.5576E-01	
RA-224	#A	1.1303E+00	1.1303E+00	1.2673E+00	1.2689E+00	1.369E+00
RA-226	#	1.2833E+00	1.2833E+00	1.1487E+00	1.1510E+00	1.224E+00
AC-228		8.6554E-01	8.6554E-01	2.5596E-01	2.6059E-01	
TH-227	#B	-2.2135E-01	-2.2135E-01	4.6040E-01	4.6057E-01	4.984E-01
PA-234	#B	-8.4019E-03	-8.4019E-03	1.8017E-01	1.8017E-01	2.017E-01
TH-234	#B	1.3105E+00	1.3105E+00	1.1344E+00	1.1367E+00	2.243E+00
AM-241	#A	-5.4200E-02	-5.4201E-02	3.1592E-01	3.1593E-01	3.243E-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 (270.1 to 1999.1 keV) 1.9219896E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.9219896E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 101F_23FEB2006_1445.An1

Sample description
FSS-NOL-05-02-004-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\101F_23FEB2006_1445.An1

Acquisition information
Start time: 23-Feb-2006 14:46:51
Live time: 2000
Real time: 2002
Dead time: 0.10 %
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/channel^2

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: 1.6390E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6390E+03) =
6.1013E+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	21-Feb-2006 15:17:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4654

***** 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
74.74	191.	15.61	1.00	1.658E-02	74.81	9.600	9.626E-01	PB212
77.02	363.	9.32	1.01	1.723E-02	77.11	17.500	9.935E-01	PB212
					77.11	10.700	1.608E+00	PB214
87.22	87.	32.79	1.01	1.924E-02	86.45	32.740	1.149E-01	EU155
93.11	187.	14.89	1.02	1.995E-02	92.38	2.570	2.853E+00	TH234
					92.80	3.000	2.503E+00	TH234
128.95	70.	37.21	0.62	2.110E-02				
186.49	152.	20.46	1.11	1.855E-02	185.99	3.280	2.063E+00	RA226
208.89	68.	32.69	1.34	1.724E-02				
238.60	762.	4.21	1.12	1.558E-02				
238.60	762.	4.21	1.12	1.558E-02	238.63	43.100	9.283E-01	PB212
241.47	129.	16.29	1.12	1.543E-02	241.00	3.900	1.751E+00	RA224
					241.92	7.470	9.174E-01	PB214
269.96	75.	25.36	2.05	1.402E-02				
295.19	158.	12.40	0.98	1.292E-02				
295.19	158.	12.40	0.98	1.292E-02	295.22	19.200	5.199E-01	PB214
300.14	57.	30.11	0.68	1.272E-02				
338.22	152.	12.31	1.24	1.136E-02	338.40	12.010	9.062E-01	AC228
351.79	242.	10.43	1.17	1.093E-02				
351.79	242.	10.43	1.17	1.093E-02	351.99	37.100	4.875E-01	PB214
462.68	49.	37.00	1.49	8.356E-03				
462.68	49.	37.00	1.49	8.356E-03	463.51	10.000	4.717E-01	SB125
510.48	104.	18.47	1.02	7.594E-03	510.72	22.500	4.266E-01	TL208
582.62	214.	8.82	1.55	6.690E-03	583.14	86.000	3.029E-01	TL208
608.95	158.	10.94	1.55	6.416E-03	609.32	46.090	4.382E-01	BI214
910.28	164.	12.07	1.55	4.450E-03	911.07	29.000	1.037E+00	AC228
967.63	96.	15.31	1.87	4.217E-03	968.90	17.460	1.068E+00	AC228

1119.30	43.	37.58	1.77	3.711E-03	1120.28	15.040	6.325E-01	BI214
1459.65	695.	3.83	2.00	2.944E-03	1460.75	10.700	1.814E+01	K40
1763.40	43.	15.25	2.17	2.481E-03	1764.51	15.920	8.883E-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	
149.04	74.92	347.	191.	0.095	46.83	1.005	PB-214	D
153.62	77.21	390.	363.	0.181	27.96	1.006	PB-214	D
174.02	87.42	364.	87.	0.044	98.37	1.014	PB-214	lD
417.45	208.89	213.	68.	0.034	98.06	1.340	AC-228	s
476.90	238.53	133.	762.	0.381	12.63	1.121	PB-212	D
539.64	269.96	135.	75.	0.037	76.08	2.053	AC-228	s
600.02	300.14	112.	57.	0.028	88.62	0.680	PB-212	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	149.01	74.72	987.	156.	0.078	85.70	1.499
PB-212	153.79	77.11	827.	316.	0.158	42.14	1.499D
PB-214	153.79	77.11	831.	312.	0.156	42.14	1.499D
TH-234	185.71	93.07	717.	205.	0.103	56.09	1.499s
TH-234	185.69	93.05	697.	207.	0.104	56.20	1.499s
RA-226	371.55	185.95	392.	125.	0.063	72.15	1.499
PB-212	476.80	238.55	337.	640.	0.320	16.79	1.499
RA-224	481.70	241.00	336.	105.	0.052	79.33	1.123D
PB-214	590.07	295.16	158.	161.	0.080	40.28	1.499
AC-228	676.22	338.22	92.	150.	0.075	36.92	1.237s
PB-214	703.43	351.82	123.	232.	0.116	27.97	1.499
SB-125	925.61	462.86	62.	46.	0.023	82.41	1.499
TL-208	1020.90	510.48	100.	88.	0.044	55.42	1.016s
TL-208	1165.24	582.62	57.	211.	0.106	26.46	1.547
BI-214	1217.93	608.95	60.	157.	0.079	32.81	1.547
AC-228	1820.91	910.28	59.	162.	0.081	36.22	1.548s
AC-228	1935.68	967.63	41.	95.	0.048	45.93	1.866s
BI-214	2239.18	1119.30	65.	43.	0.021	112.73	1.767
K-40	2920.32	1459.65	5.	693.	0.346	11.49	1.999
BI-214	3528.24	1763.40	0.	43.	0.021	45.75	2.173

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm		COMMENTS
BE-7		5.6024E-02						
			477.56	5.602E-02	&(	4.443E-01	1.29E-01	G
K-40		1.8135E+01						
			1460.75	1.814E+01	(P	3.566E-01	6.96E-01	G
MN-54		3.0631E-02						
			834.81	3.063E-02	%(P	5.663E-02	1.73E-02	G
CO-57		-7.3243E-03						
			122.07	-7.324E-03	%(	5.526E-02	1.65E-02	G K
			136.43	-5.670E-02	%	4.637E-01	1.38E-01	G
CO-60		2.4519E-03						
			1332.51	2.452E-03	&(P	5.372E-02	1.44E-02	G K
			1173.23	1.884E-02	% P	7.775E-02	2.27E-02	G K
Sr-85		-2.8582E-02						
			514.00	-2.858E-02	&(	6.483E-02	1.96E-02	G
Kr-85		-6.7576E+02						
			513.99	-6.758E+02	&(P	1.471E+03	4.43E+02	G
Y-88		2.5019E-04						
			1836.01	2.502E-04	&(	4.785E-02	1.17E-02	G K
			898.02	-9.482E-04	% P	5.587E-02	1.53E-02	G
NB-94		-1.5214E-02						
			871.10	-1.521E-02	%(P	6.626E-02	1.93E-02	G K
			702.50	1.294E-04	& P	5.130E-02	1.44E-02	G K
Ag-108M		-1.4061E-02						
			722.95	-1.406E-02	&(	7.314E-02	2.14E-02	G K
			614.37	1.733E-02	% P	6.129E-02	1.81E-02	G
			433.93	-1.260E-02	%	5.012E-02	1.48E-02	G
CD-109		1.0126E-01						
			88.04	1.013E-01	%(P	1.674E+00	5.00E-01	G
SN-113		-1.9591E-02						
			391.71	-1.959E-02	&(	7.206E-02	2.14E-02	G K
			255.04	-2.306E-01	% P	2.047E+00	6.04E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.8519E-02						
		427.95	-2.136E-02	%(P	1.463E-01	4.25E-02	G K
		600.77	2.286E-02	% P	2.908E-01	8.35E-02	G
		636.15	-1.101E-01	% P	4.893E-01	1.43E-01	G
		463.51	4.534E-01	(P	3.902E-01	1.28E-01	G
		176.29	-1.683E-01	% P	7.231E-01	2.16E-01	G
I-131	1.6870E-02						
		364.48	1.687E-02	%(	6.222E-02	1.85E-02	G K
		636.97	-2.170E-01	%	8.592E-01	2.52E-01	G
		284.29	4.139E-02	%	8.224E-01	2.41E-01	G
CS-134	1.9793E-03						
		604.66	1.979E-03	&(P	1.355E-01	4.01E-02	G K
		795.76	1.252E-03	% P	7.734E-02	2.19E-02	G
		569.29	-4.650E-03	& P	3.264E-01	9.24E-02	G
		801.84	5.519E-02	&	7.060E-01	2.01E-01	G
CS-137	4.2689E-04						
		661.62	4.269E-04	&(P	6.416E-02	1.81E-02	G
CE-139	1.0278E-02						
		165.85	1.028E-02	%(P	5.473E-02	1.63E-02	G
EU-152	-2.4987E-02						
		121.78	-2.499E-02	%(P	1.576E-01	4.70E-02	G K
		344.30	1.788E-02	& P	1.675E-01	4.90E-02	G
		1408.08	-3.888E-02	% P	2.834E-01	7.81E-02	G
		964.00	1.582E-03	& P	4.775E-01	1.34E-01	G
		1112.07	9.125E-04	% P	5.524E-01	1.54E-01	G
		778.90	-7.712E-02	% P	4.379E-01	1.26E-01	G
EU-154	-2.0081E-02						
		123.10	-2.008E-02	%(P	1.141E-01	3.41E-02	G K
		1274.80	-1.067E-02	& P	2.110E-01	5.89E-02	G
		723.30	-5.847E-02	& P	3.468E-01	1.01E-01	G
		1004.80	-4.212E-02	% P	3.476E-01	9.84E-02	G
EU-155	-7.0245E-03						
		86.45	-7.024E-03	%(	1.996E-01	5.96E-02	G K
		105.31	6.978E-02	%	2.253E-01	6.78E-02	G
HG-203	8.1547E-04						
		279.17	8.155E-04	&(	5.714E-02	1.67E-02	G K
		72.87	-4.470E-01	& P	1.397E+00	4.21E-01	G
		70.83	-1.725E+00	%	2.359E+00	7.22E-01	G
		82.50	-2.493E-01	%	2.929E+00	8.75E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.0295E-01						
		583.14	3.029E-01	(P	5.425E-02	2.70E-02	G
		510.72	4.266E-01	+ P	2.376E-01	9.30E-02	G
PB-212	8.0948E-01						
		238.63	7.866E-01	(P	1.085E-01	4.44E-02	G K
							Energy duplication
		77.11	8.653E-01	(	3.744E-01	1.22E-01	G
		74.81	8.106E-01	?(P	7.743E-01	2.39E-01	G
PB-214	4.9327E-01						
		351.99	4.724E-01	(P	1.108E-01	4.44E-02	G K
		295.22	5.337E-01	(P	2.038E-01	7.24E-02	G
							Energy duplication
		77.11	1.398E+00	+ P	6.137E-01	1.99E-01	G
		241.92	3.051E-01	% P	7.878E-01	2.38E-01	G
BI-212	3.1077E-01						
		727.17	3.108E-01	%(P	4.274E-01	1.34E-01	G K
		1620.56	2.896E-01	&	1.725E+00	4.67E-01	G
		785.42	1.123E+00	% P	2.606E+00	7.83E-01	G
BI-214	4.3822E-01						
		609.32	4.382E-01	(P	1.082E-01	4.82E-02	G K
		1764.51	8.883E-01	+ P	1.538E-01	1.37E-01	G
		1120.28	6.325E-01	+ P	5.958E-01	2.40E-01	G
RA-224	1.4324E+00						
		241.00	1.432E+00	(P	1.207E+00	3.81E-01	G
RA-226	1.6961E+00						
		185.99	1.696E+00	(	1.285E+00	4.08E-01	G
AC-228	1.0193E+00						
		911.07	1.037E+00	*(P	2.459E-01	1.27E-01	G K
		968.90	1.068E+00	(P	3.637E-01	1.65E-01	G
		338.40	9.062E-01	@(P	2.870E-01	1.13E-01	G
TH-227	-1.8497E-01						
		236.00	-1.850E-01	&(P	4.934E-01	1.49E-01	G K
		256.25	1.844E-02	% P	4.674E-01	1.35E-01	G
PA-234	-2.9764E-02						
		98.44	-2.976E-02	&(	1.994E-01	5.96E-02	G K
		946.00	4.895E-02	%	3.076E-01	8.82E-02	G
		131.28	-5.664E-02	&	2.416E-01	7.25E-02	G
		94.67	1.692E-02	%	3.324E-01	9.89E-02	G
		883.24	-3.072E-03	%	3.577E-01	9.64E-02	G
		926.70	1.269E-01	%	4.145E-01	1.21E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-6.676E-03 &   4.598E-01 1.30E-01 G

TH-234       2.0630E+00
                           63.29 6.255E-01 %(P 2.375E+00 7.12E-01 G K
                           92.80 2.860E+00  (P 1.737E+00 5.52E-01 G
                           92.38 3.314E+00 *(P 2.061E+00 6.52E-01 G

AM-241       1.9903E-02
                           59.54 1.990E-02 %(P 3.271E-01 9.73E-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 - 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 *****

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	5.4603E-02	5.6024E-02	3.8614E-01	3.8615E-01	4.330E-01
K-40		1.8135E+01	1.8135E+01	2.0908E+00	2.3284E+00	
MN-54	#A	3.0497E-02	3.0631E-02	5.1978E-02	5.2007E-02	5.638E-02
CO-57	#B	-7.2872E-03	-7.3243E-03	4.9488E-02	4.9490E-02	5.498E-02
CO-60	#B	2.4501E-03	2.4519E-03	4.3128E-02	4.3128E-02	5.368E-02

Sr-85	#A	-2.7984E-02	-2.8582E-02	5.8761E-02	5.8783E-02	6.347E-02
Kr-85	#A	-6.7575E+02	-6.7576E+02	1.4511E+03	1.4516E+03	1.471E+03
Y-88	#B	2.4700E-04	2.5019E-04	3.5007E-02	3.5007E-02	4.724E-02
NB-94	#B	-1.5214E-02	-1.5214E-02	5.9807E-02	5.9813E-02	6.626E-02
Ag-108M	#B	-1.4060E-02	-1.4061E-02	6.4148E-02	6.4152E-02	7.314E-02
CD-109	#A	1.0095E-01	1.0126E-01	1.4998E+00	1.4998E+00	1.669E+00
SN-113	#B	-1.9359E-02	-1.9591E-02	6.4185E-02	6.4194E-02	7.120E-02
SB-125	#B	9.8385E-02	9.8519E-02	8.3757E-02	8.3942E-02	1.461E-01
I-131	#B	1.4224E-02	1.6870E-02	5.5421E-02	5.5429E-02	5.246E-02
CS-134	#B	1.9757E-03	1.9793E-03	1.2021E-01	1.2021E-01	1.353E-01
CS-137	#A	4.2684E-04	4.2689E-04	5.4221E-02	5.4221E-02	6.415E-02
CE-139	#A	1.0176E-02	1.0278E-02	4.9016E-02	4.9020E-02	5.418E-02
EU-152	#B	-2.4980E-02	-2.4987E-02	1.5345E-01	1.5346E-01	1.575E-01
EU-154	#B	-2.0072E-02	-2.0081E-02	1.1158E-01	1.1158E-01	1.140E-01
EU-155	#B	-7.0192E-03	-7.0245E-03	1.7868E-01	1.7868E-01	1.994E-01
HG-203	#B	7.9181E-04	8.1547E-04	5.0189E-02	5.0189E-02	5.548E-02
TL-208		3.0295E-01	3.0295E-01	8.1074E-02	8.2862E-02	
PB-212	#	8.0948E-01	8.0948E-01	1.3721E-01	1.4463E-01	1.085E-01
PB-214	#	4.9327E-01	4.9327E-01	1.2218E-01	1.2532E-01	1.108E-01
BI-212	#B	3.1077E-01	3.1077E-01	4.0328E-01	4.0366E-01	4.274E-01
BI-214		4.3822E-01	4.3822E-01	1.4479E-01	1.4689E-01	
RA-224		1.4324E+00	1.4324E+00	1.1441E+00	1.1469E+00	
RA-226	#	1.6961E+00	1.6961E+00	1.2237E+00	1.2275E+00	1.285E+00
AC-228	#	1.0193E+00	1.0193E+00	2.3751E-01	2.4440E-01	
TH-227	#B	-1.8497E-01	-1.8497E-01	4.5611E-01	4.5623E-01	4.934E-01
PA-234	#B	-2.9764E-02	-2.9764E-02	1.7875E-01	1.7876E-01	1.994E-01
TH-234	#B	2.0630E+00	2.0630E+00	1.1940E+00	1.1995E+00	2.375E+00
AM-241	#A	1.9903E-02	1.9903E-02	2.9195E-01	2.9195E-01	3.271E-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 (269.6 to 1999.1 keV) 2.1328266E+01 pCi/gm
Total Decayed Activity (269.6 to 1999.1 keV) 2.1328266E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102_17NOV2005_1543.An1

Sample description
NOL-05-02-007-C

Spectrum Filename: C:\GammaVision\Spectra\102_17NOV2005_1543.An1

Acquisition information
Start time: 17-Nov-2005 15:43:31
Live time: 2000
Real time: 2022
Dead time: 1.09 %
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/channel^2

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: 1.8810E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8810E+03) =
5.3163E+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	17-Nov-2005 10:30:00
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: 0.1845

***** 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
74.59	109.	27.50	1.10	8.817E-03				
74.59	109.	27.50	1.10	8.817E-03	74.81	9.600	PBC<MDA	PB212
77.28	217.	13.21	1.10	9.625E-03	77.11	10.700	1.527E+00	PB214
					77.11	17.500	9.334E-01	PB212
92.70	115.	37.83	1.42	1.331E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.066E+00	TH234
128.65	78.	35.94	1.06	1.713E-02				
185.93	69.	40.36	0.82	1.627E-02				
185.93	69.	40.36	0.82	1.627E-02	185.99	3.280	PBC<MDA	RA226
238.78	640.	7.04	1.07	1.380E-02	238.63	43.100	7.728E-01	PB212
					241.00	3.900	8.592E+00	RA224
295.12	154.	15.76	1.78	1.147E-02				
295.12	154.	15.76	1.78	1.147E-02	295.22	19.200	5.013E-01	PB214
338.12	108.	22.32	1.15	1.007E-02	338.40	12.010	6.392E-01	AC228
351.76	246.	9.77	1.34	9.685E-03				
351.76	246.	9.77	1.34	9.685E-03	351.99	37.100	4.918E-01	PB214
510.62	129.	19.15	1.53	6.696E-03	510.72	22.500	6.162E-01	TL208
583.54	159.	13.20	1.16	5.886E-03	583.14	86.000	2.248E-01	TL208
609.55	167.	13.18	1.49	5.647E-03	609.32	46.090	4.602E-01	BI214
661.85	166.	11.14	1.47	5.228E-03	661.62	84.620	2.698E-01	CS137
726.87	55.	27.63	1.45	4.796E-03	727.17	11.800	6.985E-01	BI212
794.82	26.	34.84	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
911.65	115.	14.67	1.29	3.920E-03	911.07	29.000	7.256E-01	AC228
968.66	81.	18.52	1.99	3.719E-03	968.90	17.460	8.961E-01	AC228
1120.16	46.	23.50	2.35	3.283E-03	1120.28	15.040	6.620E-01	BI214
1173.67	112.	12.11	1.62	3.156E-03	1173.23	99.860	2.550E-01	CO60
1332.83	95.	12.53	1.82	2.833E-03	1332.51	99.980	2.407E-01	CO60

1461.05	519.	4.46	1.82	2.620E-03	1460.75	10.700	1.330E+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	
148.76	74.71	391.	109.	0.054	82.50	1.098	BI-207	D
154.13	77.40	302.	217.	0.108	39.62	1.100	PB-214	D
184.97	92.70	711.	115.	0.058	113.49	1.425	TH-234	l
256.88	128.65	322.	95.	0.048	85.75	1.064	AC-228	s
371.47	185.93	319.	69.	0.034	121.08	0.823	RA-226	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

********** 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	149.76	75.09	873.	112.	0.056	112.49	1.500s
PB-214	153.80	77.11	807.	201.	0.101	63.51	1.500D
PB-212	153.80	77.11	807.	201.	0.101	63.51	1.500D
PB-212	477.00	238.69	372.	466.	0.233	22.38	1.500
RA-224	477.01	238.69	221.	492.	0.246	18.58	1.500s
PB-214	590.50	295.42	194.	128.	0.064	53.38	1.500s
AC-228	675.92	338.12	162.	108.	0.054	66.97	1.148s
PB-214	703.65	351.99	123.	225.	0.112	28.91	1.500s
TL-208	1021.02	510.62	118.	129.	0.065	57.45	1.528s
TL-208	1166.91	583.54	86.	158.	0.079	39.59	1.162
BI-214	1218.96	609.55	81.	167.	0.083	39.55	1.493s
CS-137	1323.59	661.85	61.	166.	0.083	33.41	1.468
BI-212	1453.69	726.87	55.	55.	0.027	82.90	1.451
CS-134	1589.66	794.82	27.	26.	0.013	104.52	1.601s
AC-228	1823.43	911.65	46.	115.	0.057	44.00	1.295
AC-228	1937.53	968.66	48.	81.	0.040	55.56	1.991
BI-214	2240.72	1120.16	26.	46.	0.023	70.51	2.353s
CO-60	2347.81	1173.67	23.	112.	0.056	36.32	1.616s
CO-60	2666.35	1332.83	13.	95.	0.047	37.60	1.819
K-40	2923.01	1461.05	4.	519.	0.260	13.38	1.819

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		9.2901E-04					
			477.56	9.290E-04	&(	3.945E-01 1.12E-01	G
K-40		1.3300E+01					
			1460.75	1.330E+01	(P	3.037E-01 5.94E-01	G
MN-54		5.8685E-03					
			834.81	5.868E-03	&(P	5.892E-02 1.68E-02	G
CO-57		-5.5959E-04					
			122.07	-5.596E-04	&(	5.813E-02 1.72E-02	G K
			136.43	-7.316E-02	&	3.568E-01 1.06E-01	G
CO-60		2.4787E-01					
			1332.51	2.407E-01	(P	4.961E-02 3.02E-02	G K
			1173.23	2.550E-01	*(	5.722E-02 3.09E-02	G K
Sr-85		-2.0499E-02					
			514.00	-2.050E-02	%(	6.060E-02 1.81E-02	G
Kr-85		-4.7218E+02					
			513.99	-4.722E+02	%(	1.396E+03 4.17E+02	G
Y-88		-2.2120E-05					
			1836.01	-2.212E-05	%(P	2.484E-02 3.37E-03	G K
			898.02	4.721E-03	& P	6.837E-02 1.93E-02	G
NB-94		2.0657E-03					
			871.10	2.066E-03	%(	6.471E-02 1.83E-02	G K
			702.50	7.560E-03	%	4.967E-02 1.43E-02	G K
Ag-108M		-1.8141E-03					
			722.95	-1.814E-03	&(	5.569E-02 1.56E-02	G K
			614.37	-2.238E-02	% P	6.399E-02 1.91E-02	G
			433.93	-7.584E-03	%	4.916E-02 1.44E-02	G
CD-109		-4.6880E-02					
			88.04	-4.688E-02	&(P	2.206E+00 6.56E-01	G
SN-113		2.1491E-03					
			391.71	2.149E-03	%(	6.078E-02 1.75E-02	G K
			255.04	0.000E+00	%	1.902E+00 5.55E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	3.4135E-04						
		427.95	3.414E-04	&(P	1.420E-01	4.05E-02	G K
		600.77	3.762E-02	% P	2.075E-01	5.95E-02	G
		636.15	5.511E-02	& P	4.265E-01	1.22E-01	G
		463.51	2.497E-01	% P	4.095E-01	1.26E-01	G
		176.29	-5.418E-03	% P	6.311E-01	1.85E-01	G
I-131	1.3462E-04						
		364.48	1.346E-04	%(	4.646E-02	1.33E-02	G K
		636.97	4.686E-02	%	6.800E-01	1.93E-01	G
		284.29	4.362E-02	&	6.442E-01	1.88E-01	G
CS-134	2.3517E-02						
		604.66	1.377E-03	&(	1.022E-01	3.00E-02	G K
		795.76	4.882E-02	@(	5.133E-02	1.70E-02	G
		569.29	5.630E-02	%	2.956E-01	8.59E-02	G
		801.84	-2.232E-02	% P	6.675E-01	1.88E-01	G
CS-137	2.6983E-01						
		661.62	2.698E-01	(	6.339E-02	3.01E-02	G
CE-139	-7.9297E-04						
		165.85	-7.930E-04	%(P	5.398E-02	1.59E-02	G
EU-152	4.8111E-03						
		121.78	4.811E-03	&(P	1.362E-01	4.02E-02	G K
		344.30	4.978E-04	&	1.612E-01	4.67E-02	G
		1408.08	-4.312E-02	%	2.851E-01	7.97E-02	G
		964.00	-8.941E-02	& P	5.895E-01	1.71E-01	G
		1112.07	5.415E-02	%	4.597E-01	1.30E-01	G
		778.90	-7.311E-02	% P	4.603E-01	1.33E-01	G
EU-154	-7.8863E-03						
		123.10	-7.886E-03	%(P	1.157E-01	3.44E-02	G K
		1274.80	-4.220E-02	%	2.158E-01	6.22E-02	G
		723.30	7.177E-02	& P	2.536E-01	7.44E-02	G
		1004.80	-8.916E-02	%	3.643E-01	1.06E-01	G
EU-155	1.3970E-01						
		86.45	1.397E-01	%(P	2.541E-01	7.72E-02	G K
		105.31	-9.725E-03	&	2.304E-01	6.83E-02	G
HG-203	4.8927E-03						
		279.17	4.893E-03	%(P	4.386E-02	1.28E-02	G K
		72.87	-3.506E-01	%	2.098E+00	6.29E-01	G
		70.83	-5.117E-01	%	3.841E+00	1.15E+00	G
		82.50	2.280E-01	%	3.059E+00	9.08E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2479E-01						
		583.14	2.248E-01	(P	6.496E-02	2.98E-02	G
		510.72	6.162E-01	+	2.541E-01	1.18E-01	G
PB-212	5.6323E-01						
		238.63	5.632E-01	(	1.119E-01	4.20E-02	G K
							Energy duplication
		77.11	8.658E-01	+	5.812E-01	1.83E-01	G
		74.81	9.462E-01	& P	1.188E+00	3.64E-01	G
PB-214	4.3822E-01						
		351.99	4.493E-01	@(P	1.088E-01	4.34E-02	G K
		295.22	4.168E-01	*(	2.209E-01	7.42E-02	G
							Energy duplication
		77.11	1.416E+00	+	9.506E-01	3.00E-01	G
		241.92	-1.977E-01	%	7.780E-01	2.33E-01	G
BI-212	6.9848E-01						
		727.17	6.985E-01	(	4.733E-01	1.93E-01	G K
		1620.56	1.978E-01	% P	2.018E+00	5.39E-01	G
		785.42	1.215E+00	% P	2.780E+00	8.38E-01	G
BI-214	4.6023E-01						
		609.32	4.602E-01	*(	1.233E-01	6.07E-02	G K
		1764.51	1.821E-01	% P	2.690E-01	8.87E-02	G
		1120.28	6.620E-01	+	3.818E-01	1.56E-01	G
RA-224	6.6179E+00						
		241.00	6.618E+00	?(P	9.688E-01	4.11E-01	G
RA-226	8.6390E-01						
		185.99	8.639E-01	%(P	1.361E+00	4.15E-01	G
AC-228	7.5876E-01						
		911.07	7.256E-01	(P	2.170E-01	1.07E-01	G K
		968.90	8.961E-01	(P	3.874E-01	1.66E-01	G
		338.40	6.392E-01	@(	3.683E-01	1.43E-01	G
TH-227	3.5889E-03						
		236.00	3.589E-03	&(P	4.447E-01	1.31E-01	G K
		256.25	9.161E-02	&	6.096E-01	1.80E-01	G
PA-234	-7.8260E-02						
		98.44	-7.826E-02	%(	2.617E-01	7.88E-02	G K
		946.00	1.144E-02	%	3.602E-01	1.02E-01	G
		131.28	-4.711E-02	&	2.497E-01	7.47E-02	G
		94.67	7.304E-03	%	4.840E-01	1.44E-01	G
		883.24	-6.460E-02	%	5.427E-01	1.56E-01	G
		926.70	-4.679E-02	%	4.964E-01	1.40E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 8.350E-02 %   4.384E-01 1.27E-01 G

TH-234       6.1580E-01
                           63.29 6.158E-01 %(P 4.712E+00 1.41E+00 G K
                           92.80 1.417E+00 %   2.473E+00 7.53E-01 G
                           92.38 1.489E+00 % P 2.958E+00 8.98E-01 G

AM-241      -3.1189E-03
                           59.54-3.119E-03 %(  6.705E-01 1.99E-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:                      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 - 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 *****

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	9.2639E-04	9.2901E-04	3.3518E-01	3.3518E-01	3.934E-01
K-40		1.3300E+01	1.3300E+01	1.7805E+00	1.9306E+00	
MN-54	#A	5.8657E-03	5.8685E-03	5.0300E-02	5.0301E-02	5.889E-02
CO-57	#B	-5.5928E-04	-5.5959E-04	5.1720E-02	5.1720E-02	5.810E-02
CO-60		2.4785E-01	2.4787E-01	6.4820E-02	6.6296E-02	

Sr-85	#A	-2.0452E-02	-2.0499E-02	5.4362E-02	5.4374E-02	6.046E-02
Kr-85	#A	-4.7217E+02	-4.7218E+02	1.2521E+03	1.2524E+03	1.396E+03
Y-88	#B	-2.2088E-05	-2.2120E-05	1.3272E-04	1.3272E-04	2.480E-02
NB-94	#B	2.0657E-03	2.0657E-03	5.4870E-02	5.4870E-02	6.471E-02
Ag-108M	#B	-1.8141E-03	-1.8141E-03	4.6926E-02	4.6926E-02	5.569E-02
CD-109	#A	-4.6864E-02	-4.6880E-02	5.7007E+00	5.7007E+00	2.205E+00
SN-113	#B	2.1463E-03	2.1491E-03	5.2396E-02	5.2396E-02	6.070E-02
SB-125	#B	3.4130E-04	3.4135E-04	1.2150E-01	1.2150E-01	1.420E-01
I-131	#B	1.3212E-04	1.3462E-04	3.9934E-02	3.9934E-02	4.559E-02
CS-134	#B	2.3513E-02	2.3517E-02	2.4581E-02	2.4616E-02	1.021E-01
CS-137		2.6982E-01	2.6983E-01	9.0140E-02	9.1403E-02	
CE-139	#A	-7.9210E-04	-7.9297E-04	8.7155E-02	8.7155E-02	5.392E-02
EU-152	#B	4.8110E-03	4.8111E-03	1.2061E-01	1.2061E-01	1.362E-01
EU-154	#B	-7.8859E-03	-7.8863E-03	1.0891E-01	1.0891E-01	1.157E-01
EU-155	#B	1.3969E-01	1.3970E-01	2.3155E-01	2.3168E-01	2.540E-01
HG-203	#B	4.8769E-03	4.8927E-03	3.8541E-02	3.8542E-02	4.372E-02
TL-208		2.2479E-01	2.2479E-01	8.9224E-02	9.0111E-02	
PB-212	#	5.6323E-01	5.6323E-01	1.2607E-01	1.2997E-01	1.119E-01
PB-214	#	4.3822E-01	4.3822E-01	1.2691E-01	1.2927E-01	1.088E-01
BI-212		6.9848E-01	6.9848E-01	5.7906E-01	5.8038E-01	
BI-214		4.6023E-01	4.6023E-01	1.8201E-01	1.8383E-01	
RA-224	#	6.6179E+00	6.6179E+00	1.2328E+00	1.2875E+00	9.688E-01
RA-226	#A	8.6390E-01	8.6390E-01	1.2457E+00	1.2466E+00	1.361E+00
AC-228		7.5876E-01	7.5876E-01	2.4674E-01	2.5038E-01	
TH-227	#B	3.5889E-03	3.5889E-03	3.9362E-01	3.9362E-01	4.447E-01
PA-234	#B	-7.8260E-02	-7.8260E-02	2.3635E-01	2.3639E-01	2.617E-01
TH-234	#B	6.1580E-01	6.1580E-01	4.2213E+00	4.2214E+00	4.712E+00
AM-241	#A	-3.1189E-03	-3.1189E-03	5.9653E-01	5.9653E-01	6.705E-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 (86.7 to 1999.0 keV) 1.5960222E+01 pCi/gm
Total Decayed Activity (86.7 to 1999.0 keV) 1.5960245E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102_17NOV2005_1639.An1

Sample description
NOL-05-02-006-C

Spectrum Filename: C:\GammaVision\Spectra\102_17NOV2005_1639.An1

Acquisition information
Start time: 17-Nov-2005 16:39:50
Live time: 2000
Real time: 2021
Dead time: 1.04 %
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/channel^2

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: 1.9020E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9020E+03) =
5.2576E+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	17-Nov-2005 09:40:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1687

***** 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
74.41	120.	25.33	1.10	8.843E-03				
74.41	120.	25.33	1.10	8.843E-03	74.81	9.600	PBC<MDA	PB212
77.33	211.	14.87	1.10	9.717E-03	77.11	10.700	1.467E+00	PB214
					77.11	17.500	8.972E-01	PB212
93.17	106.	40.40	1.50	1.325E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.18	108.	39.54	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.924E+00	TH234
185.51	78.	31.65	1.06	1.629E-02				
185.51	78.	31.65	1.06	1.629E-02	185.99	3.280	PBC<MDA	RA226
209.18	80.	38.85	1.52	1.520E-02				
238.74	599.	4.88	1.21	1.380E-02	238.63	43.100	7.152E-01	PB212
241.57	90.	30.86	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.294E-01	PB214
277.36	53.	39.85	0.84	1.214E-02				
295.29	95.	22.86	1.24	1.146E-02	295.22	19.200	3.053E-01	PB214
338.57	122.	18.44	1.36	1.005E-02	338.40	12.010	7.174E-01	AC228
352.11	212.	13.89	1.25	9.675E-03	351.99	37.100	4.187E-01	PB214
462.96	57.	27.01	1.59	7.373E-03				
462.96	57.	27.01	1.59	7.373E-03	463.51	10.000	5.370E-01	SB125
510.72	96.	20.82	1.22	6.695E-03	510.72	22.500	4.528E-01	TL208
583.24	161.	10.50	1.29	5.889E-03	583.14	86.000	2.253E-01	TL208
609.38	162.	10.77	1.70	5.649E-03	609.32	46.090	4.410E-01	BI214
662.10	37.	40.51	0.93	5.226E-03	661.62	84.620	5.957E-02	CS137
728.14	65.	23.24	1.54	4.788E-03	727.17	11.800	8.164E-01	BI212
911.46	119.	13.02	1.80	3.920E-03	911.07	29.000	7.394E-01	AC228
968.53	87.	15.05	1.68	3.719E-03	968.90	17.460	9.486E-01	AC228

1121.22	60.	26.19	0.81	3.283E-03	1120.28	15.040	8.705E-01	BI214
1461.02	495.	4.53	2.28	2.620E-03	1460.75	10.700	1.253E+01	K40
1764.92	19.	28.34	1.00	2.225E-03	1764.51	15.920	3.713E-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	
148.40	74.80	401.	120.	0.060	76.00	1.098	BI-207	D
154.23	77.71	386.	211.	0.105	44.61	1.100	PB-214	D
370.62	185.51	253.	78.	0.039	94.94	1.059	U-235	l
417.99	209.18	330.	80.	0.040	116.54	1.524	AC-228	s
477.10	238.66	128.	599.	0.299	14.65	1.215	PB-212	D
482.77	241.50	344.	90.	0.045	92.58	1.217	PB-214	D
554.37	277.36	144.	63.	0.031	89.99	0.842	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-214	153.80	77.11	853.	200.	0.100	65.55	1.500D
PB-212	153.80	77.11	853.	200.	0.100	65.55	1.500D
TH-234	185.91	93.17	882.	106.	0.053	121.20	1.500
TH-234	185.94	93.18	863.	108.	0.054	118.62	1.500
PB-212	477.07	238.72	351.	529.	0.265	19.88	1.500
PB-214	590.38	295.36	204.	96.	0.048	70.44	1.500
AC-228	676.82	338.57	128.	122.	0.061	55.31	1.357s
PB-214	703.81	352.06	120.	188.	0.094	32.92	1.500s
SB-125	926.20	463.22	63.	42.	0.021	89.48	1.500s
TL-208	1021.22	510.72	92.	96.	0.048	62.47	1.219s
TL-208	1166.32	583.24	48.	161.	0.080	31.50	1.292
BI-214	1218.62	609.38	50.	162.	0.081	32.30	1.704
CS-137	1324.10	662.10	61.	37.	0.019	121.53	0.933s
BI-212	1456.24	728.14	48.	65.	0.032	69.72	1.545s
AC-228	1823.06	911.46	38.	118.	0.059	39.05	1.803
AC-228	1937.26	968.53	25.	87.	0.043	45.14	1.677
BI-214	2242.84	1121.22	46.	60.	0.030	78.58	0.815s
K-40	2922.94	1461.02	2.	495.	0.247	13.59	2.277
BI-214	3531.30	1764.92	3.	19.	0.009	85.01	0.999s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		5.3900E-02					
			477.56	5.390E-02	%(	4.125E-01 1.19E-01	G
K-40		1.2530E+01					
			1460.75	1.253E+01	(P	2.535E-01 5.68E-01	G
MN-54		-6.1246E-04					
			834.81	-6.125E-04	%(P	4.329E-02 1.17E-02	G
CO-57		6.2394E-03					
			122.07	6.239E-03	%(	6.006E-02 1.79E-02	G K
			136.43	-3.442E-02	%	4.394E-01 1.31E-01	G
CO-60		2.1790E-02					
			1332.51	2.179E-02	&(P	5.773E-02 1.71E-02	G K
			1173.23	1.938E-02	&	7.419E-02 2.17E-02	G K
Sr-85		-1.9203E-02					
			514.00	-1.920E-02	%(	6.178E-02 1.84E-02	G
Kr-85		-4.4197E+02					
			513.99	-4.420E+02	%(	1.422E+03 4.24E+02	G
Y-88		-2.1886E-05					
			1836.01	-2.189E-05	&(P	2.458E-02 3.33E-03	G K
			898.02	-5.227E-03	% P	5.899E-02 1.64E-02	G
NB-94		2.3410E-02					
			871.10	2.341E-02	%(	4.013E-02 1.25E-02	G K
			702.50	1.452E-03	%	4.237E-02 1.18E-02	G K
Ag-108M		9.7581E-03					
			722.95	9.758E-03	%(	5.135E-02 1.48E-02	G K
			614.37	-1.005E-02	% P	5.702E-02 1.65E-02	G
			433.93	-1.111E-02	%	4.967E-02 1.46E-02	G
CD-109		-5.4892E-02					
			88.04	-5.489E-02	%(P	2.224E+00 6.62E-01	G
SN-113		9.2210E-04					
			391.71	9.221E-04	%(	6.053E-02 1.74E-02	G K
			255.04	-3.209E-01	%	1.884E+00 5.58E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.7911E-02						
		427.95	-3.159E-02	&(P	1.572E-01	4.60E-02	G K
		600.77	-3.450E-03	& P	2.152E-01	5.98E-02	G
		636.15	4.093E-02	% P	3.257E-01	9.18E-02	G
		463.51	4.020E-01	*(P	3.831E-01	1.24E-01	G
		176.29	1.268E-01	% P	6.732E-01	2.01E-01	G
I-131	1.0209E-03						
		364.48	1.021E-03	%(	5.781E-02	1.68E-02	G K
		636.97	-1.106E-01	%	6.031E-01	1.74E-01	G
		284.29	6.908E-04	&	6.885E-01	2.01E-01	G
CS-134	2.7242E-03						
		604.66	2.724E-03	&(	1.059E-01	3.12E-02	G K
		795.76	2.646E-02	%	5.623E-02	1.70E-02	G
		569.29	-1.020E-04	%	2.420E-01	6.72E-02	G
		801.84	-3.016E-02	% P	5.676E-01	1.59E-01	G
CS-137	5.9567E-02						
		661.62	5.957E-02	(	6.274E-02	2.41E-02	G
CE-139	-4.6972E-03						
		165.85	-4.697E-03	%(P	4.277E-02	1.26E-02	G
EU-152	-1.5535E-03						
		121.78	-1.554E-03	%(P	1.559E-01	4.61E-02	G K
		344.30	-2.024E-02	%	1.514E-01	4.44E-02	G
		1408.08	-1.767E-02	%	2.239E-01	5.96E-02	G
		964.00	-5.086E-02	% P	5.789E-01	1.67E-01	G
		1112.07	-8.720E-03	&	3.872E-01	1.05E-01	G
		778.90	1.592E-03	& P	3.366E-01	9.22E-02	G
EU-154	2.5368E-02						
		123.10	2.537E-02	%(P	1.228E-01	3.68E-02	G K
		1274.80	-1.347E-02	%	1.853E-01	5.15E-02	G
		723.30	3.055E-02	% P	2.452E-01	6.98E-02	G
		1004.80	7.167E-03	&	3.545E-01	9.88E-02	G
EU-155	-1.0764E-02						
		86.45	-1.076E-02	%(P	2.646E-01	7.87E-02	G K
		105.31	4.987E-02	%	2.751E-01	8.24E-02	G
HG-203	-6.6683E-03						
		279.17	-6.668E-03	&(P	4.858E-02	1.43E-02	G K
		72.87	-1.354E-01	&	1.999E+00	5.97E-01	G
		70.83	-1.098E+00	%	3.650E+00	1.10E+00	G
		82.50	-1.210E+00	%	3.867E+00	1.16E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2525E-01						
		583.14	2.253E-01	(P	4.928E-02	2.37E-02	G
		510.72	4.528E-01	+	2.236E-01	9.43E-02	G
PB-212	6.3226E-01						
		238.63	6.323E-01	(	1.075E-01	4.19E-02	G K
							Energy duplication
		77.11	8.502E-01	+	5.906E-01	1.86E-01	G
		74.81	7.964E-01	& P	1.244E+00	3.79E-01	G
PB-214	3.5022E-01						
		351.99	3.717E-01	@(P	1.062E-01	4.09E-02	G K
		295.22	3.088E-01	(	2.238E-01	7.25E-02	G
							Energy duplication
		77.11	1.390E+00	+	9.660E-01	3.04E-01	G
		241.92	2.751E-01	%	7.375E-01	2.22E-01	G
BI-212	8.1637E-01						
		727.17	8.164E-01	@(	4.395E-01	1.90E-01	G K
		1620.56	4.753E-01	% P	1.367E+00	3.92E-01	G
		785.42	6.188E-01	% P	2.183E+00	6.37E-01	G
BI-214	4.2307E-01						
		609.32	4.410E-01	(	9.767E-02	4.75E-02	G K
		1764.51	3.713E-01	(P	2.289E-01	1.06E-01	G
		1120.28	8.705E-01	+	4.962E-01	2.28E-01	G
RA-224	5.2439E-01						
		241.00	5.244E-01	%(P	1.344E+00	4.05E-01	G
RA-226	8.4521E-01						
		185.99	8.452E-01	%(P	1.257E+00	3.84E-01	G
AC-228	7.9737E-01						
		911.07	7.394E-01	(P	1.955E-01	9.65E-02	G K
		968.90	9.486E-01	(P	2.864E-01	1.43E-01	G
		338.40	7.174E-01	@(	3.260E-01	1.32E-01	G
TH-227	-1.5859E-01						
		236.00	-1.586E-01	&(P	4.552E-01	1.37E-01	G K
		256.25	-1.160E-01	&	5.499E-01	1.63E-01	G
PA-234	-4.5782E-03						
		98.44	-4.578E-03	&(	2.635E-01	7.84E-02	G K
		946.00	-5.844E-02	%	2.905E-01	8.38E-02	G
		131.28	3.810E-04	&	2.238E-01	6.62E-02	G
		94.67	-1.344E-01	%	4.948E-01	1.49E-01	G
		883.24	0.000E+00	&	4.746E-01	1.32E-01	G
		926.70	5.853E-02	%	3.736E-01	1.04E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.253E-03 %   3.705E-01 1.03E-01 G

TH-234       1.5425E+00
                           63.29 8.100E-01 &(P 4.625E+00 1.38E+00 G K
                           92.80 1.924E+00  (  2.480E+00 7.61E-01 G
                           92.38 2.209E+00  (P 2.945E+00 9.02E-01 G

AM-241      -5.8958E-02
                           59.54-5.896E-02 %(  6.777E-01 2.02E-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:                      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 - 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 *****

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	5.3697E-02	5.3900E-02	3.5831E-01	3.5833E-01	4.110E-01
K-40		1.2530E+01	1.2530E+01	1.7035E+00	1.8429E+00	
MN-54	#A	-6.1206E-04	-6.1246E-04	1.3427E-01	1.3427E-01	4.326E-02
CO-57	#B	6.2347E-03	6.2394E-03	5.3720E-02	5.3721E-02	6.001E-02
CO-60	#B	2.1787E-02	2.1790E-02	5.1361E-02	5.1376E-02	5.773E-02

Sr-85	#A	-1.9144E-02	-1.9203E-02	5.5296E-02	5.5306E-02	6.159E-02
Kr-85	#A	-4.4197E+02	-4.4197E+02	1.2726E+03	1.2728E+03	1.422E+03
Y-88	#B	-2.1845E-05	-2.1886E-05	1.3132E-04	1.3132E-04	2.453E-02
NB-94	#B	2.3410E-02	2.3410E-02	3.7499E-02	3.7522E-02	4.013E-02
Ag-108M	#B	9.7580E-03	9.7581E-03	4.4379E-02	4.4382E-02	5.135E-02
CD-109	#A	-5.4868E-02	-5.4892E-02	4.7582E+00	4.7582E+00	2.223E+00
SN-113	#B	9.2048E-04	9.2210E-04	5.2069E-02	5.2069E-02	6.043E-02
SB-125	#B	7.7895E-02	7.7911E-02	7.2304E-02	7.2436E-02	1.572E-01
I-131	#B	9.9553E-04	1.0209E-03	5.0353E-02	5.0353E-02	5.637E-02
CS-134	#B	2.7235E-03	2.7242E-03	9.3471E-02	9.3471E-02	1.059E-01
CS-137	A	5.9566E-02	5.9567E-02	7.2394E-02	7.2472E-02	
CE-139	#A	-4.6903E-03	-4.6972E-03	4.1776E-02	4.1776E-02	4.271E-02
EU-152	#B	-1.5534E-03	-1.5535E-03	1.3652E+00	1.3652E+00	1.559E-01
EU-154	#B	2.5367E-02	2.5368E-02	1.1029E-01	1.1030E-01	1.228E-01
EU-155	#B	-1.0763E-02	-1.0764E-02	1.0825E+00	1.0825E+00	2.645E-01
HG-203	#B	-6.6395E-03	-6.6683E-03	4.3808E-02	4.3810E-02	4.837E-02
TL-208		2.2525E-01	2.2525E-01	7.1137E-02	7.2252E-02	
PB-212	#	6.3226E-01	6.3226E-01	1.2571E-01	1.3062E-01	1.075E-01
PB-214	#	3.5022E-01	3.5022E-01	1.1554E-01	1.1720E-01	1.062E-01
BI-212	#	8.1637E-01	8.1637E-01	5.6918E-01	5.7102E-01	
BI-214		4.2307E-01	4.2307E-01	1.3665E-01	1.3870E-01	
RA-224	#A	5.2439E-01	5.2439E-01	1.2158E+00	1.2161E+00	1.344E+00
RA-226	#A	8.4521E-01	8.4521E-01	1.1531E+00	1.1541E+00	1.257E+00
AC-228		7.9737E-01	7.9737E-01	2.1641E-01	2.2099E-01	
TH-227	#B	-1.5859E-01	-1.5859E-01	4.1775E-01	4.1784E-01	4.552E-01
PA-234	#B	-4.5782E-03	-4.5782E-03	2.3523E-01	2.3523E-01	2.635E-01
TH-234	#B	1.5425E+00	1.5425E+00	1.8297E+00	1.8317E+00	4.625E+00
AM-241	#A	-5.8958E-02	-5.8958E-02	6.0556E-01	6.0557E-01	6.777E-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 (277.2 to 1999.0 keV) 1.4851784E+01 pCi/gm
Total Decayed Activity (277.2 to 1999.0 keV) 1.4851785E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102_17NOV2005_1723.An1

Sample description
NOL-05-02-019-C

Spectrum Filename: C:\GammaVision\Spectra\102_17NOV2005_1723.An1

Acquisition information
Start time: 17-Nov-2005 17:23:27
Live time: 2000
Real time: 2023
Dead time: 1.14 %
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/channel^2

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: 2.0500E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0500E+03) =
4.8780E+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	17-Nov-2005 11:45:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1372

***** 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
76.22	284.	17.30	0.76	9.277E-03				
77.15	136.	33.37	1.50	9.541E-03				
77.15	136.	33.37	1.50	9.541E-03	77.11	10.700	PBC<MDA	PB214
					77.11	17.500	5.361E-01	PB212
77.15	136.	33.37	1.50	9.541E-03				
77.15	136.	33.37	1.50	9.541E-03	77.11	10.700	8.767E-01	PB214
					77.11	17.500	5.361E-01	PB212
87.79	107.	41.15	1.31	1.229E-02				
87.79	107.	41.15	1.31	1.229E-02	88.04	3.790	PBC<MDA	CD109
185.75	94.	36.99	1.59	1.628E-02				
185.75	94.	36.99	1.59	1.628E-02	185.99	3.280	PBC<MDA	RA226
238.74	584.	5.14	1.21	1.380E-02	238.63	43.100	6.465E-01	PB212
241.69	95.	22.93	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.155E-01	PB214
270.02	67.	29.56	1.75	1.244E-02				
295.30	166.	17.46	1.06	1.146E-02	295.22	19.200	4.959E-01	PB214
338.49	99.	16.57	1.10	1.006E-02	338.40	12.010	5.401E-01	AC228
352.04	238.	10.49	1.29	9.677E-03	351.99	37.100	4.362E-01	PB214
463.66	47.	31.56	1.19	7.362E-03	463.51	10.000	4.087E-01	SB125
511.07	109.	20.04	1.31	6.690E-03	510.72	22.500	4.752E-01	TL208
583.15	185.	13.43	1.29	5.890E-03	583.14	86.000	2.397E-01	TL208
609.51	188.	12.59	1.49	5.648E-03	609.32	46.090	4.760E-01	BI214
661.82	194.	10.49	1.53	5.228E-03	661.62	84.620	2.883E-01	CS137
727.41	74.	25.37	1.98	4.793E-03	727.17	11.800	8.681E-01	BI212
911.27	116.	15.16	1.60	3.921E-03	911.07	29.000	6.687E-01	AC228
968.60	112.	15.26	1.66	3.719E-03	968.90	17.460	1.137E+00	AC228
1120.28	76.	21.62	2.37	3.283E-03	1120.28	15.040	1.011E+00	BI214

1173.03	100.	16.14	1.89	3.157E-03	1173.23	99.860	2.085E-01	CO60
1332.36	72.	19.25	1.35	2.834E-03	1332.51	99.980	1.678E-01	CO60
1461.04	537.	4.47	1.92	2.620E-03	1460.75	10.700	1.261E+01	K40
1764.54	28.	18.90	1.83	2.225E-03	1764.51	15.920	5.194E-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	
152.01	76.22	821.	284.	0.142	51.91	0.757	PB-214	l
175.16	87.79	760.	107.	0.053	123.44	1.307	PB-214	l
371.11	185.75	415.	94.	0.047	110.97	1.594	U-235	l
477.10	238.73	159.	584.	0.292	15.43	1.215	PB-212	D
483.01	241.68	191.	95.	0.048	68.79	1.217	PB-214	D
539.68	270.02	149.	67.	0.034	88.68	1.752	AC-228	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-214	153.80	77.11	958.	136.	0.068	100.10	1.500D
PB-212	153.80	77.11	958.	136.	0.068	100.10	1.500D
PB-212	477.00	238.69	426.	513.	0.257	21.60	1.500
PB-214	590.38	295.36	234.	129.	0.064	56.82	1.500
AC-228	676.66	338.49	85.	99.	0.049	49.70	1.099
PB-214	703.88	352.10	105.	220.	0.110	28.15	1.500
SB-125	926.12	463.18	77.	45.	0.022	90.81	1.500s
TL-208	1021.92	511.07	101.	109.	0.054	60.12	1.306s
TL-208	1166.12	583.15	103.	184.	0.092	40.29	1.287
BI-214	1218.87	609.51	98.	188.	0.094	37.78	1.492
CS-137	1323.55	661.82	62.	194.	0.097	31.48	1.525s
BI-212	1454.77	727.41	72.	74.	0.037	76.11	1.983s
AC-228	1822.68	911.27	51.	115.	0.058	45.48	1.599
AC-228	1937.41	968.60	45.	112.	0.056	45.77	1.655s
BI-214	2240.96	1120.28	49.	76.	0.038	64.87	2.366s
CO-60	2346.52	1173.03	48.	100.	0.050	48.43	1.895
CO-60	2665.42	1332.36	29.	72.	0.036	57.75	1.353s
K-40	2922.98	1461.04	9.	537.	0.268	13.40	1.924
BI-214	3530.54	1764.54	0.	28.	0.014	56.69	1.831

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		7.9740E-02					
			477.56	7.974E-02	&(	3.335E-01 9.76E-02	G
K-40		1.2613E+01					
			1460.75	1.261E+01	(P	4.005E-01 5.64E-01	G
MN-54		-4.8393E-03					
			834.81	-4.839E-03	&(P	5.918E-02 1.69E-02	G
CO-57		4.5723E-03					
			122.07	4.572E-03	%(	5.515E-02 1.64E-02	G K
			136.43	9.119E-02	&	4.149E-01 1.24E-01	G
CO-60		1.8815E-01					
			1332.51	1.678E-01	@(P	6.457E-02 3.23E-02	G K
			1173.23	2.085E-01	(	7.340E-02 3.37E-02	G K
Sr-85		-1.1720E-02					
			514.00	-1.172E-02	&(	5.853E-02 1.73E-02	G
Kr-85		-2.6988E+02					
			513.99	-2.699E+02	&(	1.348E+03 3.98E+02	G
Y-88		-2.3707E-03					
			1836.01	-2.371E-03	%(P	4.433E-02 1.12E-02	G K
			898.02	3.041E-02	& P	4.530E-02 1.42E-02	G
NB-94		-3.3409E-03					
			871.10	-3.341E-03	%(	3.875E-02 1.07E-02	G K
			702.50	1.839E-02	%	4.188E-02 1.26E-02	G K
Ag-108M		1.9514E-02					
			722.95	1.951E-02	&(	6.109E-02 1.81E-02	G K
			614.37	-1.327E-02	% P	5.437E-02 1.59E-02	G
			433.93	8.800E-03	%	4.517E-02 1.33E-02	G
CD-109		9.0741E-03					
			88.04	9.074E-03	%(P	2.057E+00 6.13E-01	G
SN-113		-2.7169E-03					
			391.71	-2.717E-03	%(	6.414E-02 1.86E-02	G K
			255.04	-2.296E-01	%	1.977E+00 5.85E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.7204E-02						
		427.95	-5.531E-03	%(P	1.471E-01	4.23E-02	G K
		600.77	8.364E-03	& P	2.366E-01	6.70E-02	G
		636.15	1.388E-01	% P	3.808E-01	1.13E-01	G
		463.51	4.013E-01	@(P	3.900E-01	1.26E-01	G
		176.29	-1.816E-01	% P	6.708E-01	2.01E-01	G
I-131	8.0835E-03						
		364.48	8.083E-03	%(	4.893E-02	1.44E-02	G K
		636.97	2.254E-01	%	5.612E-01	1.68E-01	G
		284.29	1.289E-01	%	6.738E-01	2.00E-01	G
CS-134	0.0000E+00						
		604.66	0.000E+00	%(	9.842E-02	2.89E-02	G K
		795.76	2.619E-02	%	5.569E-02	1.69E-02	G
		569.29	0.000E+00	&	2.849E-01	8.06E-02	G
		801.84	-1.261E-02	% P	5.784E-01	1.62E-01	G
CS-137	2.8825E-01						
		661.62	2.883E-01	@(	5.892E-02	3.03E-02	G
CE-139	-8.2743E-03						
		165.85	-8.274E-03	%(P	5.338E-02	1.59E-02	G
EU-152	5.6665E-03						
		121.78	5.666E-03	%(P	1.622E-01	4.82E-02	G K
		344.30	3.681E-02	&	1.407E-01	4.18E-02	G
		1408.08	9.014E-03	%	2.035E-01	5.33E-02	G
		964.00	1.876E-01	& P	4.788E-01	1.43E-01	G
		1112.07	-9.589E-02	%	5.414E-01	1.57E-01	G
		778.90	4.595E-04	% P	3.567E-01	9.90E-02	G
EU-154	-1.2968E-02						
		123.10	-1.297E-02	%(P	1.218E-01	3.63E-02	G K
		1274.80	6.916E-02	%	1.748E-01	5.22E-02	G
		723.30	7.279E-02	& P	2.811E-01	8.27E-02	G
		1004.80	-7.972E-02	&	3.622E-01	1.05E-01	G
EU-155	7.4621E-02						
		86.45	7.462E-02	%(P	2.566E-01	7.72E-02	G K
		105.31	5.844E-02	%	2.517E-01	7.55E-02	G
HG-203	-8.2757E-03						
		279.17	-8.276E-03	%(P	5.266E-02	1.56E-02	G K
		72.87	4.746E-01	%	1.890E+00	5.69E-01	G
		70.83	-6.702E-01	&	3.424E+00	1.03E+00	G
		82.50	-6.717E-01	&	3.901E+00	1.17E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.3970E-01						
		583.14	2.397E-01	(P	6.502E-02	3.23E-02	G
		510.72	4.752E-01	+	2.172E-01	9.53E-02	G
PB-212	5.5904E-01						
		238.63	5.684E-01	(	1.095E-01	4.09E-02	G K
							Energy duplication
		77.11	5.361E-01	*(	5.802E-01	1.79E-01	G
		74.81	7.204E-01	% P	1.144E+00	3.49E-01	G
PB-214	3.9830E-01						
		351.99	4.047E-01	(P	9.246E-02	3.80E-02	G K
		295.22	3.860E-01	(	2.214E-01	7.31E-02	G
							Energy duplication
		77.11	8.767E-01	+	9.490E-01	2.93E-01	G
		241.92	2.418E-01	%	7.381E-01	2.22E-01	G
BI-212	8.6813E-01						
		727.17	8.681E-01	(	4.939E-01	2.20E-01	G K
		1620.56	-3.356E-02	% P	1.641E+00	4.08E-01	G
		785.42	7.193E-01	% P	2.001E+00	5.93E-01	G
BI-214	4.8711E-01						
		609.32	4.760E-01	(	1.237E-01	6.00E-02	G K
		1764.51	5.194E-01	(P	1.371E-01	9.85E-02	G
		1120.28	1.011E+00	+	4.730E-01	2.19E-01	G
RA-224	6.4133E-01						
		241.00	6.413E-01	%(P	1.357E+00	4.11E-01	G
RA-226	7.3346E-01						
		185.99	7.335E-01	%(P	1.281E+00	3.89E-01	G
AC-228	6.3104E-01						
		911.07	6.687E-01	(P	2.079E-01	1.02E-01	G K
		968.90	1.137E+00	+ P	3.451E-01	1.73E-01	G
		338.40	5.401E-01	(	2.492E-01	8.95E-02	G
TH-227	6.0911E-02						
		236.00	6.091E-02	%(P	3.339E-01	9.91E-02	G K
		256.25	-7.025E-02	%	5.657E-01	1.67E-01	G
PA-234	-3.9023E-03						
		98.44	-3.902E-03	%(	2.505E-01	7.45E-02	G K
		946.00	5.759E-02	%	2.771E-01	8.01E-02	G
		131.28	0.000E+00	%	2.471E-01	7.34E-02	G
		94.67	-1.011E-01	%	4.598E-01	1.38E-01	G
		883.24	-9.246E-03	%	3.889E-01	1.07E-01	G
		926.70	1.184E-01	%	4.664E-01	1.36E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 0.000E+00 &   4.225E-01 1.20E-01 G

TH-234       1.2497E+00
                           63.29 1.250E+00 %(P 4.494E+00 1.35E+00 G K
                           92.80 8.178E-01 %   2.383E+00 7.19E-01 G
                           92.38 5.840E-01 % P 2.483E+00 7.45E-01 G

AM-241      -1.1605E-02
                           59.54-1.160E-02 &(  5.614E-01 1.66E-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:                      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 - 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 *****

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	7.9497E-02	7.9740E-02	2.9271E-01	2.9274E-01	3.325E-01
K-40		1.2613E+01	1.2613E+01	1.6908E+00	1.8330E+00	
MN-54	#A	-4.8368E-03	-4.8393E-03	5.8025E-02	5.8026E-02	5.915E-02
CO-57	#B	4.5696E-03	4.5723E-03	4.9270E-02	4.9271E-02	5.511E-02
CO-60		1.8813E-01	1.8815E-01	7.0950E-02	7.1731E-02	

Sr-85	#A	-1.1690E-02	-1.1720E-02	5.1851E-02	5.1855E-02	5.839E-02
Kr-85	#A	-2.6988E+02	-2.6988E+02	1.1940E+03	1.1941E+03	1.348E+03
Y-88	#B	-2.3671E-03	-2.3707E-03	3.4283E-02	3.4283E-02	4.427E-02
NB-94	#B	-3.3409E-03	-3.3409E-03	3.2059E-02	3.2060E-02	3.875E-02
Ag-108M	#B	1.9514E-02	1.9514E-02	5.4386E-02	5.4397E-02	6.109E-02
CD-109	#A	9.0709E-03	9.0741E-03	1.8375E+00	1.8375E+00	2.056E+00
SN-113	#B	-2.7131E-03	-2.7169E-03	5.5737E-02	5.5738E-02	6.405E-02
SB-125	#B	9.7188E-02	9.7204E-02	9.1314E-02	9.1477E-02	1.471E-01
I-131	#B	7.9213E-03	8.0835E-03	4.3115E-02	4.3117E-02	4.795E-02
CS-134	#B	0.0000E+00	0.0000E+00	8.6679E-02	8.6679E-02	9.840E-02
CS-137	#	2.8825E-01	2.8825E-01	9.0739E-02	9.2169E-02	
CE-139	#A	-8.2645E-03	-8.2743E-03	5.0263E-02	5.0265E-02	5.332E-02
EU-152	#B	5.6663E-03	5.6665E-03	1.4459E-01	1.4460E-01	1.622E-01
EU-154	#B	-1.2968E-02	-1.2968E-02	1.1241E-01	1.1241E-01	1.218E-01
EU-155	#B	7.4614E-02	7.4621E-02	2.3171E-01	2.3174E-01	2.566E-01
HG-203	#B	-8.2468E-03	-8.2757E-03	4.7519E-02	4.7521E-02	5.247E-02
TL-208		2.3970E-01	2.3970E-01	9.6794E-02	9.7724E-02	
PB-212	#	5.5904E-01	5.5904E-01	1.2077E-01	1.2478E-01	1.095E-01
PB-214	#	3.9830E-01	3.9830E-01	1.1230E-01	1.1451E-01	9.246E-02
BI-212		8.6813E-01	8.6813E-01	6.6075E-01	6.6254E-01	
BI-214		4.8711E-01	4.8711E-01	1.6628E-01	1.6852E-01	
RA-224	#A	6.4133E-01	6.4133E-01	1.2336E+00	1.2341E+00	1.357E+00
RA-226	#A	7.3346E-01	7.3346E-01	1.1682E+00	1.1689E+00	1.281E+00
AC-228		6.3104E-01	6.3104E-01	2.1275E-01	2.1568E-01	
TH-227	#B	6.0911E-02	6.0911E-02	2.9742E-01	2.9744E-01	3.339E-01
PA-234	#B	-3.9023E-03	-3.9023E-03	2.2365E-01	2.2365E-01	2.505E-01
TH-234	#B	1.2497E+00	1.2497E+00	4.0542E+00	4.0548E+00	4.494E+00
AM-241	#A	-1.1605E-02	-1.1605E-02	4.9870E-01	4.9870E-01	5.614E-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 (269.7 to 1999.0 keV) 1.5315213E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 1.5315232E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102_17NOV2005_1800.An1

Sample description
NOL-05-02-010-C

Spectrum Filename: C:\GammaVision\Spectra\102_17NOV2005_1800.An1

Acquisition information
Start time: 17-Nov-2005 18:00:33
Live time: 2000
Real time: 2029
Dead time: 1.42 %
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/channel^2

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: 1.8310E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8310E+03) =
5.4615E+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	17-Nov-2005 11:20:00
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: 0.1262

***** 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
77.17	226.	14.32	1.10	9.689E-03	77.11	10.700	1.637E+00	PB214
					77.11	17.500	1.001E+00	PB212
186.39	138.	29.88	1.99	1.625E-02	185.99	3.280	1.844E+00	RA226
238.74	655.	4.78	1.21	1.380E-02	238.63	43.100	8.131E-01	PB212
241.35	114.	26.62	1.22	1.368E-02	241.00	3.900	PBC<MDA	RA224
276.94	55.	40.14	0.95	1.216E-02				
295.24	121.	21.36	1.34	1.146E-02	295.22	19.200	4.070E-01	PB214
328.06	57.	34.46	0.86	1.037E-02				
338.58	159.	16.46	1.06	1.005E-02	338.40	12.010	9.701E-01	AC228
351.98	181.	15.30	1.40	9.679E-03				
351.98	181.	15.30	1.40	9.679E-03	351.99	37.100	3.712E-01	PB214
463.28	43.	30.40	1.52	7.368E-03				
463.28	43.	30.40	1.52	7.368E-03	463.51	10.000	4.165E-01	SB125
510.83	115.	20.86	1.54	6.693E-03	510.72	22.500	5.615E-01	TL208
583.45	189.	11.84	1.39	5.887E-03	583.14	86.000	2.751E-01	TL208
609.51	139.	13.44	1.40	5.648E-03	604.66	97.600	1.848E-01	CS134
					609.32	46.090	3.940E-01	BI214
727.23	80.	26.01	1.81	4.794E-03	727.17	11.800	1.041E+00	BI212
771.94	35.	40.78	0.61	4.542E-03				
794.93	30.	39.33	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
861.05	38.	30.29	1.09	4.121E-03				
911.21	129.	15.59	1.27	3.921E-03	911.07	29.000	8.382E-01	AC228
968.55	121.	18.18	1.73	3.719E-03	968.90	17.460	1.373E+00	AC228
1120.05	55.	29.93	1.84	3.283E-03	1120.28	15.040	8.161E-01	BI214
1173.38	295.	7.27	1.75	3.156E-03	1173.23	99.860	6.907E-01	CO60
1332.73	287.	6.72	2.13	2.833E-03	1332.51	99.980	7.464E-01	CO60
1460.97	563.	4.32	1.84	2.620E-03	1460.75	10.700	1.482E+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	
477.12	238.77	163.	655.	0.328	14.34	1.215	PB-212	D
482.33	241.38	400.	114.	0.057	79.87	1.217	RA-224	D
655.79	328.06	143.	57.	0.029	103.39	0.865	AC-228	s
1543.87	771.94	63.	35.	0.018	122.35	0.608	AC-228	sM
1722.19	861.05	40.	38.	0.019	90.87	1.094	TL-208	s

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	962.	212.	0.106	65.25	1.500D
PB-212	153.80	77.11	962.	212.	0.106	65.25	1.500D
RA-226	371.90	186.14	560.	89.	0.044	111.77	1.500s
PB-212	477.15	238.76	446.	596.	0.298	19.42	1.500s
PB-214	589.89	295.12	259.	122.	0.061	61.95	1.500
AC-228	676.83	338.58	187.	159.	0.079	49.37	1.060s
PB-214	703.71	352.01	142.	174.	0.087	36.82	1.500
SB-125	925.93	463.09	69.	34.	0.017	109.62	1.500s
TL-208	1021.45	510.83	134.	115.	0.057	62.58	1.539s
TL-208	1166.74	583.45	101.	189.	0.094	35.52	1.388
BI-214	1218.88	609.51	70.	139.	0.069	40.32	1.397
BI-212	1454.41	727.23	103.	80.	0.040	78.02	1.812
CS-134	1589.87	794.93	53.	30.	0.015	117.99	1.601s
AC-228	1822.56	911.21	82.	129.	0.065	46.76	1.271s
AC-228	1937.30	968.55	95.	121.	0.060	54.55	1.730
BI-214	2240.50	1120.05	64.	55.	0.027	89.80	1.839
CO-60	2347.22	1173.38	57.	295.	0.147	21.82	1.750
CO-60	2666.17	1332.73	23.	287.	0.143	20.16	2.131
K-40	2922.84	1460.97	8.	563.	0.282	12.95	1.841

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		6.4175E-02					
			477.56	6.417E-02	%(	4.679E-01 1.36E-01	G
K-40		1.4819E+01					
			1460.75	1.482E+01	(P	4.172E-01 6.40E-01	G
MN-54		2.0528E-02					
			834.81	2.053E-02	%(P	7.037E-02 2.08E-02	G
CO-57		-1.8856E-02					
			122.07	-1.886E-02	%(	6.832E-02 2.05E-02	G K
			136.43	-1.149E-01	&	4.784E-01 1.44E-01	G
CO-60		7.1861E-01					
			1332.51	7.464E-01	(P	6.588E-02 5.02E-02	G K
			1173.23	6.907E-01	(	8.872E-02 5.02E-02	G K
Sr-85		-2.4810E-02					
			514.00	-2.481E-02	&(	6.971E-02 2.09E-02	G
Kr-85		-5.7157E+02					
			513.99	-5.716E+02	&(	1.605E+03 4.81E+02	G
Y-88		7.5119E-03					
			1836.01	7.512E-03	%(P	4.333E-02 1.15E-02	G K
			898.02	2.069E-02	& P	7.857E-02 2.31E-02	G
NB-94		-2.2422E-03					
			871.10	-2.242E-03	%(	6.870E-02 1.95E-02	G K
			702.50	-1.227E-02	%	7.166E-02 2.10E-02	G K
Ag-108M		1.6121E-02					
			722.95	1.612E-02	&(	8.555E-02 2.51E-02	G K
			614.37	2.543E-02	% P	5.281E-02 1.60E-02	G
			433.93	2.057E-02	%	5.372E-02 1.61E-02	G
CD-109		1.2670E+00					
			88.04	1.267E+00	%(P	2.159E+00 6.57E-01	G
SN-113		-6.6838E-03					
			391.71	-6.684E-03	%(	7.991E-02 2.34E-02	G K
			255.04	-3.454E-01	%	2.386E+00 7.08E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.3722E-02						
		427.95	-1.690E-02	&(P	1.786E-01	5.18E-02	G K
		600.77	-5.391E-02	% P	3.421E-01	9.99E-02	G
		636.15	-8.314E-04	% P	6.686E-01	1.93E-01	G
		463.51	3.420E-01	*(P	4.141E-01	1.31E-01	G
		176.29	-2.098E-03	% P	7.309E-01	2.16E-01	G
I-131	3.6118E-04						
		364.48	3.612E-04	%(	5.947E-02	1.72E-02	G K
		636.97	7.641E-02	%	7.301E-01	2.09E-01	G
		284.29	6.640E-03	%	6.472E-01	1.88E-01	G
CS-134	3.2106E-02						
		604.66	9.324E-03	%(	5.863E-02	1.71E-02	G K
		795.76	5.814E-02	(	7.196E-02	2.29E-02	G
		569.29	6.648E-02	&	3.517E-01	1.03E-01	G
		801.84	-1.255E-02	% P	7.171E-01	2.02E-01	G
CS-137	3.2397E-02						
		661.62	3.240E-02	%(	7.180E-02	2.17E-02	G
CE-139	9.1791E-04						
		165.85	9.179E-04	%(P	6.798E-02	2.02E-02	G
EU-152	-5.4391E-02						
		121.78	-5.439E-02	%(P	1.986E-01	5.97E-02	G K
		344.30	-3.782E-02	%	1.908E-01	5.66E-02	G
		1408.08	-1.499E-03	&	2.803E-01	7.46E-02	G
		964.00	8.271E-03	% P	7.642E-01	2.21E-01	G
		1112.07	1.788E-01	%	7.155E-01	2.11E-01	G
		778.90	1.241E-01	& P	4.582E-01	1.35E-01	G
EU-154	-3.4476E-02						
		123.10	-3.448E-02	%(P	1.348E-01	4.05E-02	G K
		1274.80	-2.621E-02	%	2.285E-01	6.50E-02	G
		723.30	6.822E-03	& P	5.486E-01	1.60E-01	G
		1004.80	2.712E-02	%	4.459E-01	1.27E-01	G
EU-155	1.3658E-01						
		86.45	1.366E-01	&(P	2.814E-01	8.53E-02	G K
		105.31	3.603E-02	%	3.263E-01	9.76E-02	G
HG-203	-1.6736E-03						
		279.17	-1.674E-03	&(P	5.734E-02	1.68E-02	G K
		72.87	8.671E-02	%	2.116E+00	6.32E-01	G
		70.83	-9.918E-01	&	3.882E+00	1.17E+00	G
		82.50	6.715E-03	&	3.944E+00	1.17E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7508E-01						
		583.14	2.751E-01	(P	7.225E-02	3.27E-02	G
		510.72	5.615E-01	+	2.780E-01	1.17E-01	G
PB-212	7.3905E-01						
		238.63	7.390E-01	@(	1.254E-01	4.78E-02	G K
							Energy duplication
		77.11	9.392E-01	+	6.507E-01	2.04E-01	G
		74.81	7.447E-01	& P	1.334E+00	4.05E-01	G
PB-214	3.7581E-01						
		351.99	3.578E-01	(P	1.199E-01	4.40E-02	G K
		295.22	4.106E-01	(	2.603E-01	8.48E-02	G
							Energy duplication
		77.11	1.536E+00	+	1.064E+00	3.34E-01	G
		241.92	-4.388E-01	%	8.378E-01	2.55E-01	G
BI-212	1.0411E+00						
		727.17	1.041E+00	(	6.530E-01	2.71E-01	G K
		1620.56	3.863E-01	% P	1.844E+00	5.08E-01	G
		785.42	1.550E+00	% P	3.392E+00	1.03E+00	G
BI-214	3.9400E-01						
		609.32	3.940E-01	(	1.182E-01	5.30E-02	G K
		1764.51	1.577E-01	% P	2.967E-01	9.25E-02	G
		1120.28	8.161E-01	+	5.995E-01	2.44E-01	G
RA-224	9.4233E-01						
		241.00	9.423E-01	%(P	1.557E+00	4.75E-01	G
RA-226	1.2265E+00						
		185.99	1.227E+00	*(P	1.563E+00	4.80E-01	G
AC-228	8.7682E-01						
		911.07	8.382E-01	*(P	2.911E-01	1.31E-01	G K
		968.90	1.373E+00	+ P	5.478E-01	2.50E-01	G
		338.40	9.701E-01	@(	4.060E-01	1.60E-01	G
TH-227	-2.8602E-01						
		236.00	-2.860E-01	%(P	6.103E-01	1.85E-01	G K
		256.25	-1.277E-01	%	6.782E-01	2.02E-01	G
PA-234	8.6928E-02						
		98.44	8.693E-02	%(	2.861E-01	8.62E-02	G K
		946.00	1.869E-02	%	4.388E-01	1.26E-01	G
		131.28	2.552E-02	&	2.864E-01	8.55E-02	G
		94.67	-7.838E-02	%	5.367E-01	1.61E-01	G
		883.24	-9.930E-02	&	7.435E-01	2.17E-01	G
		926.70	3.456E-03	%	7.577E-01	2.16E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.253E-02 &   6.037E-01 1.74E-01 G

TH-234       1.6736E+00
                           63.29 1.674E+00 %(P 4.895E+00 1.48E+00 G K
                           92.80 1.420E+00 %   2.745E+00 8.34E-01 G
                           92.38-2.331E-01 % P 3.333E+00 9.95E-01 G

AM-241       1.7499E-01
                           59.54 1.750E-01 %(  6.129E-01 1.84E-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:                      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 - 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 *****

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	6.3943E-02	6.4175E-02	4.0840E-01	4.0841E-01	4.663E-01
K-40		1.4819E+01	1.4819E+01	1.9199E+00	2.0923E+00	
MN-54	#A	2.0516E-02	2.0528E-02	6.2357E-02	6.2368E-02	7.033E-02
CO-57	#B	-1.8843E-02	-1.8856E-02	6.1650E-02	6.1658E-02	6.828E-02
CO-60		7.1854E-01	7.1861E-01	1.0674E-01	1.1411E-01	

Sr-85	#A	-2.4736E-02	-2.4810E-02	6.2727E-02	6.2743E-02	6.950E-02
Kr-85	#A	-5.7157E+02	-5.7157E+02	1.4440E+03	1.4443E+03	1.605E+03
Y-88	#B	7.4983E-03	7.5119E-03	3.4476E-02	3.4478E-02	4.325E-02
NB-94	#B	-2.2422E-03	-2.2422E-03	5.8393E-02	5.8393E-02	6.870E-02
Ag-108M	#B	1.6121E-02	1.6121E-02	7.5358E-02	7.5363E-02	8.555E-02
CD-109	#A	1.2664E+00	1.2670E+00	1.9722E+00	1.9734E+00	2.158E+00
SN-113	#B	-6.6726E-03	-6.6838E-03	7.0058E-02	7.0059E-02	7.978E-02
SB-125	#B	7.3708E-02	7.3722E-02	8.4479E-02	8.4580E-02	1.785E-01
I-131	#B	3.5262E-04	3.6118E-04	5.1715E-02	5.1715E-02	5.806E-02
CS-134	#B	3.2098E-02	3.2106E-02	3.7883E-02	3.7926E-02	5.862E-02
CS-137	#A	3.2397E-02	3.2397E-02	6.5104E-02	6.5129E-02	7.180E-02
CE-139	#A	9.1663E-04	9.1791E-04	6.0578E-02	6.0579E-02	6.788E-02
EU-152	#B	-5.4389E-02	-5.4391E-02	1.8790E-01	1.8793E-01	1.986E-01
EU-154	#B	-3.4473E-02	-3.4476E-02	1.2299E-01	1.2300E-01	1.348E-01
EU-155	#B	1.3657E-01	1.3658E-01	2.5588E-01	2.5599E-01	2.814E-01
HG-203	#B	-1.6667E-03	-1.6736E-03	5.4832E-02	5.4832E-02	5.710E-02
TL-208		2.7508E-01	2.7508E-01	9.7905E-02	9.9114E-02	
PB-212	#	7.3905E-01	7.3905E-01	1.4353E-01	1.4940E-01	1.254E-01
PB-214	#	3.7581E-01	3.7581E-01	1.3549E-01	1.3712E-01	1.199E-01
BI-212		1.0411E+00	1.0411E+00	8.1226E-01	8.1436E-01	
BI-214		3.9400E-01	3.9400E-01	1.5886E-01	1.6039E-01	
RA-224	#A	9.4233E-01	9.4233E-01	1.4249E+00	1.4259E+00	1.557E+00
RA-226	#A	1.2265E+00	1.2265E+00	1.4399E+00	1.4416E+00	1.563E+00
AC-228		8.7682E-01	8.7682E-01	2.9837E-01	3.0240E-01	
TH-227	#B	-2.8602E-01	-2.8602E-01	5.6015E-01	5.6038E-01	6.103E-01
PA-234	#B	8.6928E-02	8.6928E-02	2.5851E-01	2.5856E-01	2.861E-01
TH-234	#B	1.6736E+00	1.6736E+00	4.4268E+00	4.4278E+00	4.895E+00
AM-241	#A	1.7499E-01	1.7499E-01	5.5193E-01	5.5202E-01	6.129E-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 (269.2 to 1999.0 keV) 1.8124430E+01 pCi/gm
Total Decayed Activity (269.2 to 1999.0 keV) 1.8124500E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102_17NOV2005_1837.An1

Sample description
NOL-05-02-002-C

Spectrum Filename: C:\GammaVision\Spectra\102_17NOV2005_1837.An1

Acquisition information
Start time: 17-Nov-2005 18:37:48
Live time: 2000
Real time: 2025
Dead time: 1.22 %
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/channel^2

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: 2.0250E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0250E+03) =
4.9383E+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	17-Nov-2005 11:00:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1869

***** 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	117.	41.22	1.50	8.847E-03				
74.91	117.	41.22	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.02	182.	26.40	1.50	9.541E-03	77.11	10.700	1.188E+00	PB214
					77.11	17.500	7.263E-01	PB212
77.02	182.	26.40	1.50	9.541E-03	77.11	10.700	1.188E+00	PB214
					77.11	17.500	7.263E-01	PB212
93.17	131.	38.90	1.60	1.340E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.179E+00	TH234
					94.67	15.500	4.110E-01	PA234
185.59	156.	23.94	1.34	1.628E-02				
185.59	156.	23.94	1.34	1.628E-02	185.99	3.280	1.893E+00	RA226
209.55	94.	34.78	0.90	1.518E-02				
238.72	684.	4.69	1.21	1.380E-02	238.63	43.100	7.674E-01	PB212
241.41	106.	28.97	1.22	1.368E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.939E-01	PB214
270.43	61.	37.27	1.70	1.242E-02				
295.21	223.	12.36	1.14	1.147E-02				
295.21	223.	12.36	1.14	1.147E-02	295.22	19.200	6.763E-01	PB214
300.59	63.	30.93	0.89	1.127E-02				
338.50	200.	11.28	1.80	1.006E-02	338.40	12.010	1.107E+00	AC228
352.03	342.	9.22	1.32	9.678E-03	351.99	37.100	6.349E-01	PB214
462.54	44.	32.56	1.42	7.380E-03				
462.54	44.	32.56	1.42	7.380E-03	463.51	10.000	PBC<MDA	SB125
510.80	106.	16.76	1.08	6.694E-03	510.72	22.500	4.714E-01	TL208
583.22	232.	9.02	1.31	5.889E-03	583.14	86.000	3.054E-01	TL208
609.37	250.	8.91	1.22	5.649E-03	609.32	46.090	6.407E-01	BI214
727.36	49.	26.34	1.53	4.793E-03	727.17	11.800	5.780E-01	BI212

795.84	26.	40.30	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
835.62	39.	37.38	1.76	4.235E-03	834.81	99.978	6.133E-02	MN54
860.84	46.	22.58	1.73	4.122E-03				
911.53	128.	14.14	0.91	3.920E-03	911.07	29.000	7.497E-01	AC228
969.18	100.	19.59	1.80	3.717E-03	968.90	17.460	1.026E+00	AC228
1120.51	80.	16.08	2.12	3.283E-03	1120.28	15.040	1.076E+00	BI214
1173.59	36.	33.76	1.85	3.157E-03	1173.23	99.860	PBC<MDA	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.52	40.	24.24	0.94	2.834E-03	1332.51	99.980	9.404E-02	CO60
1460.99	571.	4.30	1.91	2.620E-03	1460.75	10.700	1.358E+01	K40
1764.98	44.	15.08	1.91	2.225E-03	1764.51	15.920	8.272E-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	
185.93	93.17	942.	131.	0.065	116.70	1.602	U-235	l
418.71	209.55	386.	94.	0.047	104.33	0.899	AC-228	
477.06	238.75	174.	684.	0.342	14.08	1.215	PB-212	D
482.44	241.44	419.	106.	0.053	86.91	1.217	RA-224	D
540.51	270.43	199.	61.	0.031	111.81	1.702	AC-228	s
600.84	300.59	144.	63.	0.031	89.22	0.886	PB-212	s
1721.76	860.84	26.	46.	0.023	67.74	1.729	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-214	153.80	77.11	1060.	182.	0.091	79.21	1.500D
PB-212	153.80	77.11	1060.	182.	0.091	79.21	1.500D
RA-226	371.72	186.06	520.	115.	0.057	85.47	1.500s
PB-212	477.03	238.70	450.	606.	0.303	19.21	1.500
PB-214	590.38	295.36	226.	200.	0.100	38.32	1.500
AC-228	676.68	338.50	124.	200.	0.100	33.85	1.799s
PB-214	703.73	352.02	151.	301.	0.150	24.43	1.500
SB-125	925.81	463.03	81.	43.	0.021	96.58	1.500
TL-208	1021.38	510.80	76.	106.	0.053	50.29	1.077s
TL-208	1166.26	583.22	74.	232.	0.116	27.07	1.315
BI-214	1218.60	609.37	77.	250.	0.125	26.74	1.216
BI-212	1454.67	727.36	49.	49.	0.024	79.02	1.530
CS-134	1591.69	795.84	41.	26.	0.013	120.90	1.601s
MN-54	1671.31	835.62	53.	39.	0.019	112.15	1.762
AC-228	1823.20	911.53	54.	128.	0.064	42.43	0.909s
AC-228	1938.57	969.18	67.	100.	0.050	58.76	1.799s
BI-214	2241.42	1120.51	23.	80.	0.040	48.24	2.120s
CO-60	2347.65	1173.59	57.	36.	0.018	101.29	1.854s
CO-60	2666.15	1332.73	22.	29.	0.015	87.62	1.959s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2922.88	1460.99	9.	571.	0.285	12.89	1.910
BI-214	3531.43	1764.98	0.	44.	0.022	45.23	1.915

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.4100E-01					
			477.56	1.410E-01	%(	4.420E-01 1.32E-01	G
K-40		1.3580E+01					
			1460.75	1.358E+01	(P	4.036E-01 5.84E-01	G
MN-54		6.1332E-02					
			834.81	6.133E-02	(P	5.784E-02 2.31E-02	G
CO-57		1.1532E-02					
			122.07	1.153E-02	&(	6.132E-02 1.84E-02	G K
			136.43	-4.386E-03	%	4.278E-01 1.27E-01	G
CO-60		7.2574E-02					
			1332.51	6.835E-02	(P	5.744E-02 2.00E-02	G K
			1173.23	7.680E-02	*(	8.014E-02 2.59E-02	G K
Sr-85		-2.0603E-02					
			514.00	-2.060E-02	%(	5.689E-02 1.71E-02	G
Kr-85		-4.7402E+02					
			513.99	-4.740E+02	%(	1.309E+03 3.92E+02	G
Y-88		-2.0560E-05					
			1836.01	-2.056E-05	%(P	5.272E-02 1.34E-02	G K
			898.02	5.476E-04	% P	5.379E-02 1.48E-02	G
NB-94		6.2535E-03					
			871.10	6.254E-03	&(	4.782E-02 1.36E-02	G K
			702.50	-1.398E-02	&	6.277E-02 1.85E-02	G K
Ag-108M		1.6850E-03					
			722.95	1.685E-03	&(	9.772E-02 2.84E-02	G K
			614.37	-7.596E-03	% P	5.527E-02 1.60E-02	G
			433.93	8.538E-03	&	4.940E-02 1.45E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-3.8902E-01						
		88.04	-3.890E-01	&(P	2.381E+00	7.14E-01	G
SN-113	-1.8433E-02						
		391.71	-1.843E-02	%(	7.287E-02	2.16E-02	G K
		255.04	-4.481E-03	&	2.064E+00	6.06E-01	G
SB-125	1.2559E-01						
		427.95	3.747E-02	&(P	1.259E-01	3.72E-02	G K
		600.77	1.334E-01	% P	2.480E-01	7.58E-02	G
		636.15	-1.849E-02	% P	3.549E-01	9.96E-02	G
		463.51	3.864E-01	(P	4.038E-01	1.29E-01	G
		176.29	2.459E-01	% P	6.894E-01	2.08E-01	G
I-131	-1.2639E-02						
		364.48	-1.264E-02	%(	5.246E-02	1.55E-02	G K
		636.97	1.054E-01	%	6.408E-01	1.85E-01	G
		284.29	-1.015E-02	%	7.873E-01	2.31E-01	G
CS-134	2.2983E-02						
		604.66	3.025E-03	%(	4.000E-02	1.13E-02	G K
		795.76	4.579E-02	*(	5.788E-02	1.85E-02	G
		569.29	0.000E+00	&	3.236E-01	9.23E-02	G
		801.84	-7.246E-02	% P	6.096E-01	1.74E-01	G
CS-137	4.0252E-02						
		661.62	4.025E-02	%(	5.621E-02	1.76E-02	G
CE-139	-5.3165E-03						
		165.85	-5.317E-03	%(P	5.790E-02	1.72E-02	G
EU-152	2.7545E-02						
		121.78	2.755E-02	&(P	1.816E-01	5.43E-02	G K
		344.30	0.000E+00	%	1.725E-01	5.03E-02	G
		1408.08	4.845E-02	%	2.165E-01	6.10E-02	G
		964.00	-2.279E-01	% P	5.895E-01	1.77E-01	G
		1112.07	0.000E+00	%	5.902E-01	1.67E-01	G
		778.90	-1.971E-02	& P	4.225E-01	1.20E-01	G
EU-154	1.6549E-02						
		123.10	1.655E-02	&(P	9.837E-02	2.93E-02	G K
		1274.80	-7.455E-03	%	1.716E-01	4.73E-02	G
		723.30	-8.628E-02	& P	3.660E-01	1.08E-01	G
		1004.80	-1.004E-01	%	3.496E-01	1.03E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	9.8809E-02						
		86.45	9.881E-02	%(P	2.680E-01	8.09E-02	G K
		105.31	8.157E-02	%	2.816E-01	8.48E-02	G
HG-203	1.8731E-02						
		279.17	1.873E-02	%(P	5.168E-02	1.55E-02	G K
		72.87	-5.641E-01	&	2.181E+00	6.57E-01	G
		70.83	-1.073E-01	%	4.501E+00	1.35E+00	G
		82.50	-8.464E-01	&	4.179E+00	1.26E+00	G
TL-208	3.0537E-01						
		583.14	3.054E-01	(P	5.646E-02	2.76E-02	G
		510.72	4.714E-01	+	1.915E-01	7.90E-02	G
PB-212	6.9333E-01						
		238.63	6.799E-01	(	1.139E-01	4.35E-02	G K
							Energy duplication
		77.11	7.263E-01	*(	6.173E-01	1.92E-01	G
		74.81	9.193E-01	& P	1.272E+00	3.89E-01	G
PB-214	5.7499E-01						
		351.99	5.592E-01	(P	1.114E-01	4.56E-02	G K
		295.22	6.055E-01	(	2.204E-01	7.74E-02	G
							Energy duplication
		77.11	1.188E+00	+	1.010E+00	3.14E-01	G
		241.92	2.991E-01	%	7.616E-01	2.30E-01	G
BI-212	5.7803E-01						
		727.17	5.780E-01	(	4.168E-01	1.52E-01	G K
		1620.56	1.524E-01	% P	1.536E+00	3.98E-01	G
		785.42	5.630E-01	% P	2.887E+00	8.40E-01	G
BI-214	6.4074E-01						
		609.32	6.407E-01	(	1.117E-01	5.71E-02	G K
		1764.51	8.272E-01	+ P	1.388E-01	1.25E-01	G
		1120.28	1.076E+00	+	3.413E-01	1.73E-01	G
RA-224	9.3856E-01						
		241.00	9.386E-01	%(P	1.414E+00	4.32E-01	G
RA-226	1.4325E+00						
		185.99	1.433E+00	@(P	1.362E+00	4.24E-01	G
AC-228	9.0557E-01						
		911.07	7.497E-01	(P	2.172E-01	1.06E-01	G K
		968.90	1.026E+00	@(P	4.207E-01	2.01E-01	G
		338.40	1.107E+00	*(	3.022E-01	1.25E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.0876E-01						
		236.00	-3.088E-01	%(P	5.380E-01	1.64E-01	G K
		256.25	1.020E-01	&	6.666E-01	1.98E-01	G
PA-234	-2.7483E-02						
		98.44	-2.748E-02	%(	2.696E-01	8.06E-02	G K
		946.00	0.000E+00	%	3.521E-01	9.96E-02	G
		131.28	-7.192E-03	&	2.668E-01	7.95E-02	G
		94.67	1.371E-02	%	4.169E-01	1.24E-01	G
		883.24	-7.031E-02	%	5.108E-01	1.47E-01	G
		926.70	2.002E-01	%	4.157E-01	1.26E-01	G
		569.26	0.000E+00	&	4.799E-01	1.37E-01	G
TH-234	4.1726E-01						
		63.29	4.173E-01	&(P	4.997E+00	1.49E+00	G K
		92.80	1.679E+00	%	2.582E+00	7.88E-01	G
		92.38	1.552E+00	% P	3.110E+00	9.44E-01	G
AM-241	1.8263E-01						
		59.54	1.826E-01	%(	7.069E-01	2.12E-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:	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 - 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	1.4042E-01	1.4100E-01	3.9490E-01	3.9498E-01	4.402E-01
K-40		1.3580E+01	1.3580E+01	1.7504E+00	1.9091E+00	
MN-54		6.1288E-02	6.1332E-02	6.9164E-02	6.9249E-02	
CO-57	#B	1.1522E-02	1.1532E-02	5.5125E-02	5.5128E-02	6.127E-02
CO-60	#	7.2566E-02	7.2574E-02	4.8657E-02	4.8827E-02	5.744E-02
Sr-85	#A	-2.0533E-02	-2.0603E-02	5.1163E-02	5.1176E-02	5.670E-02
Kr-85	#A	-4.7402E+02	-4.7402E+02	1.1771E+03	1.1774E+03	1.309E+03
Y-88	#B	-2.0518E-05	-2.0560E-05	5.2837E-04	5.2837E-04	5.261E-02
NB-94	#B	6.2535E-03	6.2535E-03	4.0651E-02	4.0653E-02	4.782E-02
Ag-108M	#B	1.6850E-03	1.6850E-03	8.5331E-02	8.5331E-02	9.772E-02
CD-109	#A	-3.8883E-01	-3.8902E-01	2.3894E+00	2.3895E+00	2.380E+00
SN-113	#B	-1.8398E-02	-1.8433E-02	6.4937E-02	6.4946E-02	7.273E-02
SB-125	#B	1.2556E-01	1.2559E-01	1.2570E-01	1.2589E-01	1.259E-01
I-131	#B	-1.2298E-02	-1.2639E-02	4.6647E-02	4.6652E-02	5.104E-02
CS-134	#B	2.2977E-02	2.2983E-02	2.7786E-02	2.7816E-02	3.999E-02
CS-137	#A	4.0251E-02	4.0252E-02	5.2897E-02	5.2945E-02	5.621E-02
CE-139	#A	-5.3080E-03	-5.3165E-03	5.6055E-02	5.6056E-02	5.781E-02
EU-152	#B	2.7544E-02	2.7545E-02	1.6300E-01	1.6301E-01	1.816E-01
EU-154	#B	1.6548E-02	1.6549E-02	8.7972E-02	8.7976E-02	9.836E-02
EU-155	#B	9.8797E-02	9.8809E-02	2.4273E-01	2.4279E-01	2.680E-01
HG-203	#B	1.8642E-02	1.8731E-02	4.6612E-02	4.6623E-02	5.143E-02
TL-208		3.0537E-01	3.0537E-01	8.2795E-02	8.4550E-02	
PB-212	#	6.9333E-01	6.9333E-01	1.3316E-01	1.3873E-01	1.139E-01
PB-214	#	5.7499E-01	5.7499E-01	1.3071E-01	1.3464E-01	1.114E-01
BI-212		5.7803E-01	5.7803E-01	4.5679E-01	4.5794E-01	
BI-214		6.4074E-01	6.4074E-01	1.7131E-01	1.7504E-01	
RA-224	#A	9.3856E-01	9.3856E-01	1.2971E+00	1.2982E+00	1.414E+00
RA-226	#	1.4325E+00	1.4325E+00	1.2720E+00	1.2745E+00	1.362E+00
AC-228		9.0557E-01	9.0557E-01	2.4162E-01	2.4691E-01	
TH-227	#B	-3.0876E-01	-3.0876E-01	4.9527E-01	4.9557E-01	5.380E-01
PA-234	#B	-2.7483E-02	-2.7483E-02	2.4181E-01	2.4181E-01	2.696E-01
TH-234	#B	4.1726E-01	4.1726E-01	4.4765E+00	4.4766E+00	4.997E+00
AM-241	#A	1.8263E-01	1.8263E-01	6.3734E-01	6.3742E-01	7.069E-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 (270.2 to 1999.0 keV) 1.6071066E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.6071108E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_12DEC2005_1449.An1

Sample description
FSS-NOL-05-02-022-F-S-WET

Spectrum Filename: C:\GammaVision\Spectra\102F_12DEC2005_1449.An1

Acquisition information
Start time: 12-Dec-2005 14:51:53
Live time: 2000
Real time: 2034
Dead time: 1.65 %
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/channel^2

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: 2.4520E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.4520E+03) =
4.0783E+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	08-Dec-2005 11:12:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2626

***** 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
74.67	130.	38.98	1.50	8.847E-03				
74.67	130.	38.98	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.00	223.	23.42	1.50	9.541E-03	77.11	10.700	1.206E+00	PB214
					77.11	17.500	7.374E-01	PB212
77.00	223.	23.42	1.50	9.541E-03	77.11	10.700	1.206E+00	PB214
					77.11	17.500	7.374E-01	PB212
186.05	119.	26.98	1.88	1.626E-02	185.99	3.280	1.187E+00	RA226
209.09	81.	36.46	0.96	1.520E-02				
238.55	787.	4.60	1.21	1.381E-02				
238.55	787.	4.60	1.21	1.381E-02	238.63	43.100	7.286E-01	PB212
241.74	121.	21.13	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.526E-01	PB214
295.03	191.	17.17	1.38	1.147E-02				
295.03	191.	17.17	1.38	1.147E-02	295.22	19.200	4.787E-01	PB214
328.11	73.	35.05	0.78	1.037E-02				
338.21	195.	15.17	0.96	1.007E-02	338.40	12.010	8.913E-01	AC228
351.56	265.	10.37	1.18	9.690E-03				
351.56	265.	10.37	1.18	9.690E-03	351.99	37.100	4.063E-01	PB214
510.10	89.	24.83	1.23	6.703E-03	510.72	22.500	3.267E-01	TL208
582.68	247.	8.88	1.30	5.894E-03	583.14	86.000	2.683E-01	TL208
609.03	165.	12.50	1.74	5.652E-03	609.32	46.090	3.501E-01	BI214
661.50	125.	18.37	1.47	5.230E-03	661.62	84.620	1.557E-01	CS137
727.01	70.	28.14	1.95	4.794E-03	727.17	11.800	6.829E-01	BI212
910.42	197.	11.10	2.36	3.924E-03	911.07	29.000	9.535E-01	AC228
968.30	132.	15.05	1.40	3.720E-03	968.90	17.460	1.117E+00	AC228
1119.70	58.	35.35	1.13	3.285E-03	1120.28	15.040	6.451E-01	BI214
1172.61	260.	10.58	1.92	3.158E-03	1173.23	99.860	4.552E-01	CO60

1331.75	222.	8.27	2.02	2.835E-03	1332.51	99.980	4.314E-01	CO60
1459.93	736.	3.79	1.92	2.622E-03	1460.75	10.700	1.447E+01	K40
1763.75	48.	15.69	1.86	2.225E-03	1764.51	15.920	7.391E-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	
417.79	209.09	381.	81.	0.041	109.37	0.961	AC-228	
476.73	238.50	262.	787.	0.393	13.81	1.215	PB-212	D
483.11	241.68	265.	121.	0.060	63.38	1.217	PB-214	D
655.89	328.11	214.	73.	0.036	105.15	0.782	AC-228	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	148.92	74.67	1281.	130.	0.065	116.94	1.500
PB-214	153.80	77.11	1257.	223.	0.112	70.26	1.500D
PB-212	153.80	77.11	1257.	223.	0.112	70.26	1.500D
RA-226	371.72	186.05	422.	115.	0.057	80.95	1.882s
PB-212	476.79	238.58	523.	714.	0.357	17.63	1.500
PB-214	589.73	295.04	314.	155.	0.078	54.07	1.500
AC-228	676.10	338.21	236.	195.	0.098	45.51	0.955
PB-214	703.13	351.72	192.	243.	0.122	30.79	1.500s
TL-208	1019.99	510.10	139.	89.	0.045	74.48	1.226s
TL-208	1165.19	582.68	78.	247.	0.123	26.64	1.305s
BI-214	1217.91	609.03	94.	165.	0.083	37.50	1.744
CS-137	1322.89	661.50	115.	125.	0.062	55.12	1.471
BI-212	1453.98	727.01	103.	70.	0.035	84.42	1.949s
AC-228	1820.98	910.42	78.	197.	0.098	33.29	2.360s
AC-228	1936.82	968.30	81.	132.	0.066	45.14	1.402
BI-214	2239.75	1119.68	98.	52.	0.026	115.44	1.121s
CO-60	2345.68	1172.61	108.	260.	0.130	31.74	1.922
CO-60	2664.21	1331.75	33.	221.	0.111	24.80	2.024s
K-40	2920.77	1459.93	13.	736.	0.368	11.38	1.920
BI-214	3528.96	1763.75	2.	48.	0.024	47.06	1.865s

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	Peak Energy keV	Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.1848E-02					
			477.56	-1.185E-02	%(	3.998E-01 1.15E-01	G
K-40		1.4472E+01					
			1460.75	1.447E+01	(P	3.790E-01 5.49E-01	G
MN-54		-1.4351E-04					
			834.81	-1.435E-04	%(P	4.827E-02 1.35E-02	G
CO-57		-3.2936E-03					
			122.07	-3.294E-03	&(	6.104E-02 1.82E-02	G K
			136.43	-2.704E-02	%	4.623E-01 1.38E-01	G
CO-60		4.4329E-01					
			1332.51	4.314E-01	@(P	5.710E-02 3.57E-02	G K
			1173.23	4.552E-01	(	8.954E-02 4.81E-02	G K
Sr-85		-2.3301E-02					
			514.00	-2.330E-02	%(	5.996E-02 1.81E-02	G
Kr-85		-5.1462E+02					
			513.99	-5.146E+02	%(	1.324E+03 3.99E+02	G
Y-88		-7.2878E-04					
			1836.01	-7.288E-04	%(P	4.622E-02 1.19E-02	G K
			898.02	2.962E-04	& P	6.766E-02 1.93E-02	G
NB-94		0.0000E+00					
			871.10	0.000E+00	%(	6.905E-02 1.98E-02	G K
			702.50	4.839E-03	&	5.127E-02 1.48E-02	G K
Ag-108M		-2.4297E-02					
			722.95	-2.430E-02	&(	7.733E-02 2.31E-02	G K
			614.37	1.074E-02	% P	5.223E-02 1.53E-02	G
			433.93	1.884E-02	%	4.514E-02 1.36E-02	G
CD-109		4.5480E-02					
			88.04	4.548E-02	%(P	2.096E+00 6.27E-01	G
SN-113		2.1535E-03					
			391.71	2.153E-03	%(	8.176E-02 2.40E-02	G K
			255.04	2.384E-01	%	1.975E+00 5.87E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-4.0709E-03						
		427.95	-4.071E-03	%(P	1.375E-01	3.97E-02	G K
		600.77	6.712E-02	& P	2.127E-01	6.31E-02	G
		636.15	-7.303E-02	% P	4.426E-01	1.29E-01	G
		463.51	-1.161E-02	& P	4.656E-01	1.34E-01	G
		176.29	3.502E-02	& P	6.315E-01	1.88E-01	G
I-131	-6.5061E-03						
		364.48	-6.506E-03	%(	5.991E-02	1.75E-02	G K
		636.97	2.333E-02	%	8.225E-01	2.34E-01	G
		284.29	1.089E-01	%	7.885E-01	2.33E-01	G
CS-134	-2.1207E-03						
		604.66	-2.121E-03	%(	1.058E-01	3.13E-02	G K
		795.76	3.621E-02	%	5.170E-02	1.62E-02	G
		569.29	-2.808E-04	&	2.645E-01	7.54E-02	G
		801.84	7.474E-02	% P	6.222E-01	1.80E-01	G
CS-137	1.5572E-01						
		661.62	1.557E-01	(	6.563E-02	2.86E-02	G
CE-139	7.1136E-04						
		165.85	7.114E-04	%(P	4.535E-02	1.34E-02	G
EU-152	3.2454E-04						
		121.78	3.245E-04	%(P	1.665E-01	4.96E-02	G K
		344.30	1.037E-02	%	1.381E-01	4.05E-02	G
		1408.08	8.057E-02	%	1.743E-01	5.29E-02	G
		964.00	1.793E-01	& P	5.290E-01	1.58E-01	G
		1112.07	-6.817E-02	&	5.250E-01	1.52E-01	G
		778.90	-1.427E-01	% P	4.599E-01	1.37E-01	G
EU-154	2.4824E-02						
		123.10	2.482E-02	%(P	1.192E-01	3.58E-02	G K
		1274.80	5.449E-02	%	1.556E-01	4.61E-02	G
		723.30	-1.103E-01	& P	3.494E-01	1.04E-01	G
		1004.80	4.389E-02	%	3.301E-01	9.51E-02	G
EU-155	8.1061E-03						
		86.45	8.106E-03	%(P	2.480E-01	7.41E-02	G K
		105.31	6.816E-02	%	2.696E-01	8.12E-02	G
HG-203	-2.6587E-03						
		279.17	-2.659E-03	%(P	5.043E-02	1.49E-02	G K
		72.87	-6.259E-01	&	2.069E+00	6.24E-01	G
		70.83	-1.927E-01	%	3.627E+00	1.08E+00	G
		82.50	-2.533E-01	%	4.070E+00	1.22E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8041E-01						
		583.14	2.683E-01	*(P	4.784E-02	2.38E-02	G
		510.72	3.267E-01	@(	2.107E-01	8.10E-02	G
PB-212	6.8346E-01						
		238.63	6.616E-01	(	1.013E-01	3.89E-02	G K
							Energy duplication
		77.11	7.374E-01	(	5.542E-01	1.73E-01	G
		74.81	8.436E-01	& P	1.100E+00	3.36E-01	G
PB-214	3.7872E-01						
		351.99	3.736E-01	@(P	1.031E-01	3.84E-02	G K
		295.22	3.887E-01	(	2.135E-01	7.01E-02	G
							Energy duplication
		77.11	1.206E+00	+	9.065E-01	2.82E-01	G
		241.92	6.769E-02	%	7.699E-01	2.30E-01	G
BI-212	6.8294E-01						
		727.17	6.829E-01	*(	4.869E-01	1.92E-01	G K
		1620.56	-4.560E-02	% P	1.659E+00	4.31E-01	G
		785.42	-1.777E-02	% P	2.628E+00	7.47E-01	G
BI-214	3.5009E-01						
		609.32	3.501E-01	(	1.012E-01	4.37E-02	G K
		1764.51	7.391E-01	+ P	1.565E-01	1.16E-01	G
		1120.28	5.748E-01	+	5.438E-01	2.21E-01	G
RA-224	7.5403E-01						
		241.00	7.540E-01	%(P	1.334E+00	4.06E-01	G
RA-226	1.1873E+00						
		185.99	1.187E+00	*(P	1.017E+00	3.33E-01	G
AC-228	9.8954E-01						
		911.07	9.535E-01	*(P	2.129E-01	1.06E-01	G K
		968.90	1.117E+00	(P	3.800E-01	1.68E-01	G
		338.40	8.913E-01	(	3.386E-01	1.35E-01	G
TH-227	-2.2565E-01						
		236.00	-2.256E-01	%(P	4.974E-01	1.51E-01	G K
		256.25	1.320E-01	&	5.872E-01	1.75E-01	G
PA-234	-8.1604E-02						
		98.44	-8.160E-02	&(	2.586E-01	7.80E-02	G K
		946.00	-5.850E-02	%	3.372E-01	9.85E-02	G
		131.28	-6.626E-02	&	2.559E-01	7.70E-02	G
		94.67	-4.084E-02	&	4.458E-01	1.34E-01	G
		883.24	1.820E-01	&	3.522E-01	1.08E-01	G
		926.70	-3.988E-03	&	4.091E-01	1.14E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 3.521E-02 &   4.098E-01 1.18E-01 G

TH-234       5.0740E-02
                           63.29 5.074E-02 %(P 4.353E+00 1.30E+00 G K
                           92.80 1.181E+00 %   2.372E+00 7.20E-01 G
                           92.38 7.354E-02 % P 2.549E+00 7.61E-01 G

AM-241       2.8824E-02
                           59.54 2.882E-02 %(  6.445E-01 1.92E-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:                      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 - 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 *****

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	-1.1227E-02	-1.1848E-02	3.4572E-01	3.4572E-01	3.788E-01
K-40		1.4472E+01	1.4472E+01	1.6469E+00	1.8363E+00	
MN-54	#A	-1.4220E-04	-1.4351E-04	1.2595E-01	1.2595E-01	4.782E-02
CO-57	#B	-3.2587E-03	-3.2936E-03	5.4719E-02	5.4720E-02	6.039E-02
CO-60		4.4263E-01	4.4329E-01	8.9293E-02	9.2693E-02	

Sr-85	#A	-2.2289E-02	-2.3301E-02	5.4157E-02	5.4173E-02	5.736E-02
Kr-85	#A	-5.1461E+02	-5.1462E+02	1.1960E+03	1.1964E+03	1.324E+03
Y-88	#B	-7.0936E-04	-7.2878E-04	3.7514E-02	3.7514E-02	4.499E-02
NB-94	#B	0.0000E+00	0.0000E+00	5.9533E-02	5.9533E-02	6.905E-02
Ag-108M	#B	-2.4296E-02	-2.4297E-02	6.9314E-02	6.9327E-02	7.733E-02
CD-109	#A	4.5192E-02	4.5480E-02	1.8796E+00	1.8796E+00	2.082E+00
SN-113	#B	2.1003E-03	2.1535E-03	7.2077E-02	7.2077E-02	7.974E-02
SB-125	#B	-4.0594E-03	-4.0709E-03	4.4215E-01	4.4215E-01	1.371E-01
I-131	#B	-4.5482E-03	-6.5061E-03	5.2569E-02	5.2570E-02	4.188E-02
CS-134	#B	-2.1126E-03	-2.1207E-03	9.3995E-02	9.3995E-02	1.054E-01
CS-137		1.5568E-01	1.5572E-01	8.5835E-02	8.6278E-02	
CE-139	#A	6.9662E-04	7.1136E-04	4.0292E-02	4.0292E-02	4.441E-02
EU-152	#B	3.2434E-04	3.2454E-04	1.4879E-01	1.4879E-01	1.664E-01
EU-154	#B	2.4801E-02	2.4824E-02	1.0734E-01	1.0735E-01	1.191E-01
EU-155	#B	8.0932E-03	8.1061E-03	2.2236E-01	2.2236E-01	2.476E-01
HG-203	#B	-2.4994E-03	-2.6587E-03	4.6489E-02	4.6489E-02	4.741E-02
TL-208	#	2.8041E-01	2.8041E-01	7.4819E-02	7.6456E-02	
PB-212	#	6.8346E-01	6.8346E-01	1.2047E-01	1.2642E-01	1.013E-01
PB-214	#	3.7872E-01	3.7872E-01	1.1680E-01	1.1872E-01	1.031E-01
BI-212	#	6.8294E-01	6.8294E-01	5.7651E-01	5.7779E-01	
BI-214		3.5009E-01	3.5009E-01	1.3129E-01	1.3275E-01	
RA-224	#A	7.5403E-01	7.5403E-01	1.2174E+00	1.2182E+00	1.334E+00
RA-226	#	1.1873E+00	1.1873E+00	9.9846E-01	1.0007E+00	
AC-228		9.8954E-01	9.8954E-01	2.3832E-01	2.4470E-01	
TH-227	#B	-2.2565E-01	-2.2565E-01	4.5605E-01	4.5623E-01	4.974E-01
PA-234	#B	-8.1604E-02	-8.1604E-02	2.3403E-01	2.3408E-01	2.586E-01
TH-234	#B	5.0740E-02	5.0740E-02	3.8927E+00	3.8927E+00	4.353E+00
AM-241	#A	2.8824E-02	2.8824E-02	5.7697E-01	5.7698E-01	6.445E-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 (294.7 to 1999.0 keV) 1.8560318E+01 pCi/gm
Total Decayed Activity (294.7 to 1999.0 keV) 1.8561028E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13DEC2005_1053.An1

Sample description
FSS-NOL-05-02-014-F

Spectrum Filename: C:\GammaVision\Spectra\102F_13DEC2005_1053.An1

Acquisition information

Start time:	13-Dec-2005 10:54:23
Live time:	2000
Real time:	2025
Dead time:	1.24 %
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/channel^2

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:	1.9270E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.9270E+03) = 5.1894E+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	08-Dec-2005 12:50:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1061

***** 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	126.	36.84	1.50	8.847E-03	72.87	6.400	1.810E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.10	209.	22.32	1.50	9.541E-03	77.11	10.700	1.437E+00	PB214
					77.11	17.500	8.788E-01	PB212
77.10	209.	22.32	1.50	9.541E-03	77.11	10.700	1.437E+00	PB214
					77.11	17.500	8.788E-01	PB212
185.61	126.	25.79	1.28	1.628E-02				
185.61	126.	25.79	1.28	1.628E-02	185.99	3.280	1.598E+00	RA226
209.40	70.	39.98	1.20	1.519E-02				
238.63	652.	4.70	1.21	1.380E-02	238.63	43.100	7.690E-01	PB212
241.67	102.	21.41	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.047E-01	PB214
295.31	134.	14.25	1.25	1.146E-02	295.22	19.200	4.276E-01	PB214
300.41	59.	27.77	1.26	1.128E-02				
327.67	56.	38.71	1.10	1.038E-02				
338.59	165.	15.89	1.35	1.005E-02	338.40	12.010	9.577E-01	AC228
351.76	252.	10.51	1.15	9.685E-03				
351.76	252.	10.51	1.15	9.685E-03	351.99	37.100	4.914E-01	PB214
510.55	100.	18.80	1.65	6.697E-03	510.72	22.500	4.660E-01	TL208
583.10	181.	11.34	1.35	5.890E-03	583.14	86.000	2.500E-01	TL208
609.15	190.	11.75	1.28	5.651E-03	609.32	46.090	5.125E-01	BI214
661.56	110.	20.71	1.33	5.230E-03	661.62	84.620	1.749E-01	CS137
727.22	46.	27.46	1.99	4.794E-03	727.17	11.800	5.678E-01	BI212
839.77	37.	40.83	1.29	4.213E-03				
910.81	137.	15.24	1.46	3.923E-03	911.07	29.000	8.433E-01	AC228
967.70	120.	12.09	1.33	3.722E-03	968.90	17.460	1.300E+00	AC228
1119.84	79.	24.11	2.11	3.283E-03	1120.28	15.040	1.122E+00	BI214

1172.99	74.	21.82	2.39	3.157E-03	1173.23	99.860	1.638E-01	CO60
1332.34	54.	22.04	2.30	2.834E-03	1332.51	99.980	1.344E-01	CO60
1460.40	648.	4.03	1.77	2.621E-03	1460.75	10.700	1.619E+01	K40
1764.09	26.	21.98	1.68	2.225E-03	1764.51	15.920	5.110E-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	
418.42	209.40	306.	70.	0.035	119.95	1.197	AC-228	
476.90	238.65	144.	652.	0.326	14.09	1.215	PB-212	D
482.97	241.68	190.	102.	0.051	64.23	1.217	PB-214	D
600.71	300.53	134.	62.	0.031	92.05	1.106	PB-212	s
655.01	327.67	162.	56.	0.028	116.12	1.101	AC-228	
1679.61	839.77	57.	38.	0.019	96.17	1.294	-	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	149.35	74.89	1075.	126.	0.063	110.52	1.500
PB-214	153.80	77.11	985.	209.	0.105	66.95	1.500D
PB-212	153.80	77.11	985.	209.	0.105	66.95	1.500D
RA-226	371.20	185.79	431.	100.	0.050	88.93	1.500s
PB-212	476.85	238.61	398.	569.	0.285	19.48	1.500
PB-214	590.16	295.25	222.	132.	0.066	54.46	1.500
AC-228	676.86	338.59	174.	165.	0.083	47.66	1.346s
PB-214	703.50	351.91	88.	236.	0.118	25.74	1.500
TL-208	1020.88	510.55	82.	100.	0.050	56.39	1.648s
TL-208	1166.03	583.10	80.	181.	0.090	34.01	1.352
BI-214	1218.15	609.15	84.	190.	0.095	35.25	1.276s
CS-137	1323.02	661.56	96.	110.	0.055	62.13	1.334
BI-212	1454.39	727.22	43.	46.	0.023	82.37	1.992s
AC-228	1821.75	910.81	68.	137.	0.068	45.73	1.458
AC-228	1935.60	967.70	29.	120.	0.060	36.27	1.333s
BI-214	2240.08	1119.84	66.	79.	0.040	72.33	2.107s
CO-60	2346.45	1172.99	52.	74.	0.037	65.47	2.385s
CO-60	2665.38	1332.34	22.	54.	0.027	66.13	2.304s
K-40	2921.71	1460.40	9.	647.	0.324	12.08	1.766
BI-214	3529.64	1764.09	2.	26.	0.013	65.94	1.683

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.3838E-01					
			477.56	1.384E-01	%(	4.293E-01 1.28E-01	G
K-40		1.6191E+01					
			1460.75	1.619E+01	(P	4.086E-01 6.52E-01	G
MN-54		-1.2296E-02					
			834.81	-1.230E-02	%(P	6.158E-02 1.78E-02	G
CO-57		-1.0498E-03					
			122.07	-1.050E-03	%(	6.369E-02 1.89E-02	G K
			136.43	-8.779E-02	&	4.758E-01 1.42E-01	G
CO-60		1.4911E-01					
			1332.51	1.344E-01	*(P	6.064E-02 2.97E-02	G K
			1173.23	1.638E-01	(	8.129E-02 3.57E-02	G K
Sr-85		-2.0010E-02					
			514.00	-2.001E-02	%(	6.706E-02 2.00E-02	G
Kr-85		-4.3823E+02					
			513.99	-4.382E+02	%(	1.469E+03 4.38E+02	G
Y-88		-2.2262E-05					
			1836.01	-2.226E-05	%(P	2.500E-02 3.39E-03	G K
			898.02	-1.651E-02	% P	7.468E-02 2.17E-02	G
NB-94		6.7172E-03					
			871.10	6.717E-03	%(	4.085E-02 1.15E-02	G K
			702.50	1.308E-02	&	5.436E-02 1.59E-02	G K
Ag-108M		-1.4777E-02					
			722.95	-1.478E-02	&(	6.568E-02 1.92E-02	G K
			614.37	1.316E-02	% P	4.739E-02 1.39E-02	G
			433.93	8.650E-03	&	4.837E-02 1.42E-02	G
CD-109		1.1826E+00					
			88.04	1.183E+00	&(P	2.140E+00 6.51E-01	G
SN-113		2.2109E-02					
			391.71	2.211E-02	%(	6.326E-02 1.89E-02	G K
			255.04	1.466E-01	%	2.041E+00 6.01E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-4.3758E-02						
		427.95	-4.376E-02	%(P	1.650E-01	4.87E-02	G K
		600.77	8.717E-02	& P	2.377E-01	7.08E-02	G
		636.15	-7.486E-02	& P	4.765E-01	1.38E-01	G
		463.51	1.916E-01	% P	4.625E-01	1.39E-01	G
		176.29	-1.061E-03	% P	6.138E-01	1.80E-01	G
I-131	4.1337E-03						
		364.48	4.134E-03	%(	7.294E-02	2.11E-02	G K
		636.97	-1.766E-01	%	1.145E+00	3.32E-01	G
		284.29	2.413E-01	&	1.017E+00	3.02E-01	G
CS-134	-2.3672E-02						
		604.66	-2.367E-02	%(	6.620E-02	1.98E-02	G K
		795.76	-2.165E-02	&	7.218E-02	2.13E-02	G
		569.29	-4.351E-02	%	2.380E-01	6.84E-02	G
		801.84	3.276E-02	% P	5.900E-01	1.66E-01	G
CS-137	1.7485E-01						
		661.62	1.749E-01	(	7.656E-02	3.62E-02	G
CE-139	-2.4153E-03						
		165.85	-2.415E-03	%(P	5.655E-02	1.68E-02	G
EU-152	-2.7722E-03						
		121.78	-2.772E-03	&(P	1.863E-01	5.54E-02	G K
		344.30	-3.512E-02	%	1.659E-01	4.91E-02	G
		1408.08	8.683E-02	%	2.225E-01	6.61E-02	G
		964.00	-1.383E-02	& P	6.180E-01	1.77E-01	G
		1112.07	-2.999E-02	%	5.512E-01	1.56E-01	G
		778.90	-5.756E-02	% P	3.697E-01	1.05E-01	G
EU-154	1.2538E-02						
		123.10	1.254E-02	%(P	1.183E-01	3.52E-02	G K
		1274.80	2.409E-02	%	2.101E-01	5.96E-02	G
		723.30	-9.022E-02	& P	3.317E-01	9.79E-02	G
		1004.80	1.267E-01	%	3.107E-01	9.30E-02	G
EU-155	1.4268E-01						
		86.45	1.427E-01	&(P	2.734E-01	8.30E-02	G K
		105.31	1.253E-01	%	2.861E-01	8.66E-02	G
HG-203	3.9010E-03						
		279.17	3.901E-03	&(P	5.457E-02	1.60E-02	G K
		72.87	-6.361E-01	%	2.391E+00	7.20E-01	G
		70.83	-3.977E-01	%	4.298E+00	1.29E+00	G
		82.50	-1.413E+00	%	4.639E+00	1.40E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5002E-01						
		583.14	2.500E-01	(P	6.160E-02	2.84E-02	G
		510.72	4.660E-01	+	2.089E-01	8.76E-02	G
PB-212	6.7072E-01						
		238.63	6.707E-01	(	1.128E-01	4.35E-02	G K
							Energy duplication
		77.11	8.788E-01	+	6.258E-01	1.96E-01	G
		74.81	1.043E+00	& P	1.284E+00	3.94E-01	G
PB-214	4.4725E-01						
		351.99	4.607E-01	(P	9.056E-02	3.96E-02	G K
		295.22	4.212E-01	(	2.298E-01	7.65E-02	G
							Energy duplication
		77.11	1.437E+00	+	1.024E+00	3.21E-01	G
		241.92	2.977E-01	%	7.651E-01	2.31E-01	G
BI-212	5.6776E-01						
		727.17	5.678E-01	(	4.133E-01	1.56E-01	G K
		1620.56	3.131E-01	% P	1.506E+00	4.08E-01	G
		785.42	6.492E-01	% P	2.747E+00	8.02E-01	G
BI-214	5.1213E-01						
		609.32	5.125E-01	@(	1.221E-01	6.02E-02	G K
		1764.51	5.110E-01	(P	1.900E-01	1.13E-01	G
		1120.28	1.122E+00	+	5.762E-01	2.70E-01	G
RA-224	9.0034E-01						
		241.00	9.003E-01	%(P	1.399E+00	4.28E-01	G
RA-226	1.3139E+00						
		185.99	1.314E+00	*(P	1.308E+00	4.07E-01	G
AC-228	8.7681E-01						
		911.07	8.433E-01	(P	2.540E-01	1.29E-01	G K
		968.90	1.300E+00	+ P	2.987E-01	1.57E-01	G
		338.40	9.577E-01	@(	3.725E-01	1.52E-01	G
TH-227	-1.7302E-01						
		236.00	-1.730E-01	&(P	4.895E-01	1.47E-01	G K
		256.25	-8.434E-03	%	6.419E-01	1.88E-01	G
PA-234	5.1468E-03						
		98.44	5.147E-03	%(	2.649E-01	7.88E-02	G K
		946.00	5.884E-02	%	2.146E-01	6.21E-02	G
		131.28	4.334E-03	&	2.626E-01	7.81E-02	G
		94.67	-1.040E-01	&	5.095E-01	1.53E-01	G
		883.24	-5.852E-02	%	4.955E-01	1.41E-01	G
		926.70	5.084E-02	%	4.082E-01	1.14E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-7.320E-02 %   3.705E-01 1.07E-01 G

TH-234       1.1600E+00
                           63.29 1.160E+00 %(P 4.837E+00 1.45E+00 G K
                           92.80 1.539E+00 %   2.589E+00 7.88E-01 G
                           92.38-1.843E-01 % P 2.790E+00 8.31E-01 G

AM-241       6.7407E-02
                           59.54 6.741E-02 %(  7.148E-01 2.13E-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:                      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 - 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 *****

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	1.2982E-01	1.3838E-01	3.8267E-01	3.8275E-01	4.027E-01
K-40		1.6191E+01	1.6191E+01	1.9557E+00	2.1564E+00	
MN-54	#A	-1.2162E-02	-1.2296E-02	5.6740E-02	5.6744E-02	6.091E-02
CO-57	#B	-1.0366E-03	-1.0498E-03	5.6807E-02	5.6807E-02	6.289E-02
CO-60		1.4885E-01	1.4911E-01	6.9428E-02	6.9930E-02	

Sr-85	#A	-1.8985E-02	-2.0010E-02	5.9993E-02	6.0003E-02	6.362E-02
Kr-85	#A	-4.3822E+02	-4.3823E+02	1.3140E+03	1.3143E+03	1.469E+03
Y-88	#B	-2.1561E-05	-2.2262E-05	1.3357E-04	1.3358E-04	2.421E-02
NB-94	#B	6.7172E-03	6.7172E-03	3.4493E-02	3.4496E-02	4.085E-02
Ag-108M	#B	-1.4776E-02	-1.4777E-02	5.7710E-02	5.7716E-02	6.567E-02
CD-109	#A	1.1737E+00	1.1826E+00	1.9519E+00	1.9530E+00	2.124E+00
SN-113	#B	2.1464E-02	2.2109E-02	5.6719E-02	5.6732E-02	6.141E-02
SB-125	#B	-4.3610E-02	-4.3758E-02	1.6746E-01	1.6747E-01	1.644E-01
I-131	#B	2.7048E-03	4.1337E-03	6.3346E-02	6.3347E-02	4.773E-02
CS-134	#B	-2.3565E-02	-2.3672E-02	5.9462E-02	5.9476E-02	6.590E-02
CS-137		1.7480E-01	1.7485E-01	1.0863E-01	1.0908E-01	
CE-139	#A	-2.3561E-03	-2.4153E-03	6.0883E-02	6.0883E-02	5.516E-02
EU-152	#B	-2.7701E-03	-2.7722E-03	4.3975E-01	4.3975E-01	1.862E-01
EU-154	#B	1.2524E-02	1.2538E-02	1.0570E-01	1.0570E-01	1.182E-01
EU-155	#B	1.4241E-01	1.4268E-01	2.4896E-01	2.4908E-01	2.729E-01
HG-203	#B	3.6257E-03	3.9010E-03	4.8067E-02	4.8067E-02	5.072E-02
TL-208		2.5002E-01	2.5002E-01	8.5219E-02	8.6366E-02	
PB-212	#	6.7072E-01	6.7072E-01	1.3064E-01	1.3595E-01	1.128E-01
PB-214	#	4.4725E-01	4.4725E-01	1.1532E-01	1.1802E-01	9.056E-02
BI-212		5.6776E-01	5.6776E-01	4.6764E-01	4.6873E-01	
BI-214		5.1213E-01	5.1213E-01	1.8053E-01	1.8280E-01	
RA-224	#A	9.0034E-01	9.0034E-01	1.2831E+00	1.2840E+00	1.399E+00
RA-226	#	1.3139E+00	1.3139E+00	1.2205E+00	1.2228E+00	1.308E+00
AC-228		8.7681E-01	8.7681E-01	2.8980E-01	2.9395E-01	
TH-227	#B	-1.7302E-01	-1.7302E-01	4.4896E-01	4.4907E-01	4.895E-01
PA-234	#B	5.1468E-03	5.1468E-03	2.3655E-01	2.3655E-01	2.649E-01
TH-234	#B	1.1600E+00	1.1600E+00	4.3564E+00	4.3569E+00	4.837E+00
AM-241	#A	6.7405E-02	6.7407E-02	6.3967E-01	6.3968E-01	7.148E-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 (295.2 to 1999.0 keV) 1.8721663E+01 pCi/gm
Total Decayed Activity (295.2 to 1999.0 keV) 1.8721983E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13DEC2005_1140.An1

Sample description
FSS-NOL-05-02-006-F

Spectrum Filename: C:\GammaVision\Spectra\102F_13DEC2005_1140.An1

Acquisition information
Start time: 13-Dec-2005 11:41:52
Live time: 2000
Real time: 2026
Dead time: 1.26 %
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/channel^2

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: 2.0250E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0250E+03) =
4.9383E+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	08-Dec-2005 12:00:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1789

***** 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
77.00	238.	20.00	1.50	9.541E-03	77.11	10.700	1.556E+00	PB214
					77.11	17.500	9.514E-01	PB212
77.00	238.	20.00	1.50	9.541E-03	77.11	10.700	1.556E+00	PB214
					77.11	17.500	9.514E-01	PB212
129.04	116.	39.35	1.27	1.715E-02				
185.40	111.	34.79	1.13	1.629E-02				
185.40	111.	34.79	1.13	1.629E-02	185.99	3.280	PBC<MDA	RA226
209.03	119.	31.21	0.98	1.520E-02				
238.66	762.	4.23	1.21	1.381E-02				
238.66	762.	4.23	1.21	1.381E-02	238.63	43.100	8.551E-01	PB212
241.90	117.	19.81	1.22	1.366E-02	241.00	3.900	1.452E+00	RA224
					241.92	7.470	7.679E-01	PB214
269.51	110.	23.13	1.32	1.246E-02				
277.24	89.	31.09	1.02	1.215E-02				
277.24	89.	31.09	1.02	1.215E-02	279.17	81.500	6.525E-02	HG203
295.23	149.	12.30	1.25	1.147E-02				
295.23	149.	12.30	1.25	1.147E-02	295.22	19.200	4.506E-01	PB214
300.10	77.	22.62	1.26	1.129E-02				
338.38	143.	18.88	1.24	1.006E-02	338.40	12.010	7.898E-01	AC228
351.94	295.	11.57	1.16	9.680E-03				
351.94	295.	11.57	1.16	9.680E-03	351.99	37.100	5.483E-01	PB214
462.35	86.	27.23	1.02	7.383E-03				
462.35	86.	27.23	1.02	7.383E-03	463.51	10.000	7.642E-01	SB125
511.23	109.	16.81	1.53	6.688E-03	510.72	22.500	4.811E-01	TL208
567.19	22.	38.58	1.11	6.048E-03				
583.30	224.	9.43	1.38	5.888E-03	583.14	86.000	2.940E-01	TL208
602.63	29.	27.36	1.50	5.690E-03	604.66	97.600	3.471E-02	CS134

609.44	188.	9.54	1.62	5.648E-03	609.32	46.090	4.811E-01	BI214
662.21	88.	22.30	1.20	5.225E-03	661.62	84.620	1.321E-01	CS137
727.30	48.	31.71	1.55	4.794E-03	727.17	11.800	5.611E-01	BI212
911.05	184.	11.74	1.44	3.922E-03	911.07	29.000	1.077E+00	AC228
967.55	152.	12.40	1.35	3.722E-03	968.90	17.460	1.557E+00	AC228
1120.55	49.	29.43	1.29	3.283E-03	1120.28	15.040	6.676E-01	BI214
1173.06	39.	29.66	1.85	3.157E-03	1173.23	99.860	8.315E-02	CO60
1460.53	645.	4.06	2.19	2.621E-03	1460.75	10.700	1.534E+01	K40
1764.59	36.	16.67	0.69	2.225E-03	1764.51	15.920	6.765E-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	
257.67	129.04	733.	116.	0.058	102.59	1.266	AC-228	s
417.67	209.03	452.	119.	0.060	93.64	0.978	AC-228	
476.95	238.61	138.	762.	0.381	12.68	1.215	PB-212	D
483.42	241.85	212.	117.	0.059	59.44	1.217	PB-214	D
538.66	269.51	201.	110.	0.055	69.39	1.318	AC-228	s
554.13	277.24	236.	89.	0.045	93.28	1.019	TL-208	l
599.70	300.02	127.	73.	0.036	74.32	1.166	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
PB-214	153.80	77.11	1015.	238.	0.119	60.01	1.500D
PB-212	153.80	77.11	1015.	238.	0.119	60.01	1.500D
RA-226	371.52	185.95	509.	92.	0.046	103.47	1.500s
PB-212	476.94	238.66	398.	678.	0.339	16.99	1.500
PB-214	590.19	295.27	227.	139.	0.070	52.44	1.500
AC-228	676.43	338.38	189.	143.	0.072	56.64	1.245
PB-214	703.58	351.95	161.	231.	0.115	30.49	1.500
SB-125	925.49	462.87	85.	39.	0.020	106.16	1.500
TL-208	1022.24	511.23	86.	109.	0.054	50.43	1.526s
TL-208	1166.42	583.30	72.	223.	0.112	28.30	1.384
CS-134	1205.11	602.63	17.	29.	0.014	82.09	1.499s
BI-214	1218.73	609.44	49.	188.	0.094	28.63	1.619s
CS-137	1324.32	662.21	75.	88.	0.044	66.90	1.202s
BI-212	1454.56	727.30	90.	48.	0.024	95.14	1.554s
AC-228	1822.24	911.05	61.	184.	0.092	35.21	1.439
AC-228	1935.30	967.55	58.	151.	0.076	37.19	1.353
BI-214	2241.50	1120.55	51.	49.	0.025	88.28	1.285s
CO-60	2346.58	1173.06	48.	39.	0.020	88.98	1.854s
K-40	2921.96	1460.53	8.	645.	0.322	12.19	2.193
BI-214	3530.65	1764.59	0.	36.	0.018	50.00	0.685s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.2227E-02					
			477.56	1.223E-02	&(	4.698E-01 1.35E-01	G
K-40		1.5341E+01					
			1460.75	1.534E+01	(P	3.850E-01 6.24E-01	G
MN-54		1.3856E-02					
			834.81	1.386E-02	%(P	5.171E-02 1.51E-02	G
CO-57		1.8248E-02					
			122.07	1.825E-02	&(	5.396E-02 1.63E-02	G K
			136.43	-3.621E-02	&	4.848E-01 1.45E-01	G
CO-60		5.1091E-02					
			1332.51	1.907E-02	%(P	5.551E-02 1.63E-02	G K
			1173.23	8.315E-02	@(	7.423E-02 2.47E-02	G K
Sr-85		-1.5082E-02					
			514.00	-1.508E-02	&(	7.053E-02 2.09E-02	G
Kr-85		-3.2946E+02					
			513.99	-3.295E+02	&(	1.544E+03 4.58E+02	G
Y-88		-4.0019E-03					
			1836.01	-4.002E-03	%(P	5.847E-02 1.55E-02	G K
			898.02	-8.342E-04	% P	5.141E-02 1.40E-02	G
NB-94		-2.2828E-04					
			871.10	-2.283E-04	&(	5.304E-02 1.48E-02	G K
			702.50	5.575E-03	%	5.017E-02 1.44E-02	G K
Ag-108M		-1.5851E-02					
			722.95	-1.585E-02	&(	7.032E-02 2.07E-02	G K
			614.37	-2.097E-02	% P	6.103E-02 1.82E-02	G
			433.93	9.261E-03	%	4.838E-02 1.42E-02	G
CD-109		-3.4720E-03					
			88.04	-3.472E-03	%(P	2.256E+00 6.72E-01	G
SN-113		3.2936E-03					
			391.71	3.294E-03	%(	7.158E-02 2.08E-02	G K
			255.04	4.802E-01	%	2.042E+00 6.09E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.2987E-02						
		427.95	-2.293E-02	&(P	1.410E-01	4.09E-02	G K
		600.77	-5.669E-02	& P	2.606E-01	7.62E-02	G
		636.15	1.380E-01	& P	3.452E-01	1.03E-01	G
		463.51	3.569E-01	(P	4.161E-01	1.31E-01	G
		176.29	-2.269E-02	% P	7.118E-01	2.10E-01	G
I-131	5.3385E-03						
		364.48	5.339E-03	&(	8.020E-02	2.34E-02	G K
		636.97	-5.786E-02	%	1.116E+00	3.20E-01	G
		284.29	1.182E-01	%	9.740E-01	2.87E-01	G
CS-134	3.4712E-02						
		604.66	3.471E-02	&(	2.617E-02	9.50E-03	G K
		795.76	-2.946E-04	%	7.119E-02	2.02E-02	G
		569.29	-6.666E-02	%	3.017E-01	8.84E-02	G
		801.84	4.214E-03	% P	4.378E-01	1.19E-01	G
CS-137	1.3215E-01						
		661.62	1.321E-01	@(	6.513E-02	2.95E-02	G
CE-139	-3.5323E-04						
		165.85	-3.532E-04	%(P	5.207E-02	1.54E-02	G
EU-152	4.0699E-02						
		121.78	4.070E-02	&(P	1.630E-01	4.89E-02	G K
		344.30	-3.846E-02	%	1.639E-01	4.87E-02	G
		1408.08	8.957E-02	&	2.167E-01	6.48E-02	G
		964.00	2.584E-01	& P	5.990E-01	1.81E-01	G
		1112.07	0.000E+00	%	6.554E-01	1.87E-01	G
		778.90	2.871E-02	& P	4.192E-01	1.19E-01	G
EU-154	7.8254E-03						
		123.10	7.825E-03	&(P	1.291E-01	3.85E-02	G K
		1274.80	3.824E-02	%	1.731E-01	4.98E-02	G
		723.30	-7.936E-02	& P	3.253E-01	9.57E-02	G
		1004.80	0.000E+00	%	2.921E-01	8.00E-02	G
EU-155	-1.0616E-03						
		86.45	-1.062E-03	%(P	2.785E-01	8.30E-02	G K
		105.31	7.107E-02	%	2.899E-01	8.71E-02	G
HG-203	3.6723E-02						
		279.17	3.672E-02	&(P	5.137E-02	1.59E-02	G K
		72.87	4.275E-01	%	2.021E+00	6.07E-01	G
		70.83	-3.111E-02	%	3.813E+00	1.14E+00	G
		82.50	-7.402E-01	%	4.389E+00	1.32E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9404E-01						
		583.14	2.940E-01	(P	5.559E-02	2.78E-02	G
		510.72	4.811E-01	+	2.039E-01	8.10E-02	G
PB-212	7.6014E-01						
		238.63	7.601E-01	(	1.073E-01	4.31E-02	G K
							Energy duplication
		77.11	9.514E-01	+	6.041E-01	1.90E-01	G
		74.81	5.282E-01	& P	1.287E+00	3.89E-01	G
PB-214	4.2669E-01						
		351.99	4.288E-01	(P	1.148E-01	4.37E-02	G K
		295.22	4.226E-01	(	2.211E-01	7.39E-02	G
							Energy duplication
		77.11	1.556E+00	+	9.880E-01	3.11E-01	G
		241.92	2.889E-01	%	7.696E-01	2.32E-01	G
BI-212	5.6114E-01						
		727.17	5.611E-01	*(	5.535E-01	1.78E-01	G K
		1620.56	-3.618E-01	% P	2.025E+00	5.55E-01	G
		785.42	1.325E+00	% P	2.593E+00	7.91E-01	G
BI-214	4.8107E-01						
		609.32	4.811E-01	*(	9.081E-02	4.59E-02	G K
		1764.51	6.765E-01	+ P	1.388E-01	1.13E-01	G
		1120.28	6.676E-01	+	4.846E-01	1.97E-01	G
RA-224	8.8132E-01						
		241.00	8.813E-01	%(P	1.408E+00	4.30E-01	G
RA-226	1.1497E+00						
		185.99	1.150E+00	*(P	1.349E+00	4.16E-01	G
AC-228	1.0771E+00						
		911.07	1.077E+00	(P	2.302E-01	1.27E-01	G K
		968.90	1.557E+00	+ P	3.912E-01	1.93E-01	G
		338.40	7.898E-01	-	3.688E-01	1.49E-01	G
TH-227	-2.6373E-01						
		236.00	-2.637E-01	%(P	4.993E-01	1.52E-01	G K
		256.25	-1.195E-01	%	6.518E-01	1.94E-01	G
PA-234	-6.6603E-02						
		98.44	-6.660E-02	%(	2.556E-01	7.69E-02	G K
		946.00	0.000E+00	%	3.411E-01	9.63E-02	G
		131.28	0.000E+00	%	2.613E-01	7.77E-02	G
		94.67	-1.197E-01	%	4.761E-01	1.43E-01	G
		883.24	-8.153E-02	&	4.945E-01	1.43E-01	G
		926.70	4.926E-02	&	4.462E-01	1.26E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-9.844E-02 %   4.455E-01 1.31E-01 G

TH-234       1.0568E+00
                           63.29 1.057E+00 &(P 4.292E+00 1.29E+00 G K
                           92.80 1.808E+00 %   2.553E+00 7.81E-01 G
                           92.38 8.129E-02 & P 2.964E+00 8.84E-01 G

AM-241      -1.4208E-01
                           59.54-1.421E-01 &(  7.182E-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:                      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 - 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 *****

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	1.1460E-02	1.2227E-02	4.0515E-01	4.0515E-01	4.403E-01
K-40		1.5341E+01	1.5341E+01	1.8707E+00	2.0593E+00	
MN-54	#A	1.3703E-02	1.3856E-02	4.5341E-02	4.5347E-02	5.114E-02
CO-57	#B	1.8015E-02	1.8248E-02	4.8762E-02	4.8772E-02	5.327E-02
CO-60	#B	5.0999E-02	5.1091E-02	4.5462E-02	4.5552E-02	5.541E-02

Sr-85	#A	-1.4299E-02	-1.5082E-02	6.2750E-02	6.2756E-02	6.687E-02
Kr-85	#A	-3.2945E+02	-3.2946E+02	1.3733E+03	1.3734E+03	1.544E+03
Y-88	#B	-3.8742E-03	-4.0019E-03	4.7010E-02	4.7011E-02	5.661E-02
NB-94	#B	-2.2828E-04	-2.2828E-04	4.4294E-02	4.4294E-02	5.304E-02
Ag-108M	#B	-1.5849E-02	-1.5851E-02	6.2031E-02	6.2038E-02	7.031E-02
CD-109	#A	-3.4456E-03	-3.4720E-03	2.8015E+00	2.8015E+00	2.239E+00
SN-113	#B	3.1961E-03	3.2936E-03	6.2424E-02	6.2424E-02	6.946E-02
SB-125	#B	7.2738E-02	7.2987E-02	8.0532E-02	8.0636E-02	1.405E-01
I-131	#B	3.4728E-03	5.3385E-03	7.0154E-02	7.0154E-02	5.218E-02
CS-134	#	3.4553E-02	3.4712E-02	2.8494E-02	2.8561E-02	2.606E-02
CS-137	#	1.3210E-01	1.3215E-01	8.8412E-02	8.8722E-02	
CE-139	#A	-3.4446E-04	-3.5323E-04	1.9804E-01	1.9804E-01	5.078E-02
EU-152	#B	4.0668E-02	4.0699E-02	1.4675E-01	1.4676E-01	1.629E-01
EU-154	#B	7.8167E-03	7.8254E-03	1.1540E-01	1.1540E-01	1.289E-01
EU-155	#B	-1.0596E-03	-1.0616E-03	3.4632E-01	3.4632E-01	2.779E-01
HG-203	#B	3.4096E-02	3.6723E-02	4.7575E-02	4.7619E-02	4.770E-02
TL-208		2.9404E-01	2.9404E-01	8.3369E-02	8.4986E-02	
PB-212	#	7.6014E-01	7.6014E-01	1.2917E-01	1.3603E-01	1.073E-01
PB-214	#	4.2669E-01	4.2669E-01	1.2946E-01	1.3166E-01	1.148E-01
BI-212	#	5.6114E-01	5.6114E-01	5.3389E-01	5.3482E-01	5.535E-01
BI-214		4.8107E-01	4.8107E-01	1.3772E-01	1.4034E-01	
RA-224	#A	8.8132E-01	8.8132E-01	1.2895E+00	1.2905E+00	1.408E+00
RA-226	#A	1.1497E+00	1.1497E+00	1.2473E+00	1.2490E+00	1.349E+00
AC-228		1.0771E+00	1.0771E+00	3.7970E-01	3.8448E-01	
TH-227	#B	-2.6373E-01	-2.6373E-01	4.5937E-01	4.5961E-01	4.993E-01
PA-234	#B	-6.6603E-02	-6.6603E-02	2.3060E-01	2.3063E-01	2.556E-01
TH-234	#B	1.0568E+00	1.0568E+00	3.8641E+00	3.8645E+00	4.292E+00
AM-241	#A	-1.4208E-01	-1.4208E-01	6.4611E-01	6.4615E-01	7.182E-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 (269.2 to 1999.0 keV) 1.7325386E+01 pCi/gm
Total Decayed Activity (269.2 to 1999.0 keV) 1.7325428E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13DEC2005_1258.An1

Sample description
FSS-NOL-05-02-022-F

Spectrum Filename: C:\GammaVision\Spectra\102F_13DEC2005_1258.An1

Acquisition information
Start time: 13-Dec-2005 13:00:08
Live time: 2000
Real time: 2032
Dead time: 1.58 %
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/channel^2

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: 1.9200E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9200E+03) =
5.2083E+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-Dec-2005 11:12:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1369

***** 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
76.97	188.	25.99	1.50	9.541E-03	77.11	10.700	1.293E+00	PB214
					77.11	17.500	7.906E-01	PB212
76.97	188.	25.99	1.50	9.541E-03	77.11	10.700	1.293E+00	PB214
					77.11	17.500	7.906E-01	PB212
86.44	103.	33.63	1.11	1.195E-02				
86.44	103.	33.63	1.11	1.195E-02	86.45	32.740	PBC<MDA	EU155
89.86	77.	41.16	1.11	1.271E-02				
93.26	116.	28.49	1.11	1.339E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.034E+00	TH234
128.56	123.	35.01	1.03	1.713E-02				
186.14	103.	28.75	1.29	1.626E-02	185.99	3.280	PBC<MDA	RA226
209.52	126.	26.60	1.41	1.518E-02				
238.69	763.	4.47	1.21	1.381E-02				
238.69	763.	4.47	1.21	1.381E-02	238.63	43.100	9.021E-01	PB212
241.83	113.	21.45	1.22	1.366E-02	241.00	3.900	1.478E+00	RA224
					241.92	7.470	7.818E-01	PB214
269.83	82.	32.37	1.78	1.244E-02				
295.14	153.	13.41	1.25	1.147E-02				
295.14	153.	13.41	1.25	1.147E-02	295.22	19.200	4.892E-01	PB214
338.33	195.	15.31	1.30	1.006E-02	338.40	12.010	1.136E+00	AC228
351.70	282.	10.10	1.32	9.687E-03				
351.70	282.	10.10	1.32	9.687E-03	351.99	37.100	5.520E-01	PB214
463.30	50.	34.89	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
510.49	114.	15.13	1.35	6.698E-03	510.72	22.500	5.345E-01	TL208
583.15	226.	10.24	1.56	5.890E-03	583.14	86.000	3.129E-01	TL208
609.14	191.	10.82	1.36	5.651E-03	609.32	46.090	5.171E-01	BI214
661.85	138.	13.68	1.42	5.228E-03	661.62	84.620	2.189E-01	CS137

726.63	103.	22.71	1.51	4.797E-03	727.17	11.800	1.282E+00	BI212
904.88	24.	40.75	1.67	3.946E-03				
911.19	156.	10.33	1.68	3.922E-03	911.07	29.000	9.613E-01	AC228
968.14	123.	14.66	2.04	3.720E-03	968.90	17.460	1.332E+00	AC228
1119.97	60.	34.00	2.21	3.283E-03	1120.28	15.040	8.481E-01	BI214
1173.15	271.	9.36	1.56	3.157E-03	1173.23	99.860	6.051E-01	CO60
1332.06	253.	8.76	2.13	2.835E-03	1332.51	99.980	6.273E-01	CO60
1460.55	721.	3.78	1.91	2.621E-03	1460.75	10.700	1.809E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.19	36.	16.67	1.00	2.225E-03	1764.51	15.920	7.135E-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	
179.30	89.73	467.	77.	0.039	123.47	1.109	PB-214	lD
256.71	128.56	710.	137.	0.069	86.38	1.028	AC-228	
418.66	209.52	399.	126.	0.063	79.81	1.410	AC-228	
477.00	238.59	200.	763.	0.381	13.42	1.215	PB-212	D
483.29	241.73	239.	113.	0.057	64.35	1.217	PB-214	D
539.31	269.83	249.	82.	0.041	97.11	1.778	AC-228	s
1809.90	904.68	37.	24.	0.012	122.24	1.675	KR-89	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 keV
PB-214	153.80	77.11	1094.	188.	0.094	77.97	1.500D
PB-212	153.80	77.11	1094.	188.	0.094	77.97	1.500D
EU-155	173.33	86.88	1157.	125.	0.062	115.12	1.500s
TH-234	185.22	92.82	1056.	132.	0.066	106.72	1.500s
TH-234	185.17	92.79	1048.	130.	0.065	109.02	1.500s
RA-226	371.96	186.18	568.	115.	0.057	88.92	1.500
PB-212	476.94	238.66	500.	706.	0.353	17.55	1.500
PB-214	590.12	295.24	270.	157.	0.078	50.54	1.500s
AC-228	676.33	338.33	232.	195.	0.097	45.92	1.296
PB-214	703.54	351.93	192.	243.	0.121	30.89	1.500s
SB-125	926.35	463.30	138.	50.	0.025	104.68	1.500s
TL-208	1020.75	510.49	81.	114.	0.057	45.40	1.354s
TL-208	1166.13	583.15	107.	225.	0.113	30.73	1.559
BI-214	1218.14	609.14	82.	191.	0.096	32.45	1.355s
CS-137	1323.59	661.85	77.	138.	0.069	41.04	1.422s
BI-212	1453.22	726.63	111.	103.	0.052	68.12	1.512
AC-228	1820.77	910.32	87.	202.	0.101	33.84	1.606s
AC-228	1936.48	968.14	65.	123.	0.061	43.99	2.036s
BI-214	2240.33	1119.97	94.	60.	0.030	101.99	2.206s
CO-60	2346.76	1173.15	93.	271.	0.135	28.07	1.561
CO-60	2664.82	1332.06	49.	253.	0.126	26.28	2.130

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2922.00	1460.55	4.	721.	0.360	11.33	1.912
BI-214	3529.84	1764.19	0.	36.	0.018	50.00	0.999s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.3076E-01					
			477.56	1.308E-01	%(	5.353E-01 1.59E-01	G
K-40		1.8093E+01					
			1460.75	1.809E+01	(P	3.063E-01 6.83E-01	G
MN-54		7.3979E-03					
			834.81	7.398E-03	&(P	7.073E-02 2.04E-02	G
CO-57		-6.5311E-04					
			122.07	-6.531E-04	%(	6.171E-02 1.83E-02	G K
			136.43	1.544E-02	&	4.954E-01 1.47E-01	G
CO-60		6.1621E-01					
			1332.51	6.273E-01	(P	8.816E-02 5.50E-02	G K
			1173.23	6.051E-01	(	1.064E-01 5.66E-02	G K
Sr-85		-3.0948E-02					
			514.00	-3.095E-02	&(	6.947E-02 2.10E-02	G
Kr-85		-7.1381E+02					
			513.99	-7.138E+02	&(	1.603E+03 4.85E+02	G
Y-88		-2.1650E-05					
			1836.01	-2.165E-05	%(P	5.551E-02 1.41E-02	G K
			898.02	-1.254E-02	% P	8.869E-02 2.57E-02	G
NB-94		-1.5112E-02					
			871.10	-1.511E-02	%(	7.538E-02 2.21E-02	G K
			702.50	1.299E-02	%	6.114E-02 1.79E-02	G K
Ag-108M		2.7612E-02					
			722.95	2.761E-02	%(	7.448E-02 2.23E-02	G K
			614.37	3.325E-02	% P	6.092E-02 1.86E-02	G
			433.93	1.273E-02	&	4.975E-02 1.47E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-2.3048E-01						
		88.04	-2.305E-01	&(P	2.518E+00	7.53E-01	G
SN-113	-2.0592E-02						
		391.71	-2.059E-02	%(	8.049E-02	2.39E-02	G K
		255.04	2.771E-02	&	2.467E+00	7.28E-01	G
SB-125	9.7831E-02						
		427.95	-3.081E-02	%(P	1.839E-01	5.40E-02	G K
		600.77	1.329E-02	% P	3.272E-01	9.43E-02	G
		636.15	2.000E-01	& P	4.798E-01	1.44E-01	G
		463.51	4.786E-01	*(P	5.490E-01	1.72E-01	G
		176.29	3.285E-02	& P	6.683E-01	1.98E-01	G
I-131	7.9712E-05						
		364.48	7.971E-05	&(	5.860E-02	1.70E-02	G K
		636.97	2.797E-01	&	7.385E-01	2.21E-01	G
		284.29	-1.578E-01	%	8.284E-01	2.46E-01	G
CS-134	-3.4692E-02						
		604.66	-3.469E-02	%(	7.375E-02	2.23E-02	G K
		795.76	3.914E-02	%	5.855E-02	1.83E-02	G
		569.29	2.966E-02	%	3.769E-01	1.09E-01	G
		801.84	-5.568E-02	% P	6.227E-01	1.77E-01	G
CS-137	2.1886E-01						
		661.62	2.189E-01	*(	6.952E-02	2.99E-02	G
CE-139	-6.9399E-03						
		165.85	-6.940E-03	&(P	5.967E-02	1.78E-02	G
EU-152	1.3882E-02						
		121.78	1.388E-02	%(P	2.061E-01	6.15E-02	G K
		344.30	6.689E-03	%	1.814E-01	5.30E-02	G
		1408.08	-2.883E-02	%	2.748E-01	7.57E-02	G
		964.00	-2.970E-03	% P	5.526E-01	1.57E-01	G
		1112.07	-7.259E-03	%	6.961E-01	1.99E-01	G
		778.90	1.310E-01	% P	4.852E-01	1.43E-01	G
EU-154	-3.5666E-02						
		123.10	-3.567E-02	%(P	1.563E-01	4.70E-02	G K
		1274.80	1.246E-02	%	2.493E-01	7.07E-02	G
		723.30	1.144E-01	% P	3.606E-01	1.07E-01	G
		1004.80	-1.231E-01	%	4.275E-01	1.26E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	2.2380E-01						
		86.45	2.238E-01	*(P	2.892E-01	8.85E-02	G K
		105.31	8.319E-02	%	3.166E-01	9.53E-02	G
HG-203	1.4585E-03						
		279.17	1.458E-03	%(P	5.896E-02	1.73E-02	G K
		72.87	-1.375E+00	&	2.414E+00	7.34E-01	G
		70.83	-4.615E-02	%	3.538E+00	1.05E+00	G
		82.50	-5.420E-01	%	4.495E+00	1.35E+00	G
TL-208	3.1290E-01						
		583.14	3.129E-01	(P	7.068E-02	3.21E-02	G
		510.72	5.345E-01	+	2.081E-01	8.09E-02	G
PB-212	8.2237E-01						
		238.63	8.353E-01	(	1.265E-01	4.89E-02	G K
							Energy duplication
		77.11	7.906E-01	*(	6.612E-01	2.05E-01	G
		74.81	9.850E-01	& P	1.381E+00	4.22E-01	G
PB-214	4.8427E-01						
		351.99	4.757E-01	@(P	1.319E-01	4.91E-02	G K
		295.22	5.009E-01	@(	2.534E-01	8.44E-02	G
							Energy duplication
		77.11	1.293E+00	+	1.081E+00	3.36E-01	G
		241.92	2.039E-01	%	8.732E-01	2.62E-01	G
BI-212	1.2815E+00						
		727.17	1.282E+00	(	6.446E-01	2.91E-01	G K
		1620.56	-3.583E-02	% P	2.843E+00	7.70E-01	G
		785.42	6.831E-01	% P	3.297E+00	9.64E-01	G
BI-214	5.1711E-01						
		609.32	5.171E-01	@(	1.212E-01	5.59E-02	G K
		1764.51	7.135E-01	+ P	1.464E-01	1.19E-01	G
		1120.28	8.481E-01	+	6.843E-01	2.88E-01	G
RA-224	-4.3335E-02						
		241.00	-4.334E-02	%(P	1.456E+00	4.31E-01	G
RA-226	1.5117E+00						
		185.99	1.512E+00	(P	1.500E+00	4.66E-01	G
AC-228	1.2523E+00						
		911.07	1.252E+00	@(P	2.852E-01	1.41E-01	G K
		968.90	1.332E+00	*(P	4.372E-01	1.95E-01	G
		338.40	1.136E+00	(	4.293E-01	1.74E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.3335E-01						
		236.00	-1.334E-01	%(P	5.704E-01	1.71E-01	G K
		256.25	8.888E-03	&	7.420E-01	2.19E-01	G
PA-234	8.9787E-02						
		98.44	8.979E-02	%(	2.829E-01	8.53E-02	G K
		946.00	-8.105E-02	&	3.978E-01	1.16E-01	G
		131.28	-3.078E-02	%	2.972E-01	8.89E-02	G
		94.67	-2.255E-01	%	5.289E-01	1.60E-01	G
		883.24	2.118E-01	%	5.149E-01	1.55E-01	G
		926.70	3.298E-01	%	5.657E-01	1.74E-01	G
		569.26	3.998E-02	%	5.605E-01	1.62E-01	G
TH-234	1.8576E+00						
		63.29	9.558E-01	%(P	5.218E+00	1.56E+00	G K
		92.80	2.285E+00	&(	2.703E+00	8.30E-01	G
		92.38	2.727E+00	&(P	3.185E+00	9.79E-01	G
AM-241	3.8783E-03						
		59.54	3.878E-03	&(	6.323E-01	1.87E-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:	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 - 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	1.3063E-01	1.3076E-01	4.7576E-01	4.7582E-01	5.348E-01
K-40		1.8093E+01	1.8093E+01	2.0497E+00	2.2874E+00	
MN-54	#A	7.3966E-03	7.3979E-03	6.1158E-02	6.1159E-02	7.071E-02
CO-57	#B	-6.5299E-04	-6.5311E-04	5.5006E-02	5.5006E-02	6.170E-02
CO-60		6.1620E-01	6.1621E-01	1.1850E-01	1.2344E-01	
Sr-85	#A	-3.0923E-02	-3.0948E-02	6.3022E-02	6.3046E-02	6.942E-02
Kr-85	#A	-7.1381E+02	-7.1381E+02	1.4537E+03	1.4543E+03	1.603E+03
Y-88	#B	-2.1640E-05	-2.1650E-05	5.5639E-04	5.5639E-04	5.549E-02
NB-94	#B	-1.5112E-02	-1.5112E-02	6.6166E-02	6.6171E-02	7.538E-02
Ag-108M	#B	2.7612E-02	2.7612E-02	6.6894E-02	6.6912E-02	7.448E-02
CD-109	#A	-2.3046E-01	-2.3048E-01	2.7453E+00	2.7453E+00	2.518E+00
SN-113	#B	-2.0583E-02	-2.0592E-02	7.1814E-02	7.1823E-02	8.045E-02
SB-125	#B	9.7826E-02	9.7831E-02	1.0558E-01	1.0572E-01	1.839E-01
I-131	#B	7.9198E-05	7.9712E-05	5.1054E-02	5.1054E-02	5.822E-02
CS-134	#B	-3.4690E-02	-3.4692E-02	6.7036E-02	6.7064E-02	7.374E-02
CS-137	#	2.1885E-01	2.1886E-01	8.9817E-02	9.0653E-02	
CE-139	#A	-6.9373E-03	-6.9399E-03	5.6916E-02	5.6917E-02	5.965E-02
EU-152	#B	1.3882E-02	1.3882E-02	1.8459E-01	1.8459E-01	2.061E-01
EU-154	#B	-3.5665E-02	-3.5666E-02	1.4262E-01	1.4263E-01	1.563E-01
EU-155	#A	2.2380E-01	2.2380E-01	2.6551E-01	2.6580E-01	2.891E-01
HG-203	#B	1.4568E-03	1.4585E-03	5.1997E-02	5.1997E-02	5.889E-02
TL-208		3.1290E-01	3.1290E-01	9.6341E-02	9.7928E-02	
PB-212	#	8.2237E-01	8.2237E-01	1.4432E-01	1.5152E-01	1.265E-01
PB-214	#	4.8427E-01	4.8427E-01	1.4347E-01	1.4602E-01	1.319E-01
BI-212		1.2815E+00	1.2815E+00	8.7296E-01	8.7592E-01	
BI-214		5.1711E-01	5.1711E-01	1.6781E-01	1.7030E-01	
RA-224	#A	-4.3335E-02	-4.3335E-02	2.7017E+00	2.7017E+00	1.456E+00
RA-226	#	1.5117E+00	1.5117E+00	1.3965E+00	1.3991E+00	1.500E+00
AC-228		1.2523E+00	1.2523E+00	3.0079E-01	3.0889E-01	
TH-227	#B	-1.3335E-01	-1.3335E-01	5.2334E-01	5.2340E-01	5.704E-01
PA-234	#B	8.9787E-02	8.9787E-02	2.5582E-01	2.5586E-01	2.829E-01
TH-234	#B	1.8576E+00	1.8576E+00	2.0000E+00	2.0026E+00	5.218E+00
AM-241	#A	3.8783E-03	3.8783E-03	5.6203E-01	5.6203E-01	6.323E-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 (269.7 to 1999.0 keV) 2.2291426E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 2.2291443E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13DEC2005_1353.An1

Sample description
FSS-NOL-05-02-009-F

Spectrum Filename: C:\GammaVision\Spectra\102F_13DEC2005_1353.An1

Acquisition information
Start time: 13-Dec-2005 13:54:44
Live time: 2000
Real time: 2026
Dead time: 1.26 %
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/channel^2

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: 2.0550E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0550E+03) =
4.8662E+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	08-Dec-2005 13:46:00
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: 0.1247

***** 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
77.08	205.	22.79	1.50	9.541E-03	77.11	10.700	1.320E+00	PB214
					77.11	17.500	8.068E-01	PB212
77.08	205.	22.79	1.50	9.541E-03	77.11	10.700	1.320E+00	PB214
					77.11	17.500	8.068E-01	PB212
86.97	93.	33.64	1.11	1.215E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
89.53	85.	37.11	1.11	1.271E-02				
93.43	131.	23.97	1.11	1.349E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.147E+00	TH234
185.73	133.	28.17	1.16	1.628E-02				
185.73	133.	28.17	1.16	1.628E-02	185.99	3.280	1.582E+00	RA226
209.53	78.	33.56	1.01	1.518E-02				
238.60	773.	4.26	1.21	1.381E-02				
238.60	773.	4.26	1.21	1.381E-02	238.63	43.100	8.544E-01	PB212
241.43	135.	21.82	1.22	1.368E-02	241.00	3.900	1.653E+00	RA224
					241.92	7.470	8.729E-01	PB214
270.26	94.	29.47	1.16	1.243E-02				
295.29	128.	14.15	1.25	1.146E-02	295.22	19.200	3.832E-01	PB214
299.51	53.	37.24	0.83	1.131E-02				
338.20	126.	18.03	1.10	1.007E-02	338.40	12.010	6.858E-01	AC228
351.78	216.	10.65	1.25	9.684E-03				
351.78	216.	10.65	1.25	9.684E-03	351.99	37.100	3.939E-01	PB214
462.86	37.	32.77	1.27	7.375E-03				
462.86	37.	32.77	1.27	7.375E-03	463.51	10.000	PBC<MDA	SB125
510.28	133.	13.74	1.55	6.701E-03	510.72	22.500	5.815E-01	TL208
583.08	226.	8.29	1.53	5.891E-03	583.14	86.000	2.929E-01	TL208
609.24	173.	11.73	1.16	5.650E-03	609.32	46.090	4.374E-01	BI214

726.30	86.	20.77	2.05	4.799E-03	727.17	11.800	1.006E+00	BI212
768.44	57.	26.10	1.27	4.560E-03				
794.73	32.	29.99	1.60	4.420E-03	795.76	85.400	5.629E-02	CS134
859.19	63.	25.99	1.50	4.129E-03				
910.81	161.	12.44	1.57	3.923E-03	911.07	29.000	9.295E-01	AC228
967.90	162.	12.38	2.03	3.721E-03	968.90	17.460	1.645E+00	AC228
1119.59	38.	25.03	1.28	3.283E-03	1120.28	15.040	5.061E-01	BI214
1460.32	643.	4.09	2.03	2.621E-03	1460.75	10.700	1.508E+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	
173.52	87.15	443.	93.	0.047	100.91	1.107	PB-214	lD
178.64	89.71	453.	85.	0.042	111.32	1.109	PB-214	lD
418.68	209.53	276.	78.	0.039	100.68	1.006	AC-228	
476.82	238.58	155.	773.	0.387	12.77	1.215	PB-212	D
482.49	241.41	369.	135.	0.068	65.45	1.217	RA-224	D
540.17	270.26	246.	94.	0.047	88.40	1.164	AC-228	s
598.68	299.51	147.	53.	0.027	111.71	0.831	TH-227	
1536.87	768.44	51.	57.	0.029	65.82	1.271	BI-214	sM
1718.46	859.19	52.	63.	0.031	77.97	1.497	TL-208	s

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	988.	205.	0.102	68.37	1.500D
PB-212	153.80	77.11	988.	205.	0.102	68.37	1.500D
TH-234	185.84	93.13	993.	146.	0.073	94.25	1.500
TH-234	185.79	93.11	958.	166.	0.083	82.63	1.500
RA-226	371.14	185.77	489.	110.	0.055	85.91	1.500s
PB-212	476.89	238.63	408.	702.	0.351	16.65	1.500s
RA-224	482.65	241.51	536.	90.	0.045	112.57	1.500
PB-214	590.03	295.19	184.	137.	0.068	49.23	1.500s
AC-228	676.07	338.20	156.	126.	0.063	54.08	1.102
PB-214	703.35	351.83	126.	212.	0.106	30.48	1.500
SB-125	925.82	463.04	65.	46.	0.023	83.90	1.500
TL-208	1020.33	510.28	75.	133.	0.067	41.23	1.553s
TL-208	1165.99	583.08	48.	226.	0.113	24.86	1.528
BI-214	1218.33	609.24	75.	173.	0.087	35.18	1.156
BI-212	1452.55	726.30	68.	86.	0.043	62.31	2.054s
CS-134	1589.48	794.73	30.	32.	0.016	89.97	1.601s
AC-228	1821.76	910.81	60.	161.	0.080	37.31	1.570
AC-228	1936.01	967.90	58.	162.	0.081	37.14	2.025s
BI-214	2239.58	1119.59	21.	38.	0.019	75.10	1.279s
K-40	2921.54	1460.32	11.	643.	0.322	12.28	2.026

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-5.1092E-02					
			477.56	-5.109E-02	%(	4.384E-01 1.27E-01	G
K-40		1.5080E+01					
			1460.75	1.508E+01	(P	4.252E-01 6.17E-01	G
MN-54		1.4754E-02					
			834.81	1.475E-02	%(P	4.689E-02 1.38E-02	G
CO-57		5.3242E-04					
			122.07	5.324E-04	%(	6.342E-02 1.89E-02	G K
			136.43	-6.963E-02	&	4.585E-01 1.37E-01	G
CO-60		1.9868E-02					
			1332.51	1.987E-02	%(P	4.420E-02 1.33E-02	G K
			1173.23	3.065E-02	&	7.476E-02 2.24E-02	G K
Sr-85		-3.9998E-02					
			514.00	-4.000E-02	&(	6.772E-02 2.07E-02	G
Kr-85		-8.7541E+02					
			513.99	-8.754E+02	&(	1.482E+03 4.54E+02	G
Y-88		-6.5483E-03					
			1836.01	-6.548E-03	%(P	5.133E-02 1.37E-02	G K
			898.02	-3.444E-03	& P	5.685E-02 1.58E-02	G
NB-94		-8.1247E-03					
			871.10	-8.125E-03	%(	4.223E-02 1.20E-02	G K
			702.50	8.841E-03	%	4.988E-02 1.45E-02	G K
Ag-108M		1.6605E-03					
			722.95	1.661E-03	&(	9.888E-02 2.88E-02	G K
			614.37	-2.357E-02	% P	5.599E-02 1.68E-02	G
			433.93	1.146E-02	%	4.461E-02 1.32E-02	G
CD-109		1.1464E+00					
			88.04	1.146E+00	%(P	2.017E+00 6.14E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-1.2835E-02						
		391.71	-1.284E-02	%(	7.046E-02	2.08E-02	G K
		255.04	-3.670E-01	%	2.014E+00	5.98E-01	G
SB-125	1.3056E-01						
		427.95	3.657E-02	%(P	1.257E-01	3.71E-02	G K
		600.77	-4.648E-02	% P	2.880E-01	8.39E-02	G
		636.15	1.625E-02	& P	4.531E-01	1.29E-01	G
		463.51	4.088E-01	(P	3.608E-01	1.18E-01	G
		176.29	-1.308E-01	% P	7.097E-01	2.11E-01	G
I-131	-1.8609E-02						
		364.48	-1.861E-02	%(	8.141E-02	2.41E-02	G K
		636.97	5.102E-03	&	1.075E+00	3.05E-01	G
		284.29	-1.022E-02	&	9.698E-01	2.83E-01	G
CS-134	2.1191E-02						
		604.66	-9.522E-03	%(	6.854E-02	2.01E-02	G K
		795.76	5.629E-02	&(	4.974E-02	1.69E-02	G
		569.29	0.000E+00	%	2.994E-01	8.50E-02	G
		801.84	1.291E-01	& P	5.162E-01	1.50E-01	G
CS-137	3.8961E-02						
		661.62	3.896E-02	%(	5.949E-02	1.85E-02	G
CE-139	1.2439E-02						
		165.85	1.244E-02	&(P	5.695E-02	1.71E-02	G
EU-152	-1.0198E-04						
		121.78	-1.020E-04	&(P	1.505E-01	4.46E-02	G K
		344.30	-5.537E-03	%	1.604E-01	4.68E-02	G
		1408.08	1.449E-03	%	2.333E-01	6.15E-02	G
		964.00	-4.390E-02	& P	5.214E-01	1.50E-01	G
		1112.07	2.178E-01	%	4.211E-01	1.29E-01	G
		778.90	1.350E-01	% P	3.496E-01	1.04E-01	G
EU-154	-1.3197E-02						
		123.10	-1.320E-02	%(P	1.341E-01	4.01E-02	G K
		1274.80	-1.327E-03	%	1.762E-01	4.84E-02	G
		723.30	6.877E-02	& P	2.439E-01	7.16E-02	G
		1004.80	1.590E-02	%	2.872E-01	7.97E-02	G
EU-155	-4.6199E-03						
		86.45	-4.620E-03	&(P	2.766E-01	8.25E-02	G K
		105.31	5.729E-02	%	2.843E-01	8.53E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-5.7368E-03						
		279.17	-5.737E-03	%(P	5.750E-02	1.70E-02	G K
		72.87	-8.346E-01	%	2.311E+00	6.98E-01	G
		70.83	1.740E+00	&	3.972E+00	1.20E+00	G
		82.50	-3.054E-02	&	4.717E+00	1.41E+00	G
TL-208	2.9287E-01						
		583.14	2.929E-01	(P	4.561E-02	2.43E-02	G
		510.72	5.815E-01	+	1.878E-01	7.99E-02	G
PB-212	7.8488E-01						
		238.63	7.760E-01	@(	1.071E-01	4.31E-02	G K
							Energy duplication
		77.11	8.068E-01	*(	5.874E-01	1.84E-01	G
		74.81	7.943E-01	& P	1.264E+00	3.85E-01	G
PB-214	3.9468E-01						
		351.99	3.874E-01	(P	1.009E-01	3.94E-02	G K
		295.22	4.087E-01	(	1.968E-01	6.71E-02	G
							Energy duplication
		77.11	1.320E+00	+	9.607E-01	3.01E-01	G
		241.92	-2.315E-02	%	7.574E-01	2.25E-01	G
BI-212	1.0055E+00						
		727.17	1.006E+00	@(	4.766E-01	2.09E-01	G K
		1620.56	5.303E-01	% P	1.514E+00	4.38E-01	G
		785.42	5.274E-01	% P	2.673E+00	7.76E-01	G
BI-214	4.5431E-01						
		609.32	4.374E-01	(	1.086E-01	5.13E-02	G K
		1764.51	-1.609E-03	% P	5.009E-01	1.37E-01	G
		1120.28	5.061E-01	(	3.205E-01	1.27E-01	G
RA-224	1.1035E+00						
		241.00	1.104E+00	(P	1.362E+00	4.19E-01	G
RA-226	1.3618E+00						
		185.99	1.362E+00	*(P	1.303E+00	4.06E-01	G
AC-228	9.2954E-01						
		911.07	9.295E-01	(P	2.248E-01	1.16E-01	G K
		968.90	1.645E+00	+ P	3.858E-01	2.04E-01	G
		338.40	6.858E-01	-	3.315E-01	1.24E-01	G
TH-227	-2.0885E-01						
		236.00	-2.088E-01	%(P	5.272E-01	1.59E-01	G K
		256.25	6.997E-02	%	6.058E-01	1.79E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	5.8463E-03						
		98.44	5.846E-03	%(	2.569E-01	7.65E-02	G K
		946.00	-2.678E-02	%	2.750E-01	7.78E-02	G
		131.28	-1.104E-02	&	2.672E-01	7.96E-02	G
		94.67	-1.812E-01	%	4.883E-01	1.48E-01	G
		883.24	1.942E-01	%	3.839E-01	1.17E-01	G
		926.70	9.689E-02	&	4.488E-01	1.29E-01	G
		569.26	0.000E+00	%	4.422E-01	1.26E-01	G
TH-234	2.0687E+00						
		63.29	1.074E+00	%(P	4.457E+00	1.34E+00	G K
		92.80	2.723E+00	(	2.415E+00	7.50E-01	G
		92.38	2.814E+00	&(P	2.887E+00	8.91E-01	G
AM-241	1.2119E-01						
		59.54	1.212E-01	&(	6.871E-01	2.06E-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:	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 - 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	-4.7878E-02	-5.1092E-02	3.8146E-01	3.8147E-01	4.109E-01
K-40		1.5080E+01	1.5080E+01	1.8518E+00	2.0360E+00	
MN-54	#A	1.4590E-02	1.4754E-02	4.1354E-02	4.1363E-02	4.637E-02
CO-57	#B	5.2562E-04	5.3242E-04	5.6615E-02	5.6615E-02	6.261E-02
CO-60	#B	1.9832E-02	1.9868E-02	4.0033E-02	4.0049E-02	4.412E-02
Sr-85	#A	-3.7914E-02	-3.9998E-02	6.2179E-02	6.2220E-02	6.419E-02
Kr-85	#A	-8.7538E+02	-8.7541E+02	1.3607E+03	1.3616E+03	1.482E+03
Y-88	#B	-6.3386E-03	-6.5483E-03	4.1468E-02	4.1470E-02	4.969E-02
NB-94	#B	-8.1247E-03	-8.1247E-03	3.6143E-02	3.6146E-02	4.223E-02
Ag-108M	#B	1.6604E-03	1.6605E-03	8.6433E-02	8.6433E-02	9.887E-02
CD-109	#A	1.1377E+00	1.1464E+00	1.8405E+00	1.8416E+00	2.001E+00
SN-113	#B	-1.2454E-02	-1.2835E-02	6.2293E-02	6.2297E-02	6.837E-02
SB-125	#F	1.3011E-01	1.3056E-01	1.1326E-01	1.1349E-01	1.252E-01
I-131	#B	-1.2086E-02	-1.8609E-02	7.2386E-02	7.2393E-02	5.287E-02
CS-134	#B	2.1094E-02	2.1191E-02	1.9067E-02	1.9104E-02	6.823E-02
CS-137	#A	3.8949E-02	3.8961E-02	5.5417E-02	5.5460E-02	5.947E-02
CE-139	#A	1.2129E-02	1.2439E-02	5.1165E-02	5.1170E-02	5.553E-02
EU-152	#B	-1.0190E-04	-1.0198E-04	1.5912E-01	1.5912E-01	1.504E-01
EU-154	#B	-1.3182E-02	-1.3197E-02	1.2385E-01	1.2386E-01	1.340E-01
EU-155	#B	-4.6110E-03	-4.6199E-03	1.5265E+00	1.5265E+00	2.761E-01
HG-203	#B	-5.3251E-03	-5.7368E-03	5.2129E-02	5.2130E-02	5.338E-02
TL-208		2.9287E-01	2.9287E-01	7.2945E-02	7.4774E-02	
PB-212	#	7.8488E-01	7.8488E-01	1.3071E-01	1.3793E-01	1.071E-01
PB-214	#	3.9468E-01	3.9468E-01	1.1433E-01	1.1646E-01	1.009E-01
BI-212	#	1.0055E+00	1.0055E+00	6.2651E-01	6.2904E-01	
BI-214		4.5431E-01	4.5431E-01	1.5984E-01	1.6186E-01	
RA-224	#A	1.1035E+00	1.1035E+00	1.2582E+00	1.2598E+00	1.362E+00
RA-226	#	1.3618E+00	1.3618E+00	1.2172E+00	1.2196E+00	1.303E+00
AC-228		9.2954E-01	9.2954E-01	3.4734E-01	3.5123E-01	
TH-227	#B	-2.0885E-01	-2.0885E-01	4.8331E-01	4.8345E-01	5.272E-01
PA-234	#B	5.8463E-03	5.8463E-03	2.2957E-01	2.2957E-01	2.569E-01
TH-234	#B	2.0687E+00	2.0687E+00	1.7094E+00	1.7133E+00	4.457E+00
AM-241	#A	1.2119E-01	1.2119E-01	6.1732E-01	6.1736E-01	6.871E-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

YAEC Chemistry Lab Spectrum name: 102F_13DEC2005_1353.An1

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

Total Activity (270.2 to 1999.0 keV) 1.7761839E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.7761839E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13DEC2005_1459.An1

Sample description
FSS-NOL-05-02-004-F

Spectrum Filename: C:\GammaVision\Spectra\102F_13DEC2005_1459.An1

Acquisition information
Start time: 13-Dec-2005 15:01:01
Live time: 2000
Real time: 2024
Dead time: 1.18 %
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/channel^2

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: 1.8830E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8830E+03) =
5.3107E+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	08-Dec-2005 13:40:00
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: 0.1387

***** 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	129.	24.01	1.10	8.802E-03				
74.57	129.	24.01	1.10	8.802E-03	74.81	9.600	PBC<MDA	PB212
77.23	227.	14.10	1.10	9.603E-03	77.11	10.700	1.599E+00	PB214
					77.11	17.500	9.776E-01	PB212
185.57	92.	37.03	1.36	1.628E-02				
185.57	92.	37.03	1.36	1.628E-02	185.99	3.280	PBC<MDA	RA226
238.63	635.	4.73	1.21	1.381E-02				
238.63	635.	4.73	1.21	1.381E-02	238.63	43.100	7.660E-01	PB212
242.00	88.	24.15	1.22	1.365E-02				
270.45	73.	33.30	0.73	1.242E-02				
295.21	116.	15.74	1.02	1.147E-02				
295.21	116.	15.74	1.02	1.147E-02	295.22	19.200	3.795E-01	PB214
300.68	54.	34.84	1.83	1.127E-02				
328.09	48.	30.92	1.10	1.037E-02				
338.23	133.	20.32	1.06	1.006E-02	338.40	12.010	7.888E-01	AC228
351.94	221.	10.84	1.31	9.680E-03				
351.94	221.	10.84	1.31	9.680E-03	351.99	37.100	4.409E-01	PB214
462.89	37.	30.70	1.25	7.375E-03				
462.89	37.	30.70	1.25	7.375E-03	463.51	10.000	PBC<MDA	SB125
511.55	102.	21.02	1.07	6.684E-03	510.72	22.500	4.855E-01	TL208
583.07	221.	9.67	1.45	5.891E-03	583.14	86.000	3.131E-01	TL208
609.05	168.	11.37	1.15	5.652E-03	609.32	46.090	4.636E-01	BI214
661.72	33.	39.23	1.51	5.229E-03	661.62	84.620	PBC<MDA	CS137
727.22	42.	25.48	0.88	4.794E-03	727.17	11.800	5.392E-01	BI212
911.03	103.	15.90	1.43	3.922E-03	911.07	29.000	6.510E-01	AC228
968.69	121.	16.60	1.58	3.719E-03	968.90	17.460	1.335E+00	AC228
1118.96	77.	22.40	1.06	3.283E-03	1120.28	15.040	1.119E+00	BI214

1172.79	32.	34.59	1.85	3.157E-03	1173.23	99.860	PBC<MDA	CO60
1332.28	23.	29.39	1.96	2.834E-03	1332.51	99.980	5.847E-02	CO60
1460.38	556.	4.41	2.14	2.621E-03	1460.75	10.700	1.424E+01	K40
1763.85	30.	22.79	1.58	2.225E-03	1764.51	15.920	6.120E-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	
148.71	74.66	414.	129.	0.064	72.02	1.098	BI-207	D
154.03	77.32	401.	227.	0.114	42.30	1.100	PB-214	D
476.89	238.59	134.	635.	0.318	14.20	1.215	PB-212	D
483.63	241.96	182.	88.	0.044	72.46	1.217	PB-214	D
540.55	270.45	202.	73.	0.037	99.91	0.735	AC-228	s
601.01	300.68	120.	54.	0.027	95.30	1.830	PB-212	s
655.85	328.09	84.	48.	0.024	92.76	1.103	AC-228	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	149.48	74.95	927.	137.	0.068	95.75	1.500s
PB-214	153.80	77.11	853.	197.	0.099	66.41	1.500D
PB-212	153.80	77.11	853.	197.	0.099	66.41	1.500D
RA-226	371.46	185.93	409.	87.	0.044	97.95	1.500
PB-212	476.89	238.63	303.	571.	0.285	18.03	1.500
PB-214	590.07	295.21	145.	111.	0.056	54.11	1.500
AC-228	676.14	338.23	175.	133.	0.066	60.97	1.064
PB-214	703.56	351.94	118.	193.	0.097	32.04	1.500
SB-125	925.33	462.79	68.	45.	0.022	86.84	1.500
TL-208	1022.87	511.55	108.	102.	0.051	63.05	1.066s
TL-208	1165.97	583.07	70.	221.	0.110	29.00	1.452s
BI-214	1217.96	609.05	60.	168.	0.084	34.10	1.152
CS-137	1323.34	661.72	69.	33.	0.017	117.69	1.509s
BI-212	1454.40	727.22	32.	42.	0.021	76.43	0.883s
AC-228	1822.20	911.03	51.	103.	0.052	47.71	1.432
AC-228	1937.58	968.69	61.	121.	0.060	49.81	1.578
BI-214	2238.31	1118.96	49.	77.	0.038	67.20	1.062s
CO-60	2346.04	1172.79	46.	32.	0.016	103.78	1.854
CO-60	2665.26	1332.28	12.	23.	0.012	88.18	1.959
K-40	2921.66	1460.38	12.	556.	0.278	13.23	2.142
BI-214	3529.16	1763.85	4.	30.	0.015	68.37	1.582s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.9252E-01					
			477.56	1.925E-01	&(	4.297E-01 1.30E-01	G
K-40		1.4236E+01					
			1460.75	1.424E+01	(P	4.782E-01 6.28E-01	G
MN-54		-9.9518E-03					
			834.81	-9.952E-03	&(P	6.431E-02 1.85E-02	G
CO-57		-6.1210E-03					
			122.07	-6.121E-03	%(	5.977E-02 1.78E-02	G K
			136.43	-8.578E-03	%	4.585E-01 1.36E-01	G
CO-60		6.6026E-02					
			1332.51	5.847E-02	(P	4.717E-02 1.72E-02	G K
			1173.23	7.359E-02	(	7.839E-02 2.55E-02	G K
Sr-85		-8.5672E-03					
			514.00	-8.567E-03	%(	6.418E-02 1.88E-02	G
Kr-85		-1.8737E+02					
			513.99	-1.874E+02	%(	1.404E+03 4.11E+02	G
Y-88		6.7410E-03					
			1836.01	6.741E-03	%(P	4.868E-02 1.29E-02	G K
			898.02	8.846E-03	% P	5.701E-02 1.61E-02	G
NB-94		-1.1190E-02					
			871.10	-1.119E-02	%(	6.024E-02 1.74E-02	G K
			702.50	0.000E+00	&	5.940E-02 1.68E-02	G K
Ag-108M		-3.6244E-03					
			722.95	-3.624E-03	%(	1.054E-01 3.07E-02	G K
			614.37	-1.222E-04	% P	5.233E-02 1.47E-02	G
			433.93	-1.166E-02	%	5.067E-02 1.49E-02	G
CD-109		3.2685E-01					
			88.04	3.269E-01	%(P	2.177E+00 6.52E-01	G
SN-113		-9.9490E-03					
			391.71	-9.949E-03	%(	7.802E-02 2.29E-02	G K
			255.04	3.650E-01	&	1.880E+00 5.57E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0655E-01						
		427.95	-4.765E-03	&(P	1.573E-01	4.51E-02	G K
		600.77	-3.868E-02	% P	2.439E-01	7.02E-02	G
		636.15	5.892E-02	& P	3.845E-01	1.10E-01	G
		463.51	4.361E-01	(P	4.014E-01	1.31E-01	G
		176.29	-2.189E-01	% P	7.129E-01	2.13E-01	G
I-131	-1.1193E-02						
		364.48	-1.119E-02	%(	8.149E-02	2.39E-02	G K
		636.97	1.507E-01	&	8.889E-01	2.55E-01	G
		284.29	-1.965E-01	&	1.059E+00	3.13E-01	G
CS-134	4.7254E-04						
		604.66	4.725E-04	&(	5.387E-02	1.53E-02	G K
		795.76	3.865E-02	%	5.612E-02	1.77E-02	G
		569.29	3.063E-02	%	3.046E-01	8.74E-02	G
		801.84	1.190E-01	% P	4.679E-01	1.35E-01	G
CS-137	5.4224E-02						
		661.62	5.422E-02	*(	6.731E-02	2.13E-02	G
CE-139	5.3809E-03						
		165.85	5.381E-03	&(P	5.067E-02	1.50E-02	G
EU-152	-2.6761E-02						
		121.78	-2.676E-02	%(P	1.699E-01	5.07E-02	G K
		344.30	3.893E-02	%	1.472E-01	4.37E-02	G
		1408.08	7.536E-02	%	2.108E-01	6.18E-02	G
		964.00	3.088E-02	& P	6.448E-01	1.86E-01	G
		1112.07	5.657E-03	%	4.623E-01	1.27E-01	G
		778.90	1.213E-01	% P	3.697E-01	1.09E-01	G
EU-154	-1.8833E-02						
		123.10	-1.883E-02	%(P	1.289E-01	3.85E-02	G K
		1274.80	-2.938E-02	&	2.209E-01	6.30E-02	G
		723.30	-1.004E-02	& P	4.762E-01	1.38E-01	G
		1004.80	7.667E-02	%	3.137E-01	9.08E-02	G
EU-155	4.0693E-03						
		86.45	4.069E-03	%(P	2.442E-01	7.26E-02	G K
		105.31	1.014E-01	%	2.877E-01	8.68E-02	G
HG-203	-1.0769E-02						
		279.17	-1.077E-02	&(P	6.155E-02	1.83E-02	G K
		72.87	-1.190E+00	&	2.425E+00	7.36E-01	G
		70.83	-2.316E+00	%	4.182E+00	1.27E+00	G
		82.50	1.012E-01	%	4.211E+00	1.25E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.1310E-01						
		583.14	3.131E-01	@(P	5.908E-02	3.03E-02	G
		510.72	4.855E-01	+	2.437E-01	1.02E-01	G
PB-212	6.8817E-01						
		238.63	6.882E-01	(	1.010E-01	4.14E-02	G K
							Energy duplication
		77.11	8.469E-01	+	5.965E-01	1.87E-01	G
		74.81	1.155E+00	& P	1.222E+00	3.77E-01	G
PB-214	3.7831E-01						
		351.99	3.866E-01	(P	1.065E-01	4.14E-02	G K
		295.22	3.622E-01	(	1.920E-01	6.53E-02	G
							Energy duplication
		77.11	1.385E+00	+	9.756E-01	3.07E-01	G
		241.92	-1.187E-01	%	7.358E-01	2.19E-01	G
BI-212	5.3916E-01						
		727.17	5.392E-01	(	3.714E-01	1.37E-01	G K
		1620.56	2.235E-01	& P	1.919E+00	5.13E-01	G
		785.42	2.323E-01	% P	2.746E+00	7.79E-01	G
BI-214	5.0171E-01						
		609.32	4.636E-01	(	1.068E-01	5.27E-02	G K
		1764.51	6.120E-01	(P	2.386E-01	1.40E-01	G
		1120.28	1.119E+00	+	5.135E-01	2.51E-01	G
RA-224	6.7051E-01						
		241.00	6.705E-01	%(P	1.343E+00	4.07E-01	G
RA-226	1.1759E+00						
		185.99	1.176E+00	(P	1.303E+00	4.04E-01	G
AC-228	6.9136E-01						
		911.07	6.510E-01	(P	2.267E-01	1.04E-01	G K
		968.90	1.335E+00	+ P	4.331E-01	2.22E-01	G
		338.40	7.888E-01	(	3.825E-01	1.60E-01	G
TH-227	-2.8356E-01						
		236.00	-2.836E-01	%(P	5.276E-01	1.60E-01	G K
		256.25	3.260E-03	%	5.490E-01	1.60E-01	G
PA-234	4.2088E-02						
		98.44	4.209E-02	&(	2.722E-01	8.15E-02	G K
		946.00	1.220E-03	&	2.433E-01	6.62E-02	G
		131.28	-5.068E-03	%	2.463E-01	7.31E-02	G
		94.67	-1.609E-01	%	4.854E-01	1.46E-01	G
		883.24	-3.603E-02	%	4.672E-01	1.32E-01	G
		926.70	4.766E-02	&	4.492E-01	1.26E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 4.520E-02 %   4.498E-01 1.29E-01 G

TH-234      -1.2612E-02
                           63.29-1.261E-02 %(P 4.937E+00 1.47E+00 G K
                           92.80 1.834E+00 %   2.604E+00 7.96E-01 G
                           92.38 2.173E+00 % P 3.075E+00 9.40E-01 G

AM-241       1.5969E-01
                           59.54 1.597E-01 %(  6.554E-01 1.97E-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:                      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 - 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 *****

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	1.8029E-01	1.9252E-01	3.8943E-01	3.8958E-01	4.024E-01
K-40		1.4236E+01	1.4236E+01	1.8832E+00	2.0456E+00	
MN-54	#A	-9.8407E-03	-9.9518E-03	5.9799E-02	5.9802E-02	6.359E-02
CO-57	#B	-6.0420E-03	-6.1210E-03	5.3436E-02	5.3437E-02	5.900E-02
CO-60	#	6.5906E-02	6.6026E-02	4.5023E-02	4.5175E-02	4.708E-02

Sr-85	#A	-8.1164E-03	-8.5672E-03	5.6391E-02	5.6393E-02	6.080E-02
Kr-85	#A	-1.8737E+02	-1.8737E+02	1.2334E+03	1.2334E+03	1.404E+03
Y-88	#B	6.5230E-03	6.7410E-03	3.8578E-02	3.8580E-02	4.711E-02
NB-94	#B	-1.1190E-02	-1.1190E-02	5.2225E-02	5.2229E-02	6.024E-02
Ag-108M	#B	-3.6241E-03	-3.6244E-03	9.2149E-02	9.2149E-02	1.053E-01
CD-109	#A	3.2433E-01	3.2685E-01	1.9547E+00	1.9548E+00	2.160E+00
SN-113	#B	-9.6506E-03	-9.9490E-03	6.8637E-02	6.8639E-02	7.568E-02
SB-125	#B	1.0619E-01	1.0655E-01	9.5743E-02	9.5930E-02	1.568E-01
I-131	#B	-7.2383E-03	-1.1193E-02	7.1622E-02	7.1624E-02	5.270E-02
CS-134	#B	4.7035E-04	4.7254E-04	4.5905E-02	4.5905E-02	5.362E-02
CS-137	#A	5.4207E-02	5.4224E-02	6.3818E-02	6.3891E-02	6.729E-02
CE-139	#A	5.2455E-03	5.3809E-03	4.5081E-02	4.5082E-02	4.940E-02
EU-152	#B	-2.6741E-02	-2.6761E-02	1.6734E-01	1.6735E-01	1.697E-01
EU-154	#B	-1.8811E-02	-1.8833E-02	1.1818E-01	1.1819E-01	1.287E-01
EU-155	#B	4.0614E-03	4.0693E-03	2.1770E-01	2.1770E-01	2.437E-01
HG-203	#B	-9.9887E-03	-1.0769E-02	5.5532E-02	5.5535E-02	5.709E-02
TL-208	#	3.1310E-01	3.1310E-01	9.0966E-02	9.2647E-02	
PB-212	#	6.8817E-01	6.8817E-01	1.2407E-01	1.2994E-01	1.010E-01
PB-214	#	3.7831E-01	3.7831E-01	1.1901E-01	1.2089E-01	1.065E-01
BI-212		5.3916E-01	5.3916E-01	4.1211E-01	4.1322E-01	
BI-214		5.0171E-01	5.0171E-01	1.7109E-01	1.7339E-01	
RA-224	#A	6.7051E-01	6.7051E-01	1.2221E+00	1.2226E+00	1.343E+00
RA-226	#A	1.1759E+00	1.1759E+00	1.2106E+00	1.2124E+00	1.303E+00
AC-228		6.9136E-01	6.9136E-01	2.6785E-01	2.7064E-01	
TH-227	#B	-2.8356E-01	-2.8356E-01	4.8569E-01	4.8595E-01	5.276E-01
PA-234	#B	4.2088E-02	4.2088E-02	2.4443E-01	2.4444E-01	2.722E-01
TH-234	#B	-1.2612E-02	-1.2612E-02	2.9318E+00	2.9318E+00	4.937E+00
AM-241	#A	1.5969E-01	1.5969E-01	5.8962E-01	5.8969E-01	6.554E-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 (270.2 to 1999.0 keV) 1.6280964E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.6280964E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13DEC2005_1539.An1

Sample description
FSS-NOL-05-02-007-F

Spectrum Filename: C:\GammaVision\Spectra\102F_13DEC2005_1539.An1

Acquisition information
Start time: 13-Dec-2005 15:39:38
Live time: 2000
Real time: 2025
Dead time: 1.22 %
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/channel^2

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: 2.0430E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0430E+03) =
4.8948E+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	08-Dec-2005 14:02:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1743

***** 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
74.78	151.	20.38	1.10	8.847E-03	74.81	9.600	1.178E+00	PB212
77.08	204.	12.74	1.10	9.541E-03	77.11	17.500	9.144E-01	PB212
87.01	113.	39.61	1.50	1.199E-02	86.45	32.740	PBC<MDA	EU155
186.28	111.	30.10	1.40	1.625E-02	185.99	3.280	1.321E+00	RA226
209.45	65.	37.95	1.78	1.518E-02				
238.60	754.	4.37	1.21	1.381E-02	238.63	43.100	8.383E-01	PB212
241.89	96.	22.28	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.204E-01	PB214
251.36	86.	31.66	0.70	1.323E-02				
294.88	156.	15.07	1.33	1.148E-02	295.22	19.200	4.699E-01	PB214
300.43	72.	24.60	1.31	1.128E-02				
338.54	131.	18.90	1.11	1.006E-02	338.40	12.010	7.155E-01	AC228
351.72	260.	9.68	1.17	9.686E-03	351.99	37.100	4.779E-01	PB214
510.44	115.	14.06	1.24	6.698E-03	510.72	22.500	5.067E-01	TL208
582.97	223.	9.61	1.46	5.892E-03	583.14	86.000	2.903E-01	TL208
609.15	164.	12.43	1.38	5.651E-03	609.32	46.090	4.179E-01	BI214
726.56	52.	33.91	1.68	4.794E-03	727.17	11.800	6.104E-01	BI212
911.03	121.	11.90	1.58	3.922E-03	911.07	29.000	7.047E-01	AC228
964.39	37.	22.26	1.71	3.733E-03	964.00	14.580	PBC<MDA	EU152
968.82	80.	13.40	1.72	3.718E-03	968.90	17.460	8.122E-01	AC228
1120.12	70.	16.04	1.65	3.283E-03	1120.28	15.040	9.324E-01	BI214
1460.29	592.	4.17	1.91	2.621E-03	1460.75	10.700	1.396E+01	K40
1763.85	33.	17.41	2.05	2.225E-03	1764.51	15.920	6.145E-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	
418.51	209.45	256.	65.	0.032	113.85	1.780	AC-228	s
502.36	251.36	234.	86.	0.043	82.09	0.705	-	s
600.52	300.43	109.	72.	0.036	73.81	1.310	PB-212	
1928.98	964.48	15.	37.	0.018	66.76	1.715	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	149.20	74.81	420.	151.	0.076	61.14	1.098D
PB-212	153.80	77.11	420.	204.	0.102	38.23	1.100A
EU-155	173.60	87.01	1007.	113.	0.056	118.82	1.500
RA-226	371.69	186.04	476.	80.	0.040	114.43	1.500s
PB-212	476.89	238.63	145.	754.	0.377	12.85	1.215D
PB-214	483.47	241.92	197.	96.	0.048	69.34	1.217D
PB-214	589.40	294.88	154.	156.	0.078	45.22	1.331s
AC-228	676.75	338.54	165.	131.	0.065	56.69	1.110
PB-214	703.12	351.72	134.	259.	0.130	29.05	1.165
TL-208	1020.65	510.44	62.	115.	0.058	42.18	1.236s
TL-208	1165.78	582.97	72.	222.	0.111	28.83	1.455
BI-214	1218.16	609.15	72.	164.	0.082	37.30	1.379
BI-212	1453.08	726.56	77.	52.	0.026	101.73	1.682
AC-228	1822.21	911.03	34.	121.	0.061	35.70	1.584
AC-228	1938.01	968.90	17.	80.	0.040	40.21	1.718D
BI-214	2240.64	1120.12	20.	70.	0.035	48.13	1.649s
K-40	2921.49	1460.29	6.	592.	0.296	12.52	1.906
BI-214	3529.17	1763.85	0.	33.	0.016	52.22	2.048

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	Peak Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm		COMMENTS
BE-7		1.2655E-01						
			477.56	1.266E-01	%(	3.958E-01	1.18E-01	G
K-40		1.3960E+01						
			1460.75	1.396E+01	(P	3.365E-01	5.82E-01	G
MN-54		2.1642E-02						
			834.81	2.164E-02	%(P	5.431E-02	1.63E-02	G
CO-57		2.0815E-02						
			122.07	2.082E-02	%(	5.460E-02	1.65E-02	G K
			136.43	-7.120E-02	&	4.691E-01	1.40E-01	G
CO-60		1.7693E-02						
			1332.51	1.769E-02	%(P	5.163E-02	1.52E-02	G K
			1173.23	2.011E-02	&	7.304E-02	2.14E-02	G K
Sr-85		-3.5561E-02						
			514.00	-3.556E-02	%(	6.159E-02	1.88E-02	G
Kr-85		-7.7781E+02						
			513.99	-7.778E+02	%(	1.347E+03	4.12E+02	G
Y-88		-5.8912E-03						
			1836.01	-5.891E-03	%(P	4.942E-02	1.31E-02	G K
			898.02	-9.968E-03	% P	6.233E-02	1.78E-02	G
NB-94		2.4875E-02						
			871.10	2.487E-02	%(	4.376E-02	1.35E-02	G K
			702.50	-1.423E-02	%	6.107E-02	1.80E-02	G K
Ag-108M		-1.8873E-02						
			722.95	-1.887E-02	&(	6.634E-02	1.96E-02	G K
			614.37	6.572E-03	% P	4.956E-02	1.43E-02	G
			433.93	6.179E-03	&	4.418E-02	1.29E-02	G
CD-109		-6.1901E-02						
			88.04	-6.190E-02	%(P	2.142E+00	6.38E-01	G
SN-113		2.9293E-04						
			391.71	2.929E-04	&(	6.738E-02	1.95E-02	G K
			255.04	-4.175E-04	&	1.728E+00	5.04E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-2.1229E-02						
		427.95	-2.123E-02	&(P	1.279E-01	3.70E-02	G K
		600.77	-2.040E-02	% P	2.227E-01	6.33E-02	G
		636.15	-1.440E-03	& P	3.861E-01	1.08E-01	G
		463.51	2.368E-01	& P	4.315E-01	1.31E-01	G
		176.29	-1.042E-02	% P	6.839E-01	2.02E-01	G
I-131	9.8614E-03						
		364.48	9.861E-03	%(	7.496E-02	2.19E-02	G K
		636.97	-6.516E-04	%	9.056E-01	2.53E-01	G
		284.29	8.536E-02	%	9.189E-01	2.69E-01	G
CS-134	-2.5473E-03						
		604.66	-2.547E-03	%(	1.115E-01	3.29E-02	G K
		795.76	9.386E-03	%	5.669E-02	1.63E-02	G
		569.29	-2.248E-02	%	3.112E-01	8.95E-02	G
		801.84	-8.801E-04	% P	8.625E-01	2.47E-01	G
CS-137	2.6622E-02						
		661.62	2.662E-02	%(	5.283E-02	1.61E-02	G
CE-139	-6.4512E-03						
		165.85	-6.451E-03	&(P	5.825E-02	1.74E-02	G
EU-152	-1.3848E-02						
		121.78	-1.385E-02	%(P	1.781E-01	5.31E-02	G K
		344.30	4.661E-03	%	1.519E-01	4.42E-02	G
		1408.08	1.157E-02	%	2.515E-01	6.78E-02	G
		964.00	2.497E-01	% P	4.500E-01	1.38E-01	G
		1112.07	-1.027E-01	%	5.636E-01	1.64E-01	G
		778.90	1.220E-01	& P	3.387E-01	1.01E-01	G
EU-154	3.7642E-02						
		123.10	3.764E-02	%(P	1.258E-01	3.79E-02	G K
		1274.80	-3.446E-02	%	1.806E-01	5.18E-02	G
		723.30	-2.873E-02	& P	3.060E-01	8.81E-02	G
		1004.80	0.000E+00	%	3.648E-01	1.02E-01	G
EU-155	1.8998E-01						
		86.45	1.900E-01	(P	2.543E-01	7.78E-02	G K
		105.31	8.516E-02	%	2.832E-01	8.53E-02	G
HG-203	-6.1036E-03						
		279.17	-6.104E-03	%(P	5.543E-02	1.64E-02	G K
		72.87	-5.624E-01	&	2.232E+00	6.72E-01	G
		70.83	-1.743E+00	%	3.879E+00	1.18E+00	G
		82.50	-1.143E-02	&	3.898E+00	1.16E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9028E-01						
		583.14	2.903E-01	(P	5.507E-02	2.79E-02	G
		510.72	5.067E-01	+	1.725E-01	7.12E-02	G
PB-212	8.6029E-01						
		238.63	8.383E-01	(	6.539E-02	3.59E-02	G K
							Energy duplication
		77.11	8.072E-01	}	3.891E-01	1.03E-01	G
		74.81	1.178E+00	+ P	7.647E-01	2.45E-01	G
PB-214	4.7516E-01						
		351.99	4.779E-01	(P	1.042E-01	4.63E-02	G K
		295.22	4.699E-01	@(	1.817E-01	7.08E-02	G
							Energy duplication
		77.11	0.000E+00	}	8.970E-01	0.00E+00	G
		241.92	6.212E-01	+	4.420E-01	1.44E-01	G
BI-212	6.1036E-01						
		727.17	6.104E-01	(	5.092E-01	2.07E-01	G K
		1620.56	6.090E-01	% P	1.270E+00	3.87E-01	G
		785.42	1.564E-01	% P	2.808E+00	7.98E-01	G
BI-214	4.1789E-01						
		609.32	4.179E-01	(	1.077E-01	5.19E-02	G K
		1764.51	6.145E-01	+ P	1.376E-01	1.07E-01	G
		1120.28	9.324E-01	+	3.183E-01	1.50E-01	G
RA-224	-6.7090E-02						
		241.00	-6.709E-02	%(P	1.289E+00	3.81E-01	G
RA-226	9.8679E-01						
		185.99	9.868E-01	*(P	1.295E+00	3.97E-01	G
AC-228	7.3903E-01						
		911.07	7.047E-01	(P	1.734E-01	8.40E-02	G K
		968.90	8.122E-01	(P	2.251E-01	1.09E-01	G
		338.40	7.155E-01	(	3.428E-01	1.35E-01	G
TH-227	-1.8179E-01						
		236.00	-1.818E-01	%(P	4.654E-01	1.40E-01	G K
		256.25	-2.386E-02	%	6.436E-01	1.90E-01	G
PA-234	-2.7433E-02						
		98.44	-2.743E-02	&(	2.702E-01	8.08E-02	G K
		946.00	-6.515E-02	%	3.056E-01	8.88E-02	G
		131.28	4.617E-02	%	2.561E-01	7.67E-02	G
		94.67	-1.167E-02	%	4.799E-01	1.43E-01	G
		883.24	-2.698E-02	&	4.133E-01	1.16E-01	G
		926.70	1.890E-03	%	4.891E-01	1.36E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.308E-02 %   4.594E-01 1.32E-01 G

TH-234      -1.7280E-01
                           63.29-1.728E-01 %(P 4.751E+00 1.41E+00 G K
                           92.80 1.154E+00 &   2.507E+00 7.60E-01 G
                           92.38 7.203E-01 & P 2.657E+00 7.99E-01 G

AM-241       1.5495E-01
                           59.54 1.549E-01 %(  6.538E-01 1.96E-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:                      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 - 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 *****

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	1.1849E-01	1.2655E-01	3.5256E-01	3.5263E-01	3.706E-01
K-40		1.3960E+01	1.3960E+01	1.7477E+00	1.9153E+00	
MN-54	#A	2.1400E-02	2.1642E-02	4.8760E-02	4.8775E-02	5.370E-02
CO-57	#B	2.0546E-02	2.0815E-02	4.9448E-02	4.9461E-02	5.389E-02
CO-60	#B	1.7661E-02	1.7693E-02	4.5488E-02	4.5498E-02	5.154E-02

Sr-85	#A	-3.3685E-02	-3.5561E-02	5.6540E-02	5.6575E-02	5.834E-02
Kr-85	#A	-7.7778E+02	-7.7781E+02	1.2365E+03	1.2373E+03	1.347E+03
Y-88	#B	-5.7002E-03	-5.8912E-03	3.9570E-02	3.9571E-02	4.781E-02
NB-94	#B	2.4875E-02	2.4875E-02	4.0593E-02	4.0617E-02	4.376E-02
Ag-108M	#B	-1.8871E-02	-1.8873E-02	5.8889E-02	5.8899E-02	6.634E-02
CD-109	#A	-6.1423E-02	-6.1901E-02	3.9026E+00	3.9026E+00	2.125E+00
SN-113	#B	2.8412E-04	2.9293E-04	5.8365E-02	5.8365E-02	6.536E-02
SB-125	#B	-2.1155E-02	-2.1229E-02	1.4493E-01	1.4493E-01	1.275E-01
I-131	#B	6.3708E-03	9.8614E-03	6.5837E-02	6.5840E-02	4.843E-02
CS-134	#B	-2.5355E-03	-2.5473E-03	9.8677E-02	9.8677E-02	1.110E-01
CS-137	#A	2.6614E-02	2.6622E-02	4.8274E-02	4.8297E-02	5.281E-02
CE-139	#A	-6.2885E-03	-6.4512E-03	5.5691E-02	5.5693E-02	5.678E-02
EU-152	#B	-1.3838E-02	-1.3848E-02	1.8893E-01	1.8894E-01	1.780E-01
EU-154	#B	3.7600E-02	3.7642E-02	1.1357E-01	1.1359E-01	1.256E-01
EU-155	#A	1.8962E-01	1.8998E-01	2.3340E-01	2.3364E-01	2.538E-01
HG-203	#B	-5.6603E-03	-6.1036E-03	5.0164E-02	5.0165E-02	5.141E-02
TL-208		2.9028E-01	2.9028E-01	8.3837E-02	8.5405E-02	
PB-212		8.6029E-01	8.6029E-01	1.1059E-01	1.2067E-01	
PB-214		4.7516E-01	4.7516E-01	1.2774E-01	1.3050E-01	
BI-212		6.1036E-01	6.1036E-01	6.2091E-01	6.2186E-01	
BI-214		4.1789E-01	4.1789E-01	1.5586E-01	1.5762E-01	
RA-224	#A	-6.7090E-02	-6.7090E-02	1.7679E+00	1.7679E+00	1.289E+00
RA-226	#A	9.8679E-01	9.8679E-01	1.1924E+00	1.1937E+00	1.295E+00
AC-228		7.3903E-01	7.3903E-01	1.9259E-01	1.9701E-01	
TH-227	#B	-1.8179E-01	-1.8179E-01	4.2705E-01	4.2717E-01	4.654E-01
PA-234	#B	-2.7433E-02	-2.7433E-02	2.4239E-01	2.4239E-01	2.702E-01
TH-234	#B	-1.7280E-01	-1.7280E-01	4.8570E+00	4.8570E+00	4.751E+00
AM-241	#A	1.5494E-01	1.5495E-01	5.8851E-01	5.8857E-01	6.538E-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 (1119.8 to 1999.0 keV) 1.7353483E+01 pCi/gm
Total Decayed Activity (1119.8 to 1999.0 keV) 1.7353483E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13DEC2005_1627.An1

Sample description
FSS-NOL-05-02-005-F

Spectrum Filename: C:\GammaVision\Spectra\102F_13DEC2005_1627.An1

Acquisition information
Start time: 13-Dec-2005 16:27:19
Live time: 2000
Real time: 2024
Dead time: 1.17 %
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/channel^2

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: 1.9810E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9810E+03) =
5.0480E+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	08-Dec-2005 13:05:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2484

***** 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
77.07	188.	24.15	1.50	9.541E-03	77.11	10.700	1.258E+00	PB214
					77.11	17.500	7.691E-01	PB212
77.07	188.	24.15	1.50	9.541E-03	77.11	10.700	1.258E+00	PB214
					77.11	17.500	7.691E-01	PB212
89.95	76.	39.07	1.11	1.271E-02				
92.83	122.	25.67	1.11	1.329E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.074E+00	TH234
185.74	120.	25.36	1.20	1.628E-02				
185.74	120.	25.36	1.20	1.628E-02	185.99	3.280	1.477E+00	RA226
209.20	96.	29.62	1.30	1.520E-02				
224.16	65.	39.31	1.42	1.448E-02				
238.73	793.	6.49	1.08	1.380E-02	238.63	43.100	9.090E-01	PB212
270.22	74.	29.90	1.19	1.243E-02				
294.94	122.	20.73	1.08	1.148E-02				
294.94	122.	20.73	1.08	1.148E-02	295.22	19.200	3.768E-01	PB214
327.85	55.	36.36	1.44	1.037E-02				
338.48	143.	17.87	1.38	1.006E-02	338.40	12.010	8.074E-01	AC228
351.90	275.	11.53	1.47	9.681E-03				
351.90	275.	11.53	1.47	9.681E-03	351.99	37.100	5.215E-01	PB214
462.82	74.	23.34	0.93	7.376E-03				
510.63	101.	17.79	2.26	6.696E-03	510.72	22.500	4.574E-01	TL208
582.99	219.	9.65	1.70	5.891E-03	583.14	86.000	2.944E-01	TL208
609.31	143.	11.34	1.30	5.649E-03	609.32	46.090	3.746E-01	BI214
660.98	35.	37.31	1.26	5.234E-03				
660.98	35.	37.31	1.26	5.234E-03	661.62	84.620	5.428E-02	CS137
727.14	67.	25.75	1.46	4.794E-03	727.17	11.800	8.067E-01	BI212
785.39	24.	41.54	1.59	4.472E-03	785.42	2.000	PBC<MDA	BI212

910.83	136.	12.17	1.80	3.923E-03	911.07	29.000	8.155E-01	AC228
964.64	29.	29.67	1.71	3.732E-03	964.00	14.580	PBC<MDA	EU152
968.71	68.	14.91	1.72	3.718E-03	968.90	17.460	7.121E-01	AC228
1119.91	48.	23.61	1.61	3.284E-03	1120.28	15.040	6.700E-01	BI214
1460.24	582.	4.19	1.87	2.622E-03	1460.75	10.700	1.415E+01	K40
1619.45	22.	21.32	1.00	2.397E-03	1620.56	2.750	2.242E+00	BI212
1763.97	32.	17.68	1.81	2.225E-03	1764.51	15.920	6.145E-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	
179.47	89.71	398.	76.	0.038	117.21	1.109	PB-214	D
185.24	92.59	426.	122.	0.061	77.01	1.111	TH-234	D
418.01	209.20	300.	96.	0.048	88.87	1.298	AC-228	
447.95	224.16	245.	65.	0.032	117.94	1.424	SB-126	s
477.09	238.73	1139.	156.	0.078	95.19	1.085	PB-212	
540.09	270.22	172.	74.	0.037	89.71	1.187	AC-228	
655.38	327.85	138.	55.	0.027	109.09	1.444	AC-228	s
925.39	462.82	76.	72.	0.036	62.85	0.930	CS-138	
1929.32	964.74	22.	30.	0.015	87.21	1.715	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-214	153.80	77.11	939.	188.	0.094	72.45	1.500D
PB-212	153.80	77.11	939.	188.	0.094	72.45	1.500D
TH-234	185.32	92.87	948.	130.	0.065	102.67	1.500s
TH-234	185.30	92.86	951.	128.	0.064	105.23	1.500s
RA-226	371.43	185.91	392.	118.	0.059	73.43	1.500
PB-212	476.80	238.59	393.	591.	0.296	18.84	1.500
PB-214	590.12	295.23	196.	107.	0.054	62.57	1.500
AC-228	676.63	338.48	170.	143.	0.072	53.61	1.378s
PB-214	703.59	351.95	128.	247.	0.123	27.22	1.500s
TL-208	1021.04	510.63	74.	101.	0.051	53.38	2.256s
TL-208	1165.82	582.99	65.	219.	0.109	28.95	1.705s
BI-214	1218.48	609.31	48.	143.	0.072	34.02	1.296
CS-137	1322.70	661.40	52.	30.	0.015	116.40	1.509
BI-212	1454.23	727.14	62.	67.	0.033	77.24	1.464s
BI-212	1570.78	785.39	36.	24.	0.012	124.62	1.594
AC-228	1821.81	910.83	41.	136.	0.068	36.52	1.795
AC-228	1938.01	968.90	21.	68.	0.034	46.42	1.718D
BI-214	2240.22	1119.91	28.	48.	0.024	70.84	1.609
K-40	2921.38	1460.24	3.	582.	0.291	12.56	1.866
BI-212	3240.09	1619.45	0.	22.	0.011	63.96	0.999s
BI-214	3529.39	1763.97	0.	32.	0.016	53.03	1.811

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-4.9056E-02					
			477.56	-4.906E-02	%(	4.903E-01 1.42E-01	G
K-40		1.4154E+01					
			1460.75	1.415E+01	(P	2.672E-01 5.93E-01	G
MN-54		-3.4764E-04					
			834.81	-3.476E-04	%(P	6.995E-02 1.99E-02	G
CO-57		-8.4472E-04					
			122.07	-8.447E-04	&(	6.306E-02 1.88E-02	G K
			136.43	4.265E-02	%	4.750E-01 1.42E-01	G
CO-60		2.4691E-02					
			1332.51	2.469E-02	%(P	5.315E-02 1.61E-02	G K
			1173.23	4.767E-02	%	7.371E-02 2.30E-02	G K
Sr-85		-1.6770E-02					
			514.00	-1.677E-02	%(	5.591E-02 1.66E-02	G
Kr-85		-3.6663E+02					
			513.99	-3.666E+02	%(	1.222E+03 3.63E+02	G
Y-88		-7.1476E-03					
			1836.01	-7.148E-03	%(P	5.518E-02 1.48E-02	G K
			898.02	-3.504E-04	& P	6.162E-02 1.71E-02	G
NB-94		9.1026E-03					
			871.10	9.103E-03	&(	4.494E-02 1.29E-02	G K
			702.50	1.400E-02	&	5.295E-02 1.56E-02	G K
Ag-108M		-7.0190E-03					
			722.95	-7.019E-03	%(	6.079E-02 1.75E-02	G K
			614.37	-2.000E-02	% P	5.641E-02 1.68E-02	G
			433.93	1.185E-02	%	4.076E-02 1.21E-02	G
CD-109		-2.5161E-01					
			88.04	-2.516E-01	%(P	1.994E+00 5.95E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	6.6516E-03						
		391.71	6.652E-03	&(	6.865E-02	2.00E-02	G K
		255.04	3.991E-02	%	2.114E+00	6.21E-01	G
SB-125	6.2479E-02						
		427.95	6.248E-02	%(P	1.086E-01	3.33E-02	G K
		600.77	4.806E-02	& P	2.589E-01	7.53E-02	G
		636.15	1.079E-01	& P	3.698E-01	1.09E-01	G
		463.51	1.332E-02	% P	3.736E-01	1.06E-01	G
		176.29	-1.112E-01	& P	7.189E-01	2.14E-01	G
I-131	1.0719E-02						
		364.48	1.072E-02	%(	7.527E-02	2.20E-02	G K
		636.97	1.419E-01	&	1.021E+00	2.94E-01	G
		284.29	2.469E-01	%	9.660E-01	2.87E-01	G
CS-134	-3.7805E-03						
		604.66	-3.781E-03	%(	5.963E-02	1.72E-02	G K
		795.76	1.404E-02	%	4.740E-02	1.38E-02	G
		569.29	-1.394E-02	&	3.110E-01	8.89E-02	G
		801.84	-9.077E-04	& P	7.214E-01	2.04E-01	G
CS-137	4.6165E-02						
		661.62	4.617E-02	(	5.624E-02	1.79E-02	G
CE-139	-1.1910E-02						
		165.85	-1.191E-02	&(P	5.829E-02	1.74E-02	G
EU-152	2.9256E-03						
		121.78	2.926E-03	&(P	1.776E-01	5.28E-02	G K
		344.30	-3.520E-02	%	1.513E-01	4.48E-02	G
		1408.08	2.644E-02	&	2.164E-01	5.86E-02	G
		964.00	2.463E-01	& P	4.626E-01	1.41E-01	G
		1112.07	4.565E-03	&	4.167E-01	1.14E-01	G
		778.90	8.460E-02	% P	3.754E-01	1.09E-01	G
EU-154	-1.2696E-03						
		123.10	-1.270E-03	%(P	1.282E-01	3.81E-02	G K
		1274.80	-3.068E-02	%	1.959E-01	5.59E-02	G
		723.30	2.494E-02	% P	2.040E-01	5.75E-02	G
		1004.80	3.908E-02	%	3.144E-01	8.90E-02	G
EU-155	4.0510E-02						
		86.45	4.051E-02	%(P	2.163E-01	6.47E-02	G K
		105.31	3.721E-02	%	2.930E-01	8.77E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-1.0464E-02						
		279.17	-1.046E-02	%(P	5.611E-02	1.66E-02	G K
		72.87	-2.387E-01	%	2.265E+00	6.78E-01	G
		70.83	-3.617E-01	%	4.003E+00	1.20E+00	G
		82.50	-5.833E-01	%	4.415E+00	1.32E+00	G
TL-208	2.9438E-01						
		583.14	2.944E-01	@(P	5.440E-02	2.84E-02	G
		510.72	4.574E-01	+	1.938E-01	8.14E-02	G
PB-212	7.0403E-01						
		238.63	6.776E-01	(	1.090E-01	4.25E-02	G K
							Energy duplication
		77.11	7.691E-01	(	5.946E-01	1.86E-01	G
		74.81	7.708E-01	& P	1.244E+00	3.79E-01	G
PB-214	4.6854E-01						
		351.99	4.685E-01	@(P	1.053E-01	4.26E-02	G K
		295.22	3.323E-01	-	2.108E-01	6.93E-02	G
							Energy duplication
		77.11	1.258E+00	+	9.724E-01	3.04E-01	G
		241.92	8.829E-03	%	8.336E-01	2.48E-01	G
BI-212	8.0672E-01						
		727.17	8.067E-01	@(	4.755E-01	2.08E-01	G K
		1620.56	2.242E+00	+ P	7.627E-01	4.85E-01	G
		785.42	1.795E+00	+ P	2.344E+00	7.47E-01	G
BI-214	3.7464E-01						
		609.32	3.746E-01	(	9.168E-02	4.25E-02	G K
		1764.51	6.145E-01	+ P	1.419E-01	1.09E-01	G
		1120.28	6.700E-01	+	3.811E-01	1.58E-01	G
RA-224	5.7624E-01						
		241.00	5.762E-01	%(P	1.424E+00	4.30E-01	G
RA-226	1.5086E+00						
		185.99	1.509E+00	(P	1.215E+00	3.83E-01	G
AC-228	7.8307E-01						
		911.07	8.155E-01	(P	1.953E-01	9.94E-02	G K
		968.90	7.124E-01	(P	2.540E-01	1.10E-01	G
		338.40	8.074E-01	@(	3.584E-01	1.44E-01	G
TH-227	-2.4561E-01						
		236.00	-2.456E-01	%(P	5.398E-01	1.63E-01	G K
		256.25	-1.141E-01	&	6.426E-01	1.91E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	7.4478E-02						
		98.44	7.448E-02	%(	2.724E-01	8.20E-02	G K
		946.00	8.830E-02	&	3.220E-01	9.46E-02	G
		131.28	0.000E+00	&	2.426E-01	7.20E-02	G
		94.67	-1.776E-01	%	5.078E-01	1.53E-01	G
		883.24	-2.541E-02	%	4.262E-01	1.19E-01	G
		926.70	0.000E+00	&	5.548E-01	1.55E-01	G
		569.26	-2.058E-02	&	4.592E-01	1.31E-01	G
TH-234	1.5584E+00						
		63.29	3.777E-01	%(P	4.737E+00	1.41E+00	G K
		92.80	2.191E+00	*(	2.498E+00	7.69E-01	G
		92.38	2.611E+00	*(P	2.929E+00	9.02E-01	G
AM-241	-2.1371E-01						
		59.54	-2.137E-01	%(	7.010E-01	2.11E-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:	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 - 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	-4.5889E-02	-4.9056E-02	4.2711E-01	4.2712E-01	4.587E-01
K-40		1.4154E+01	1.4154E+01	1.7786E+00	1.9479E+00	
MN-54	#A	-3.4370E-04	-3.4764E-04	2.5420E-02	2.5420E-02	6.916E-02
CO-57	#B	-8.3365E-04	-8.4472E-04	5.6264E-02	5.6264E-02	6.224E-02
CO-60	#B	2.4645E-02	2.4691E-02	4.8300E-02	4.8320E-02	5.305E-02
Sr-85	#A	-1.5873E-02	-1.6770E-02	4.9890E-02	4.9899E-02	5.292E-02
Kr-85	#A	-3.6662E+02	-3.6663E+02	1.0903E+03	1.0905E+03	1.222E+03
Y-88	#B	-6.9127E-03	-7.1476E-03	4.4791E-02	4.4793E-02	5.337E-02
NB-94	#B	9.1025E-03	9.1026E-03	3.8607E-02	3.8610E-02	4.494E-02
Ag-108M	#B	-7.0185E-03	-7.0190E-03	5.2434E-02	5.2436E-02	6.078E-02
CD-109	#A	-2.4964E-01	-2.5161E-01	2.1247E+00	2.1247E+00	1.978E+00
SN-113	#B	6.4488E-03	6.6516E-03	6.0025E-02	6.0026E-02	6.656E-02
SB-125	#B	6.2260E-02	6.2479E-02	9.9827E-02	9.9889E-02	1.082E-01
I-131	#B	6.8817E-03	1.0719E-02	6.6110E-02	6.6112E-02	4.833E-02
CS-134	#B	-3.7627E-03	-3.7805E-03	5.1650E-02	5.1650E-02	5.935E-02
CS-137	#A	4.6150E-02	4.6165E-02	5.3737E-02	5.3799E-02	5.623E-02
CE-139	#A	-1.1605E-02	-1.1910E-02	5.4313E-02	5.4318E-02	5.680E-02
EU-152	#B	2.9233E-03	2.9256E-03	1.5830E-01	1.5830E-01	1.774E-01
EU-154	#B	-1.2682E-03	-1.2696E-03	1.5837E-01	1.5837E-01	1.280E-01
EU-155	#B	4.0430E-02	4.0510E-02	1.9404E-01	1.9405E-01	2.159E-01
HG-203	#B	-9.6933E-03	-1.0464E-02	5.0600E-02	5.0603E-02	5.198E-02
TL-208	#	2.9438E-01	2.9438E-01	8.5370E-02	8.6953E-02	
PB-212	#	7.0403E-01	7.0403E-01	1.3262E-01	1.3838E-01	1.090E-01
PB-214	#	4.6854E-01	4.6854E-01	1.2772E-01	1.3040E-01	1.053E-01
BI-212		8.0672E-01	8.0672E-01	6.2310E-01	6.2474E-01	
BI-214		3.7464E-01	3.7464E-01	1.2746E-01	1.2918E-01	
RA-224	#A	5.7624E-01	5.7624E-01	1.2905E+00	1.2909E+00	1.424E+00
RA-226	#	1.5086E+00	1.5086E+00	1.1497E+00	1.1528E+00	1.215E+00
AC-228		7.8307E-01	7.8307E-01	2.0832E-01	2.1290E-01	
TH-227	#B	-2.4561E-01	-2.4561E-01	4.9545E-01	4.9565E-01	5.398E-01
PA-234	#B	7.4478E-02	7.4478E-02	2.4590E-01	2.4594E-01	2.724E-01
TH-234	#B	1.5584E+00	1.5584E+00	1.6145E+00	1.6168E+00	4.737E+00
AM-241	#A	-2.1371E-01	-2.1371E-01	6.3317E-01	6.3328E-01	7.010E-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 (1119.8 to 1999.0 keV) 1.6412958E+01 pCi/gm
Total Decayed Activity (1119.8 to 1999.0 keV) 1.6412958E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13DEC2005_1704.An1

Sample description
FSS-NOL-05-02-012-F

Spectrum Filename: C:\GammaVision\Spectra\102F_13DEC2005_1704.An1

Acquisition information
Start time: 13-Dec-2005 17:04:45
Live time: 2000
Real time: 2023
Dead time: 1.12 %
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/channel^2

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: 1.8100E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8100E+03) =
5.5249E+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	08-Dec-2005 13:25:00
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: 0.1868

***** 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
74.80	120.	36.29	1.50	8.847E-03				
74.80	120.	36.29	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.13	162.	26.20	1.50	9.541E-03	77.11	10.700	1.188E+00	PB214
					77.11	17.500	7.262E-01	PB212
77.13	162.	26.20	1.50	9.541E-03	77.11	10.700	1.188E+00	PB214
					77.11	17.500	7.262E-01	PB212
129.84	102.	33.08	1.01	1.718E-02				
185.96	65.	35.19	1.28	1.627E-02				
185.96	65.	35.19	1.28	1.627E-02	185.99	3.280	PBC<MDA	RA226
209.82	90.	29.89	1.48	1.517E-02				
238.58	580.	5.01	1.21	1.381E-02				
238.58	580.	5.01	1.21	1.381E-02	238.63	43.100	7.274E-01	PB212
241.34	82.	29.54	1.22	1.368E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.989E-01	PB214
269.90	56.	39.89	1.54	1.244E-02				
295.26	101.	16.13	0.87	1.146E-02	295.22	19.200	3.422E-01	PB214
300.63	75.	22.60	1.36	1.127E-02				
338.40	111.	18.26	1.19	1.006E-02	338.40	12.010	6.859E-01	AC228
351.88	147.	15.88	1.19	9.682E-03				
351.88	147.	15.88	1.19	9.682E-03	351.99	37.100	3.046E-01	PB214
463.21	55.	23.51	1.70	7.369E-03				
463.21	55.	23.51	1.70	7.369E-03	463.51	10.000	5.479E-01	SB125
510.61	101.	17.22	1.47	6.696E-03	510.72	22.500	5.006E-01	TL208
582.86	184.	12.69	1.53	5.893E-03	583.14	86.000	2.709E-01	TL208
609.37	118.	14.83	1.75	5.649E-03	609.32	46.090	3.386E-01	BI214
727.44	33.	35.59	1.55	4.794E-03	727.17	11.800	PBC<MDA	BI212
910.72	111.	13.85	1.82	3.923E-03	911.07	29.000	7.298E-01	AC228

967.92	90.	15.82	1.33	3.721E-03	968.90	17.460	1.039E+00	AC228
1460.19	612.	4.04	1.99	2.622E-03	1460.75	10.700	1.629E+01	K40
1764.43	34.	17.15	2.12	2.225E-03	1764.51	15.920	7.147E-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	
259.27	129.84	452.	78.	0.039	120.00	1.014	AC-228	
371.52	185.96	219.	65.	0.033	105.57	1.276	RA-226	l
419.25	209.82	250.	90.	0.045	89.68	1.481	NP-239	s
476.80	238.54	133.	580.	0.290	15.04	1.215	PB-212	D
482.30	241.29	251.	82.	0.041	88.62	1.217	RA-224	D
539.45	269.90	167.	56.	0.028	119.68	1.539	AC-228	s
600.91	300.63	90.	75.	0.038	67.81	1.364	PB-212	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	149.18	74.80	941.	120.	0.060	108.88	1.500s
PB-214	153.80	77.11	824.	162.	0.081	78.61	1.500D
PB-212	153.80	77.11	824.	162.	0.081	78.61	1.500D
PB-212	476.77	238.57	302.	486.	0.243	20.39	1.500
PB-214	590.10	295.22	133.	95.	0.047	60.04	1.500
AC-228	676.47	338.40	120.	111.	0.056	54.79	1.187
PB-214	703.63	351.98	94.	119.	0.060	43.95	1.500
SB-125	925.84	463.04	41.	48.	0.024	68.64	1.500s
TL-208	1021.00	510.61	72.	101.	0.051	51.67	1.473s
TL-208	1165.54	582.86	93.	184.	0.092	38.06	1.526s
BI-214	1218.59	609.37	61.	118.	0.059	44.50	1.745
BI-212	1454.84	727.44	53.	33.	0.017	106.77	1.554s
AC-228	1821.59	910.72	40.	111.	0.056	41.56	1.821
AC-228	1936.04	967.92	34.	90.	0.045	47.47	1.329
K-40	2921.29	1460.19	0.	612.	0.306	12.13	1.993
BI-214	3530.32	1764.43	0.	34.	0.017	51.45	2.123

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		2.0702E-01					
			477.56	2.070E-01	%(	4.175E-01 1.27E-01	G
K-40		1.6290E+01					
			1460.75	1.629E+01	(P	1.962E-01 6.58E-01	G
MN-54		1.0694E-02					
			834.81	1.069E-02	%(P	5.741E-02 1.65E-02	G
CO-57		-2.6604E-03					
			122.07	-2.660E-03	%(	6.109E-02 1.81E-02	G K
			136.43	6.798E-02	%	4.528E-01 1.35E-01	G
CO-60		-7.0636E-03					
			1332.51	-7.064E-03	%(P	6.059E-02 1.67E-02	G K
			1173.23	2.919E-02	%	7.426E-02 2.22E-02	G K
Sr-85		-2.1762E-02					
			514.00	-2.176E-02	%(	6.306E-02 1.89E-02	G
Kr-85		-4.7547E+02					
			513.99	-4.755E+02	%(	1.378E+03 4.12E+02	G
Y-88		-2.3737E-05					
			1836.01	-2.374E-05	%(P	8.200E-02 2.19E-02	G K
			898.02	1.819E-04	% P	6.028E-02 1.65E-02	G
NB-94		1.8548E-02					
			871.10	1.855E-02	&(	5.177E-02 1.54E-02	G K
			702.50	-5.930E-03	%	5.539E-02 1.59E-02	G K
Ag-108M		-2.7989E-03					
			722.95	-2.799E-03	&(	7.074E-02 2.02E-02	G K
			614.37	-2.698E-04	& P	5.870E-02 1.66E-02	G
			433.93	9.868E-04	%	4.528E-02 1.29E-02	G
CD-109		-1.1541E-02					
			88.04	-1.154E-02	%(P	2.203E+00 6.55E-01	G
SN-113		1.9586E-02					
			391.71	1.959E-02	&(	5.408E-02 1.61E-02	G K
			255.04	-3.854E-01	%	1.957E+00 5.80E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.4303E-01						
		427.95	2.698E-02	%(P	1.366E-01	3.98E-02	G K
		600.77	-3.856E-02	% P	2.817E-01	8.12E-02	G
		636.15	-1.997E-03	& P	4.377E-01	1.23E-01	G
		463.51	4.865E-01	(P	3.299E-01	1.15E-01	G
		176.29	-2.038E-01	% P	6.931E-01	2.07E-01	G
I-131	-1.4815E-02						
		364.48	-1.481E-02	%(	7.289E-02	2.14E-02	G K
		636.97	8.307E-02	%	1.038E+00	2.95E-01	G
		284.29	2.760E-02	%	9.576E-01	2.78E-01	G
CS-134	-9.0580E-05						
		604.66	-9.058E-05	&(	5.134E-02	1.45E-02	G K
		795.76	2.584E-02	%	5.207E-02	1.59E-02	G
		569.29	-1.202E-02	%	2.715E-01	7.64E-02	G
		801.84	7.243E-02	% P	5.310E-01	1.50E-01	G
CS-137	1.7285E-02						
		661.62	1.729E-02	%(	5.681E-02	1.67E-02	G
CE-139	3.4641E-03						
		165.85	3.464E-03	&(P	5.201E-02	1.54E-02	G
EU-152	-2.9663E-02						
		121.78	-2.966E-02	%(P	1.748E-01	5.22E-02	G K
		344.30	9.132E-03	%	1.219E-01	3.51E-02	G
		1408.08	5.445E-02	%	2.732E-01	7.70E-02	G
		964.00	2.603E-01	& P	4.445E-01	1.37E-01	G
		1112.07	6.464E-02	&	5.502E-01	1.57E-01	G
		778.90	-8.230E-02	% P	4.798E-01	1.39E-01	G
EU-154	-1.9063E-02						
		123.10	-1.906E-02	%(P	1.125E-01	3.35E-02	G K
		1274.80	7.032E-02	&	1.870E-01	5.56E-02	G
		723.30	-6.786E-02	& P	3.795E-01	1.11E-01	G
		1004.80	6.107E-02	&	2.881E-01	8.22E-02	G
EU-155	9.0347E-02						
		86.45	9.035E-02	%(P	2.556E-01	7.70E-02	G K
		105.31	1.331E-02	%	2.886E-01	8.59E-02	G
HG-203	9.9117E-04						
		279.17	9.912E-04	&(P	5.367E-02	1.56E-02	G K
		72.87	-8.306E-01	%	2.438E+00	7.36E-01	G
		70.83	-1.127E+00	&	3.052E+00	9.20E-01	G
		82.50	-1.138E+00	%	4.297E+00	1.29E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7090E-01						
		583.14	2.709E-01	*(P	7.031E-02	3.44E-02	G
		510.72	5.006E-01	+	2.094E-01	8.62E-02	G
PB-212	6.4304E-01						
		238.63	6.093E-01	(	1.050E-01	4.14E-02	G K
							Energy duplication
		77.11	7.262E-01	@(	6.104E-01	1.90E-01	G
		74.81	1.056E+00	& P	1.281E+00	3.93E-01	G
PB-214	2.7320E-01						
		351.99	2.479E-01	(P	9.967E-02	3.64E-02	G K
		295.22	3.220E-01	(	1.915E-01	6.44E-02	G
							Energy duplication
		77.11	1.188E+00	+	9.983E-01	3.11E-01	G
		241.92	4.014E-01	%	7.180E-01	2.19E-01	G
BI-212	4.3684E-01						
		727.17	4.368E-01	@(	4.828E-01	1.55E-01	G K
		1620.56	-3.801E-02	& P	1.859E+00	4.62E-01	G
		785.42	7.073E-01	% P	2.935E+00	8.57E-01	G
BI-214	3.3864E-01						
		609.32	3.386E-01	(	1.120E-01	5.02E-02	G K
		1764.51	7.147E-01	+ P	1.553E-01	1.23E-01	G
		1120.28	2.275E-01	%	4.860E-01	1.47E-01	G
RA-224	8.7716E-01						
		241.00	8.772E-01	%(P	1.351E+00	4.13E-01	G
RA-226	8.3300E-01						
		185.99	8.330E-01	%(P	1.261E+00	3.85E-01	G
AC-228	7.1693E-01						
		911.07	7.298E-01	(P	2.108E-01	1.01E-01	G K
		968.90	1.039E+00	+ P	3.420E-01	1.64E-01	G
		338.40	6.859E-01	(	3.322E-01	1.25E-01	G
TH-227	-1.9182E-01						
		236.00	-1.918E-01	&(P	5.146E-01	1.55E-01	G K
		256.25	-1.005E-01	%	5.955E-01	1.76E-01	G
PA-234	1.0811E-03						
		98.44	1.081E-03	&(	2.252E-01	6.67E-02	G K
		946.00	-4.873E-02	%	3.488E-01	1.00E-01	G
		131.28	5.045E-02	&	2.439E-01	7.30E-02	G
		94.67	-9.566E-02	%	4.898E-01	1.47E-01	G
		883.24	1.785E-01	&	3.829E-01	1.16E-01	G
		926.70	1.278E-01	%	4.438E-01	1.29E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.506E-02 &   4.004E-01 1.13E-01 G

TH-234       1.0420E+00
                           63.29 1.042E+00 %(P 4.753E+00 1.42E+00 G K
                           92.80 1.044E+00 %   2.529E+00 7.65E-01 G
                           92.38 1.146E+00 % P 3.012E+00 9.10E-01 G

AM-241      -6.7509E-02
                           59.54-6.751E-02 &(  7.038E-01 2.10E-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:                      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 - 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 *****

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	1.9363E-01	2.0702E-01	3.8083E-01	3.8101E-01	3.904E-01
K-40		1.6290E+01	1.6290E+01	1.9760E+00	2.1772E+00	
MN-54	#A	1.0573E-02	1.0694E-02	4.9563E-02	4.9567E-02	5.675E-02
CO-57	#B	-2.6255E-03	-2.6604E-03	5.4443E-02	5.4443E-02	6.029E-02
CO-60	#B	-7.0505E-03	-7.0636E-03	5.3208E-02	5.3209E-02	6.048E-02

Sr-85	#A	-2.0596E-02	-2.1762E-02	5.6570E-02	5.6583E-02	5.968E-02
Kr-85	#A	-4.7545E+02	-4.7547E+02	1.2360E+03	1.2363E+03	1.378E+03
Y-88	#B	-2.2955E-05	-2.3737E-05	8.6268E-04	8.6269E-04	7.930E-02
NB-94	#B	1.8548E-02	1.8548E-02	4.6059E-02	4.6071E-02	5.177E-02
Ag-108M	#B	-2.7987E-03	-2.7989E-03	6.0540E-02	6.0540E-02	7.074E-02
CD-109	#A	-1.1450E-02	-1.1541E-02	5.6409E+00	5.6409E+00	2.186E+00
SN-113	#B	1.8988E-02	1.9586E-02	4.8415E-02	4.8428E-02	5.243E-02
SB-125	#F	1.4252E-01	1.4303E-01	1.0136E-01	1.0167E-01	1.361E-01
I-131	#B	-9.5009E-03	-1.4815E-02	6.4195E-02	6.4201E-02	4.675E-02
CS-134	#B	-9.0152E-05	-9.0580E-05	4.3420E-02	4.3420E-02	5.109E-02
CS-137	#A	1.7279E-02	1.7285E-02	5.0242E-02	5.0251E-02	5.679E-02
CE-139	#A	3.3753E-03	3.4641E-03	4.6143E-02	4.6143E-02	5.068E-02
EU-152	#B	-2.9640E-02	-2.9663E-02	1.7123E-01	1.7124E-01	1.746E-01
EU-154	#B	-1.9041E-02	-1.9063E-02	1.0299E-01	1.0299E-01	1.123E-01
EU-155	#B	9.0169E-02	9.0347E-02	2.3112E-01	2.3117E-01	2.551E-01
HG-203	#B	9.1803E-04	9.9117E-04	4.6917E-02	4.6917E-02	4.971E-02
TL-208	#	2.7090E-01	2.7090E-01	1.0333E-01	1.0445E-01	
PB-212	#	6.4304E-01	6.4304E-01	1.3112E-01	1.3599E-01	1.050E-01
PB-214	#	2.7320E-01	2.7320E-01	1.0176E-01	1.0291E-01	9.967E-02
BI-212	#A	4.3684E-01	4.3684E-01	4.6644E-01	4.6708E-01	4.828E-01
BI-214		3.3864E-01	3.3864E-01	1.5070E-01	1.5189E-01	
RA-224	#A	8.7716E-01	8.7716E-01	1.2397E+00	1.2407E+00	1.351E+00
RA-226	#A	8.3300E-01	8.3300E-01	1.1563E+00	1.1573E+00	1.261E+00
AC-228		7.1693E-01	7.1693E-01	2.4670E-01	2.4996E-01	
TH-227	#B	-1.9182E-01	-1.9182E-01	4.7214E-01	4.7227E-01	5.146E-01
PA-234	#B	1.0811E-03	1.0811E-03	1.9998E-01	1.9998E-01	2.252E-01
TH-234	#B	1.0420E+00	1.0420E+00	4.2732E+00	4.2736E+00	4.753E+00
AM-241	#A	-6.7508E-02	-6.7509E-02	6.2898E-01	6.2900E-01	7.038E-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 (269.7 to 1999.0 keV) 1.7616556E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 1.7616556E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13DEC2005_1741.An1

Sample description
FSS-NOL-05-02-017-F

Spectrum Filename: C:\GammaVision\Spectra\102F_13DEC2005_1741.An1

Acquisition information
Start time: 13-Dec-2005 17:41:56
Live time: 2000
Real time: 2025
Dead time: 1.25 %
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/channel^2

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: 1.9360E+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	08-Dec-2005 15:06:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1751

***** 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
74.73	104.	41.03	1.50	8.847E-03	72.87	6.400	1.486E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.12	140.	30.82	1.50	9.541E-03	77.11	10.700	9.552E-01	PB214
					77.11	17.500	5.840E-01	PB212
77.12	140.	30.82	1.50	9.541E-03	77.11	10.700	9.552E-01	PB214
					77.11	17.500	5.840E-01	PB212
238.81	682.	7.06	1.24	1.380E-02	238.63	43.100	8.007E-01	PB212
295.00	120.	14.51	1.25	1.148E-02				
295.00	120.	14.51	1.25	1.148E-02	295.22	19.200	3.803E-01	PB214
299.97	45.	32.96	1.26	1.130E-02				
338.35	132.	19.79	1.16	1.006E-02	338.40	12.010	7.603E-01	AC228
351.70	183.	11.06	1.19	9.687E-03				
351.70	183.	11.06	1.19	9.687E-03	351.99	37.100	3.554E-01	PB214
462.78	56.	23.97	1.65	7.376E-03				
462.78	56.	23.97	1.65	7.376E-03	463.51	10.000	5.151E-01	SB125
510.54	69.	25.25	0.88	6.697E-03	510.72	22.500	3.211E-01	TL208
582.91	175.	9.95	1.82	5.892E-03	583.14	86.000	2.411E-01	TL208
608.78	149.	11.44	1.69	5.654E-03	604.66	97.600	1.885E-01	CS134
					609.32	46.090	4.002E-01	BI214
662.05	94.	19.09	0.78	5.226E-03	661.62	84.620	1.483E-01	CS137
727.40	44.	39.78	1.12	4.793E-03	727.17	11.800	5.404E-01	BI212
794.10	39.	28.26	1.07	4.428E-03				
910.76	109.	14.95	1.91	3.923E-03	911.07	29.000	6.651E-01	AC228
968.63	109.	18.44	1.75	3.719E-03	968.90	17.460	1.173E+00	AC228
1120.04	46.	22.63	1.12	3.284E-03	1120.28	15.040	6.559E-01	BI214
1172.60	72.	20.48	1.45	3.158E-03	1173.23	99.860	1.604E-01	CO60
1332.32	57.	20.14	1.74	2.834E-03	1332.51	99.980	1.415E-01	CO60

1460.14	593.	4.16	2.15	2.622E-03	1460.75	10.700	1.477E+01	K40
1620.76	20.	22.36	1.50	2.397E-03	1620.56	2.750	2.082E+00	BI212

********** 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
599.44	299.89	137.	58.	0.029	93.38	1.143	TH-227
1323.99	662.05	73.	78.	0.039	57.71	0.784	CS-137 s
1588.22	794.10	24.	48.	0.024	60.74	1.071	PA-234 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-214	153.80	77.11	857.	140.	0.070	92.47	1.500D
PB-212	153.80	77.11	857.	140.	0.070	92.47	1.500D
PB-212	476.81	238.59	372.	550.	0.275	19.61	1.500
PB-214	589.71	295.03	162.	104.	0.052	59.72	1.500
AC-228	676.38	338.35	176.	132.	0.066	59.38	1.155
PB-214	703.26	351.79	111.	179.	0.089	33.49	1.500
SB-125	925.28	462.77	61.	55.	0.027	70.37	1.500s
TL-208	1020.86	510.54	82.	69.	0.035	75.76	0.882s
TL-208	1165.66	582.91	50.	175.	0.087	29.84	1.821s
BI-214	1217.40	608.78	53.	149.	0.075	34.31	1.691
BI-212	1454.56	727.30	69.	52.	0.026	104.49	1.149
AC-228	1821.65	910.76	49.	108.	0.054	44.84	1.906
AC-228	1937.46	968.63	63.	109.	0.055	55.32	1.749
BI-214	2240.47	1120.04	27.	46.	0.023	67.88	1.119s
CO-60	2345.67	1172.60	38.	72.	0.036	61.45	1.447
CO-60	2665.33	1332.32	19.	57.	0.029	60.42	1.738
K-40	2921.19	1460.14	4.	593.	0.297	12.49	2.146
BI-212	3242.70	1620.76	0.	20.	0.010	67.08	1.499s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		2.4880E-01					
			477.56	2.488E-01	%(	3.849E-01 1.20E-01	G
K-40		1.4767E+01					
			1460.75	1.477E+01	(P	2.921E-01 6.15E-01	G
MN-54		5.1549E-03					
			834.81	5.155E-03	%(P	5.065E-02 1.43E-02	G
CO-57		-1.0454E-03					
			122.07	-1.045E-03	&(	6.075E-02 1.80E-02	G K
			136.43	8.192E-03	%	4.910E-01 1.46E-01	G
CO-60		1.5093E-01					
			1332.51	1.415E-01	(P	5.640E-02 2.85E-02	G K
			1173.23	1.604E-01	(	6.948E-02 3.28E-02	G K
Sr-85		-2.1042E-02					
			514.00	-2.104E-02	%(	6.382E-02 1.91E-02	G
Kr-85		-4.6004E+02					
			513.99	-4.600E+02	%(	1.395E+03 4.17E+02	G
Y-88		-2.2186E-05					
			1836.01	-2.219E-05	%(P	2.491E-02 3.38E-03	G K
			898.02	7.611E-03	& P	6.568E-02 1.87E-02	G
NB-94		2.2525E-02					
			871.10	2.253E-02	%(	4.871E-02 1.47E-02	G K
			702.50	1.525E-02	&	4.333E-02 1.29E-02	G K
Ag-108M		8.5848E-03					
			722.95	8.585E-03	&(	5.251E-02 1.51E-02	G K
			614.37	1.646E-02	% P	4.695E-02 1.39E-02	G
			433.93	-1.273E-02	&	4.787E-02 1.42E-02	G
CD-109		1.7567E-02					
			88.04	1.757E-02	%(P	2.098E+00 6.24E-01	G
SN-113		-2.0748E-02					
			391.71	-2.075E-02	%(	7.414E-02 2.21E-02	G K
			255.04	0.000E+00	%	1.964E+00 5.74E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3937E-01						
		427.95	9.928E-03	&(P	1.523E-01	4.40E-02	G K
		600.77	9.905E-02	& P	2.297E-01	6.91E-02	G
		636.15	9.258E-02	& P	3.722E-01	1.08E-01	G
		463.51	5.225E-01	(P	3.722E-01	1.26E-01	G
		176.29	-4.781E-02	% P	5.021E-01	1.47E-01	G
I-131	-2.5769E-02						
		364.48	-2.577E-02	&(	8.744E-02	2.61E-02	G K
		636.97	-1.113E-01	%	9.930E-01	2.84E-01	G
		284.29	-2.479E-03	&	8.631E-01	2.50E-01	G
CS-134	-8.9620E-04						
		604.66	-8.962E-04	%(	5.008E-02	1.42E-02	G K
		795.76	-2.695E-02	%	8.168E-02	2.43E-02	G
		569.29	1.501E-03	&	2.636E-01	7.39E-02	G
		801.84	2.317E-03	% P	6.658E-01	1.87E-01	G
CS-137	2.5520E-02						
		661.62	2.552E-02	%(	7.310E-02	2.18E-02	G
CE-139	1.5841E-03						
		165.85	1.584E-03	&(P	5.476E-02	1.62E-02	G
EU-152	3.8819E-02						
		121.78	3.882E-02	&(P	1.769E-01	5.30E-02	G K
		344.30	4.498E-04	&	1.249E-01	3.58E-02	G
		1408.08	3.327E-02	&	2.423E-01	6.66E-02	G
		964.00	1.161E-01	% P	3.054E-01	9.05E-02	G
		1112.07	4.000E-02	&	5.647E-01	1.61E-01	G
		778.90	-9.792E-02	% P	4.434E-01	1.29E-01	G
EU-154	-1.7423E-02						
		123.10	-1.742E-02	&(P	1.317E-01	3.93E-02	G K
		1274.80	-2.234E-02	%	1.860E-01	5.24E-02	G
		723.30	3.600E-02	& P	2.551E-01	7.31E-02	G
		1004.80	-6.465E-02	%	3.533E-01	1.02E-01	G
EU-155	4.3800E-02						
		86.45	4.380E-02	%(P	2.405E-01	7.20E-02	G K
		105.31	1.152E-01	%	2.750E-01	8.32E-02	G
HG-203	-1.1962E-04						
		279.17	-1.196E-04	&(P	5.345E-02	1.56E-02	G K
		72.87	4.262E-01	%	2.136E+00	6.41E-01	G
		70.83	-1.458E+00	%	4.150E+00	1.25E+00	G
		82.50	-2.941E-01	&	4.496E+00	1.34E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.4114E-01						
		583.14	2.411E-01	@(P	4.914E-02	2.40E-02	G
		510.72	3.211E-01	+	2.077E-01	8.11E-02	G
PB-212	6.2775E-01						
		238.63	6.455E-01	(	1.086E-01	4.22E-02	G K
							Energy duplication
		77.11	5.840E-01	(	5.817E-01	1.80E-01	G
		74.81	8.544E-01	& P	1.180E+00	3.61E-01	G
PB-214	3.4170E-01						
		351.99	3.478E-01	(P	1.007E-01	3.89E-02	G K
		295.22	3.299E-01	(	1.969E-01	6.57E-02	G
							Energy duplication
		77.11	9.552E-01	+	9.514E-01	2.94E-01	G
		241.92	-1.862E-02	%	8.156E-01	2.42E-01	G
BI-212	9.1391E-01						
		727.17	6.416E-01	(	5.111E-01	2.23E-01	G K
		1620.56	2.082E+00	(P	7.804E-01	4.74E-01	G
		785.42	2.817E-03	% P	2.185E+00	5.99E-01	G
BI-214	4.0024E-01						
		609.32	4.002E-01	(	9.795E-02	4.57E-02	G K
		1764.51	1.777E-01	% P	2.538E-01	8.47E-02	G
		1120.28	6.559E-01	+	3.781E-01	1.48E-01	G
RA-224	5.0284E-01						
		241.00	5.028E-01	%(P	1.408E+00	4.24E-01	G
RA-226	5.6910E-01						
		185.99	5.691E-01	%(P	1.327E+00	4.00E-01	G
AC-228	6.9297E-01						
		911.07	6.651E-01	(P	2.161E-01	9.96E-02	G K
		968.90	1.173E+00	+ P	4.267E-01	2.16E-01	G
		338.40	7.603E-01	(	3.732E-01	1.50E-01	G
TH-227	-2.6485E-01						
		236.00	-2.648E-01	%(P	5.150E-01	1.56E-01	G K
		256.25	1.680E-01	&	5.202E-01	1.56E-01	G
PA-234	3.7025E-03						
		98.44	3.703E-03	%(	2.537E-01	7.55E-02	G K
		946.00	-7.372E-02	&	3.539E-01	1.03E-01	G
		131.28	-1.957E-02	&	2.687E-01	8.01E-02	G
		94.67	-1.461E-01	%	4.666E-01	1.41E-01	G
		883.24	1.375E-01	&	4.533E-01	1.33E-01	G
		926.70	0.000E+00	&	5.760E-01	1.61E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.956E-02 &   4.228E-01 1.21E-01 G

TH-234       7.4273E-01
                           63.29 7.427E-01 %(P 4.764E+00 1.42E+00 G K
                           92.80 1.557E+00 %   2.425E+00 7.40E-01 G
                           92.38 1.797E+00 % P 2.886E+00 8.80E-01 G

AM-241      -6.8102E-02
                           59.54-6.810E-02 &(  7.138E-01 2.13E-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:                      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 - 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 *****

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	2.3284E-01	2.4880E-01	3.5860E-01	3.5888E-01	3.602E-01
K-40		1.4767E+01	1.4767E+01	1.8443E+00	2.0219E+00	
MN-54	#A	5.0968E-03	5.1549E-03	4.2848E-02	4.2849E-02	5.008E-02
CO-57	#B	-1.0318E-03	-1.0454E-03	5.4138E-02	5.4138E-02	5.996E-02
CO-60		1.5065E-01	1.5093E-01	6.5080E-02	6.5629E-02	

Sr-85	#A	-1.9924E-02	-2.1042E-02	5.7230E-02	5.7242E-02	6.043E-02
Kr-85	#A	-4.6003E+02	-4.6004E+02	1.2510E+03	1.2513E+03	1.395E+03
Y-88	#B	-2.1461E-05	-2.2186E-05	1.3311E-04	1.3312E-04	2.410E-02
NB-94	#B	2.2525E-02	2.2525E-02	4.4235E-02	4.4253E-02	4.871E-02
Ag-108M	#B	8.5842E-03	8.5848E-03	4.5246E-02	4.5249E-02	5.251E-02
CD-109	#A	1.7431E-02	1.7567E-02	1.8728E+00	1.8728E+00	2.082E+00
SN-113	#B	-2.0120E-02	-2.0748E-02	6.6165E-02	6.6175E-02	7.189E-02
SB-125	#B	1.3889E-01	1.3937E-01	1.0085E-01	1.0115E-01	1.518E-01
I-131	#B	-1.6590E-02	-2.5769E-02	7.8230E-02	7.8243E-02	5.629E-02
CS-134	#B	-8.9200E-04	-8.9620E-04	4.2602E-02	4.2602E-02	4.985E-02
CS-137	#A	2.5512E-02	2.5520E-02	6.5489E-02	6.5505E-02	7.308E-02
CE-139	#A	1.5438E-03	1.5841E-03	4.8626E-02	4.8626E-02	5.337E-02
EU-152	#B	3.8790E-02	3.8819E-02	1.5906E-01	1.5907E-01	1.768E-01
EU-154	#B	-1.7403E-02	-1.7423E-02	1.2088E-01	1.2089E-01	1.315E-01
EU-155	#B	4.3715E-02	4.3800E-02	2.1593E-01	2.1595E-01	2.400E-01
HG-203	#B	-1.1086E-04	-1.1962E-04	1.8305E-01	1.8305E-01	4.954E-02
TL-208		2.4114E-01	2.4114E-01	7.2122E-02	7.3380E-02	
PB-212	#	6.2775E-01	6.2775E-01	1.2311E-01	1.2805E-01	1.086E-01
PB-214	#	3.4170E-01	3.4170E-01	1.1469E-01	1.1628E-01	1.007E-01
BI-212		9.1391E-01	9.1391E-01	5.7022E-01	5.7253E-01	
BI-214		4.0024E-01	4.0024E-01	1.3733E-01	1.3916E-01	
RA-224	#A	5.0284E-01	5.0284E-01	1.2720E+00	1.2723E+00	1.408E+00
RA-226	#A	5.6910E-01	5.6910E-01	1.2010E+00	1.2014E+00	1.327E+00
AC-228		6.9297E-01	6.9297E-01	2.5801E-01	2.6092E-01	
TH-227	#B	-2.6485E-01	-2.6485E-01	4.7369E-01	4.7392E-01	5.150E-01
PA-234	#B	3.7025E-03	3.7025E-03	2.2638E-01	2.2638E-01	2.537E-01
TH-234	#B	7.4273E-01	7.4273E-01	4.2749E+00	4.2751E+00	4.764E+00
AM-241	#A	-6.8100E-02	-6.8102E-02	6.3883E-01	6.3884E-01	7.138E-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 1999.0 keV) 1.7165817E+01 pCi/gm
Total Decayed Activity (50.2 to 1999.0 keV) 1.7166094E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_13DEC2005_1819.An1

Sample description
FSS-NOL-05-02-008-F

Spectrum Filename: C:\GammaVision\Spectra\102F_13DEC2005_1819.An1

Acquisition information
Start time: 13-Dec-2005 18:19:20
Live time: 2000
Real time: 2026
Dead time: 1.29 %
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/channel^2

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: 1.9710E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9710E+03) =
5.0736E+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	08-Dec-2005 13:57:00
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. 11 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2509

***** 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	115.	40.98	1.50	8.847E-03				
74.84	115.	40.98	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.00	192.	24.39	1.50	9.541E-03				
77.00	192.	24.39	1.50	9.541E-03	77.11	17.500	7.878E-01	PB212
					77.11	10.700	1.288E+00	PB214
77.00	192.	24.39	1.50	9.541E-03				
77.00	192.	24.39	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.288E+00	PB214
186.00	95.	29.46	1.09	1.627E-02	185.99	3.280	PBC<MDA	RA226
209.01	108.	29.45	1.25	1.521E-02				
238.60	657.	4.71	1.21	1.381E-02				
238.60	657.	4.71	1.21	1.381E-02	238.63	43.100	7.572E-01	PB212
276.82	75.	34.20	0.97	1.216E-02				
294.95	181.	15.64	1.52	1.148E-02				
294.95	181.	15.64	1.52	1.148E-02	295.22	19.200	5.647E-01	PB214
300.33	57.	33.16	1.37	1.128E-02				
337.94	194.	11.73	1.47	1.007E-02	338.40	12.010	1.102E+00	AC228
351.76	281.	9.62	1.49	9.685E-03				
351.76	281.	9.62	1.49	9.685E-03	351.99	37.100	5.362E-01	PB214
463.23	38.	31.14	1.35	7.369E-03				
463.23	38.	31.14	1.35	7.369E-03	463.51	10.000	PBC<MDA	SB125
510.46	101.	18.82	1.69	6.698E-03	510.72	22.500	4.597E-01	TL208
582.88	203.	9.65	1.38	5.893E-03	583.14	86.000	2.746E-01	TL208
609.08	195.	11.85	1.52	5.651E-03	609.32	46.090	5.140E-01	BI214
661.53	38.	30.31	1.51	5.229E-03	661.62	84.620	5.932E-02	CS137
727.31	70.	28.92	0.94	4.793E-03	727.17	11.800	8.520E-01	BI212
795.34	45.	24.92	1.14	4.422E-03				

795.34	45.	24.92	1.14	4.422E-03	795.76	85.400	8.287E-02	CS134
911.03	146.	13.28	1.80	3.922E-03	911.07	29.000	8.781E-01	AC228
968.63	104.	20.28	1.59	3.719E-03	968.90	17.460	1.101E+00	AC228
1120.57	52.	36.17	0.61	3.283E-03	1120.28	15.040	7.179E-01	BI214
1172.28	55.	30.59	0.88	3.159E-03				
1460.07	626.	4.23	2.06	2.622E-03	1460.75	10.700	1.531E+01	K40
1763.56	27.	19.25	1.42	2.225E-03	1764.51	15.920	5.208E-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	
417.63	209.01	349.	108.	0.054	88.34	1.253	AC-228	s
476.83	238.61	150.	657.	0.329	14.12	1.215	PB-212	D
553.29	276.82	212.	74.	0.037	90.03	0.970	TL-208	s
600.32	300.33	134.	57.	0.028	95.61	1.368	PB-212	s
2345.02	1172.28	63.	49.	0.025	80.53	0.881	J-132	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	153.80	77.11	999.	192.	0.096	73.17	1.500D
PB-214	153.80	77.11	999.	192.	0.096	73.17	1.500D
RA-226	371.59	185.99	447.	96.	0.048	93.48	1.500D
PB-212	476.85	238.61	359.	627.	0.314	17.54	1.500
PB-214	590.09	295.22	215.	157.	0.078	46.43	1.500s
AC-228	675.55	337.94	125.	194.	0.097	35.18	1.470s
PB-214	703.21	351.76	118.	246.	0.123	26.74	1.500
SB-125	925.91	463.08	81.	35.	0.018	113.44	1.500
TL-208	1020.71	510.46	84.	101.	0.051	56.47	1.686s
TL-208	1165.59	582.88	63.	203.	0.101	28.96	1.383
BI-214	1218.02	609.08	92.	195.	0.098	35.54	1.524
CS-137	1322.96	661.53	48.	38.	0.019	90.94	1.509s
BI-212	1453.89	726.97	57.	34.	0.017	107.98	1.554s
CS-134	1589.55	794.77	24.	34.	0.017	79.08	1.601
AC-228	1822.20	911.03	62.	146.	0.073	39.85	1.804s
AC-228	1937.47	968.63	84.	104.	0.052	60.84	1.594
BI-214	2241.53	1120.57	69.	52.	0.026	108.51	0.614s
K-40	2921.04	1460.07	16.	626.	0.313	12.70	2.055
BI-214	3528.58	1763.56	0.	27.	0.013	57.74	1.415s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		9.3244E-02					
			477.56	9.324E-02	&(	4.379E-01 1.28E-01	G
K-40		1.5312E+01					
			1460.75	1.531E+01	(P	5.184E-01 6.48E-01	G
MN-54		1.3939E-02					
			834.81	1.394E-02	%(P	5.097E-02 1.49E-02	G
CO-57		2.0824E-03					
			122.07	2.082E-03	&(	6.593E-02 1.96E-02	G K
			136.43	1.038E-01	%	4.622E-01 1.39E-01	G
CO-60		4.1790E-02					
			1332.51	4.179E-02	%(P	5.692E-02 1.83E-02	G K
			1173.23	1.253E-02	%	7.118E-02 2.05E-02	G K
Sr-85		-2.4932E-02					
			514.00	-2.493E-02	&(	6.583E-02 1.98E-02	G
Kr-85		-5.4477E+02					
			513.99	-5.448E+02	&(	1.438E+03 4.32E+02	G
Y-88		-5.8579E-04					
			1836.01	-5.858E-04	&(P	4.857E-02 1.21E-02	G K
			898.02	-1.235E-03	& P	5.828E-02 1.60E-02	G
NB-94		2.3749E-02					
			871.10	2.375E-02	%(	5.182E-02 1.57E-02	G K
			702.50	-9.102E-03	%	5.440E-02 1.58E-02	G K
Ag-108M		-3.7371E-02					
			722.95	-3.737E-02	&(	8.007E-02 2.43E-02	G K
			614.37	-1.458E-03	% P	5.875E-02 1.67E-02	G
			433.93	1.632E-02	&	4.148E-02 1.24E-02	G
CD-109		8.1554E-01					
			88.04	8.155E-01	&(P	2.112E+00 6.38E-01	G
SN-113		-1.1879E-02					
			391.71	-1.188E-02	%(	7.477E-02 2.20E-02	G K
			255.04	3.850E-01	%	2.044E+00 6.07E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0987E-01						
		427.95	3.495E-02	%(P	9.797E-02	2.90E-02	G K
		600.77	3.546E-03	& P	2.615E-01	7.41E-02	G
		636.15	-1.106E-01	& P	4.697E-01	1.38E-01	G
		463.51	3.316E-01	(P	4.175E-01	1.31E-01	G
		176.29	-2.171E-01	& P	6.684E-01	2.00E-01	G
I-131	-1.7867E-02						
		364.48	-1.787E-02	%(	7.572E-02	2.24E-02	G K
		636.97	-2.516E-01	%	1.021E+00	2.99E-01	G
		284.29	3.054E-01	%	1.018E+00	3.04E-01	G
CS-134	2.7173E-02						
		604.66	-3.961E-03	%(	1.284E-01	3.80E-02	G K
		795.76	6.276E-02	(	4.651E-02	1.65E-02	G
		569.29	-4.024E-02	%	3.084E-01	8.92E-02	G
		801.84	-4.578E-03	& P	6.412E-01	1.80E-01	G
CS-137	5.9320E-02						
		661.62	5.932E-02	(	5.433E-02	1.80E-02	G
CE-139	-2.2594E-04						
		165.85	-2.259E-04	&(P	5.458E-02	1.61E-02	G
EU-152	-1.1134E-02						
		121.78	-1.113E-02	&(P	1.923E-01	5.73E-02	G K
		344.30	3.831E-02	%	1.340E-01	3.98E-02	G
		1408.08	7.359E-02	%	1.905E-01	5.64E-02	G
		964.00	3.076E-01	& P	4.470E-01	1.40E-01	G
		1112.07	-5.734E-02	%	6.062E-01	1.74E-01	G
		778.90	8.358E-02	% P	4.108E-01	1.19E-01	G
EU-154	3.2767E-02						
		123.10	3.277E-02	&(P	1.082E-01	3.25E-02	G K
		1274.80	-3.611E-02	%	2.076E-01	5.96E-02	G
		723.30	3.417E-02	& P	2.440E-01	6.98E-02	G
		1004.80	-5.772E-02	%	3.464E-01	9.94E-02	G
EU-155	6.3823E-02						
		86.45	6.382E-02	&(P	2.248E-01	6.75E-02	G K
		105.31	5.320E-02	%	2.922E-01	8.76E-02	G
HG-203	7.3157E-04						
		279.17	7.316E-04	%(P	5.638E-02	1.65E-02	G K
		72.87	-5.769E-01	%	2.148E+00	6.47E-01	G
		70.83	-1.434E-02	%	4.021E+00	1.20E+00	G
		82.50	-6.477E-01	%	4.253E+00	1.27E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7462E-01						
		583.14	2.746E-01	(P	5.377E-02	2.66E-02	G
		510.72	4.597E-01	+	2.067E-01	8.65E-02	G
PB-212	7.4174E-01						
		238.63	7.230E-01	(	1.049E-01	4.23E-02	G K
							Energy duplication
		77.11	7.878E-01	*(	6.159E-01	1.92E-01	G
		74.81	9.293E-01	& P	1.279E+00	3.91E-01	G
PB-214	4.7589E-01						
		351.99	4.698E-01	(P	1.020E-01	4.19E-02	G K
		295.22	4.876E-01	*(	2.214E-01	7.55E-02	G
							Energy duplication
		77.11	1.288E+00	+	1.007E+00	3.14E-01	G
		241.92	-4.408E-02	%	8.332E-01	2.48E-01	G
BI-212	4.0928E-01						
		727.17	4.093E-01	(	4.592E-01	1.47E-01	G K
		1620.56	-3.614E-02	% P	2.061E+00	5.33E-01	G
		785.42	-3.228E-01	% P	2.718E+00	7.77E-01	G
BI-214	5.1576E-01						
		609.32	5.140E-01	(	1.247E-01	6.09E-02	G K
		1764.51	5.208E-01	(P	1.426E-01	1.01E-01	G
		1120.28	7.179E-01	+	5.763E-01	2.60E-01	G
RA-224	8.2440E-01						
		241.00	8.244E-01	%(P	1.360E+00	4.15E-01	G
RA-226	1.2380E+00						
							Energy duplication
		185.99	1.238E+00	*(P	1.301E+00	4.04E-01	G
AC-228	9.9074E-01						
		911.07	8.781E-01	@(P	2.381E-01	1.17E-01	G K
		968.90	1.101E+00	(P	4.790E-01	2.23E-01	G
		338.40	1.102E+00	@(	3.108E-01	1.29E-01	G
TH-227	-1.6723E-01						
		236.00	-1.672E-01	%(P	5.054E-01	1.52E-01	G K
		256.25	-1.649E-02	&	6.057E-01	1.78E-01	G
PA-234	-7.8277E-02						
		98.44	-7.828E-02	%(	2.682E-01	8.08E-02	G K
		946.00	2.778E-02	&	3.202E-01	9.11E-02	G
		131.28	2.119E-03	%	2.653E-01	7.89E-02	G
		94.67	-5.868E-02	%	4.858E-01	1.45E-01	G
		883.24	6.023E-02	%	4.049E-01	1.15E-01	G
		926.70	7.512E-02	&	4.895E-01	1.40E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-5.941E-02 %   4.553E-01 1.32E-01 G

TH-234       1.0334E-01
                           63.29 1.033E-01 %(P 4.540E+00 1.35E+00 G K
                           92.80 1.250E+00 %   2.547E+00 7.73E-01 G
                           92.38 9.069E-01 & P 2.763E+00 8.33E-01 G

AM-241      -2.0490E-01
                           59.54-2.049E-01 %(  7.181E-01 2.16E-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:                      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 - 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 *****

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	8.7178E-02	9.3244E-02	3.8510E-01	3.8513E-01	4.094E-01
K-40		1.5312E+01	1.5312E+01	1.9446E+00	2.1259E+00	
MN-54	#A	1.3779E-02	1.3939E-02	4.4665E-02	4.4672E-02	5.039E-02
CO-57	#B	2.0549E-03	2.0824E-03	5.8914E-02	5.8914E-02	6.506E-02
CO-60	#B	4.1712E-02	4.1790E-02	5.4857E-02	5.4907E-02	5.682E-02

Sr-85	#A	-2.3588E-02	-2.4932E-02	5.9343E-02	5.9360E-02	6.229E-02
Kr-85	#A	-5.4475E+02	-5.4477E+02	1.2963E+03	1.2966E+03	1.438E+03
Y-88	#B	-5.6638E-04	-5.8579E-04	3.9040E-02	3.9040E-02	4.696E-02
NB-94	#B	2.3749E-02	2.3749E-02	4.7022E-02	4.7041E-02	5.182E-02
Ag-108M	#B	-3.7368E-02	-3.7371E-02	7.2752E-02	7.2783E-02	8.007E-02
CD-109	#A	8.0910E-01	8.1554E-01	1.9139E+00	1.9145E+00	2.095E+00
SN-113	#B	-1.1514E-02	-1.1879E-02	6.5982E-02	6.5986E-02	7.247E-02
SB-125	#F	1.0948E-01	1.0987E-01	1.3007E-01	1.3021E-01	9.762E-02
I-131	#B	-1.1429E-02	-1.7867E-02	6.7164E-02	6.7172E-02	4.843E-02
CS-134	#B	2.7044E-02	2.7173E-02	2.1489E-02	2.1543E-02	1.278E-01
CS-137	#	5.9301E-02	5.9320E-02	5.3947E-02	5.4050E-02	5.431E-02
CE-139	#A	-2.2012E-04	-2.2594E-04	4.2325E-02	4.2325E-02	5.317E-02
EU-152	#B	-1.1125E-02	-1.1134E-02	2.1441E-01	2.1441E-01	1.922E-01
EU-154	#B	3.2729E-02	3.2767E-02	9.7585E-02	9.7602E-02	1.081E-01
EU-155	#B	6.3697E-02	6.3823E-02	2.0256E-01	2.0259E-01	2.243E-01
HG-203	#B	6.7729E-04	7.3157E-04	4.9517E-02	4.9517E-02	5.219E-02
TL-208		2.7462E-01	2.7462E-01	7.9688E-02	8.1165E-02	
PB-212	#	7.4174E-01	7.4174E-01	1.3008E-01	1.3657E-01	1.049E-01
PB-214	#	4.7589E-01	4.7589E-01	1.2743E-01	1.3020E-01	1.020E-01
BI-212	#A	4.0928E-01	4.0928E-01	4.4194E-01	4.4253E-01	4.592E-01
BI-214		5.1576E-01	5.1576E-01	1.7525E-01	1.7762E-01	
RA-224	#A	8.2440E-01	8.2440E-01	1.2444E+00	1.2453E+00	1.360E+00
RA-226	#A	1.2380E+00	1.2380E+00	1.2109E+00	1.2129E+00	1.301E+00
AC-228		9.9074E-01	9.9074E-01	2.6698E-01	2.7271E-01	
TH-227	#B	-1.6723E-01	-1.6723E-01	4.6337E-01	4.6347E-01	5.054E-01
PA-234	#B	-7.8277E-02	-7.8277E-02	2.4230E-01	2.4234E-01	2.682E-01
TH-234	#B	1.0334E-01	1.0334E-01	4.0480E+00	4.0480E+00	4.540E+00
AM-241	#A	-2.0490E-01	-2.0490E-01	6.4812E-01	6.4822E-01	7.181E-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 (269.7 to 1999.0 keV) 1.7092638E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 1.7092638E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_23FEB2006_1131.An1

Sample description
FSS-NOL-05-02-008-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\102F_23FEB2006_1131.An1

Acquisition information
Start time: 23-Feb-2006 11:33:27
Live time: 2000
Real time: 2023
Dead time: 1.13 %
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/channel^2

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: 1.7290E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7290E+03) =
5.7837E+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.

YAEC Chemistry Lab Spectrum name: 102F_23FEB2006_1131.An1

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	21-Feb-2006 15:28:00
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: 0.2143

***** 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
74.75	145.	20.13	1.10	8.847E-03	74.81	9.600	1.337E+00	PB212
77.05	157.	16.51	1.10	9.541E-03	77.11	17.500	9.504E-01	PB212
					77.11	10.700	1.554E+00	PB214
185.36	120.	26.27	1.13	1.629E-02				
185.36	120.	26.27	1.13	1.629E-02	185.99	3.280	1.685E+00	RA226
209.54	73.	37.65	1.47	1.518E-02				
238.85	612.	7.70	1.22	1.379E-02	238.63	43.100	8.039E-01	PB212
295.27	149.	11.35	1.25	1.147E-02	295.22	19.200	5.299E-01	PB214
300.30	57.	25.33	1.26	1.129E-02				
328.52	35.	41.11	0.73	1.035E-02				
338.67	136.	15.95	1.01	1.005E-02	338.40	12.010	8.824E-01	AC228
352.08	248.	12.46	1.41	9.676E-03	351.99	37.100	5.396E-01	PB214
462.86	60.	28.07	1.27	7.375E-03				
462.86	60.	28.07	1.27	7.375E-03	463.51	10.000	6.264E-01	SB125
511.43	106.	19.28	1.17	6.686E-03	510.72	22.500	5.490E-01	TL208
583.42	184.	13.74	1.22	5.887E-03	583.14	86.000	2.839E-01	TL208
609.55	180.	10.75	1.33	5.647E-03	609.32	46.090	5.415E-01	BI214
726.95	60.	22.48	1.80	4.795E-03	727.17	11.800	8.262E-01	BI212
795.15	33.	29.67	1.60	4.420E-03	795.76	85.400	6.764E-02	CS134
911.71	130.	11.56	1.06	3.919E-03	911.07	29.000	8.918E-01	AC228
968.26	109.	14.96	1.62	3.720E-03	968.90	17.460	1.317E+00	AC228
1120.98	61.	24.43	0.95	3.283E-03	1120.28	15.040	9.624E-01	BI214
1461.35	588.	4.12	2.20	2.620E-03	1460.75	10.700	1.638E+01	K40
1765.10	24.	22.58	0.63	2.225E-03	1764.51	15.920	5.298E-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	
418.69	209.54	273.	73.	0.036	112.96	1.465	AC-228	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
600.11	300.23	102.	50.	0.025	95.62	1.399	PB-212	M
656.71	328.52	86.	35.	0.018	123.32	0.728	RH-106M	s
1022.63	511.43	144.	53.	0.027	103.75	1.167	RH-106M	s

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	149.20	74.81	375.	145.	0.073	60.40	1.098D
PB-212	153.80	77.11	386.	157.	0.078	49.53	1.100A
RA-226	371.70	186.05	424.	87.	0.044	99.62	1.500s
PB-212	476.89	238.63	149.	559.	0.280	15.72	1.215D
PB-214	590.05	295.20	115.	152.	0.076	39.78	1.371
AC-228	677.01	338.67	130.	136.	0.068	47.85	1.007
PB-214	703.85	352.08	192.	248.	0.124	37.39	1.410s
SB-125	926.85	463.55	73.	34.	0.017	113.69	1.500s
TL-208	1021.94	511.08	92.	52.	0.026	88.30	1.499s
TL-208	1166.64	583.41	58.	152.	0.076	32.25	1.499
BI-214	1218.95	609.55	58.	180.	0.090	32.26	1.326
BI-212	1453.86	726.95	43.	60.	0.030	67.45	1.802s
CS-134	1590.31	795.15	30.	33.	0.016	89.01	1.601s
AC-228	1823.57	911.71	32.	130.	0.065	34.69	1.059s
AC-228	1936.72	968.26	41.	109.	0.055	44.87	1.615s
BI-214	2242.36	1120.98	43.	61.	0.030	73.29	0.949s
K-40	2923.61	1461.35	0.	588.	0.294	12.37	2.200
BI-214	3531.66	1765.10	2.	24.	0.012	67.74	0.630s

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	Nuclide Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		7.8740E-02					
			477.56	7.874E-02	&(	4.156E-01 1.21E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	1.6384E+01						
		1460.75	1.638E+01	(P	2.054E-01	6.76E-01	G
MN-54	1.4885E-02						
		834.81	1.488E-02	%(P	5.054E-02	1.48E-02	G
CO-57	-5.6168E-03						
		122.07	-5.617E-03	%(	6.518E-02	1.94E-02	G K
		136.43	-2.465E-02	%	4.852E-01	1.44E-01	G
CO-60	-2.1470E-04						
		1332.51	-2.147E-04	%(P	6.620E-02	1.78E-02	G K
		1173.23	-1.625E-03	%	8.437E-02	2.37E-02	G K
Sr-85	1.4473E-04						
		514.00	1.447E-04	&(	6.545E-02	1.89E-02	G
Kr-85	2.9718E+00						
		513.99	2.972E+00	&(	1.482E+03	4.27E+02	G
Y-88	-2.4319E-05						
		1836.01	-2.432E-05	%(P	2.731E-02	3.71E-03	G K
		898.02	6.920E-03	& P	5.485E-02	1.53E-02	G
NB-94	0.0000E+00						
		871.10	0.000E+00	%(	7.436E-02	2.10E-02	G K
		702.50	1.707E-02	%	4.674E-02	1.39E-02	G K
Ag-108M	-1.9760E-02						
		722.95	-1.976E-02	&(	7.502E-02	2.21E-02	G K
		614.37	-2.484E-02	& P	6.436E-02	1.92E-02	G
		433.93	2.225E-03	&	4.835E-02	1.39E-02	G
CD-109	-3.6536E-02						
		88.04	-3.654E-02	%(P	1.999E+00	5.92E-01	G
SN-113	1.2020E-02						
		391.71	1.202E-02	%(	6.615E-02	1.94E-02	G K
		255.04	3.676E-01	&	2.097E+00	6.21E-01	G
SB-125	8.6654E-02						
		427.95	-4.604E-03	%(P	1.471E-01	4.17E-02	G K
		600.77	4.545E-02	% P	2.215E-01	6.38E-02	G
		636.15	1.039E-01	& P	3.947E-01	1.15E-01	G
		463.51	3.568E-01	*(P	4.506E-01	1.41E-01	G
		176.29	-5.588E-02	% P	7.266E-01	2.14E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	2.4691E-03						
		364.48	2.469E-03	%(	6.816E-02	1.98E-02	G K
		636.97	3.686E-02	&	7.372E-01	2.07E-01	G
		284.29	2.145E-01	%	8.087E-01	2.41E-01	G
CS-134	3.3165E-02						
		604.66	3.001E-03	&(	1.038E-01	3.04E-02	G K
		795.76	6.764E-02	(	5.900E-02	2.01E-02	G
		569.29	-1.516E-02	&	2.979E-01	8.42E-02	G
		801.84	-8.906E-02	% P	6.573E-01	1.87E-01	G
CS-137	3.5798E-02						
		661.62	3.580E-02	&(	5.502E-02	1.72E-02	G
CE-139	-5.2506E-03						
		165.85	-5.251E-03	%(P	5.187E-02	1.54E-02	G
EU-152	-3.3341E-02						
		121.78	-3.334E-02	%(P	1.932E-01	5.77E-02	G K
		344.30	4.615E-03	%	1.516E-01	4.38E-02	G
		1408.08	3.936E-02	%	2.529E-01	6.95E-02	G
		964.00	5.339E-02	& P	3.192E-01	8.92E-02	G
		1112.07	-1.138E-02	&	5.453E-01	1.52E-01	G
		778.90	-4.087E-02	% P	3.967E-01	1.12E-01	G
EU-154	5.2632E-03						
		123.10	5.263E-03	%(P	1.333E-01	3.96E-02	G K
		1274.80	-1.711E-02	&	2.251E-01	6.32E-02	G
		723.30	-4.324E-02	& P	2.885E-01	8.27E-02	G
		1004.80	4.679E-03	&	3.739E-01	1.04E-01	G
EU-155	-8.0483E-03						
		86.45	-8.048E-03	&(P	2.077E-01	6.11E-02	G K
		105.31	2.708E-02	&	3.061E-01	9.13E-02	G
HG-203	-1.2104E-02						
		279.17	-1.210E-02	%(P	5.656E-02	1.68E-02	G K
		72.87	-4.099E-01	%	2.360E+00	7.08E-01	G
		70.83	-4.049E-02	%	4.109E+00	1.22E+00	G
		82.50	-3.753E-01	&	4.561E+00	1.36E+00	G
TL-208	2.4181E-01						
		583.14	2.340E-01	(P	5.895E-02	2.52E-02	G
		510.72	2.715E-01	*(	2.465E-01	7.99E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	7.3446E-01						
		238.63	7.345E-01	(	7.837E-02	3.85E-02	G K
							Energy duplication
		77.11	7.345E-01	}	4.412E-01	1.21E-01	G
		74.81	1.337E+00	+ P	8.551E-01	2.75E-01	G
PB-214	5.3939E-01						
		351.99	5.396E-01	@(P	1.465E-01	6.74E-02	G K
		295.22	5.390E-01	(	1.872E-01	7.15E-02	G
							Energy duplication
		77.11	5.796E-02	}	1.004E+00	2.54E-01	G
		241.92	-8.737E-03	%	5.361E-01	1.57E-01	G
BI-212	8.2621E-01						
		727.17	8.262E-01	*(	4.606E-01	1.86E-01	G K
		1620.56	5.236E-01	% P	1.732E+00	4.91E-01	G
		785.42	1.061E+00	% P	2.807E+00	8.37E-01	G
BI-214	5.3850E-01						
		609.32	5.415E-01	(	1.143E-01	5.83E-02	G K
		1764.51	5.298E-01	(P	2.047E-01	1.20E-01	G
		1120.28	9.624E-01	+	5.277E-01	2.35E-01	G
RA-224	-3.5475E-02						
		241.00	-3.547E-02	&(P	1.552E+00	4.59E-01	G
RA-226	1.2804E+00						
		185.99	1.280E+00	*(P	1.445E+00	4.47E-01	G
AC-228	8.8902E-01						
		911.07	8.918E-01	@(P	2.004E-01	1.03E-01	G K
		968.90	1.317E+00	+ P	3.903E-01	1.97E-01	G
		338.40	8.824E-01	(	3.607E-01	1.41E-01	G
TH-227	-1.6280E-01						
		236.00	-1.628E-01	&(P	5.365E-01	1.61E-01	G K
		256.25	-1.267E-01	&	6.899E-01	2.05E-01	G
PA-234	-5.1013E-02						
		98.44	-5.101E-02	%(	2.432E-01	7.28E-02	G K
		946.00	-2.565E-03	%	2.537E-01	6.87E-02	G
		131.28	8.119E-02	&	2.337E-01	7.04E-02	G
		94.67	-7.967E-02	%	4.539E-01	1.36E-01	G
		883.24	-8.042E-02	%	5.249E-01	1.50E-01	G
		926.70	2.496E-01	%	5.283E-01	1.60E-01	G
		569.26	-2.180E-02	&	4.532E-01	1.28E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-234       1.3404E+00
                           63.29 1.340E+00 &(P 5.079E+00 1.53E+00 G K
                           92.80 1.488E+00 &   2.735E+00 8.31E-01 G
                           92.38 2.174E-01 & P 3.261E+00 9.73E-01 G

AM-241      -1.4297E-01
                           59.54-1.430E-01 %(  8.314E-01 2.49E-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:                      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 - 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 *****

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	7.6885E-02	7.8740E-02	3.6238E-01	3.6241E-01	4.058E-01
K-40		1.6384E+01	1.6384E+01	2.0276E+00	2.2263E+00	
MN-54	#A	1.4824E-02	1.4885E-02	4.4258E-02	4.4266E-02	5.033E-02
CO-57	#B	-5.5904E-03	-5.6168E-03	5.8236E-02	5.8236E-02	6.487E-02
CO-60	#B	-2.1456E-04	-2.1470E-04	8.3005E-03	8.3005E-03	6.616E-02
Sr-85	#A	1.4191E-04	1.4473E-04	5.6627E-02	5.6627E-02	6.418E-02

Kr-85	#A	2.9718E+00	2.9718E+00	1.2818E+03	1.2818E+03	1.482E+03
Y-88	#B	-2.4030E-05	-2.4319E-05	1.4591E-04	1.4592E-04	2.698E-02
NB-94	#B	0.0000E+00	0.0000E+00	6.2969E-02	6.2969E-02	7.436E-02
Ag-108M	#B	-1.9759E-02	-1.9760E-02	6.6324E-02	6.6333E-02	7.501E-02
CD-109	#A	-3.6433E-02	-3.6536E-02	9.3532E+00	9.3532E+00	1.993E+00
SN-113	#B	1.1888E-02	1.2020E-02	5.8069E-02	5.8073E-02	6.542E-02
SB-125	#B	8.6545E-02	8.6654E-02	1.0305E-01	1.0317E-01	1.469E-01
I-131	#B	2.1074E-03	2.4691E-03	5.9304E-02	5.9304E-02	5.817E-02
CS-134	#B	3.3109E-02	3.3165E-02	2.9521E-02	2.9579E-02	1.037E-01
CS-137	#A	3.5794E-02	3.5798E-02	5.1583E-02	5.1622E-02	5.501E-02
CE-139	#A	-5.2022E-03	-5.2506E-03	5.0718E-02	5.0718E-02	5.139E-02
EU-152	#B	-3.3332E-02	-3.3341E-02	1.8834E-01	1.8835E-01	1.932E-01
EU-154	#B	5.2610E-03	5.2632E-03	1.1875E-01	1.1875E-01	1.332E-01
EU-155	#B	-8.0427E-03	-8.0483E-03	6.4846E+00	6.4846E+00	2.075E-01
HG-203	#B	-1.1778E-02	-1.2104E-02	5.0988E-02	5.0993E-02	5.504E-02
TL-208	#	2.4181E-01	2.4181E-01	7.8194E-02	7.9363E-02	5.895E-02
PB-212		7.3446E-01	7.3446E-01	1.1542E-01	1.2256E-01	
PB-214		5.3939E-01	5.3939E-01	1.4735E-01	1.5043E-01	
BI-212	#	8.2621E-01	8.2621E-01	5.5726E-01	5.5919E-01	
BI-214		5.3850E-01	5.3850E-01	1.7370E-01	1.7631E-01	
RA-224	#A	-3.5475E-02	-3.5475E-02	3.9002E+00	3.9002E+00	1.552E+00
RA-226	#A	1.2804E+00	1.2804E+00	1.3406E+00	1.3426E+00	1.445E+00
AC-228		8.8902E-01	8.8902E-01	2.6289E-01	2.6758E-01	
TH-227	#B	-1.6280E-01	-1.6280E-01	4.9206E-01	4.9214E-01	5.365E-01
PA-234	#B	-5.1013E-02	-5.1013E-02	2.1832E-01	2.1834E-01	2.432E-01
TH-234	#B	1.3404E+00	1.3404E+00	4.5762E+00	4.5768E+00	5.079E+00
AM-241	#A	-1.4297E-01	-1.4297E-01	7.4696E-01	7.4700E-01	8.314E-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 (277.7 to 1999.0 keV) 1.9911901E+01 pCi/gm
Total Decayed Activity (277.7 to 1999.0 keV) 1.9911901E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_23FEB2006_1337.An1

Sample description
FSS-NOL-05-02-013-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\102F_23FEB2006_1337.An1

Acquisition information
Start time: 23-Feb-2006 13:38:48
Live time: 2000
Real time: 2024
Dead time: 1.19 %
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/channel^2

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: 1.7990E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7990E+03) =
5.5586E+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	21-Feb-2006 15:41:00
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. 11 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1080

***** 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
77.03	209.	20.13	1.50	9.541E-03	77.11	10.700	1.536E+00	PB214
					77.11	17.500	9.393E-01	PB212
77.03	209.	20.13	1.50	9.541E-03	77.11	10.700	1.536E+00	PB214
					77.11	17.500	9.393E-01	PB212
89.57	68.	40.98	1.11	1.271E-02				
92.84	120.	21.64	1.11	1.337E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.252E+00	TH234
128.89	77.	38.55	1.27	1.714E-02				
186.14	131.	20.12	1.35	1.626E-02	185.99	3.280	1.776E+00	RA226
208.66	80.	36.17	1.11	1.522E-02				
238.65	586.	5.00	1.21	1.381E-02				
238.65	586.	5.00	1.21	1.381E-02	238.63	43.100	7.402E-01	PB212
241.60	85.	24.16	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.227E-01	PB214
295.25	127.	13.62	1.25	1.146E-02	295.22	19.200	4.345E-01	PB214
300.13	45.	31.33	1.26	1.129E-02				
328.13	53.	37.97	1.40	1.037E-02				
338.78	130.	18.33	1.32	1.005E-02	338.40	12.010	8.082E-01	AC228
352.10	257.	11.75	1.16	9.676E-03	351.99	37.100	5.368E-01	PB214
462.73	45.	27.85	1.28	7.377E-03				
462.73	45.	27.85	1.28	7.377E-03	463.51	10.000	4.417E-01	SB125
511.29	92.	19.95	1.49	6.688E-03	510.72	22.500	4.588E-01	TL208
583.15	170.	10.45	1.17	5.890E-03	583.14	86.000	2.515E-01	TL208
609.20	154.	13.77	1.48	5.650E-03	609.32	46.090	4.431E-01	BI214
727.26	42.	24.53	2.25	4.794E-03	727.17	11.800	5.630E-01	BI212
910.84	126.	12.90	1.30	3.923E-03	911.07	29.000	8.320E-01	AC228
968.08	88.	24.22	1.58	3.721E-03	968.90	17.460	1.016E+00	AC228

1120.77	67.	22.36	2.12	3.283E-03	1120.28	15.040	1.019E+00	BI214
1460.55	605.	4.16	2.25	2.621E-03	1460.75	10.700	1.621E+01	K40
1764.40	17.	33.03	2.24	2.225E-03	1764.51	15.920	3.555E-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	
178.71	89.71	355.	68.	0.034	122.94	1.109	PB-214	D
185.26	92.99	277.	120.	0.060	64.92	1.111	TH-234	D
257.37	128.89	356.	105.	0.053	81.31	1.267	AC-228	
416.94	208.66	303.	80.	0.040	108.52	1.108	LU-177	
476.93	238.58	136.	586.	0.293	14.99	1.215	PB-212	D
482.83	241.53	166.	85.	0.042	72.49	1.217	PB-214	D
599.91	300.17	75.	45.	0.022	94.00	1.258	PB-212	lD
655.93	328.13	131.	53.	0.027	113.91	1.401	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

********** 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	779.	209.	0.104	60.40	1.500D
PB-212	153.80	77.11	779.	209.	0.104	60.40	1.500D
TH-234	185.20	92.81	765.	118.	0.059	102.36	1.500
TH-234	185.17	92.80	768.	109.	0.054	111.64	1.500
RA-226	371.52	185.95	370.	98.	0.049	84.64	1.500s
PB-212	476.97	238.67	326.	549.	0.275	18.93	1.500
PB-214	590.19	295.27	161.	127.	0.063	50.23	1.500s
AC-228	677.23	338.78	146.	130.	0.065	55.00	1.316s
PB-214	703.66	351.99	129.	205.	0.102	31.44	1.500s
SB-125	926.34	463.29	53.	35.	0.018	96.59	1.500
TL-208	1022.36	511.29	70.	92.	0.046	59.86	1.488s
TL-208	1166.14	583.15	56.	170.	0.085	31.35	1.170
BI-214	1218.26	609.20	86.	154.	0.077	41.31	1.476
BI-212	1454.47	727.26	29.	42.	0.021	73.59	2.252s
AC-228	1821.83	910.84	41.	126.	0.063	38.69	1.301
AC-228	1936.36	968.08	79.	88.	0.044	72.65	1.579s
BI-214	2241.93	1120.77	45.	67.	0.034	67.09	2.117
K-40	2921.99	1460.55	7.	605.	0.303	12.48	2.254
BI-214	3530.27	1764.40	7.	17.	0.008	99.09	2.237s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-9.1594E-02					
			477.56	-9.159E-02	%(	4.148E-01 1.21E-01	G
K-40		1.6213E+01					
			1460.75	1.621E+01	(P	3.969E-01 6.74E-01	G
MN-54		1.1080E-02					
			834.81	1.108E-02	%(P	5.452E-02 1.57E-02	G
CO-57		3.8607E-04					
			122.07	3.861E-04	%(	6.517E-02 1.94E-02	G K
			136.43	-4.372E-03	&	4.837E-01 1.43E-01	G
CO-60		-2.0635E-04					
			1332.51	-2.064E-04	%(P	7.421E-02 2.03E-02	G K
			1173.23	-1.138E-02	%	9.299E-02 2.68E-02	G K
Sr-85		-9.2823E-03					
			514.00	-9.282E-03	&(	6.092E-02 1.78E-02	G
Kr-85		-2.0978E+02					
			513.99	-2.098E+02	&(	1.378E+03 4.03E+02	G
Y-88		-2.3385E-05					
			1836.01	-2.338E-05	%(P	1.102E-01 3.05E-02	G K
			898.02	1.739E-03	& P	5.815E-02 1.60E-02	G
NB-94		1.5715E-02					
			871.10	1.571E-02	&(	5.540E-02 1.62E-02	G K
			702.50	-1.143E-03	%	5.935E-02 1.68E-02	G K
Ag-108M		-1.7265E-02					
			722.95	-1.727E-02	%(	7.064E-02 2.07E-02	G K
			614.37	-3.649E-04	& P	5.459E-02 1.53E-02	G
			433.93	8.456E-03	%	4.611E-02 1.35E-02	G
CD-109		-7.5316E-02					
			88.04	-7.532E-02	%(P	2.439E+00 7.27E-01	G
SN-113		-2.5232E-02					
			391.71	-2.523E-02	%(	7.545E-02 2.26E-02	G K
			255.04	-3.273E-02	%	2.099E+00 6.15E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.5831E-02						
		427.95	-2.012E-02	%(P	1.337E-01	3.84E-02	G K
		600.77	-9.973E-04	% P	3.150E-01	8.96E-02	G
		636.15	-8.671E-02	& P	5.183E-01	1.51E-01	G
		463.51	3.598E-01	(P	3.750E-01	1.21E-01	G
		176.29	-7.454E-02	& P	6.841E-01	2.02E-01	G
I-131	4.4501E-04						
		364.48	4.450E-04	%(	6.145E-02	1.77E-02	G K
		636.97	-1.337E-02	%	7.693E-01	2.16E-01	G
		284.29	2.495E-01	%	8.325E-01	2.49E-01	G
CS-134	-9.3601E-03						
		604.66	-9.360E-03	%(	5.734E-02	1.67E-02	G K
		795.76	3.331E-02	%	5.761E-02	1.78E-02	G
		569.29	6.863E-04	%	2.907E-01	8.16E-02	G
		801.84	-3.085E-03	& P	5.791E-01	1.60E-01	G
CS-137	3.0592E-02						
		661.62	3.059E-02	%(	6.393E-02	1.94E-02	G
CE-139	-3.0953E-05						
		165.85	-3.095E-05	%(P	4.527E-02	1.33E-02	G
EU-152	-4.6591E-02						
		121.78	-4.659E-02	%(P	1.892E-01	5.68E-02	G K
		344.30	-9.836E-04	%	1.663E-01	4.82E-02	G
		1408.08	-1.581E-03	%	2.569E-01	6.73E-02	G
		964.00	7.805E-02	& P	5.319E-01	1.53E-01	G
		1112.07	2.120E-01	&	4.626E-01	1.40E-01	G
		778.90	-2.216E-03	% P	3.366E-01	9.15E-02	G
EU-154	-2.2070E-05						
		123.10	-2.207E-05	&(P	1.325E-01	3.93E-02	G K
		1274.80	5.710E-03	&	1.666E-01	4.51E-02	G
		723.30	6.946E-03	& P	4.267E-01	1.23E-01	G
		1004.80	0.000E+00	%	4.467E-01	1.26E-01	G
EU-155	1.9562E-02						
		86.45	1.956E-02	%(P	2.612E-01	7.79E-02	G K
		105.31	5.675E-02	&	2.989E-01	8.96E-02	G
HG-203	2.4546E-02						
		279.17	2.455E-02	%(P	4.996E-02	1.52E-02	G K
		72.87	-3.970E-01	%	2.278E+00	6.83E-01	G
		70.83	-6.803E-01	%	4.180E+00	1.25E+00	G
		82.50	-9.776E-01	&	4.313E+00	1.29E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5150E-01						
		583.14	2.515E-01	(P	5.592E-02	2.63E-02	G
		510.72	4.588E-01	+	2.079E-01	9.15E-02	G
PB-212	6.9335E-01						
		238.63	6.934E-01	(	1.096E-01	4.37E-02	G K
							Energy duplication
		77.11	9.393E-01	+	5.974E-01	1.89E-01	G
		74.81	5.841E-01	& P	1.272E+00	3.85E-01	G
PB-214	4.2948E-01						
		351.99	4.282E-01	@(P	1.163E-01	4.50E-02	G K
		295.22	4.320E-01	@(	2.112E-01	7.23E-02	G
							Energy duplication
		77.11	1.536E+00	+	9.770E-01	3.09E-01	G
		241.92	2.047E-02	%	8.404E-01	2.49E-01	G
BI-212	5.6301E-01						
		727.17	5.630E-01	(	3.669E-01	1.38E-01	G K
		1620.56	3.720E-01	% P	1.648E+00	4.51E-01	G
		785.42	1.638E+00	% P	2.275E+00	7.24E-01	G
BI-214	4.2064E-01						
		609.32	4.431E-01	(	1.328E-01	6.10E-02	G K
		1764.51	3.555E-01	?(P	3.218E-01	1.18E-01	G
		1120.28	1.019E+00	+	5.168E-01	2.28E-01	G
RA-224	5.7232E-01						
		241.00	5.723E-01	%(P	1.463E+00	4.41E-01	G
RA-226	1.3782E+00						
		185.99	1.378E+00	*(P	1.300E+00	4.07E-01	G
AC-228	8.8193E-01						
		911.07	8.320E-01	(P	2.150E-01	1.07E-01	G K
		968.90	1.016E+00	*(P	5.114E-01	2.46E-01	G
		338.40	8.082E-01	@(	3.669E-01	1.48E-01	G
TH-227	-2.8302E-02						
		236.00	-2.830E-02	&(P	4.070E-01	1.20E-01	G K
		256.25	1.164E-01	%	6.131E-01	1.82E-01	G
PA-234	8.4293E-02						
		98.44	8.429E-02	&(	2.767E-01	8.33E-02	G K
		946.00	0.000E+00	&	3.335E-01	9.31E-02	G
		131.28	-7.084E-02	%	2.772E-01	8.33E-02	G
		94.67	-1.629E-01	%	5.015E-01	1.51E-01	G
		883.24	-7.473E-02	%	4.682E-01	1.34E-01	G
		926.70	3.697E-02	&	5.018E-01	1.40E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.211E-04 %   4.311E-01 1.21E-01 G

TH-234       1.8149E+00
                           63.29 1.121E+00 &(P 4.945E+00 1.48E+00 G K
                           92.80 2.047E+00  (  2.476E+00 7.62E-01 G
                           92.38 2.597E+00  (P 2.903E+00 8.95E-01 G

AM-241      -1.0041E-01
                           59.54-1.004E-01 &(  7.208E-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:                      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 - 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 *****

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	-8.9345E-02	-9.1594E-02	3.6393E-01	3.6396E-01	4.047E-01
K-40		1.6213E+01	1.6213E+01	2.0231E+00	2.2183E+00	
MN-54	#A	1.1033E-02	1.1080E-02	4.7098E-02	4.7102E-02	5.429E-02
CO-57	#B	3.8417E-04	3.8607E-04	5.8058E-02	5.8058E-02	6.485E-02
CO-60	#B	-2.0621E-04	-2.0635E-04	9.4795E-03	9.4795E-03	7.416E-02

Sr-85	#A	-9.0942E-03	-9.2823E-03	5.3518E-02	5.3520E-02	5.969E-02
Kr-85	#A	-2.0978E+02	-2.0978E+02	1.2104E+03	1.2105E+03	1.378E+03
Y-88	#B	-2.3095E-05	-2.3385E-05	1.2019E-03	1.2019E-03	1.089E-01
NB-94	#B	1.5715E-02	1.5715E-02	4.8653E-02	4.8661E-02	5.540E-02
Ag-108M	#B	-1.7265E-02	-1.7265E-02	6.2248E-02	6.2255E-02	7.063E-02
CD-109	#A	-7.5095E-02	-7.5316E-02	4.2086E+00	4.2086E+00	2.431E+00
SN-113	#B	-2.4942E-02	-2.5232E-02	6.7659E-02	6.7674E-02	7.458E-02
SB-125	#B	7.5732E-02	7.5831E-02	7.6458E-02	7.6576E-02	1.335E-01
I-131	#B	3.7728E-04	4.4501E-04	5.3109E-02	5.3109E-02	5.209E-02
CS-134	#B	-9.3436E-03	-9.3601E-03	5.0019E-02	5.0022E-02	5.724E-02
CS-137	#A	3.0588E-02	3.0592E-02	5.8184E-02	5.8209E-02	6.392E-02
CE-139	#A	-3.0656E-05	-3.0953E-05	5.1428E-02	5.1428E-02	4.484E-02
EU-152	#B	-4.6578E-02	-4.6591E-02	1.8034E-01	1.8036E-01	1.892E-01
EU-154	#B	-2.2061E-05	-2.2070E-05	1.4348E-01	1.4348E-01	1.325E-01
EU-155	#B	1.9548E-02	1.9562E-02	2.3355E-01	2.3356E-01	2.610E-01
HG-203	#B	2.3857E-02	2.4546E-02	4.5491E-02	4.5511E-02	4.856E-02
TL-208		2.5150E-01	2.5150E-01	7.9034E-02	8.0284E-02	
PB-212	#	6.9335E-01	6.9335E-01	1.3124E-01	1.3688E-01	1.096E-01
PB-214	#	4.2948E-01	4.2948E-01	1.2733E-01	1.2959E-01	1.163E-01
BI-212		5.6301E-01	5.6301E-01	4.1433E-01	4.1553E-01	
BI-214		4.2064E-01	4.2064E-01	1.7377E-01	1.7536E-01	
RA-224	#A	5.7232E-01	5.7232E-01	1.3241E+00	1.3244E+00	1.463E+00
RA-226	#	1.3782E+00	1.3782E+00	1.2196E+00	1.2221E+00	1.300E+00
AC-228		8.8193E-01	8.8193E-01	2.9117E-01	2.9535E-01	
TH-227	#B	-2.8302E-02	-2.8302E-02	3.9688E-01	3.9688E-01	4.070E-01
PA-234	#B	8.4293E-02	8.4293E-02	2.4999E-01	2.5003E-01	2.767E-01
TH-234	#B	1.8149E+00	1.8149E+00	1.8762E+00	1.8789E+00	4.945E+00
AM-241	#A	-1.0041E-01	-1.0041E-01	6.4567E-01	6.4570E-01	7.208E-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 (295.2 to 1999.0 keV) 1.8329977E+01 pCi/gm
Total Decayed Activity (295.2 to 1999.0 keV) 1.8329977E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_23FEB2006_1418.An1

Sample description
FSS-NOL-05-02-006-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\102F_23FEB2006_1418.An1

Acquisition information

Start time:	23-Feb-2006 14:19:26
Live time:	2000
Real time:	2024
Dead time:	1.18 %
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/channel^2

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:	1.6220E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.6220E+03) = 6.1652E+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	21-Feb-2006 15:24:00
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: 0.0668

***** 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
74.68	119.	35.35	1.50	8.847E-03				
74.68	119.	35.35	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.17	181.	24.13	1.50	9.541E-03	77.11	10.700	1.478E+00	PB214
					77.11	17.500	9.040E-01	PB212
77.17	181.	24.13	1.50	9.541E-03	77.11	10.700	1.478E+00	PB214
					77.11	17.500	9.040E-01	PB212
93.33	98.	39.86	1.50	1.325E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.15	98.	25.74	1.38	1.626E-02	185.99	3.280	1.461E+00	RA226
209.69	98.	24.53	0.79	1.517E-02				
238.63	561.	5.10	1.21	1.381E-02				
238.63	561.	5.10	1.21	1.381E-02	238.63	43.100	7.858E-01	PB212
241.86	116.	17.50	1.22	1.366E-02	241.00	3.900	1.788E+00	RA224
					241.92	7.470	9.456E-01	PB214
294.95	158.	14.05	1.58	1.147E-02				
294.95	158.	14.05	1.58	1.147E-02	295.22	19.200	5.995E-01	PB214
338.26	147.	17.45	1.33	1.006E-02	338.40	12.010	1.016E+00	AC228
351.94	199.	10.47	1.28	9.680E-03				
351.94	199.	10.47	1.28	9.680E-03	351.99	37.100	4.615E-01	PB214
463.21	60.	29.48	1.85	7.370E-03				
463.21	60.	29.48	1.85	7.370E-03	463.51	10.000	6.633E-01	SB125
510.84	113.	18.43	1.44	6.693E-03	510.72	22.500	6.228E-01	TL208
583.27	193.	10.01	1.50	5.889E-03	583.14	86.000	3.168E-01	TL208
609.27	191.	11.61	1.54	5.650E-03	609.32	46.090	6.105E-01	BI214
727.45	63.	27.20	1.55	4.792E-03	727.17	11.800	9.264E-01	BI212
860.07	29.	33.32	1.29	4.125E-03				
910.96	138.	12.58	1.44	3.922E-03	911.07	29.000	1.009E+00	AC228

967.95	94.	18.05	1.44	3.721E-03	968.90	17.460	1.202E+00	AC228
1120.38	57.	26.37	2.13	3.283E-03	1120.28	15.040	9.651E-01	BI214
1460.61	580.	4.21	2.24	2.621E-03	1460.75	10.700	1.724E+01	K40
1620.54	12.	33.41	0.73	2.397E-03	1620.56	2.750	1.512E+00	BI212
1764.58	18.	29.60	2.24	2.225E-03	1764.51	15.920	4.163E-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	
418.99	209.69	217.	98.	0.049	73.60	0.791	NP-239	s
476.90	238.54	129.	561.	0.281	15.30	1.215	PB-212	D
483.34	241.76	147.	116.	0.058	52.49	1.217	PB-214	D
1720.22	860.07	26.	29.	0.015	99.96	1.286	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	148.94	74.68	879.	119.	0.060	106.06	1.500
PB-214	153.80	77.11	865.	181.	0.091	72.39	1.500D
PB-212	153.80	77.11	865.	181.	0.091	72.39	1.500D
TH-234	186.25	93.33	728.	98.	0.049	119.58	1.500s
RA-226	371.88	186.13	309.	100.	0.050	76.61	1.500
PB-212	476.93	238.65	312.	508.	0.254	19.88	1.500
RA-224	482.02	241.19	435.	76.	0.038	118.99	1.500
PB-214	590.11	295.23	149.	142.	0.071	44.29	1.500s
AC-228	676.19	338.26	161.	147.	0.074	52.34	1.330
PB-214	703.57	351.94	121.	205.	0.103	30.86	1.500
SB-125	925.61	462.93	53.	43.	0.021	81.76	1.500s
TL-208	1021.45	510.84	88.	113.	0.056	55.30	1.435s
TL-208	1166.38	583.27	60.	193.	0.096	30.02	1.502
BI-214	1218.39	609.27	83.	191.	0.095	34.82	1.543s
BI-212	1454.86	727.45	62.	63.	0.031	81.59	1.546s
AC-228	1822.06	910.96	48.	138.	0.069	37.73	1.441
AC-228	1936.10	967.95	49.	94.	0.047	54.14	1.436s
BI-214	2241.16	1120.38	45.	57.	0.029	79.10	2.130
K-40	2922.12	1460.61	4.	580.	0.290	12.63	2.245
BI-212	3242.27	1620.54	2.	12.	0.006	100.24	0.734s
BI-214	3530.61	1764.58	5.	18.	0.009	88.81	2.237

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	Peak Energy keV	Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-6.7798E-02					
			477.56	-6.780E-02	%(	4.694E-01 1.36E-01	G
K-40		1.7239E+01					
			1460.75	1.724E+01	(P	3.487E-01 7.26E-01	G
MN-54		-1.1005E-03					
			834.81	-1.101E-03	%(P	6.920E-02 1.94E-02	G
CO-57		-1.4959E-02					
			122.07	-1.496E-02	%(	6.723E-02 2.01E-02	G K
			136.43	3.634E-02	&	5.504E-01 1.64E-01	G
CO-60		-2.2887E-04					
			1332.51	-2.289E-04	&(P	9.685E-02 2.69E-02	G K
			1173.23	3.114E-02	&	7.888E-02 2.36E-02	G K
Sr-85		-2.6519E-02					
			514.00	-2.652E-02	%(	7.022E-02 2.11E-02	G
Kr-85		-5.9956E+02					
			513.99	-5.996E+02	%(	1.588E+03 4.77E+02	G
Y-88		1.0486E-02					
			1836.01	1.049E-02	%(P	2.913E-02 7.66E-03	G K
			898.02	-5.866E-04	% P	6.540E-02 1.79E-02	G
NB-94		-1.3287E-02					
			871.10	-1.329E-02	%(	6.391E-02 1.85E-02	G K
			702.50	-1.838E-03	%	7.380E-02 2.11E-02	G K
Ag-108M		-2.7637E-02					
			722.95	-2.764E-02	%(	8.206E-02 2.44E-02	G K
			614.37	-1.054E-03	& P	6.038E-02 1.70E-02	G
			433.93	-1.496E-04	%	4.710E-02 1.33E-02	G
CD-109		-4.3620E-01					
			88.04	-4.362E-01	%(P	2.188E+00 6.54E-01	G
SN-113		-3.3072E-03					
			391.71	-3.307E-03	&(	7.489E-02 2.16E-02	G K
			255.04	7.595E-01	&	1.941E+00 5.84E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.1976E-01						
		427.95	-4.017E-03	&(P	1.575E-01	4.46E-02	G K
		600.77	6.925E-03	% P	2.578E-01	7.20E-02	G
		636.15	-7.550E-04	% P	4.741E-01	1.33E-01	G
		463.51	4.862E-01	(P	4.140E-01	1.37E-01	G
		176.29	1.849E-01	% P	6.091E-01	1.82E-01	G
I-131	1.1656E-02						
		364.48	1.166E-02	%(	6.411E-02	1.88E-02	G K
		636.97	1.096E-01	%	8.652E-01	2.48E-01	G
		284.29	-2.772E-01	%	9.716E-01	2.90E-01	G
CS-134	-2.0598E-02						
		604.66	-2.060E-02	&(	7.542E-02	2.24E-02	G K
		795.76	3.307E-02	%	7.648E-02	2.30E-02	G
		569.29	-1.042E-01	%	3.912E-01	1.15E-01	G
		801.84	-1.157E-01	% P	8.655E-01	2.50E-01	G
CS-137	1.1871E-02						
		661.62	1.187E-02	&(	6.871E-02	1.99E-02	G
CE-139	1.1471E-02						
		165.85	1.147E-02	%(P	6.027E-02	1.80E-02	G
EU-152	4.6998E-02						
		121.78	4.700E-02	%(P	1.990E-01	5.96E-02	G K
		344.30	3.665E-02	&	1.752E-01	5.17E-02	G
		1408.08	9.284E-02	%	2.810E-01	8.20E-02	G
		964.00	1.919E-01	& P	5.627E-01	1.67E-01	G
		1112.07	-7.337E-02	%	6.160E-01	1.76E-01	G
		778.90	-5.554E-02	% P	4.970E-01	1.42E-01	G
EU-154	3.1074E-02						
		123.10	3.107E-02	%(P	1.434E-01	4.29E-02	G K
		1274.80	3.481E-02	%	2.664E-01	7.61E-02	G
		723.30	-2.195E-03	% P	3.207E-01	8.99E-02	G
		1004.80	2.199E-02	&	3.499E-01	9.69E-02	G
EU-155	-2.6198E-02						
		86.45	-2.620E-02	%(P	3.055E-01	9.10E-02	G K
		105.31	1.219E-01	%	3.100E-01	9.37E-02	G
HG-203	4.6094E-03						
		279.17	4.609E-03	%(P	5.936E-02	1.74E-02	G K
		72.87	-5.994E-01	%	2.524E+00	7.59E-01	G
		70.83	-6.495E-01	&	4.538E+00	1.36E+00	G
		82.50	-1.500E+00	%	4.736E+00	1.43E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.1677E-01						
		583.14	3.168E-01	(P	6.403E-02	3.18E-02	G
		510.72	6.228E-01	+	2.573E-01	1.15E-01	G
PB-212	7.1111E-01						
		238.63	7.111E-01	(	1.191E-01	4.71E-02	G K
							Energy duplication
		77.11	9.040E-01	+	6.973E-01	2.18E-01	G
		74.81	1.172E+00	& P	1.382E+00	4.25E-01	G
PB-214	4.9722E-01						
		351.99	4.759E-01	(P	1.252E-01	4.90E-02	G K
		295.22	5.385E-01	(	2.259E-01	7.95E-02	G
							Energy duplication
		77.11	1.478E+00	+	1.140E+00	3.57E-01	G
		241.92	4.142E-01	%	8.328E-01	2.53E-01	G
BI-212	1.0371E+00						
		727.17	9.264E-01	@(	5.807E-01	2.52E-01	G K
		1620.56	1.512E+00	(P	1.183E+00	5.19E-01	G
		785.42	8.913E-01	% P	2.806E+00	8.27E-01	G
BI-214	6.1051E-01						
		609.32	6.105E-01	*(	1.447E-01	7.08E-02	G K
		1764.51	4.163E-01	- P	3.102E-01	1.24E-01	G
		1120.28	9.651E-01	+	5.720E-01	2.54E-01	G
RA-224	1.1904E+00						
		241.00	1.190E+00	?(P	1.558E+00	4.79E-01	G
RA-226	1.5641E+00						
		185.99	1.564E+00	(P	1.322E+00	4.17E-01	G
AC-228	1.0683E+00						
		911.07	1.009E+00	(P	2.569E-01	1.27E-01	G K
		968.90	1.202E+00	@(P	4.549E-01	2.17E-01	G
		338.40	1.016E+00	(	4.259E-01	1.77E-01	G
TH-227	-2.6658E-01						
		236.00	-2.666E-01	%(P	5.685E-01	1.72E-01	G K
		256.25	-1.299E-01	%	6.789E-01	2.01E-01	G
PA-234	6.8670E-02						
		98.44	6.867E-02	%(	2.925E-01	8.78E-02	G K
		946.00	-5.102E-02	%	3.544E-01	1.01E-01	G
		131.28	-9.854E-02	&	2.999E-01	9.03E-02	G
		94.67	-1.802E-01	%	5.402E-01	1.63E-01	G
		883.24	0.000E+00	&	6.056E-01	1.70E-01	G
		926.70	8.263E-03	%	5.172E-01	1.41E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.540E-01 %   5.792E-01 1.71E-01 G

TH-234       2.0272E+00
                           63.29 1.789E+00 %(P 5.341E+00 1.61E+00 G K
                           92.80 1.979E+00 %   2.757E+00 8.44E-01 G
                           92.38 2.389E+00 &(P 3.142E+00 9.64E-01 G

AM-241      -1.8101E-01
                           59.54-1.810E-01 %(  8.040E-01 2.41E-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:                      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 - 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 *****

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	-6.6099E-02	-6.7798E-02	4.0747E-01	4.0749E-01	4.576E-01
K-40		1.7239E+01	1.7239E+01	2.1777E+00	2.3829E+00	
MN-54	#A	-1.0958E-03	-1.1005E-03	1.3027E-01	1.3027E-01	6.890E-02
CO-57	#B	-1.4884E-02	-1.4959E-02	6.0423E-02	6.0429E-02	6.689E-02
CO-60	#B	-2.2871E-04	-2.2887E-04	1.2576E-02	1.2576E-02	9.678E-02

Sr-85	#A	-2.5971E-02	-2.6519E-02	6.3232E-02	6.3249E-02	6.877E-02
Kr-85	#A	-5.9956E+02	-5.9956E+02	1.4296E+03	1.4300E+03	1.588E+03
Y-88	#B	1.0354E-02	1.0486E-02	2.2973E-02	2.2980E-02	2.877E-02
NB-94	#B	-1.3287E-02	-1.3287E-02	5.5393E-02	5.5398E-02	6.391E-02
Ag-108M	#B	-2.7636E-02	-2.7637E-02	7.3310E-02	7.3326E-02	8.205E-02
CD-109	#A	-4.3490E-01	-4.3620E-01	2.2164E+00	2.2166E+00	2.181E+00
SN-113	#B	-3.2685E-03	-3.3072E-03	6.4807E-02	6.4807E-02	7.401E-02
SB-125	#B	1.1960E-01	1.1976E-01	1.0145E-01	1.0167E-01	1.573E-01
I-131	#B	9.8480E-03	1.1656E-02	5.6386E-02	5.6390E-02	5.416E-02
CS-134	#B	-2.0561E-02	-2.0598E-02	6.7069E-02	6.7079E-02	7.529E-02
CS-137	#A	1.1869E-02	1.1871E-02	5.9620E-02	5.9623E-02	6.870E-02
CE-139	#A	1.1358E-02	1.1471E-02	5.3927E-02	5.3931E-02	5.968E-02
EU-152	#B	4.6985E-02	4.6998E-02	1.7892E-01	1.7894E-01	1.989E-01
EU-154	#B	3.1061E-02	3.1074E-02	1.2885E-01	1.2886E-01	1.433E-01
EU-155	#B	-2.6178E-02	-2.6198E-02	5.1767E-01	5.1767E-01	3.053E-01
HG-203	#B	4.4772E-03	4.6094E-03	5.2234E-02	5.2234E-02	5.766E-02
TL-208		3.1677E-01	3.1677E-01	9.5298E-02	9.6941E-02	
PB-212	#	7.1111E-01	7.1111E-01	1.4133E-01	1.4686E-01	1.191E-01
PB-214	#	4.9722E-01	4.9722E-01	1.3428E-01	1.3715E-01	1.252E-01
BI-212		1.0371E+00	1.0371E+00	6.8158E-01	6.8406E-01	
BI-214		6.1051E-01	6.1051E-01	2.1256E-01	2.1530E-01	
RA-224	#A	1.1904E+00	1.1904E+00	1.4380E+00	1.4395E+00	1.558E+00
RA-226	#	1.5641E+00	1.5641E+00	1.2516E+00	1.2547E+00	1.322E+00
AC-228		1.0683E+00	1.0683E+00	3.0008E-01	3.0601E-01	
TH-227	#B	-2.6658E-01	-2.6658E-01	5.2266E-01	5.2287E-01	5.685E-01
PA-234	#B	6.8670E-02	6.8670E-02	2.6331E-01	2.6333E-01	2.925E-01
TH-234	#B	2.0272E+00	2.0272E+00	2.4533E+00	2.4558E+00	5.341E+00
AM-241	#A	-1.8100E-01	-1.8101E-01	7.2317E-01	7.2324E-01	8.040E-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 (269.7 to 1999.0 keV) 2.0272038E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 2.0272038E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 102F_23FEB2006_1455.An1

Sample description
FSS-NOL-05-02-003-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\102F_23FEB2006_1455.An1

Acquisition information
Start time: 23-Feb-2006 14:57:13
Live time: 2000
Real time: 2023
Dead time: 1.16 %
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/channel^2

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: 1.6110E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6110E+03) =
6.2073E+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	21-Feb-2006 15:12:00
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: 0.0961

***** 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	117.	36.53	1.50	8.847E-03				
74.91	117.	36.53	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.03	183.	23.52	1.50	9.541E-03	77.11	17.500	9.189E-01	PB212
					77.11	10.700	1.503E+00	PB214
77.03	183.	23.52	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.503E+00	PB214
128.62	87.	35.29	1.08	1.713E-02				
185.79	102.	27.55	1.63	1.627E-02				
185.79	102.	27.55	1.63	1.627E-02	185.99	3.280	1.540E+00	RA226
209.09	72.	34.96	0.93	1.520E-02				
238.65	611.	4.77	1.21	1.380E-02	238.63	43.100	8.621E-01	PB212
241.47	109.	24.13	1.22	1.367E-02	241.00	3.900	1.693E+00	RA224
					241.92	7.470	8.959E-01	PB214
270.26	72.	27.24	1.27	1.243E-02				
295.30	127.	13.82	1.25	1.146E-02	295.22	19.200	4.844E-01	PB214
300.16	46.	29.44	1.26	1.129E-02				
338.31	116.	19.67	1.44	1.006E-02	338.40	12.010	8.081E-01	AC228
351.85	226.	11.41	1.35	9.683E-03				
351.85	226.	11.41	1.35	9.683E-03	351.99	37.100	5.261E-01	PB214
463.00	60.	32.71	1.04	7.373E-03				
463.00	60.	32.71	1.04	7.373E-03	463.51	10.000	6.678E-01	SB125
510.95	92.	18.37	1.58	6.692E-03	510.72	22.500	5.101E-01	TL208
583.27	217.	10.13	1.77	5.889E-03	583.14	86.000	3.587E-01	TL208
609.40	192.	10.44	1.77	5.649E-03	609.32	46.090	6.185E-01	BI214
795.15	37.	28.98	1.60	4.420E-03	795.76	85.400	8.197E-02	CS134
911.20	136.	13.32	1.43	3.921E-03	911.07	29.000	1.001E+00	AC228
968.54	108.	17.83	1.04	3.719E-03	968.90	17.460	1.400E+00	AC228

1121.57	56.	25.98	2.25	3.283E-03	1120.28	15.040	9.581E-01	BI214
1460.69	582.	4.17	2.13	2.621E-03	1460.75	10.700	1.740E+01	K40
1764.69	22.	26.57	2.24	2.225E-03	1764.51	15.920	5.142E-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	
417.80	209.09	240.	72.	0.036	104.87	0.929	AC-228	s
476.92	238.64	120.	611.	0.306	14.32	1.215	PB-212	D
482.56	241.46	291.	109.	0.054	72.40	1.217	PB-214	D
540.16	270.26	140.	72.	0.036	81.73	1.272	AC-228	
599.97	300.24	68.	46.	0.023	88.32	1.258	PB-212	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 keV
PB-212	149.39	74.91	906.	117.	0.059	109.59	1.500s
PB-212	153.80	77.11	834.	183.	0.091	70.57	1.500D
PB-214	153.80	77.11	834.	183.	0.091	70.57	1.500D
RA-226	371.86	186.13	391.	103.	0.051	82.92	1.500s
PB-212	476.96	238.66	300.	533.	0.267	18.95	1.500
RA-224	482.64	241.50	376.	87.	0.044	98.38	1.500
PB-214	482.91	241.64	382.	75.	0.038	115.61	1.500s
PB-214	590.46	295.40	168.	134.	0.067	48.55	1.500s
AC-228	676.29	338.31	141.	116.	0.058	59.01	1.445
PB-214	703.74	352.03	96.	201.	0.100	29.51	1.500
SB-125	925.68	462.97	53.	47.	0.023	76.44	1.500
TL-208	1021.68	510.95	68.	92.	0.046	55.11	1.585s
TL-208	1166.37	583.27	70.	217.	0.108	30.38	1.769s
BI-214	1218.65	609.40	60.	192.	0.096	31.33	1.767s
CS-134	1590.31	795.15	39.	37.	0.018	86.95	1.601s
AC-228	1822.54	911.20	48.	136.	0.068	39.95	1.427
AC-228	1937.29	968.54	58.	108.	0.054	53.48	1.039s
BI-214	2243.53	1121.57	41.	56.	0.028	77.95	2.249s
K-40	2922.28	1460.69	2.	582.	0.291	12.52	2.133
BI-214	3530.84	1764.69	6.	22.	0.011	79.70	2.236s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.9970E-01					
			477.56	1.997E-01	&(	4.958E-01 1.49E-01	G
K-40		1.7396E+01					
			1460.75	1.740E+01	(P	2.993E-01 7.26E-01	G
MN-54		-5.7733E-05					
			834.81	-5.773E-05	&(P	6.016E-02 1.66E-02	G
CO-57		-3.2158E-04					
			122.07	-3.216E-04	%(	6.308E-02 1.87E-02	G K
			136.43	-1.544E-02	&	3.993E-01 1.18E-01	G
CO-60		-2.3044E-04					
			1332.51	-2.304E-04	%(P	7.436E-02 2.01E-02	G K
			1173.23	4.464E-02	%	9.408E-02 2.85E-02	G K
Sr-85		-2.1490E-02					
			514.00	-2.149E-02	%(	6.958E-02 2.07E-02	G
Kr-85		-4.8474E+02					
			513.99	-4.847E+02	%(	1.572E+03 4.68E+02	G
Y-88		-5.2029E-03					
			1836.01	-5.203E-03	%(P	6.281E-02 1.64E-02	G K
			898.02	1.755E-02	% P	5.804E-02 1.69E-02	G
NB-94		0.0000E+00					
			871.10	0.000E+00	&(	7.687E-02 2.16E-02	G K
			702.50	7.784E-03	&	4.817E-02 1.37E-02	G K
Ag-108M		1.6190E-03					
			722.95	1.619E-03	&(	7.148E-02 2.02E-02	G K
			614.37	-3.034E-03	% P	6.698E-02 1.91E-02	G
			433.93	9.567E-03	%	5.018E-02 1.46E-02	G
CD-109		-5.6299E-01					
			88.04	-5.630E-01	&(P	2.719E+00 8.16E-01	G
SN-113		-1.7852E-03					
			391.71	-1.785E-03	&(	7.429E-02 2.14E-02	G K
			255.04	3.336E-01	&	2.332E+00 6.90E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.6697E-01						
		427.95	4.280E-02	&(P	1.492E-01	4.40E-02	G K
		600.77	7.767E-02	% P	2.665E-01	7.83E-02	G
		636.15	7.034E-02	% P	4.480E-01	1.28E-01	G
		463.51	5.345E-01	(P	4.194E-01	1.41E-01	G
		176.29	-3.556E-03	& P	8.039E-01	2.37E-01	G
I-131	7.9291E-03						
		364.48	7.929E-03	%(	6.490E-02	1.89E-02	G K
		636.97	1.061E-01	%	7.843E-01	2.23E-01	G
		284.29	3.665E-01	&	8.008E-01	2.42E-01	G
CS-134	2.8943E-02						
		604.66	-1.746E-02	%(	5.911E-02	1.75E-02	G K
		795.76	8.197E-02	(	7.043E-02	2.38E-02	G
		569.29	6.839E-02	%	2.993E-01	8.70E-02	G
		801.84	-2.691E-01	& P	8.768E-01	2.60E-01	G
CS-137	2.0783E-02						
		661.62	2.078E-02	&(	6.709E-02	1.98E-02	G
CE-139	-9.6743E-03						
		165.85	-9.674E-03	%(P	5.311E-02	1.58E-02	G
EU-152	2.9065E-02						
		121.78	2.906E-02	%(P	1.662E-01	4.95E-02	G K
		344.30	3.258E-02	%	1.686E-01	4.96E-02	G
		1408.08	2.237E-02	%	2.794E-01	7.50E-02	G
		964.00	2.609E-01	& P	5.581E-01	1.69E-01	G
		1112.07	-5.693E-02	%	6.393E-01	1.82E-01	G
		778.90	1.098E-01	% P	4.303E-01	1.25E-01	G
EU-154	-2.7485E-02						
		123.10	-2.749E-02	%(P	1.532E-01	4.58E-02	G K
		1274.80	1.255E-01	&	1.757E-01	5.65E-02	G
		723.30	9.956E-02	& P	2.358E-01	7.07E-02	G
		1004.80	5.051E-02	%	3.690E-01	1.04E-01	G
EU-155	1.2973E-01						
		86.45	1.297E-01	%(P	3.047E-01	9.21E-02	G K
		105.31	7.529E-02	%	2.895E-01	8.69E-02	G
HG-203	8.5353E-04						
		279.17	8.535E-04	%(P	6.565E-02	1.92E-02	G K
		72.87	-8.388E-01	%	2.585E+00	7.80E-01	G
		70.83	0.000E+00	%	5.218E+00	1.56E+00	G
		82.50	2.239E-02	%	4.549E+00	1.35E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.5868E-01						
		583.14	3.587E-01	@(P	6.924E-02	3.64E-02	G
		510.72	5.101E-01	+	2.297E-01	9.37E-02	G
PB-212	7.5170E-01						
		238.63	7.517E-01	(	1.177E-01	4.75E-02	G K
							Energy duplication
		77.11	9.189E-01	+	6.898E-01	2.16E-01	G
		74.81	1.156E+00	+ P	1.412E+00	4.33E-01	G
PB-214	4.9896E-01						
		351.99	4.692E-01	(P	1.128E-01	4.62E-02	G K
		295.22	5.101E-01	(	2.403E-01	8.25E-02	G
							Energy duplication
		77.11	1.503E+00	+	1.128E+00	3.54E-01	G
		241.92	6.181E-01	?(	7.712E-01	2.38E-01	G
BI-212	2.5063E-01						
		727.17	2.506E-01	%(	5.277E-01	1.60E-01	G K
		1620.56	2.669E-01	% P	1.655E+00	4.32E-01	G
		785.42	5.186E-01	% P	2.939E+00	8.44E-01	G
BI-214	5.9177E-01						
		609.32	6.185E-01	*(	1.250E-01	6.46E-02	G K
		1764.51	5.142E-01	?(P	3.336E-01	1.37E-01	G
		1120.28	9.581E-01	+	5.505E-01	2.49E-01	G
RA-224	1.3674E+00						
		241.00	1.367E+00	?(P	1.461E+00	4.54E-01	G
RA-226	1.6181E+00						
		185.99	1.618E+00	(P	1.492E+00	4.67E-01	G
AC-228	1.1513E+00						
		911.07	1.001E+00	(P	2.587E-01	1.34E-01	G K
		968.90	1.400E+00	(P	4.922E-01	2.50E-01	G
		338.40	8.081E-01	-	4.024E-01	1.59E-01	G
TH-227	-9.0032E-02						
		236.00	-9.003E-02	&(P	4.909E-01	1.46E-01	G K
		256.25	4.018E-03	&	6.019E-01	1.75E-01	G
PA-234	-3.4247E-02						
		98.44	-3.425E-02	%(	2.745E-01	8.19E-02	G K
		946.00	-6.205E-02	%	3.430E-01	9.86E-02	G
		131.28	-6.265E-02	%	3.040E-01	9.11E-02	G
		94.67	-1.695E-01	&	5.805E-01	1.75E-01	G
		883.24	3.625E-02	&	4.975E-01	1.39E-01	G
		926.70	2.155E-02	&	6.414E-01	1.80E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.029E-01 %   4.426E-01 1.29E-01 G

TH-234       1.9766E-01
                           63.29 1.977E-01 &(P 5.610E+00 1.67E+00 G K
                           92.80 1.631E+00 &   2.902E+00 8.83E-01 G
                           92.38 1.707E+00 % P 3.483E+00 1.06E+00 G

AM-241       1.3281E-01
                           59.54 1.328E-01 %(  7.966E-01 2.38E-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:                      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 - 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 *****

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	1.9461E-01	1.9970E-01	4.4674E-01	4.4688E-01	4.832E-01
K-40		1.7396E+01	1.7396E+01	2.1785E+00	2.3872E+00	
MN-54	#A	-5.7479E-05	-5.7733E-05	6.5440E-02	6.5440E-02	5.989E-02
CO-57	#B	-3.1995E-04	-3.2158E-04	5.6004E-02	5.6004E-02	6.276E-02
CO-60	#B	-2.3027E-04	-2.3044E-04	9.3775E-03	9.3775E-03	7.430E-02

Sr-85	#A	-2.1038E-02	-2.1490E-02	6.2199E-02	6.2211E-02	6.812E-02
Kr-85	#A	-4.8473E+02	-4.8474E+02	1.4055E+03	1.4057E+03	1.572E+03
Y-88	#B	-5.1361E-03	-5.2029E-03	4.9762E-02	4.9763E-02	6.201E-02
NB-94	#B	0.0000E+00	0.0000E+00	6.4914E-02	6.4914E-02	7.687E-02
Ag-108M	#B	1.6189E-03	1.6190E-03	6.0562E-02	6.0562E-02	7.148E-02
CD-109	#A	-5.6128E-01	-5.6299E-01	2.6912E+00	2.6914E+00	2.711E+00
SN-113	#B	-1.7639E-03	-1.7852E-03	6.4082E-02	6.4082E-02	7.341E-02
SB-125	#F	1.6674E-01	1.6697E-01	1.3185E-01	1.3218E-01	1.490E-01
I-131	#B	6.6792E-03	7.9291E-03	5.6685E-02	5.6687E-02	5.467E-02
CS-134	#B	2.8890E-02	2.8943E-02	2.5167E-02	2.5219E-02	5.900E-02
CS-137	#A	2.0780E-02	2.0783E-02	5.9465E-02	5.9476E-02	6.708E-02
CE-139	#A	-9.5777E-03	-9.6743E-03	5.0082E-02	5.0085E-02	5.258E-02
EU-152	#B	2.9056E-02	2.9065E-02	1.4857E-01	1.4858E-01	1.662E-01
EU-154	#B	-2.7473E-02	-2.7485E-02	1.4009E-01	1.4010E-01	1.532E-01
EU-155	#B	1.2963E-01	1.2973E-01	2.7639E-01	2.7648E-01	3.045E-01
HG-203	#B	8.2864E-04	8.5353E-04	5.7657E-02	5.7657E-02	6.374E-02
TL-208	#	3.5868E-01	3.5868E-01	1.0918E-01	1.1102E-01	
PB-212	#	7.5170E-01	7.5170E-01	1.4243E-01	1.4855E-01	1.177E-01
PB-214	#	4.9896E-01	4.9896E-01	1.4754E-01	1.5017E-01	1.128E-01
BI-212	#B	2.5063E-01	2.5063E-01	4.8002E-01	4.8022E-01	5.277E-01
BI-214	#	5.9177E-01	5.9177E-01	1.8539E-01	1.8834E-01	
RA-224	#A	1.3674E+00	1.3674E+00	1.3632E+00	1.3654E+00	1.461E+00
RA-226	#	1.6181E+00	1.6181E+00	1.3999E+00	1.4028E+00	1.492E+00
AC-228		1.1513E+00	1.1513E+00	3.8455E-01	3.8994E-01	
TH-227	#B	-9.0032E-02	-9.0032E-02	4.5357E-01	4.5359E-01	4.909E-01
PA-234	#B	-3.4247E-02	-3.4247E-02	2.4559E-01	2.4560E-01	2.745E-01
TH-234	#B	1.9766E-01	1.9766E-01	5.0060E+00	5.0060E+00	5.610E+00
AM-241	#A	1.3281E-01	1.3281E-01	7.1443E-01	7.1447E-01	7.966E-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 (270.2 to 1999.0 keV) 1.9497684E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.9497684E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103_13DEC2005_1254.An1

Sample description
FSS-NOL-05-02-023-F

Spectrum Filename: C:\GammaVision\Spectra\103_13DEC2005_1254.An1

Acquisition information

Start time:	13-Dec-2005 12:55:33
Live time:	2000
Real time:	2003
Dead time:	0.16 %
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/channel^2

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:	1.8360E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8360E+03) = 5.4466E+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	08-Dec-2005 10:26:00
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. 21 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1055

***** 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	132.	22.54	0.99	9.052E-03	74.81	9.600	1.114E+00	PB212
77.22	184.	13.57	0.99	1.011E-02	77.11	17.500	9.331E-01	PB212
					77.11	10.700	1.526E+00	PB214
93.06	96.	40.77	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.07	94.	41.66	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.77	99.	37.65	1.15	2.445E-02				
186.21	200.	19.42	1.29	2.566E-02	185.99	3.280	1.638E+00	RA226
209.78	131.	28.76	0.70	2.469E-02				
238.67	1231.	3.32	1.09	2.320E-02	238.63	43.100	8.970E-01	PB212
241.05	130.	33.46	1.09	2.307E-02	241.00	3.900	1.063E+00	RA224
					241.92	7.470	5.563E-01	PB214
269.83	154.	21.38	1.50	2.153E-02				
276.72	75.	36.56	1.14	2.118E-02				
295.13	261.	13.20	1.12	2.025E-02	295.22	19.200	4.868E-01	PB214
300.73	101.	27.53	0.97	1.998E-02				
327.72	63.	36.57	1.01	1.875E-02				
338.45	308.	11.20	1.19	1.830E-02	338.40	12.010	1.028E+00	AC228
351.78	494.	8.06	1.08	1.776E-02	351.99	37.100	5.462E-01	PB214
409.27	75.	28.91	0.83	1.575E-02				
462.74	110.	24.64	1.45	1.427E-02				
462.74	110.	24.64	1.45	1.427E-02	463.51	10.000	5.611E-01	SB125
510.66	168.	14.58	1.34	1.317E-02	510.72	22.500	3.515E-01	TL208
583.03	377.	6.27	1.32	1.185E-02	583.14	86.000	2.694E-01	TL208
609.21	350.	6.11	1.32	1.144E-02	609.32	46.090	4.795E-01	BI214
614.71	36.	34.16	1.32	1.136E-02	614.37	90.393	PBC<MDA	Ag108M

661.46	148.	16.51	1.14	1.072E-02	661.62	84.620	1.191E-01	CS137
722.77	38.	31.05	1.39	1.001E-02				
722.77	38.	31.05	1.39	1.001E-02	722.95	90.499	3.056E-02	Ag108M
					723.30	19.700	1.406E-01	EU154
726.88	87.	15.52	1.39	9.969E-03	727.17	11.800	5.423E-01	BI212
767.96	40.	32.83	1.61	9.556E-03				
785.50	37.	38.75	1.50	9.394E-03	785.42	2.000	PBC<MDA	BI212
794.37	60.	37.80	2.02	9.314E-03				
794.37	60.	37.80	2.02	9.314E-03	795.76	85.400	5.531E-02	CS134
860.06	53.	23.61	1.66	8.771E-03				
910.88	282.	7.33	1.36	8.403E-03	911.07	29.000	8.433E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
927.55	26.	40.56	0.87	8.290E-03	926.70	11.000	2.087E-01	PA234
964.57	65.	19.80	1.54	8.052E-03				
968.58	164.	9.68	1.54	8.027E-03	968.90	17.460	8.581E-01	AC228
1001.06	40.	35.02	1.17	7.834E-03				
1119.51	71.	20.73	1.57	7.215E-03	1120.28	15.040	4.689E-01	BI214
1331.93	41.	24.04	0.97	6.351E-03				
1331.93	41.	24.04	0.97	6.351E-03	1332.51	99.980	PBC<MDA	CO60
1460.26	1474.	2.67	1.82	5.933E-03	1460.75	10.700	1.687E+01	K40
1763.62	86.	10.78	2.30	5.144E-03	1764.51	15.920	7.439E-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	
258.71	129.77	575.	133.	0.067	80.76	1.146	AC-228	s
418.73	209.78	533.	131.	0.065	86.28	0.695	NP-239	s
538.82	269.83	372.	154.	0.077	64.14	1.496	AC-228	s
600.61	300.73	280.	101.	0.051	82.58	0.973	PB-212	s
654.59	327.72	211.	63.	0.031	109.71	1.006	AC-228	
817.66	409.27	167.	75.	0.038	86.74	0.827	AC-228	s
1228.51	614.66	57.	36.	0.018	102.49	1.323	RH-106M	lD
1444.61	722.63	49.	38.	0.019	93.16	1.389	SB-124	lD
1534.99	767.96	64.	40.	0.020	98.49	1.614	BI-214	M
1719.17	860.06	48.	53.	0.026	70.83	1.657	TL-208	
1927.82	964.70	49.	65.	0.032	59.34	1.538	AC-228	D
2001.12	1001.06	54.	46.	0.023	81.28	1.173	TA-182	
2662.77	1331.93	28.	38.	0.019	75.83	0.973	CO-60	s

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	396.	132.	0.066	67.63	0.993D
PB-212	153.39	77.11	392.	184.	0.092	40.72	0.995A
RA-226	371.59	186.21	785.	196.	0.098	59.98	1.500s
PB-212	476.43	238.64	664.	1311.	0.656	12.72	1.114
RA-224	482.90	241.87	842.	124.	0.062	102.61	1.500
PB-214	589.41	295.13	361.	257.	0.129	39.60	1.117
AC-228	676.05	338.45	295.	307.	0.153	33.60	1.186
PB-214	702.69	351.78	327.	489.	0.244	24.18	1.078s

SB-125	925.10	462.99	172.	83.	0.042	73.30	1.500s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1020.43	510.66	181.	142.	0.071	43.75	1.342s
TL-208	1165.16	583.03	87.	373.	0.186	18.81	1.317
BI-214	1217.43	609.16	149.	343.	0.171	24.18	1.204
CS-137	1322.01	661.46	142.	147.	0.073	49.53	1.144
BI-212	1451.42	726.17	130.	128.	0.064	55.73	1.018s
BI-212	1570.06	785.50	86.	37.	0.019	116.24	1.500
CS-134	1588.77	794.86	76.	43.	0.022	96.43	1.500s
AC-228	1820.78	910.88	62.	279.	0.140	21.99	1.358
AC-228	1936.81	968.90	35.	163.	0.082	27.97	1.540D
BI-214	2237.99	1119.51	58.	69.	0.035	62.19	1.570s
K-40	2919.39	1460.26	42.	1455.	0.728	8.00	1.823
BI-214	3526.00	1763.62	3.	83.	0.041	32.35	2.302s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	%(	3.507E-01 1.02E-01	G
K-40		1.6874E+01					
			1460.75	1.687E+01	(P	3.809E-01 4.56E-01	G
MN-54		8.0892E-03					
			834.81	8.089E-03	%(P	4.219E-02 1.24E-02	G
CO-57		1.5648E-03					
			122.07	1.565E-03	%(P	5.460E-02 1.63E-02	G K
			136.43	3.922E-02	&	4.136E-01 1.24E-01	G
CO-60		-1.6458E-04					
			1332.51	-1.646E-04	%(P	5.207E-02 1.47E-02	G K
			1173.23	2.279E-02	% P	5.504E-02 1.65E-02	G K
Sr-85		-2.1306E-02					
			514.00	-2.131E-02	%(	4.814E-02 1.46E-02	G
Kr-85		-4.6577E+02					
			513.99	-4.658E+02	%(	1.052E+03 3.18E+02	G
Y-88		5.9172E-03					
			1836.01	5.917E-03	&(P	3.105E-02 8.69E-03	G K
			898.02	6.638E-03	& P	4.140E-02 1.20E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	4.9432E-03						
		871.10	4.943E-03	&(	3.623E-02	1.05E-02	G K
		702.50	-5.771E-03	&	3.935E-02	1.15E-02	G K
Ag-108M	1.6834E-02						
		722.95	1.683E-02	%(	4.548E-02	1.36E-02	G K
		614.37	2.034E-02	% P	3.883E-02	1.18E-02	G
		433.93	1.359E-02	%	3.814E-02	1.15E-02	G
CD-109	1.3999E+00						
		88.04	1.400E+00	%(	1.929E+00	5.90E-01	G
SN-113	1.8428E-03						
		391.71	1.843E-03	&(	4.898E-02	1.43E-02	G K
		255.04	-2.274E-02	&	1.728E+00	5.11E-01	G
SB-125	1.0664E-01						
		427.95	-3.106E-03	%(P	1.130E-01	3.30E-02	G K
		600.77	-6.893E-02	% P	1.901E-01	5.70E-02	G
		636.15	-4.203E-02	% P	3.472E-01	1.01E-01	G
		463.51	4.315E-01	*(P	3.311E-01	1.07E-01	G
		176.29	-8.786E-04	%	5.963E-01	1.77E-01	G
I-131	8.7781E-03						
		364.48	8.778E-03	%(P	6.054E-02	1.79E-02	G K
		636.97	1.938E-01	&	6.570E-01	1.95E-01	G
		284.29	-1.450E-02	% P	7.005E-01	2.05E-01	G
CS-134	9.4067E-03						
		604.66	-1.771E-02	&(	4.416E-02	1.33E-02	G K
		795.76	4.040E-02	(P	4.035E-02	1.30E-02	G
		569.29	-3.768E-02	% P	2.457E-01	7.18E-02	G
		801.84	-4.399E-02	% P	4.209E-01	1.20E-01	G
CS-137	1.1914E-01						
		661.62	1.191E-01	(P	4.729E-02	1.99E-02	G
CE-139	-3.3395E-03						
		165.85	-3.340E-03	%(	4.932E-02	1.47E-02	G
EU-152	5.9095E-03						
		121.78	5.909E-03	%(P	1.581E-01	4.71E-02	G K
		344.30	-2.653E-02	% P	1.247E-01	3.71E-02	G
		1408.08	5.953E-02	%	1.208E-01	3.69E-02	G
		964.00	1.112E-01	& P	2.841E-01	8.51E-02	G
		1112.07	1.455E-01	%	2.877E-01	8.76E-02	G
		778.90	1.995E-02	%	2.724E-01	7.85E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	-8.2532E-03						
		123.10	-8.253E-03	&(	1.174E-01	3.51E-02	G K
		1274.80	1.750E-02	%	1.323E-01	3.83E-02	G
		723.30	-3.979E-03	&	3.122E-01	9.18E-02	G
		1004.80	-5.569E-02	&	2.409E-01	7.08E-02	G
EU-155	1.6167E-01						
		86.45	1.617E-01	%(	2.423E-01	7.40E-02	G K
		105.31	3.894E-02	&	2.463E-01	7.38E-02	G
HG-203	-2.2237E-03						
		279.17	-2.224E-03	&(P	4.835E-02	1.43E-02	G K
		72.87	-2.407E-01	% P	2.229E+00	6.66E-01	G
		70.83	-1.204E+00	%	4.996E+00	1.50E+00	G
		82.50	3.934E-01	%	3.820E+00	1.14E+00	G
TL-208	2.6944E-01						
		583.14	2.694E-01	(P	3.338E-02	1.71E-02	G
		510.72	3.515E-01	+ P	1.626E-01	6.09E-02	G
PB-212	9.5607E-01						
		238.63	9.654E-01	(P	9.036E-02	4.13E-02	G K
							Energy duplication
		77.11	7.631E-01	} P	3.947E-01	1.04E-01	G
		74.81	1.114E+00	+ P	8.089E-01	2.57E-01	G
PB-214	5.2595E-01						
		351.99	5.462E-01	@(P	9.723E-02	4.45E-02	G K
		295.22	4.868E-01	(P	1.727E-01	6.53E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.473E-01	0.00E+00	G
		241.92	-2.630E-02	%	7.001E-01	2.09E-01	G
BI-212	8.0064E-01						
		727.17	8.006E-01	@(P	3.497E-01	1.49E-01	G K
		1620.56	8.059E-02	% P	1.154E+00	3.16E-01	G
		785.42	1.462E+00	+	1.798E+00	5.66E-01	G
BI-214	4.7612E-01						
		609.32	4.785E-01	(P	8.326E-02	3.93E-02	G K
		1764.51	7.439E-01	+ P	1.002E-01	8.34E-02	G
		1120.28	4.689E-01	(P	2.590E-01	9.98E-02	G
RA-224	1.0173E+00						
		241.00	1.017E+00	(	1.129E+00	3.48E-01	G
RA-226	1.7174E+00						
		185.99	1.717E+00	*(P	1.165E+00	3.66E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AC-228       8.8559E-01
                          911.07 8.433E-01  (P 1.189E-01 6.25E-02 G K
                          968.90 8.581E-01  (P 1.583E-01 8.01E-02 G
                          338.40 1.028E+00  (P 2.771E-01 1.15E-01 G

TH-227       1.5098E-01
                          236.00 1.510E-01 %(  2.567E-01 7.83E-02 G K
                          256.25-1.015E-01 % P 5.068E-01 1.51E-01 G

PA-234       5.2236E-02
                           98.44 5.224E-02 %(P 2.285E-01 6.86E-02 G K
                          946.00-1.252E-02 & P 2.025E-01 5.82E-02 G
                          131.28-8.562E-02 % P 1.747E-01 5.30E-02 G
                           94.67-1.533E-01 & P 4.462E-01 1.35E-01 G
                          883.24 2.454E-03 &   3.130E-01 8.92E-02 G
                          926.70-8.669E-03 %   3.538E-01 1.01E-01 G
                          569.26-3.292E-02 % P 3.206E-01 9.26E-02 G

TH-234      -3.9884E-01
                           63.29-3.988E-01 &(P 6.811E+00 2.02E+00 G K
                           92.80 1.428E+00 % P 2.271E+00 6.90E-01 G
                           92.38 1.654E+00 % P 2.696E+00 8.18E-01 G

AM-241      -8.6164E-02
                           59.54-8.616E-02 &(P 1.153E+00 3.44E-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:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
```

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

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	0.0000E+00	0.0000E+00	3.0571E-01	3.0571E-01	3.282E-01
K-40		1.6874E+01	1.6874E+01	1.3676E+00	1.6823E+00	
MN-54	#A	7.9981E-03	8.0892E-03	3.7159E-02	3.7162E-02	4.172E-02
CO-57	#B	1.5444E-03	1.5648E-03	4.8841E-02	4.8841E-02	5.389E-02
CO-60	#B	-1.6428E-04	-1.6458E-04	4.9153E-02	4.9153E-02	5.197E-02
Sr-85	#A	-2.0175E-02	-2.1306E-02	4.3686E-02	4.3704E-02	4.558E-02
Kr-85	#A	-4.6575E+02	-4.6577E+02	9.5501E+02	9.5539E+02	1.052E+03
Y-88	#B	5.7240E-03	5.9172E-03	2.6069E-02	2.6072E-02	3.003E-02
NB-94	#B	4.9432E-03	4.9432E-03	3.1503E-02	3.1504E-02	3.623E-02
Ag-108M	#B	1.6833E-02	1.6834E-02	4.0931E-02	4.0942E-02	4.547E-02
CD-109	#A	1.3891E+00	1.3999E+00	1.7712E+00	1.7729E+00	1.914E+00
SN-113	#B	1.7870E-03	1.8428E-03	4.2944E-02	4.2944E-02	4.750E-02
SB-125	#B	1.0627E-01	1.0664E-01	7.9364E-02	7.9605E-02	1.126E-01
I-131	#B	5.6533E-03	8.7781E-03	5.3674E-02	5.3677E-02	3.899E-02
CS-134	#B	9.3626E-03	9.4067E-03	9.0895E-03	9.1059E-03	4.395E-02
CS-137		1.1910E-01	1.1914E-01	5.9570E-02	5.9970E-02	
CE-139	#A	-3.2547E-03	-3.3395E-03	4.4136E-02	4.4136E-02	4.807E-02
EU-152	#B	5.9050E-03	5.9095E-03	1.4141E-01	1.4141E-01	1.579E-01
EU-154	#B	-8.2438E-03	-8.2532E-03	1.0522E-01	1.0522E-01	1.172E-01
EU-155	#B	1.6135E-01	1.6167E-01	2.2199E-01	2.2217E-01	2.419E-01
HG-203	#B	-2.0611E-03	-2.2237E-03	4.3675E-02	4.3675E-02	4.481E-02
TL-208		2.6944E-01	2.6944E-01	5.1267E-02	5.3601E-02	
PB-212		9.5607E-01	9.5607E-01	1.2271E-01	1.3468E-01	
PB-214		5.2595E-01	5.2595E-01	1.2381E-01	1.2752E-01	
BI-212		8.0064E-01	8.0064E-01	4.4796E-01	4.5037E-01	
BI-214		4.7612E-01	4.7612E-01	1.1728E-01	1.2049E-01	
RA-224	A	1.0173E+00	1.0173E+00	1.0438E+00	1.0455E+00	1.129E+00
RA-226	#	1.7174E+00	1.7174E+00	1.0981E+00	1.1026E+00	1.165E+00
AC-228		8.8559E-01	8.8559E-01	1.4510E-01	1.5394E-01	
TH-227	#B	1.5098E-01	1.5098E-01	2.3504E-01	2.3520E-01	2.567E-01
PA-234	#B	5.2236E-02	5.2236E-02	2.0582E-01	2.0584E-01	2.285E-01
TH-234	#B	-3.9884E-01	-3.9884E-01	2.7528E+01	2.7528E+01	6.811E+00
AM-241	#A	-8.6162E-02	-8.6164E-02	1.0745E+00	1.0745E+00	1.153E+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 (1001.0 to 2000.7 keV) 2.1924494E+01 pCi/gm
Total Decayed Activity (1001.0 to 2000.7 keV) 2.1924532E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_12DEC2005_1443.An1

Sample description
FSS-NOL-05-02-006-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\103F_12DEC2005_1443.An1

Acquisition information
Start time: 12-Dec-2005 14:45:18
Live time: 2000
Real time: 2004
Dead time: 0.19 %
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/channel^2

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: 2.3300E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.3300E+03) =
4.2918E+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	08-Dec-2005 13:15:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3168

***** 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	129.	24.74	0.99	9.052E-03	74.81	9.600	8.593E-01	PB212
77.23	201.	15.89	0.99	1.011E-02	77.11	17.500	7.666E-01	PB212
					77.11	10.700	1.254E+00	PB214
86.67	89.	37.96	1.00	1.422E-02	86.45	32.740	1.121E-01	EU155
					88.04	3.790	9.324E-01	CD109
89.91	99.	32.03	1.00	1.545E-02				
93.46	143.	23.80	1.00	1.670E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.15	179.	25.35	1.41	2.566E-02	185.99	3.280	1.143E+00	RA226
209.47	99.	37.52	0.89	2.470E-02				
238.57	1333.	3.37	1.09	2.320E-02	238.63	43.100	7.664E-01	PB212
241.96	143.	20.13	1.10	2.302E-02	241.00	3.900	9.188E-01	RA224
					241.92	7.470	4.807E-01	PB214
269.02	129.	26.10	1.21	2.157E-02				
277.13	74.	36.25	1.00	2.115E-02				
295.07	254.	11.99	0.99	2.026E-02	295.22	19.200	3.729E-01	PB214
327.85	67.	32.60	0.87	1.875E-02				
338.17	281.	12.48	1.14	1.831E-02	338.40	12.010	7.389E-01	AC228
351.71	444.	7.97	1.12	1.776E-02	351.99	37.100	3.858E-01	PB214
409.03	56.	39.18	0.99	1.576E-02				
463.03	78.	34.15	1.09	1.426E-02				
463.03	78.	34.15	1.09	1.426E-02	463.51	10.000	3.140E-01	SB125
510.47	190.	12.63	1.45	1.318E-02	510.72	22.500	3.200E-01	TL208
582.83	481.	5.17	1.30	1.185E-02	583.14	86.000	2.712E-01	TL208
608.86	410.	8.33	1.55	1.145E-02	609.32	46.090	4.443E-01	BI214
660.99	60.	27.66	1.32	1.073E-02	661.62	84.620	3.735E-02	CS137
726.40	123.	17.41	1.41	9.973E-03	727.17	11.800	6.047E-01	BI212

766.80	67.	29.59	1.59	9.568E-03				
794.31	70.	31.75	1.17	9.314E-03				
910.47	340.	7.59	1.12	8.405E-03	911.07	29.000	8.016E-01	AC228
968.20	261.	11.23	1.51	8.030E-03	968.90	17.460	1.080E+00	AC228
1119.63	109.	22.33	1.88	7.215E-03	1120.28	15.040	5.743E-01	BI214
1331.56	36.	29.02	1.77	6.349E-03	1332.51	99.980	3.281E-02	CO60
1459.73	1509.	2.64	1.76	5.935E-03	1460.75	10.700	1.362E+01	K40
1620.00	24.	26.30	0.70	5.488E-03	1620.56	2.750	9.284E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1763.27	60.	14.54	1.79	5.145E-03	1764.51	15.920	4.041E-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	
172.52	86.74	528.	89.	0.045	113.87	1.000	BI-207	lD
178.99	89.97	453.	99.	0.049	96.08	1.002	PB-214	lD
418.09	209.47	582.	99.	0.049	112.55	0.890	AC-228	
537.18	269.02	417.	129.	0.064	78.30	1.212	AC-228	s
654.85	327.85	215.	67.	0.033	97.79	0.872	AC-228	
817.19	409.03	188.	56.	0.028	117.54	0.990	CS-138	s
1532.66	766.80	112.	67.	0.033	88.78	1.588	J-134	s
1587.68	794.31	124.	72.	0.036	74.97	1.166	AC-228	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	469.	129.	0.064	74.22	0.993D
PB-212	153.39	77.11	471.	201.	0.101	47.67	0.995A
TH-234	185.48	93.15	1298.	154.	0.077	91.60	1.500s
TH-234	185.43	93.13	1283.	153.	0.076	91.55	1.500s
RA-226	371.19	186.01	999.	157.	0.078	81.90	1.500s
PB-212	476.24	238.54	899.	1396.	0.698	13.45	1.069
RA-224	482.05	241.45	925.	134.	0.067	99.65	1.500s
PB-214	589.29	295.07	310.	250.	0.125	35.96	0.987
AC-228	675.48	338.17	353.	280.	0.140	37.45	1.145
PB-214	702.57	351.71	305.	438.	0.219	23.92	1.121
SB-125	924.76	462.82	192.	71.	0.035	88.99	1.500s
TL-208	1020.06	510.47	175.	164.	0.082	37.89	1.454s
TL-208	1164.68	582.79	199.	480.	0.240	21.35	1.289
BI-214	1216.82	608.86	217.	404.	0.202	24.99	1.551
CS-137	1321.07	660.99	99.	58.	0.029	82.99	1.321s
BI-212	1451.88	726.40	116.	123.	0.061	52.22	1.413s
AC-228	1819.96	910.47	102.	337.	0.168	22.77	1.119s
AC-228	1935.44	968.21	140.	248.	0.124	35.43	1.502
BI-214	2238.23	1119.63	127.	107.	0.054	66.99	1.881s
CO-60	2662.02	1331.56	46.	36.	0.018	87.05	1.765s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2918.33	1459.73	38.	1491.	0.745	7.91	1.760
BI-212	3238.80	1620.00	5.	24.	0.012	78.91	0.700s
BI-214	3525.29	1763.27	9.	57.	0.029	43.61	1.790

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-5.1522E-02					
			477.56	-5.152E-02	&(	3.113E-01 9.22E-02	G
K-40		1.3621E+01					
			1460.75	1.362E+01	(P	2.884E-01 3.63E-01	G
MN-54		9.8413E-03					
			834.81	9.841E-03	%(P	3.479E-02 1.03E-02	G
CO-57		1.2846E-02					
			122.07	1.285E-02	&(P	4.250E-02 1.28E-02	G K
			136.43	3.790E-02	%	3.419E-01 1.02E-01	G
CO-60		3.2808E-02					
			1332.51	3.281E-02	*(P	3.134E-02 1.02E-02	G K
			1173.23	2.994E-02	% P	4.321E-02 1.33E-02	G K
Sr-85		-1.4951E-02					
			514.00	-1.495E-02	%(	3.711E-02 1.12E-02	G
Kr-85		-3.3063E+02					
			513.99	-3.306E+02	%(	8.204E+02 2.47E+02	G
Y-88		-7.5705E-05					
			1836.01	-7.571E-05	&(P	3.016E-02 8.15E-03	G K
			898.02	-6.349E-03	% P	3.495E-02 1.02E-02	G
NB-94		-1.5164E-03					
			871.10	-1.516E-03	%(	3.256E-02 9.39E-03	G K
			702.50	3.246E-03	%	2.884E-02 8.40E-03	G K
Ag-108M		-9.3894E-03					
			722.95	-9.389E-03	%(	3.929E-02 1.17E-02	G K
			614.37	4.365E-03	% P	3.316E-02 9.73E-03	G
			433.93	5.710E-03	&	3.025E-02 8.97E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.1380E+00						
		88.04	1.138E+00	&(	1.768E+00	5.39E-01	G
SN-113	-4.0974E-03						
		391.71	-4.097E-03	%(	4.485E-02	1.32E-02	G K
		255.04	-2.101E-01	%	1.419E+00	4.23E-01	G
SB-125	9.8914E-02						
		427.95	3.505E-02	%(P	8.336E-02	2.52E-02	G K
		600.77	9.589E-03	% P	1.472E-01	4.27E-02	G
		636.15	-5.977E-02	& P	2.672E-01	7.88E-02	G
		463.51	2.880E-01	*(P	2.748E-01	8.70E-02	G
		176.29	-3.617E-02	%	4.617E-01	1.38E-01	G
I-131	9.9796E-03						
		364.48	9.980E-03	%(P	4.587E-02	1.36E-02	G K
		636.97	9.243E-02	&	5.638E-01	1.66E-01	G
		284.29	-2.722E-01	& P	7.146E-01	2.16E-01	G
CS-134	-2.1911E-02						
		604.66	-2.191E-02	%(	3.981E-02	1.21E-02	G K
		795.76	-1.624E-03	% P	3.679E-02	1.06E-02	G
		569.29	-1.628E-02	% P	2.064E-01	6.01E-02	G
		801.84	-3.990E-02	% P	3.529E-01	1.01E-01	G
CS-137	3.7348E-02						
		661.62	3.735E-02	@(P	3.132E-02	1.06E-02	G
CE-139	-8.8649E-03						
		165.85	-8.865E-03	%(	4.332E-02	1.30E-02	G
EU-152	2.7639E-03						
		121.78	2.764E-03	&(P	1.415E-01	4.23E-02	G K
		344.30	1.145E-03	& P	1.037E-01	3.05E-02	G
		1408.08	-9.470E-04	%	1.167E-01	3.18E-02	G
		964.00	-2.290E-03	% P	2.792E-01	8.05E-02	G
		1112.07	7.405E-02	%	2.603E-01	7.70E-02	G
		778.90	-2.339E-02	%	2.603E-01	7.59E-02	G
EU-154	1.7915E-02						
		123.10	1.792E-02	%(	1.002E-01	3.01E-02	G K
		1274.80	3.102E-02	&	9.493E-02	2.82E-02	G
		723.30	-3.414E-02	&	1.718E-01	5.07E-02	G
		1004.80	-6.768E-02	%	1.950E-01	5.82E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.5186E-01						
		86.45	1.519E-01	%(	2.143E-01	6.55E-02	G K
		105.31	3.732E-02	&	2.111E-01	6.34E-02	G
HG-203	-1.2267E-02						
		279.17	-1.227E-02	%(P	4.056E-02	1.22E-02	G K
		72.87	-6.689E-01	% P	2.146E+00	6.47E-01	G
		70.83	5.194E-02	%	4.321E+00	1.29E+00	G
		82.50	-7.182E-01	%	3.746E+00	1.13E+00	G
TL-208	2.8284E-01						
		583.14	2.731E-01	(P	3.900E-02	1.96E-02	G
		510.72	3.200E-01	*(P	1.261E-01	4.70E-02	G
PB-212	8.0568E-01						
		238.63	8.096E-01	(P	8.263E-02	3.66E-02	G K
							Energy duplication
		77.11	6.600E-01	} P	3.403E-01	1.05E-01	G
		74.81	8.593E-01	(P	6.918E-01	2.18E-01	G
PB-214	3.8142E-01						
		351.99	3.858E-01	(P	7.403E-02	3.11E-02	G K
		295.22	3.729E-01	(P	1.265E-01	4.54E-02	G
							Energy duplication
		77.11	1.391E-02	} P	8.298E-01	1.96E-01	G
		241.92	-6.722E-03	%	5.573E-01	1.66E-01	G
BI-212	6.6591E-01						
		727.17	6.047E-01	*(P	2.613E-01	1.06E-01	G K
		1620.56	9.284E-01	(P	4.984E-01	2.45E-01	G
		785.42	6.710E-01	%	1.592E+00	4.80E-01	G
BI-214	4.3400E-01						
		609.32	4.443E-01	(P	7.851E-02	3.76E-02	G K
		1764.51	4.041E-01	(P	1.181E-01	6.21E-02	G
		1120.28	5.743E-01	+ P	2.948E-01	1.30E-01	G
RA-224	8.6460E-01						
		241.00	8.646E-01	(	9.312E-01	2.87E-01	G
RA-226	1.0789E+00						
		185.99	1.079E+00	@(P	1.034E+00	3.19E-01	G
AC-228	7.8322E-01						
		911.07	8.016E-01	@(P	1.186E-01	6.14E-02	G K
		968.90	1.028E+00	+ P	2.391E-01	1.21E-01	G
		338.40	7.389E-01	(P	2.382E-01	9.25E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -7.6164E-02
                          236.00-7.616E-02 %(  3.489E-01 1.05E-01 G K
                          256.25-2.311E-02 % P 4.190E-01 1.24E-01 G

PA-234       4.0621E-02
                           98.44 4.062E-02 %(P 2.037E-01 6.12E-02 G K
                          946.00-3.790E-02 & P 1.687E-01 4.96E-02 G
                          131.28-3.156E-03 & P 1.846E-01 5.51E-02 G
                           94.67-1.256E-01 % P 3.937E-01 1.19E-01 G
                          883.24-2.299E-02 %   2.551E-01 7.37E-02 G
                          926.70 4.816E-02 &   2.598E-01 7.57E-02 G
                          569.26-2.438E-02 % P 3.051E-01 8.88E-02 G

TH-234       1.4474E+00
                           63.29 7.344E-01 %(P 5.800E+00 1.73E+00 G K
                           92.80 1.794E+00  (P 1.993E+00 6.11E-01 G
                           92.38 2.125E+00 &(P 2.361E+00 7.23E-01 G

AM-241      -1.1468E-01
                           59.54-1.147E-01 %(P 1.029E+00 3.08E-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:                      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 - 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	-4.8875E-02	-5.1522E-02	2.7648E-01	2.7649E-01	2.953E-01
K-40		1.3621E+01	1.3621E+01	1.0910E+00	1.3474E+00	
MN-54	#A	9.7530E-03	9.8413E-03	3.0986E-02	3.0991E-02	3.447E-02
CO-57	#B	1.2713E-02	1.2846E-02	3.8410E-02	3.8416E-02	4.206E-02
CO-60	#F	3.2760E-02	3.2808E-02	3.0668E-02	3.0727E-02	3.129E-02
Sr-85	#A	-1.4315E-02	-1.4951E-02	3.3587E-02	3.3598E-02	3.554E-02
Kr-85	#A	-3.3062E+02	-3.3063E+02	7.4248E+02	7.4272E+02	8.204E+02
Y-88	#B	-7.3731E-05	-7.5705E-05	3.0807E-03	3.0807E-03	2.938E-02
NB-94	#B	-1.5164E-03	-1.5164E-03	2.8157E-02	2.8157E-02	3.256E-02
Ag-108M	#B	-9.3888E-03	-9.3894E-03	3.4978E-02	3.4982E-02	3.929E-02
CD-109	#A	1.1309E+00	1.1380E+00	1.6174E+00	1.6187E+00	1.757E+00
SN-113	#B	-3.9984E-03	-4.0974E-03	3.9695E-02	3.9696E-02	4.376E-02
SB-125	#F	9.8639E-02	9.8914E-02	8.9615E-02	8.9799E-02	8.313E-02
I-131	#B	7.0307E-03	9.9796E-03	4.0933E-02	4.0937E-02	3.231E-02
CS-134	#B	-2.1829E-02	-2.1911E-02	3.6395E-02	3.6418E-02	3.966E-02
CS-137	#	3.7339E-02	3.7348E-02	3.1731E-02	3.1805E-02	
CE-139	#A	-8.6852E-03	-8.8649E-03	3.9032E-02	3.9035E-02	4.244E-02
EU-152	#B	2.7622E-03	2.7639E-03	1.2681E-01	1.2681E-01	1.414E-01
EU-154	#B	1.7899E-02	1.7915E-02	9.0253E-02	9.0258E-02	1.001E-01
EU-155	#B	1.5163E-01	1.5186E-01	1.9645E-01	1.9663E-01	2.140E-01
HG-203	#B	-1.1547E-02	-1.2267E-02	3.6665E-02	3.6672E-02	3.818E-02
TL-208		2.8284E-01	2.8284E-01	6.0918E-02	6.3092E-02	
PB-212		8.0568E-01	8.0568E-01	1.0926E-01	1.1885E-01	
PB-214		3.8142E-01	3.8142E-01	8.3619E-02	8.6501E-02	
BI-212		6.6591E-01	6.6591E-01	3.1586E-01	3.1822E-01	
BI-214		4.3400E-01	4.3400E-01	1.1019E-01	1.1303E-01	
RA-224	#A	8.6460E-01	8.6460E-01	8.6154E-01	8.6300E-01	9.312E-01
RA-226	#	1.0789E+00	1.0789E+00	9.5668E-01	9.5873E-01	1.034E+00
AC-228		7.8322E-01	7.8322E-01	1.7259E-01	1.7848E-01	
TH-227	#B	-7.6164E-02	-7.6164E-02	3.1463E-01	3.1466E-01	3.489E-01
PA-234	#B	4.0621E-02	4.0621E-02	1.8353E-01	1.8355E-01	2.037E-01
TH-234	#B	1.4474E+00	1.4474E+00	1.4781E+00	1.4803E+00	5.800E+00
AM-241	#A	-1.1467E-01	-1.1468E-01	9.4613E-01	9.4615E-01	1.029E+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 (84.4 to 2000.7 keV) 1.7011475E+01 pCi/gm
Total Decayed Activity (84.4 to 2000.7 keV) 1.7011484E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1048.An1

Sample description
FSS-NOL-05-02-010-F

Spectrum Filename: C:\GammaVision\Spectra\103F_13DEC2005_1048.An1

Acquisition information

Start time:	13-Dec-2005 10:49:46
Live time:	2000
Real time:	2003
Dead time:	0.15 %
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/channel^2

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:	1.7930E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.7930E+03) = 5.5772E+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	08-Dec-2005 12:58:00
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. 22 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1933

***** 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	159.	18.18	0.99	9.052E-03	74.81	9.600	1.377E+00	PB212
77.23	176.	1.51	0.99	1.011E-02	77.11	17.500	7.445E-01	PB212
					77.11	10.700	1.218E+00	PB214
92.99	116.	33.38	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.01	119.	33.02	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.54	94.	36.10	1.00	2.442E-02				
186.03	134.	22.31	1.14	2.567E-02	185.99	3.280	PBC<MDA	RA226
209.40	98.	33.86	0.78	2.471E-02				
238.76	1067.	3.57	1.09	2.319E-02	238.63	43.100	7.950E-01	PB212
241.69	134.	17.71	1.09	2.304E-02	241.00	3.900	1.127E+00	RA224
					241.92	7.470	5.894E-01	PB214
270.72	108.	28.84	1.37	2.149E-02				
277.61	60.	35.67	1.20	2.113E-02				
277.61	60.	35.67	1.20	2.113E-02	279.17	81.500	PBC<MDA	HG203
295.21	244.	9.44	1.13	2.025E-02	295.22	19.200	4.648E-01	PB214
299.90	68.	27.03	1.13	2.003E-02				
328.15	100.	32.20	1.08	1.873E-02				
338.33	234.	11.98	1.13	1.830E-02	338.40	12.010	7.993E-01	AC228
351.77	407.	8.11	1.28	1.776E-02	351.99	37.100	4.597E-01	PB214
462.91	77.	22.91	1.13	1.426E-02				
462.91	77.	22.91	1.13	1.426E-02	463.51	10.000	4.035E-01	SB125
510.66	156.	16.41	1.47	1.317E-02	510.72	22.500	3.296E-01	TL208
583.00	417.	7.41	1.35	1.185E-02	583.14	86.000	3.055E-01	TL208
609.07	326.	9.56	1.41	1.144E-02	609.32	46.090	4.563E-01	BI214
661.10	50.	34.50	0.71	1.073E-02	661.62	84.620	PBC<MDA	CS137

726.89	130.	16.79	1.10	9.968E-03	727.17	11.800	8.333E-01	BI212
768.52	48.	38.43	1.01	9.551E-03				
784.85	51.	34.34	1.24	9.394E-03	785.42	2.000	2.038E+00	BI212
795.13	75.	24.03	1.63	9.307E-03				
910.90	248.	8.12	1.44	8.402E-03	911.07	29.000	7.574E-01	AC228
963.99	47.	25.03	1.54	8.056E-03	964.00	14.580	2.989E-01	EU152
968.67	151.	9.89	1.54	8.027E-03	968.90	17.460	8.114E-01	AC228
1120.02	89.	24.19	1.59	7.213E-03	1120.28	15.040	6.053E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1331.77	33.	28.39	1.77	6.349E-03	1332.51	99.980	3.951E-02	CO60
1460.36	1337.	2.82	1.58	5.933E-03	1460.75	10.700	1.565E+01	K40
1764.16	54.	17.98	2.16	5.142E-03	1764.51	15.920	4.947E-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	
417.95	209.40	434.	98.	0.049	101.57	0.778	AC-228	
540.59	270.72	333.	108.	0.054	86.51	1.373	AC-228	s
554.37	277.61	196.	63.	0.032	100.87	1.204	NP-239	s
598.69	299.77	160.	63.	0.031	91.54	0.973	TH-227	
655.44	328.15	323.	100.	0.050	96.59	1.083	AC-228	
1536.10	768.52	103.	48.	0.024	115.29	1.013	BI-214	
1589.32	795.13	77.	74.	0.037	61.07	1.629	AC-228	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	355.	159.	0.079	54.53	0.993D
PB-212	153.39	77.11	396.	176.	0.088	4.52	0.995A
TH-234	185.19	93.01	963.	119.	0.059	99.06	1.500s
TH-234	185.15	92.99	950.	116.	0.058	100.14	1.500s
RA-226	371.56	186.20	659.	159.	0.080	66.74	1.500
PB-212	476.78	238.81	680.	993.	0.496	15.82	1.017
RA-224	482.18	241.51	678.	106.	0.053	108.63	1.500
PB-214	589.32	295.08	361.	246.	0.123	43.06	1.206
AC-228	675.80	338.33	214.	233.	0.117	35.95	1.131
PB-214	702.67	351.77	241.	402.	0.201	24.32	1.281s
SB-125	925.20	463.04	133.	69.	0.035	77.92	1.500s
TL-208	1020.43	510.66	188.	130.	0.065	49.22	1.470s
TL-208	1165.10	583.00	150.	413.	0.206	22.24	1.348
BI-214	1217.24	609.07	172.	319.	0.160	28.69	1.406
CS-137	1321.29	661.10	100.	49.	0.024	103.49	0.707s
BI-212	1452.85	726.89	95.	130.	0.065	50.37	1.102
BI-212	1568.76	784.85	79.	51.	0.025	103.01	1.242
AC-228	1820.84	910.90	64.	245.	0.122	24.36	1.441
EU-152	1927.82	964.40	83.	38.	0.019	110.26	1.538

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1936.00	968.49	98.	194.	0.097	35.70	1.568
BI-214	2239.01	1120.02	106.	87.	0.044	72.56	1.591
CO-60	2662.44	1331.77	37.	33.	0.017	85.17	1.765s
K-40	2919.59	1460.36	43.	1318.	0.659	8.45	1.577
BI-214	3527.08	1764.16	15.	54.	0.027	53.93	2.159s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		8.3526E-02					
			477.56	8.353E-02	%(	3.525E-01 1.05E-01 G	
K-40		1.5653E+01					
			1460.75	1.565E+01	(P	3.938E-01 4.47E-01 G	
MN-54		1.2615E-02					
			834.81	1.262E-02	%(P	3.594E-02 1.07E-02 G	
CO-57		-2.7798E-04					
			122.07	-2.780E-04	&(P	4.673E-02 1.39E-02 G K	
			136.43	3.646E-02	&	3.843E-01 1.15E-01 G	
CO-60		3.9509E-02					
			1332.51	3.951E-02	(P	3.673E-02 1.21E-02 G K	
			1173.23	1.862E-02	% P	5.199E-02 1.55E-02 G K	
Sr-85		-2.0486E-02					
			514.00	-2.049E-02	%(	4.647E-02 1.41E-02 G	
Kr-85		-4.4885E+02					
			513.99	-4.488E+02	%(	1.018E+03 3.08E+02 G	
Y-88		-9.8923E-05					
			1836.01	-9.892E-05	&(P	1.158E-02 1.57E-03 G K	
			898.02	-9.653E-03	% P	4.232E-02 1.24E-02 G	
NB-94		-5.0772E-03					
			871.10	-5.077E-03	&(	3.396E-02 9.82E-03 G K	
			702.50	5.263E-03	&	3.371E-02 9.83E-03 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-8.8572E-04						
		722.95	-8.857E-04	%(	7.794E-02	2.30E-02	G K
		614.37	-1.782E-05	% P	4.135E-02	1.19E-02	G
		433.93	5.353E-03	%	3.257E-02	9.58E-03	G
CD-109	9.4713E-01						
		88.04	9.471E-01	&(	1.971E+00	5.98E-01	G
SN-113	-1.7165E-02						
		391.71	-1.717E-02	%(	5.604E-02	1.68E-02	G K
		255.04	-5.611E-03	%	1.665E+00	4.92E-01	G
SB-125	9.3292E-02						
		427.95	8.102E-04	%(P	1.041E-01	3.02E-02	G K
		600.77	-2.841E-02	% P	2.006E-01	5.88E-02	G
		636.15	4.088E-02	& P	2.737E-01	7.95E-02	G
		463.51	3.670E-01	@(P	3.000E-01	9.71E-02	G
		176.29	1.292E-01	%	5.443E-01	1.63E-01	G
I-131	-2.4459E-03						
		364.48	-2.446E-03	%(P	4.587E-02	1.33E-02	G K
		636.97	5.281E-02	&	6.517E-01	1.88E-01	G
		284.29	4.882E-02	% P	8.120E-01	2.40E-01	G
CS-134	2.8698E-03						
		604.66	2.870E-03	%(	8.482E-02	2.52E-02	G K
		795.76	8.253E-04	% P	4.482E-02	1.28E-02	G
		569.29	5.156E-02	% P	2.045E-01	6.02E-02	G
		801.84	-1.026E-01	% P	4.058E-01	1.18E-01	G
CS-137	4.0393E-02						
		661.62	4.039E-02	@(P	4.105E-02	1.43E-02	G
CE-139	8.9812E-03						
		165.85	8.981E-03	%(	4.675E-02	1.40E-02	G
EU-152	7.4012E-02						
		121.78	-1.168E-02	%(P	1.570E-01	4.68E-02	G K
		344.30	1.234E-02	% P	1.203E-01	3.55E-02	G
		1408.08	-6.083E-04	%	1.651E-01	4.53E-02	G
		964.00	2.459E-01	&(P	2.900E-01	9.17E-02	G
		1112.07	-7.028E-03	%	3.328E-01	9.50E-02	G
		778.90	-2.940E-02	%	2.602E-01	7.51E-02	G
EU-154	2.3819E-02						
		123.10	2.382E-02	&(	9.815E-02	2.95E-02	G K
		1274.80	1.206E-02	&	1.273E-01	3.65E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-7.258E-02 %   1.984E-01 5.95E-02 G
                         1004.80-4.303E-03 %   2.006E-01 5.66E-02 G

EU-155       2.9120E-02
                           86.45 2.912E-02 %(  2.198E-01 6.57E-02 G K
                          105.31 2.679E-02 %   2.440E-01 7.30E-02 G

HG-203      -1.6297E-03
                          279.17-1.630E-03 &(P 4.201E-02 1.24E-02 G K
                           72.87-7.180E-01 & P 2.394E+00 7.21E-01 G
                           70.83 1.736E+00 %   3.990E+00 1.21E+00 G
                           82.50-1.610E+00 &   3.621E+00 1.10E+00 G

TL-208       3.1050E-01
                          583.14 3.055E-01  (P 4.425E-02 2.29E-02 G
                          510.72 3.296E-01 *(P 1.695E-01 6.52E-02 G

PB-212       7.4732E-01
                          238.63 7.485E-01  (P 9.365E-02 3.99E-02 G K
                                                          Energy duplication
                           77.11 7.473E-01 } P 4.065E-01 1.13E-02 G
                           74.81 1.377E+00 + P 7.852E-01 2.55E-01 G

PB-214       4.6543E-01
                          351.99 4.597E-01 @(P 8.593E-02 3.78E-02 G K
                          295.22 4.764E-01  (P 1.770E-01 6.95E-02 G
                                                          Energy duplication
                           77.11 3.225E-03 } P 9.412E-01 1.09E-01 G
                          241.92-2.890E-02 %   6.331E-01 1.89E-01 G

BI-212       8.3330E-01
                          727.17 8.333E-01  (P 3.085E-01 1.40E-01 G K
                         1620.56 2.019E-01 % P 1.127E+00 3.17E-01 G
                          785.42 2.038E+00 +   1.772E+00 6.99E-01 G

BI-214       4.6618E-01
                          609.32 4.563E-01  (P 9.118E-02 4.45E-02 G K
                         1764.51 4.947E-01 *(P 1.926E-01 9.43E-02 G
                         1120.28 6.053E-01 + P 3.520E-01 1.50E-01 G

RA-224       8.8454E-01
                          241.00 8.845E-01  (  1.039E+00 3.20E-01 G

RA-226       1.4235E+00
                          185.99 1.424E+00  (P 1.095E+00 3.42E-01 G

AC-228       7.6966E-01
                          911.07 7.574E-01  (P 1.239E-01 6.23E-02 G K
                          968.90 1.045E+00 + P 2.622E-01 1.24E-01 G
                          338.40 7.993E-01  (P 2.430E-01 9.62E-02 G
```

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.1392E-01
                          236.00-1.139E-01 %(  3.857E-01 1.16E-01 G K
                          256.25 9.774E-02 & P 4.942E-01 1.48E-01 G

PA-234      -1.9208E-03
                           98.44-1.921E-03 %(P 2.182E-01 6.48E-02 G K
                          946.00 3.800E-02 & P 2.049E-01 5.99E-02 G
                          131.28-6.056E-02 & P 2.246E-01 6.76E-02 G
                           94.67-2.055E-01 & P 4.421E-01 1.34E-01 G
                          883.24-6.034E-02 %   3.063E-01 8.94E-02 G
                          926.70-4.161E-03 %   2.574E-01 7.16E-02 G
                          569.26 7.445E-02 % P 3.020E-01 8.89E-02 G

TH-234       1.6380E+00
                           63.29 1.205E+00 %(P 6.711E+00 2.01E+00 G K
                           92.80 1.776E+00  (P 2.235E+00 6.83E-01 G
                           92.38 2.135E+00  (P 2.650E+00 8.10E-01 G

AM-241      -1.8348E-03
                           59.54-1.835E-03 %(P 1.235E+00 3.67E-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:                      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 - 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	7.8368E-02	8.3526E-02	3.1392E-01	3.1396E-01	3.308E-01
K-40		1.5653E+01	1.5653E+01	1.3417E+00	1.6205E+00	
MN-54	#A	1.2478E-02	1.2615E-02	3.2128E-02	3.2136E-02	3.555E-02
CO-57	#B	-2.7450E-04	-2.7798E-04	1.6113E-01	1.6113E-01	4.614E-02
CO-60	#F	3.9439E-02	3.9509E-02	3.6329E-02	3.6401E-02	3.666E-02
Sr-85	#A	-1.9438E-02	-2.0486E-02	4.2158E-02	4.2174E-02	4.409E-02
Kr-85	#A	-4.4883E+02	-4.4885E+02	9.2351E+02	9.2388E+02	1.018E+03
Y-88	#B	-9.5814E-05	-9.8923E-05	5.9354E-04	5.9357E-04	1.121E-02
NB-94	#B	-5.0772E-03	-5.0772E-03	2.9458E-02	2.9459E-02	3.396E-02
Ag-108M	#B	-8.8565E-04	-8.8572E-04	6.8959E-02	6.8959E-02	7.794E-02
CD-109	#A	9.4005E-01	9.4713E-01	1.7931E+00	1.7939E+00	1.956E+00
SN-113	#B	-1.6665E-02	-1.7165E-02	5.0339E-02	5.0348E-02	5.440E-02
SB-125	#B	9.2979E-02	9.3292E-02	7.4029E-02	7.4227E-02	1.038E-01
I-131	#B	-1.6017E-03	-2.4459E-03	6.3518E-02	6.3518E-02	3.004E-02
CS-134	#B	2.8569E-03	2.8698E-03	7.5679E-02	7.5679E-02	8.444E-02
CS-137	#A	4.0381E-02	4.0393E-02	4.2996E-02	4.3060E-02	
CE-139	#A	8.7616E-03	8.9812E-03	4.2002E-02	4.2006E-02	4.560E-02
EU-152	#B	7.3958E-02	7.4012E-02	8.2771E-02	8.2873E-02	1.569E-01
EU-154	#B	2.3793E-02	2.3819E-02	8.8370E-02	8.8380E-02	9.804E-02
EU-155	#B	2.9066E-02	2.9120E-02	1.9716E-01	1.9717E-01	2.194E-01
HG-203	#B	-1.5149E-03	-1.6297E-03	3.8012E-02	3.8013E-02	3.905E-02
TL-208		3.1050E-01	3.1050E-01	6.9779E-02	7.2070E-02	
PB-212		7.4732E-01	7.4732E-01	1.1966E-01	1.2729E-01	
PB-214		4.6543E-01	4.6543E-01	1.1477E-01	1.1791E-01	
BI-212		8.3330E-01	8.3330E-01	4.2136E-01	4.2412E-01	
BI-214		4.6618E-01	4.6618E-01	1.3647E-01	1.3913E-01	
RA-224	A	8.8454E-01	8.8454E-01	9.6088E-01	9.6225E-01	1.039E+00
RA-226	#	1.4235E+00	1.4235E+00	1.0274E+00	1.0307E+00	1.095E+00
AC-228		7.6966E-01	7.6966E-01	1.6837E-01	1.7420E-01	
TH-227	#B	-1.1392E-01	-1.1392E-01	3.4831E-01	3.4837E-01	3.857E-01
PA-234	#B	-1.9208E-03	-1.9208E-03	2.3530E+00	2.3530E+00	2.182E-01
TH-234	#B	1.6380E+00	1.6380E+00	1.8638E+00	1.8660E+00	6.711E+00
AM-241	#A	-1.8347E-03	-1.8348E-03	4.3773E-01	4.3773E-01	1.235E+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) 2.0170773E+01 pCi/gm
Total Decayed Activity (83.9 to 2000.7 keV) 2.0170784E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-NOL-05-02-016-F

Spectrum Filename: C:\GammaVision\Spectra\103F_13DEC2005_1136.An1

Acquisition information

Start time:	13-Dec-2005 11:37:38
Live time:	2000
Real time:	2003
Dead time:	0.15 %
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/channel^2

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:	1.9240E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.9240E+03) = 5.1975E+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	08-Dec-2005 13:18:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2676

***** 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
75.01	133.	22.81	0.99	9.052E-03	74.81	9.600	1.077E+00	PB212
77.31	129.	18.96	0.99	1.011E-02	77.11	17.500	7.142E-01	PB212
					77.11	10.700	1.168E+00	PB214
87.45	93.	32.43	1.00	1.460E-02	86.45	32.740	1.412E-01	EU155
					88.04	3.790	1.175E+00	CD109
93.04	102.	28.77	1.00	1.663E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.02	157.	22.79	1.25	2.567E-02	185.99	3.280	1.205E+00	RA226
209.94	140.	25.28	0.76	2.468E-02				
238.72	1189.	3.42	1.09	2.320E-02	238.63	43.100	8.266E-01	PB212
241.56	190.	16.79	1.09	2.305E-02	241.00	3.900	1.484E+00	RA224
					241.92	7.470	7.767E-01	PB214
269.98	81.	38.10	1.41	2.152E-02				
295.31	223.	10.36	1.13	2.024E-02	295.22	19.200	3.957E-01	PB214
299.93	93.	22.07	1.13	2.002E-02				
327.71	88.	27.91	1.12	1.875E-02				
338.24	262.	13.27	1.13	1.831E-02	338.40	12.010	8.350E-01	AC228
351.67	398.	7.97	1.24	1.777E-02	351.99	37.100	4.186E-01	PB214
409.37	58.	31.09	1.52	1.575E-02				
463.21	88.	22.51	1.33	1.425E-02				
463.21	88.	22.51	1.33	1.425E-02	463.51	10.000	4.275E-01	SB125
510.55	205.	13.06	1.48	1.318E-02	510.72	22.500	4.235E-01	TL208
582.93	424.	6.70	1.32	1.185E-02	583.14	86.000	2.895E-01	TL208
609.15	301.	9.10	1.28	1.144E-02	609.32	46.090	3.925E-01	BI214
727.43	117.	18.68	1.41	9.962E-03	727.17	11.800	6.947E-01	BI212
794.19	57.	30.53	1.08	9.315E-03				
859.85	76.	22.09	1.36	8.773E-03				

910.86	302.	7.71	1.74	8.403E-03	911.07	29.000	8.609E-01	AC228
963.68	50.	25.85	1.54	8.057E-03				
963.68	50.	25.85	1.54	8.057E-03	964.00	14.580	2.951E-01	EU152
968.65	153.	10.06	1.54	8.026E-03	968.90	17.460	7.639E-01	AC228
1119.59	109.	22.04	1.52	7.215E-03	1120.28	15.040	6.936E-01	BI214
1331.72	25.	34.70	1.77	6.349E-03	1332.51	99.980	PBC<MDA	CO60
1460.33	1536.	2.58	1.98	5.933E-03	1460.75	10.700	1.678E+01	K40
1619.48	20.	26.88	1.21	5.488E-03	1620.56	2.750	9.102E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1763.85	46.	14.74	1.39	5.142E-03	1764.51	15.920	3.967E-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	
174.07	87.72	405.	93.	0.046	97.28	1.001	PB-214	lD
419.04	209.94	465.	140.	0.070	75.83	0.760	NP-239	s
539.10	269.98	361.	81.	0.040	114.30	1.409	AC-228	s
599.00	299.92	274.	91.	0.045	90.63	1.206	TH-227	
654.56	327.71	222.	88.	0.044	83.72	1.120	AC-228	s
817.87	409.37	129.	58.	0.029	93.28	1.516	AC-228	s
1587.43	794.19	74.	69.	0.035	63.79	1.076	PA-234	s
1718.75	859.85	70.	76.	0.038	66.26	1.359	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	419.	133.	0.067	68.44	0.993D
PB-212	153.39	77.11	406.	129.	0.064	56.89	0.995A
TH-234	185.33	93.08	979.	132.	0.066	90.97	1.500s
RA-226	371.25	186.05	787.	140.	0.070	80.73	1.500s
PB-212	476.42	238.63	245.	1170.	0.585	10.31	1.093D
PB-214	483.00	241.92	353.	99.	0.049	77.22	1.095A
PB-214	589.75	295.30	235.	202.	0.101	38.28	1.056
AC-228	675.63	338.24	308.	261.	0.131	39.82	1.128s
PB-214	702.49	351.67	223.	393.	0.196	23.92	1.243
SB-125	925.41	463.15	167.	82.	0.041	73.37	1.500
TL-208	1020.21	510.55	187.	179.	0.089	39.17	1.475s
TL-208	1164.97	582.93	141.	420.	0.210	20.09	1.319
BI-214	1217.40	609.15	151.	295.	0.147	27.29	1.276
BI-212	1453.94	727.43	113.	116.	0.058	56.03	1.406
AC-228	1820.76	910.86	83.	299.	0.149	23.13	1.743s
EU-152	1927.72	964.35	91.	52.	0.026	86.95	1.538
AC-228	1934.83	967.91	75.	232.	0.116	28.06	1.540
BI-214	2238.15	1119.59	119.	107.	0.054	66.11	1.524s
CO-60	2662.35	1331.72	34.	25.	0.012	104.09	1.765
K-40	2919.52	1460.33	29.	1517.	0.758	7.74	1.976

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3237.78	1619.48	2.	20.	0.010	80.64	1.210s
BI-214	3526.45	1763.85	5.	46.	0.023	44.23	1.388s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.7980E-02					
			477.56	1.798E-02	&(	3.052E-01 8.89E-02	G
K-40		1.6784E+01					
			1460.75	1.678E+01	(P	3.087E-01 4.38E-01	G
MN-54		1.2745E-02					
			834.81	1.274E-02	%(P	3.590E-02 1.07E-02	G
CO-57		4.5864E-03					
			122.07	4.586E-03	&(P	4.656E-02 1.39E-02	G K
			136.43	-4.639E-02	%	3.815E-01 1.14E-01	G
CO-60		2.7357E-02					
			1332.51	2.736E-02	(P	3.309E-02 1.05E-02	G K
			1173.23	2.673E-02	% P	4.821E-02 1.47E-02	G K
Sr-85		-1.8863E-02					
			514.00	-1.886E-02	%(	4.299E-02 1.30E-02	G
Kr-85		-4.1404E+02					
			513.99	-4.140E+02	%(	9.418E+02 2.85E+02	G
Y-88		-3.9431E-03					
			1836.01	-3.943E-03	%(P	3.036E-02 8.34E-03	G K
			898.02	-6.896E-03	% P	3.957E-02 1.15E-02	G
NB-94		5.7040E-03					
			871.10	5.704E-03	%(	3.193E-02 9.28E-03	G K
			702.50	-3.132E-03	%	3.493E-02 1.01E-02	G K
Ag-108M		9.6972E-03					
			722.95	9.697E-03	&(	3.068E-02 9.10E-03	G K
			614.37	-3.363E-03	& P	3.912E-02 1.14E-02	G
			433.93	-4.019E-04	&	3.389E-02 9.87E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-6.7506E-02						
		88.04	-6.751E-02	%(	2.067E+00	6.17E-01	G
SN-113	8.2895E-03						
		391.71	8.289E-03	%(	5.002E-02	1.48E-02	G K
		255.04	4.298E-01	%	1.614E+00	4.84E-01	G
SB-125	9.3362E-02						
		427.95	-1.213E-02	&(P	1.065E-01	3.13E-02	G K
		600.77	-2.058E-03	% P	1.539E-01	4.41E-02	G
		636.15	4.484E-02	& P	2.866E-01	8.37E-02	G
		463.51	4.056E-01	(P	3.113E-01	1.01E-01	G
		176.29	0.000E+00	&	5.601E-01	1.66E-01	G
I-131	-1.9393E-03						
		364.48	-1.939E-03	&(P	4.788E-02	1.39E-02	G K
		636.97	1.524E-01	&	6.687E-01	1.97E-01	G
		284.29	-1.731E-01	% P	8.512E-01	2.54E-01	G
CS-134	-1.2308E-03						
		604.66	-1.231E-03	%(	3.582E-02	1.04E-02	G K
		795.76	-1.183E-02	& P	4.476E-02	1.32E-02	G
		569.29	9.316E-03	% P	1.785E-01	5.12E-02	G
		801.84	9.414E-02	% P	3.524E-01	1.03E-01	G
CS-137	3.2708E-03						
		661.62	3.271E-03	&(P	4.299E-02	1.25E-02	G
CE-139	-2.9154E-03						
		165.85	-2.915E-03	&(	4.845E-02	1.45E-02	G
EU-152	1.0251E-01						
		121.78	-2.314E-03	&(P	1.506E-01	4.48E-02	G K
		344.30	4.456E-03	% P	1.226E-01	3.61E-02	G
		1408.08	4.915E-02	%	1.445E-01	4.26E-02	G
		964.00	3.127E-01	&(P	2.826E-01	9.16E-02	G
		1112.07	-7.097E-02	%	3.862E-01	1.14E-01	G
		778.90	2.865E-02	&	2.928E-01	8.51E-02	G
EU-154	4.2526E-02						
		123.10	4.253E-02	&(	1.091E-01	3.30E-02	G K
		1274.80	-2.618E-02	&	1.220E-01	3.57E-02	G
		723.30	3.797E-03	&	3.235E-01	9.53E-02	G
		1004.80	-3.273E-03	&	1.845E-01	5.19E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-1.7380E-03						
		86.45	-1.738E-03	&(	2.360E-01	7.04E-02	G K
		105.31	6.140E-02	%	2.284E-01	6.87E-02	G
HG-203	-3.6723E-03						
		279.17	-3.672E-03	&(P	4.474E-02	1.33E-02	G K
		72.87	-4.102E-01	% P	2.338E+00	7.02E-01	G
		70.83	-9.558E-02	&	4.860E+00	1.45E+00	G
		82.50	1.756E-01	&	3.164E+00	9.41E-01	G
TL-208	2.8952E-01						
		583.14	2.895E-01	(P	4.004E-02	1.96E-02	G
		510.72	4.235E-01	+ P	1.575E-01	6.36E-02	G
PB-212	8.2170E-01						
		238.63	8.217E-01	(P	5.317E-02	2.85E-02	G K
							Energy duplication
		77.11	5.113E-01	} P	3.834E-01	9.70E-02	G
		74.81	1.077E+00	+ P	7.927E-01	2.51E-01	G
PB-214	4.0424E-01						
		351.99	4.186E-01	(P	7.717E-02	3.38E-02	G K
		295.22	3.648E-01	(P	1.340E-01	4.75E-02	G
							Energy duplication
		77.11	2.759E-01	} P	9.415E-01	2.10E-01	G
		241.92	4.042E-01	}	3.685E-01	1.04E-01	G
BI-212	7.3545E-01						
		727.17	6.947E-01	(P	3.117E-01	1.30E-01	G K
		1620.56	9.102E-01	(P	4.652E-01	2.45E-01	G
		785.42	7.058E-01	%	1.873E+00	5.62E-01	G
BI-214	3.9356E-01						
		609.32	3.925E-01	(P	7.999E-02	3.65E-02	G K
		1764.51	3.967E-01	(P	1.106E-01	6.26E-02	G
		1120.28	6.936E-01	+ P	3.466E-01	1.55E-01	G
RA-224	8.4820E-01						
							Derived Ave Activity
		241.00	8.482E-01	}(	1.140E+00	3.65E-01	G
RA-226	1.1706E+00						
		185.99	1.171E+00	(P	1.113E+00	3.44E-01	G
AC-228	8.5333E-01						
		911.07	8.609E-01	(P	1.305E-01	6.71E-02	G K
		968.90	1.163E+00	+ P	2.158E-01	1.09E-01	G
		338.40	8.350E-01	@(P	2.699E-01	1.11E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.4742E-01
                          236.00-1.474E-01 %(  4.006E-01 1.21E-01 G K
                          256.25 7.883E-02 % P 4.923E-01 1.47E-01 G

PA-234       6.3487E-02
                           98.44 6.349E-02 &(P 1.989E-01 5.99E-02 G K
                          946.00-2.675E-02 % P 1.901E-01 5.52E-02 G
                          131.28 7.769E-03 % P 2.066E-01 6.16E-02 G
                           94.67 4.744E-03 % P 3.795E-01 1.13E-01 G
                          883.24 7.291E-02 %   2.482E-01 7.32E-02 G
                          926.70-1.009E-01 %   3.681E-01 1.09E-01 G
                          569.26 1.179E-02 % P 2.638E-01 7.55E-02 G

TH-234       7.3872E-01
                           63.29-2.377E-01 &(P 6.276E+00 1.86E+00 G K
                           92.80 1.540E+00 % P 2.130E+00 6.49E-01 G
                           92.38 2.220E+00  (P 2.489E+00 7.63E-01 G

AM-241       1.9953E-01
                           59.54 1.995E-01 %(P 1.090E+00 3.26E-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:                      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 - 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	1.6866E-02	1.7980E-02	2.6658E-01	2.6658E-01	2.863E-01
K-40		1.6784E+01	1.6784E+01	1.3146E+00	1.6363E+00	
MN-54	#A	1.2606E-02	1.2745E-02	3.2147E-02	3.2155E-02	3.551E-02
CO-57	#B	4.5287E-03	4.5864E-03	4.1689E-02	4.1689E-02	4.598E-02
CO-60	#B	2.7308E-02	2.7357E-02	3.1529E-02	3.1569E-02	3.303E-02
Sr-85	#A	-1.7895E-02	-1.8863E-02	3.8997E-02	3.9013E-02	4.079E-02
Kr-85	#A	-4.1402E+02	-4.1404E+02	8.5430E+02	8.5464E+02	9.417E+02
Y-88	#B	-3.8187E-03	-3.9431E-03	2.6215E-02	2.6216E-02	2.941E-02
NB-94	#B	5.7040E-03	5.7040E-03	2.7831E-02	2.7833E-02	3.193E-02
Ag-108M	#B	9.6965E-03	9.6972E-03	2.7291E-02	2.7297E-02	3.068E-02
CD-109	#A	-6.6999E-02	-6.7506E-02	1.8525E+00	1.8525E+00	2.051E+00
SN-113	#B	8.0470E-03	8.2895E-03	4.4422E-02	4.4425E-02	4.856E-02
SB-125	#B	9.3047E-02	9.3362E-02	6.9564E-02	6.9774E-02	1.062E-01
I-131	#B	-1.2678E-03	-1.9393E-03	7.2623E-02	7.2623E-02	3.130E-02
CS-134	#B	-1.2252E-03	-1.2308E-03	3.1178E-02	3.1178E-02	3.566E-02
CS-137	#A	3.2698E-03	3.2708E-03	3.7438E-02	3.7438E-02	4.298E-02
CE-139	#A	-2.8438E-03	-2.9154E-03	4.3361E-02	4.3361E-02	4.726E-02
EU-152	#B	1.0244E-01	1.0251E-01	9.0064E-02	9.0243E-02	1.504E-01
EU-154	#B	4.2479E-02	4.2526E-02	9.8950E-02	9.8978E-02	1.090E-01
EU-155	#B	-1.7347E-03	-1.7380E-03	2.1113E-01	2.1113E-01	2.355E-01
HG-203	#B	-3.4126E-03	-3.6723E-03	4.0201E-02	4.0201E-02	4.158E-02
TL-208		2.8952E-01	2.8952E-01	5.8771E-02	6.1127E-02	
PB-212		8.2170E-01	8.2170E-01	8.5558E-02	9.7959E-02	
PB-214		4.0424E-01	4.0424E-01	9.8083E-02	1.0085E-01	
BI-212		7.3545E-01	7.3545E-01	3.6215E-01	3.6466E-01	
BI-214		3.9356E-01	3.9356E-01	1.0815E-01	1.1054E-01	
RA-224	A	8.4820E-01	8.4820E-01	1.0627E+00	1.0639E+00	
RA-226	#	1.1706E+00	1.1706E+00	1.0323E+00	1.0345E+00	1.113E+00
AC-228		8.5333E-01	8.5333E-01	1.9764E-01	2.0375E-01	
TH-227	#B	-1.4742E-01	-1.4742E-01	3.6306E-01	3.6316E-01	4.006E-01
PA-234	#B	6.3487E-02	6.3487E-02	1.7973E-01	1.7977E-01	1.989E-01
TH-234	#B	7.3872E-01	7.3872E-01	7.6154E-01	7.6264E-01	6.276E+00
AM-241	#A	1.9952E-01	1.9953E-01	9.7861E-01	9.7867E-01	1.090E+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 (245.9 to 2000.7 keV) 2.1130184E+01 pCi/gm
Total Decayed Activity (245.9 to 2000.7 keV) 2.1130184E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1341.An1

Sample description
FSS-NOL-05-02-023-F-RC

Spectrum Filename: C:\GammaVision\Spectra\103F_13DEC2005_1341.An1

Acquisition information
Start time: 13-Dec-2005 13:43:18
Live time: 2000
Real time: 2003
Dead time: 0.16 %
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/channel^2

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: 1.8360E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8360E+03) =
5.4466E+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	08-Dec-2005 10:26:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1889

***** 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
74.97	165.	17.99	0.99	9.052E-03	74.81	9.600	1.396E+00	PB212
77.27	129.	19.36	0.99	1.011E-02	77.11	17.500	7.293E-01	PB212
					77.11	10.700	1.193E+00	PB214
92.98	98.	40.02	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
186.24	152.	25.98	1.02	2.566E-02	185.99	3.280	1.212E+00	RA226
209.33	132.	23.61	1.12	2.471E-02				
238.65	1199.	3.37	1.09	2.320E-02	238.63	43.100	8.738E-01	PB212
241.45	172.	17.25	1.09	2.304E-02	241.00	3.900	1.406E+00	RA224
270.10	60.	41.31	1.37	2.152E-02				
277.99	51.	40.51	1.16	2.111E-02				
295.05	224.	12.38	1.04	2.026E-02	295.22	19.200	4.160E-01	PB214
300.51	110.	26.78	1.56	1.999E-02				
328.22	78.	29.20	1.63	1.873E-02				
338.21	294.	12.04	1.25	1.831E-02	338.40	12.010	9.808E-01	AC228
351.76	456.	7.04	1.25	1.776E-02	351.99	37.100	5.035E-01	PB214
462.97	98.	17.52	0.99	1.426E-02				
462.97	98.	17.52	0.99	1.426E-02	463.51	10.000	5.036E-01	SB125
510.84	204.	14.34	1.76	1.317E-02	510.72	22.500	4.409E-01	TL208
582.94	411.	7.94	1.25	1.185E-02	583.14	86.000	2.939E-01	TL208
609.19	328.	9.27	1.49	1.144E-02	609.32	46.090	4.486E-01	BI214
661.59	134.	16.50	1.20	1.072E-02	661.62	84.620	1.080E-01	CS137
726.12	145.	16.44	1.20	9.976E-03	727.17	11.800	9.058E-01	BI212
767.82	36.	36.00	1.64	9.558E-03				
794.07	70.	32.12	1.44	9.316E-03				
794.07	70.	32.12	1.44	9.316E-03	795.76	85.400	6.462E-02	CS134

859.84	56.	35.53	0.85	8.773E-03				
910.87	288.	7.20	1.64	8.403E-03	911.07	29.000	8.608E-01	AC228
964.12	52.	21.24	1.54	8.055E-03	964.00	14.580	3.249E-01	EU152
968.59	163.	9.68	1.54	8.027E-03	968.90	17.460	8.528E-01	AC228
1119.50	80.	19.26	1.46	7.215E-03	1120.28	15.040	5.300E-01	BI214
1172.51	32.	39.79	1.67	6.972E-03	1173.23	99.860	PBC<MDA	CO60
1331.77	24.	38.20	1.77	6.349E-03	1332.51	99.980	PBC<MDA	CO60
1460.20	1524.	2.63	1.77	5.934E-03	1460.75	10.700	1.745E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1763.72	67.	14.96	0.80	5.144E-03	1764.51	15.920	5.712E-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	
417.81	209.33	398.	132.	0.066	70.82	1.125	AC-228	s
539.36	270.10	264.	60.	0.030	123.94	1.369	AC-228	s
555.14	277.99	196.	51.	0.025	121.54	1.156	NP-239	l
600.16	300.51	303.	110.	0.055	80.33	1.555	PB-212	s
655.58	328.22	199.	78.	0.039	87.60	1.634	AC-228	s
1534.71	767.82	60.	36.	0.018	108.01	1.639	BI-214	s
1718.72	859.84	98.	56.	0.028	106.58	0.849	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	375.	165.	0.082	53.98	0.993D
PB-212	153.39	77.11	419.	129.	0.064	58.07	0.995A
RA-226	371.60	186.22	821.	149.	0.075	77.91	1.500
PB-212	476.48	238.66	617.	1246.	0.623	12.83	1.078
RA-224	482.13	241.49	815.	122.	0.061	103.20	1.500
PB-214	589.25	295.05	251.	220.	0.110	37.14	1.040
AC-228	675.56	338.21	321.	293.	0.146	36.13	1.246
PB-214	702.67	351.76	226.	451.	0.225	21.11	1.249
SB-125	924.91	462.89	134.	101.	0.051	56.10	1.500
TL-208	1020.79	510.84	224.	178.	0.089	43.01	1.760s
TL-208	1164.98	582.94	186.	407.	0.203	23.83	1.249
BI-214	1217.47	609.19	182.	321.	0.161	27.81	1.492s
CS-137	1322.27	661.59	125.	133.	0.067	49.51	1.195s
BI-212	1451.31	726.12	125.	145.	0.072	49.31	1.195s
CS-134	1588.40	794.67	78.	45.	0.023	93.49	1.500s
AC-228	1820.78	910.87	56.	285.	0.142	21.59	1.641
EU-152	1927.46	964.22	95.	39.	0.020	114.00	1.538
AC-228	1934.91	967.95	96.	264.	0.132	29.35	1.544s
BI-214	2237.98	1119.50	65.	78.	0.039	57.79	1.460s
K-40	2919.27	1460.20	39.	1505.	0.752	7.88	1.770
BI-214	3526.20	1763.72	10.	64.	0.032	44.89	0.805s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		8.9548E-02					
			477.56	8.955E-02	%(	3.304E-01 9.83E-02	G
K-40		1.7452E+01					
			1460.75	1.745E+01	(P	3.690E-01 4.64E-01	G
MN-54		-3.8397E-04					
			834.81	-3.840E-04	%(P	3.342E-02 9.44E-03	G
CO-57		-4.5146E-03					
			122.07	-4.515E-03	&(P	5.580E-02 1.67E-02	G K
			136.43	9.543E-04	&	3.342E-01 9.91E-02	G
CO-60		2.8411E-02					
			1332.51	2.841E-02	%(P	3.852E-02 1.20E-02	G K
			1173.23	3.416E-02	% P	4.629E-02 1.44E-02	G K
Sr-85		-2.5620E-02					
			514.00	-2.562E-02	%(	5.000E-02 1.52E-02	G
Kr-85		-5.5994E+02					
			513.99	-5.599E+02	%(	1.093E+03 3.32E+02	G
Y-88		1.7460E-03					
			1836.01	1.746E-03	%(P	3.077E-02 8.23E-03	G K
			898.02	-1.273E-03	& P	4.199E-02 1.19E-02	G
NB-94		-5.1141E-03					
			871.10	-5.114E-03	%(	3.726E-02 1.08E-02	G K
			702.50	1.632E-03	%	3.471E-02 1.00E-02	G K
Ag-108M		1.2258E-03					
			722.95	1.226E-03	%(	5.095E-02 1.48E-02	G K
			614.37	-4.502E-05	% P	4.559E-02 1.32E-02	G
			433.93	1.285E-02	%	3.518E-02 1.06E-02	G
CD-109		1.4153E-01					
			88.04	1.415E-01	%(	2.216E+00 6.63E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	8.4808E-03						
		391.71	8.481E-03	%(	5.169E-02	1.53E-02	G K
		255.04	-1.660E-01	&	1.619E+00	4.81E-01	G
SB-125	1.4398E-01						
		427.95	1.488E-02	%(P	1.144E-01	3.37E-02	G K
		600.77	3.197E-02	% P	1.671E-01	4.90E-02	G
		636.15	1.090E-01	& P	2.671E-01	8.02E-02	G
		463.51	5.261E-01	(P	2.942E-01	9.96E-02	G
		176.29	-8.922E-02	%	5.971E-01	1.79E-01	G
I-131	3.6232E-03						
		364.48	3.623E-03	&(P	5.919E-02	1.74E-02	G K
		636.97	9.331E-03	&	7.251E-01	2.09E-01	G
		284.29	2.159E-01	& P	8.224E-01	2.46E-01	G
CS-134	1.9020E-02						
		604.66	-1.402E-03	&(	8.393E-02	2.49E-02	G K
		795.76	4.236E-02	@(P	4.089E-02	1.32E-02	G
		569.29	-1.516E-02	% P	2.538E-01	7.36E-02	G
		801.84	-6.728E-02	% P	4.102E-01	1.18E-01	G
CS-137	1.0802E-01						
		661.62	1.080E-01	*(P	4.446E-02	1.80E-02	G
CE-139	-6.6644E-03						
		165.85	-6.664E-03	&(	5.310E-02	1.59E-02	G
EU-152	7.6195E-02						
		121.78	-8.789E-03	%(P	1.575E-01	4.70E-02	G K
		344.30	-1.795E-02	% P	1.271E-01	3.77E-02	G
		1408.08	6.274E-03	%	1.646E-01	4.56E-02	G
		964.00	2.466E-01	&(P	3.024E-01	9.50E-02	G
		1112.07	1.494E-01	%	3.013E-01	9.16E-02	G
		778.90	-5.663E-02	&	3.318E-01	9.75E-02	G
EU-154	-5.4067E-03						
		123.10	-5.407E-03	&(	1.056E-01	3.15E-02	G K
		1274.80	3.033E-03	%	1.007E-01	2.81E-02	G
		723.30	1.011E-02	%	2.304E-01	6.71E-02	G
		1004.80	5.372E-02	&	2.215E-01	6.51E-02	G
EU-155	9.0930E-02						
		86.45	9.093E-02	%(	2.087E-01	6.32E-02	G K
		105.31	2.876E-02	%	2.498E-01	7.47E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

HG-203       9.6808E-04
                          279.17 9.681E-04 &(P 4.623E-02 1.37E-02 G K
                           72.87-6.355E-01 % P 2.521E+00 7.59E-01 G
                           70.83 3.853E-02 %   4.182E+00 1.24E+00 G
                           82.50-8.341E-01 &   4.277E+00 1.28E+00 G

TL-208       2.9386E-01
                          583.14 2.939E-01  (P 4.792E-02 2.36E-02 G
                          510.72 4.409E-01 + P 1.801E-01 7.27E-02 G

PB-212       9.1710E-01
                          238.63 9.171E-01  (P 8.721E-02 3.96E-02 G K
                                                            Energy duplication
                           77.11 5.347E-01 } P 4.077E-01 1.03E-01 G
                           74.81 1.396E+00 + P 7.876E-01 2.56E-01 G

PB-214       5.0351E-01
                          351.99 5.035E-01  (P 8.139E-02 3.59E-02 G K
                          295.22 4.160E-01 - P 1.450E-01 5.24E-02 G
                                                            Energy duplication
                           77.11 2.102E-01 } P 9.702E-01 2.23E-01 G
                          241.92-8.810E-02 %   5.481E-01 1.64E-01 G

BI-212       9.0580E-01
                          727.17 9.058E-01 *(P 3.435E-01 1.49E-01 G K
                         1620.56 2.144E-01 % P 9.950E-01 2.81E-01 G
                          785.42 4.873E-01 %   1.746E+00 5.16E-01 G

BI-214       4.8982E-01
                          609.32 4.486E-01 @(P 9.147E-02 4.24E-02 G K
                         1764.51 5.712E-01  (P 1.600E-01 8.99E-02 G
                         1120.28 5.300E-01  (P 2.731E-01 1.05E-01 G

RA-224       9.9515E-01
                          241.00 9.951E-01  (  1.110E+00 3.42E-01 G

RA-226       1.3068E+00
                          185.99 1.307E+00  (P 1.191E+00 3.69E-01 G

AC-228       8.9595E-01
                          911.07 8.608E-01  (P 1.136E-01 6.27E-02 G K
                          968.90 1.386E+00 + P 2.542E-01 1.36E-01 G
                          338.40 9.808E-01  (P 2.887E-01 1.19E-01 G

TH-227      -1.9052E-01
                          236.00-1.905E-01 &(  4.027E-01 1.22E-01 G K
                          256.25 3.431E-02 & P 4.585E-01 1.36E-01 G
```

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234      -2.7478E-02
                            98.44-2.748E-02 &(P 2.373E-01 7.09E-02 G K
                           946.00-3.012E-02 & P 2.162E-01 6.30E-02 G
                           131.28 5.632E-02 % P 1.949E-01 5.86E-02 G
                            94.67-5.876E-02 % P 3.480E-01 1.04E-01 G
                           883.24-6.610E-02 %   3.462E-01 1.02E-01 G
                           926.70 6.282E-02 &   3.363E-01 9.80E-02 G
                           569.26-2.238E-02 % P 3.747E-01 1.09E-01 G

TH-234       1.5642E-01
                            63.29 1.564E-01 %(P 6.623E+00 1.97E+00 G K
                            92.80 1.460E+00 % P 2.270E+00 6.90E-01 G
                            92.38 1.701E+00 % P 2.692E+00 8.17E-01 G

AM-241      -7.9087E-02
                            59.54-7.909E-02 %(P 1.173E+00 3.49E-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:                      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 - 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 *****

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	8.3772E-02	8.9548E-02	2.9482E-01	2.9487E-01	3.090E-01
K-40		1.7452E+01	1.7452E+01	1.3928E+00	1.7223E+00	
MN-54	#A	-3.7961E-04	-3.8397E-04	2.2165E-01	2.2165E-01	3.305E-02
CO-57	#B	-4.4555E-03	-4.5146E-03	5.3697E-02	5.3697E-02	5.506E-02
CO-60	#B	2.8359E-02	2.8411E-02	3.6084E-02	3.6121E-02	3.845E-02
Sr-85	#A	-2.4251E-02	-2.5620E-02	4.5589E-02	4.5613E-02	4.733E-02
Kr-85	#A	-5.5992E+02	-5.5994E+02	9.9627E+02	9.9680E+02	1.093E+03
Y-88	#B	1.6887E-03	1.7460E-03	2.4686E-02	2.4686E-02	2.976E-02
NB-94	#B	-5.1141E-03	-5.1141E-03	3.2444E-02	3.2445E-02	3.726E-02
Ag-108M	#B	1.2257E-03	1.2258E-03	4.4480E-02	4.4480E-02	5.094E-02
CD-109	#A	1.4042E-01	1.4153E-01	1.9887E+00	1.9887E+00	2.198E+00
SN-113	#B	8.2225E-03	8.4808E-03	4.5877E-02	4.5879E-02	5.011E-02
SB-125	#F	1.4347E-01	1.4398E-01	8.1785E-02	8.2211E-02	1.140E-01
I-131	#B	2.3268E-03	3.6232E-03	5.2094E-02	5.2094E-02	3.801E-02
CS-134	#B	1.8930E-02	1.9020E-02	1.7816E-02	1.7850E-02	8.354E-02
CS-137	#	1.0798E-01	1.0802E-01	5.4034E-02	5.4397E-02	
CE-139	#A	-6.4941E-03	-6.6644E-03	4.7674E-02	4.7676E-02	5.174E-02
EU-152	#B	7.6137E-02	7.6195E-02	8.8065E-02	8.8166E-02	1.573E-01
EU-154	#B	-5.4005E-03	-5.4067E-03	9.4475E-02	9.4476E-02	1.055E-01
EU-155	#B	9.0752E-02	9.0930E-02	1.8951E-01	1.8958E-01	2.082E-01
HG-203	#B	8.9685E-04	9.6808E-04	4.0999E-02	4.0999E-02	4.283E-02
TL-208		2.9386E-01	2.9386E-01	7.0780E-02	7.2807E-02	
PB-212		9.1710E-01	9.1710E-01	1.1876E-01	1.3015E-01	
PB-214		5.0351E-01	5.0351E-01	1.0761E-01	1.1151E-01	
BI-212	#	9.0580E-01	9.0580E-01	4.4815E-01	4.5122E-01	
BI-214		4.8982E-01	4.8982E-01	1.3201E-01	1.3504E-01	
RA-224	#A	9.9515E-01	9.9515E-01	1.0270E+00	1.0287E+00	1.110E+00
RA-226	#	1.3068E+00	1.3068E+00	1.1063E+00	1.1089E+00	1.191E+00
AC-228		8.9595E-01	8.9595E-01	1.8968E-01	1.9668E-01	
TH-227	#B	-1.9052E-01	-1.9052E-01	3.6632E-01	3.6649E-01	4.027E-01
PA-234	#B	-2.7478E-02	-2.7478E-02	2.3897E-01	2.3898E-01	2.373E-01
TH-234	#B	1.5642E-01	1.5642E-01	5.9003E+00	5.9003E+00	6.623E+00
AM-241	#A	-7.9085E-02	-7.9087E-02	1.0968E+00	1.0968E+00	1.173E+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

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1341.An1

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

Total Activity (83.4 to 2000.7 keV) 2.1565830E+01 pCi/gm
Total Decayed Activity (83.4 to 2000.7 keV) 2.1565866E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1437.An1

Sample description
FSS-NOL-05-02-016-F

Spectrum Filename: C:\GammaVision\Spectra\103F_13DEC2005_1437.An1

Acquisition information
Start time: 13-Dec-2005 14:38:32
Live time: 2000
Real time: 2003
Dead time: 0.15 %
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/channel^2

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: 1.9240E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9240E+03) =
5.1975E+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	08-Dec-2005 13:18:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0941

***** 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
74.98	140.	20.57	0.99	9.052E-03	74.81	9.600	1.134E+00	PB212
77.28	178.	13.36	0.99	1.011E-02	77.11	17.500	8.132E-01	PB212
					77.11	10.700	1.330E+00	PB214
87.51	114.	26.78	1.00	1.461E-02				
87.51	114.	26.78	1.00	1.461E-02	88.04	3.790	1.445E+00	CD109
93.02	132.	23.33	1.00	1.660E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
186.10	168.	20.16	1.17	2.566E-02	185.99	3.280	1.297E+00	RA226
209.35	133.	28.35	1.66	2.471E-02				
238.69	1198.	3.35	1.09	2.320E-02	238.63	43.100	8.330E-01	PB212
270.24	113.	24.60	0.75	2.151E-02				
295.18	231.	14.25	1.11	2.025E-02	295.22	19.200	4.100E-01	PB214
300.06	95.	27.86	0.74	2.001E-02				
328.15	59.	35.43	1.13	1.873E-02				
338.43	292.	11.13	1.00	1.830E-02	338.40	12.010	9.309E-01	AC228
351.92	379.	10.25	1.14	1.776E-02	351.99	37.100	3.986E-01	PB214
462.55	95.	24.22	1.37	1.427E-02				
462.55	95.	24.22	1.37	1.427E-02	463.51	10.000	4.657E-01	SB125
510.73	188.	15.70	1.21	1.317E-02	510.72	22.500	3.823E-01	TL208
583.16	423.	7.42	1.25	1.184E-02	583.14	86.000	2.890E-01	TL208
609.24	268.	7.89	1.25	1.144E-02	609.32	46.090	3.484E-01	BI214
727.76	104.	22.81	1.59	9.958E-03	727.17	11.800	6.213E-01	BI212
860.65	64.	26.42	1.57	8.767E-03				
911.15	284.	7.99	1.61	8.401E-03	911.07	29.000	8.096E-01	AC228
964.52	57.	19.38	1.54	8.052E-03				
968.93	163.	9.52	1.54	8.025E-03	968.90	17.460	8.168E-01	AC228

1119.92	45.	36.32	2.37	7.212E-03	1120.28	15.040	PBC<MDA	BI214
1460.61	1658.	2.49	1.94	5.932E-03	1460.75	10.700	1.814E+01	K40
1764.58	69.	13.03	2.31	5.142E-03	1764.51	15.920	5.931E-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	
174.20	87.75	409.	114.	0.057	80.34	1.001	PB-214	lD
417.85	209.35	533.	133.	0.066	85.04	1.662	AC-228	s
482.14	241.46	391.	169.	0.085	54.59	1.095	PB-214	lD
539.62	270.24	300.	113.	0.056	73.81	0.753	AC-228	
599.27	300.06	264.	95.	0.048	83.59	0.742	PB-212	s
655.44	328.15	189.	59.	0.030	106.29	1.135	AC-228	s
1720.33	860.65	74.	64.	0.032	79.27	1.570	TL-208	
1928.22	964.58	31.	58.	0.029	56.55	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
PB-212	148.79	74.81	367.	140.	0.070	61.71	0.993D
PB-212	153.39	77.11	387.	178.	0.089	40.07	0.995A
TH-234	185.24	93.03	1041.	130.	0.065	95.01	1.500s
TH-234	185.22	93.02	1019.	133.	0.066	92.60	1.500s
RA-226	371.60	186.22	774.	167.	0.084	68.66	1.500
PB-212	476.60	238.72	828.	1088.	0.544	15.67	1.120
RA-224	482.54	241.69	787.	130.	0.065	95.43	1.500
PB-214	589.50	295.18	332.	227.	0.113	42.75	1.110
AC-228	676.01	338.43	275.	291.	0.146	33.38	1.002
PB-214	702.98	351.92	339.	374.	0.187	30.76	1.141
SB-125	924.85	462.86	150.	80.	0.040	71.94	1.500
TL-208	1020.58	510.73	234.	161.	0.081	47.10	1.208s
TL-208	1165.43	583.16	170.	419.	0.210	22.25	1.255
BI-214	1217.57	609.24	84.	262.	0.131	23.68	1.252
BI-212	1454.60	727.76	133.	104.	0.052	68.43	1.586s
AC-228	1821.33	911.15	83.	281.	0.140	23.97	1.610
AC-228	1936.81	968.90	39.	163.	0.082	28.52	1.541D
BI-214	2238.82	1119.92	92.	45.	0.023	108.96	2.374s
K-40	2920.08	1460.61	34.	1639.	0.819	7.48	1.941
BI-214	3527.92	1764.58	7.	69.	0.035	39.08	2.307s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		5.1279E-02					
			477.56	5.128E-02	&(	2.906E-01 8.55E-02	G
K-40		1.8135E+01					
			1460.75	1.814E+01	(P	3.312E-01 4.57E-01	G
MN-54		5.5973E-04					
			834.81	5.597E-04	%(P	4.378E-02 1.26E-02	G
CO-57		-6.3807E-03					
			122.07	-6.381E-03	&(P	5.035E-02 1.51E-02	G K
			136.43	-2.879E-03	%	3.693E-01 1.10E-01	G
CO-60		2.0719E-02					
			1332.51	2.072E-02	%(P	3.932E-02 1.19E-02	G K
			1173.23	2.148E-02	% P	4.913E-02 1.48E-02	G K
Sr-85		-1.3237E-02					
			514.00	-1.324E-02	%(	4.445E-02 1.33E-02	G
Kr-85		-2.9016E+02					
			513.99	-2.902E+02	%(	9.724E+02 2.91E+02	G
Y-88		-4.5135E-04					
			1836.01	-4.513E-04	&(P	2.846E-02 7.45E-03	G K
			898.02	1.117E-02	& P	3.325E-02 9.85E-03	G
NB-94		1.2149E-02					
			871.10	1.215E-02	%(	3.056E-02 9.16E-03	G K
			702.50	-4.705E-03	%	3.688E-02 1.08E-02	G K
Ag-108M		-6.3621E-03					
			722.95	-6.362E-03	%(	4.062E-02 1.19E-02	G K
			614.37	1.140E-02	% P	3.713E-02 1.11E-02	G
			433.93	-2.098E-03	&	3.456E-02 1.01E-02	G
CD-109		1.3015E+00					
			88.04	1.301E+00	&(	1.928E+00 5.89E-01	G
SN-113		-8.0483E-03					
			391.71	-8.048E-03	%(	4.996E-02 1.48E-02	G K
			255.04	-1.819E-01	&	1.635E+00 4.86E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.9822E-02						
		427.95	-5.849E-05	%(P	1.129E-01	3.30E-02	G K
		600.77	-8.919E-03	& P	1.735E-01	5.02E-02	G
		636.15	-2.976E-02	& P	3.355E-01	9.77E-02	G
		463.51	3.955E-01	(P	2.960E-01	9.63E-02	G
		176.29	2.813E-02	%	5.942E-01	1.77E-01	G
I-131	-5.2326E-03						
		364.48	-5.233E-03	%(P	5.760E-02	1.69E-02	G K
		636.97	-7.340E-02	&	7.401E-01	2.16E-01	G
		284.29	-5.723E-03	& P	7.841E-01	2.31E-01	G
CS-134	-2.6748E-03						
		604.66	-2.675E-03	&(	7.294E-02	2.17E-02	G K
		795.76	-1.023E-03	% P	4.343E-02	1.25E-02	G
		569.29	-5.147E-02	% P	2.027E-01	5.94E-02	G
		801.84	-4.603E-02	% P	4.033E-01	1.15E-01	G
CS-137	6.9006E-03						
		661.62	6.901E-03	%(P	3.847E-02	1.12E-02	G
CE-139	2.0193E-05						
		165.85	2.019E-05	%(	4.251E-02	1.26E-02	G
EU-152	-1.9401E-02						
		121.78	-1.940E-02	%(P	1.459E-01	4.36E-02	G K
		344.30	3.378E-03	% P	1.084E-01	3.18E-02	G
		1408.08	4.017E-02	&	1.454E-01	4.23E-02	G
		964.00	4.344E-02	& P	1.980E-01	5.73E-02	G
		1112.07	-3.700E-02	%	3.345E-01	9.70E-02	G
		778.90	-5.944E-02	%	2.808E-01	8.26E-02	G
EU-154	3.6546E-02						
		123.10	3.655E-02	%(	9.447E-02	2.85E-02	G K
		1274.80	2.179E-02	&	1.167E-01	3.39E-02	G
		723.30	-2.754E-02	%	1.940E-01	5.68E-02	G
		1004.80	-1.682E-02	%	2.172E-01	6.24E-02	G
EU-155	1.6221E-03						
		86.45	1.622E-03	%(	2.440E-01	7.28E-02	G K
		105.31	5.629E-02	%	2.188E-01	6.58E-02	G
HG-203	-3.5624E-04						
		279.17	-3.562E-04	&(P	4.137E-02	1.22E-02	G K
		72.87	-1.380E-01	% P	2.097E+00	6.26E-01	G
		70.83	5.412E-01	%	4.503E+00	1.35E+00	G
		82.50	-5.433E-02	&	3.775E+00	1.12E+00	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-208       2.8897E-01
                          583.14 2.890E-01  (P 4.375E-02 2.17E-02 G
                          510.72 3.823E-01 + P 1.752E-01 7.00E-02 G

PB-212       7.7842E-01
                          238.63 7.643E-01  (P 9.610E-02 4.04E-02 G K
                                                          Energy duplication
                           77.11 7.057E-01 } P 3.746E-01 9.43E-02 G
                           74.81 1.134E+00 + P 7.431E-01 2.38E-01 G

PB-214       4.0248E-01
                          351.99 3.986E-01  (P 9.442E-02 4.15E-02 G K
                          295.22 4.100E-01  (P 1.583E-01 5.95E-02 G
                                                          Energy duplication
                           77.11 0.000E+00 } P 8.856E-01 0.00E+00 G
                          241.92-2.954E-01 %   5.857E-01 1.78E-01 G

BI-212       6.2126E-01
                          727.17 6.213E-01 @(P 3.372E-01 1.42E-01 G K
                         1620.56 4.622E-01 & P 9.799E-01 2.98E-01 G
                          785.42 1.073E+00 %   1.705E+00 5.26E-01 G

BI-214       3.4840E-01
                          609.32 3.484E-01  (P 6.067E-02 2.82E-02 G K
                         1764.51 5.931E-01 + P 1.281E-01 8.09E-02 G
                         1120.28 2.914E-01 - P 3.070E-01 1.10E-01 G

RA-224       1.0127E+00
                          241.00 1.013E+00  (  1.041E+00 3.22E-01 G

RA-226       1.3955E+00
                          185.99 1.396E+00  (P 1.104E+00 3.44E-01 G

AC-228       8.3680E-01
                          911.07 8.096E-01  (P 1.303E-01 6.55E-02 G K
                          968.90 8.173E-01  (P 1.593E-01 7.78E-02 G
                          338.40 9.309E-01  (P 2.555E-01 1.04E-01 G

TH-227      -1.0756E-01
                          236.00-1.076E-01 %(  3.982E-01 1.20E-01 G K
                          256.25 7.732E-02 % P 4.531E-01 1.35E-01 G

PA-234      -8.4276E-02
                           98.44-8.428E-02 %(P 1.999E-01 6.04E-02 G K
                          946.00 1.133E-02 % P 1.437E-01 4.07E-02 G
                          131.28-9.669E-03 % P 2.130E-01 6.36E-02 G
                           94.67 1.702E-01 % P 3.867E-01 1.17E-01 G
                          883.24 8.535E-02 %   2.819E-01 8.35E-02 G
                          926.70 1.775E-02 &   3.253E-01 9.31E-02 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-7.601E-02 % P 2.993E-01 8.78E-02 G

TH-234       7.3826E-01
                           63.29-1.099E+00 %(P 6.034E+00 1.80E+00 G K
                           92.80 1.888E+00 *(P 2.155E+00 6.60E-01 G
                           92.38 2.184E+00 *(P 2.566E+00 7.85E-01 G

AM-241       2.3566E-01
                           59.54 2.357E-01 %(P 1.057E+00 3.17E-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:                      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 - 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 *****

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	4.8022E-02	5.1279E-02	2.5645E-01	2.5647E-01	2.722E-01
K-40		1.8135E+01	1.8135E+01	1.3715E+00	1.7291E+00	
MN-54	#A	5.5348E-04	5.5973E-04	3.7931E-02	3.7931E-02	4.329E-02
CO-57	#B	-6.2985E-03	-6.3807E-03	4.7396E-02	4.7397E-02	4.970E-02
CO-60	#B	2.0682E-02	2.0719E-02	3.5647E-02	3.5668E-02	3.925E-02

Sr-85	#A	-1.2541E-02	-1.3237E-02	3.9927E-02	3.9934E-02	4.212E-02
Kr-85	#A	-2.9015E+02	-2.9016E+02	8.7343E+02	8.7360E+02	9.724E+02
Y-88	#B	-4.3675E-04	-4.5135E-04	3.3828E-02	3.3828E-02	2.754E-02
NB-94	#B	1.2149E-02	1.2149E-02	2.7483E-02	2.7492E-02	3.056E-02
Ag-108M	#B	-6.3616E-03	-6.3621E-03	3.5695E-02	3.5697E-02	4.062E-02
CD-109	#A	1.2914E+00	1.3015E+00	1.7664E+00	1.7679E+00	1.913E+00
SN-113	#B	-7.8070E-03	-8.0483E-03	4.4348E-02	4.4350E-02	4.846E-02
SB-125	#B	9.9477E-02	9.9822E-02	7.2955E-02	7.3184E-02	1.125E-01
I-131	#B	-3.3839E-03	-5.2326E-03	6.2217E-02	6.2218E-02	3.725E-02
CS-134	#B	-2.6624E-03	-2.6748E-03	6.4970E-02	6.4970E-02	7.260E-02
CS-137	#A	6.8984E-03	6.9006E-03	3.3725E-02	3.3727E-02	3.846E-02
CE-139	#A	1.9685E-05	2.0193E-05	3.7855E-02	3.7855E-02	4.144E-02
EU-152	#B	-1.9387E-02	-1.9401E-02	1.4486E-01	1.4486E-01	1.458E-01
EU-154	#B	3.6505E-02	3.6546E-02	8.5622E-02	8.5646E-02	9.437E-02
EU-155	#B	1.6190E-03	1.6221E-03	2.1845E-01	2.1845E-01	2.435E-01
HG-203	#B	-3.3043E-04	-3.5624E-04	4.0264E-02	4.0264E-02	3.837E-02
TL-208		2.8897E-01	2.8897E-01	6.4967E-02	6.7099E-02	
PB-212		7.7842E-01	7.7842E-01	1.2336E-01	1.3137E-01	
PB-214		4.0248E-01	4.0248E-01	1.0779E-01	1.1029E-01	
BI-212	#	6.2126E-01	6.2126E-01	4.2718E-01	4.2870E-01	
BI-214		3.4840E-01	3.4840E-01	8.4533E-02	8.6920E-02	
RA-224	A	1.0127E+00	1.0127E+00	9.6638E-01	9.6817E-01	1.041E+00
RA-226	#	1.3955E+00	1.3955E+00	1.0324E+00	1.0356E+00	1.104E+00
AC-228		8.3680E-01	8.3680E-01	1.4019E-01	1.4837E-01	
TH-227	#B	-1.0756E-01	-1.0756E-01	3.5953E-01	3.5958E-01	3.982E-01
PA-234	#B	-8.4276E-02	-8.4276E-02	1.8789E-01	1.8795E-01	1.999E-01
TH-234	#B	7.3826E-01	7.3826E-01	7.7463E-01	7.7571E-01	6.034E+00
AM-241	#A	2.3565E-01	2.3566E-01	9.5086E-01	9.5095E-01	1.057E+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) 2.2424295E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.2424295E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1515.An1

Sample description
FSS-NOL-05-02-023-F

Spectrum Filename: C:\GammaVision\Spectra\103F_13DEC2005_1515.An1

Acquisition information
Start time: 13-Dec-2005 15:15:53
Live time: 2000
Real time: 2003
Dead time: 0.16 %
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/channel^2

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: 1.8360E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8360E+03) =
5.4466E+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	08-Dec-2005 10:26:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1241

***** 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
74.95	154.	18.54	0.99	9.100E-03	74.81	9.600	1.276E+00	PB212
77.26	219.	14.37	0.99	1.016E-02	77.11	17.500	8.994E-01	PB212
					77.11	10.700	1.471E+00	PB214
129.30	114.	39.02	1.18	2.440E-02				
129.30	114.	39.02	1.18	2.440E-02	131.28	20.000	PBC<MDA	PA234
186.01	140.	31.42	1.25	2.567E-02	185.99	3.280	PBC<MDA	RA226
209.96	131.	29.75	1.02	2.468E-02				
238.73	1198.	3.38	1.09	2.319E-02	238.63	43.100	8.733E-01	PB212
270.32	131.	26.12	1.20	2.151E-02				
295.19	212.	14.80	0.99	2.025E-02	295.22	19.200	3.937E-01	PB214
300.31	82.	29.04	1.11	2.000E-02				
327.79	65.	31.42	0.85	1.875E-02				
338.32	253.	12.51	0.99	1.830E-02	338.40	12.010	8.436E-01	AC228
351.94	434.	6.79	0.85	1.775E-02	351.99	37.100	4.781E-01	PB214
462.84	122.	20.15	1.61	1.426E-02				
462.84	122.	20.15	1.61	1.426E-02	463.51	10.000	6.244E-01	SB125
510.93	180.	15.01	1.29	1.317E-02	510.72	22.500	3.798E-01	TL208
583.02	416.	7.73	1.27	1.185E-02	583.14	86.000	2.978E-01	TL208
609.20	364.	8.69	1.23	1.144E-02	609.32	46.090	4.994E-01	BI214
					614.37	90.393	2.609E-01	Ag108M
661.64	119.	22.52	1.20	1.072E-02	661.62	84.620	9.544E-02	CS137
722.57	39.	39.39	1.50	1.001E-02	722.95	90.499	PBC<MDA	Ag108M
					723.30	19.700	1.444E-01	EU154
726.84	142.	17.28	1.42	9.968E-03	727.17	11.800	8.889E-01	BI212
794.37	62.	27.44	1.41	9.314E-03				
794.37	62.	27.44	1.41	9.314E-03	795.76	85.400	5.736E-02	CS134
860.00	57.	32.59	1.01	8.772E-03				

911.07	293.	8.48	1.75	8.401E-03	911.07	29.000	8.744E-01	AC228
934.02	35.	39.77	1.00	8.247E-03				
964.40	54.	21.79	1.54	8.054E-03	964.00	14.580	3.368E-01	EU152
968.86	139.	11.23	1.54	8.026E-03	968.90	17.460	7.306E-01	AC228
1120.37	88.	23.84	2.07	7.211E-03	1120.28	15.040	5.843E-01	BI214
1172.93	44.	34.62	1.67	6.972E-03	1173.23	99.860	PBC<MDA	CO60
1174.14	77.	32.02	1.21	6.968E-03				
1333.73	84.	18.87	1.64	6.345E-03	1332.51	99.980	9.508E-02	CO60
1377.00	43.	26.97	0.96	6.197E-03				
1460.64	1512.	2.63	1.72	5.932E-03	1460.75	10.700	1.732E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.62	73.	11.47	2.13	5.142E-03	1764.51	15.920	6.539E-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	
257.77	129.30	774.	120.	0.060	102.31	1.181	AC-228	s
419.08	209.96	555.	131.	0.065	89.24	1.023	NP-239	s
481.88	241.33	435.	147.	0.073	65.19	1.095	RA-224	lD
539.80	270.32	388.	131.	0.066	78.36	1.204	AC-228	s
599.77	300.31	231.	82.	0.041	87.12	1.109	PB-212	
654.72	327.79	176.	65.	0.032	94.25	0.852	AC-228	
1719.04	860.00	96.	57.	0.029	97.76	1.007	TL-208	
1927.73	964.39	44.	53.	0.027	66.62	1.538	AC-228	D
2347.24	1174.14	143.	77.	0.038	96.06	1.208	CO-60	l
2666.37	1333.73	73.	55.	0.028	76.64	1.638	CO-60	s
2752.89	1377.00	24.	43.	0.021	80.91	0.958	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	389.	151.	0.075	59.39	0.993D
PB-212	153.39	77.11	390.	185.	0.092	40.01	0.995A
RA-226	371.59	186.21	839.	141.	0.070	82.90	1.500s
PB-212	476.70	238.77	711.	1190.	0.595	13.87	1.132
RA-224	482.69	241.77	782.	120.	0.060	102.91	1.500
PB-214	589.53	295.19	313.	208.	0.104	44.40	0.994
AC-228	675.79	338.32	289.	252.	0.126	37.53	0.992
PB-214	703.01	351.94	194.	428.	0.214	20.38	0.847
SB-125	925.06	462.97	166.	81.	0.041	73.74	1.500s
TL-208	1020.97	510.93	203.	153.	0.076	45.02	1.295s
TL-208	1165.14	583.02	182.	412.	0.206	23.20	1.270
BI-214	1217.50	609.20	183.	358.	0.179	26.06	1.235
CS-137	1322.36	661.64	163.	118.	0.059	67.57	1.198
Ag-108M	1444.21	722.57	96.	39.	0.019	118.16	1.500s
BI-212	1452.74	726.84	133.	142.	0.071	51.84	1.424s
CS-134	1589.07	795.01	77.	49.	0.024	87.41	1.500
AC-228	1821.16	911.07	105.	289.	0.145	25.44	1.748s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1936.81	968.90	53.	139.	0.070	33.72	1.541D
BI-214	2239.72	1120.37	112.	86.	0.043	71.51	2.068s
CO-60	2344.82	1172.93	103.	44.	0.022	103.86	1.667s
K-40	2920.15	1460.64	40.	1493.	0.747	7.90	1.723
BI-214	3528.00	1764.62	3.	73.	0.036	34.41	2.125

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		2.6729E-02					
			477.56	2.673E-02	&(	3.088E-01 9.00E-02	G
K-40		1.7318E+01					
			1460.75	1.732E+01	(P	3.711E-01 4.62E-01	G
MN-54		-1.4671E-03					
			834.81	-1.467E-03	%(P	3.151E-02 8.91E-03	G
CO-57		1.1754E-02					
			122.07	1.175E-02	%(P	5.400E-02 1.62E-02	G K
			136.43	-3.108E-02	&	4.317E-01 1.29E-01	G
CO-60		3.8426E-02					
			1332.51	3.069E-02	%(P	4.736E-02 1.46E-02	G K
			1173.23	4.617E-02	@(P	5.308E-02 1.67E-02	G K
Sr-85		-1.6204E-02					
			514.00	-1.620E-02	%(	4.604E-02 1.38E-02	G
Kr-85		-3.5409E+02					
			513.99	-3.541E+02	%(	1.005E+03 3.02E+02	G
Y-88		-9.6789E-05					
			1836.01	-9.679E-05	%(P	2.516E-02 6.35E-03	G K
			898.02	-8.280E-03	& P	4.235E-02 1.23E-02	G
NB-94		1.1469E-02					
			871.10	1.147E-02	&(	3.199E-02 9.54E-03	G K
			702.50	8.355E-03	%	3.147E-02 9.29E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	3.1381E-02						
		722.95	3.138E-02	(	3.938E-02	1.24E-02	G K
		614.37	3.547E-03	% P	4.012E-02	1.17E-02	G
		433.93	1.790E-02	%	4.028E-02	1.22E-02	G
CD-109	-7.2943E-04						
		88.04	-7.294E-04	&(	2.201E+00	6.57E-01	G
SN-113	0.0000E+00						
		391.71	0.000E+00	%(	5.511E-02	1.61E-02	G K
		255.04	5.927E-01	&	1.543E+00	4.65E-01	G
SB-125	1.1824E-01						
		427.95	1.581E-02	%(P	1.059E-01	3.12E-02	G K
		600.77	1.073E-02	& P	1.793E-01	5.19E-02	G
		636.15	3.758E-02	% P	3.121E-01	9.09E-02	G
		463.51	4.214E-01	*(P	3.252E-01	1.05E-01	G
		176.29	-2.009E-01	%	6.086E-01	1.83E-01	G
I-131	-1.2203E-03						
		364.48	-1.220E-03	%(P	5.862E-02	1.71E-02	G K
		636.97	2.111E-02	%	7.994E-01	2.31E-01	G
		284.29	-4.267E-04	% P	7.125E-01	2.09E-01	G
CS-134	1.6086E-02						
		604.66	-9.604E-03	%(	4.203E-02	1.25E-02	G K
		795.76	4.545E-02	(P	4.063E-02	1.33E-02	G
		569.29	2.182E-02	& P	2.394E-01	6.98E-02	G
		801.84	-4.397E-02	& P	4.949E-01	1.43E-01	G
CS-137	9.5441E-02						
		661.62	9.544E-02	(P	5.054E-02	2.18E-02	G
CE-139	-7.4426E-03						
		165.85	-7.443E-03	&(	4.963E-02	1.49E-02	G
EU-152	3.1303E-02						
		121.78	3.130E-02	%(P	1.566E-01	4.70E-02	G K
		344.30	1.453E-03	& P	1.205E-01	3.54E-02	G
		1408.08	5.386E-02	%	1.327E-01	3.97E-02	G
		964.00	2.246E-01	& P	3.362E-01	1.04E-01	G
		1112.07	7.587E-02	&	3.395E-01	9.98E-02	G
		778.90	9.964E-02	%	2.491E-01	7.48E-02	G
EU-154	-4.9255E-03						
		123.10	-4.926E-03	&(	1.165E-01	3.48E-02	G K
		1274.80	2.753E-02	&	1.185E-01	3.46E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	1.333E-01	%	1.864E-01	5.80E-02	G
		1004.80	-2.404E-02	%	1.898E-01	5.44E-02	G
EU-155	1.0674E-02						
		86.45	1.067E-02	&(	2.589E-01	7.74E-02	G K
		105.31	9.650E-02	%	2.274E-01	6.88E-02	G
HG-203	-6.0736E-03						
		279.17	-6.074E-03	&(P	4.636E-02	1.38E-02	G K
		72.87	-5.286E-01	% P	2.454E+00	7.37E-01	G
		70.83	-7.727E-01	&	4.572E+00	1.37E+00	G
		82.50	-9.648E-01	&	4.425E+00	1.33E+00	G
TL-208	2.9783E-01						
		583.14	2.978E-01	(P	4.736E-02	2.33E-02	G
		510.72	3.798E-01	+ P	1.716E-01	6.69E-02	G
PB-212	8.8293E-01						
		238.63	8.762E-01	(P	9.344E-02	4.09E-02	G K
							Energy duplication
		77.11	7.683E-01	} P	3.938E-01	1.02E-01	G
		74.81	1.276E+00	+ P	8.018E-01	2.58E-01	G
PB-214	4.7814E-01						
		351.99	4.781E-01	(P	7.559E-02	3.29E-02	G K
		295.22	3.937E-01	- P	1.612E-01	5.94E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.644E-01	0.00E+00	G
		241.92	-2.893E-01	%	5.885E-01	1.79E-01	G
BI-212	8.8890E-01						
		727.17	8.889E-01	*(P	3.534E-01	1.54E-01	G K
		1620.56	2.431E-01	& P	8.393E-01	2.40E-01	G
		785.42	2.405E-01	%	1.900E+00	5.53E-01	G
BI-214	5.2029E-01						
		609.32	4.994E-01	(P	9.185E-02	4.42E-02	G K
		1764.51	6.539E-01	+ P	1.002E-01	7.84E-02	G
		1120.28	5.843E-01	(P	3.529E-01	1.42E-01	G
RA-224	9.7846E-01						
		241.00	9.785E-01	(	1.088E+00	3.36E-01	G
RA-226	1.2312E+00						
		185.99	1.231E+00	(P	1.204E+00	3.72E-01	G
AC-228	8.2505E-01						
		911.07	8.744E-01	@(P	1.521E-01	7.50E-02	G K
		968.90	7.304E-01	(P	1.923E-01	8.22E-02	G
		338.40	8.436E-01	(P	2.744E-01	1.06E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -9.3018E-02
                          236.00-9.302E-02 &(  3.723E-01 1.12E-01 G K
                          256.25-4.214E-02 & P 5.386E-01 1.60E-01 G

PA-234      -7.1935E-04
                           98.44-7.194E-04 %(P 2.312E-01 6.88E-02 G K
                          946.00-3.343E-02 & P 2.160E-01 6.30E-02 G
                          131.28-9.271E-03 & P 2.159E-01 6.44E-02 G
                           94.67 2.575E-01 % P 3.636E-01 1.11E-01 G
                          883.24 9.473E-02 &   2.983E-01 8.86E-02 G
                          926.70-4.470E-02 %   3.364E-01 9.73E-02 G
                          569.26 3.236E-02 & P 3.534E-01 1.03E-01 G

TH-234      -3.0891E-01
                           63.29-3.089E-01 %(P 6.833E+00 2.03E+00 G K
                           92.80 1.049E+00 % P 2.336E+00 7.05E-01 G
                           92.38 1.228E+00 % P 2.780E+00 8.39E-01 G

AM-241       2.0370E-01
                           59.54 2.037E-01 &(P 1.113E+00 3.33E-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:                      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 - 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	2.4984E-02	2.6729E-02	2.7000E-01	2.7001E-01	2.886E-01
K-40		1.7318E+01	1.7318E+01	1.3859E+00	1.7122E+00	
MN-54	#A	-1.4503E-03	-1.4671E-03	4.0286E-02	4.0286E-02	3.115E-02
CO-57	#B	1.1598E-02	1.1754E-02	4.8644E-02	4.8648E-02	5.328E-02
CO-60	#B	3.8354E-02	3.8426E-02	3.4392E-02	3.4464E-02	4.727E-02
Sr-85	#A	-1.5327E-02	-1.6204E-02	4.1504E-02	4.1515E-02	4.355E-02
Kr-85	#A	-3.5408E+02	-3.5409E+02	9.0637E+02	9.0661E+02	1.005E+03
Y-88	#B	-9.3570E-05	-9.6789E-05	2.3986E-03	2.3986E-03	2.432E-02
NB-94	#B	1.1469E-02	1.1469E-02	2.8610E-02	2.8618E-02	3.199E-02
Ag-108M	#A	3.1378E-02	3.1381E-02	3.7081E-02	3.7125E-02	3.937E-02
CD-109	#A	-7.2365E-04	-7.2943E-04	1.9715E+00	1.9715E+00	2.184E+00
SN-113	#B	0.0000E+00	0.0000E+00	4.8381E-02	4.8381E-02	5.341E-02
SB-125	#F	1.1782E-01	1.1824E-01	8.8557E-02	8.8822E-02	1.055E-01
I-131	#B	-7.7930E-04	-1.2203E-03	1.3888E-01	1.3888E-01	3.744E-02
CS-134	#B	1.6009E-02	1.6086E-02	1.4085E-02	1.4116E-02	4.183E-02
CS-137		9.5409E-02	9.5441E-02	6.5251E-02	6.5486E-02	
CE-139	#A	-7.2500E-03	-7.4426E-03	4.4565E-02	4.4567E-02	4.835E-02
EU-152	#B	3.1279E-02	3.1303E-02	1.4097E-01	1.4098E-01	1.565E-01
EU-154	#B	-4.9198E-03	-4.9255E-03	1.0435E-01	1.0435E-01	1.164E-01
EU-155	#B	1.0653E-02	1.0674E-02	2.3212E-01	2.3212E-01	2.584E-01
HG-203	#B	-5.6214E-03	-6.0736E-03	4.1609E-02	4.1610E-02	4.290E-02
TL-208		2.9783E-01	2.9783E-01	6.9830E-02	7.1939E-02	
PB-212		8.8293E-01	8.8293E-01	1.2367E-01	1.3388E-01	
PB-214		4.7814E-01	4.7814E-01	9.8718E-02	1.0255E-01	
BI-212	#	8.8890E-01	8.8890E-01	4.6238E-01	4.6525E-01	
BI-214		5.2029E-01	5.2029E-01	1.3803E-01	1.4129E-01	
RA-224	A	9.7846E-01	9.7846E-01	1.0069E+00	1.0085E+00	1.088E+00
RA-226	#	1.2312E+00	1.2312E+00	1.1146E+00	1.1169E+00	1.204E+00
AC-228		8.2505E-01	8.2505E-01	1.5612E-01	1.6331E-01	
TH-227	#B	-9.3018E-02	-9.3018E-02	3.3550E-01	3.3554E-01	3.723E-01
PA-234	#B	-7.1935E-04	-7.1935E-04	5.4791E-01	5.4791E-01	2.312E-01
TH-234	#B	-3.0891E-01	-3.0891E-01	6.3426E+01	6.3426E+01	6.833E+00
AM-241	#A	2.0370E-01	2.0370E-01	9.9909E-01	9.9915E-01	1.113E+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) 2.2285473E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.2285503E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1554.An1

Sample description
FSS-NOL-05-02-023-F-RC

Spectrum Filename: C:\GammaVision\Spectra\103F_13DEC2005_1554.An1

Acquisition information
Start time: 13-Dec-2005 15:54:46
Live time: 2000
Real time: 2003
Dead time: 0.16 %
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/channel^2

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: 1.8360E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8360E+03) =
5.4466E+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	08-Dec-2005 10:26:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0857

***** 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
74.78	126.	22.11	0.99	9.100E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	1.041E+00	PB212
77.19	237.	13.25	0.99	1.021E-02	77.11	10.700	1.595E+00	PB214
					77.11	17.500	9.750E-01	PB212
86.74	77.	40.17	1.00	1.426E-02	86.45	32.740	1.231E-01	EU155
					88.04	3.790	1.025E+00	CD109
93.59	116.	26.82	1.00	1.676E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
185.79	179.	22.25	1.04	2.567E-02	185.99	3.280	1.450E+00	RA226
209.49	123.	29.68	0.92	2.470E-02				
238.73	1201.	3.37	1.09	2.320E-02	238.63	43.100	8.751E-01	PB212
241.72	215.	12.39	1.09	2.304E-02	241.00	3.900	1.760E+00	RA224
					241.92	7.470	9.208E-01	PB214
269.85	138.	22.31	1.19	2.153E-02				
276.07	91.	32.24	1.34	2.121E-02				
295.19	242.	10.66	1.07	2.025E-02	295.22	19.200	4.505E-01	PB214
300.15	95.	28.00	1.02	2.001E-02				
327.68	92.	30.18	1.04	1.876E-02				
338.65	239.	12.28	1.11	1.829E-02	338.40	12.010	7.953E-01	AC228
351.89	420.	6.65	0.89	1.776E-02	351.99	37.100	4.625E-01	PB214
409.18	63.	32.34	0.75	1.576E-02				
433.64	45.	41.03	1.00	1.504E-02				
433.64	45.	41.03	1.00	1.504E-02	433.93	89.881	2.442E-02	Ag108M
462.67	97.	22.57	1.22	1.427E-02				
462.67	97.	22.57	1.22	1.427E-02	463.51	10.000	4.963E-01	SB125
510.89	183.	18.29	1.45	1.317E-02	510.72	22.500	3.887E-01	TL208

583.05	447.	6.96	1.23	1.185E-02	583.14	86.000	3.202E-01	TL208
609.31	289.	7.04	1.32	1.144E-02	609.32	46.090	3.947E-01	BI214
614.64	38.	34.48	1.32	1.136E-02	614.37	90.393	PBC<MDA	Ag108M
661.51	142.	16.43	1.21	1.072E-02	661.62	84.620	1.141E-01	CS137
719.21	25.	39.82	1.50	1.001E-02	723.30	19.700	PBC<MDA	EU154
727.24	146.	18.12	1.10	9.964E-03	727.17	11.800	9.077E-01	BI212
794.62	52.	34.89	1.58	9.311E-03				
794.62	52.	34.89	1.58	9.311E-03	795.76	85.400	4.833E-02	CS134
860.36	78.	25.98	1.31	8.769E-03				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
911.17	282.	7.82	1.38	8.401E-03	911.07	29.000	8.409E-01	AC228
963.72	33.	38.14	1.54	8.057E-03				
963.72	33.	38.14	1.54	8.057E-03	964.00	14.580	PBC<MDA	EU152
968.96	171.	9.53	1.54	8.025E-03	968.90	17.460	8.970E-01	AC228
1120.05	115.	20.33	1.47	7.213E-03	1120.28	15.040	7.662E-01	BI214
1332.28	33.	32.12	1.77	6.349E-03	1332.51	99.980	PBC<MDA	CO60
1460.59	1612.	2.56	1.99	5.933E-03	1460.75	10.700	1.847E+01	K40
1619.22	15.	33.40	0.59	5.488E-03	1620.56	2.750	7.099E-01	BI212
1764.14	79.	12.13	1.45	5.143E-03	1764.51	15.920	6.800E-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	
418.14	209.49	528.	123.	0.062	89.04	0.920	AC-228	
538.86	269.85	324.	138.	0.069	66.93	1.189	AC-228	s
551.29	276.07	291.	119.	0.059	66.90	1.338	ND-147	s
599.46	300.15	265.	95.	0.047	84.01	1.018	PB-212	
654.50	327.68	268.	92.	0.046	90.55	1.043	AC-228	s
817.49	409.18	155.	63.	0.032	97.02	0.746	CS-138	s
866.41	433.64	133.	45.	0.022	123.08	1.000	J-134	l
1228.38	614.66	66.	38.	0.019	103.45	1.323	RH-106M	lD
1719.77	860.36	95.	78.	0.039	62.96	1.312	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	148.79	74.81	395.	124.	0.062	71.23	0.993D
PB-212	153.39	77.11	379.	217.	0.108	37.61	0.995A
EU-155	173.70	87.26	1027.	119.	0.060	117.47	1.500s
CD-109	173.77	87.30	901.	132.	0.066	100.26	1.500s
TH-234	185.49	93.16	974.	150.	0.075	81.60	1.500s
TH-234	185.46	93.14	956.	150.	0.075	80.81	1.500s
PA-234	185.39	93.11	717.	175.	0.088	68.47	1.500s
RA-226	370.74	185.79	598.	166.	0.083	66.76	1.043s
PB-212	476.42	238.63	253.	1182.	0.591	10.28	1.093D
RA-224	481.16	241.00	958.	146.	0.073	94.23	1.095D
PB-214	483.00	241.92	364.	107.	0.054	66.46	1.095A
PB-214	589.53	295.19	216.	238.	0.119	31.99	1.066

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	676.45	338.65	239.	238.	0.119	36.84	1.111s
PB-214	702.92	351.89	176.	414.	0.207	19.94	0.893
SB-125	924.43	462.65	169.	82.	0.041	73.66	1.500s
TL-208	1020.90	510.89	280.	157.	0.078	54.86	1.451s
TL-208	1165.19	583.05	158.	443.	0.222	20.88	1.226
BI-214	1217.80	609.35	160.	321.	0.161	25.94	1.404
CS-137	1322.11	661.51	135.	141.	0.070	49.28	1.205
EU-154	1437.50	719.21	38.	25.	0.013	119.46	1.500
BI-212	1453.56	727.24	149.	145.	0.073	54.35	1.101s
CS-134	1588.91	794.93	74.	52.	0.026	81.49	1.500
AC-228	1821.38	911.17	74.	278.	0.139	23.47	1.378
EU-152	1928.00	964.49	101.	38.	0.019	120.79	1.538
AC-228	1935.70	968.34	102.	247.	0.124	29.99	1.457s
BI-214	2239.07	1120.05	112.	113.	0.056	60.98	1.470s
CO-60	2663.47	1332.28	52.	33.	0.017	96.36	1.765s
K-40	2920.04	1460.59	41.	1593.	0.796	7.69	1.993
BI-212	3237.25	1619.22	3.	15.	0.007	100.20	0.591s
BI-214	3527.03	1764.14	6.	76.	0.038	36.39	1.451

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-7.0982E-04					
			477.56	-7.098E-04	%(	3.423E-01 9.94E-02 G	
K-40		1.8471E+01					
			1460.75	1.847E+01	(P	3.779E-01 4.79E-01 G	
MN-54		-1.1809E-03					
			834.81	-1.181E-03	%(P	4.617E-02 1.33E-02 G	
CO-57		3.3802E-03					
			122.07	3.380E-03	%(P	4.561E-02 1.36E-02 G K	
			136.43	5.122E-02	%	4.112E-01 1.23E-01 G	
CO-60		3.8748E-02					
			1332.51	3.875E-02	*(P	4.200E-02 1.34E-02 G K	
			1173.23	3.603E-02	% P	5.377E-02 1.66E-02 G K	
Sr-85		-2.2710E-02					
			514.00	-2.271E-02	&(	4.925E-02 1.49E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Kr-85	-4.9592E+02						
		513.99	-4.959E+02	&(	1.075E+03	3.26E+02	G
Y-88	7.8810E-03						
		1836.01	7.881E-03	%(P	2.598E-02	7.47E-03	G K
		898.02	1.663E-02	% P	3.663E-02	1.10E-02	G
NB-94	9.2700E-03						
		871.10	9.270E-03	%(	2.851E-02	8.44E-03	G K
		702.50	7.291E-03	%	4.045E-02	1.19E-02	G K
Ag-108M	2.8135E-02						
		722.95	2.813E-02	%(	4.192E-02	1.30E-02	G K
		614.37	2.206E-02	% P	4.117E-02	1.25E-02	G
		433.93	2.362E-02	%	3.650E-02	1.12E-02	G
CD-109	1.7497E+00						
		88.04	1.750E+00	&(	1.896E+00	5.85E-01	G
SN-113	-9.8229E-03						
		391.71	-9.823E-03	%(	5.396E-02	1.60E-02	G K
		255.04	-1.909E-01	%	1.804E+00	5.37E-01	G
SB-125	1.1113E-01						
		427.95	4.809E-03	%(P	9.636E-02	2.80E-02	G K
		600.77	5.570E-03	& P	1.770E-01	5.10E-02	G
		636.15	-8.975E-03	& P	3.098E-01	8.91E-02	G
		463.51	4.258E-01	*(P	3.284E-01	1.06E-01	G
		176.29	-9.219E-02	%	5.903E-01	1.77E-01	G
I-131	1.3350E-02						
		364.48	1.335E-02	%(P	5.938E-02	1.76E-02	G K
		636.97	-1.548E-03	&	7.863E-01	2.27E-01	G
		284.29	-8.034E-02	% P	7.796E-01	2.30E-01	G
CS-134	2.2029E-02						
		604.66	-9.912E-04	%(	9.794E-03	2.56E-03	G K
		795.76	4.834E-02	(P	3.981E-02	1.32E-02	G
		569.29	-6.706E-03	% P	2.287E-01	6.57E-02	G
		801.84	-1.457E-02	% P	3.276E-01	9.04E-02	G
CS-137	1.1410E-01						
		661.62	1.141E-01	(P	4.620E-02	1.89E-02	G
CE-139	3.1917E-03						
		165.85	3.192E-03	%(	5.044E-02	1.50E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	8.2864E-02						
		121.78	5.695E-03	%(P	1.520E-01	4.53E-02	G K
		344.30	-3.963E-02	% P	1.198E-01	3.60E-02	G
		1408.08	6.561E-02	%	1.408E-01	4.27E-02	G
		964.00	2.376E-01	(P	3.108E-01	9.71E-02	G
		1112.07	9.573E-02	&	3.187E-01	9.45E-02	G
		778.90	4.339E-03	%	2.845E-01	8.16E-02	G
EU-154	1.6194E-02						
		123.10	-2.202E-02	%(	1.175E-01	3.53E-02	G K
		1274.80	-1.040E-02	&	1.388E-01	3.99E-02	G
		723.30	9.468E-02	(	1.178E-01	3.77E-02	G
		1004.80	1.327E-02	&	2.207E-01	6.31E-02	G
EU-155	1.9014E-01						
		86.45	1.901E-01	*(	2.429E-01	7.45E-02	G K
		105.31	5.036E-02	%	2.465E-01	7.40E-02	G
HG-203	-1.4503E-02						
		279.17	-1.450E-02	%(P	4.860E-02	1.46E-02	G K
		72.87	-7.379E-03	% P	2.484E+00	7.41E-01	G
		70.83	-2.766E-01	&	4.883E+00	1.46E+00	G
		82.50	-2.391E-01	&	4.387E+00	1.31E+00	G
TL-208	3.2016E-01						
		583.14	3.202E-01	(P	4.427E-02	2.25E-02	G
		510.72	3.887E-01	+ P	2.005E-01	8.32E-02	G
PB-212	9.0079E-01						
		238.63	8.704E-01	(P	5.652E-02	3.01E-02	G K
							Energy duplication
		77.11	9.008E-01	} P	3.887E-01	1.13E-01	G
		74.81	1.050E+00	+ P	8.074E-01	2.56E-01	G
PB-214	4.5840E-01						
		351.99	4.625E-01	(P	7.214E-02	3.12E-02	G K
		295.22	4.505E-01	(P	1.348E-01	4.89E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.154E-01	0.00E+00	G
		241.92	4.584E-01	}	3.920E-01	1.02E-01	G
BI-212	8.7030E-01						
		727.17	9.077E-01	*(P	3.730E-01	1.65E-01	G K
		1620.56	7.099E-01	(P	5.540E-01	2.38E-01	G
		785.42	3.957E-01	%	1.398E+00	4.11E-01	G
BI-214	4.4844E-01						
		609.32	4.484E-01	(P	8.601E-02	3.96E-02	G K
		1764.51	6.800E-01	+ P	1.301E-01	8.61E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                         1120.28 7.662E-01 + P 3.532E-01 1.58E-01 G

RA-224       1.1976E+00
                                                        Derived Ave Activity
                          241.00 1.198E+00 }(  1.202E+00 3.86E-01 G

RA-226       1.4500E+00
                          185.99 1.450E+00 *(P 1.020E+00 3.48E-01 G

AC-228       8.2752E-01
                          911.07 8.409E-01  (P 1.290E-01 6.66E-02 G K
                          968.90 1.300E+00 + P 2.609E-01 1.30E-01 G
                          338.40 7.953E-01 @(P 2.506E-01 9.82E-02 G

TH-227      -8.8947E-02
                          236.00-8.895E-02 &(  3.936E-01 1.18E-01 G K
                          256.25 4.772E-02 & P 5.214E-01 1.55E-01 G

PA-234       1.2749E-01
                           98.44-9.483E-02 %(P 2.121E-01 6.42E-02 G K
                          946.00-4.553E-03 & P 1.968E-01 5.62E-02 G
                          131.28-1.245E-02 & P 2.286E-01 6.82E-02 G
                           94.67 4.875E-01 ?(P 3.543E-01 1.11E-01 G
                          883.24-3.555E-02 %   2.730E-01 7.86E-02 G
                          926.70-2.117E-03 %   3.312E-01 9.40E-02 G
                          569.26-9.902E-03 % P 3.376E-01 9.71E-02 G

TH-234       2.3395E+00
                           63.29 2.221E+00 %(P 6.757E+00 2.03E+00 G K
                           92.80 2.240E+00 *(P 2.189E+00 6.74E-01 G
                           92.38 2.636E+00 *(P 2.602E+00 8.01E-01 G

AM-241       1.5720E-02
                           59.54 1.572E-02 %(P 1.008E+00 2.99E-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 Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-6.6325E-04	-7.0982E-04	2.9811E-01	2.9811E-01	3.198E-01
K-40		1.8471E+01	1.8471E+01	1.4367E+00	1.7928E+00	
MN-54	#A	-1.1672E-03	-1.1809E-03	6.6907E-02	6.6907E-02	4.564E-02
CO-57	#B	3.3351E-03	3.3802E-03	4.0743E-02	4.0743E-02	4.500E-02
CO-60	#B	3.8675E-02	3.8748E-02	4.0301E-02	4.0364E-02	4.192E-02
Sr-85	#A	-2.1476E-02	-2.2710E-02	4.4751E-02	4.4771E-02	4.657E-02
Kr-85	#A	-4.9590E+02	-4.9592E+02	9.7702E+02	9.7744E+02	1.075E+03
Y-88	#B	7.6176E-03	7.8810E-03	2.2405E-02	2.2410E-02	2.511E-02
NB-94	#B	9.2700E-03	9.2700E-03	2.5307E-02	2.5313E-02	2.851E-02
Ag-108M	#B	2.8133E-02	2.8135E-02	3.8900E-02	3.8934E-02	4.191E-02
CD-109	#A	1.7358E+00	1.7497E+00	1.7542E+00	1.7568E+00	1.881E+00
SN-113	#B	-9.5184E-03	-9.8229E-03	4.8009E-02	4.8013E-02	5.229E-02
SB-125	#F	1.1073E-01	1.1113E-01	8.3132E-02	8.3382E-02	9.601E-02
I-131	#B	8.5062E-03	1.3350E-02	5.2931E-02	5.2937E-02	3.783E-02
CS-134	#F	2.1923E-02	2.2029E-02	1.7982E-02	1.8027E-02	9.747E-03
CS-137		1.1407E-01	1.1410E-01	5.6781E-02	5.7166E-02	
CE-139	#A	3.1087E-03	3.1917E-03	4.5141E-02	4.5141E-02	4.913E-02
EU-152	#B	8.2799E-02	8.2864E-02	1.0153E-01	1.0164E-01	1.519E-01
EU-154	#B	1.6175E-02	1.6194E-02	1.9346E-02	1.9366E-02	1.173E-01
EU-155	#A	1.8976E-01	1.9014E-01	2.2336E-01	2.2361E-01	2.424E-01
HG-203	#B	-1.3418E-02	-1.4503E-02	4.3904E-02	4.3912E-02	4.496E-02
TL-208		3.2016E-01	3.2016E-01	6.7499E-02	7.0012E-02	
PB-212		9.0079E-01	9.0079E-01	9.3554E-02	1.0718E-01	
PB-214		4.5840E-01	4.5840E-01	8.7794E-02	9.1739E-02	
BI-212	#	8.7030E-01	8.7030E-01	4.7466E-01	4.7734E-01	
BI-214		4.4844E-01	4.4844E-01	1.1867E-01	1.2150E-01	
RA-224	A	1.1976E+00	1.1976E+00	1.1285E+00	1.1306E+00	
RA-226	#	1.4500E+00	1.4500E+00	1.0437E+00	1.0470E+00	

AC-228	8.2752E-01	8.2752E-01	1.8195E-01	1.8819E-01

TH-227 #B	-8.8947E-02	-8.8947E-02	3.5459E-01	3.5463E-01	3.936E-01
PA-234 #B	1.2749E-01	1.2749E-01	8.7467E-02	8.7752E-02	2.121E-01
TH-234 #B	2.3395E+00	2.3395E+00	2.1127E+00	2.1167E+00	6.757E+00
AM-241 #A	1.5719E-02	1.5720E-02	8.9653E-01	8.9653E-01	1.008E+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 (269.4 to 2000.7 keV) 2.5058317E+01 pCi/gm
Total Decayed Activity (269.4 to 2000.7 keV) 2.5058365E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1640.An1

Sample description
FSS-NOL-05-02-002-F

Spectrum Filename: C:\GammaVision\Spectra\103F_13DEC2005_1640.An1

Acquisition information
Start time: 13-Dec-2005 16:40:14
Live time: 2000
Real time: 2003
Dead time: 0.15 %
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/channel^2

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: 1.9430E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9430E+03) =
5.1467E+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	08-Dec-2005 13:32:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1073

***** 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	145.	18.96	0.99	9.052E-03	74.81	9.600	1.163E+00	PB212
77.23	202.	14.66	0.99	1.011E-02	77.11	17.500	1.103E+00	PB212
					77.11	10.700	1.804E+00	PB214
87.22	101.	30.78	1.00	1.448E-02				
87.22	101.	30.78	1.00	1.448E-02	88.04	3.790	1.264E+00	CD109
89.72	80.	38.41	1.00	1.542E-02				
93.40	121.	25.09	1.00	1.672E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
185.98	125.	26.88	1.24	2.567E-02				
185.98	125.	26.88	1.24	2.567E-02	185.99	3.280	PBC<MDA	RA226
200.15	80.	39.98	1.22	2.513E-02				
209.55	108.	31.05	0.88	2.470E-02				
238.70	1152.	3.42	1.09	2.320E-02	238.63	43.100	7.933E-01	PB212
241.73	166.	15.36	1.09	2.304E-02	241.00	3.900	1.287E+00	RA224
					241.92	7.470	6.733E-01	PB214
270.14	136.	24.09	1.25	2.152E-02				
277.26	70.	33.94	0.79	2.115E-02				
295.31	252.	11.69	1.23	2.024E-02	295.22	19.200	4.443E-01	PB214
327.54	71.	36.07	1.01	1.876E-02				
338.29	239.	12.22	0.95	1.831E-02	338.40	12.010	7.534E-01	AC228
351.88	412.	7.60	1.02	1.776E-02	351.99	37.100	4.293E-01	PB214
409.31	60.	36.37	1.01	1.575E-02				
463.19	75.	25.49	1.38	1.425E-02				
463.19	75.	25.49	1.38	1.425E-02	463.51	10.000	3.622E-01	SB125
510.63	177.	11.70	1.88	1.317E-02	510.72	22.500	3.528E-01	TL208
583.14	381.	6.90	1.17	1.184E-02	583.14	86.000	2.575E-01	TL208

609.24	325.	8.50	1.25	1.144E-02	609.32	46.090	4.202E-01	BI214
661.41	110.	22.84	1.04	1.072E-02	661.62	84.620	8.290E-02	CS137
727.14	98.	19.09	1.79	9.965E-03	727.17	11.800	5.767E-01	BI212
782.20	53.	31.20	0.81	9.424E-03				
794.29	46.	31.74	1.48	9.314E-03				
794.29	46.	31.74	1.48	9.314E-03	795.76	85.400	4.074E-02	CS134
859.95	63.	29.20	1.14	8.772E-03				
911.03	295.	8.51	1.73	8.402E-03	911.07	29.000	8.337E-01	AC228
964.63	37.	40.92	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152
968.55	224.	9.96	1.64	8.028E-03	968.90	17.460	1.112E+00	AC228
1119.51	97.	21.37	1.15	7.215E-03	1120.28	15.040	6.098E-01	BI214
1332.03	34.	30.22	0.87	6.351E-03				
1332.03	34.	30.22	0.87	6.351E-03	1332.51	99.980	3.419E-02	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.47	1349.	2.81	1.98	5.933E-03	1460.75	10.700	1.458E+01	K40
1763.92	52.	14.36	2.49	5.142E-03	1764.51	15.920	4.446E-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	
173.61	87.41	429.	101.	0.050	92.34	1.001	PB-214	lD
178.61	89.91	429.	80.	0.040	115.24	1.002	PB-214	lD
399.46	200.15	431.	80.	0.040	119.93	1.216	PA-234	
418.26	209.55	442.	108.	0.054	93.15	0.882	AC-228	
539.42	270.14	358.	136.	0.068	72.28	1.246	AC-228	s
654.22	327.54	234.	71.	0.036	108.22	1.011	AC-228	s
817.75	409.31	170.	60.	0.030	109.12	1.014	AC-228	
1563.46	782.20	93.	37.	0.019	119.66	0.812	PA-234	sM
1718.95	859.95	75.	63.	0.031	87.59	1.143	TL-208	
2662.97	1332.03	25.	34.	0.017	90.67	0.866	CO-60	l

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	325.	145.	0.073	56.89	0.993D
PB-212	153.39	77.11	347.	202.	0.101	43.99	0.995A
TH-234	185.41	93.12	1016.	119.	0.059	101.46	1.500s
TH-234	185.40	93.12	981.	123.	0.062	96.86	1.500s
PA-234	185.29	93.06	708.	155.	0.077	76.52	1.500s
RA-226	371.52	186.18	812.	122.	0.061	92.42	1.500
PB-212	476.42	238.63	215.	1139.	0.570	10.28	1.093D
RA-224	481.16	241.00	881.	113.	0.056	116.41	1.095D
PB-214	483.00	241.92	329.	108.	0.054	59.65	1.095A
PB-214	589.78	295.31	262.	248.	0.124	35.07	1.234s
AC-228	675.72	338.29	238.	238.	0.119	36.67	0.949
PB-214	702.90	351.88	216.	407.	0.203	22.80	1.016
SB-125	924.85	462.86	138.	71.	0.035	77.37	1.500s
TL-208	1020.38	510.63	132.	150.	0.075	35.11	1.877s
TL-208	1165.37	583.14	120.	377.	0.189	20.71	1.171
BI-214	1217.58	609.24	152.	319.	0.159	25.50	1.247

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	1321.91	661.41	149.	108.	0.054	68.53	1.045
BI-212	1453.36	727.14	90.	98.	0.049	57.27	1.787s
CS-134	1588.87	794.90	58.	46.	0.023	83.39	1.500s
AC-228	1821.08	911.03	97.	292.	0.146	25.54	1.734
EU-152	1928.27	964.63	97.	37.	0.018	122.77	1.538s
AC-228	1936.11	968.55	86.	224.	0.112	29.88	1.639
BI-214	2238.00	1119.51	97.	95.	0.048	64.10	1.155s
K-40	2919.82	1460.47	40.	1331.	0.665	8.43	1.985
BI-214	3526.60	1763.92	6.	52.	0.026	43.08	2.491s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		3.6079E-02					
			477.56	3.608E-02	%(	3.311E-01 9.72E-02 G	
K-40		1.4580E+01					
			1460.75	1.458E+01	(P	3.543E-01 4.15E-01 G	
MN-54		1.9790E-02					
			834.81	1.979E-02	%(P	3.104E-02 9.61E-03 G	
CO-57		-1.3564E-02					
			122.07	-1.356E-02	%(P	4.742E-02 1.43E-02 G K	
			136.43	-7.081E-02	&	3.925E-01 1.18E-01 G	
CO-60		1.2536E-02					
			1332.51	1.254E-02	%(P	3.214E-02 9.43E-03 G K	
			1173.23	1.620E-02	& P	4.182E-02 1.25E-02 G K	
Sr-85		-3.0474E-02					
			514.00	-3.047E-02	&(	4.809E-02 1.47E-02 G	
Kr-85		-6.6603E+02					
			513.99	-6.660E+02	&(	1.051E+03 3.22E+02 G	
Y-88		-2.9183E-03					
			1836.01	-2.918E-03	%(P	2.612E-02 7.01E-03 G K	
			898.02	1.093E-02	& P	3.185E-02 9.43E-03 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	7.6622E-03						
		871.10	7.662E-03	&(	3.297E-02	9.67E-03	G K
		702.50	5.926E-05	%	3.637E-02	1.05E-02	G K
Ag-108M	-1.9689E-02						
		722.95	-1.969E-02	%(	4.887E-02	1.47E-02	G K
		614.37	1.358E-04	% P	3.847E-02	1.11E-02	G
		433.93	-5.116E-03	%	3.425E-02	1.01E-02	G
CD-109	1.1353E+00						
		88.04	1.135E+00	%(	1.853E+00	5.65E-01	G
SN-113	-5.1833E-04						
		391.71	-5.183E-04	%(	3.846E-02	1.11E-02	G K
		255.04	-2.280E-01	&	1.499E+00	4.46E-01	G
SB-125	9.8914E-02						
		427.95	1.509E-02	%(P	1.029E-01	3.03E-02	G K
		600.77	4.418E-03	% P	1.571E-01	4.51E-02	G
		636.15	2.007E-02	& P	2.412E-01	6.92E-02	G
		463.51	3.470E-01	@(P	2.816E-01	9.11E-02	G
		176.29	8.524E-02	&	5.498E-01	1.64E-01	G
I-131	1.6256E-03						
		364.48	1.626E-03	%(P	5.532E-02	1.62E-02	G K
		636.97	-5.629E-02	%	6.815E-01	1.98E-01	G
		284.29	-5.967E-02	& P	7.826E-01	2.31E-01	G
CS-134	1.7809E-02						
		604.66	-1.863E-03	%(	3.137E-02	9.07E-03	G K
		795.76	4.029E-02	*(P	3.374E-02	1.12E-02	G
		569.29	1.114E-02	% P	2.291E-01	6.66E-02	G
		801.84	-5.104E-02	% P	4.011E-01	1.15E-01	G
CS-137	8.2900E-02						
		661.62	8.290E-02	(P	4.568E-02	1.92E-02	G
CE-139	6.9965E-03						
		165.85	6.997E-03	%(	4.084E-02	1.22E-02	G
EU-152	4.5848E-02						
		121.78	-3.920E-02	%(P	1.373E-01	4.13E-02	G K
		344.30	1.425E-02	% P	9.924E-02	2.93E-02	G
		1408.08	5.355E-02	%	1.373E-01	4.09E-02	G
		964.00	2.164E-01	(P	2.881E-01	8.99E-02	G
		1112.07	1.099E-01	%	2.549E-01	7.68E-02	G
		778.90	-3.533E-02	%	2.808E-01	8.18E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	1.0558E-02						
		123.10	1.056E-02	%(	1.011E-01	3.02E-02	G K
		1274.80	7.045E-04	%	1.006E-01	2.81E-02	G
		723.30	-9.102E-02	%	2.224E-01	6.70E-02	G
		1004.80	1.829E-02	%	2.089E-01	6.00E-02	G
EU-155	4.3127E-02						
		86.45	4.313E-02	&(	2.021E-01	6.06E-02	G K
		105.31	5.665E-02	%	2.230E-01	6.70E-02	G
HG-203	-7.4053E-03						
		279.17	-7.405E-03	%(P	4.189E-02	1.25E-02	G K
		72.87	-4.270E-02	% P	2.146E+00	6.40E-01	G
		70.83	1.435E-01	%	4.052E+00	1.21E+00	G
		82.50	-3.810E-01	%	3.871E+00	1.16E+00	G
TL-208	2.5747E-01						
		583.14	2.575E-01	(P	3.669E-02	1.80E-02	G
		510.72	3.528E-01	+ P	1.318E-01	4.86E-02	G
PB-212	7.9230E-01						
		238.63	7.923E-01	(P	4.941E-02	2.74E-02	G K
							Energy duplication
		77.11	7.923E-01	} P	3.519E-01	1.16E-01	G
		74.81	1.163E+00	+ P	6.938E-01	2.25E-01	G
PB-214	4.3627E-01						
		351.99	4.293E-01	(P	7.526E-02	3.31E-02	G K
		295.22	4.443E-01	*(P	1.397E-01	5.28E-02	G
							Energy duplication
		77.11	2.861E-01	} P	8.503E-01	2.16E-01	G
		241.92	4.363E-01	}	3.526E-01	8.68E-02	G
BI-212	5.7674E-01						
		727.17	5.767E-01	*(P	2.782E-01	1.11E-01	G K
		1620.56	1.642E-01	& P	9.080E-01	2.53E-01	G
		785.42	5.936E-01	%	1.656E+00	4.95E-01	G
BI-214	4.2645E-01						
		609.32	4.202E-01	(P	7.948E-02	3.64E-02	G K
		1764.51	4.446E-01	@(P	1.173E-01	6.78E-02	G
		1120.28	6.098E-01	+ P	3.115E-01	1.33E-01	G
RA-224	8.7224E-01						
							Derived Ave Activity
		241.00	8.722E-01	}(	1.090E+00	3.47E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

RA-226       1.0094E+00
                          185.99 1.009E+00  (P 1.119E+00 3.44E-01 G

AC-228       8.1016E-01
                          911.07 8.337E-01  (P 1.387E-01 7.18E-02 G K
                          968.90 1.112E+00 + P 2.279E-01 1.11E-01 G
                          338.40 7.534E-01  (P 2.360E-01 9.25E-02 G

TH-227       2.0506E-02
                          236.00 2.051E-02 %(  3.486E-01 1.04E-01 G K
                          256.25 3.834E-03 & P 4.577E-01 1.35E-01 G

PA-234       1.0938E-01
                           98.44-7.449E-02 %(P 2.076E-01 6.26E-02 G K
                          946.00 1.345E-02 % P 1.573E-01 4.49E-02 G
                          131.28 8.990E-03 & P 2.024E-01 6.04E-02 G
                           94.67 4.071E-01 ?(P 3.327E-01 1.04E-01 G
                          883.24-2.161E-02 &   3.122E-01 9.00E-02 G
                          926.70 0.000E+00 %   3.025E-01 8.55E-02 G
                          569.26 1.643E-02 % P 3.383E-01 9.83E-02 G

TH-234       1.3452E+00
                           63.29 6.301E-01 %(P 6.173E+00 1.84E+00 G K
                           92.80 1.736E+00  (P 2.095E+00 6.41E-01 G
                           92.38 1.974E+00 &(P 2.510E+00 7.67E-01 G

AM-241       1.3901E-01
                           59.54 1.390E-01 %(P 1.109E+00 3.31E-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:	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 - 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	3.3754E-02	3.6079E-02	2.9154E-01	2.9155E-01	3.098E-01
K-40		1.4580E+01	1.4580E+01	1.2467E+00	1.5069E+00	
MN-54	#A	1.9566E-02	1.9790E-02	2.8826E-02	2.8849E-02	3.069E-02
CO-57	#B	-1.3387E-02	-1.3564E-02	4.3756E-02	4.3763E-02	4.680E-02
CO-60	#B	1.2513E-02	1.2536E-02	2.8291E-02	2.8300E-02	3.208E-02
Sr-85	#A	-2.8847E-02	-3.0474E-02	4.4181E-02	4.4217E-02	4.553E-02
Kr-85	#A	-6.6601E+02	-6.6603E+02	9.6557E+02	9.6634E+02	1.051E+03
Y-88	#B	-2.8226E-03	-2.9183E-03	2.2393E-02	2.2394E-02	2.526E-02
NB-94	#B	7.6622E-03	7.6622E-03	2.9013E-02	2.9017E-02	3.297E-02
Ag-108M	#B	-1.9687E-02	-1.9689E-02	4.4169E-02	4.4184E-02	4.887E-02
CD-109	#A	1.1264E+00	1.1353E+00	1.6945E+00	1.6957E+00	1.839E+00
SN-113	#B	-5.0256E-04	-5.1833E-04	3.3376E-02	3.3376E-02	3.729E-02
SB-125	#B	9.8567E-02	9.8914E-02	7.7910E-02	7.8122E-02	1.026E-01
I-131	#B	1.0445E-03	1.6256E-03	4.8542E-02	4.8542E-02	3.555E-02
CS-134	#B	1.7725E-02	1.7809E-02	1.4880E-02	1.4916E-02	3.122E-02
CS-137		8.2873E-02	8.2900E-02	5.7544E-02	5.7745E-02	
CE-139	#A	6.8179E-03	6.9965E-03	3.6633E-02	3.6635E-02	3.980E-02
EU-152	#B	4.5813E-02	4.5848E-02	5.7130E-02	5.7186E-02	1.372E-01
EU-154	#B	1.0546E-02	1.0558E-02	9.0593E-02	9.0595E-02	1.009E-01
EU-155	#B	4.3043E-02	4.3127E-02	1.8188E-01	1.8190E-01	2.017E-01
HG-203	#B	-6.8611E-03	-7.4053E-03	3.7617E-02	3.7619E-02	3.881E-02
TL-208		2.5747E-01	2.5747E-01	5.3941E-02	5.5974E-02	
PB-212		7.9230E-01	7.9230E-01	8.2342E-02	9.4319E-02	
PB-214		4.3627E-01	4.3627E-01	1.0085E-01	1.0398E-01	
BI-212	#	5.7674E-01	5.7674E-01	3.3197E-01	3.3366E-01	
BI-214		4.2645E-01	4.2645E-01	1.1094E-01	1.1367E-01	
RA-224	A	8.7224E-01	8.7224E-01	1.0154E+00	1.0166E+00	
RA-226	#A	1.0094E+00	1.0094E+00	1.0318E+00	1.0335E+00	1.119E+00
AC-228		8.1016E-01	8.1016E-01	1.8226E-01	1.8823E-01	
TH-227	#B	2.0506E-02	2.0506E-02	3.1157E-01	3.1157E-01	3.486E-01
PA-234	#B	1.0938E-01	1.0938E-01	8.3885E-02	8.4104E-02	2.076E-01
TH-234	#B	1.3452E+00	1.3452E+00	1.4896E+00	1.4914E+00	6.173E+00

AM-241 #A	1.3900E-01	1.3901E-01	9.9399E-01	9.9402E-01	1.109E+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 (269.9 to 2000.7 keV) 1.8834282E+01 pCi/gm
Total Decayed Activity (269.9 to 2000.7 keV) 1.8834309E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1716.An1

Sample description
FSS-NOL-05-02-018-F

Spectrum Filename: C:\GammaVision\Spectra\103F_13DEC2005_1716.An1

Acquisition information
Start time: 13-Dec-2005 17:17:00
Live time: 2000
Real time: 2003
Dead time: 0.14 %
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/channel^2

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: 1.8770E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8770E+03) =
5.3277E+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	08-Dec-2005 10:35:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1345

***** 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
74.95	118.	22.76	0.99	9.052E-03	74.81	9.600	9.814E-01	PB212
77.25	204.	11.19	0.99	1.011E-02	77.11	17.500	8.867E-01	PB212
87.22	119.	36.70	1.50	1.410E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	1.546E+00	CD109
87.27	120.	34.80	1.50	1.472E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	1.562E+00	CD109
186.05	221.	18.58	1.25	2.566E-02	185.99	3.280	1.781E+00	RA226
209.45	116.	34.35	0.79	2.471E-02				
238.66	1115.	3.49	1.09	2.320E-02	236.00	11.200	3.071E+00	TH227
					238.63	43.100	7.942E-01	PB212
241.67	119.	19.82	1.09	2.304E-02	241.00	3.900	9.544E-01	RA224
					241.92	7.470	4.993E-01	PB214
269.95	96.	30.57	1.20	2.153E-02				
276.92	58.	39.83	1.22	2.116E-02				
295.19	225.	14.57	1.13	2.025E-02	295.22	19.200	4.084E-01	PB214
300.21	51.	37.14	1.07	2.001E-02				
327.63	71.	32.12	0.89	1.876E-02				
338.26	212.	11.57	1.18	1.831E-02	338.40	12.010	6.895E-01	AC228
351.85	351.	7.66	1.41	1.776E-02	351.99	37.100	3.773E-01	PB214
462.92	66.	32.90	1.08	1.426E-02				
462.92	66.	32.90	1.08	1.426E-02	463.51	10.000	3.293E-01	SB125
510.96	189.	13.17	0.99	1.317E-02	510.72	22.500	3.938E-01	TL208
582.96	376.	7.62	1.27	1.185E-02	583.14	86.000	2.631E-01	TL208
609.12	293.	8.30	1.53	1.144E-02	609.32	46.090	3.918E-01	BI214
661.20	31.	38.66	1.50	1.072E-02	661.62	84.620	PBC<MDA	CS137
726.86	121.	16.13	1.33	9.968E-03	727.17	11.800	7.391E-01	BI212
794.96	37.	29.48	1.50	9.301E-03	795.76	85.400	3.343E-02	CS134

911.12	238.	8.04	1.88	8.401E-03	911.07	29.000	6.945E-01	AC228
964.04	36.	26.95	1.54	8.056E-03	964.00	14.580	2.154E-01	EU152
968.88	157.	9.01	1.54	8.026E-03	968.90	17.460	8.084E-01	AC228
1120.00	94.	16.38	1.81	7.213E-03	1120.28	15.040	6.134E-01	BI214
1332.14	20.	38.07	1.77	6.349E-03	1332.51	99.980	PBC<MDA	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.43	1056.	3.23	1.99	5.933E-03	1460.75	10.700	1.177E+01	K40
1619.81	24.	26.01	1.10	5.488E-03	1620.56	2.750	1.124E+00	BI212
1763.88	44.	14.59	2.00	5.142E-03	1764.51	15.920	3.846E-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	
418.07	209.45	542.	116.	0.058	103.06	0.794	AC-228	s
539.05	269.95	306.	96.	0.048	91.70	1.196	AC-228	
599.57	300.21	162.	51.	0.025	111.42	1.075	PB-212	
654.40	327.63	198.	71.	0.036	96.35	0.888	AC-228	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	325.	118.	0.059	68.29	0.993D
PB-212	153.39	77.11	321.	204.	0.102	33.57	0.995A
EU-155	173.61	87.22	892.	119.	0.059	110.11	1.500s
CD-109	173.70	87.27	813.	120.	0.060	104.39	1.500s
RA-226	371.47	186.15	663.	169.	0.084	63.49	1.500s
PB-212	476.49	238.67	498.	1152.	0.576	12.70	1.136
RA-224	482.39	241.61	658.	105.	0.053	107.73	1.500
PB-214	589.53	295.19	306.	221.	0.110	43.72	1.127s
AC-228	675.66	338.26	177.	211.	0.105	34.72	1.175
PB-214	702.85	351.85	167.	345.	0.173	22.97	1.414s
SB-125	924.91	462.90	134.	59.	0.029	89.86	1.500s
TL-208	1021.03	510.96	161.	162.	0.081	39.51	0.991s
TL-208	1165.02	582.96	132.	372.	0.186	22.86	1.270
BI-214	1217.34	609.12	103.	287.	0.143	24.90	1.534s
CS-137	1321.48	661.20	63.	31.	0.015	115.98	1.500s
BI-212	1452.79	726.86	77.	121.	0.060	48.40	1.332s
CS-134	1588.98	794.96	41.	37.	0.018	88.45	1.500s
AC-228	1821.26	911.12	53.	235.	0.118	24.12	1.875s
EU-152	1927.43	964.21	46.	37.	0.019	89.46	1.538
AC-228	1936.77	968.88	46.	156.	0.078	33.30	1.727
BI-214	2238.98	1120.00	46.	92.	0.046	49.13	1.808
K-40	2919.73	1460.43	40.	1037.	0.519	9.70	1.989

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3238.43	1619.81	4.	24.	0.012	78.03	1.100s
BI-214	3526.52	1763.88	3.	44.	0.022	43.76	2.000

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-9.4935E-02					
			477.56	-9.494E-02	%(	3.080E-01 9.19E-02	G
K-40		1.1766E+01					
			1460.75	1.177E+01	(P	3.639E-01 3.87E-01	G
MN-54		6.6760E-03					
			834.81	6.676E-03	&(P	3.398E-02 9.91E-03	G
CO-57		2.1610E-02					
			122.07	2.161E-02	%(P	4.511E-02 1.37E-02	G K
			136.43	-4.138E-02	%	3.142E-01 9.37E-02	G
CO-60		2.2173E-02					
			1332.51	2.217E-02	%(P	3.068E-02 9.59E-03	G K
			1173.23	1.165E-02	% P	4.642E-02 1.36E-02	G K
Sr-85		-1.1518E-02					
			514.00	-1.152E-02	%(	4.140E-02 1.24E-02	G
Kr-85		-2.5132E+02					
			513.99	-2.513E+02	%(	9.034E+02 2.70E+02	G
Y-88		1.2794E-03					
			1836.01	1.279E-03	%(P	2.245E-02 5.73E-03	G K
			898.02	1.778E-03	% P	3.844E-02 1.09E-02	G
NB-94		-4.5428E-03					
			871.10	-4.543E-03	&(	3.461E-02 1.00E-02	G K
			702.50	1.421E-02	&	2.774E-02 8.45E-03	G K
Ag-108M		-9.1474E-03					
			722.95	-9.147E-03	%(	3.707E-02 1.09E-02	G K
			614.37	-5.795E-05	% P	3.420E-02 9.80E-03	G
			433.93	-5.820E-03	%	3.173E-02 9.36E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.5617E+00						
		88.04	1.562E+00	(	1.763E+00	5.43E-01	G
SN-113	-8.3119E-04						
		391.71	-8.312E-04	&(	4.719E-02	1.38E-02	G K
		255.04	1.680E-01	%	1.454E+00	4.31E-01	G
SB-125	7.5390E-02						
		427.95	-5.997E-05	&(P	1.030E-01	2.99E-02	G K
		600.77	-6.278E-02	% P	1.851E-01	5.53E-02	G
		636.15	1.076E-01	& P	2.206E-01	6.69E-02	G
		463.51	2.987E-01	*(P	2.869E-01	9.14E-02	G
		176.29	3.769E-02	&	5.200E-01	1.55E-01	G
I-131	-8.2858E-04						
		364.48	-8.286E-04	%(P	4.159E-02	1.19E-02	G K
		636.97	2.412E-01	&	4.614E-01	1.41E-01	G
		284.29	3.427E-01	% P	7.386E-01	2.24E-01	G
CS-134	1.6696E-02						
		604.66	2.057E-03	%(	7.320E-02	2.17E-02	G K
		795.76	3.343E-02	*(P	2.948E-02	9.88E-03	G
		569.29	2.522E-02	% P	1.841E-01	5.34E-02	G
		801.84	4.663E-02	& P	3.467E-01	9.93E-02	G
CS-137	2.4540E-02						
		661.62	2.454E-02	(P	3.156E-02	9.91E-03	G
CE-139	1.0421E-02						
		165.85	1.042E-02	%(	3.791E-02	1.14E-02	G
EU-152	1.1775E-01						
		121.78	6.205E-02	%(P	1.307E-01	3.96E-02	G K
		344.30	1.422E-03	& P	1.164E-01	3.41E-02	G
		1408.08	6.306E-02	%	1.203E-01	3.70E-02	G
		964.00	2.294E-01	(P	2.097E-01	6.94E-02	G
		1112.07	-7.154E-03	%	2.525E-01	7.10E-02	G
		778.90	-7.474E-02	%	2.782E-01	8.23E-02	G
EU-154	-1.4138E-02						
		123.10	-1.414E-02	&(	1.032E-01	3.09E-02	G K
		1274.80	3.305E-02	&	9.652E-02	2.86E-02	G
		723.30	-1.150E-02	%	1.376E-01	3.93E-02	G
		1004.80	6.501E-02	%	1.782E-01	5.31E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.8561E-01						
		86.45	1.856E-01	(	2.216E-01	6.81E-02	G K
		105.31	1.956E-02	&	2.263E-01	6.76E-02	G
HG-203	-3.4087E-03						
		279.17	-3.409E-03	&(P	4.069E-02	1.20E-02	G K
		72.87	-3.483E-01	& P	2.326E+00	6.97E-01	G
		70.83	-1.993E+00	%	4.319E+00	1.31E+00	G
		82.50	-7.500E-01	&	3.852E+00	1.16E+00	G
TL-208	2.6306E-01						
		583.14	2.631E-01	(P	3.973E-02	2.03E-02	G
		510.72	3.938E-01	+ P	1.502E-01	6.04E-02	G
PB-212	8.4583E-01						
		238.63	8.292E-01	(P	7.686E-02	3.55E-02	G K
							Energy duplication
		77.11	8.291E-01	} P	3.506E-01	9.28E-02	G
		74.81	9.814E-01	+ P	7.186E-01	2.29E-01	G
PB-214	3.8791E-01						
		351.99	3.773E-01	(P	6.876E-02	2.94E-02	G K
		295.22	4.084E-01	@(P	1.561E-01	6.06E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.233E-01	0.00E+00	G
		241.92	2.891E-02	%	5.725E-01	1.71E-01	G
BI-212	7.3907E-01						
		727.17	7.391E-01	@(P	2.674E-01	1.20E-01	G K
		1620.56	1.124E+00	+ P	5.980E-01	2.93E-01	G
		785.42	8.715E-01	%	1.609E+00	4.92E-01	G
BI-214	3.8996E-01						
		609.32	3.918E-01	@(P	6.830E-02	3.32E-02	G K
		1764.51	3.846E-01	(P	9.797E-02	6.03E-02	G
		1120.28	6.134E-01	+ P	2.268E-01	1.02E-01	G
RA-224	8.4022E-01						
		241.00	8.402E-01	(	9.784E-01	3.02E-01	G
RA-226	1.4450E+00						
		185.99	1.445E+00	*(P	1.049E+00	3.29E-01	G
AC-228	7.2491E-01						
		911.07	6.945E-01	@(P	1.082E-01	5.66E-02	G K
		968.90	7.997E-01	(P	1.769E-01	8.88E-02	G
		338.40	6.895E-01	(P	2.122E-01	8.02E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.4790E-01
                          236.00-1.479E-01 %(  3.439E-01 1.04E-01 G K
                          256.25-6.478E-02 & P 4.539E-01 1.35E-01 G

PA-234      -5.0503E-03
                           98.44-5.050E-03 %(P 2.002E-01 5.95E-02 G K
                          946.00-3.153E-02 % P 1.630E-01 4.73E-02 G
                          131.28-4.106E-03 & P 2.031E-01 6.05E-02 G
                           94.67-3.984E-02 % P 3.732E-01 1.11E-01 G
                          883.24 5.328E-02 &   2.560E-01 7.45E-02 G
                          926.70 8.480E-03 %   3.300E-01 9.40E-02 G
                          569.26 3.763E-02 % P 2.717E-01 7.88E-02 G

TH-234       6.6553E-01
                           63.29 6.655E-01 %(P 6.066E+00 1.81E+00 G K
                           92.80 1.012E+00 % P 2.040E+00 6.16E-01 G
                           92.38 1.064E+00 % P 2.455E+00 7.40E-01 G

AM-241      -2.1009E-01
                           59.54-2.101E-01 &(P 1.100E+00 3.29E-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:                      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 - 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	-8.8648E-02	-9.4935E-02	2.7565E-01	2.7570E-01	2.876E-01
K-40		1.1766E+01	1.1766E+01	1.1616E+00	1.3475E+00	
MN-54	#A	6.5982E-03	6.6760E-03	2.9726E-02	2.9728E-02	3.358E-02
CO-57	#B	2.1319E-02	2.1610E-02	4.1033E-02	4.1051E-02	4.450E-02
CO-60	#B	2.2131E-02	2.2173E-02	2.8762E-02	2.8791E-02	3.062E-02
Sr-85	#A	-1.0886E-02	-1.1518E-02	3.7078E-02	3.7084E-02	3.913E-02
Kr-85	#A	-2.5131E+02	-2.5132E+02	8.0904E+02	8.0917E+02	9.034E+02
Y-88	#B	1.2362E-03	1.2794E-03	1.7204E-02	1.7204E-02	2.170E-02
NB-94	#B	-4.5428E-03	-4.5428E-03	3.0037E-02	3.0038E-02	3.461E-02
Ag-108M	#B	-9.1467E-03	-9.1474E-03	3.2804E-02	3.2808E-02	3.707E-02
CD-109	#A	1.5491E+00	1.5617E+00	1.6302E+00	1.6325E+00	1.749E+00
SN-113	#B	-8.0518E-04	-8.3119E-04	4.1281E-02	4.1281E-02	4.572E-02
SB-125	#B	7.5117E-02	7.5390E-02	6.9208E-02	6.9346E-02	1.027E-01
I-131	#B	-5.2562E-04	-8.2858E-04	1.7965E-01	1.7965E-01	2.639E-02
CS-134	#B	1.6615E-02	1.6696E-02	1.4803E-02	1.4835E-02	7.284E-02
CS-137	#A	2.4532E-02	2.4540E-02	2.9739E-02	2.9773E-02	3.155E-02
CE-139	#A	1.0148E-02	1.0421E-02	3.4132E-02	3.4137E-02	3.692E-02
EU-152	#B	1.1765E-01	1.1775E-01	1.0687E-01	1.0707E-01	1.305E-01
EU-154	#B	-1.4122E-02	-1.4138E-02	9.2630E-02	9.2634E-02	1.031E-01
EU-155	#A	1.8524E-01	1.8561E-01	2.0438E-01	2.0464E-01	2.211E-01
HG-203	#B	-3.1512E-03	-3.4087E-03	3.6487E-02	3.6488E-02	3.761E-02
TL-208		2.6306E-01	2.6306E-01	6.0818E-02	6.2707E-02	
PB-212		8.4583E-01	8.4583E-01	1.0858E-01	1.1917E-01	
PB-214		3.8791E-01	3.8791E-01	9.0567E-02	9.3325E-02	
BI-212	#	7.3907E-01	7.3907E-01	3.5916E-01	3.6172E-01	
BI-214		3.8996E-01	3.8996E-01	9.9275E-02	1.0182E-01	
RA-224	#A	8.4022E-01	8.4022E-01	9.0513E-01	9.0645E-01	9.784E-01
RA-226	#	1.4450E+00	1.4450E+00	9.8778E-01	9.9134E-01	1.049E+00
AC-228		7.2491E-01	7.2491E-01	1.3074E-01	1.3734E-01	
TH-227	#B	-1.4790E-01	-1.4790E-01	3.1222E-01	3.1233E-01	3.439E-01
PA-234	#B	-5.0503E-03	-5.0503E-03	3.3716E-01	3.3716E-01	2.002E-01
TH-234	#B	6.6553E-01	6.6553E-01	5.4174E+00	5.4175E+00	6.066E+00
AM-241	#A	-2.1009E-01	-2.1009E-01	1.0044E+00	1.0045E+00	1.100E+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

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1716.An1

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

Total Activity (86.9 to 2000.7 keV) 1.5116343E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 1.5116343E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1753.An1

Sample description
FSS-NOL-05-02-021-F

Spectrum Filename: C:\GammaVision\Spectra\103F_13DEC2005_1753.An1

Acquisition information
Start time: 13-Dec-2005 17:53:39
Live time: 2000
Real time: 2003
Dead time: 0.15 %
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/channel^2

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: 1.8850E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8850E+03) =
5.3050E+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	08-Dec-2005 11:24:00
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. 22 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1908

***** 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	144.	19.63	0.99	9.052E-03	74.81	9.600	1.191E+00	PB212
77.22	190.	12.99	0.99	1.011E-02	77.11	17.500	8.740E-01	PB212
					77.11	10.700	1.429E+00	PB214
92.90	135.	29.24	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.92	105.	36.44	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.52	112.	31.42	1.33	2.442E-02				
129.52	112.	31.42	1.33	2.442E-02	131.28	20.000	PBC<MDA	PA234
185.86	212.	21.11	1.40	2.567E-02	185.99	3.280	1.695E+00	RA226
208.32	134.	29.95	1.19	2.476E-02				
238.66	1132.	3.47	1.09	2.320E-02	238.63	43.100	8.028E-01	PB212
241.72	129.	19.32	1.09	2.303E-02	241.00	3.900	1.028E+00	RA224
					241.92	7.470	5.378E-01	PB214
269.91	84.	33.09	1.15	2.153E-02				
295.04	240.	10.69	1.12	2.026E-02	295.22	19.200	4.349E-01	PB214
300.33	95.	28.63	1.12	2.000E-02				
338.12	267.	11.58	1.10	1.831E-02	338.40	12.010	8.673E-01	AC228
351.74	419.	7.30	1.11	1.776E-02	351.99	37.100	4.495E-01	PB214
462.86	109.	25.66	1.50	1.426E-02				
462.86	109.	25.66	1.50	1.426E-02	463.51	10.000	5.420E-01	SB125
510.59	149.	17.39	1.60	1.318E-02	510.72	22.500	2.959E-01	TL208
583.11	307.	7.25	1.19	1.185E-02	583.14	86.000	2.131E-01	TL208
609.14	367.	7.99	1.42	1.144E-02	609.32	46.090	4.902E-01	BI214
727.26	78.	23.25	1.83	9.964E-03	727.17	11.800	4.750E-01	BI212
794.19	46.	33.86	0.84	9.315E-03				
910.99	265.	7.48	1.55	8.402E-03	911.07	29.000	7.693E-01	AC228

963.86	41.	32.15	1.54	8.057E-03				
963.86	41.	32.15	1.54	8.057E-03	964.00	14.580	PBC<MDA	EU152
968.72	174.	9.22	1.54	8.027E-03	968.90	17.460	8.882E-01	AC228
1119.77	100.	16.32	1.66	7.214E-03	1120.28	15.040	6.484E-01	BI214
1172.76	157.	14.41	1.86	6.974E-03	1173.23	99.860	1.602E-01	CO60
1332.17	88.	13.94	0.89	6.351E-03	1332.51	99.980	9.657E-02	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.42	1466.	2.70	1.92	5.933E-03	1460.75	10.700	1.635E+01	K40
1620.10	14.	37.25	2.78	5.488E-03	1620.56	2.750	PBC<MDA	BI212
1764.58	60.	12.91	1.23	5.142E-03	1764.51	15.920	4.968E-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	
258.21	129.52	521.	123.	0.062	83.00	1.326	AC-228	s
415.81	208.32	568.	134.	0.067	89.85	1.189	LU-177	s
538.97	269.91	296.	84.	0.042	99.27	1.147	AC-228	s
599.80	300.33	258.	95.	0.047	85.90	1.120	PB-212	s
1587.43	794.19	57.	60.	0.030	65.43	0.844	PA-234	s
1926.74	963.83	65.	41.	0.020	96.46	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 keV
PB-212	148.79	74.81	349.	144.	0.072	58.90	0.993D
PB-212	153.39	77.11	382.	190.	0.095	38.96	0.995A
TH-234	184.97	92.90	939.	135.	0.068	87.71	1.500s
RA-226	370.88	185.86	676.	199.	0.100	63.32	1.400s
PB-212	476.49	238.67	649.	1144.	0.572	14.07	1.122
RA-224	482.55	241.70	728.	112.	0.056	106.10	1.500
PB-214	482.60	241.72	324.	62.	0.031	122.91	1.724s
PB-214	589.23	295.04	203.	236.	0.118	32.08	1.117s
AC-228	675.38	338.12	256.	266.	0.133	34.73	1.104
PB-214	702.62	351.74	204.	413.	0.206	21.91	1.111
SB-125	925.01	462.95	151.	85.	0.042	68.56	1.500s
TL-208	1020.29	510.59	201.	122.	0.061	52.16	1.597s
TL-208	1165.33	583.11	86.	303.	0.151	21.74	1.193
BI-214	1217.37	609.14	160.	361.	0.180	23.97	1.419
BI-212	1453.59	727.26	98.	78.	0.039	69.74	1.827s
AC-228	1821.00	910.99	57.	261.	0.131	22.44	1.545
AC-228	1935.52	968.25	146.	225.	0.113	38.19	1.466
BI-214	2238.52	1119.77	66.	98.	0.049	48.97	1.663s
CO-60	2344.48	1172.76	101.	155.	0.078	43.22	1.865s
CO-60	2663.26	1332.17	27.	85.	0.043	41.81	0.886s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2919.71	1460.42	44.	1447.	0.724	8.10	1.922
BI-212	3239.01	1620.10	6.	14.	0.007	111.76	2.784s
BI-214	3527.91	1764.58	3.	57.	0.028	38.73	1.234s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-3.8391E-02					
			477.56	-3.839E-02	%(	3.357E-01 9.85E-02	G
K-40		1.6349E+01					
			1460.75	1.635E+01	(P	3.778E-01 4.47E-01	G
MN-54		5.0393E-03					
			834.81	5.039E-03	%(P	3.939E-02 1.15E-02	G
CO-57		-2.0340E-03					
			122.07	-2.034E-03	%(P	5.289E-02 1.58E-02	G K
			136.43	-1.262E-01	%	4.068E-01 1.23E-01	G
CO-60		9.6574E-02					
			1332.51	9.657E-02	@(P	3.028E-02 1.39E-02	G K
			1173.23	1.602E-01	+ P	5.105E-02 2.34E-02	G K
Sr-85		-1.1434E-02					
			514.00	-1.143E-02	%(	4.172E-02 1.25E-02	G
Kr-85		-2.5287E+02					
			513.99	-2.529E+02	%(	9.107E+02 2.72E+02	G
Y-88		1.4267E-03					
			1836.01	1.427E-03	&(P	2.529E-02 6.60E-03	G K
			898.02	3.590E-03	% P	4.128E-02 1.19E-02	G
NB-94		-8.3833E-03					
			871.10	-8.383E-03	%(	3.397E-02 9.98E-03	G K
			702.50	-7.985E-03	%	3.394E-02 1.00E-02	G K
Ag-108M		3.0409E-04					
			722.95	3.041E-04	&(	4.935E-02 1.43E-02	G K
			614.37	1.651E-02	% P	3.348E-02 1.02E-02	G
			433.93	0.000E+00	&	3.441E-02 1.00E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	8.8724E-01						
		88.04	8.872E-01	&(	1.936E+00	5.87E-01	G
SN-113	8.7016E-03						
		391.71	8.702E-03	&(	4.412E-02	1.30E-02	G K
		255.04	-2.393E-03	%	1.480E+00	4.36E-01	G
SB-125	1.3141E-01						
		427.95	3.149E-02	%(P	9.568E-02	2.86E-02	G K
		600.77	3.707E-04	& P	1.841E-01	5.31E-02	G
		636.15	4.434E-02	& P	3.065E-01	8.96E-02	G
		463.51	4.272E-01	(P	3.027E-01	9.91E-02	G
		176.29	2.345E-02	%	5.718E-01	1.70E-01	G
I-131	8.9491E-03						
		364.48	8.949E-03	%(P	5.557E-02	1.64E-02	G K
		636.97	1.129E-01	&	7.461E-01	2.19E-01	G
		284.29	-1.476E-01	% P	8.361E-01	2.49E-01	G
CS-134	-2.0480E-03						
		604.66	-2.048E-03	%(	8.614E-02	2.56E-02	G K
		795.76	-1.719E-02	& P	4.592E-02	1.38E-02	G
		569.29	-4.837E-03	% P	2.344E-01	6.76E-02	G
		801.84	-1.460E-02	& P	4.427E-01	1.26E-01	G
CS-137	2.1550E-02						
		661.62	2.155E-02	%(P	3.963E-02	1.21E-02	G
CE-139	-5.1108E-03						
		165.85	-5.111E-03	%(	4.593E-02	1.37E-02	G
EU-152	-6.4333E-03						
		121.78	-6.433E-03	%(P	1.490E-01	4.44E-02	G K
		344.30	2.428E-02	% P	1.072E-01	3.19E-02	G
		1408.08	5.913E-02	%	1.244E-01	3.78E-02	G
		964.00	1.916E-01	& P	3.231E-01	9.90E-02	G
		1112.07	8.310E-03	%	2.928E-01	8.32E-02	G
		778.90	-6.219E-03	%	2.621E-01	7.50E-02	G
EU-154	-5.1830E-03						
		123.10	-5.183E-03	&(	1.070E-01	3.19E-02	G K
		1274.80	3.991E-02	%	1.016E-01	3.04E-02	G
		723.30	-2.198E-02	&	1.920E-01	5.60E-02	G
		1004.80	6.744E-02	%	2.328E-01	6.89E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.0294E-01						
		86.45	1.029E-01	%(	2.374E-01	7.19E-02	G K
		105.31	6.934E-02	%	2.209E-01	6.66E-02	G
HG-203	-1.8098E-03						
		279.17	-1.810E-03	%(P	4.250E-02	1.26E-02	G K
		72.87	-3.051E-01	% P	2.405E+00	7.21E-01	G
		70.83	-7.768E-01	&	3.170E+00	9.49E-01	G
		82.50	-1.567E-01	%	3.188E+00	9.47E-01	G
TL-208	2.1310E-01						
		583.14	2.131E-01	(P	3.236E-02	1.57E-02	G
		510.72	2.959E-01	+ P	1.662E-01	6.26E-02	G
PB-212	8.3568E-01						
		238.63	8.201E-01	(P	8.707E-02	3.89E-02	G K
							Energy duplication
		77.11	7.690E-01	} P	3.800E-01	9.99E-02	G
		74.81	1.191E+00	+ P	7.402E-01	2.39E-01	G
PB-214	4.4452E-01						
		351.99	4.495E-01	(P	7.540E-02	3.33E-02	G K
		295.22	4.349E-01	*(P	1.275E-01	4.73E-02	G
							Energy duplication
		77.11	1.335E-02	} P	9.017E-01	2.20E-01	G
		241.92	2.585E-01	-	3.610E-01	1.06E-01	G
BI-212	5.1051E-01						
		727.17	4.750E-01	(P	2.979E-01	1.11E-01	G K
		1620.56	6.630E-01	(P	6.730E-01	2.48E-01	G
		785.42	4.918E-01	%	1.764E+00	5.22E-01	G
BI-214	4.9192E-01						
		609.32	4.902E-01	(P	8.395E-02	3.99E-02	G K
		1764.51	4.968E-01	(P	9.756E-02	6.78E-02	G
		1120.28	6.484E-01	+ P	2.679E-01	1.08E-01	G
RA-224	8.9219E-01						
		241.00	8.922E-01	(	1.024E+00	3.16E-01	G
RA-226	1.6950E+00						
		185.99	1.695E+00	*(P	1.055E+00	3.81E-01	G
AC-228	7.9797E-01						
		911.07	7.693E-01	(P	1.111E-01	5.83E-02	G K
		968.90	1.152E+00	+ P	3.018E-01	1.47E-01	G
		338.40	8.673E-01	(P	2.521E-01	1.01E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.6889E-01
                          236.00-1.689E-01 %(  3.212E-01 9.76E-02 G K
                          256.25-4.701E-02 % P 4.867E-01 1.45E-01 G

PA-234      -4.8757E-03
                           98.44-4.876E-03 %(P 2.219E-01 6.61E-02 G K
                          946.00-1.269E-02 % P 1.809E-01 5.18E-02 G
                          131.28-1.829E-02 % P 1.761E-01 5.25E-02 G
                           94.67-1.763E-01 % P 4.196E-01 1.27E-01 G
                          883.24-9.757E-03 %   2.849E-01 8.12E-02 G
                          926.70 4.577E-02 &   3.101E-01 8.97E-02 G
                          569.26-3.244E-03 % P 2.643E-01 7.50E-02 G

TH-234       2.3136E-01
                           63.29-1.139E+00 &(P 6.263E+00 1.87E+00 G K
                           92.80 1.529E+00 % P 2.136E+00 6.51E-01 G
                           92.38 2.312E+00  (P 2.489E+00 7.64E-01 G

AM-241      -1.8989E-02
                           59.54-1.899E-02 &(P 1.098E+00 3.26E-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:                      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 - 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	-3.5852E-02	-3.8391E-02	2.9556E-01	2.9557E-01	3.135E-01
K-40		1.6349E+01	1.6349E+01	1.3417E+00	1.6435E+00	
MN-54	#A	4.9807E-03	5.0393E-03	3.4376E-02	3.4378E-02	3.894E-02
CO-57	#B	-2.0067E-03	-2.0340E-03	5.5181E-02	5.5181E-02	5.218E-02
CO-60	#	9.6391E-02	9.6574E-02	4.1628E-02	4.2004E-02	
Sr-85	#A	-1.0808E-02	-1.1434E-02	3.7353E-02	3.7359E-02	3.943E-02
Kr-85	#A	-2.5286E+02	-2.5287E+02	8.1571E+02	8.1584E+02	9.107E+02
Y-88	#B	1.3787E-03	1.4267E-03	1.9786E-02	1.9786E-02	2.443E-02
NB-94	#B	-8.3833E-03	-8.3833E-03	2.9951E-02	2.9954E-02	3.397E-02
Ag-108M	#B	3.0406E-04	3.0409E-04	4.3001E-02	4.3001E-02	4.934E-02
CD-109	#A	8.8012E-01	8.8724E-01	1.7605E+00	1.7611E+00	1.921E+00
SN-113	#B	8.4297E-03	8.7016E-03	3.9142E-02	3.9146E-02	4.275E-02
SB-125	#F	1.3094E-01	1.3141E-01	9.1450E-02	9.1768E-02	9.533E-02
I-131	#B	5.6812E-03	8.9491E-03	4.9230E-02	4.9233E-02	3.528E-02
CS-134	#B	-2.0381E-03	-2.0480E-03	7.6923E-02	7.6923E-02	8.573E-02
CS-137	#A	2.1543E-02	2.1550E-02	3.6197E-02	3.6219E-02	3.961E-02
CE-139	#A	-4.9768E-03	-5.1108E-03	4.1143E-02	4.1144E-02	4.473E-02
EU-152	#B	-6.4282E-03	-6.4333E-03	1.8225E-01	1.8225E-01	1.489E-01
EU-154	#B	-5.1769E-03	-5.1830E-03	9.5788E-02	9.5788E-02	1.069E-01
EU-155	#B	1.0274E-01	1.0294E-01	2.1564E-01	2.1572E-01	2.369E-01
HG-203	#B	-1.6733E-03	-1.8098E-03	3.8407E-02	3.8407E-02	3.930E-02
TL-208		2.1310E-01	2.1310E-01	4.6996E-02	4.8597E-02	
PB-212		8.3568E-01	8.3568E-01	1.1884E-01	1.2836E-01	
PB-214		4.4452E-01	4.4452E-01	8.7724E-02	9.1442E-02	
BI-212		5.1051E-01	5.1051E-01	3.3763E-01	3.3892E-01	
BI-214		4.9192E-01	4.9192E-01	1.1727E-01	1.2070E-01	
RA-224	A	8.9219E-01	8.9219E-01	9.4665E-01	9.4806E-01	1.024E+00
RA-226	#	1.6950E+00	1.6950E+00	1.1431E+00	1.1473E+00	
AC-228		7.9797E-01	7.9797E-01	1.6610E-01	1.7244E-01	
TH-227	#B	-1.6889E-01	-1.6889E-01	2.9283E-01	2.9300E-01	3.212E-01
PA-234	#B	-4.8757E-03	-4.8757E-03	3.8256E-01	3.8256E-01	2.219E-01
TH-234	#B	2.3136E-01	2.3136E-01	2.2942E-01	2.2978E-01	6.263E+00
AM-241	#A	-1.8988E-02	-1.8989E-02	1.1766E+00	1.1766E+00	1.098E+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

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1753.An1

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

Total Activity (86.4 to 2000.7 keV) 2.2326000E+01 pCi/gm
Total Decayed Activity (86.4 to 2000.7 keV) 2.2326193E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_13DEC2005_1830.An1

Sample description
FSS-NOL-05-02-028-F

Spectrum Filename: C:\GammaVision\Spectra\103F_13DEC2005_1830.An1

Acquisition information
Start time: 13-Dec-2005 18:30:30
Live time: 2000
Real time: 2003
Dead time: 0.16 %
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/channel^2

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: 2.0240E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0240E+03) =
4.9407E+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	08-Dec-2005 10:16:00
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. 22 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1918

***** 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	97.	29.14	0.99	9.052E-03	74.81	9.600	7.432E-01	PB212
77.30	175.	16.10	0.99	1.011E-02	77.11	17.500	7.246E-01	PB212
93.14	105.	36.90	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.14	104.	36.97	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.47	105.	34.55	0.68	2.430E-02				
178.92	72.	39.39	0.00	2.586E-02				
186.48	158.	20.92	0.94	2.565E-02	185.99	3.280	1.148E+00	RA226
209.46	121.	24.00	1.08	2.471E-02				
238.69	1090.	3.60	1.09	2.320E-02	238.63	43.100	7.197E-01	PB212
241.73	167.	15.38	1.09	2.304E-02	241.00	3.900	1.239E+00	RA224
					241.92	7.470	6.482E-01	PB214
269.80	127.	26.55	1.24	2.153E-02				
295.30	181.	14.50	0.97	2.024E-02	295.22	19.200	3.039E-01	PB214
300.25	87.	28.01	0.99	2.001E-02				
338.38	234.	11.48	1.14	1.830E-02	338.40	12.010	7.075E-01	AC228
351.71	377.	9.01	0.97	1.776E-02	351.99	37.100	3.766E-01	PB214
463.14	68.	31.17	0.98	1.426E-02				
463.14	68.	31.17	0.98	1.426E-02	463.51	10.000	3.120E-01	SB125
510.85	206.	13.74	1.51	1.317E-02	510.72	22.500	4.031E-01	TL208
582.88	409.	6.91	1.07	1.185E-02	583.14	86.000	2.653E-01	TL208
609.11	317.	8.39	1.22	1.144E-02	609.32	46.090	3.932E-01	BI214
661.85	90.	24.19	1.38	1.072E-02	661.62	84.620	6.523E-02	CS137
726.86	121.	15.88	1.56	9.968E-03	727.17	11.800	6.831E-01	BI212
795.26	67.	28.59	1.60	9.306E-03				
795.26	67.	28.59	1.60	9.306E-03	795.76	85.400	5.669E-02	CS134

859.29	62.	27.18	1.25	8.777E-03				
910.91	265.	11.84	1.24	8.402E-03	911.07	29.000	7.164E-01	AC228
964.23	52.	23.62	1.54	8.054E-03	964.00	14.580	2.904E-01	EU152
968.62	154.	10.10	1.54	8.027E-03	968.90	17.460	7.310E-01	AC228
1119.69	58.	23.07	1.63	7.212E-03	1120.28	15.040	3.561E-01	BI214
1172.71	157.	15.84	1.94	6.974E-03	1173.23	99.860	1.486E-01	CO60
1332.47	141.	13.18	1.29	6.349E-03	1332.51	99.980	1.456E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1407.65	15.	41.51	1.81	6.096E-03	1408.08	21.210	PBC<MDA	EU152
1460.36	1416.	2.71	1.83	5.933E-03	1460.75	10.700	1.470E+01	K40
1763.58	62.	12.40	2.81	5.142E-03	1764.51	15.920	5.035E-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	
418.08	209.46	361.	121.	0.060	71.99	1.075	AC-228	
538.76	269.80	387.	127.	0.063	79.66	1.241	AC-228	s
599.65	300.25	229.	87.	0.043	84.03	0.995	PB-212	s
1717.63	859.29	74.	62.	0.031	81.54	1.253	TL-208	s
1927.21	964.37	52.	48.	0.024	76.38	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
PB-212	148.79	74.81	376.	97.	0.048	87.42	0.993D
PB-212	153.39	77.11	375.	175.	0.087	48.29	0.995A
RA-226	372.12	186.48	456.	145.	0.072	62.77	0.935
PB-212	476.42	238.63	238.	1077.	0.539	10.82	1.093D
RA-224	481.16	241.00	854.	112.	0.056	115.06	1.095D
PB-214	483.00	241.92	324.	99.	0.049	63.26	1.095A
PB-214	589.74	295.30	246.	177.	0.088	43.51	0.970
AC-228	675.91	338.38	204.	233.	0.116	34.43	1.137
PB-214	702.56	351.71	274.	371.	0.186	27.03	0.972s
SB-125	925.20	463.04	146.	55.	0.027	99.20	1.500s
TL-208	1020.81	510.85	206.	179.	0.089	41.21	1.513s
TL-208	1164.85	582.88	130.	405.	0.202	20.74	1.067
BI-214	1217.33	609.11	136.	311.	0.155	25.16	1.221
CS-137	1322.78	661.85	129.	89.	0.044	72.57	1.376
BI-212	1452.80	726.86	89.	120.	0.060	47.63	1.563s
CS-134	1589.16	795.05	77.	36.	0.018	114.12	1.500s
AC-228	1820.85	910.91	167.	261.	0.131	35.52	1.240s
EU-152	1927.81	964.40	94.	42.	0.021	106.34	1.538
AC-228	1936.81	968.90	42.	153.	0.077	30.06	1.540D
BI-214	2238.35	1119.69	67.	58.	0.029	69.21	1.634s
CO-60	2344.37	1172.71	129.	155.	0.077	47.52	1.939

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2663.85	1332.47	55.	138.	0.069	39.54	1.293s
EU-152	2814.19	1407.65	11.	15.	0.007	124.54	1.812s
K-40	2919.59	1460.36	34.	1397.	0.699	8.14	1.829
BI-214	3525.92	1763.58	3.	62.	0.031	37.21	2.813s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		5.5199E-02					
			477.56	5.520E-02	&(	2.761E-01 8.14E-02	G
K-40		1.4698E+01					
			1460.75	1.470E+01	(P	3.132E-01 4.04E-01	G
MN-54		1.8187E-02					
			834.81	1.819E-02	%(P	3.595E-02 1.09E-02	G
CO-57		-1.2810E-03					
			122.07	-1.281E-03	%(P	4.253E-02 1.26E-02	G K
			136.43	-4.394E-02	%	3.380E-01 1.01E-01	G
CO-60		1.4709E-01					
			1332.51	1.456E-01	@(P	3.922E-02 1.96E-02	G K
			1173.23	1.486E-01	(P	5.353E-02 2.38E-02	G K
Sr-85		-2.3193E-02					
			514.00	-2.319E-02	%(	4.438E-02 1.35E-02	G
Kr-85		-5.0585E+02					
			513.99	-5.059E+02	%(	9.677E+02 2.94E+02	G
Y-88		-8.7880E-05					
			1836.01	-8.788E-05	%(P	3.069E-02 8.15E-03	G K
			898.02	-3.637E-03	& P	3.939E-02 1.13E-02	G
NB-94		8.9525E-03					
			871.10	8.952E-03	%(	3.086E-02 9.12E-03	G K
			702.50	-6.945E-04	%	3.831E-02 1.11E-02	G K
Ag-108M		-1.8694E-02					
			722.95	-1.869E-02	%(	4.702E-02 1.42E-02	G K
			614.37	-2.488E-03	% P	3.587E-02 1.04E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	1.533E-03	%	3.380E-02	9.89E-03	G
CD-109	-6.4211E-02						
		88.04	-6.421E-02	%(	1.890E+00	5.64E-01	G
SN-113	-1.4100E-02						
		391.71	-1.410E-02	%(	4.800E-02	1.44E-02	G K
		255.04	1.092E-01	&	1.343E+00	3.97E-01	G
SB-125	7.3501E-02						
		427.95	1.105E-02	&(P	9.791E-02	2.88E-02	G K
		600.77	1.674E-02	% P	1.643E-01	4.78E-02	G
		636.15	1.743E-02	& P	2.800E-01	8.10E-02	G
		463.51	2.584E-01	*(P	2.774E-01	8.74E-02	G
		176.29	-2.163E-01	%	5.680E-01	1.72E-01	G
I-131	8.9020E-03						
		364.48	8.902E-03	%(P	5.335E-02	1.58E-02	G K
		636.97	4.522E-02	%	6.609E-01	1.91E-01	G
		284.29	1.787E-01	% P	7.447E-01	2.22E-01	G
CS-134	1.2892E-02						
		604.66	-2.543E-03	%(	7.811E-02	2.32E-02	G K
		795.76	3.053E-02	*(P	3.682E-02	1.16E-02	G
		569.29	5.025E-03	& P	1.812E-01	5.20E-02	G
		801.84	-1.383E-01	% P	3.944E-01	1.16E-01	G
CS-137	6.5229E-02						
		661.62	6.523E-02	(P	4.101E-02	1.60E-02	G
CE-139	2.4423E-03						
		165.85	2.442E-03	%(	4.409E-02	1.31E-02	G
EU-152	8.8938E-02						
		121.78	2.314E-02	%(P	1.346E-01	4.03E-02	G K
		344.30	9.872E-03	& P	9.887E-02	2.91E-02	G
		1408.08	7.572E-02	?(	9.450E-02	3.14E-02	G
		964.00	2.401E-01	&(P	2.725E-01	8.62E-02	G
		1112.07	-5.847E-03	%	3.231E-01	9.27E-02	G
		778.90	5.792E-03	%	2.509E-01	7.19E-02	G
EU-154	-2.1394E-02						
		123.10	-2.139E-02	%(	1.053E-01	3.16E-02	G K
		1274.80	-7.522E-03	&	1.042E-01	2.96E-02	G
		723.30	-8.898E-02	%	2.275E-01	6.85E-02	G
		1004.80	-8.847E-03	&	2.080E-01	5.95E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	2.0875E-02						
		86.45	2.088E-02	%(	2.244E-01	6.71E-02	G K
		105.31	4.702E-02	&	2.209E-01	6.63E-02	G
HG-203	-1.1419E-03						
		279.17	-1.142E-03	&(P	3.661E-02	1.08E-02	G K
		72.87	-3.512E-01	% P	2.252E+00	6.75E-01	G
		70.83	-2.072E-01	%	4.007E+00	1.19E+00	G
		82.50	-9.586E-01	%	3.785E+00	1.14E+00	G
TL-208	2.6525E-01						
		583.14	2.653E-01	(P	3.664E-02	1.85E-02	G
		510.72	4.031E-01	+ P	1.568E-01	6.36E-02	G
PB-212	7.2391E-01						
		238.63	7.193E-01	(P	4.986E-02	2.62E-02	G K
							Energy duplication
		77.11	6.599E-01	} P	3.506E-01	1.06E-01	G
		74.81	7.432E-01	(P	7.154E-01	2.24E-01	G
PB-214	3.8243E-01						
		351.99	3.766E-01	@(P	8.088E-02	3.44E-02	G K
		295.22	3.039E-01	- P	1.302E-01	4.51E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.139E-01	0.00E+00	G
		241.92	3.824E-01	}	3.362E-01	8.06E-02	G
BI-212	6.8312E-01						
		727.17	6.831E-01	(P	2.646E-01	1.09E-01	G K
		1620.56	2.878E-01	% P	9.059E-01	2.64E-01	G
		785.42	5.604E-01	%	1.507E+00	4.51E-01	G
BI-214	3.8411E-01						
		609.32	3.932E-01	(P	7.237E-02	3.37E-02	G K
		1764.51	5.035E-01	+ P	9.086E-02	6.57E-02	G
		1120.28	3.561E-01	&(P	2.515E-01	8.48E-02	G
RA-224	8.3457E-01						
							Derived Ave Activity
		241.00	8.346E-01	}(	1.031E+00	3.28E-01	G
RA-226	1.1480E+00						
		185.99	1.148E+00	(P	8.109E-01	2.62E-01	G
AC-228	7.1881E-01						
		911.07	7.164E-01	@(P	1.722E-01	8.59E-02	G K
		968.90	7.306E-01	(P	1.562E-01	7.33E-02	G
		338.40	7.075E-01	(P	2.105E-01	8.16E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -5.2604E-02
                          236.00-5.260E-02 &(  3.443E-01 1.03E-01 G K
                          256.25 5.833E-02 % P 4.212E-01 1.25E-01 G

PA-234      -2.9913E-03
                           98.44-2.991E-03 &(P 2.182E-01 6.50E-02 G K
                          946.00-8.631E-05 & P 2.364E-01 6.84E-02 G
                          131.28-4.987E-02 & P 1.985E-01 5.97E-02 G
                           94.67-8.589E-04 % P 3.816E-01 1.14E-01 G
                          883.24-3.718E-03 &   2.890E-01 8.25E-02 G
                          926.70 8.541E-02 %   2.649E-01 7.84E-02 G
                          569.26 2.376E-02 & P 2.713E-01 7.85E-02 G

TH-234       1.1699E+00
                           63.29 1.170E+00 %(P 5.765E+00 1.72E+00 G K
                           92.80 1.413E+00 % P 2.006E+00 6.11E-01 G
                           92.38 1.676E+00 % P 2.372E+00 7.22E-01 G

AM-241       3.1087E-01
                           59.54 3.109E-01 %(P 1.005E+00 3.03E-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:                      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 - 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	5.1500E-02	5.5199E-02	2.4415E-01	2.4417E-01	2.576E-01
K-40		1.4698E+01	1.4698E+01	1.2124E+00	1.4826E+00	
MN-54	#A	1.7973E-02	1.8187E-02	3.2780E-02	3.2797E-02	3.553E-02
CO-57	#B	-1.2635E-03	-1.2810E-03	4.7629E-02	4.7629E-02	4.195E-02
CO-60		1.4681E-01	1.4709E-01	4.6159E-02	4.6942E-02	
Sr-85	#A	-2.1906E-02	-2.3193E-02	4.0488E-02	4.0511E-02	4.191E-02
Kr-85	#A	-5.0583E+02	-5.0585E+02	8.8286E+02	8.8335E+02	9.676E+02
Y-88	#B	-8.4879E-05	-8.7880E-05	3.0799E-03	3.0799E-03	2.964E-02
NB-94	#B	8.9525E-03	8.9525E-03	2.7354E-02	2.7359E-02	3.086E-02
Ag-108M	#B	-1.8693E-02	-1.8694E-02	4.2474E-02	4.2488E-02	4.701E-02
CD-109	#A	-6.3688E-02	-6.4211E-02	1.6932E+00	1.6932E+00	1.875E+00
SN-113	#B	-1.3653E-02	-1.4100E-02	4.3054E-02	4.3062E-02	4.648E-02
SB-125	#B	7.3232E-02	7.3501E-02	7.4602E-02	7.4724E-02	9.756E-02
I-131	#B	5.6160E-03	8.9020E-03	4.7317E-02	4.7320E-02	3.366E-02
CS-134	#B	1.2829E-02	1.2892E-02	1.4748E-02	1.4767E-02	7.772E-02
CS-137		6.5207E-02	6.5229E-02	4.8079E-02	4.8228E-02	
CE-139	#A	2.3773E-03	2.4423E-03	3.9419E-02	3.9419E-02	4.292E-02
EU-152	#B	8.8867E-02	8.8938E-02	9.5800E-02	9.5927E-02	1.345E-01
EU-154	#B	-2.1368E-02	-2.1394E-02	9.4868E-02	9.4876E-02	1.052E-01
EU-155	#B	2.0833E-02	2.0875E-02	2.0144E-01	2.0144E-01	2.240E-01
HG-203	#B	-1.0546E-03	-1.1419E-03	3.3287E-02	3.3287E-02	3.381E-02
TL-208		2.6525E-01	2.6525E-01	5.5602E-02	5.7695E-02	
PB-212		7.2391E-01	7.2391E-01	7.9169E-02	8.9634E-02	
PB-214		3.8243E-01	3.8243E-01	1.0492E-01	1.0724E-01	
BI-212	#	6.8312E-01	6.8312E-01	3.2667E-01	3.2907E-01	
BI-214		3.8411E-01	3.8411E-01	9.8669E-02	1.0116E-01	
RA-224	A	8.3457E-01	8.3457E-01	9.6026E-01	9.6148E-01	
RA-226		1.1479E+00	1.1480E+00	7.8502E-01	7.8785E-01	
AC-228		7.1881E-01	7.1881E-01	1.3964E-01	1.4574E-01	
TH-227	#B	-5.2604E-02	-5.2604E-02	3.0912E-01	3.0913E-01	3.443E-01
PA-234	#B	-2.9913E-03	-2.9913E-03	5.5785E-01	5.5785E-01	2.182E-01
TH-234	#B	1.1699E+00	1.1699E+00	5.1731E+00	5.1735E+00	5.765E+00
AM-241	#A	3.1087E-01	3.1087E-01	9.0781E-01	9.0798E-01	1.005E+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) 2.0050068E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.0050381E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_23FEB2006_1140.An1

Sample description
FSS-NOL-05-02-009-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\103F_23FEB2006_1140.An1

Acquisition information
Start time: 23-Feb-2006 11:43:06
Live time: 2000
Real time: 2003
Dead time: 0.15 %
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/channel^2

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: 1.7340E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7340E+03) =
5.7670E+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	21-Feb-2006 15:33:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1621

***** 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	146.	18.43	0.99	9.052E-03	74.81	9.600	1.313E+00	PB212
77.24	132.	17.10	0.99	1.011E-02	77.11	17.500	7.579E-01	PB212
					77.11	10.700	1.240E+00	PB214
92.59	116.	33.93	1.41	1.638E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.07	131.	23.22	1.13	2.566E-02	185.99	3.280	PBC<MDA	RA226
209.51	100.	32.15	1.12	2.470E-02				
238.71	991.	3.72	1.09	2.320E-02	238.63	43.100	7.634E-01	PB212
241.99	151.	16.56	1.10	2.302E-02	241.00	3.900	1.307E+00	RA224
					241.92	7.470	6.840E-01	PB214
270.38	108.	26.08	1.72	2.150E-02				
278.66	74.	36.18	0.88	2.108E-02				
278.66	74.	36.18	0.88	2.108E-02	279.17	81.500	PBC<MDA	HG203
295.15	241.	9.48	1.13	2.026E-02	295.22	19.200	4.751E-01	PB214
327.82	103.	26.25	0.90	1.875E-02				
338.28	202.	14.26	1.08	1.831E-02	338.40	12.010	7.127E-01	AC228
351.85	395.	8.73	1.11	1.776E-02	351.99	37.100	4.605E-01	PB214
462.86	63.	29.88	0.72	1.426E-02				
462.86	63.	29.88	0.72	1.426E-02	463.51	10.000	3.403E-01	SB125
510.73	160.	17.42	1.29	1.317E-02	510.72	22.500	3.519E-01	TL208
583.07	320.	8.89	1.31	1.185E-02	583.14	86.000	2.415E-01	TL208
609.22	296.	8.61	1.47	1.144E-02	609.32	46.090	4.274E-01	BI214
661.80	50.	33.53	0.91	1.072E-02	661.62	84.620	4.202E-02	CS137
726.87	91.	22.23	0.90	9.968E-03	727.17	11.800	6.005E-01	BI212
794.53	47.	33.90	1.31	9.312E-03				
794.53	47.	33.90	1.31	9.312E-03	795.76	85.400	4.581E-02	CS134
860.23	66.	25.17	1.68	8.770E-03				

910.89	246.	12.37	1.92	8.403E-03	911.07	29.000	7.745E-01	AC228
963.98	34.	31.87	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152
968.84	142.	10.21	1.54	8.026E-03	968.90	17.460	7.912E-01	AC228
1120.44	82.	25.00	1.44	7.211E-03	1120.28	15.040	5.727E-01	BI214
1460.44	1357.	2.82	1.74	5.933E-03	1460.75	10.700	1.643E+01	K40
1619.86	18.	31.98	1.34	5.488E-03	1620.56	2.750	9.066E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1763.78	70.	11.95	1.19	5.143E-03	1764.51	15.920	6.353E-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	
418.18	209.51	407.	100.	0.050	96.46	1.124	AC-228	
539.90	270.38	272.	108.	0.054	78.25	1.721	AC-228	s
556.46	278.66	254.	74.	0.037	108.55	0.881	SB-126	l
654.79	327.82	235.	103.	0.052	78.76	0.900	AC-228	s
1322.68	661.80	87.	50.	0.025	100.58	0.911	CS-137	l
1588.11	794.53	69.	48.	0.024	86.21	1.308	AC-228	
1719.51	860.23	70.	66.	0.033	75.51	1.680	TL-208	
1926.98	964.08	43.	34.	0.017	95.61	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 keV
PB-212	148.79	74.81	308.	146.	0.073	55.29	0.993D
PB-212	153.39	77.11	336.	132.	0.066	51.30	0.995A
TH-234	185.24	93.03	809.	125.	0.062	87.57	1.500s
TH-234	185.27	93.05	805.	111.	0.056	96.22	1.500s
RA-226	371.38	186.11	624.	133.	0.066	76.11	1.500
PB-212	476.72	238.78	552.	973.	0.487	14.72	1.070
RA-224	482.41	241.63	581.	152.	0.076	71.42	1.500
PB-214	589.09	294.97	316.	213.	0.106	44.33	1.071
AC-228	675.70	338.28	234.	201.	0.101	42.79	1.081
PB-214	702.84	351.85	262.	389.	0.195	26.20	1.111
SB-125	924.71	462.79	112.	41.	0.021	115.33	1.500s
TL-208	1020.58	510.73	204.	134.	0.067	52.26	1.290s
TL-208	1165.24	583.07	148.	316.	0.158	26.68	1.306
BI-214	1217.54	609.22	128.	289.	0.144	26.85	1.474
BI-212	1452.80	726.87	103.	91.	0.045	66.69	0.903s
AC-228	1820.81	910.89	154.	242.	0.121	37.12	1.920s
AC-228	1936.61	968.80	92.	186.	0.093	36.95	1.663
BI-214	2239.86	1120.44	100.	80.	0.040	75.00	1.442s
K-40	2919.75	1460.44	46.	1338.	0.669	8.46	1.740
BI-212	3238.52	1619.86	4.	18.	0.009	95.94	1.340s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3526.31	1763.78	3.	67.	0.033	35.86	1.190s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-9.4928E-02					
			477.56	-9.493E-02	&(	3.258E-01 9.70E-02	G
K-40		1.6432E+01					
			1460.75	1.643E+01	(P	4.202E-01 4.70E-01	G
MN-54		1.9343E-02					
			834.81	1.934E-02	%(P	3.479E-02 1.07E-02	G
CO-57		4.9487E-03					
			122.07	4.949E-03	&(P	5.213E-02 1.56E-02	G K
			136.43	1.253E-02	&	3.051E-01 9.04E-02	G
CO-60		3.7768E-03					
			1332.51	3.777E-03	%(P	4.388E-02 1.23E-02	G K
			1173.23	1.602E-02	% P	4.897E-02 1.45E-02	G K
Sr-85		-2.2497E-02					
			514.00	-2.250E-02	%(	4.494E-02 1.36E-02	G
Kr-85		-5.0950E+02					
			513.99	-5.095E+02	%(	1.017E+03 3.09E+02	G
Y-88		-2.6226E-03					
			1836.01	-2.623E-03	%(P	2.306E-02 6.01E-03	G K
			898.02	-1.327E-03	& P	3.573E-02 1.00E-02	G
NB-94		-7.1420E-03					
			871.10	-7.142E-03	&(	3.989E-02 1.16E-02	G K
			702.50	1.583E-03	%	3.709E-02 1.07E-02	G K
Ag-108M		-1.7942E-04					
			722.95	-1.794E-04	%(	3.902E-02 1.11E-02	G K
			614.37	-8.725E-03	% P	4.084E-02 1.20E-02	G
			433.93	-5.542E-03	%	3.281E-02 9.65E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-2.2719E-02						
		88.04	-2.272E-02	%(	1.832E+00	5.45E-01	G
SN-113	2.0066E-02						
		391.71	2.007E-02	%(	4.862E-02	1.47E-02	G K
		255.04	1.260E-01	%	1.660E+00	4.92E-01	G
SB-125	5.6703E-02						
		427.95	-6.476E-05	%(P	1.163E-01	3.39E-02	G K
		600.77	7.597E-02	% P	1.639E-01	4.96E-02	G
		636.15	8.396E-02	% P	3.012E-01	8.91E-02	G
		463.51	2.247E-01	(P	2.854E-01	8.91E-02	G
		176.29	-9.992E-03	%	5.279E-01	1.56E-01	G
I-131	-6.5358E-03						
		364.48	-6.536E-03	%(P	4.790E-02	1.41E-02	G K
		636.97	1.524E-01	%	5.258E-01	1.56E-01	G
		284.29	-1.022E-01	& P	5.838E-01	1.73E-01	G
CS-134	-1.0103E-03						
		604.66	-1.010E-03	%(	3.497E-02	1.01E-02	G K
		795.76	-8.925E-04	% P	4.106E-02	1.17E-02	G
		569.29	1.593E-02	& P	1.964E-01	5.65E-02	G
		801.84	3.075E-02	& P	4.324E-01	1.24E-01	G
CS-137	2.3562E-02						
		661.62	2.356E-02	%(P	4.190E-02	1.28E-02	G
CE-139	1.0974E-02						
		165.85	1.097E-02	&(	4.346E-02	1.30E-02	G
EU-152	1.1850E-02						
		121.78	1.185E-02	&(P	1.524E-01	4.55E-02	G K
		344.30	3.462E-02	% P	1.081E-01	3.24E-02	G
		1408.08	2.787E-02	%	1.558E-01	4.43E-02	G
		964.00	1.318E-01	% P	3.403E-01	1.02E-01	G
		1112.07	9.707E-02	&	3.067E-01	9.09E-02	G
		778.90	8.601E-02	%	2.446E-01	7.29E-02	G
EU-154	3.8815E-03						
		123.10	3.882E-03	%(	1.045E-01	3.11E-02	G K
		1274.80	-2.180E-02	%	1.423E-01	4.13E-02	G
		723.30	3.669E-02	&	1.633E-01	4.78E-02	G
		1004.80	-2.073E-03	%	1.839E-01	5.13E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	9.0636E-02						
		86.45	9.064E-02	&(	1.834E-01	5.57E-02	G K
		105.31	8.375E-03	%	2.383E-01	7.10E-02	G
HG-203	7.5062E-03						
		279.17	7.506E-03	%(P	4.116E-02	1.22E-02	G K
		72.87	-1.185E+00	% P	2.448E+00	7.42E-01	G
		70.83	-3.376E-02	%	5.051E+00	1.51E+00	G
		82.50	-8.213E-01	&	3.945E+00	1.18E+00	G
TL-208	2.4152E-01						
		583.14	2.415E-01	(P	4.549E-02	2.18E-02	G
		510.72	3.519E-01	+ P	1.822E-01	7.35E-02	G
PB-212	7.5826E-01						
		238.63	7.584E-01	(P	8.745E-02	3.77E-02	G K
							Energy duplication
		77.11	5.824E-01	} P	3.880E-01	9.96E-02	G
		74.81	1.313E+00	+ P	7.577E-01	2.47E-01	G
PB-214	4.4901E-01						
		351.99	4.605E-01	(P	9.243E-02	4.08E-02	G K
		295.22	4.269E-01	(P	1.715E-01	6.42E-02	G
							Energy duplication
		77.11	1.398E-01	} P	9.160E-01	2.23E-01	G
		241.92	-1.780E-02	%	6.785E-01	2.02E-01	G
BI-212	6.5837E-01						
		727.17	6.005E-01	*(P	3.320E-01	1.34E-01	G K
		1620.56	9.066E-01	(P	6.473E-01	2.91E-01	G
		785.42	7.728E-01	%	1.720E+00	5.20E-01	G
BI-214	4.2663E-01						
		609.32	4.266E-01	(P	8.205E-02	3.90E-02	G K
		1764.51	6.353E-01	+ P	1.061E-01	7.96E-02	G
		1120.28	5.727E-01	+ P	3.548E-01	1.47E-01	G
RA-224	1.3193E+00						
		241.00	1.319E+00	(	9.966E-01	3.14E-01	G
RA-226	1.2293E+00						
		185.99	1.229E+00	(P	1.102E+00	3.42E-01	G
AC-228	8.3952E-01						
		911.07	7.745E-01	(P	1.936E-01	9.72E-02	G K
		968.90	1.035E+00	(P	2.636E-01	1.28E-01	G
		338.40	7.127E-01	(P	2.624E-01	1.02E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227       1.3668E-02
                          236.00 1.367E-02 %(  3.227E-01 9.57E-02 G K
                          256.25-1.921E-01 % P 5.220E-01 1.57E-01 G

PA-234      -4.1851E-02
                           98.44-4.185E-02 %(P 2.235E-01 6.69E-02 G K
                          946.00 4.268E-02 % P 1.557E-01 4.56E-02 G
                          131.28 5.228E-02 & P 1.886E-01 5.67E-02 G
                           94.67-9.982E-02 & P 4.108E-01 1.23E-01 G
                          883.24 4.770E-02 %   2.950E-01 8.55E-02 G
                          926.70 1.341E-01 %   2.544E-01 7.79E-02 G
                          569.26 2.359E-02 & P 2.909E-01 8.37E-02 G

TH-234       5.6008E-01
                           63.29-1.516E+00 %(P 6.661E+00 1.99E+00 G K
                           92.80 1.753E+00  (P 2.130E+00 6.52E-01 G
                           92.38 2.318E+00 *(P 2.515E+00 7.72E-01 G

AM-241      -9.9749E-02
                           59.54-9.975E-02 %(P 1.148E+00 3.42E-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:                      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 - 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	-9.2687E-02	-9.4928E-02	2.9113E-01	2.9118E-01	3.181E-01
K-40		1.6432E+01	1.6432E+01	1.4099E+00	1.7023E+00	
MN-54	#A	1.9264E-02	1.9343E-02	3.1953E-02	3.1973E-02	3.465E-02
CO-57	#B	4.9254E-03	4.9487E-03	4.6682E-02	4.6683E-02	5.189E-02
CO-60	#B	3.7743E-03	3.7768E-03	3.7002E-02	3.7003E-02	4.386E-02
Sr-85	#A	-2.2059E-02	-2.2497E-02	4.0950E-02	4.0971E-02	4.407E-02
Kr-85	#A	-5.0949E+02	-5.0950E+02	9.2700E+02	9.2747E+02	1.017E+03
Y-88	#B	-2.5914E-03	-2.6226E-03	1.9448E-02	1.9448E-02	2.279E-02
NB-94	#B	-7.1420E-03	-7.1420E-03	3.4941E-02	3.4943E-02	3.989E-02
Ag-108M	#B	-1.7941E-04	-1.7942E-04	3.3421E-02	3.3421E-02	3.902E-02
CD-109	#A	-2.2656E-02	-2.2719E-02	1.6339E+00	1.6339E+00	1.827E+00
SN-113	#B	1.9845E-02	2.0066E-02	4.3979E-02	4.3995E-02	4.808E-02
SB-125	#B	5.6631E-02	5.6703E-02	6.7428E-02	6.7508E-02	1.161E-01
I-131	#B	-5.5769E-03	-6.5358E-03	4.8563E-02	4.8564E-02	4.087E-02
CS-134	#B	-1.0086E-03	-1.0103E-03	3.0226E-02	3.0226E-02	3.491E-02
CS-137	#A	2.3560E-02	2.3562E-02	3.8349E-02	3.8374E-02	4.189E-02
CE-139	#A	1.0873E-02	1.0974E-02	3.9113E-02	3.9119E-02	4.306E-02
EU-152	#B	1.1847E-02	1.1850E-02	1.3637E-01	1.3638E-01	1.524E-01
EU-154	#B	3.8799E-03	3.8815E-03	9.3273E-02	9.3273E-02	1.044E-01
EU-155	#B	9.0572E-02	9.0636E-02	1.6698E-01	1.6706E-01	1.833E-01
HG-203	#B	7.3034E-03	7.5062E-03	3.6748E-02	3.6751E-02	4.004E-02
TL-208		2.4152E-01	2.4152E-01	6.5306E-02	6.6794E-02	
PB-212		7.5826E-01	7.5826E-01	1.1297E-01	1.2124E-01	
PB-214		4.4901E-01	4.4901E-01	1.1768E-01	1.2053E-01	
BI-212		6.5837E-01	6.5837E-01	3.8596E-01	3.8785E-01	
BI-214		4.2663E-01	4.2663E-01	1.1710E-01	1.1969E-01	
RA-224	#	1.3193E+00	1.3193E+00	9.4226E-01	9.4537E-01	9.966E-01
RA-226	#	1.2293E+00	1.2293E+00	1.0269E+00	1.0294E+00	1.102E+00
AC-228		8.3952E-01	8.3952E-01	1.9051E-01	1.9665E-01	
TH-227	#B	1.3668E-02	1.3668E-02	2.8708E-01	2.8708E-01	3.227E-01
PA-234	#B	-4.1851E-02	-4.1851E-02	2.1754E-01	2.1755E-01	2.235E-01
TH-234	#B	5.6008E-01	5.6008E-01	5.5991E-01	5.6077E-01	6.661E+00
AM-241	#A	-9.9748E-02	-9.9749E-02	1.0653E+00	1.0653E+00	1.148E+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 (84.9 to 2000.7 keV) 1.9804951E+01 pCi/gm
Total Decayed Activity (84.9 to 2000.7 keV) 1.9804951E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_23FEB2006_1324.An1

Sample description
FSS-NOL-05-02-012-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\103F_23FEB2006_1324.An1

Acquisition information
Start time: 23-Feb-2006 13:25:13
Live time: 2000
Real time: 2003
Dead time: 0.17 %
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/channel^2

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: 1.8250E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8250E+03) =
5.4795E+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	21-Feb-2006 15:36:00
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: 0.3884

***** 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	112.	23.30	0.99	9.100E-03	74.81	9.600	9.261E-01	PB212
77.91	79.	38.34	1.00	1.048E-02	77.11	17.500	PBC<MDA	PB212
93.12	94.	40.82	1.50	1.708E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
185.91	137.	27.61	0.98	2.567E-02				
185.91	137.	27.61	0.98	2.567E-02	185.99	3.280	PBC<MDA	RA226
209.47	102.	34.29	1.03	2.470E-02				
238.54	1045.	3.75	1.09	2.320E-02	238.63	43.100	7.652E-01	PB212
241.40	128.	21.17	1.09	2.305E-02	241.00	3.900	1.056E+00	RA224
					241.92	7.470	5.523E-01	PB214
269.86	108.	27.54	0.81	2.153E-02				
295.08	230.	11.52	0.97	2.026E-02	295.22	19.200	4.307E-01	PB214
300.36	81.	31.30	0.75	2.000E-02				
327.65	67.	29.49	1.14	1.876E-02				
338.24	274.	11.03	1.12	1.831E-02	338.40	12.010	9.184E-01	AC228
351.66	414.	7.75	1.25	1.777E-02	351.99	37.100	4.593E-01	PB214
462.83	70.	26.56	1.70	1.426E-02				
462.83	70.	26.56	1.70	1.426E-02	463.51	10.000	3.556E-01	SB125
510.13	173.	14.15	1.69	1.318E-02	510.72	22.500	3.656E-01	TL208
582.78	386.	7.34	1.27	1.185E-02	583.14	86.000	2.778E-01	TL208
608.97	318.	9.38	1.52	1.144E-02	609.32	46.090	4.368E-01	BI214
661.44	154.	15.79	1.67	1.072E-02	661.62	84.620	1.246E-01	CS137
726.80	90.	22.44	1.37	9.969E-03	727.17	11.800	5.636E-01	BI212
794.56	46.	30.92	1.28	9.312E-03				
794.56	46.	30.92	1.28	9.312E-03	795.76	85.400	4.306E-02	CS134
859.73	58.	20.66	1.61	8.774E-03				

910.45	287.	8.70	1.67	8.406E-03	911.07	29.000	8.608E-01	AC228
964.43	47.	25.38	1.54	8.053E-03	964.00	14.580	PBC<MDA	EU152
968.24	151.	10.10	1.54	8.030E-03	968.90	17.460	7.974E-01	AC228
1119.79	104.	17.51	1.39	7.214E-03	1120.28	15.040	6.971E-01	BI214
1172.14	95.	18.55	1.16	6.976E-03	1173.23	99.860	9.893E-02	CO60
1331.35	61.	17.73	1.14	6.353E-03	1332.51	99.980	6.846E-02	CO60
1459.62	1235.	3.02	1.95	5.935E-03	1460.75	10.700	1.418E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1619.43	21.	27.36	0.85	5.488E-03	1620.56	2.750	1.028E+00	BI212
1763.18	79.	11.25	1.44	5.145E-03	1764.51	15.920	6.850E-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	
418.10	209.47	463.	102.	0.051	102.87	1.027	AC-228	s
481.95	241.39	305.	128.	0.064	63.52	1.095	RA-224	lD
538.87	269.86	308.	108.	0.054	82.61	0.810	AC-228	s
599.87	300.36	237.	81.	0.041	93.91	0.748	PB-212	s
654.45	327.65	154.	67.	0.034	88.47	1.142	AC-228	s
1718.50	859.73	40.	58.	0.029	61.97	1.606	TL-208	s
1926.67	964.42	43.	51.	0.025	69.42	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
PB-212	148.79	74.81	332.	107.	0.054	75.37	0.993D
PB-212	153.39	77.11	333.	192.	0.096	41.97	0.995A
PA-234	185.42	93.12	702.	94.	0.047	122.45	1.500s
RA-226	371.33	186.08	691.	115.	0.058	90.00	1.500
PB-212	476.19	238.52	709.	1052.	0.526	15.67	1.027
PB-214	589.30	295.08	219.	226.	0.113	34.55	0.966
AC-228	675.63	338.24	237.	273.	0.136	33.10	1.116s
PB-214	702.46	351.66	233.	409.	0.204	23.24	1.250
SB-125	924.22	462.55	117.	80.	0.040	65.58	1.500s
TL-208	1019.38	510.13	169.	146.	0.073	42.44	1.695s
TL-208	1164.65	582.78	131.	382.	0.191	22.01	1.275
BI-214	1217.03	608.97	169.	311.	0.156	28.13	1.519
CS-137	1321.97	661.44	126.	153.	0.076	47.38	1.673s
BI-212	1452.68	726.80	106.	90.	0.045	67.33	1.374s
CS-134	1587.75	794.35	57.	47.	0.024	80.21	1.500
AC-228	1819.94	910.45	102.	283.	0.142	26.09	1.674
AC-228	1936.81	968.90	27.	151.	0.075	28.42	1.540D
BI-214	2238.55	1119.79	71.	102.	0.051	52.54	1.385
CO-60	2343.24	1172.14	76.	93.	0.046	55.64	1.163s
CO-60	2661.61	1331.35	27.	59.	0.029	53.19	1.135s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2918.11	1459.62	48.	1216.	0.608	9.05	1.954
BI-212	3237.67	1619.43	4.	21.	0.010	82.07	0.846s
BI-214	3525.12	1763.18	3.	76.	0.038	33.75	1.445

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.0039E-01					
			477.56	1.004E-01	&(	3.247E-01 9.70E-02	G
K-40		1.4184E+01					
			1460.75	1.418E+01	(P	4.087E-01 4.34E-01	G
MN-54		-6.2476E-03					
			834.81	-6.248E-03	&(P	4.000E-02 1.16E-02	G
CO-57		-9.8404E-03					
			122.07	-9.840E-03	&(P	5.162E-02 1.55E-02	G K
			136.43	-8.841E-02	%	3.969E-01 1.19E-01	G
CO-60		8.3689E-02					
			1332.51	6.846E-02	(P	3.161E-02 1.27E-02	G K
			1173.23	9.893E-02	@(P	4.614E-02 1.87E-02	G K
Sr-85		-2.3868E-02					
			514.00	-2.387E-02	%(	4.589E-02 1.40E-02	G
Kr-85		-5.4004E+02					
			513.99	-5.400E+02	%(	1.038E+03 3.16E+02	G
Y-88		2.6064E-03					
			1836.01	2.606E-03	&(P	1.870E-02 4.84E-03	G K
			898.02	1.387E-02	& P	3.599E-02 1.07E-02	G
NB-94		-1.7096E-05					
			871.10	-1.710E-05	&(	2.803E-02 7.81E-03	G K
			702.50	1.206E-02	%	3.361E-02 1.00E-02	G K
Ag-108M		1.6787E-03					
			722.95	1.679E-03	%(	3.462E-02 9.90E-03	G K
			614.37	-1.202E-02	% P	3.967E-02 1.18E-02	G
			433.93	6.212E-03	%	3.441E-02 1.02E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-2.8336E-02						
		88.04	-2.834E-02	&(	2.067E+00	6.17E-01	G
SN-113	-7.8859E-03						
		391.71	-7.886E-03	%(	4.806E-02	1.42E-02	G K
		255.04	-9.872E-02	%	1.628E+00	4.83E-01	G
SB-125	1.1591E-01						
		427.95	1.492E-02	&(P	9.377E-02	2.75E-02	G K
		600.77	-5.199E-02	% P	1.981E-01	5.88E-02	G
		636.15	-9.834E-03	% P	3.210E-01	9.25E-02	G
		463.51	4.149E-01	(P	2.770E-01	9.21E-02	G
		176.29	-4.094E-02	&	5.550E-01	1.65E-01	G
I-131	-3.2539E-03						
		364.48	-3.254E-03	%(P	4.584E-02	1.34E-02	G K
		636.97	-1.157E-02	&	4.770E-01	1.36E-01	G
		284.29	-2.201E-03	% P	6.601E-01	1.95E-01	G
CS-134	2.0696E-02						
		604.66	1.902E-04	%(	3.261E-02	9.36E-03	G K
		795.76	4.413E-02	(P	3.525E-02	1.18E-02	G
		569.29	8.595E-03	& P	1.925E-01	5.52E-02	G
		801.84	-6.705E-02	% P	4.184E-01	1.20E-01	G
CS-137	1.2456E-01						
		661.62	1.246E-01	*(P	4.497E-02	1.98E-02	G
CE-139	-6.6701E-03						
		165.85	-6.670E-03	&(	4.657E-02	1.39E-02	G
EU-152	-2.9213E-02						
		121.78	-2.921E-02	&(P	1.507E-01	4.52E-02	G K
		344.30	-8.883E-03	% P	9.806E-02	2.87E-02	G
		1408.08	5.546E-02	%	1.243E-01	3.75E-02	G
		964.00	1.370E-02	& P	4.142E-01	1.21E-01	G
		1112.07	0.000E+00	%	3.007E-01	8.51E-02	G
		778.90	2.623E-02	&	2.037E-01	5.82E-02	G
EU-154	-1.9526E-02						
		123.10	-1.953E-02	%(	1.016E-01	3.04E-02	G K
		1274.80	-1.289E-02	%	1.227E-01	3.52E-02	G
		723.30	-8.149E-02	%	2.432E-01	7.29E-02	G
		1004.80	-2.503E-02	%	2.324E-01	6.71E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.1251E-01						
		86.45	1.125E-01	%(	2.319E-01	7.04E-02	G K
		105.31	7.374E-02	%	2.330E-01	7.02E-02	G
HG-203	1.9433E-02						
		279.17	1.943E-02	&(P	3.706E-02	1.13E-02	G K
		72.87	-2.375E-01	& P	1.713E+00	5.11E-01	G
		70.83	-1.720E+00	%	4.023E+00	1.22E+00	G
		82.50	-1.026E+00	%	3.878E+00	1.17E+00	G
TL-208	2.7782E-01						
		583.14	2.778E-01	(P	4.071E-02	2.06E-02	G
		510.72	3.656E-01	+ P	1.580E-01	6.11E-02	G
PB-212	8.0338E-01						
		238.63	7.789E-01	(P	9.392E-02	4.11E-02	G K
							Energy duplication
		77.11	8.034E-01	} P	3.671E-01	1.12E-01	G
		74.81	9.134E-01	(P	7.464E-01	2.36E-01	G
PB-214	4.4957E-01						
		351.99	4.593E-01	(P	8.309E-02	3.60E-02	G K
		295.22	4.307E-01	(P	1.365E-01	5.05E-02	G
							Energy duplication
		77.11	1.292E-01	} P	8.779E-01	2.39E-01	G
		241.92	-4.305E-02	%	6.416E-01	1.92E-01	G
BI-212	6.5145E-01						
		727.17	5.636E-01	@(P	3.199E-01	1.27E-01	G K
		1620.56	1.028E+00	(P	5.928E-01	2.82E-01	G
		785.42	-5.044E-02	%	1.754E+00	5.02E-01	G
BI-214	4.3682E-01						
		609.32	4.368E-01	(P	8.888E-02	4.18E-02	G K
		1764.51	6.850E-01	+ P	1.008E-01	8.04E-02	G
		1120.28	6.971E-01	+ P	2.864E-01	1.24E-01	G
RA-224	7.4160E-01						
		241.00	7.416E-01	%(	1.089E+00	3.33E-01	G
RA-226	1.0158E+00						
		185.99	1.016E+00	(P	1.101E+00	3.39E-01	G
AC-228	8.5380E-01						
		911.07	8.608E-01	(P	1.511E-01	7.57E-02	G K
		968.90	7.977E-01	(P	1.423E-01	7.56E-02	G
		338.40	9.184E-01	@(P	2.510E-01	1.02E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.5227E-01
                          236.00-1.523E-01 %(  4.100E-01 1.24E-01 G K
                          256.25 1.797E-01 & P 4.320E-01 1.30E-01 G

PA-234       7.4225E-02
                           98.44-4.308E-02 %(P 2.118E-01 6.34E-02 G K
                          946.00 4.456E-03 & P 1.733E-01 4.91E-02 G
                          131.28 9.487E-02 & P 1.777E-01 5.40E-02 G
                           94.67 2.642E-01 ?(P 3.528E-01 1.08E-01 G
                          883.24-6.839E-02 %   2.808E-01 8.23E-02 G
                          926.70 7.282E-02 &   3.053E-01 8.94E-02 G
                          569.26 1.264E-02 & P 2.851E-01 8.18E-02 G

TH-234       9.2329E-01
                           63.29 9.233E-01 %(P 6.334E+00 1.89E+00 G K
                           92.80 1.198E+00 % P 2.162E+00 6.54E-01 G
                           92.38 1.267E+00 & P 2.590E+00 7.82E-01 G

AM-241      -3.4491E-01
                           59.54-3.449E-01 %(P 1.115E+00 3.36E-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:                      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
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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	9.7932E-02	1.0039E-01	2.9093E-01	2.9099E-01	3.168E-01
K-40		1.4184E+01	1.4184E+01	1.3036E+00	1.5420E+00	
MN-54	#A	-6.2212E-03	-6.2476E-03	3.8434E-02	3.8435E-02	3.983E-02
CO-57	#B	-9.7923E-03	-9.8404E-03	4.7950E-02	4.7953E-02	5.136E-02
CO-60		8.3632E-02	8.3689E-02	3.3257E-02	3.3610E-02	
Sr-85	#A	-2.3386E-02	-2.3868E-02	4.1864E-02	4.1887E-02	4.496E-02
Kr-85	#A	-5.4003E+02	-5.4004E+02	9.4697E+02	9.4749E+02	1.038E+03
Y-88	#B	2.5743E-03	2.6064E-03	1.4521E-02	1.4522E-02	1.847E-02
NB-94	#B	-1.7096E-05	-1.7096E-05	2.3417E-02	2.3417E-02	2.803E-02
Ag-108M	#B	1.6787E-03	1.6787E-03	2.9713E-02	2.9713E-02	3.462E-02
CD-109	#A	-2.8253E-02	-2.8336E-02	1.8498E+00	1.8498E+00	2.061E+00
SN-113	#B	-7.7957E-03	-7.8859E-03	4.2588E-02	4.2591E-02	4.751E-02
SB-125	#F	1.1576E-01	1.1591E-01	7.7226E-02	7.7519E-02	9.364E-02
I-131	#B	-2.7601E-03	-3.2539E-03	5.2479E-02	5.2479E-02	3.889E-02
CS-134	#B	2.0660E-02	2.0696E-02	1.6631E-02	1.6674E-02	3.256E-02
CS-137	#	1.2455E-01	1.2456E-01	5.9552E-02	5.9990E-02	
CE-139	#A	-6.6062E-03	-6.6701E-03	4.1772E-02	4.1774E-02	4.612E-02
EU-152	#B	-2.9205E-02	-2.9213E-02	1.4544E-01	1.4545E-01	1.507E-01
EU-154	#B	-1.9517E-02	-1.9526E-02	9.1338E-02	9.1344E-02	1.016E-01
EU-155	#B	1.1242E-01	1.1251E-01	2.1108E-01	2.1117E-01	2.318E-01
HG-203	#B	1.8889E-02	1.9433E-02	3.3816E-02	3.3835E-02	3.603E-02
TL-208		2.7782E-01	2.7782E-01	6.1833E-02	6.3902E-02	
PB-212		8.0338E-01	8.0338E-01	1.2730E-01	1.3558E-01	
PB-214		4.4957E-01	4.4957E-01	9.5148E-02	9.8663E-02	
BI-212		6.5145E-01	6.5145E-01	3.4697E-01	3.4903E-01	
BI-214		4.3682E-01	4.3682E-01	1.2543E-01	1.2797E-01	
RA-224	#A	7.4160E-01	7.4160E-01	9.9935E-01	1.0003E+00	1.089E+00
RA-226	#A	1.0158E+00	1.0158E+00	1.0168E+00	1.0185E+00	1.101E+00
AC-228		8.5380E-01	8.5380E-01	1.4540E-01	1.5362E-01	
TH-227	#B	-1.5227E-01	-1.5227E-01	3.7159E-01	3.7170E-01	4.100E-01
PA-234	#B	7.4225E-02	7.4225E-02	9.1217E-02	9.1309E-02	2.118E-01
TH-234	#B	9.2329E-01	9.2329E-01	5.6675E+00	5.6677E+00	6.334E+00
AM-241	#A	-3.4491E-01	-3.4491E-01	1.0174E+00	1.0175E+00	1.115E+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

YAEC Chemistry Lab Spectrum name: 103F_23FEB2006_1324.An1

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

Total Activity (1077.0 to 2000.7 keV) 1.7865410E+01 pCi/gm
Total Decayed Activity (1077.0 to 2000.7 keV) 1.7865484E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_23FEB2006_1401.An1

Sample description
FSS-NOL-05-02-005-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\103F_23FEB2006_1401.An1

Acquisition information

Start time:	23-Feb-2006 14:02:59
Live time:	2000
Real time:	2003
Dead time:	0.17 %
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/channel^2

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:	1.7290E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.7290E+03) = 5.7837E+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	21-Feb-2006 15:20:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3146

***** 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	102.	26.02	0.99	9.052E-03	74.81	9.600	9.158E-01	PB212
77.21	181.	15.31	0.99	1.011E-02	77.11	17.500	9.121E-01	PB212
86.90	72.	41.65	1.23	1.428E-02	86.45	32.740	1.217E-01	EU155
93.11	112.	33.02	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.13	92.	39.12	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.93	181.	18.23	1.11	2.567E-02	185.99	3.280	1.556E+00	RA226
209.87	128.	25.46	0.74	2.469E-02				
238.60	1132.	3.48	1.09	2.320E-02	238.63	43.100	8.755E-01	PB212
241.82	145.	18.79	1.09	2.302E-02	241.00	3.900	1.256E+00	RA224
					241.92	7.470	6.569E-01	PB214
270.48	83.	30.04	1.54	2.150E-02				
295.04	227.	12.62	1.23	2.026E-02	295.22	19.200	4.474E-01	PB214
327.80	50.	39.50	0.76	1.875E-02				
338.18	229.	13.88	1.12	1.831E-02	338.40	12.010	8.111E-01	AC228
351.67	458.	8.59	1.27	1.777E-02	351.99	37.100	5.374E-01	PB214
462.69	85.	18.56	1.44	1.427E-02				
462.69	85.	18.56	1.44	1.427E-02	463.51	10.000	4.599E-01	SB125
510.51	217.	11.90	1.41	1.318E-02	510.72	22.500	5.024E-01	TL208
582.75	385.	7.27	1.13	1.185E-02	583.14	86.000	2.920E-01	TL208
608.85	327.	8.41	1.14	1.145E-02	609.32	46.090	4.749E-01	BI214
631.86	24.	35.98	1.50	1.106E-02	636.15	11.200	PBC<MDA	SB125
661.53	35.	40.71	0.85	1.072E-02				
661.53	35.	40.71	0.85	1.072E-02	661.62	84.620	PBC<MDA	CS137
726.74	86.	19.33	1.25	9.969E-03	727.17	11.800	5.657E-01	BI212
794.26	68.	29.67	1.06	9.315E-03				

794.26	68.	29.67	1.06	9.315E-03	795.76	85.400	6.655E-02	CS134
860.23	68.	20.95	1.30	8.770E-03				
910.60	247.	8.14	0.97	8.405E-03	911.07	29.000	7.816E-01	AC228
963.61	45.	26.18	1.54	8.058E-03				
963.61	45.	26.18	1.54	8.058E-03	964.00	14.580	PBC<MDA	EU152
968.24	182.	9.23	1.54	8.029E-03	968.90	17.460	1.012E+00	AC228
1119.58	66.	31.61	0.87	7.215E-03	1120.28	15.040	4.591E-01	BI214
1237.59	48.	39.83	1.09	6.704E-03				
1376.36	37.	28.15	0.95	6.199E-03				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1459.70	1399.	2.77	1.91	5.935E-03	1460.75	10.700	1.700E+01	K40
1619.31	14.	35.41	0.64	5.488E-03	1620.56	2.750	7.124E-01	BI212
1763.33	63.	13.44	1.46	5.144E-03	1764.51	15.920	5.665E-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	
418.89	209.87	410.	128.	0.064	76.38	0.736	NP-239	
540.12	270.48	242.	83.	0.041	90.13	1.544	AC-228	s
654.75	327.80	170.	50.	0.025	118.49	0.757	AC-228	s
1322.15	661.53	70.	35.	0.018	122.12	0.846	CS-137	l
1719.50	860.23	54.	68.	0.034	62.86	1.304	TL-208	
1926.24	963.73	46.	45.	0.022	78.55	1.537	EU-152	lD
2474.12	1237.59	103.	48.	0.024	119.50	1.089	J-133	s
2751.61	1376.36	22.	37.	0.019	84.45	0.953	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	323.	102.	0.051	78.05	0.993D
PB-212	153.39	77.11	339.	181.	0.090	45.94	0.995A
TH-234	185.40	93.11	863.	112.	0.056	99.06	1.500
RA-226	371.02	185.93	423.	168.	0.084	54.68	1.108
PB-212	476.45	238.65	709.	1219.	0.609	14.20	1.088
RA-224	482.17	241.51	726.	134.	0.067	88.92	1.500s
PB-214	589.22	295.04	250.	223.	0.111	37.86	1.226
AC-228	675.50	338.18	271.	228.	0.114	41.63	1.125
PB-214	702.47	351.67	318.	453.	0.226	25.78	1.265
SB-125	924.46	462.67	120.	91.	0.045	59.13	1.500
TL-208	1020.14	510.51	167.	191.	0.095	35.69	1.415s
TL-208	1164.59	582.75	132.	381.	0.190	21.80	1.133
BI-214	1216.79	608.85	141.	320.	0.160	25.24	1.137
SB-125	1262.80	631.86	28.	24.	0.012	107.94	1.500s
BI-212	1452.56	726.74	79.	85.	0.043	57.99	1.249
CS-134	1587.53	794.24	50.	46.	0.023	78.32	1.500
AC-228	1820.23	910.60	66.	244.	0.122	24.43	0.968s
AC-228	1934.18	967.58	107.	249.	0.124	31.16	1.794s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2238.14	1119.58	112.	64.	0.032	94.82	0.865s
K-40	2918.27	1459.70	47.	1380.	0.690	8.32	1.912
BI-212	3237.44	1619.31	4.	14.	0.007	106.23	0.642s
BI-214	3525.42	1763.33	6.	59.	0.030	40.31	1.461

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		8.6367E-02					
			477.56	8.637E-02	%(	3.154E-01 9.37E-02	G
K-40		1.6996E+01					
			1460.75	1.700E+01	(P	4.256E-01 4.78E-01	G
MN-54		-3.1313E-04					
			834.81	-3.131E-04	%(P	5.196E-02 1.50E-02	G
CO-57		1.5555E-02					
			122.07	1.555E-02	&(P	4.859E-02 1.46E-02	G K
			136.43	-4.396E-02	%	3.765E-01 1.12E-01	G
CO-60		-5.3269E-03					
			1332.51	-5.327E-03	%(P	4.047E-02 1.10E-02	G K
			1173.23	7.434E-03	% P	4.676E-02 1.35E-02	G K
Sr-85		-1.8743E-02					
			514.00	-1.874E-02	%(	4.662E-02 1.41E-02	G
Kr-85		-4.2379E+02					
			513.99	-4.238E+02	%(	1.054E+03 3.18E+02	G
Y-88		-5.2454E-06					
			1836.01	-5.245E-06	&(P	3.299E-02 8.69E-03	G K
			898.02	-9.115E-03	% P	4.021E-02 1.17E-02	G
NB-94		0.0000E+00					
			871.10	0.000E+00	&(	4.205E-02 1.20E-02	G K
			702.50	-1.495E-03	&	3.938E-02 1.14E-02	G K
Ag-108M		-2.1802E-02					
			722.95	-2.180E-02	%(	5.600E-02 1.69E-02	G K
			614.37	-8.790E-03	% P	4.328E-02 1.28E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	-5.946E-03	%	3.873E-02	1.14E-02	G
CD-109	-1.0318E+00						
		88.04	-1.032E+00	&(	1.838E+00	5.59E-01	G
SN-113	-4.1226E-03						
		391.71	-4.123E-03	&(	4.333E-02	1.27E-02	G K
		255.04	1.822E-02	&	1.709E+00	5.05E-01	G
SB-125	1.1918E-01						
		427.95	-2.174E-02	%(P	1.067E-01	3.16E-02	G K
		600.77	-5.219E-05	& P	1.938E-01	5.58E-02	G
		636.15	1.530E-01	?(P	1.728E-01	5.64E-02	G
		463.51	4.984E-01	(P	2.949E-01	9.96E-02	G
		176.29	1.412E-01	&	5.595E-01	1.68E-01	G
I-131	-1.6137E-04						
		364.48	-1.614E-04	%(P	4.616E-02	1.35E-02	G K
		636.97	1.236E-01	&	4.830E-01	1.42E-01	G
		284.29	3.087E-02	% P	6.283E-01	1.85E-01	G
CS-134	-1.9918E-02						
		604.66	-1.992E-02	%(	4.556E-02	1.38E-02	G K
		795.76	4.554E-02	& P	3.513E-02	1.19E-02	G
		569.29	-1.859E-02	& P	2.112E-01	6.05E-02	G
		801.84	2.752E-02	% P	3.489E-01	9.85E-02	G
CS-137	1.4872E-02						
		661.62	1.487E-02	%(P	3.846E-02	1.15E-02	G
CE-139	-1.2168E-02						
		165.85	-1.217E-02	%(	4.920E-02	1.48E-02	G
EU-152	5.3437E-02						
		121.78	5.344E-02	&(P	1.400E-01	4.23E-02	G K
		344.30	-3.578E-03	% P	1.323E-01	3.89E-02	G
		1408.08	5.165E-03	%	1.467E-01	3.99E-02	G
		964.00	2.207E-01	& P	3.411E-01	1.05E-01	G
		1112.07	3.823E-02	&	3.846E-01	1.12E-01	G
		778.90	3.404E-02	&	2.319E-01	6.68E-02	G
EU-154	-5.9808E-03						
		123.10	-5.981E-03	&(	1.180E-01	3.52E-02	G K
		1274.80	2.335E-02	%	1.251E-01	3.63E-02	G
		723.30	0.000E+00	%	3.229E-01	9.47E-02	G
		1004.80	3.114E-02	%	2.020E-01	5.82E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.1266E-01						
		86.45	1.127E-01	&(	2.525E-01	7.65E-02	G K
		105.31	5.789E-02	%	2.314E-01	6.95E-02	G
HG-203	-1.5345E-02						
		279.17	-1.534E-02	%(P	4.028E-02	1.21E-02	G K
		72.87	-8.488E-02	& P	2.041E+00	6.07E-01	G
		70.83	-1.387E+00	%	4.198E+00	1.27E+00	G
		82.50	-7.652E-01	%	3.969E+00	1.19E+00	G
TL-208	2.9202E-01						
		583.14	2.920E-01	(P	4.322E-02	2.14E-02	G
		510.72	5.024E-01	+ P	1.662E-01	6.81E-02	G
PB-212	9.3757E-01						
		238.63	9.527E-01	(P	9.912E-02	4.55E-02	G K
							Energy duplication
		77.11	7.986E-01	} P	3.911E-01	1.22E-01	G
		74.81	9.158E-01	(P	7.779E-01	2.46E-01	G
PB-214	5.0671E-01						
		351.99	5.374E-01	(P	1.018E-01	4.67E-02	G K
		295.22	4.474E-01	(P	1.537E-01	5.75E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.448E-01	0.00E+00	G
		241.92	4.012E-01	%	6.066E-01	1.85E-01	G
BI-212	5.9343E-01						
		727.17	5.657E-01	(P	2.931E-01	1.10E-01	G K
		1620.56	7.124E-01	(P	6.376E-01	2.53E-01	G
		785.42	0.000E+00	%	2.180E+00	6.27E-01	G
BI-214	4.9070E-01						
		609.32	4.749E-01	(P	8.595E-02	4.07E-02	G K
		1764.51	5.665E-01	(P	1.318E-01	8.03E-02	G
		1120.28	4.591E-01	*(P	3.754E-01	1.49E-01	G
RA-224	1.1675E+00						
		241.00	1.168E+00	?(	1.115E+00	3.46E-01	G
RA-226	1.5564E+00						
		185.99	1.556E+00	(P	9.153E-01	3.06E-01	G
AC-228	7.9023E-01						
		911.07	7.816E-01	(P	1.305E-01	6.45E-02	G K
		968.90	1.386E+00	+ P	2.845E-01	1.44E-01	G
		338.40	8.111E-01	(P	2.824E-01	1.13E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.1801E-01
                          236.00-2.180E-01 %(  4.119E-01 1.25E-01 G K
                          256.25 1.285E-01 & P 4.850E-01 1.45E-01 G

PA-234      -2.3712E-02
                           98.44-2.371E-02 &(P 2.320E-01 6.92E-02 G K
                          946.00-2.138E-05 & P 1.999E-01 5.67E-02 G
                          131.28-2.057E-02 % P 2.227E-01 6.65E-02 G
                           94.67-1.397E-01 % P 4.305E-01 1.30E-01 G
                          883.24 9.440E-04 %   3.259E-01 9.27E-02 G
                          926.70-5.165E-02 &   3.537E-01 1.02E-01 G
                          569.26-3.008E-02 & P 3.132E-01 8.99E-02 G

TH-234       1.2605E+00
                           63.29 8.716E-01 %(P 6.440E+00 1.92E+00 G K
                           92.80 1.766E+00  (P 2.210E+00 6.75E-01 G
                           92.38 1.712E+00 % P 2.627E+00 7.98E-01 G

AM-241      -2.0077E-01
                           59.54-2.008E-01 %(P 1.198E+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:                      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 - 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	8.4213E-02	8.6367E-02	2.8121E-01	2.8125E-01	3.075E-01
K-40		1.6996E+01	1.6996E+01	1.4333E+00	1.7401E+00	
MN-54	#A	-3.1178E-04	-3.1313E-04	3.2265E-02	3.2265E-02	5.174E-02
CO-57	#B	1.5477E-02	1.5555E-02	4.3897E-02	4.3906E-02	4.835E-02
CO-60	#B	-5.3232E-03	-5.3269E-03	1.3745E-01	1.3745E-01	4.044E-02
Sr-85	#A	-1.8357E-02	-1.8743E-02	4.2177E-02	4.2191E-02	4.566E-02
Kr-85	#A	-4.2378E+02	-4.2379E+02	9.5363E+02	9.5395E+02	1.054E+03
Y-88	#B	-5.1794E-06	-5.2454E-06	2.8931E-02	2.8931E-02	3.258E-02
NB-94	#B	0.0000E+00	0.0000E+00	3.6068E-02	3.6068E-02	4.205E-02
Ag-108M	#B	-2.1801E-02	-2.1802E-02	5.0557E-02	5.0572E-02	5.600E-02
CD-109	#A	-1.0288E+00	-1.0318E+00	1.6785E+00	1.6794E+00	1.833E+00
SN-113	#B	-4.0746E-03	-4.1226E-03	3.7960E-02	3.7960E-02	4.283E-02
SB-125	#F	1.1902E-01	1.1918E-01	7.1459E-02	7.1793E-02	1.066E-01
I-131	#B	-1.3644E-04	-1.6137E-04	8.5368E-02	8.5368E-02	3.902E-02
CS-134	#B	-1.9882E-02	-1.9918E-02	4.1297E-02	4.1314E-02	4.547E-02
CS-137	#A	1.4871E-02	1.4872E-02	3.4465E-02	3.4476E-02	3.846E-02
CE-139	#A	-1.2050E-02	-1.2168E-02	4.4331E-02	4.4337E-02	4.872E-02
EU-152	#B	5.3422E-02	5.3437E-02	1.2681E-01	1.2685E-01	1.400E-01
EU-154	#B	-5.9782E-03	-5.9808E-03	1.0560E-01	1.0560E-01	1.179E-01
EU-155	#B	1.1257E-01	1.1266E-01	2.2949E-01	2.2958E-01	2.523E-01
HG-203	#B	-1.4907E-02	-1.5345E-02	3.6498E-02	3.6509E-02	3.913E-02
TL-208		2.9202E-01	2.9202E-01	6.4369E-02	6.6564E-02	
PB-212		9.3757E-01	9.3757E-01	1.3440E-01	1.4501E-01	
PB-214		5.0671E-01	5.0671E-01	1.1796E-01	1.2157E-01	
BI-212		5.9343E-01	5.9343E-01	3.4611E-01	3.4782E-01	
BI-214		4.9070E-01	4.9070E-01	1.2638E-01	1.2955E-01	
RA-224	#	1.1675E+00	1.1675E+00	1.0382E+00	1.0404E+00	1.115E+00
RA-226		1.5564E+00	1.5564E+00	9.1678E-01	9.2122E-01	
AC-228		7.9023E-01	7.9023E-01	1.9207E-01	1.9748E-01	
TH-227	#B	-2.1801E-01	-2.1801E-01	3.7552E-01	3.7573E-01	4.119E-01
PA-234	#B	-2.3712E-02	-2.3712E-02	2.3958E-01	2.3958E-01	2.320E-01
TH-234	#B	1.2605E+00	1.2605E+00	1.4462E+00	1.4479E+00	6.440E+00
AM-241	#A	-2.0077E-01	-2.0077E-01	1.0954E+00	1.0955E+00	1.198E+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

YAEC Chemistry Lab Spectrum name: 103F_23FEB2006_1401.An1

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

Total Activity (86.4 to 2000.7 keV) 2.2163382E+01 pCi/gm
Total Decayed Activity (86.4 to 2000.7 keV) 2.2163385E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_23FEB2006_1439.An1

Sample description
FSS-NOL-05-02-001-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\103F_23FEB2006_1439.An1

Acquisition information
Start time: 23-Feb-2006 14:41:09
Live time: 2000
Real time: 2004
Dead time: 0.18 %
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/channel^2

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: 1.8290E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8290E+03) =
5.4675E+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.

YAEC Chemistry Lab Spectrum name: 103F_23FEB2006_1439.An1

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	21-Feb-2006 15:00:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3702

***** 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
75.02	113.	25.94	0.99	9.151E-03	74.81	9.600	9.355E-01	PB212
77.78	114.	27.46	1.00	1.042E-02	77.11	17.500	4.642E-01	PB212
					77.11	10.700	PBC<MDA	PB214
93.07	98.	38.63	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.07	102.	37.77	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.06	123.	33.08	0.94	2.437E-02				
186.17	173.	21.62	1.51	2.566E-02	185.99	3.280	1.405E+00	RA226
209.51	127.	28.42	0.89	2.470E-02				
238.69	1165.	3.42	1.09	2.320E-02	238.63	43.100	8.521E-01	PB212
241.45	146.	20.89	1.09	2.305E-02	241.00	3.900	1.199E+00	RA224
					241.92	7.470	6.271E-01	PB214
269.91	125.	26.58	1.58	2.153E-02				
276.72	63.	41.65	1.24	2.118E-02				
294.77	284.	12.22	1.08	2.027E-02	295.22	19.200	5.326E-01	PB214
299.88	102.	20.19	0.77	2.002E-02				
338.16	241.	14.13	1.16	1.831E-02	338.40	12.010	8.051E-01	AC228
351.53	450.	8.22	1.20	1.777E-02	351.99	37.100	4.984E-01	PB214
462.76	83.	29.75	0.89	1.427E-02				
462.76	83.	29.75	0.89	1.427E-02	463.51	10.000	4.234E-01	SB125
510.53	221.	11.52	1.35	1.318E-02	510.72	22.500	4.854E-01	TL208
582.81	405.	6.80	1.31	1.185E-02	583.14	86.000	2.906E-01	TL208
608.81	313.	7.72	1.31	1.145E-02	609.32	46.090	4.291E-01	BI214
660.62	129.	14.89	1.45	1.073E-02	661.62	84.620	1.039E-01	CS137
726.90	83.	17.67	1.21	9.968E-03	727.17	11.800	5.184E-01	BI212
793.84	51.	28.31	1.57	9.318E-03				

859.82	61.	30.75	1.10	8.773E-03				
910.53	271.	7.33	1.64	8.405E-03	911.07	29.000	8.107E-01	AC228
963.48	39.	31.10	1.54	8.059E-03				
968.45	151.	10.05	1.54	8.028E-03	968.90	17.460	7.938E-01	AC228
1119.39	158.	17.91	1.42	7.216E-03	1120.28	15.040	1.064E+00	BI214
1172.85	110.	22.75	1.39	6.973E-03	1173.23	99.860	1.148E-01	CO60
1331.10	50.	27.49	1.75	6.349E-03	1332.51	99.980	5.795E-02	CO60
1459.79	1454.	2.69	2.02	5.935E-03	1460.75	10.700	1.671E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1619.76	17.	31.92	0.67	5.488E-03	1620.56	2.750	8.497E-01	BI212
1763.14	76.	11.47	1.58	5.145E-03	1764.51	15.920	6.565E-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	
418.18	209.51	490.	127.	0.064	85.27	0.889	AC-228	
538.98	269.91	364.	125.	0.063	79.74	1.585	AC-228	s
552.59	276.72	264.	75.	0.037	98.33	1.240	TL-208	s
598.92	299.88	168.	102.	0.051	60.56	0.768	TH-227	
1586.74	793.84	49.	66.	0.033	58.08	1.575	PA-234	
1718.69	859.82	90.	61.	0.030	92.24	1.104	TL-208	
1925.98	963.52	56.	39.	0.020	93.31	1.537	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 keV
PB-212	148.79	74.81	356.	110.	0.055	75.78	0.993D
PB-212	153.39	77.11	353.	180.	0.090	39.74	0.995A
RA-226	371.69	186.26	746.	152.	0.076	73.68	1.500s
PB-212	476.42	238.63	229.	1151.	0.576	10.31	1.093D
PB-214	483.00	241.92	336.	119.	0.059	49.60	1.095A
PB-214	588.70	294.77	346.	280.	0.140	36.66	1.075
AC-228	675.47	338.16	316.	240.	0.120	42.38	1.157
PB-214	702.20	351.53	302.	444.	0.222	24.66	1.196s
SB-125	924.54	462.71	162.	70.	0.035	83.38	1.500s
TL-208	1020.17	510.53	165.	195.	0.097	34.57	1.353s
TL-208	1164.71	582.81	130.	401.	0.200	20.39	1.311
BI-214	1216.72	608.81	107.	306.	0.153	23.17	1.313
CS-137	1320.33	660.62	97.	128.	0.064	44.67	1.449s
BI-212	1452.88	726.90	60.	83.	0.041	53.00	1.205
AC-228	1820.10	910.53	57.	267.	0.134	21.98	1.643
AC-228	1936.01	968.50	95.	228.	0.114	31.98	1.802
BI-214	2237.95	1119.49	134.	138.	0.069	57.00	1.405s
CO-60	2344.66	1172.85	131.	108.	0.054	68.24	1.391
CO-60	2661.11	1331.10	48.	50.	0.025	82.46	1.749
K-40	2918.45	1459.79	37.	1435.	0.718	8.06	2.019

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3238.33	1619.76	6.	17.	0.009	95.75	0.672s
BI-214	3525.03	1763.14	3.	73.	0.036	34.41	1.583

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-1.5092E-03					
			477.56	-1.509E-03	&(	2.805E-01 8.08E-02	G
K-40		1.6707E+01					
			1460.75	1.671E+01	(P	3.603E-01 4.55E-01	G
MN-54		1.3672E-02					
			834.81	1.367E-02	%(P	3.786E-02 1.13E-02	G
CO-57		6.3597E-04					
			122.07	6.360E-04	%(P	4.990E-02 1.48E-02	G K
			136.43	1.291E-02	%	3.370E-01 1.00E-01	G
CO-60		8.6336E-02					
			1332.51	5.795E-02	(P	4.086E-02 1.68E-02	G K
			1173.23	1.148E-01	(P	5.951E-02 2.66E-02	G K
Sr-85		-2.0360E-02					
			514.00	-2.036E-02	%(	4.586E-02 1.39E-02	G
Kr-85		-4.6073E+02					
			513.99	-4.607E+02	%(	1.037E+03 3.14E+02	G
Y-88		-2.1404E-03					
			1836.01	-2.140E-03	%(P	2.449E-02 6.41E-03	G K
			898.02	1.124E-02	& P	3.813E-02 1.13E-02	G
NB-94		1.4157E-03					
			871.10	1.416E-03	%(	3.133E-02 8.88E-03	G K
			702.50	7.545E-03	%	3.531E-02 1.04E-02	G K
Ag-108M		1.2985E-02					
			722.95	1.298E-02	%(	4.342E-02 1.29E-02	G K
			614.37	1.444E-02	% P	3.465E-02 1.04E-02	G
			433.93	9.815E-03	%	3.820E-02 1.14E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	7.5057E-01						
		88.04	7.506E-01	%(	1.962E+00	5.93E-01	G
SN-113	-9.6749E-03						
		391.71	-9.675E-03	%(	5.180E-02	1.54E-02	G K
		255.04	-1.723E-02	&	1.666E+00	4.93E-01	G
SB-125	8.3039E-02						
		427.95	-1.174E-02	%(P	1.124E-01	3.30E-02	G K
		600.77	-2.168E-02	& P	1.899E-01	5.54E-02	G
		636.15	9.909E-02	% P	2.608E-01	7.80E-02	G
		463.51	3.636E-01	*(P	3.220E-01	1.03E-01	G
		176.29	-6.746E-02	%	5.716E-01	1.71E-01	G
I-131	-8.8149E-03						
		364.48	-8.815E-03	&(P	4.549E-02	1.35E-02	G K
		636.97	2.325E-02	&	5.356E-01	1.54E-01	G
		284.29	-1.473E-02	& P	6.019E-01	1.77E-01	G
CS-134	-2.0630E-02						
		604.66	-2.063E-02	%(	4.554E-02	1.38E-02	G K
		795.76	-1.666E-02	& P	5.405E-02	1.61E-02	G
		569.29	-5.038E-02	& P	2.360E-01	6.92E-02	G
		801.84	6.783E-02	% P	4.339E-01	1.26E-01	G
CS-137	1.0393E-01						
		661.62	1.039E-01	*(P	3.966E-02	1.56E-02	G
CE-139	2.1224E-03						
		165.85	2.122E-03	&(	4.456E-02	1.33E-02	G
EU-152	-6.2095E-02						
		121.78	-6.210E-02	%(P	1.593E-01	4.81E-02	G K
		344.30	-2.194E-02	% P	1.275E-01	3.79E-02	G
		1408.08	0.000E+00	%	1.781E-01	4.93E-02	G
		964.00	7.286E-02	& P	2.286E-01	6.75E-02	G
		1112.07	1.449E-01	%	2.766E-01	8.45E-02	G
		778.90	6.091E-02	&	2.530E-01	7.43E-02	G
EU-154	-4.2810E-02						
		123.10	-4.281E-02	%(	1.179E-01	3.56E-02	G K
		1274.80	-2.147E-02	%	1.199E-01	3.48E-02	G
		723.30	-1.597E-02	&	3.087E-01	9.09E-02	G
		1004.80	-2.591E-02	&	1.903E-01	5.46E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	5.1132E-03						
		86.45	5.113E-03	%(	2.619E-01	7.82E-02	G K
		105.31	6.557E-02	%	2.399E-01	7.22E-02	G
HG-203	-9.7084E-03						
		279.17	-9.708E-03	%(P	4.443E-02	1.33E-02	G K
		72.87	-9.175E-01	% P	2.241E+00	6.78E-01	G
		70.83	5.780E-01	%	3.234E+00	9.66E-01	G
		82.50	4.422E-02	&	3.958E+00	1.18E+00	G
TL-208	2.9063E-01						
		583.14	2.906E-01	(P	4.055E-02	2.00E-02	G
		510.72	4.854E-01	+ P	1.561E-01	6.36E-02	G
PB-212	8.7682E-01						
		238.63	8.506E-01	(P	5.409E-02	2.95E-02	G K
							Energy duplication
		77.11	7.533E-01	} P	3.769E-01	9.98E-02	G
		74.81	9.368E-01	(P	7.704E-01	2.43E-01	G
PB-214	5.1004E-01						
		351.99	4.984E-01	@(P	9.385E-02	4.15E-02	G K
		295.22	5.326E-01	(P	1.698E-01	6.60E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.472E-01	0.00E+00	G
		241.92	5.100E-01	}	3.786E-01	8.43E-02	G
BI-212	5.1843E-01						
		727.17	5.184E-01	(P	2.448E-01	9.21E-02	G K
		1620.56	8.497E-01	+ P	6.747E-01	2.72E-01	G
		785.42	1.036E+00	%	1.635E+00	5.06E-01	G
BI-214	4.2914E-01						
		609.32	4.291E-01	(P	7.128E-02	3.38E-02	G K
		1764.51	6.565E-01	+ P	1.005E-01	7.86E-02	G
		1120.28	9.408E-01	+ P	3.858E-01	1.81E-01	G
RA-224	8.1952E-01						
							Derived Ave Activity
		241.00	8.195E-01	}(	1.164E+00	3.67E-01	G
RA-226	1.3297E+00						
		185.99	1.330E+00	(P	1.141E+00	3.54E-01	G
AC-228	8.0907E-01						
		911.07	8.107E-01	(P	1.146E-01	6.01E-02	G K
		968.90	1.200E+00	+ P	2.542E-01	1.28E-01	G
		338.40	8.051E-01	(P	2.878E-01	1.14E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.8135E-01
                          236.00-1.813E-01 %(  3.993E-01 1.21E-01 G K
                          256.25 1.569E-01 % P 5.073E-01 1.52E-01 G

PA-234       4.1420E-03
                           98.44 4.142E-03 &(P 1.693E-01 5.01E-02 G K
                          946.00-3.909E-02 % P 1.941E-01 5.67E-02 G
                          131.28-5.444E-02 % P 2.289E-01 6.88E-02 G
                           94.67-1.771E-01 % P 3.883E-01 1.18E-01 G
                          883.24 7.273E-03 %   2.520E-01 7.10E-02 G
                          926.70 4.946E-02 %   3.464E-01 1.00E-01 G
                          569.26-6.906E-02 & P 3.475E-01 1.02E-01 G

TH-234       2.6021E+00
                           63.29 2.602E+00 &(P 5.329E+00 1.61E+00 G K
                           92.80 1.473E+00 & P 2.207E+00 6.71E-01 G
                           92.38 1.794E+00 & P 2.613E+00 7.95E-01 G

AM-241       1.2735E-01
                           59.54 1.274E-01 %(P 1.140E+00 3.40E-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:                      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 - 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	-1.4708E-03	-1.5092E-03	2.4246E-01	2.4246E-01	2.734E-01
K-40		1.6707E+01	1.6707E+01	1.3642E+00	1.6739E+00	
MN-54	#A	1.3612E-02	1.3672E-02	3.3925E-02	3.3934E-02	3.769E-02
CO-57	#B	6.3273E-04	6.3597E-04	4.4541E-02	4.4541E-02	4.965E-02
CO-60		8.6274E-02	8.6336E-02	4.8007E-02	4.8268E-02	
Sr-85	#A	-1.9932E-02	-2.0360E-02	4.1620E-02	4.1636E-02	4.490E-02
Kr-85	#A	-4.6073E+02	-4.6073E+02	9.4078E+02	9.4116E+02	1.037E+03
Y-88	#B	-2.1130E-03	-2.1404E-03	2.1022E-02	2.1022E-02	2.417E-02
NB-94	#B	1.4157E-03	1.4157E-03	2.6628E-02	2.6628E-02	3.133E-02
Ag-108M	#B	1.2984E-02	1.2985E-02	3.8766E-02	3.8774E-02	4.342E-02
CD-109	#A	7.4830E-01	7.5057E-01	1.7791E+00	1.7796E+00	1.956E+00
SN-113	#B	-9.5598E-03	-9.6749E-03	4.6075E-02	4.6078E-02	5.118E-02
SB-125	#B	8.2926E-02	8.3039E-02	7.0502E-02	7.0666E-02	1.122E-01
I-131	#B	-7.4272E-03	-8.8149E-03	4.4525E-02	4.4528E-02	3.833E-02
CS-134	#B	-2.0593E-02	-2.0630E-02	4.1345E-02	4.1363E-02	4.546E-02
CS-137	#	1.0392E-01	1.0393E-01	4.6934E-02	4.7320E-02	
CE-139	#A	2.1012E-03	2.1224E-03	3.9770E-02	3.9771E-02	4.411E-02
EU-152	#B	-6.2077E-02	-6.2095E-02	1.4926E-01	1.4930E-01	1.593E-01
EU-154	#B	-4.2791E-02	-4.2810E-02	1.0684E-01	1.0686E-01	1.178E-01
EU-155	#B	5.1093E-03	5.1132E-03	2.3461E-01	2.3461E-01	2.617E-01
HG-203	#B	-9.4256E-03	-9.7084E-03	3.9980E-02	3.9984E-02	4.313E-02
TL-208		2.9063E-01	2.9063E-01	5.9900E-02	6.2232E-02	
PB-212		8.7682E-01	8.7682E-01	9.1319E-02	1.0455E-01	
PB-214		5.1004E-01	5.1004E-01	1.1424E-01	1.1802E-01	
BI-212		5.1843E-01	5.1843E-01	2.7641E-01	2.7804E-01	
BI-214		4.2914E-01	4.2914E-01	1.0155E-01	1.0457E-01	
RA-224	A	8.1952E-01	8.1952E-01	1.0788E+00	1.0799E+00	
RA-226	#	1.3297E+00	1.3297E+00	1.0635E+00	1.0663E+00	1.141E+00
AC-228		8.0907E-01	8.0907E-01	1.8006E-01	1.8608E-01	
TH-227	#B	-1.8135E-01	-1.8135E-01	3.6301E-01	3.6316E-01	3.993E-01
PA-234	#B	4.1420E-03	4.1420E-03	1.5028E-01	1.5028E-01	1.693E-01
TH-234	#B	2.6021E+00	2.6021E+00	4.8387E+00	4.8408E+00	5.329E+00
AM-241	#A	1.2735E-01	1.2735E-01	1.0205E+00	1.0205E+00	1.140E+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 (269.4 to 2000.7 keV) 2.1151115E+01 pCi/gm
Total Decayed Activity (269.4 to 2000.7 keV) 2.1151188E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 103F_23FEB2006_1517.An1

Sample description
FSS-NOL-05-02-002-R SOIL

Spectrum Filename: C:\GammaVision\Spectra\103F_23FEB2006_1517.An1

Acquisition information
Start time: 23-Feb-2006 15:19:37
Live time: 2000
Real time: 2003
Dead time: 0.17 %
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/channel^2

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: 1.7250E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7250E+03) =
5.7971E+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	21-Feb-2006 15:08:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3449

***** 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	126.	21.84	0.99	9.052E-03	74.81	9.600	1.136E+00	PB212
77.21	189.	12.46	0.99	1.011E-02	77.11	17.500	1.016E+00	PB212
					77.11	10.700	1.662E+00	PB214
87.61	104.	41.38	1.50	1.472E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	1.465E+00	CD109
92.92	113.	33.72	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
92.97	105.	36.37	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
128.79	111.	31.41	0.80	2.434E-02				
185.88	158.	22.57	1.41	2.567E-02	185.99	3.280	1.347E+00	RA226
209.72	137.	25.24	0.91	2.469E-02				
238.71	1086.	3.51	1.09	2.320E-02	238.63	43.100	8.419E-01	PB212
241.69	159.	15.59	1.09	2.304E-02	241.00	3.900	1.386E+00	RA224
					241.92	7.470	7.254E-01	PB214
270.38	140.	24.43	1.20	2.150E-02				
295.11	267.	10.47	1.17	2.025E-02	295.22	19.200	5.299E-01	PB214
300.00	76.	32.61	1.20	2.002E-02				
327.62	55.	40.32	0.92	1.876E-02				
337.95	247.	14.56	1.06	1.832E-02	338.40	12.010	8.772E-01	AC228
351.80	397.	7.08	1.14	1.776E-02	351.99	37.100	4.651E-01	PB214
409.63	59.	30.32	1.25	1.574E-02				
462.68	85.	21.79	1.52	1.427E-02				
462.68	85.	21.79	1.52	1.427E-02	463.51	10.000	4.588E-01	SB125
510.47	137.	13.24	1.26	1.318E-02	510.72	22.500	2.907E-01	TL208

582.80	385.	6.95	1.32	1.185E-02	583.14	86.000	2.928E-01	TL208
608.93	296.	8.60	1.42	1.145E-02	609.32	46.090	4.308E-01	BI214
726.57	99.	17.51	1.85	9.971E-03	727.17	11.800	6.563E-01	BI212
794.62	64.	24.60	1.54	9.311E-03				
794.62	64.	24.60	1.54	9.311E-03	795.76	85.400	6.354E-02	CS134
859.99	106.	21.57	1.18	8.772E-03				
910.60	234.	8.97	1.75	8.405E-03	911.07	29.000	7.422E-01	AC228
963.11	38.	32.95	1.54	8.060E-03				
963.11	38.	32.95	1.54	8.060E-03	964.00	14.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
968.26	149.	9.90	1.54	8.028E-03	968.90	17.460	8.316E-01	AC228
1119.94	121.	18.86	1.49	7.213E-03	1120.28	15.040	8.602E-01	BI214
1407.43	19.	36.72	1.81	6.096E-03	1408.08	21.210	PBC<MDA	EU152
1459.85	1296.	2.90	1.89	5.935E-03	1460.75	10.700	1.577E+01	K40
1619.36	40.	15.81	1.63	5.488E-03	1620.56	2.750	2.074E+00	BI212
1763.54	47.	15.41	1.69	5.144E-03	1764.51	15.920	4.223E-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	
256.75	128.79	512.	126.	0.063	80.90	0.795	AC-228	
418.59	209.72	441.	137.	0.068	75.71	0.911	NP-239	s
539.90	270.38	365.	140.	0.070	73.28	1.196	AC-228	s
599.14	300.00	234.	76.	0.038	97.83	1.205	PB-212	
654.37	327.62	202.	55.	0.028	120.96	0.917	AC-228	
818.39	409.63	113.	59.	0.029	90.97	1.253	AC-228	s
1719.02	859.99	109.	106.	0.053	64.71	1.177	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	336.	126.	0.063	65.53	0.993D
PB-212	153.39	77.11	331.	189.	0.094	37.37	0.995A
CD-109	174.39	87.61	875.	104.	0.052	124.13	1.500
TH-234	185.00	92.92	921.	113.	0.056	101.16	1.500s
RA-226	370.92	185.88	495.	145.	0.072	67.71	1.407s
PB-212	476.42	238.63	225.	1065.	0.533	10.80	1.093D
RA-224	481.16	241.00	831.	109.	0.055	116.82	1.095D
PB-214	483.00	241.92	325.	106.	0.053	58.84	1.095A
PB-214	589.36	295.11	238.	263.	0.131	31.42	1.171
AC-228	675.05	337.95	329.	246.	0.123	43.69	1.062s
PB-214	702.75	351.80	176.	391.	0.196	21.23	1.139s
SB-125	924.55	462.71	113.	75.	0.038	67.76	1.500s
TL-208	1019.92	510.40	219.	169.	0.084	45.24	1.546s
TL-208	1164.70	582.80	118.	381.	0.190	20.84	1.318
BI-214	1216.95	608.93	128.	290.	0.145	25.79	1.424
BI-212	1452.22	726.57	72.	99.	0.049	52.54	1.851s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	1588.21	794.57	57.	53.	0.027	72.58	1.500s
AC-228	1820.22	910.60	77.	231.	0.115	26.90	1.750
EU-152	1926.96	963.97	89.	42.	0.021	103.50	1.538
AC-228	1934.43	967.71	92.	219.	0.110	32.35	1.433
BI-214	2238.86	1119.94	110.	119.	0.060	56.57	1.491s
EU-152	2813.75	1407.43	14.	19.	0.009	110.16	1.812
K-40	2918.57	1459.85	47.	1277.	0.639	8.69	1.894
BI-212	3237.54	1619.36	0.	40.	0.020	47.43	1.625s
BI-214	3525.87	1763.56	8.	34.	0.017	55.46	2.033

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	%(	3.624E-01 1.05E-01 G	
K-40		1.5766E+01					
			1460.75	1.577E+01	(P	4.262E-01 4.63E-01 G	
MN-54		6.9511E-03					
			834.81	6.951E-03	%(P	4.288E-02 1.25E-02 G	
CO-57		-1.6910E-04					
			122.07	-1.691E-04	&(P	5.391E-02 1.60E-02 G K	
			136.43	-3.638E-03	&	4.268E-01 1.27E-01 G	
CO-60		-1.3350E-02					
			1332.51	-1.335E-02	%(P	4.137E-02 1.17E-02 G K	
			1173.23	2.451E-02	% P	4.872E-02 1.47E-02 G K	
Sr-85		-2.5789E-02					
			514.00	-2.579E-02	%(	4.901E-02 1.49E-02 G	
Kr-85		-5.8255E+02					
			513.99	-5.825E+02	%(	1.107E+03 3.37E+02 G	
Y-88		-4.0373E-04					
			1836.01	-4.037E-04	%(P	2.747E-02 7.03E-03 G K	
			898.02	-4.763E-03	& P	3.865E-02 1.10E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-8.6197E-03						
		871.10	-8.620E-03	%(	4.043E-02	1.19E-02	G K
		702.50	0.000E+00	&	3.818E-02	1.10E-02	G K
Ag-108M	-2.3958E-02						
		722.95	-2.396E-02	%(	5.474E-02	1.65E-02	G K
		614.37	-4.178E-04	& P	4.016E-02	1.16E-02	G
		433.93	-5.230E-03	&	3.487E-02	1.03E-02	G
CD-109	1.4654E+00						
		88.04	1.465E+00	(	1.979E+00	6.06E-01	G
SN-113	3.2557E-04						
		391.71	3.256E-04	&(	4.998E-02	1.46E-02	G K
		255.04	3.073E-01	%	1.733E+00	5.17E-01	G
SB-125	9.4212E-02						
		427.95	-1.439E-02	%(P	1.014E-01	2.98E-02	G K
		600.77	6.639E-02	% P	1.702E-01	5.11E-02	G
		636.15	7.067E-02	% P	3.362E-01	9.90E-02	G
		463.51	4.157E-01	*(P	2.879E-01	9.55E-02	G
		176.29	-7.302E-03	&	5.853E-01	1.74E-01	G
I-131	6.4875E-03						
		364.48	6.488E-03	%(P	4.713E-02	1.39E-02	G K
		636.97	-8.928E-02	%	6.367E-01	1.86E-01	G
		284.29	-8.872E-02	% P	6.573E-01	1.95E-01	G
CS-134	2.6132E-02						
		604.66	2.975E-03	%(	9.777E-02	2.91E-02	G K
		795.76	5.260E-02	*(P	3.733E-02	1.27E-02	G
		569.29	3.260E-02	% P	2.089E-01	6.08E-02	G
		801.84	1.183E-01	% P	2.373E-01	7.14E-02	G
CS-137	2.1115E-02						
		661.62	2.112E-02	%(P	4.036E-02	1.23E-02	G
CE-139	2.3354E-03						
		165.85	2.335E-03	%(	4.974E-02	1.48E-02	G
EU-152	1.0024E-01						
		121.78	-1.093E-03	&(P	1.536E-01	4.56E-02	G K
		344.30	1.546E-02	& P	1.028E-01	3.03E-02	G
		1408.08	1.141E-01	(	1.239E-01	4.19E-02	G
		964.00	2.833E-01	&(P	3.116E-01	9.90E-02	G
		1112.07	-7.411E-03	%	2.332E-01	6.47E-02	G
		778.90	-4.524E-03	&	1.926E-01	5.35E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	1.4101E-02						
		123.10	1.410E-02	&(	1.041E-01	3.11E-02	G K
		1274.80	4.838E-05	&	1.173E-01	3.28E-02	G
		723.30	-9.408E-02	%	2.534E-01	7.61E-02	G
		1004.80	-3.138E-02	&	2.391E-01	6.92E-02	G
EU-155	1.0843E-02						
		86.45	1.084E-02	&(	2.574E-01	7.68E-02	G K
		105.31	2.802E-02	&	2.429E-01	7.26E-02	G
HG-203	-1.8141E-05						
		279.17	-1.814E-05	&(P	4.209E-02	1.24E-02	G K
		72.87	-5.280E-01	% P	2.375E+00	7.13E-01	G
		70.83	-1.279E-02	%	4.328E+00	1.29E+00	G
		82.50	-1.648E-01	&	3.081E+00	9.14E-01	G
TL-208	2.9277E-01						
		583.14	2.928E-01	(P	4.106E-02	2.06E-02	G
		510.72	4.462E-01	+ P	1.895E-01	7.79E-02	G
PB-212	8.3446E-01						
		238.63	8.345E-01	(P	5.684E-02	3.04E-02	G K
							Energy duplication
		77.11	8.345E-01	} P	3.874E-01	1.04E-01	G
		74.81	1.136E+00	+ P	7.945E-01	2.54E-01	G
PB-214	4.8376E-01						
		351.99	4.651E-01	@(P	7.674E-02	3.34E-02	G K
		295.22	5.299E-01	(P	1.503E-01	5.63E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.401E-01	0.00E+00	G
		241.92	4.838E-01	}	3.953E-01	9.49E-02	G
BI-212	6.5628E-01						
		727.17	6.563E-01	(P	2.824E-01	1.15E-01	G K
		1620.56	2.074E+00	+ P	3.826E-01	3.28E-01	G
		785.42	7.067E-01	%	1.915E+00	5.73E-01	G
BI-214	4.3079E-01						
		609.32	4.308E-01	(P	8.239E-02	3.78E-02	G K
		1764.51	3.268E-01	- P	1.559E-01	6.62E-02	G
		1120.28	8.602E-01	+ P	3.724E-01	1.65E-01	G
RA-224	9.5167E-01						
							Derived Ave Activity
		241.00	9.517E-01	}(	1.193E+00	3.80E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

RA-226       1.3469E+00
                          185.99 1.347E+00 *(P 9.902E-01 3.31E-01 G

AC-228       7.8174E-01
                          911.07 7.422E-01  (P 1.403E-01 6.75E-02 G K
                          968.90 1.225E+00 + P 2.650E-01 1.32E-01 G
                          338.40 8.772E-01 *(P 3.109E-01 1.28E-01 G

TH-227      -4.4803E-02
                          236.00-4.480E-02 %(  3.593E-01 1.07E-01 G K
                          256.25-1.120E-02 & P 5.015E-01 1.48E-01 G

PA-234       2.1518E-03
                           98.44 2.152E-03 %(P 2.074E-01 6.15E-02 G K
                          946.00 1.692E-04 % P 1.670E-01 4.67E-02 G
                          131.28-2.640E-02 % P 2.216E-01 6.62E-02 G
                           94.67-5.512E-03 % P 4.209E-01 1.25E-01 G
                          883.24-2.479E-02 %   2.758E-01 7.87E-02 G
                          926.70 8.267E-02 %   3.620E-01 1.06E-01 G
                          569.26 4.991E-02 % P 3.090E-01 9.00E-02 G

TH-234       1.0868E+00
                           63.29 5.446E-01 %(P 6.743E+00 2.01E+00 G K
                           92.80 1.792E+00  (P 2.288E+00 6.99E-01 G
                           92.38 1.968E+00 % P 2.743E+00 8.36E-01 G

AM-241      -8.8409E-02
                           59.54-8.841E-02 %(P 1.160E+00 3.45E-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:	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 - 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	0.0000E+00	0.0000E+00	3.1607E-01	3.1607E-01	3.530E-01
K-40		1.5766E+01	1.5766E+01	1.3906E+00	1.6648E+00	
MN-54	#A	6.9202E-03	6.9511E-03	3.7581E-02	3.7583E-02	4.269E-02
CO-57	#B	-1.6823E-04	-1.6910E-04	4.1498E-02	4.1498E-02	5.363E-02
CO-60	#B	-1.3341E-02	-1.3350E-02	5.7993E-02	5.7998E-02	4.134E-02
Sr-85	#A	-2.5241E-02	-2.5789E-02	4.4727E-02	4.4752E-02	4.797E-02
Kr-85	#A	-5.8254E+02	-5.8255E+02	1.0106E+03	1.0112E+03	1.107E+03
Y-88	#B	-3.9849E-04	-4.0373E-04	3.5152E-02	3.5152E-02	2.712E-02
NB-94	#B	-8.6197E-03	-8.6197E-03	3.5583E-02	3.5586E-02	4.043E-02
Ag-108M	#B	-2.3957E-02	-2.3958E-02	4.9623E-02	4.9643E-02	5.474E-02
CD-109	#A	1.4609E+00	1.4654E+00	1.8191E+00	1.8209E+00	1.973E+00
SN-113	#B	3.2166E-04	3.2557E-04	4.3665E-02	4.3665E-02	4.938E-02
SB-125	#B	9.4083E-02	9.4212E-02	6.4912E-02	6.5142E-02	1.013E-01
I-131	#B	5.4562E-03	6.4875E-03	4.1710E-02	4.1712E-02	3.964E-02
CS-134	#B	2.6084E-02	2.6132E-02	1.8998E-02	1.9059E-02	9.759E-02
CS-137	#A	2.1113E-02	2.1115E-02	3.6782E-02	3.6802E-02	4.035E-02
CE-139	#A	2.3118E-03	2.3354E-03	4.4438E-02	4.4438E-02	4.924E-02
EU-152	#B	1.0021E-01	1.0024E-01	1.0508E-01	1.0523E-01	1.535E-01
EU-154	#B	1.4095E-02	1.4101E-02	9.3299E-02	9.3302E-02	1.040E-01
EU-155	#B	1.0835E-02	1.0843E-02	2.3048E-01	2.3048E-01	2.572E-01
HG-203	#B	-1.7607E-05	-1.8141E-05	2.8651E-03	2.8651E-03	4.085E-02
TL-208		2.9277E-01	2.9277E-01	6.1718E-02	6.4016E-02	
PB-212		8.3446E-01	8.3446E-01	9.1101E-02	1.0318E-01	
PB-214		4.8376E-01	4.8376E-01	1.0420E-01	1.0792E-01	
BI-212	#	6.5628E-01	6.5628E-01	3.4653E-01	3.4862E-01	
BI-214		4.3079E-01	4.3079E-01	1.1356E-01	1.1628E-01	
RA-224	A	9.5167E-01	9.5167E-01	1.1117E+00	1.1131E+00	
RA-226	#	1.3469E+00	1.3469E+00	9.9368E-01	9.9676E-01	
AC-228		7.8174E-01	7.8174E-01	2.0199E-01	2.0703E-01	
TH-227	#B	-4.4803E-02	-4.4803E-02	3.2161E-01	3.2162E-01	3.593E-01
PA-234	#B	2.1518E-03	2.1518E-03	1.8461E-01	1.8461E-01	2.074E-01
TH-234	#B	1.0868E+00	1.0868E+00	1.2714E+00	1.2728E+00	6.743E+00

AM-241 #A	-8.8408E-02	-8.8409E-02	1.0811E+00	1.0811E+00	1.159E+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 (269.9 to 2000.7 keV) 2.1544125E+01 pCi/gm
Total Decayed Activity (269.9 to 2000.7 keV) 2.1544128E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107_16NOV2005_1140.An1

Sample description
NOL-05-02-017-C

Spectrum Filename: C:\GammaVision\Spectra\107_16NOV2005_1140.An1

Acquisition information
Start time: 18-Nov-2005 11:41:16
Live time: 2000
Real time: 2002
Dead time: 0.12 %
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/channel^2

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: 1.9910E+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	17-Nov-2005 09:20:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1766

***** 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
74.79	295.	20.75	1.50	2.849E-02	72.87	6.400	1.159E+00	HG203
					74.81	9.600	7.329E-01	PB212
77.02	444.	13.60	1.50	2.957E-02	77.11	10.700	9.532E-01	PB214
					77.11	17.500	5.828E-01	PB212
77.02	449.	13.60	1.50	2.957E-02	77.11	10.700	9.532E-01	PB214
					77.11	17.500	5.891E-01	PB212
87.04	178.	21.27	1.19	3.302E-02	86.45	32.740	1.122E-01	EU155
					88.04	3.790	9.567E-01	CD109
90.10	113.	32.15	1.19	3.379E-02				
93.08	132.	27.42	1.19	3.446E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.97	186.	18.97	1.56	3.610E-02	185.99	3.280	1.068E+00	RA226
238.66	1000.	4.15	1.30	3.189E-02	238.63	43.100	4.862E-01	PB212
					241.00	3.900	5.479E+00	RA224
241.47	156.	24.94	1.30	3.167E-02				
270.05	122.	29.90	1.04	2.946E-02				
294.98	307.	13.04	1.46	2.769E-02				
294.98	307.	13.04	1.46	2.769E-02	295.22	19.200	3.863E-01	PB214
328.07	77.	30.00	1.66	2.560E-02				
338.40	282.	12.00	1.47	2.500E-02	338.40	12.010	6.292E-01	AC228
351.72	538.	8.11	1.69	2.427E-02				
351.72	538.	8.11	1.69	2.427E-02	351.99	37.100	4.022E-01	PB214
510.67	131.	13.98	2.45	1.808E-02	510.72	22.500	2.191E-01	TL208
582.95	392.	8.13	1.54	1.629E-02	583.14	86.000	1.875E-01	TL208
600.79	35.	41.26	1.55	1.592E-02	600.77	18.400	PBC<MDA	SB125
609.24	380.	7.65	1.57	1.574E-02	609.32	46.090	3.512E-01	BI214
661.38	136.	17.70	1.21	1.478E-02	661.62	84.620	7.172E-02	CS137

725.81	117.	20.05	2.32	1.374E-02	723.30	19.700	2.927E-01	EU154
					727.17	11.800	4.906E-01	BI212
769.51	64.	28.79	0.86	1.317E-02				
794.51	64.	34.55	1.50	1.285E-02				
911.07	280.	7.95	1.51	1.161E-02	911.07	29.000	5.560E-01	AC228
967.61	248.	11.10	1.62	1.110E-02	968.90	17.460	8.620E-01	AC228
1119.46	93.	16.29	1.25	9.975E-03	1120.28	15.040	4.179E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1331.46	21.	37.99	2.03	8.773E-03	1332.51	99.980	PBC<MDA	CO60
1460.19	1794.	2.47	2.29	8.193E-03	1460.75	10.700	1.386E+01	K40
1763.50	95.	10.21	2.19	7.084E-03	1764.51	15.920	5.724E-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	
173.75	87.11	626.	178.	0.089	63.81	1.187	BI-207	D
179.87	90.17	608.	113.	0.057	96.45	1.189	PB-214	D
185.82	93.15	588.	132.	0.066	82.27	1.191	U-235	D
476.96	238.65	361.	1000.	0.500	12.44	1.297	PB-212	D
482.57	241.46	680.	156.	0.078	74.81	1.299	PB-214	D
539.72	270.05	430.	122.	0.061	89.70	1.044	AC-228	s
655.76	328.07	209.	77.	0.039	90.01	1.659	AC-228	s
1538.58	769.51	95.	64.	0.032	86.37	0.858	BI-214	sM
1588.58	794.51	112.	72.	0.036	71.39	1.501	AC-228	

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	149.26	74.79	1782.	295.	0.148	62.25	1.500s
PB-214	153.89	77.11	1645.	444.	0.222	40.79	1.500D
PB-212	153.89	77.11	1640.	449.	0.225	40.79	1.500D
EU-155	173.91	87.12	1485.	177.	0.088	95.10	1.500
CD-109	174.67	87.50	1383.	135.	0.067	119.60	1.500
RA-226	371.58	185.97	484.	186.	0.093	56.91	1.557s
PB-212	476.89	238.63	827.	977.	0.488	15.46	1.500s
PB-214	590.05	295.21	409.	278.	0.139	35.07	1.500s
AC-228	676.42	338.40	300.	278.	0.139	35.99	1.468s
PB-214	703.38	351.88	275.	492.	0.246	19.42	1.500s
TL-208	1020.94	510.67	170.	131.	0.066	41.94	2.449s
TL-208	1165.48	582.95	182.	387.	0.193	24.39	1.542
BI-214	1218.06	609.24	150.	375.	0.188	22.95	1.574
CS-137	1322.33	661.38	137.	132.	0.066	53.09	1.214s
BI-212	1451.19	725.81	129.	117.	0.059	60.16	2.324s
AC-228	1821.71	911.07	76.	276.	0.138	23.86	1.509

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1934.78	967.61	121.	246.	0.123	33.30	1.615s
BI-214	2238.48	1119.46	54.	92.	0.046	48.87	1.251s
K-40	2919.97	1460.19	46.	1790.	0.895	7.42	2.289
BI-214	3526.65	1763.50	1.	95.	0.048	30.62	2.187

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		7.8478E-02					
			477.56	7.848E-02	%(	1.923E-01 5.79E-02 G	
K-40		1.3860E+01					
			1460.75	1.386E+01	(P	2.666E-01 3.44E-01 G	
MN-54		1.4010E-03					
			834.81	1.401E-03	&(P	2.838E-02 8.20E-03 G	
CO-57		-5.6649E-03					
			122.07	-5.665E-03	%(P	3.055E-02 9.16E-03 G K	
			136.43	-1.064E-02	% P	2.553E-01 7.62E-02 G	
CO-60		1.5928E-02					
			1332.51	1.593E-02	%(P	2.324E-02 7.16E-03 G K	
			1173.23	1.955E-02	% P	3.998E-02 1.20E-02 G K	
Sr-85		-1.5510E-02					
			514.00	-1.551E-02	&(	3.123E-02 9.48E-03 G	
Kr-85		-3.8533E+02					
			513.99	-3.853E+02	&(P	7.189E+02 2.17E+02 G	
Y-88		1.9889E-03					
			1836.01	1.989E-03	%(P	1.510E-02 3.91E-03 G K	
			898.02	9.305E-03	% P	2.440E-02 7.26E-03 G	
NB-94		6.1926E-04					
			871.10	6.193E-04	%(P	2.667E-02 7.65E-03 G K	
			702.50	2.938E-03	% P	2.460E-02 7.16E-03 G K	
Ag-108M		1.2152E-02					
			722.95	1.215E-02	&(	3.023E-02 9.10E-03 G K	
			614.37	-2.184E-02	&	3.347E-02 1.03E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	1.115E-02	% P	2.364E-02	7.15E-03	G
CD-109	7.2673E-01						
		88.04	7.267E-01	(P	9.491E-01	2.90E-01	G
SN-113	-8.6521E-04						
		391.71	-8.652E-04	%(P	3.789E-02	1.11E-02	G K
		255.04	-3.041E-01	%	1.176E+00	3.53E-01	G
SB-125	-1.5914E-02						
		427.95	-1.591E-02	%(P	7.486E-02	2.21E-02	G K
		600.77	8.039E-02	% P	1.110E-01	3.45E-02	G
		636.15	1.964E-02	& P	1.948E-01	5.64E-02	G
		463.51	1.199E-01	% P	2.353E-01	7.13E-02	G
		176.29	1.064E-01	% P	3.524E-01	1.06E-01	G
I-131	3.0690E-03						
		364.48	3.069E-03	%(	2.749E-02	8.10E-03	G K
		636.97	-4.573E-02	%	3.470E-01	1.01E-01	G
		284.29	-1.388E-01	%	4.299E-01	1.29E-01	G
CS-134	-4.6496E-03						
		604.66	-4.650E-03	&(P	2.367E-02	6.95E-03	G K
		795.76	-5.203E-03	% P	3.332E-02	9.74E-03	G
		569.29	-1.672E-03	%	1.237E-01	3.54E-02	G
		801.84	-9.388E-02	% P	2.853E-01	8.48E-02	G
CS-137	7.1719E-02						
		661.62	7.172E-02	*(P	3.108E-02	1.30E-02	G
CE-139	3.2174E-05						
		165.85	3.217E-05	&(P	3.285E-02	9.78E-03	G
EU-152	-2.2205E-02						
		121.78	-2.220E-02	%(P	9.293E-02	2.79E-02	G K
		344.30	-1.676E-02	% P	8.823E-02	2.62E-02	G
		1408.08	-1.649E-02	% P	1.256E-01	3.54E-02	G
		964.00	2.376E-02	& P	2.991E-01	8.79E-02	G
		1112.07	-5.141E-02	% P	2.276E-01	6.66E-02	G
		778.90	-4.722E-03	& P	1.849E-01	5.28E-02	G
EU-154	-2.9844E-03						
		123.10	-2.984E-03	%(P	6.743E-02	2.01E-02	G K
		1274.80	-2.755E-03	% P	7.951E-02	2.24E-02	G
		723.30	-9.479E-03	& P	1.427E-01	4.14E-02	G
		1004.80	-3.945E-02	% P	1.889E-01	5.56E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.1176E-01						
		86.45	1.118E-01	(	1.151E-01	3.54E-02	G K
		105.31	3.520E-02	% P	1.391E-01	4.19E-02	G
HG-203	-3.8073E-04						
		279.17	-3.807E-04	&(P	2.781E-02	8.18E-03	G K
		72.87	4.233E-01	% P	8.037E-01	2.44E-01	G
		70.83	-9.032E-02	%	1.083E+00	3.23E-01	G
		82.50	-3.250E-01	%	1.658E+00	4.98E-01	G
TL-208	1.9404E-01						
		583.14	1.875E-01	(P	3.177E-02	1.54E-02	G
		510.72	2.191E-01	*(P	1.058E-01	3.85E-02	G
PB-212	4.8227E-01						
		238.63	4.823E-01	@(P	6.752E-02	2.53E-02	G K
							Energy duplication
		77.11	5.891E-01	+	2.511E-01	8.01E-02	G
		74.81	7.329E-01	+ P	4.949E-01	1.54E-01	G
PB-214	3.6582E-01						
		351.99	3.712E-01	*(P	6.027E-02	2.43E-02	G K
		295.22	3.554E-01	(P	1.239E-01	4.22E-02	G
							Energy duplication
		77.11	9.532E-01	+ P	4.112E-01	1.31E-01	G
		241.92	-2.670E-02	% P	3.606E-01	1.07E-01	G
BI-212	4.9059E-01						
		727.17	4.906E-01	*(P	2.327E-01	9.93E-02	G K
		1620.56	1.564E-01	% P	7.365E-01	2.08E-01	G
		785.42	-3.308E-02	% P	1.439E+00	4.13E-01	G
BI-214	3.6763E-01						
		609.32	3.512E-01	(P	5.584E-02	2.72E-02	G K
		1764.51	5.724E-01	+ P	4.436E-02	5.90E-02	G
		1120.28	4.179E-01	*(P	1.668E-01	6.87E-02	G
RA-224	3.3408E-02						
		241.00	3.341E-02	%(P	8.254E-01	2.46E-01	G
RA-226	1.0684E+00						
		185.99	1.068E+00	*(	6.029E-01	2.03E-01	G
AC-228	5.7745E-01						
		911.07	5.560E-01	(P	8.750E-02	4.49E-02	G K
		968.90	8.620E-01	+ P	1.892E-01	9.65E-02	G
		338.40	6.292E-01	@(P	1.884E-01	7.64E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.5462E-01
                          236.00-1.546E-01 %(P 2.792E-01 8.49E-02 G K
                          256.25-1.001E-01 % P 3.665E-01 1.10E-01 G

PA-234      -6.5195E-03
                           98.44-6.519E-03 &(  1.104E-01 3.29E-02 G K
                          946.00 3.974E-02 %   1.272E-01 3.77E-02 G
                          131.28-9.675E-03 &   1.472E-01 4.40E-02 G
                           94.67-2.114E-02 %   2.249E-01 6.74E-02 G
                          883.24-3.037E-02 %   1.950E-01 5.65E-02 G
                          926.70 4.936E-02 &   2.120E-01 6.21E-02 G
                          569.26 1.578E-02 %   1.709E-01 4.93E-02 G

TH-234       5.7686E-01
                           63.29 5.769E-01 %(P 1.499E+00 4.52E-01 G K
                           92.80 5.158E-01 % P 1.183E+00 3.57E-01 G
                           92.38-9.420E-02 % P 1.412E+00 4.21E-01 G

AM-241      -1.6836E-02
                           59.54-1.684E-02 %(P 1.946E-01 5.82E-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 - 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	7.7367E-02	7.8478E-02	1.7368E-01	1.7374E-01	1.895E-01
K-40		1.3860E+01	1.3860E+01	1.0309E+00	1.3164E+00	
MN-54	#A	1.3976E-03	1.4010E-03	2.4602E-02	2.4602E-02	2.831E-02
CO-57	#B	-5.6490E-03	-5.6649E-03	2.8049E-02	2.8051E-02	3.046E-02
CO-60	#B	1.5922E-02	1.5928E-02	2.1474E-02	2.1495E-02	2.323E-02
Sr-85	#A	-1.5329E-02	-1.5510E-02	2.8443E-02	2.8457E-02	3.086E-02
Kr-85	#A	-3.8532E+02	-3.8533E+02	7.4696E+02	7.4731E+02	7.189E+02
Y-88	#B	1.9748E-03	1.9889E-03	1.1734E-02	1.1734E-02	1.499E-02
NB-94	#B	6.1926E-04	6.1926E-04	2.2947E-02	2.2947E-02	2.667E-02
Ag-108M	#B	1.2152E-02	1.2152E-02	2.7290E-02	2.7300E-02	3.023E-02
CD-109	#A	7.2551E-01	7.2673E-01	8.7125E-01	8.7218E-01	9.475E-01
SN-113	#B	-8.5951E-04	-8.6521E-04	1.2043E-01	1.2043E-01	3.764E-02
SB-125	#B	-1.5902E-02	-1.5914E-02	8.0561E-02	8.0567E-02	7.480E-02
I-131	#B	2.7918E-03	3.0690E-03	2.4286E-02	2.4287E-02	2.500E-02
CS-134	#B	-4.6449E-03	-4.6496E-03	2.3021E-02	2.3023E-02	2.365E-02
CS-137	#	7.1714E-02	7.1719E-02	3.9093E-02	3.9322E-02	
CE-139	#A	3.1997E-05	3.2174E-05	2.9346E-02	2.9346E-02	3.267E-02
EU-152	#B	-2.2201E-02	-2.2205E-02	8.4461E-02	8.4470E-02	9.291E-02
EU-154	#B	-2.9836E-03	-2.9844E-03	7.0880E-02	7.0880E-02	6.741E-02
EU-155	#A	1.1172E-01	1.1176E-01	1.0629E-01	1.0647E-01	1.151E-01
HG-203	#B	-3.7456E-04	-3.8073E-04	6.3586E-02	6.3586E-02	2.736E-02
TL-208		1.9404E-01	1.9404E-01	4.7874E-02	4.9227E-02	
PB-212	#	4.8227E-01	4.8227E-01	7.5758E-02	8.0936E-02	6.752E-02
PB-214	#	3.6582E-01	3.6582E-01	7.1768E-02	7.4949E-02	6.027E-02
BI-212	#	4.9059E-01	4.9059E-01	2.9839E-01	2.9980E-01	
BI-214		3.6763E-01	3.6763E-01	8.5358E-02	8.8076E-02	
RA-224	#A	3.3408E-02	3.3408E-02	7.3863E-01	7.3863E-01	8.254E-01
RA-226	#	1.0684E+00	1.0684E+00	6.0803E-01	6.1130E-01	
AC-228		5.7745E-01	5.7745E-01	1.2626E-01	1.3078E-01	
TH-227	#B	-1.5462E-01	-1.5462E-01	2.5644E-01	2.5660E-01	2.792E-01
PA-234	#B	-6.5195E-03	-6.5195E-03	9.8823E-02	9.8823E-02	1.104E-01
TH-234	#B	5.7686E-01	5.7686E-01	1.3564E+00	1.3568E+00	1.499E+00
AM-241	#A	-1.6835E-02	-1.6836E-02	1.9088E-01	1.9088E-01	1.946E-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 (269.7 to 2000.1 keV) 1.6629475E+01 pCi/gm
Total Decayed Activity (269.7 to 2000.1 keV) 1.6629480E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107_17NOV2005_1634.An1

Sample description
NOL-05-02-018-C

Spectrum Filename: C:\GammaVision\Spectra\107_17NOV2005_1634.An1

Acquisition information
Start time: 17-Nov-2005 16:34:10
Live time: 2000
Real time: 2003
Dead time: 0.15 %
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/channel^2

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: 2.1940E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1940E+03) =
4.5579E+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	17-Nov-2005 10:55:00
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. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1347

***** 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
74.78	348.	13.61	1.18	2.849E-02	72.87	6.400	1.224E+00	HG203
					74.81	9.600	7.835E-01	PB212
77.08	565.	6.96	1.18	2.957E-02	77.11	10.700	1.132E+00	PB214
					77.11	17.500	6.980E-01	PB212
86.61	163.	28.04	1.19	3.283E-02				
86.61	163.	28.04	1.19	3.283E-02	86.45	32.740	9.317E-02	EU155
89.81	107.	38.58	1.19	3.366E-02	88.04	3.790	PBC<MDA	CD109
93.28	258.	16.43	1.19	3.445E-02	92.38	2.570	1.749E+00	TH234
					92.80	3.000	1.424E+00	TH234
185.95	129.	25.66	1.26	3.609E-02	185.99	3.280	6.725E-01	RA226
209.31	189.	22.87	1.98	3.428E-02				
238.69	1500.	3.38	1.30	3.188E-02	238.63	43.100	6.649E-01	PB212
241.58	259.	13.83	1.30	3.165E-02	241.00	3.900	1.278E+00	RA224
					241.92	7.470	6.710E-01	PB214
270.20	123.	30.28	0.95	2.945E-02				
276.69	84.	39.67	1.57	2.897E-02				
295.22	312.	9.26	1.34	2.768E-02	295.22	19.200	3.569E-01	PB214
300.49	86.	27.63	1.34	2.732E-02				
328.76	132.	27.39	0.93	2.556E-02				
338.55	347.	10.76	1.55	2.499E-02	338.40	12.010	7.051E-01	AC228
351.88	637.	8.39	1.59	2.426E-02	351.99	37.100	4.325E-01	PB214
462.20	144.	22.20	1.96	1.957E-02				
462.20	144.	22.20	1.96	1.957E-02	463.51	10.000	4.460E-01	SB125
510.74	245.	12.31	2.04	1.808E-02	510.72	22.500	3.197E-01	TL208
583.13	581.	5.91	1.74	1.629E-02	583.14	86.000	2.536E-01	TL208
609.23	404.	6.21	1.56	1.574E-02	609.32	46.090	3.389E-01	BI214
614.53	45.	35.06	1.56	1.564E-02				

661.42	288.	9.51	1.87	1.477E-02	661.62	84.620	1.401E-01	CS137
722.74	45.	30.87	1.64	1.380E-02				
727.35	140.	12.49	1.64	1.374E-02	727.17	11.800	5.270E-01	BI212
785.93	38.	41.03	1.68	1.297E-02	785.42	2.000	PBC<MDA	BI212
796.18	92.	27.87	1.80	1.283E-02	795.76	85.400	5.162E-02	CS134
911.02	376.	6.54	2.01	1.161E-02	911.07	29.000	6.802E-01	AC228
967.51	324.	8.12	1.84	1.110E-02	968.90	17.460	1.023E+00	AC228
1119.28	144.	18.81	2.08	9.976E-03	1120.28	15.040	5.887E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1173.02	156.	18.67	1.16	9.639E-03	1173.23	99.860	9.738E-02	CO60
1331.11	117.	14.42	2.09	8.780E-03	1332.51	99.980	7.966E-02	CO60
1460.56	1881.	2.34	2.25	8.192E-03	1460.75	10.700	1.319E+01	K40
1620.19	23.	27.10	1.43	7.569E-03	1620.56	2.750	6.717E-01	BI212
1764.08	105.	10.48	2.17	7.085E-03	1764.51	15.920	5.708E-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	
172.87	86.43	959.	162.	0.081	84.63	1.186	BI-207	D
179.26	89.63	795.	109.	0.055	113.35	1.189	PB-214	D
186.20	93.10	768.	261.	0.130	48.73	1.191	U-235	D
418.25	209.31	700.	189.	0.094	68.62	1.983	AC-228	s
540.03	270.20	490.	123.	0.062	90.85	0.951	AC-228	
553.00	276.69	415.	99.	0.050	92.23	1.574	TL-208	
600.60	300.50	236.	86.	0.043	82.89	1.341	PB-212	lD
657.14	328.76	408.	132.	0.066	82.17	0.935	LA-140	s
923.99	462.20	340.	71.	0.035	116.25	1.956	CS-138	s
1228.64	614.53	104.	45.	0.023	105.17	1.561	RH-106M	lD
1445.89	723.02	73.	43.	0.021	96.32	1.635	J-131	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	974.	348.	0.174	40.82	1.178D
PB-212	153.89	77.11	1014.	565.	0.282	20.87	1.179A
EU-155	173.69	87.01	1877.	177.	0.089	106.04	1.500s
TH-234	185.82	93.08	1753.	265.	0.132	67.52	1.500s
TH-234	185.79	93.06	1705.	258.	0.129	65.14	1.500s
PA-234	191.04	95.69	1932.	-157.	-0.079	120.82	1.500s
RA-226	371.62	185.99	989.	138.	0.069	99.89	1.500s
TH-227	471.54	235.95	1587.	-178.	-0.089	97.52	1.500s
PB-212	476.89	238.63	464.	1480.	0.740	9.81	1.297D
PB-214	483.47	241.92	584.	225.	0.113	49.38	1.299D
PB-214	590.07	295.22	420.	313.	0.156	34.80	1.602s
AC-228	676.71	338.55	364.	344.	0.172	32.28	1.545
PB-214	703.37	351.88	560.	632.	0.316	25.17	1.588s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	925.60	463.00	236.	71.	0.035	94.84	1.500s
TL-208	1021.07	510.74	248.	211.	0.106	36.94	2.037s
TL-208	1165.84	583.13	186.	577.	0.288	17.73	1.742s
BI-214	1218.02	609.22	269.	455.	0.228	24.77	1.743
CS-137	1322.41	661.42	153.	284.	0.142	28.54	1.869
BI-212	1453.91	727.17	88.	139.	0.069	37.97	1.638D
CS-134	1589.59	795.01	132.	52.	0.026	101.75	1.684s
AC-228	1821.60	911.02	92.	372.	0.186	19.62	2.014s
AC-228	1934.58	967.51	107.	322.	0.161	24.35	1.843s
BI-214	2238.12	1119.28	142.	143.	0.072	56.42	2.077s
CO-60	2345.60	1173.02	166.	152.	0.076	56.01	1.161s
CO-60	2661.81	1331.11	51.	113.	0.057	43.26	2.086s
K-40	2920.72	1460.56	21.	1876.	0.938	7.01	2.251
BI-212	3240.00	1620.19	5.	23.	0.011	81.29	1.435s
BI-214	3527.82	1764.08	4.	105.	0.052	31.43	2.168s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-3.3483E-03					
			477.56	-3.348E-03	%(	2.334E-01 6.83E-02	G
K-40		1.3185E+01					
			1460.75	1.319E+01	(P	1.685E-01 3.09E-01	G
MN-54		3.9057E-04					
			834.81	3.906E-04	&(P	3.423E-02 9.98E-03	G
CO-57		-2.5579E-03					
			122.07	-2.558E-03	&(P	3.102E-02 9.28E-03	G K
			136.43	-4.277E-02	& P	2.725E-01 8.18E-02	G
CO-60		8.8516E-02					
			1332.51	7.966E-02	@(P	2.517E-02 1.19E-02	G K
			1173.23	9.738E-02	(P	4.015E-02 1.87E-02	G K
Sr-85		-1.5318E-02					
			514.00	-1.532E-02	%(	3.101E-02 9.41E-03	G
Kr-85		-3.7686E+02					
			513.99	-3.769E+02	%(P	7.170E+02 2.17E+02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	-8.4685E-04						
		1836.01	-8.469E-04	%(P	1.721E-02	4.34E-03	G K
		898.02	4.674E-03	& P	3.114E-02	9.11E-03	G
NB-94	5.6196E-04						
		871.10	5.620E-04	&(P	2.900E-02	8.39E-03	G K
		702.50	1.011E-02	% P	2.516E-02	7.57E-03	G K
Ag-108M	-6.5679E-03						
		722.95	-6.568E-03	&(	2.324E-02	6.89E-03	G K
		614.37	-8.136E-04	%	2.729E-02	7.95E-03	G
		433.93	1.177E-02	% P	2.634E-02	7.96E-03	G
CD-109	-9.2904E-03						
		88.04	-9.290E-03	%(P	1.037E+00	3.11E-01	G
SN-113	3.6037E-03						
		391.71	3.604E-03	%(P	2.958E-02	8.69E-03	G K
		255.04	6.180E-02	&	1.172E+00	3.48E-01	G
SB-125	4.9661E-02						
		427.95	-8.863E-03	%(P	7.511E-02	2.21E-02	G K
		600.77	2.085E-02	& P	1.169E-01	3.43E-02	G
		636.15	-5.801E-02	% P	2.177E-01	6.45E-02	G
		463.51	2.229E-01	@(P	2.343E-01	7.33E-02	G
		176.29	-1.001E-01	% P	4.168E-01	1.25E-01	G
I-131	-1.1925E-04						
		364.48	-1.193E-04	%(	2.551E-02	7.48E-03	G K
		636.97	-8.242E-02	%	3.145E-01	9.33E-02	G
		284.29	1.032E-01	%	3.400E-01	1.02E-01	G
CS-134	1.3924E-02						
		604.66	6.706E-04	&(P	5.913E-02	1.76E-02	G K
		795.76	2.907E-02	@(P	3.155E-02	9.96E-03	G
		569.29	8.285E-03	%	1.104E-01	3.18E-02	G
		801.84	-9.124E-03	% P	2.926E-01	8.44E-02	G
CS-137	1.4013E-01						
		661.62	1.401E-01	(P	2.971E-02	1.35E-02	G
CE-139	-6.3423E-03						
		165.85	-6.342E-03	%(P	3.305E-02	9.93E-03	G
EU-152	-1.4337E-02						
		121.78	-1.434E-02	&(P	9.947E-02	2.99E-02	G K
		344.30	-2.581E-02	% P	8.728E-02	2.62E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                        1408.08 5.131E-02 % P 9.709E-02 2.96E-02 G
                         964.00-5.092E-02 & P 2.257E-01 6.68E-02 G
                        1112.07 4.107E-02 % P 1.851E-01 5.41E-02 G
                         778.90-3.331E-02 % P 1.815E-01 5.31E-02 G

EU-154      -2.2063E-03
                         123.10-2.206E-03 %(P 7.072E-02 2.11E-02 G K
                        1274.80-8.410E-03 & P 1.051E-01 3.05E-02 G
                         723.30-3.166E-04 & P 1.309E-01 3.78E-02 G
                        1004.80-4.478E-02 % P 1.846E-01 5.46E-02 G

EU-155       1.0163E-01
                          86.45 1.016E-01  (  1.172E-01 3.59E-02 G K
                         105.31 3.496E-02 % P 1.371E-01 4.13E-02 G

HG-203      -4.7335E-03
                         279.17-4.733E-03 &(P 3.063E-02 9.13E-03 G K
                          72.87 3.121E-01 % P 8.043E-01 2.43E-01 G
                          70.83 1.361E-02 %   1.421E+00 4.26E-01 G
                          82.50-6.525E-01 %   1.757E+00 5.31E-01 G

TL-208       2.5358E-01
                         583.14 2.536E-01 *(P 2.915E-02 1.51E-02 G
                         510.72 3.197E-01 + P 1.152E-01 4.56E-02 G

PB-212       6.7322E-01
                         238.63 6.632E-01  (P 4.619E-02 2.19E-02 G K
                                                         Energy duplication
                          77.11 6.724E-01 }   1.799E-01 4.68E-02 G
                          74.81 7.835E-01 + P 3.336E-01 1.08E-01 G

PB-214       4.0869E-01
                         351.99 4.325E-01 *(P 7.733E-02 3.66E-02 G K
                         295.22 3.628E-01 *(P 1.138E-01 4.27E-02 G
                                                         Energy duplication
                          77.11 9.797E-03 } P 3.985E-01 1.10E-01 G
                         241.92 5.869E-01 + P 3.006E-01 9.72E-02 G

BI-212       5.5421E-01
                         727.17 5.268E-01  (P 1.766E-01 6.73E-02 G K
                        1620.56 6.717E-01  (P 3.977E-01 1.86E-01 G
                         785.42 9.067E-01 % P 1.238E+00 3.84E-01 G

BI-214       3.8632E-01
                         609.32 3.863E-01  (P 6.717E-02 3.22E-02 G K
                        1764.51 5.708E-01 + P 6.877E-02 6.03E-02 G
                        1120.28 5.887E-01 + P 2.390E-01 1.11E-01 G
```

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

RA-224       4.8056E-01
                          241.00 4.806E-01 %(P 8.734E-01 2.65E-01 G

RA-226       7.1852E-01
                          185.99 7.185E-01 *(  7.762E-01 2.39E-01 G

AC-228       6.8752E-01
                          911.07 6.802E-01 @(P 8.684E-02 4.50E-02 G K
                          968.90 1.023E+00 + P 1.621E-01 8.36E-02 G
                          338.40 7.051E-01  (P 1.880E-01 7.66E-02 G

TH-227      -3.0552E-01
                          236.00-3.055E-01 ?(P 3.226E-01 9.92E-02 G K
                          256.25-5.996E-03 % P 3.429E-01 1.01E-01 G

PA-234       5.2737E-02
                           98.44 5.274E-02 %(  1.244E-01 3.77E-02 G K
                          946.00-3.754E-02 %   1.689E-01 5.01E-02 G
                          131.28-1.244E-02 &   1.480E-01 4.44E-02 G
                           94.67-1.800E-01 +   2.372E-01 7.25E-02 G
                          883.24 5.845E-02 %   1.943E-01 5.76E-02 G
                          926.70 3.508E-03 %   2.300E-01 6.59E-02 G
                          569.26 5.804E-03 %   1.758E-01 5.06E-02 G

TH-234       1.2975E+00
                           63.29 7.451E-01 %(P 1.500E+00 4.54E-01 G K
                           92.80 1.543E+00  (P 1.165E+00 3.61E-01 G
                           92.38 1.849E+00  (P 1.382E+00 4.29E-01 G

AM-241       3.9038E-02
                           59.54 3.904E-02 %(P 1.859E-01 5.59E-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 Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-3.3380E-03	-3.3483E-03	2.0499E-01	2.0499E-01	2.327E-01
K-40		1.3185E+01	1.3185E+01	9.2718E-01	1.2108E+00	
MN-54	#A	3.9037E-04	3.9057E-04	2.9950E-02	2.9950E-02	3.421E-02
CO-57	#B	-2.5564E-03	-2.5579E-03	2.9014E-02	2.9014E-02	3.100E-02
CO-60	#	8.8509E-02	8.8516E-02	3.2249E-02	3.2670E-02	
Sr-85	#A	-1.5279E-02	-1.5318E-02	2.8234E-02	2.8249E-02	3.093E-02
Kr-85	#A	-3.7686E+02	-3.7686E+02	7.3797E+02	7.3831E+02	7.170E+02
Y-88	#B	-8.4556E-04	-8.4685E-04	1.8529E-01	1.8529E-01	1.718E-02
NB-94	#B	5.6196E-04	5.6196E-04	2.5178E-02	2.5178E-02	2.900E-02
Ag-108M	#B	-6.5679E-03	-6.5679E-03	2.0664E-02	2.0668E-02	2.324E-02
CD-109	#A	-9.2871E-03	-9.2904E-03	1.3089E+00	1.3089E+00	1.036E+00
SN-113	#B	3.5986E-03	3.6037E-03	2.6078E-02	2.6078E-02	2.954E-02
SB-125	#B	4.9653E-02	4.9661E-02	4.8972E-02	4.9059E-02	7.510E-02
I-131	#B	-1.1685E-04	-1.1925E-04	2.2426E-02	2.2426E-02	2.500E-02
CS-134	#B	1.3921E-02	1.3924E-02	1.4312E-02	1.4336E-02	5.912E-02
CS-137		1.4013E-01	1.4013E-01	4.0489E-02	4.1326E-02	
CE-139	#A	-6.3348E-03	-6.3423E-03	3.0444E-02	3.0446E-02	3.301E-02
EU-152	#B	-1.4336E-02	-1.4337E-02	9.0552E-02	9.0556E-02	9.947E-02
EU-154	#B	-2.2062E-03	-2.2063E-03	7.7260E-02	7.7260E-02	7.072E-02
EU-155	#A	1.0162E-01	1.0163E-01	1.0777E-01	1.0791E-01	1.172E-01
HG-203	#B	-4.7169E-03	-4.7335E-03	3.1650E-02	3.1651E-02	3.052E-02
TL-208	#	2.5358E-01	2.5358E-01	4.5326E-02	4.7736E-02	
PB-212		6.7322E-01	6.7322E-01	6.6743E-02	7.7688E-02	
PB-214		4.0869E-01	4.0869E-01	8.8841E-02	9.2061E-02	
BI-212		5.5421E-01	5.5421E-01	2.1240E-01	2.1491E-01	
BI-214		3.8632E-01	3.8632E-01	9.6590E-02	9.9248E-02	
RA-224	#A	4.8056E-01	4.8056E-01	7.9617E-01	7.9668E-01	8.734E-01
RA-226	#A	7.1852E-01	7.1852E-01	7.1771E-01	7.1897E-01	7.762E-01
AC-228		6.8752E-01	6.8752E-01	1.3114E-01	1.3728E-01	
TH-227	#A	-3.0552E-01	-3.0552E-01	2.9841E-01	2.9895E-01	3.226E-01

PA-234 #B	5.2737E-02	5.2737E-02	1.1299E-01	1.1303E-01	1.244E-01

TH-234 #B	1.2975E+00	1.2975E+00	8.9910E-01	9.0198E-01	1.500E+00
AM-241 #A	3.9038E-02	3.9038E-02	1.6774E-01	1.6776E-01	1.859E-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 (785.2 to 2000.1 keV) 1.6377323E+01 pCi/gm
Total Decayed Activity (785.2 to 2000.1 keV) 1.6377333E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107_18NOV2005_1019.An1

Sample description
NOL-05-02-015-C

Spectrum Filename: C:\GammaVision\Spectra\107_18NOV2005_1019.An1

Acquisition information
Start time: 18-Nov-2005 10:21:24
Live time: 2000
Real time: 2004
Dead time: 0.18 %
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/channel^2

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: 2.1160E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1160E+03) =
4.7259E+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	17-Nov-2005 09:20:00
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. 23 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1576

***** 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
74.44	357.	14.64	1.18	2.842E-02	72.87	6.400	1.313E+00	HG203
					74.81	9.600	8.256E-01	PB212
77.16	727.	7.67	1.18	2.969E-02	77.11	10.700	1.457E+00	PB214
					77.11	17.500	8.969E-01	PB212
86.86	232.	20.76	1.19	3.298E-02	86.45	32.740	1.380E-01	EU155
					88.04	3.790	PBC<MDA	CD109
90.07	173.	26.19	1.19	3.380E-02				
93.41	243.	18.80	1.19	3.453E-02	92.38	2.570	1.704E+00	TH234
					92.80	3.000	1.383E+00	TH234
129.72	186.	30.07	0.70	3.820E-02				
185.92	302.	18.91	1.81	3.611E-02	185.99	3.280	1.627E+00	RA226
208.92	141.	32.11	1.93	3.432E-02				
238.68	1651.	3.18	1.30	3.189E-02	238.63	43.100	7.596E-01	PB212
					241.00	3.900	8.515E+00	RA224
241.90	275.	15.06	1.30	3.163E-02	241.92	7.470	7.385E-01	PB214
269.94	140.	33.38	1.23	2.947E-02				
278.45	169.	25.45	1.56	2.885E-02				
278.45	169.	25.45	1.56	2.885E-02	279.17	81.500	4.646E-02	HG203
295.08	376.	8.70	1.34	2.768E-02	295.22	19.200	4.464E-01	PB214
300.26	96.	27.61	1.34	2.734E-02				
327.85	140.	29.22	1.24	2.561E-02				
338.28	428.	11.47	1.30	2.501E-02	338.40	12.010	9.028E-01	AC228
351.81	771.	6.69	1.43	2.427E-02	351.99	37.100	5.437E-01	PB214
462.44	138.	19.87	1.64	1.956E-02				
462.44	138.	19.87	1.64	1.956E-02	463.51	10.000	4.431E-01	SB125
510.70	331.	13.10	1.73	1.808E-02	510.72	22.500	4.668E-01	TL208
582.97	587.	5.77	1.83	1.629E-02	583.14	86.000	2.653E-01	TL208

609.18	598.	6.14	1.81	1.574E-02	609.32	46.090	5.221E-01	BI214
661.69	136.	25.63	0.89	1.477E-02	661.62	84.620	6.789E-02	CS137
727.18	137.	15.47	1.35	1.374E-02	727.17	11.800	5.337E-01	BI212
794.61	61.	31.34	1.68	1.284E-02	795.76	85.400	3.532E-02	CS134
861.77	113.	22.41	1.32	1.210E-02				
910.78	496.	6.43	1.56	1.161E-02	911.07	29.000	9.330E-01	AC228
964.40	115.	15.85	1.80	1.113E-02	964.00	14.580	4.518E-01	EU152
968.77	247.	8.91	1.80	1.109E-02	968.90	17.460	8.078E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1119.82	221.	16.59	2.36	9.973E-03	1120.28	15.040	9.383E-01	BI214
1172.69	839.	4.86	1.96	9.641E-03	1173.23	99.860	5.544E-01	CO60
1331.92	741.	4.55	2.26	8.776E-03	1332.51	99.980	5.370E-01	CO60
1460.20	2313.	2.12	2.15	8.193E-03	1460.75	10.700	1.682E+01	K40
1763.78	123.	10.55	1.11	7.084E-03	1764.51	15.920	6.983E-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	
173.38	86.97	1046.	232.	0.116	62.29	1.187	BI-207	D
179.80	90.18	937.	173.	0.086	78.57	1.189	PB-214	D
186.48	93.52	923.	243.	0.122	56.41	1.191	U-235	D
417.48	208.92	835.	141.	0.071	96.32	1.931	AC-228	s
539.51	269.94	707.	140.	0.070	100.14	1.227	AC-228	
600.16	300.27	406.	94.	0.047	99.83	0.771	PB-212	sM
655.31	327.85	526.	140.	0.070	87.65	1.244	AC-228	
1723.10	861.77	170.	113.	0.056	67.23	1.320	TL-208	s
1928.02	964.32	110.	113.	0.056	48.51	1.796	AC-228	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-212	149.29	74.81	1161.	388.	0.194	39.83	1.178D
PB-212	153.89	77.11	1187.	616.	0.308	21.62	1.179A
TH-234	185.71	93.02	2196.	246.	0.123	80.24	1.500s
TH-234	185.69	93.01	2141.	237.	0.118	78.46	1.500s
RA-226	371.48	185.92	1134.	302.	0.151	56.72	1.808s
TH-227	470.82	235.59	1663.	-179.	-0.090	99.18	1.500s
PB-212	476.89	238.63	570.	1635.	0.818	9.55	1.297D
RA-224	477.72	239.04	1421.	1192.	0.596	15.96	1.500s
PB-214	483.47	241.92	726.	267.	0.134	46.29	1.299D
HG-203	553.80	277.08	535.	88.	0.044	114.89	1.500s
PB-214	589.81	295.09	679.	422.	0.211	34.33	1.421
AC-228	676.18	338.28	604.	424.	0.212	34.42	1.300
PB-214	703.23	351.81	578.	766.	0.383	20.06	1.428
SB-125	925.10	462.75	265.	115.	0.058	64.30	1.500

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1021.00	510.70	421.	297.	0.149	39.29	1.730s
TL-208	1165.53	582.97	212.	582.	0.291	17.32	1.828
BI-214	1217.95	609.18	246.	593.	0.297	18.42	1.812s
Ag-108M	1222.99	611.70	347.	-99.	-0.050	85.04	1.561s
CS-137	1322.96	661.69	305.	133.	0.066	76.89	0.887s
BI-212	1453.94	727.18	136.	136.	0.068	46.40	1.349
CS-134	1588.79	794.61	153.	61.	0.030	94.01	1.684s
AC-228	1821.13	910.78	172.	492.	0.246	19.29	1.558
AC-228	1937.36	968.90	121.	245.	0.122	26.75	1.799D
BI-214	2239.22	1119.82	246.	220.	0.110	49.78	2.361s
CO-60	2344.95	1172.69	216.	835.	0.418	14.58	1.962
CO-60	2663.42	1331.92	103.	737.	0.369	13.65	2.258s
K-40	2920.00	1460.20	28.	2308.	1.154	6.37	2.149
BI-214	3527.21	1763.78	10.	123.	0.062	31.65	1.114s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	Peak COMMENTS
BE-7		-7.0254E-03					
			477.56	-7.025E-03	&(	2.551E-01	7.49E-02 G
K-40		1.6819E+01					
			1460.75	1.682E+01	(P	1.989E-01	3.58E-01 G
MN-54		-4.0763E-04					
			834.81	-4.076E-04	&(P	3.485E-02	1.01E-02 G
CO-57		-9.3289E-03					
			122.07	-9.329E-03	%(P	3.941E-02	1.19E-02 G K
			136.43	3.131E-02	% P	3.025E-01	9.08E-02 G
CO-60		5.4569E-01					
			1332.51	5.370E-01	@(P	3.638E-02	2.46E-02 G K
			1173.23	5.544E-01	(P	4.725E-02	2.71E-02 G K
Sr-85		-2.1663E-02					
			514.00	-2.166E-02	%(	3.836E-02	1.17E-02 G
Kr-85		-5.1944E+02					
			513.99	-5.194E+02	%(P	8.783E+02	2.67E+02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	-2.9338E-03						
		1836.01	-2.934E-03	%(P	2.355E-02	6.42E-03	G K
		898.02	-6.270E-03	% P	3.901E-02	1.14E-02	G
NB-94	1.9941E-03						
		871.10	1.994E-03	%(P	2.551E-02	7.37E-03	G K
		702.50	2.794E-04	& P	3.653E-02	1.07E-02	G K
Ag-108M	3.7145E-03						
		722.95	3.714E-03	&(	3.429E-02	1.01E-02	G K
		614.37	-4.489E-02	+	4.044E-02	1.27E-02	G
		433.93	6.704E-03	% P	2.820E-02	8.40E-03	G
CD-109	9.1780E-03						
		88.04	9.178E-03	&(P	1.217E+00	3.65E-01	G
SN-113	-1.4146E-03						
		391.71	-1.415E-03	%(P	4.366E-02	1.29E-02	G K
		255.04	2.332E-01	%	1.393E+00	4.17E-01	G
SB-125	1.0942E-01						
		427.95	1.872E-02	%(P	7.663E-02	2.28E-02	G K
		600.77	2.877E-02	% P	1.563E-01	4.63E-02	G
		636.15	-2.836E-03	% P	2.574E-01	7.49E-02	G
		463.51	3.779E-01	(P	2.571E-01	8.30E-02	G
		176.29	-1.092E-02	% P	4.482E-01	1.34E-01	G
I-131	6.0922E-03						
		364.48	6.092E-03	%(	3.305E-02	9.84E-03	G K
		636.97	1.706E-01	%	4.229E-01	1.27E-01	G
		284.29	-1.544E-01	%	5.291E-01	1.59E-01	G
CS-134	1.3205E-02						
		604.66	-6.148E-03	%(P	7.325E-02	2.19E-02	G K
		795.76	3.532E-02	(P	3.523E-02	1.12E-02	G
		569.29	7.326E-02	%	1.644E-01	4.97E-02	G
		801.84	-1.003E-01	% P	3.732E-01	1.11E-01	G
CS-137	6.7891E-02						
		661.62	6.789E-02	(P	4.298E-02	1.79E-02	G
CE-139	2.7898E-03						
		165.85	2.790E-03	&(P	3.790E-02	1.13E-02	G
EU-152	-2.9416E-02						
		121.78	-2.942E-02	%(P	1.187E-01	3.58E-02	G K
		344.30	3.776E-02	% P	8.292E-02	2.51E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1408.08	6.474E-02	% P	9.245E-02	2.92E-02	G
		964.00	2.159E-01	& P	3.740E-01	1.14E-01	G
		1112.07	-7.260E-02	% P	3.134E-01	9.29E-02	G
		778.90	-8.931E-02	& P	2.716E-01	8.13E-02	G
EU-154	-2.3972E-02						
		123.10	-2.397E-02	&(P	7.888E-02	2.38E-02	G K
		1274.80	-1.494E-02	% P	1.164E-01	3.41E-02	G
		723.30	4.415E-03	& P	2.576E-01	7.63E-02	G
		1004.80	5.658E-04	& P	2.253E-01	6.56E-02	G
EU-155	8.4775E-02						
		86.45	8.477E-02	%(	1.394E-01	4.24E-02	G K
		105.31	-5.060E-04	% P	1.688E-01	5.06E-02	G
HG-203	2.4189E-02						
		279.17	2.419E-02	*(P	3.055E-02	9.40E-03	G K
		72.87	2.522E-01	% P	9.389E-01	2.84E-01	G
		70.83	-1.182E+00	%	1.687E+00	5.14E-01	G
		82.50	-8.571E-01	&	2.103E+00	6.37E-01	G
TL-208	2.6534E-01						
		583.14	2.653E-01	(P	3.216E-02	1.54E-02	G
		510.72	4.668E-01	+ P	1.543E-01	6.80E-02	G
PB-212	7.5960E-01						
		238.63	7.596E-01	(P	5.294E-02	2.44E-02	G K
							Energy duplication
		77.11	7.596E-01	}	2.015E-01	5.47E-02	G
		74.81	9.058E-01	+ P	3.770E-01	1.21E-01	G
PB-214	5.3123E-01						
		351.99	5.437E-01	(P	8.141E-02	3.66E-02	G K
		295.22	5.071E-01	(P	1.492E-01	5.86E-02	G
							Energy duplication
		77.11	2.062E-01	} P	4.408E-01	1.23E-01	G
		241.92	7.221E-01	+ P	3.467E-01	1.12E-01	G
BI-212	5.3367E-01						
		727.17	5.337E-01	(P	2.251E-01	8.33E-02	G K
		1620.56	4.623E-01	% P	7.488E-01	2.33E-01	G
		785.42	8.365E-01	% P	1.644E+00	4.99E-01	G
BI-214	5.2212E-01						
		609.32	5.221E-01	(P	6.670E-02	3.23E-02	G K
		1764.51	6.983E-01	+ P	9.752E-02	7.42E-02	G
		1120.28	9.383E-01	+ P	3.226E-01	1.56E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

RA-224       6.1547E+00
                          241.00 6.155E+00 ?(P 9.214E-01 3.28E-01 G

RA-226       1.6266E+00
                          185.99 1.627E+00 *(  8.611E-01 3.07E-01 G

AC-228       8.8916E-01
                          911.07 9.330E-01  (P 1.212E-01 6.05E-02 G K
                          968.90 8.071E-01  (P 1.781E-01 7.26E-02 G
                          338.40 9.028E-01  (P 2.492E-01 1.04E-01 G

TH-227      -3.1852E-01
                          236.00-3.185E-01 ?(P 3.423E-01 1.05E-01 G K
                          256.25-7.769E-02 % P 4.185E-01 1.25E-01 G

PA-234       8.8912E-03
                           98.44 8.891E-03 %(  1.381E-01 4.14E-02 G K
                          946.00-5.727E-02 &   2.174E-01 6.49E-02 G
                          131.28-3.515E-02 %   1.628E-01 4.90E-02 G
                           94.67-1.194E-01 %   2.593E-01 7.86E-02 G
                          883.24 0.000E+00 %   3.307E-01 9.67E-02 G
                          926.70-1.401E-02 &   3.681E-01 1.08E-01 G
                          569.26 1.086E-01 %   2.437E-01 7.37E-02 G

TH-234       1.2418E+00
                           63.29 7.110E-01 %(P 1.707E+00 5.16E-01 G K
                           92.80 1.466E+00  (P 1.352E+00 4.15E-01 G
                           92.38 1.786E+00  (P 1.602E+00 4.93E-01 G

AM-241      -1.3979E-03
                           59.54-1.398E-03 %(P 2.190E-01 6.55E-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 - 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	-6.9310E-03	-7.0254E-03	2.2458E-01	2.2458E-01	2.517E-01
K-40		1.6819E+01	1.6819E+01	1.0737E+00	1.4627E+00	
MN-54	#A	-4.0668E-04	-4.0763E-04	1.0299E-01	1.0299E-01	3.477E-02
CO-57	#B	-9.3039E-03	-9.3289E-03	3.6042E-02	3.6046E-02	3.931E-02
CO-60		5.4548E-01	5.4569E-01	5.4781E-02	6.3558E-02	
Sr-85	#A	-2.1423E-02	-2.1663E-02	3.5049E-02	3.5073E-02	3.793E-02
Kr-85	#A	-5.1943E+02	-5.1944E+02	8.8008E+02	8.8061E+02	8.783E+02
Y-88	#B	-2.9139E-03	-2.9338E-03	3.2877E-02	3.2877E-02	2.339E-02
NB-94	#B	1.9941E-03	1.9941E-03	2.2121E-02	2.2121E-02	2.551E-02
Ag-108M	#B	3.7144E-03	3.7145E-03	3.0241E-02	3.0242E-02	3.429E-02
CD-109	#A	9.1634E-03	9.1780E-03	1.0957E+00	1.0957E+00	1.215E+00
SN-113	#B	-1.4058E-03	-1.4146E-03	1.4315E-01	1.4315E-01	4.339E-02
SB-125	#F	1.0934E-01	1.0942E-01	7.2071E-02	7.2360E-02	7.657E-02
I-131	#B	5.5685E-03	6.0922E-03	2.9528E-02	2.9530E-02	3.021E-02
CS-134	#B	1.3192E-02	1.3205E-02	1.2523E-02	1.2547E-02	7.318E-02
CS-137		6.7887E-02	6.7891E-02	5.3589E-02	5.3739E-02	
CE-139	#A	2.7752E-03	2.7898E-03	3.4050E-02	3.4050E-02	3.770E-02
EU-152	#B	-2.9411E-02	-2.9416E-02	1.0793E-01	1.0795E-01	1.187E-01
EU-154	#B	-2.3966E-02	-2.3972E-02	7.2756E-02	7.2768E-02	7.886E-02
EU-155	#B	8.4741E-02	8.4775E-02	1.2726E-01	1.2735E-01	1.394E-01
HG-203	#A	2.3817E-02	2.4189E-02	2.8202E-02	2.8238E-02	3.008E-02
TL-208		2.6534E-01	2.6534E-01	4.6308E-02	4.8888E-02	
PB-212		7.5960E-01	7.5960E-01	7.3210E-02	8.5862E-02	
PB-214		5.3123E-01	5.3123E-01	1.0665E-01	1.1117E-01	
BI-212		5.3367E-01	5.3367E-01	2.5000E-01	2.5198E-01	
BI-214		5.2212E-01	5.2212E-01	9.6885E-02	1.0167E-01	
RA-224	#	6.1547E+00	6.1547E+00	9.8390E-01	1.0489E+00	9.214E-01
RA-226	#	1.6266E+00	1.6266E+00	9.2254E-01	9.2753E-01	
AC-228		8.8916E-01	8.8916E-01	1.4246E-01	1.5183E-01	
TH-227	#A	-3.1852E-01	-3.1852E-01	3.1639E-01	3.1695E-01	3.423E-01

PA-234 #B	8.8912E-03	8.8912E-03	1.2418E-01	1.2418E-01	1.381E-01

TH-234 #B	1.2418E+00	1.2418E+00	1.0266E+00	1.0289E+00	1.707E+00
AM-241 #A	-1.3979E-03	-1.3979E-03	5.9135E-01	5.9135E-01	2.190E-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) 2.2560162E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 2.2560371E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107_18nov2005_1059.An1

Sample description
NOL-05-02-003-C

Spectrum Filename: C:\GammaVision\Spectra\107_18nov2005_1059.An1

Acquisition information
Start time: 18-Nov-2005 11:01:15
Live time: 2000
Real time: 2003
Dead time: 0.13 %
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/channel^2

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: 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	17-Nov-2005 09:00:00
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: 0.1669

***** 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
63.95	189.	32.56	1.32	2.079E-02	63.29	3.900	PBC<MDA	TH234
74.83	334.	13.60	1.18	2.842E-02	74.81	9.600	7.907E-01	PB212
77.08	518.	9.96	1.18	2.949E-02	77.11	17.500	6.570E-01	PB212
					77.11	10.700	1.065E+00	PB214
87.41	177.	31.10	1.41	3.310E-02	86.45	32.740	1.079E-01	EU155
					88.04	3.790	PBC<MDA	CD109
93.17	133.	37.56	1.50	3.438E-02	92.80	3.000	PBC<MDA	TH234
185.74	207.	22.75	1.04	3.612E-02	185.99	3.280	1.147E+00	RA226
208.74	246.	20.54	1.68	3.433E-02				
238.64	1263.	3.64	1.30	3.189E-02	238.63	43.100	5.951E-01	PB212
					241.00	3.900	6.688E+00	RA224
241.69	189.	17.84	1.30	3.165E-02	241.92	7.470	5.220E-01	PB214
270.14	135.	29.59	1.87	2.945E-02				
295.27	256.	10.80	1.34	2.768E-02	295.22	19.200	3.108E-01	PB214
300.27	76.	30.21	1.34	2.735E-02				
338.01	297.	12.36	2.00	2.503E-02	338.40	12.010	6.420E-01	AC228
351.87	554.	8.51	1.55	2.426E-02	351.99	37.100	4.002E-01	PB214
462.93	89.	20.86	1.30	1.955E-02				
462.93	89.	20.86	1.30	1.955E-02	463.51	10.000	2.904E-01	SB125
510.73	228.	16.30	1.81	1.808E-02	510.72	22.500	3.127E-01	TL208
583.04	473.	6.66	1.85	1.629E-02	583.14	86.000	2.194E-01	TL208
609.19	460.	6.58	1.40	1.574E-02	609.32	46.090	4.120E-01	BI214
661.20	106.	29.29	1.38	1.478E-02	661.62	84.620	5.352E-02	CS137
727.15	125.	16.50	2.20	1.374E-02	727.17	11.800	5.053E-01	BI212
785.84	29.	40.31	1.18	1.297E-02	785.42	2.000	PBC<MDA	BI212
794.25	77.	25.57	1.08	1.286E-02				
860.49	106.	21.04	1.55	1.211E-02				

911.01	418.	9.22	1.95	1.161E-02	911.07	29.000	8.061E-01	AC228
963.36	48.	29.41	1.80	1.114E-02				
963.36	48.	29.41	1.80	1.114E-02	964.00	14.580	PBC<MDA	EU152
968.51	194.	9.66	1.80	1.109E-02	968.90	17.460	6.498E-01	AC228
1120.29	110.	15.87	1.81	9.970E-03	1120.28	15.040	4.756E-01	BI214
1172.71	175.	13.25	2.32	9.640E-03	1173.23	99.860	HL>Cutoff	CO60
1237.66	70.	37.09	1.29	9.265E-03				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1331.93	211.	12.77	1.51	8.776E-03	1332.51	99.980	HL>Cutoff	CO60
1460.20	1864.	2.41	2.17	8.193E-03	1460.75	10.700	1.391E+01	K40
1620.57	25.	22.45	0.67	7.569E-03	1620.56	2.750	7.941E-01	BI212
1763.63	76.	12.83	2.44	7.084E-03	1764.51	15.920	4.404E-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	
127.57	63.95	1331.	189.	0.094	97.68	1.317	PA-234	l
417.11	208.74	794.	246.	0.123	61.62	1.677	LU-177	s
539.91	270.14	518.	135.	0.067	88.77	1.867	AC-228	s
600.17	300.15	223.	76.	0.038	90.62	1.341	PB-212	lD
1588.06	794.25	92.	86.	0.043	57.22	1.084	AC-228	s
1720.54	860.49	120.	106.	0.053	52.41	1.548	TL-208	
1925.95	963.58	78.	45.	0.023	94.38	1.795	EU-152	D
2474.89	1237.66	165.	70.	0.035	111.26	1.289	J-133	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	149.29	74.81	866.	330.	0.165	40.74	1.178D
PB-212	153.89	77.11	882.	350.	0.175	32.57	1.179A
PB-214	153.89	77.11	1512.	157.	0.079	97.85	1.500A
EU-155	174.03	87.18	1725.	158.	0.079	113.77	1.500
CD-109	173.91	87.12	1462.	136.	0.068	121.57	1.500
RA-226	371.12	185.74	804.	207.	0.104	68.24	1.039s
TH-227	472.25	236.31	1633.	-177.	-0.088	99.78	1.500s
PB-212	476.89	238.63	441.	1247.	0.624	10.92	1.297D
RA-224	476.95	238.66	602.	1289.	0.645	11.60	1.500s
PB-214	483.47	241.92	528.	174.	0.087	59.89	1.299D
PB-214	589.91	295.15	401.	270.	0.135	38.80	1.498
AC-228	675.64	338.01	366.	294.	0.147	37.09	1.995s
PB-214	703.35	351.87	456.	549.	0.274	25.52	1.553s
SB-125	925.55	462.98	139.	79.	0.040	68.73	1.500
TL-208	1021.04	510.73	336.	194.	0.097	48.91	1.811s
TL-208	1165.66	583.04	173.	468.	0.234	19.99	1.854s
BI-214	1217.96	609.19	142.	456.	0.228	19.73	1.400

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	1321.90	661.16	236.	136.	0.068	71.09	1.424s
BI-212	1453.86	727.15	111.	125.	0.062	49.50	2.197s
AC-228	1821.59	911.01	213.	414.	0.207	27.66	1.954
AC-228	1937.36	968.90	81.	192.	0.096	28.99	1.799D
BI-214	2240.14	1120.29	72.	109.	0.054	47.60	1.811s
CO-60	2344.99	1172.71	122.	171.	0.086	39.74	2.316
CO-60	2663.45	1331.93	96.	207.	0.104	38.31	1.509s
K-40	2920.00	1460.20	40.	1859.	0.930	7.22	2.172
BI-212	3240.76	1620.57	3.	25.	0.013	67.35	0.665s
BI-214	3526.92	1763.63	6.	76.	0.038	38.49	2.439

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		6.2673E-03					
			477.56	6.267E-03	%(	2.248E-01 6.56E-02 G	
K-40		1.3915E+01					
			1460.75	1.391E+01	(P	2.407E-01 3.36E-01 G	
MN-54		1.0165E-02					
			834.81	1.017E-02	%(P	2.914E-02 8.71E-03 G	
CO-57		-1.1954E-03					
			122.07	-1.195E-03	%(P	3.300E-02 9.86E-03 G K	
			136.43	-4.830E-02	% P	2.637E-01 7.92E-02 G	
CO-60		1.5505E-01					
			1332.51	1.551E-01	@(P	3.615E-02 2.02E-02 G K	
			1173.23	1.168E-01	- P	3.691E-02 1.58E-02 G K	
Sr-85		-1.6012E-02					
			514.00	-1.601E-02	&(	3.334E-02 1.01E-02 G	
Kr-85		-3.9105E+02					
			513.99	-3.910E+02	&(P	7.640E+02 2.31E+02 G	
Y-88		-7.2603E-04					
			1836.01	-7.260E-04	%(P	2.020E-02 5.20E-03 G K	
			898.02	-1.816E-04	& P	3.944E-02 1.14E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-5.1249E-04						
		871.10	-5.125E-04	%(P	2.507E-02	7.17E-03	G K
		702.50	3.539E-03	% P	2.801E-02	8.21E-03	G K
Ag-108M	-1.8141E-02						
		722.95	-1.814E-02	%(	3.916E-02	1.19E-02	G K
		614.37	-8.415E-03	%	3.184E-02	9.49E-03	G
		433.93	4.816E-03	% P	2.598E-02	7.69E-03	G
CD-109	7.0980E-01						
		88.04	7.098E-01	(P	9.428E-01	2.88E-01	G
SN-113	7.7291E-04						
		391.71	7.729E-04	&(P	3.611E-02	1.06E-02	G K
		255.04	-1.877E-01	%	1.143E+00	3.41E-01	G
SB-125	5.7197E-02						
		427.95	-1.365E-02	%(P	6.774E-02	1.99E-02	G K
		600.77	8.700E-03	% P	1.271E-01	3.69E-02	G
		636.15	-4.944E-02	& P	2.246E-01	6.62E-02	G
		463.51	2.669E-01	(P	1.938E-01	6.33E-02	G
		176.29	-5.345E-03	% P	4.070E-01	1.21E-01	G
I-131	3.4606E-03						
		364.48	3.461E-03	&(	2.875E-02	8.49E-03	G K
		636.97	7.290E-03	%	3.409E-01	9.83E-02	G
		284.29	3.568E-02	%	4.381E-01	1.30E-01	G
CS-134	-1.5569E-02						
		604.66	-1.557E-02	%(P	3.633E-02	1.10E-02	G K
		795.76	-7.028E-03	% P	3.126E-02	9.20E-03	G
		569.29	6.480E-02	&	1.376E-01	4.17E-02	G
		801.84	5.694E-02	% P	2.698E-01	7.91E-02	G
CS-137	7.1364E-02						
		661.62	7.136E-02	(P	3.900E-02	1.73E-02	G
CE-139	5.3671E-04						
		165.85	5.367E-04	%(P	2.898E-02	8.62E-03	G
EU-152	-3.4374E-03						
		121.78	-3.437E-03	%(P	8.801E-02	2.63E-02	G K
		344.30	-9.605E-03	& P	8.893E-02	2.63E-02	G
		1408.08	4.828E-02	& P	8.907E-02	2.73E-02	G
		964.00	1.767E-03	& P	3.283E-01	9.63E-02	G
		1112.07	1.004E-01	% P	2.144E-01	6.48E-02	G
		778.90	3.535E-02	& P	1.913E-01	5.60E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	1.0783E-02						
		123.10	1.078E-02	%(P	7.181E-02	2.15E-02	G K
		1274.80	6.037E-03	& P	9.772E-02	2.82E-02	G
		723.30	-3.870E-03	% P	2.259E-01	6.66E-02	G
		1004.80	-7.044E-04	& P	2.130E-01	6.18E-02	G
EU-155	9.6690E-02						
		86.45	9.669E-02	(	1.198E-01	3.67E-02	G K
		105.31	4.870E-02	% P	1.460E-01	4.41E-02	G
HG-203	-3.3078E-04						
		279.17	-3.308E-04	&(P	2.538E-02	7.46E-03	G K
		72.87	-5.369E-01	% P	8.995E-01	2.73E-01	G
		70.83	1.156E-02	%	1.492E+00	4.47E-01	G
		82.50	-2.680E-01	%	1.801E+00	5.41E-01	G
TL-208	2.1936E-01						
		583.14	2.194E-01	*(P	2.993E-02	1.48E-02	G
		510.72	3.127E-01	+ P	1.421E-01	5.98E-02	G
PB-212	6.1220E-01						
		238.63	5.952E-01	(P	4.798E-02	2.19E-02	G K
							Energy duplication
		77.11	4.442E-01	}	1.788E-01	4.82E-02	G
		74.81	7.919E-01	+ P	3.353E-01	1.09E-01	G
PB-214	3.7756E-01						
		351.99	4.002E-01	@(P	7.451E-02	3.44E-02	G K
		295.22	3.339E-01	(P	1.185E-01	4.39E-02	G
							Energy duplication
		77.11	3.265E-01	} P	3.812E-01	1.06E-01	G
		241.92	4.834E-01	+ P	3.048E-01	9.73E-02	G
BI-212	5.0530E-01						
		727.17	5.053E-01	*(P	2.096E-01	8.42E-02	G K
		1620.56	7.941E-01	+ P	3.313E-01	1.82E-01	G
		785.42	7.447E-01	% P	9.784E-01	3.13E-01	G
BI-214	4.3027E-01						
		609.32	4.120E-01	(P	5.272E-02	2.74E-02	G K
		1764.51	4.404E-01	(P	8.378E-02	5.71E-02	G
		1120.28	4.756E-01	(P	1.852E-01	7.61E-02	G
RA-224	6.8397E+00						
		241.00	6.840E+00	?(P	6.212E-01	2.65E-01	G
RA-226	1.1468E+00						
		185.99	1.147E+00	*(	7.470E-01	2.61E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AC-228       8.0612E-01
                          911.07 8.061E-01  (P 1.379E-01 7.51E-02 G K
                          968.90 6.498E-01 - P 1.514E-01 6.35E-02 G
                          338.40 6.420E-01 - P 2.007E-01 8.02E-02 G

TH-227      -3.2223E-01
                          236.00-3.222E-01 &(P 3.484E-01 1.07E-01 G K
                          256.25 1.282E-02 % P 3.459E-01 1.02E-01 G

PA-234       1.5693E-03
                           98.44 1.569E-03 &(  1.279E-01 3.82E-02 G K
                          946.00-2.787E-02 %   1.523E-01 4.48E-02 G
                          131.28-5.219E-03 &   1.488E-01 4.45E-02 G
                           94.67-9.213E-02 %   2.261E-01 6.84E-02 G
                          883.24 4.945E-02 %   2.045E-01 6.02E-02 G
                          926.70 6.076E-03 &   2.717E-01 7.84E-02 G
                          569.26 9.604E-02 &   2.040E-01 6.18E-02 G

TH-234       6.7248E-01
                           63.29 6.725E-01 %(P 1.470E+00 4.44E-01 G K
                           92.80 8.451E-01 % P 1.197E+00 3.64E-01 G
                           92.38 3.168E-02 % P 1.286E+00 3.84E-01 G

AM-241      -1.6944E-02
                           59.54-1.694E-02 &(P 1.857E-01 5.56E-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
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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	6.1797E-03	6.2673E-03	1.9678E-01	1.9678E-01	2.216E-01
K-40		1.3915E+01	1.3915E+01	1.0071E+00	1.2999E+00	
MN-54	#A	1.0141E-02	1.0165E-02	2.6141E-02	2.6148E-02	2.907E-02
CO-57	#B	-1.1921E-03	-1.1954E-03	3.2475E-02	3.2476E-02	3.291E-02
CO-60	#H	1.5499E-01	1.5505E-01	6.0486E-02	6.1176E-02	
Sr-85	#A	-1.5827E-02	-1.6012E-02	3.0333E-02	3.0348E-02	3.296E-02
Kr-85	#A	-3.9105E+02	-3.9105E+02	7.8830E+02	7.8864E+02	7.640E+02
Y-88	#B	-7.2093E-04	-7.2603E-04	3.8151E-01	3.8151E-01	2.006E-02
NB-94	#B	-5.1249E-04	-5.1249E-04	2.8808E-02	2.8808E-02	2.507E-02
Ag-108M	#B	-1.8140E-02	-1.8141E-02	3.5584E-02	3.5600E-02	3.916E-02
CD-109	#A	7.0863E-01	7.0980E-01	8.6493E-01	8.6582E-01	9.412E-01
SN-113	#B	7.6788E-04	7.7291E-04	3.1736E-02	3.1736E-02	3.588E-02
SB-125	#B	5.7155E-02	5.7197E-02	4.0703E-02	4.0843E-02	6.769E-02
I-131	#B	3.1518E-03	3.4606E-03	2.5483E-02	2.5483E-02	2.619E-02
CS-134	#B	-1.5554E-02	-1.5569E-02	3.3861E-02	3.3874E-02	3.630E-02
CS-137	#	7.1359E-02	7.1364E-02	5.2051E-02	5.2221E-02	
CE-139	#A	5.3379E-04	5.3671E-04	2.5857E-02	2.5857E-02	2.882E-02
EU-152	#B	-3.4368E-03	-3.4374E-03	8.2610E-02	8.2610E-02	8.799E-02
EU-154	#B	1.0780E-02	1.0783E-02	6.4643E-02	6.4645E-02	7.180E-02
EU-155	#A	9.6650E-02	9.6690E-02	1.1000E-01	1.1013E-01	1.197E-01
HG-203	#B	-3.2548E-04	-3.3078E-04	4.2089E-01	4.2089E-01	2.497E-02
TL-208	#	2.1936E-01	2.1936E-01	4.4285E-02	4.6141E-02	
PB-212		6.1220E-01	6.1220E-01	6.7692E-02	7.6743E-02	
PB-214		3.7756E-01	3.7756E-01	8.8948E-02	9.1700E-02	
BI-212		5.0530E-01	5.0530E-01	2.5272E-01	2.5447E-01	
BI-214		4.3027E-01	4.3027E-01	8.5708E-02	8.9396E-02	
RA-224	#	6.8397E+00	6.8397E+00	7.9451E-01	8.9130E-01	6.212E-01
RA-226	#	1.1468E+00	1.1468E+00	7.8254E-01	7.8546E-01	
AC-228		8.0612E-01	8.0612E-01	2.2523E-01	2.3021E-01	
TH-227	#A	-3.2223E-01	-3.2223E-01	3.2202E-01	3.2258E-01	3.484E-01
PA-234	#B	1.5693E-03	1.5693E-03	1.1464E-01	1.1464E-01	1.279E-01
TH-234	#B	6.7248E-01	6.7248E-01	1.3331E+00	1.3336E+00	1.470E+00
AM-241	#A	-1.6944E-02	-1.6944E-02	1.8154E-01	1.8154E-01	1.857E-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) 1.8238762E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.8238831E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107_18NOV2005_1653.An1

Sample description
NOL-05-02-012-C

Spectrum Filename: C:\GammaVision\Spectra\107_18NOV2005_1653.An1

Acquisition information
Start time: 18-Nov-2005 16:53:29
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/channel^2

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: 2.3180E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.3180E+03) =
4.3141E+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	17-Nov-2005 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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2514

***** 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
74.90	324.	22.40	1.50	2.849E-02				
74.90	324.	22.40	1.50	2.849E-02	74.81	9.600	6.908E-01	PB212
77.02	463.	15.30	1.50	2.957E-02				
77.02	463.	15.30	1.50	2.957E-02	77.11	17.500	5.215E-01	PB212
					77.11	10.700	8.441E-01	PB214
77.02	458.	15.30	1.50	2.957E-02				
77.02	458.	15.30	1.50	2.957E-02	77.11	17.500	5.161E-01	PB212
					77.11	10.700	8.441E-01	PB214
87.44	181.	34.25	1.50	3.327E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
93.09	158.	41.46	1.19	3.444E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
154.32	113.	38.52	1.87	3.795E-02				
185.74	199.	22.48	1.45	3.612E-02	185.99	3.280	9.783E-01	RA226
209.53	193.	22.36	1.58	3.427E-02				
238.64	1255.	3.98	1.30	3.189E-02	238.63	43.100	5.257E-01	PB212
241.62	273.	14.14	1.30	3.165E-02	241.00	3.900	1.279E+00	RA224
					241.92	7.470	6.712E-01	PB214
295.09	266.	10.93	1.34	2.768E-02				
295.09	266.	10.93	1.34	2.768E-02	295.22	19.200	2.868E-01	PB214
300.61	72.	33.23	1.34	2.731E-02				
327.59	133.	26.50	1.68	2.563E-02				
338.17	364.	12.73	1.64	2.502E-02	338.40	12.010	7.012E-01	AC228
351.87	581.	6.90	1.99	2.426E-02				
351.87	581.	6.90	1.99	2.426E-02	351.99	37.100	3.728E-01	PB214
462.72	75.	40.08	1.72	1.955E-02				
462.72	75.	40.08	1.72	1.955E-02	463.51	10.000	PBC<MDA	SB125

510.81	250.	12.89	2.06	1.808E-02	510.72	22.500	3.095E-01	TL208
582.92	544.	6.58	1.90	1.629E-02	583.14	86.000	2.244E-01	TL208
608.88	471.	6.38	2.04	1.575E-02	609.32	46.090	3.750E-01	BI214
662.07	93.	26.64	1.63	1.476E-02	661.62	84.620	4.173E-02	CS137
726.83	124.	22.65	2.30	1.374E-02	727.17	11.800	4.440E-01	BI212
794.85	59.	27.34	1.68	1.284E-02	795.76	85.400	3.130E-02	CS134
910.96	382.	6.89	2.33	1.161E-02	911.07	29.000	6.549E-01	AC228
968.03	343.	11.20	2.44	1.110E-02	968.90	17.460	1.025E+00	AC228
1119.46	173.	19.60	0.84	9.975E-03	1120.28	15.040	6.684E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1172.93	53.	34.16	1.94	9.637E-03	1173.23	99.860	HL>Cutoff	CO60
1331.57	82.	26.67	1.47	8.773E-03	1332.51	99.980	HL>Cutoff	CO60
1460.17	1953.	2.31	2.32	8.193E-03	1460.75	10.700	1.296E+01	K40
1619.58	36.	24.16	0.62	7.569E-03	1620.56	2.750	1.017E+00	BI212
1764.25	120.	9.71	2.64	7.084E-03	1764.51	15.920	6.224E-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	
308.30	154.32	810.	113.	0.056	115.57	1.871	XE-138	s
418.70	209.53	699.	193.	0.097	67.08	1.579	AC-228	s
476.91	238.65	619.	1255.	0.628	11.93	1.297	PB-212	D
482.88	241.63	611.	273.	0.137	42.41	1.299	PB-214	D
600.88	300.63	414.	88.	0.044	103.70	1.290	PB-212	s
654.81	327.59	396.	133.	0.067	79.49	1.678	AC-228	s
703.34	351.87	830.	104.	0.052	120.80	1.993	PB-214	s
925.04	462.72	269.	75.	0.038	120.24	1.723	CS-138	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

********** 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	149.47	74.90	2538.	324.	0.162	67.19	1.500s
PB-212	153.89	77.11	2278.	463.	0.231	45.91	1.500D
PB-214	153.89	77.11	2283.	458.	0.229	45.91	1.500D
CD-109	174.54	87.44	1842.	181.	0.091	102.76	1.500s
RA-226	371.13	185.74	781.	199.	0.099	67.45	1.454s
TH-227	471.13	235.75	1814.	-198.	-0.099	93.95	1.500s
PB-212	476.88	238.62	1226.	1255.	0.628	14.34	1.500s
PB-214	589.85	295.11	502.	272.	0.136	38.65	1.500s
AC-228	675.95	338.17	529.	361.	0.181	38.19	1.643s
PB-214	703.38	351.88	375.	471.	0.236	21.97	1.500s
TL-208	1021.21	510.81	252.	216.	0.108	38.68	2.056s
TL-208	1165.42	582.92	228.	539.	0.270	19.73	1.898s
BI-214	1217.35	608.88	148.	467.	0.233	19.14	2.043s
CS-137	1323.71	662.07	172.	89.	0.045	79.92	1.633s
BI-212	1453.22	726.83	188.	124.	0.062	67.94	2.298s
CS-134	1589.27	794.85	102.	59.	0.029	82.03	1.684s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1821.47	910.96	116.	378.	0.189	20.68	2.328s
AC-228	1935.61	968.03	224.	340.	0.170	33.59	2.441s
BI-214	2238.48	1119.46	208.	172.	0.086	58.79	0.838s
CO-60	2345.43	1172.93	125.	53.	0.027	102.49	1.940
CO-60	2662.71	1331.57	92.	82.	0.041	80.00	1.475s
K-40	2919.93	1460.17	23.	1949.	0.974	6.92	2.317s
BI-212	3238.79	1619.58	14.	36.	0.018	72.48	0.618s
BI-214	3528.15	1764.25	5.	120.	0.060	29.13	2.638s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		2.7813E-04					
			477.56	2.781E-04	&(	1.940E-01 5.64E-02	G
K-40		1.2962E+01					
			1460.75	1.296E+01	@(P	1.677E-01 3.00E-01	G
MN-54		7.6323E-03					
			834.81	7.632E-03	%(P	2.449E-02 7.29E-03	G
CO-57		-1.0922E-03					
			122.07	-1.092E-03	%(P	2.522E-02 7.52E-03	G K
			136.43	7.250E-02	& P	2.308E-01 6.96E-02	G
CO-60		5.4685E-02					
			1332.51	5.468E-02	*(P	3.149E-02 1.52E-02	G K
			1173.23	3.221E-02	- P	3.320E-02 1.19E-02	G K
Sr-85		-1.4462E-02					
			514.00	-1.446E-02	&(	2.829E-02 8.60E-03	G
Kr-85		-3.5221E+02					
			513.99	-3.522E+02	&(P	6.472E+02 1.96E+02	G
Y-88		-1.1030E-03					
			1836.01	-1.103E-03	%(P	1.596E-02 4.03E-03	G K
			898.02	-4.977E-03	% P	3.142E-02 9.17E-03	G
NB-94		2.0702E-03					
			871.10	2.070E-03	&(P	2.463E-02 7.14E-03	G K
			702.50	3.399E-03	& P	2.372E-02 6.95E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.0341E-02						
		722.95	-1.034E-02	%(	3.516E-02	1.05E-02	G K
		614.37	-1.603E-02	%	2.713E-02	8.30E-03	G
		433.93	1.574E-03	& P	2.252E-02	6.60E-03	G
CD-109	8.3939E-01						
		88.04	8.394E-01	(P	9.392E-01	2.88E-01	G
SN-113	8.5017E-03						
		391.71	8.502E-03	%(P	3.160E-02	9.42E-03	G K
		255.04	3.436E-01	%	9.774E-01	2.94E-01	G
SB-125	-5.4701E-03						
		427.95	-5.470E-03	%(P	7.343E-02	2.15E-02	G K
		600.77	2.688E-02	% P	1.187E-01	3.51E-02	G
		636.15	3.955E-02	% P	1.801E-01	5.31E-02	G
		463.51	1.316E-01	% P	2.209E-01	6.74E-02	G
		176.29	1.302E-02	% P	4.067E-01	1.21E-01	G
I-131	1.4797E-03						
		364.48	1.480E-03	&(	2.547E-02	7.48E-03	G K
		636.97	5.236E-02	%	2.963E-01	8.69E-02	G
		284.29	-8.681E-02	%	3.945E-01	1.18E-01	G
CS-134	1.4278E-02						
		604.66	-6.144E-04	%(P	6.014E-02	1.79E-02	G K
		795.76	3.130E-02	*(P	2.655E-02	8.63E-03	G
		569.29	-2.475E-03	%	1.511E-01	4.41E-02	G
		801.84	8.008E-02	& P	2.509E-01	7.46E-02	G
CS-137	4.1732E-02						
		661.62	4.173E-02	*(P	2.973E-02	1.16E-02	G
CE-139	-4.5494E-03						
		165.85	-4.549E-03	%(P	3.203E-02	9.60E-03	G
EU-152	2.2895E-02						
		121.78	2.290E-02	%(P	8.987E-02	2.71E-02	G K
		344.30	-2.370E-02	% P	7.807E-02	2.34E-02	G
		1408.08	2.059E-02	% P	9.845E-02	2.83E-02	G
		964.00	1.305E-01	& P	2.881E-01	8.72E-02	G
		1112.07	4.175E-02	& P	2.341E-01	6.88E-02	G
		778.90	6.404E-03	% P	1.871E-01	5.41E-02	G
EU-154	1.2016E-02						
		123.10	1.202E-02	%(P	6.593E-02	1.98E-02	G K
		1274.80	-1.704E-03	& P	1.005E-01	2.90E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-4.465E-02	& P	1.641E-01	4.90E-02	G
		1004.80	2.246E-02	% P	1.683E-01	4.92E-02	G
EU-155	8.2577E-02						
		86.45	8.258E-02	%(	1.164E-01	3.55E-02	G K
		105.31	1.005E-02	% P	1.312E-01	3.93E-02	G
HG-203	-4.2797E-03						
		279.17	-4.280E-03	%(P	2.883E-02	8.59E-03	G K
		72.87	-3.424E-01	% P	7.938E-01	2.40E-01	G
		70.83	8.509E-01	%	1.226E+00	3.74E-01	G
		82.50	-4.191E-01	&	1.681E+00	5.07E-01	G
TL-208	2.2445E-01						
		583.14	2.244E-01	*(P	3.039E-02	1.49E-02	G
		510.72	3.095E-01	+ P	1.099E-01	4.61E-02	G
PB-212	5.2920E-01						
		238.63	5.323E-01	*(P	7.034E-02	2.58E-02	G K
							Energy duplication
		77.11	5.215E-01	*(	2.536E-01	7.98E-02	G
		74.81	6.908E-01	+ P	5.061E-01	1.57E-01	G
PB-214	3.0304E-01						
		351.99	3.052E-01	*(P	6.023E-02	2.26E-02	G K
		295.22	2.988E-01	*(P	1.176E-01	3.91E-02	G
							Energy duplication
		77.11	8.441E-01	+ P	4.152E-01	1.31E-01	G
		241.92	-1.404E-01	% P	5.077E-01	1.53E-01	G
BI-212	4.4403E-01						
		727.17	4.440E-01	*(P	2.397E-01	1.02E-01	G K
		1620.56	1.017E+00	+ P	5.590E-01	2.49E-01	G
		785.42	6.645E-01	% P	1.088E+00	3.34E-01	G
BI-214	3.7497E-01						
		609.32	3.750E-01	*(P	4.778E-02	2.41E-02	G K
		1764.51	6.224E-01	+ P	6.566E-02	6.09E-02	G
		1120.28	6.684E-01	+ P	2.719E-01	1.32E-01	G
RA-224	2.9894E-01						
		241.00	2.989E-01	&(P	8.857E-01	2.67E-01	G
RA-226	9.7826E-01						
		185.99	9.783E-01	*(	6.546E-01	2.20E-01	G
AC-228	6.6847E-01						
		911.07	6.549E-01	*(P	9.155E-02	4.56E-02	G K
		968.90	1.025E+00	+ P	2.179E-01	1.15E-01	G
		338.40	7.012E-01	*(P	2.133E-01	9.00E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.2062E-01						
		236.00	-3.206E-01	?(P	3.262E-01	1.00E-01	G K
		256.25	-7.717E-02	& P	3.466E-01	1.04E-01	G
PA-234	1.1668E-02						
		98.44	1.167E-02	%(	1.145E-01	3.43E-02	G K
		946.00	5.581E-02	&	1.249E-01	3.77E-02	G
		131.28	3.856E-02	&	1.306E-01	3.94E-02	G
		94.67	-5.384E-02	%	2.289E-01	6.90E-02	G
		883.24	-8.137E-05	%	1.994E-01	5.72E-02	G
		926.70	2.040E-02	%	2.584E-01	7.52E-02	G
		569.26	-3.667E-03	%	2.240E-01	6.53E-02	G
TH-234	3.3797E-01						
		63.29	3.380E-01	%(P	1.394E+00	4.19E-01	G K
		92.80	8.504E-01	% P	1.190E+00	3.62E-01	G
		92.38	-1.372E-01	% P	1.425E+00	4.27E-01	G
AM-241	-3.5053E-02						
		59.54	-3.505E-02	%(P	1.908E-01	5.74E-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 - 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	2.7354E-04	2.7813E-04	1.6925E-01	1.6925E-01	1.908E-01
K-40	#	1.2962E+01	1.2962E+01	8.9902E-01	1.1808E+00	
MN-54	#A	7.6106E-03	7.6323E-03	2.1869E-02	2.1873E-02	2.442E-02
CO-57	#B	-1.0886E-03	-1.0922E-03	2.4695E-02	2.4695E-02	2.513E-02
CO-60	#H	5.4659E-02	5.4685E-02	4.5752E-02	4.5866E-02	
Sr-85	#A	-1.4265E-02	-1.4462E-02	2.5787E-02	2.5801E-02	2.790E-02
Kr-85	#A	-3.5221E+02	-3.5221E+02	6.6761E+02	6.6793E+02	6.472E+02
Y-88	#B	-1.0938E-03	-1.1030E-03	5.4269E-02	5.4269E-02	1.583E-02
NB-94	#B	2.0702E-03	2.0702E-03	2.1431E-02	2.1432E-02	2.463E-02
Ag-108M	#B	-1.0341E-02	-1.0341E-02	3.1551E-02	3.1557E-02	3.515E-02
CD-109	#A	8.3774E-01	8.3939E-01	8.6409E-01	8.6535E-01	9.373E-01
SN-113	#B	8.4362E-03	8.5017E-03	2.8273E-02	2.8277E-02	3.136E-02
SB-125	#B	-5.4653E-03	-5.4701E-03	1.0610E-01	1.0610E-01	7.336E-02
I-131	#B	1.3247E-03	1.4797E-03	2.2448E-02	2.2449E-02	2.280E-02
CS-134	#B	1.4261E-02	1.4278E-02	1.1818E-02	1.1848E-02	6.006E-02
CS-137	#	4.1728E-02	4.1732E-02	3.4669E-02	3.4756E-02	
CE-139	#A	-4.5201E-03	-4.5494E-03	2.9671E-02	2.9672E-02	3.182E-02
EU-152	#B	2.2891E-02	2.2895E-02	8.1193E-02	8.1203E-02	8.985E-02
EU-154	#B	1.2013E-02	1.2016E-02	5.9431E-02	5.9435E-02	6.591E-02
EU-155	#B	8.2536E-02	8.2577E-02	1.0655E-01	1.0664E-01	1.163E-01
HG-203	#B	-4.1988E-03	-4.2797E-03	3.0044E-02	3.0045E-02	2.828E-02
TL-208	#	2.2445E-01	2.2445E-01	4.4667E-02	4.6592E-02	
PB-212	#	5.2920E-01	5.2920E-01	7.6843E-02	8.2956E-02	7.034E-02
PB-214	#	3.0304E-01	3.0304E-01	6.7296E-02	6.9635E-02	6.023E-02
BI-212		4.4403E-01	4.4403E-01	3.0480E-01	3.0593E-01	
BI-214	#	3.7497E-01	3.7497E-01	7.2436E-02	7.5746E-02	
RA-224	#A	2.9894E-01	2.9894E-01	8.0244E-01	8.0263E-01	8.857E-01
RA-226	#	9.7825E-01	9.7826E-01	6.5982E-01	6.6234E-01	
AC-228	#	6.6847E-01	6.6847E-01	1.3979E-01	1.4526E-01	
TH-227	#A	-3.2062E-01	-3.2062E-01	3.0164E-01	3.0224E-01	3.262E-01
PA-234	#B	1.1668E-02	1.1668E-02	1.0299E-01	1.0299E-01	1.145E-01
TH-234	#B	3.3797E-01	3.3797E-01	1.2572E+00	1.2573E+00	1.394E+00
AM-241	#A	-3.5053E-02	-3.5053E-02	1.7852E-01	1.7853E-01	1.908E-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 (294.7 to 2000.1 keV) 1.5748640E+01 pCi/gm
Total Decayed Activity (294.7 to 2000.1 keV) 1.5748672E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107F_13DEC2005_1336.An1

Sample description
FSS-NOL-05-02-027-F

Spectrum Filename: C:\GammaVision\Spectra\107F_13DEC2005_1336.An1

Acquisition information
Start time: 13-Dec-2005 13:37:49
Live time: 2000
Real time: 2003
Dead time: 0.15 %
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/channel^2

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: 2.0110E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0110E+03) =
4.9727E+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	08-Dec-2005 14:50:00
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: 0.2335

***** 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
74.81	360.	13.24	1.18	2.842E-02	74.81	9.600	8.738E-01	PB212
77.02	642.	8.29	1.18	2.947E-02	77.11	17.500	8.337E-01	PB212
					77.11	10.700	1.353E+00	PB214
86.73	166.	25.28	1.19	3.290E-02	86.45	32.740	1.041E-01	EU155
89.74	171.	24.63	1.19	3.367E-02				
93.47	203.	21.90	1.19	3.451E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.90	147.	38.71	1.92	3.818E-02				
185.92	224.	19.60	1.93	3.611E-02	185.99	3.280	1.271E+00	RA226
209.15	150.	21.57	1.28	3.427E-02				
238.59	1370.	3.50	1.30	3.189E-02	238.63	43.100	6.620E-01	PB212
					241.00	3.900	7.433E+00	RA224
241.90	224.	16.18	1.30	3.163E-02	241.92	7.470	6.336E-01	PB214
270.19	101.	27.22	1.32	2.947E-02				
295.17	309.	9.44	1.34	2.767E-02	295.22	19.200	3.848E-01	PB214
300.53	71.	32.68	1.34	2.732E-02				
338.69	382.	11.13	1.67	2.499E-02	338.40	12.010	8.485E-01	AC228
351.89	570.	7.55	1.76	2.426E-02	351.99	37.100	4.215E-01	PB214
463.63	129.	21.91	1.20	1.952E-02	463.51	10.000	4.364E-01	SB125
510.48	274.	13.04	1.89	1.809E-02	510.72	22.500	3.967E-01	TL208
582.92	607.	7.52	1.52	1.629E-02	583.14	86.000	2.892E-01	TL208
609.20	428.	7.34	1.97	1.574E-02	609.32	46.090	3.928E-01	BI214
661.64	148.	18.49	1.46	1.477E-02	661.62	84.620	7.758E-02	CS137
726.80	176.	19.85	1.75	1.375E-02	727.17	11.800	7.240E-01	BI212
794.49	69.	24.53	2.03	1.285E-02				
794.49	69.	24.53	2.03	1.285E-02	795.76	85.400	4.222E-02	CS134
910.82	466.	7.74	1.66	1.161E-02	911.07	29.000	9.224E-01	AC228

963.80	70.	24.68	1.80	1.114E-02				
963.80	70.	24.68	1.80	1.114E-02	964.00	14.580	PBC<MDA	EU152
968.60	206.	9.81	1.80	1.110E-02	968.90	17.460	7.068E-01	AC228
1119.87	128.	22.51	1.61	9.973E-03	1120.28	15.040	5.697E-01	BI214
1172.60	523.	7.32	1.92	9.641E-03	1173.23	99.860	3.626E-01	CO60
1331.90	474.	6.32	2.11	8.776E-03	1332.51	99.980	3.613E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.14	2256.	2.15	2.21	8.194E-03	1460.75	10.700	1.726E+01	K40
1764.23	83.	11.37	2.27	7.084E-03	1764.51	15.920	4.940E-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	
173.13	86.67	799.	166.	0.083	75.83	1.186	BI-207	lD
179.13	89.67	805.	171.	0.086	73.88	1.189	PB-214	lD
257.46	128.90	1157.	172.	0.086	87.21	1.923	AC-228	s
418.50	209.43	784.	173.	0.086	81.55	1.532	AC-228	s
539.38	269.88	551.	153.	0.077	79.31	1.704	AC-228	s
600.84	300.61	396.	79.	0.040	124.16	1.347	PB-212	
1926.51	963.76	124.	61.	0.030	86.85	1.795	EU-152	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	958.	355.	0.177	39.85	1.178D
PB-212	153.89	77.11	995.	464.	0.232	26.40	1.179A
PB-214	153.89	77.11	1673.	170.	0.085	98.15	1.500A
TH-234	185.29	92.81	1825.	210.	0.105	85.31	1.500s
TH-234	185.28	92.81	1760.	205.	0.102	81.36	1.500s
RA-226	371.48	185.92	741.	224.	0.112	58.81	1.934s
TH-227	470.94	235.65	1574.	-223.	-0.112	78.13	1.500s
PB-212	476.89	238.63	486.	1347.	0.673	10.57	1.297D
RA-224	476.89	238.63	761.	1313.	0.657	12.14	1.500
PB-214	483.47	241.92	548.	222.	0.111	48.63	1.299D
PB-214	590.12	295.25	335.	322.	0.161	29.77	1.639s
AC-228	676.99	338.69	450.	379.	0.190	33.39	1.670s
PB-214	703.39	351.89	406.	564.	0.282	22.66	1.760s
SB-125	925.18	462.79	215.	84.	0.042	78.37	1.500s
TL-208	1020.54	510.48	312.	240.	0.120	39.13	1.893s
TL-208	1165.42	582.92	341.	603.	0.301	22.57	1.522s
BI-214	1217.98	609.20	185.	424.	0.212	22.01	1.966s
CS-137	1322.86	661.64	197.	144.	0.072	55.47	1.457s
BI-212	1453.18	726.80	262.	175.	0.087	59.54	1.754s
CS-134	1588.52	794.48	123.	67.	0.033	78.72	1.684s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1821.21	910.82	199.	462.	0.231	23.23	1.658s
AC-228	1937.36	968.90	103.	204.	0.102	29.45	1.799D
BI-214	2239.30	1119.87	196.	127.	0.064	67.52	1.615
CO-60	2344.77	1172.60	234.	518.	0.259	21.96	1.918s
CO-60	2663.37	1331.90	98.	471.	0.235	18.96	2.114s
K-40	2919.88	1460.14	32.	2251.	1.125	6.45	2.210
BI-214	3528.11	1764.23	3.	83.	0.041	34.12	2.271s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-1.1994E-02					
			477.56	-1.199E-02	%(	2.785E-01 8.18E-02	G
K-40		1.7257E+01					
			1460.75	1.726E+01	(P	2.236E-01 3.72E-01	G
MN-54		1.0113E-02					
			834.81	1.011E-02	&(P	3.407E-02 1.02E-02	G
CO-57		-2.8528E-03					
			122.07	-2.853E-03	&(P	3.385E-02 1.01E-02	G K
			136.43	8.008E-02	% P	2.798E-01 8.43E-02	G
CO-60		3.6196E-01					
			1332.51	3.613E-01	@(P	3.753E-02 2.30E-02	G K
			1173.23	3.626E-01	@(P	5.171E-02 2.67E-02	G K
Sr-85		-1.7487E-02					
			514.00	-1.749E-02	%(	3.625E-02 1.10E-02	G
Kr-85		-4.0884E+02					
			513.99	-4.088E+02	%(P	7.970E+02 2.41E+02	G
Y-88		-1.7657E-03					
			1836.01	-1.766E-03	&(P	2.570E-02 6.91E-03	G K
			898.02	-1.575E-02	% P	4.254E-02 1.27E-02	G
NB-94		-7.6160E-05					
			871.10	-7.616E-05	%(P	3.480E-02 1.01E-02	G K
			702.50	9.268E-04	% P	3.414E-02 9.99E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	1.8728E-03						
		722.95	1.873E-03	%(	5.943E-02	1.76E-02	G K
		614.37	-3.971E-03	%	3.289E-02	9.69E-03	G
		433.93	1.621E-04	% P	2.931E-02	8.59E-03	G
CD-109	5.5449E-02						
		88.04	5.545E-02	%(P	1.188E+00	3.57E-01	G
SN-113	-7.3062E-03						
		391.71	-7.306E-03	%(P	4.061E-02	1.20E-02	G K
		255.04	2.327E-02	%	1.375E+00	4.09E-01	G
SB-125	7.3269E-02						
		427.95	4.143E-04	%(P	7.804E-02	2.28E-02	G K
		600.77	8.420E-03	% P	1.297E-01	3.76E-02	G
		636.15	-1.760E-03	& P	2.413E-01	6.99E-02	G
		463.51	2.889E-01	*(P	2.452E-01	7.80E-02	G
		176.29	-5.886E-02	& P	4.309E-01	1.29E-01	G
I-131	5.2480E-03						
		364.48	5.248E-03	&(	4.439E-02	1.31E-02	G K
		636.97	0.000E+00	&	5.680E-01	1.65E-01	G
		284.29	-7.973E-02	%	6.517E-01	1.94E-01	G
CS-134	1.8022E-02						
		604.66	-2.156E-03	%(P	6.578E-02	1.96E-02	G K
		795.76	4.108E-02	(P	3.344E-02	1.09E-02	G
		569.29	2.897E-02	%	1.846E-01	5.46E-02	G
		801.84	-1.302E-04	& P	3.920E-01	1.14E-01	G
CS-137	7.7584E-02						
		661.62	7.758E-02	@(P	3.661E-02	1.47E-02	G
CE-139	-6.2331E-03						
		165.85	-6.233E-03	&(P	3.631E-02	1.09E-02	G
EU-152	-1.3689E-02						
		121.78	-1.369E-02	&(P	1.018E-01	3.05E-02	G K
		344.30	-2.113E-02	% P	1.000E-01	2.98E-02	G
		1408.08	-7.112E-03	% P	1.103E-01	3.03E-02	G
		964.00	6.995E-02	& P	3.536E-01	1.05E-01	G
		1112.07	-1.647E-02	% P	3.226E-01	9.41E-02	G
		778.90	-2.579E-03	& P	2.029E-01	5.82E-02	G
EU-154	-6.0493E-03						
		123.10	-6.049E-03	%(P	7.695E-02	2.30E-02	G K
		1274.80	-8.403E-03	% P	1.133E-01	3.29E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-6.563E-02 & P 2.081E-01 6.24E-02 G
                         1004.80 1.472E-02 % P 2.042E-01 5.95E-02 G

EU-155       9.0160E-02
                           86.45 9.016E-02 %(  1.306E-01 3.98E-02 G K
                          105.31 3.939E-02 & P 1.485E-01 4.47E-02 G

HG-203      -6.9601E-03
                          279.17-6.960E-03 %(P 3.605E-02 1.08E-02 G K
                           72.87-3.778E-01 & P 1.020E+00 3.08E-01 G
                           70.83-1.046E-01 %   1.120E+00 3.35E-01 G
                           82.50-9.365E-01 %   1.724E+00 5.24E-01 G

TL-208       2.8917E-01
                          583.14 2.892E-01 *(P 4.258E-02 2.19E-02 G
                          510.72 3.967E-01 + P 1.404E-01 5.90E-02 G

PB-212       6.5845E-01
                          238.63 6.585E-01  (P 5.154E-02 2.35E-02 G K
                                                          Energy duplication
                           77.11 6.028E-01 }   1.944E-01 5.31E-02 G
                           74.81 8.711E-01 + P 3.610E-01 1.17E-01 G

PB-214       4.1681E-01
                          351.99 4.215E-01 *(P 7.209E-02 3.21E-02 G K
                          295.22 4.078E-01  (P 1.112E-01 4.10E-02 G
                                                          Energy duplication
                           77.11 3.617E-01 } P 4.105E-01 1.18E-01 G
                          241.92 6.324E-01 + P 3.178E-01 1.03E-01 G

BI-212       7.2398E-01
                          727.17 7.240E-01 @(P 3.240E-01 1.45E-01 G K
                         1620.56 6.794E-02 % P 7.468E-01 2.04E-01 G
                          785.42 7.269E-01 % P 1.607E+00 4.85E-01 G

BI-214       3.9276E-01
                          609.32 3.928E-01 @(P 6.120E-02 2.91E-02 G K
                         1764.51 4.940E-01 + P 6.501E-02 5.68E-02 G
                         1120.28 5.697E-01 + P 3.044E-01 1.29E-01 G

RA-224       7.1382E+00
                          241.00 7.138E+00 ?(P 7.134E-01 2.89E-01 G

RA-226       1.2712E+00
                          185.99 1.271E+00 *(  7.352E-01 2.49E-01 G

AC-228       9.0075E-01
                          911.07 9.224E-01 @(P 1.366E-01 7.21E-02 G K
                          968.90 7.063E-01 - P 1.738E-01 7.01E-02 G
                          338.40 8.485E-01 *(P 2.272E-01 9.53E-02 G
```

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -4.1706E-01
                          236.00-4.171E-01 &(P 3.505E-01 1.08E-01 G K
                          256.25-6.721E-03 & P 2.860E-01 8.39E-02 G

PA-234       1.7950E-02
                           98.44 1.795E-02 %(  1.364E-01 4.09E-02 G K
                          946.00 2.590E-02 %   1.685E-01 4.95E-02 G
                          131.28-2.171E-02 &   1.552E-01 4.66E-02 G
                           94.67-1.399E-01 %   2.490E-01 7.57E-02 G
                          883.24 5.223E-02 &   2.272E-01 6.69E-02 G
                          926.70 0.000E+00 %   3.429E-01 9.97E-02 G
                          569.26 4.280E-02 %   2.726E-01 8.06E-02 G

TH-234       1.1941E+00
                           63.29 8.169E-01 %(P 1.596E+00 4.83E-01 G K
                           92.80 1.334E+00  (P 1.291E+00 3.97E-01 G
                           92.38 1.603E+00  (P 1.539E+00 4.73E-01 G

AM-241      -4.4324E-03
                           59.54-4.432E-03 %(P 1.928E-01 5.76E-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 - 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	-1.1248E-02	-1.1994E-02	2.4535E-01	2.4535E-01	2.612E-01
K-40		1.7257E+01	1.7257E+01	1.1155E+00	1.5110E+00	
MN-54	#A	1.0003E-02	1.0113E-02	3.0472E-02	3.0478E-02	3.369E-02
CO-57	#B	-2.8168E-03	-2.8528E-03	3.1644E-02	3.1644E-02	3.343E-02
CO-60	#	3.6132E-01	3.6196E-01	5.2931E-02	5.7085E-02	
Sr-85	#A	-1.6585E-02	-1.7487E-02	3.2987E-02	3.3003E-02	3.438E-02
Kr-85	#A	-4.0883E+02	-4.0884E+02	8.2034E+02	8.2070E+02	7.969E+02
Y-88	#B	-1.7098E-03	-1.7657E-03	5.7299E-02	5.7299E-02	2.488E-02
NB-94	#B	-7.6160E-05	-7.6160E-05	8.2388E-03	8.2388E-03	3.480E-02
Ag-108M	#B	1.8727E-03	1.8728E-03	5.2868E-02	5.2868E-02	5.943E-02
CD-109	#A	5.5030E-02	5.5449E-02	1.0699E+00	1.0699E+00	1.179E+00
SN-113	#B	-7.0916E-03	-7.3062E-03	4.5897E-02	4.5899E-02	3.942E-02
SB-125	#B	7.3021E-02	7.3269E-02	5.9349E-02	5.9507E-02	7.777E-02
I-131	#B	3.4250E-03	5.2480E-03	3.9413E-02	3.9414E-02	2.897E-02
CS-134	#B	1.7940E-02	1.8022E-02	1.4299E-02	1.4338E-02	6.548E-02
CS-137	#	7.7560E-02	7.7584E-02	4.4086E-02	4.4324E-02	
CE-139	#A	-6.0795E-03	-6.2331E-03	3.3516E-02	3.3518E-02	3.542E-02
EU-152	#B	-1.3679E-02	-1.3689E-02	9.2738E-02	9.2741E-02	1.017E-01
EU-154	#B	-6.0426E-03	-6.0493E-03	7.4759E-02	7.4760E-02	7.686E-02
EU-155	#B	8.9989E-02	9.0160E-02	1.1949E-01	1.1959E-01	1.303E-01
HG-203	#B	-6.4659E-03	-6.9601E-03	3.6242E-02	3.6244E-02	3.349E-02
TL-208	#	2.8917E-01	2.8917E-01	6.5761E-02	6.7943E-02	
PB-212		6.5845E-01	6.5845E-01	7.0381E-02	8.0410E-02	
PB-214		4.1681E-01	4.1681E-01	7.8924E-02	8.2674E-02	
BI-212	#	7.2398E-01	7.2398E-01	4.3421E-01	4.3631E-01	
BI-214		3.9276E-01	3.9276E-01	8.7347E-02	9.0375E-02	
RA-224	#	7.1382E+00	7.1382E+00	8.6783E-01	9.6481E-01	7.134E-01
RA-226	#	1.2712E+00	1.2712E+00	7.4759E-01	7.5136E-01	
AC-228		9.0075E-01	9.0075E-01	1.8479E-01	1.9229E-01	
TH-227	#A	-4.1706E-01	-4.1706E-01	3.2623E-01	3.2716E-01	3.505E-01
PA-234	#B	1.7950E-02	1.7950E-02	1.2282E-01	1.2282E-01	1.364E-01
TH-234	#B	1.1941E+00	1.1941E+00	8.6575E-01	8.6828E-01	1.596E+00
AM-241	#A	-4.4323E-03	-4.4324E-03	2.4167E-01	2.4167E-01	1.928E-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

YAEC Chemistry Lab Spectrum name: 107F_13DEC2005_1336.An1

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

Total Activity (1120.2 to 2000.1 keV) 2.2349110E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 2.2349785E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107F_13DEC2005_1448.An1

Sample description
FSS-NOL-05-02-015-F

Spectrum Filename: C:\GammaVision\Spectra\107F_13DEC2005_1448.An1

Acquisition information
Start time: 13-Dec-2005 14:50:22
Live time: 2000
Real time: 2003
Dead time: 0.15 %
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/channel^2

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: 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	08-Dec-2005 11:36:00
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. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2765

***** 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
74.79	373.	12.74	1.18	2.849E-02	74.81	9.600	8.896E-01	PB212
77.09	546.	7.00	1.18	2.957E-02	77.11	10.700	1.153E+00	PB214
					77.11	17.500	7.111E-01	PB212
93.04	191.	29.89	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.05	208.	29.49	1.50	3.429E-02	92.38	2.570	1.538E+00	TH234
					92.80	3.000	PBC<MDA	TH234
93.06	128.	41.48	1.44	3.444E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.58	149.	32.77	1.58	3.817E-02				
185.89	230.	21.15	1.60	3.611E-02				
185.89	230.	21.15	1.60	3.611E-02	185.99	3.280	1.264E+00	RA226
209.62	170.	25.71	1.80	3.426E-02				
238.65	1464.	3.51	1.30	3.189E-02	238.63	43.100	6.872E-01	PB212
					241.00	3.900	7.712E+00	RA224
241.46	250.	18.43	1.30	3.166E-02	241.92	7.470	6.870E-01	PB214
270.65	153.	23.77	1.62	2.941E-02				
295.12	332.	8.61	1.34	2.769E-02	295.22	19.200	4.018E-01	PB214
300.42	101.	25.21	1.34	2.734E-02				
328.15	114.	30.37	2.09	2.559E-02				
338.38	354.	9.06	2.09	2.500E-02	338.40	12.010	7.619E-01	AC228
351.79	627.	6.67	1.68	2.427E-02	351.99	37.100	4.510E-01	PB214
462.65	133.	19.87	1.57	1.956E-02				
462.65	133.	19.87	1.57	1.956E-02	463.51	10.000	4.360E-01	SB125
510.39	230.	16.40	2.20	1.809E-02	510.72	22.500	3.143E-01	TL208
583.11	533.	6.06	1.82	1.629E-02	583.14	86.000	2.462E-01	TL208
609.04	437.	6.86	1.67	1.575E-02	609.32	46.090	3.893E-01	BI214

661.58	129.	23.02	2.03	1.477E-02	661.62	84.620	6.549E-02	CS137
726.88	140.	17.14	1.29	1.375E-02	727.17	11.800	5.575E-01	BI212
768.72	70.	35.36	1.49	1.318E-02				
794.24	95.	24.83	1.97	1.286E-02				
794.24	95.	24.83	1.97	1.286E-02	795.76	85.400	5.622E-02	CS134
859.90	99.	23.77	0.96	1.212E-02				
910.64	406.	7.58	1.73	1.161E-02	911.07	29.000	7.776E-01	AC228
968.04	357.	10.42	1.88	1.110E-02	968.90	17.460	1.194E+00	AC228
1120.08	148.	23.28	1.25	9.971E-03	1120.28	15.040	6.399E-01	BI214
1160.73	41.	39.30	1.25	9.713E-03				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1172.75	345.	9.13	2.03	9.640E-03	1173.23	99.860	2.315E-01	CO60
1237.62	99.	29.47	1.58	9.266E-03				
1332.01	288.	8.13	1.99	8.775E-03	1332.51	99.980	2.119E-01	CO60
1406.54	24.	29.79	2.08	8.420E-03	1408.08	21.210	8.916E-02	EU152
1460.08	2220.	2.26	2.25	8.194E-03	1460.75	10.700	1.649E+01	K40
1619.79	28.	27.80	1.07	7.569E-03	1620.56	2.750	8.929E-01	BI212
1763.55	98.	11.62	1.59	7.084E-03	1764.51	15.920	5.691E-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	
418.88	209.62	700.	170.	0.085	77.13	1.798	NP-239	s
540.92	270.65	468.	153.	0.076	71.32	1.617	AC-228	s
600.16	300.27	334.	150.	0.075	60.65	2.030	PB-212	sM
655.93	328.15	405.	114.	0.057	91.10	2.090	AC-228	s
1537.02	768.72	172.	70.	0.035	106.07	1.494	BI-214	M
1719.37	859.90	130.	99.	0.049	71.32	0.961	TL-208	s
2321.03	1160.73	83.	41.	0.020	117.90	1.249	-	s
2474.82	1237.62	199.	99.	0.050	88.41	1.582	J-133	s

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	149.29	74.81	969.	373.	0.187	38.22	1.178D
PB-212	153.89	77.11	1019.	546.	0.273	21.01	1.179A
TH-234	185.77	93.05	1925.	208.	0.104	88.48	1.500s
TH-234	185.75	93.04	1900.	191.	0.096	89.67	1.500s
RA-226	371.78	186.07	993.	187.	0.094	74.70	1.500s
TH-227	471.49	235.93	1686.	-189.	-0.095	94.61	1.500s
PB-212	476.89	238.63	526.	1441.	0.720	10.25	1.297D
RA-224	476.96	238.66	776.	1440.	0.720	11.38	1.500s
PB-214	483.47	241.92	606.	232.	0.116	48.76	1.299D
PB-214	589.58	294.98	377.	342.	0.171	30.89	1.637s
AC-228	676.37	338.38	273.	351.	0.175	27.18	2.091s
PB-214	703.10	351.75	488.	654.	0.327	22.04	1.686s
SB-125	925.07	462.74	196.	112.	0.056	58.46	1.500
TL-208	1020.37	510.39	355.	196.	0.098	49.19	2.201s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1165.80	583.11	181.	529.	0.264	18.19	1.819s
BI-214	1217.66	609.04	170.	433.	0.217	20.59	1.666
CS-137	1322.73	661.58	219.	125.	0.063	69.05	2.034s
BI-212	1453.33	726.88	151.	139.	0.069	51.43	1.292
CS-134	1588.84	794.64	102.	65.	0.032	75.09	1.684s
AC-228	1820.84	910.64	163.	401.	0.201	22.73	1.735s
AC-228	1935.64	968.04	225.	355.	0.177	31.27	1.875s
BI-214	2239.73	1120.08	232.	147.	0.074	69.85	1.253s
CO-60	2345.07	1172.75	175.	341.	0.171	27.40	2.031s
CO-60	2663.60	1332.01	81.	284.	0.142	24.40	1.993
EU-152	2812.67	1406.54	16.	24.	0.012	89.38	2.078
K-40	2919.75	1460.08	61.	2215.	1.108	6.78	2.248
BI-212	3239.21	1619.79	10.	28.	0.014	83.40	1.069s
BI-214	3526.76	1763.55	10.	98.	0.049	34.87	1.588s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.1254E-01					
			477.56	1.125E-01	%(	2.332E-01 7.07E-02 G	
K-40		1.6486E+01					
			1460.75	1.649E+01	(P	2.902E-01 3.73E-01 G	
MN-54		3.2555E-03					
			834.81	3.256E-03	&(P	3.310E-02 9.69E-03 G	
CO-57		7.2382E-03					
			122.07	7.238E-03	%(P	3.538E-02 1.06E-02 G K	
			136.43	4.571E-02	& P	2.759E-01 8.28E-02 G	
CO-60		2.2171E-01					
			1332.51	2.119E-01	(P	3.318E-02 1.75E-02 G K	
			1173.23	2.315E-01	*(P	4.369E-02 2.14E-02 G K	
Sr-85		-2.1530E-02					
			514.00	-2.153E-02	&(	3.513E-02 1.07E-02 G	
Kr-85		-4.9584E+02					
			513.99	-4.958E+02	&(P	7.707E+02 2.35E+02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	-1.1924E-04						
		1836.01	-1.192E-04	%(P	2.138E-02	5.59E-03	G K
		898.02	-6.622E-03	& P	3.771E-02	1.10E-02	G
NB-94	6.7252E-03						
		871.10	6.725E-03	&(P	2.533E-02	7.49E-03	G K
		702.50	-2.373E-04	& P	2.596E-02	7.48E-03	G K
Ag-108M	0.0000E+00						
		722.95	0.000E+00	%(	5.768E-02	1.71E-02	G K
		614.37	-2.197E-02	%	3.299E-02	1.01E-02	G
		433.93	3.146E-03	% P	2.757E-02	8.13E-03	G
CD-109	7.1619E-01						
		88.04	7.162E-01	&(P	1.016E+00	3.10E-01	G
SN-113	-8.5013E-05						
		391.71	-8.501E-05	%(P	3.878E-02	1.14E-02	G K
		255.04	6.088E-05	%	1.078E+00	3.19E-01	G
SB-125	9.5100E-02						
		427.95	2.773E-04	&(P	7.706E-02	2.25E-02	G K
		600.77	-7.981E-03	% P	1.572E-01	4.59E-02	G
		636.15	6.642E-02	% P	1.952E-01	5.82E-02	G
		463.51	3.758E-01	(P	2.278E-01	7.51E-02	G
		176.29	-5.890E-02	% P	4.484E-01	1.34E-01	G
I-131	-5.7058E-03						
		364.48	-5.706E-03	%(	4.579E-02	1.36E-02	G K
		636.97	-1.759E-01	%	5.946E-01	1.78E-01	G
		284.29	-5.000E-02	%	6.303E-01	1.87E-01	G
CS-134	1.6479E-02						
		604.66	-3.028E-03	%(P	6.604E-02	1.97E-02	G K
		795.76	3.877E-02	@(P	2.972E-02	9.78E-03	G
		569.29	2.884E-02	&	1.520E-01	4.48E-02	G
		801.84	-1.027E-03	% P	3.156E-01	9.09E-02	G
CS-137	6.5488E-02						
		661.62	6.549E-02	*(P	3.737E-02	1.55E-02	G
CE-139	8.5106E-03						
		165.85	8.511E-03	%(P	3.478E-02	1.05E-02	G
EU-152	3.6352E-02						
		121.78	-1.954E-03	%(P	9.112E-02	2.72E-02	G K
		344.30	-4.068E-02	% P	8.918E-02	2.70E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1408.08	8.916E-02	(P	7.830E-02	2.73E-02	G
		964.00	4.582E-03	& P	3.017E-01	8.83E-02	G
		1112.07	-8.895E-03	& P	3.220E-01	9.38E-02	G
		778.90	-6.548E-03	% P	2.573E-01	7.49E-02	G
EU-154	-5.2011E-03						
		123.10	-5.201E-03	%(P	7.712E-02	2.31E-02	G K
		1274.80	3.671E-02	% P	8.191E-02	2.47E-02	G
		723.30	-3.871E-02	% P	1.577E-01	4.68E-02	G
		1004.80	-5.320E-02	& P	2.166E-01	6.43E-02	G
EU-155	8.5541E-02						
		86.45	8.554E-02	&(	1.277E-01	3.89E-02	G K
		105.31	1.933E-02	& P	1.484E-01	4.45E-02	G
HG-203	-4.8557E-03						
		279.17	-4.856E-03	&(P	3.521E-02	1.05E-02	G K
		72.87	-2.817E-02	& P	1.087E+00	3.27E-01	G
		70.83	7.127E-01	%	1.358E+00	4.12E-01	G
		82.50	-8.483E-01	%	1.889E+00	5.73E-01	G
TL-208	2.4616E-01						
		583.14	2.462E-01	*(P	3.047E-02	1.51E-02	G
		510.72	3.143E-01	+ P	1.451E-01	6.03E-02	G
PB-212	6.9158E-01						
		238.63	6.837E-01	(P	5.199E-02	2.36E-02	G K
							Energy duplication
		77.11	6.877E-01	}	1.909E-01	4.82E-02	G
		74.81	8.896E-01	+ P	3.523E-01	1.15E-01	G
PB-214	4.5584E-01						
		351.99	4.742E-01	@(P	7.653E-02	3.51E-02	G K
		295.22	4.203E-01	(P	1.143E-01	4.38E-02	G
							Energy duplication
		77.11	1.360E-02	} P	4.148E-01	1.16E-01	G
		241.92	6.410E-01	+ P	3.241E-01	1.05E-01	G
BI-212	5.5748E-01						
		727.17	5.575E-01	(P	2.415E-01	9.64E-02	G K
		1620.56	8.929E-01	+ P	5.350E-01	2.53E-01	G
		785.42	6.099E-01	% P	1.418E+00	4.27E-01	G
BI-214	3.8929E-01						
		609.32	3.893E-01	(P	5.704E-02	2.70E-02	G K
		1764.51	5.691E-01	+ P	9.916E-02	6.67E-02	G
		1120.28	6.399E-01	+ P	3.204E-01	1.50E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

RA-224       7.5931E+00
                          241.00 7.593E+00 ?(P 6.991E-01 2.88E-01 G

RA-226       1.0312E+00
                          185.99 1.031E+00 *(  8.238E-01 2.57E-01 G

AC-228       7.7300E-01
                          911.07 7.776E-01 @(P 1.204E-01 5.95E-02 G K
                          968.90 1.194E+00 + P 2.448E-01 1.25E-01 G
                          338.40 7.619E-01 *(P 1.732E-01 6.97E-02 G

TH-227      -3.4367E-01
                          236.00-3.437E-01 ?(P 3.520E-01 1.08E-01 G K
                          256.25-2.654E-04 % P 3.810E-01 1.13E-01 G

PA-234       2.5816E-02
                           98.44 2.582E-02 %(  1.351E-01 4.06E-02 G K
                          946.00-3.614E-02 %   1.592E-01 4.71E-02 G
                          131.28-3.356E-02 &   1.566E-01 4.71E-02 G
                           94.67-1.550E-01 %   2.571E-01 7.82E-02 G
                          883.24 3.257E-03 %   2.375E-01 6.84E-02 G
                          926.70 0.000E+00 &   2.945E-01 8.51E-02 G
                          569.26 4.247E-02 &   2.244E-01 6.62E-02 G

TH-234       1.0673E+00
                           63.29 6.489E-01 %(P 1.575E+00 4.76E-01 G K
                           92.80 1.208E+00  (P 1.301E+00 3.98E-01 G
                           92.38 1.538E+00  (P 1.533E+00 4.71E-01 G

AM-241      -4.3094E-03
                           59.54-4.309E-03 %(P 2.143E-01 6.41E-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 Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.0529E-01	1.1254E-01	2.1224E-01	2.1234E-01	2.182E-01
K-40		1.6486E+01	1.6486E+01	1.1199E+00	1.4840E+00	
MN-54	#A	3.2186E-03	3.2555E-03	2.9076E-02	2.9076E-02	3.273E-02
CO-57	#B	7.1434E-03	7.2382E-03	3.1912E-02	3.1914E-02	3.491E-02
CO-60		2.2130E-01	2.2171E-01	4.1187E-02	4.3219E-02	
Sr-85	#A	-2.0380E-02	-2.1530E-02	3.2210E-02	3.2235E-02	3.325E-02
Kr-85	#A	-4.9582E+02	-4.9584E+02	7.7937E+02	7.7992E+02	7.707E+02
Y-88	#B	-1.1532E-04	-1.1924E-04	2.2623E-02	2.2623E-02	2.068E-02
NB-94	#B	6.7252E-03	6.7252E-03	2.2459E-02	2.2462E-02	2.533E-02
Ag-108M	#B	0.0000E+00	0.0000E+00	5.1228E-02	5.1228E-02	5.768E-02
CD-109	#A	7.1058E-01	7.1619E-01	9.3036E-01	9.3120E-01	1.008E+00
SN-113	#B	-8.2425E-05	-8.5013E-05	4.1654E-02	4.1654E-02	3.760E-02
SB-125	#F	9.4766E-02	9.5100E-02	5.6988E-02	5.7265E-02	7.679E-02
I-131	#B	-3.6649E-03	-5.7058E-03	4.0714E-02	4.0715E-02	2.941E-02
CS-134	#B	1.6402E-02	1.6479E-02	1.2474E-02	1.2512E-02	6.573E-02
CS-137	#	6.5467E-02	6.5488E-02	4.6490E-02	4.6651E-02	
CE-139	#A	8.2931E-03	8.5106E-03	3.1386E-02	3.1390E-02	3.389E-02
EU-152	#B	3.6325E-02	3.6352E-02	3.3435E-02	3.3496E-02	9.105E-02
EU-154	#B	-5.1951E-03	-5.2011E-03	7.5694E-02	7.5695E-02	7.703E-02
EU-155	#B	8.5373E-02	8.5541E-02	1.1678E-01	1.1688E-01	1.274E-01
HG-203	#B	-4.4986E-03	-4.8557E-03	3.6950E-02	3.6951E-02	3.262E-02
TL-208	#	2.4616E-01	2.4616E-01	4.5164E-02	4.7446E-02	
PB-212		6.9158E-01	6.9158E-01	7.1663E-02	8.2485E-02	
PB-214		4.5584E-01	4.5584E-01	8.7490E-02	9.1538E-02	
BI-212		5.5748E-01	5.5748E-01	2.8937E-01	2.9123E-01	
BI-214		3.8929E-01	3.8929E-01	8.0950E-02	8.4152E-02	
RA-224	#	7.5931E+00	7.5931E+00	8.6522E-01	9.7453E-01	6.991E-01
RA-226	#	1.0312E+00	1.0312E+00	7.7035E-01	7.7276E-01	8.238E-01
AC-228	#	7.7300E-01	7.7300E-01	1.3829E-01	1.4563E-01	
TH-227	#A	-3.4367E-01	-3.4367E-01	3.2562E-01	3.2625E-01	3.520E-01

PA-234 #B	2.5816E-02	2.5816E-02	1.2186E-01	1.2187E-01	1.351E-01

TH-234 #B	1.0673E+00	1.0673E+00	9.1823E-01	9.2013E-01	1.575E+00
AM-241 #A	-4.3093E-03	-4.3094E-03	2.6892E-01	2.6892E-01	2.143E-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 (270.2 to 2000.1 keV) 1.9885786E+01 pCi/gm
Total Decayed Activity (270.2 to 2000.1 keV) 1.9886217E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107F_13DEC2005_1527.An1

Sample description
FSS-NOL-05-02-030-F

Spectrum Filename: C:\GammaVision\Spectra\107F_13DEC2005_1527.An1

Acquisition information
Start time: 13-Dec-2005 15:27:21
Live time: 2000
Real time: 2002
Dead time: 0.12 %
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/channel^2

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: 1.7440E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7440E+03) =
5.7339E+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	08-Dec-2005 10:52:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3352

***** 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
74.64	295.	14.73	1.18	2.842E-02	74.81	9.600	8.246E-01	PB212
77.08	476.	9.66	1.18	2.957E-02	77.11	17.500	7.124E-01	PB212
					77.11	10.700	1.154E+00	PB214
86.92	146.	37.47	1.50	3.284E-02				
86.92	146.	37.47	1.50	3.284E-02	86.45	32.740	PBC<MDA	EU155
89.56	103.	34.12	1.19	3.367E-02				
93.06	183.	20.27	1.19	3.446E-02	92.38	2.570	1.535E+00	TH234
					92.80	3.000	PBC<MDA	TH234
129.11	120.	38.73	1.00	3.818E-02				
185.93	233.	18.32	1.59	3.611E-02	185.99	3.280	1.525E+00	RA226
209.11	141.	22.94	1.13	3.430E-02				
238.57	1255.	3.59	1.30	3.191E-02	238.63	43.100	6.983E-01	PB212
241.85	205.	15.63	1.30	3.165E-02	241.92	7.470	6.688E-01	PB214
269.87	120.	29.83	0.99	2.947E-02				
295.05	258.	9.81	1.34	2.768E-02	295.22	19.200	3.693E-01	PB214
300.12	74.	27.89	1.34	2.734E-02				
338.28	286.	10.89	1.42	2.501E-02	338.40	12.010	7.302E-01	AC228
351.80	540.	8.67	1.60	2.427E-02	351.99	37.100	4.602E-01	PB214
409.10	78.	34.79	0.92	2.156E-02				
462.57	85.	31.39	1.35	1.956E-02				
462.57	85.	31.39	1.35	1.956E-02	463.51	10.000	3.285E-01	SB125
510.84	216.	13.88	2.62	1.808E-02	510.72	22.500	3.473E-01	TL208
582.93	419.	6.09	2.02	1.629E-02	583.14	86.000	2.292E-01	TL208
609.06	419.	8.99	1.78	1.575E-02	609.32	46.090	4.431E-01	BI214
726.72	116.	16.84	1.55	1.375E-02	727.17	11.800	5.472E-01	BI212
794.75	66.	22.27	1.68	1.284E-02	795.76	85.400	4.652E-02	CS134
860.03	81.	30.95	2.17	1.212E-02				

910.72	394.	7.70	2.13	1.161E-02	911.07	29.000	8.969E-01	AC228
967.41	288.	9.52	2.09	1.110E-02	968.90	17.460	1.144E+00	AC228
1120.64	133.	18.84	1.28	9.968E-03	1120.28	15.040	6.832E-01	BI214
1331.53	28.	31.32	2.03	8.773E-03	1332.51	99.980	PBC<MDA	CO60
1376.45	46.	23.70	0.73	8.564E-03				
1460.07	1709.	2.50	2.22	8.194E-03	1460.75	10.700	1.506E+01	K40
1619.48	26.	23.67	1.21	7.569E-03	1620.56	2.750	9.790E-01	BI212
1763.29	66.	13.18	1.04	7.087E-03	1764.51	15.920	4.446E-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	
178.77	89.67	572.	103.	0.052	102.37	1.189	PB-214	lD
185.57	93.17	604.	172.	0.086	64.94	1.191	U-235	D
417.86	209.11	413.	141.	0.071	68.83	1.133	AC-228	
539.38	269.87	418.	120.	0.060	89.48	0.986	AC-228	s
599.87	300.21	178.	74.	0.037	83.66	1.341	PB-212	lD
817.80	409.10	207.	78.	0.039	104.36	0.924	CS-138	s
1719.62	860.03	146.	81.	0.041	71.14	2.169	TL-208	s
2752.48	1376.45	20.	46.	0.023	71.09	0.725	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.29	74.81	794.	298.	0.149	43.15	1.178D
PB-212	153.89	77.11	817.	301.	0.151	36.50	1.179A
PB-214	153.89	77.11	1471.	165.	0.083	89.34	1.500A
EU-155	173.50	86.92	1433.	146.	0.073	112.42	1.500
TH-234	185.36	92.85	1344.	175.	0.087	87.76	1.500s
TH-234	185.36	92.85	1328.	166.	0.083	85.68	1.500s
RA-226	371.50	185.93	636.	233.	0.116	54.97	1.589s
TH-227	470.87	235.62	1159.	-157.	-0.079	95.19	1.500s
PB-212	476.89	238.63	368.	1239.	0.619	10.58	1.297D
PB-214	483.47	241.92	439.	203.	0.102	48.15	1.299D
PB-214	590.41	295.39	406.	355.	0.178	33.38	1.818s
AC-228	676.17	338.28	248.	283.	0.141	32.67	1.419s
PB-214	703.22	351.80	429.	534.	0.267	26.02	1.602s
SB-125	925.29	462.85	181.	56.	0.028	103.71	1.500
TL-208	1021.26	510.84	229.	182.	0.091	41.63	2.620s
TL-208	1165.45	582.93	98.	414.	0.207	18.28	2.017s
BI-214	1217.70	609.06	232.	415.	0.207	26.98	1.781s
BI-212	1453.00	726.72	92.	115.	0.057	50.52	1.547s
CS-134	1589.06	794.75	76.	66.	0.033	66.82	1.684s
AC-228	1821.01	910.72	126.	390.	0.195	23.09	2.126s
AC-228	1934.39	967.41	121.	286.	0.143	28.55	2.091s
BI-214	2240.84	1120.64	122.	132.	0.066	56.52	1.280s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2662.63	1331.53	36.	28.	0.014	93.95	2.031
K-40	2919.75	1460.07	28.	1704.	0.852	7.50	2.216
BI-212	3238.58	1619.48	4.	26.	0.013	71.01	1.205s
BI-214	3526.23	1763.29	4.	65.	0.032	39.55	1.040s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		3.8483E-02					
			477.56	3.848E-02	%(	2.398E-01 7.05E-02 G	
K-40		1.5064E+01					
			1460.75	1.506E+01	(P	2.425E-01 3.77E-01 G	
MN-54		4.9679E-04					
			834.81	4.968E-04	%(P	3.719E-02 1.08E-02 G	
CO-57		1.8616E-04					
			122.07	1.862E-04	&(P	3.246E-02 9.65E-03 G K	
			136.43	-1.579E-02	% P	2.675E-01 7.98E-02 G	
CO-60		2.4467E-02					
			1332.51	2.447E-02	(P	2.729E-02 8.70E-03 G K	
			1173.23	1.172E-02	% P	4.505E-02 1.33E-02 G K	
Sr-85		-1.6627E-02					
			514.00	-1.663E-02	&(	3.850E-02 1.16E-02 G	
Kr-85		-3.9321E+02					
			513.99	-3.932E+02	&(P	8.449E+02 2.54E+02 G	
Y-88		-2.6554E-03					
			1836.01	-2.655E-03	&(P	2.721E-02 7.27E-03 G K	
			898.02	-5.009E-03	% P	3.335E-02 9.59E-03 G	
NB-94		-1.4646E-03					
			871.10	-1.465E-03	%(P	2.614E-02 7.45E-03 G K	
			702.50	3.159E-03	% P	2.596E-02 7.53E-03 G K	
Ag-108M		-7.1985E-04					
			722.95	-7.199E-04	%(	5.949E-02 1.76E-02 G K	
			614.37	-9.399E-03	%	3.499E-02 1.04E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	-5.738E-03	% P	3.084E-02	9.10E-03	G
CD-109	-4.5240E-01						
		88.04	-4.524E-01	&(P	1.046E+00	3.17E-01	G
SN-113	-8.2373E-03						
		391.71	-8.237E-03	&(P	4.382E-02	1.30E-02	G K
		255.04	-2.456E-01	%	1.293E+00	3.86E-01	G
SB-125	5.8477E-02						
		427.95	2.748E-03	&(P	8.354E-02	2.43E-02	G K
		600.77	3.050E-02	& P	1.381E-01	4.06E-02	G
		636.15	1.532E-02	% P	1.965E-01	5.64E-02	G
		463.51	2.234E-01	(P	2.603E-01	8.11E-02	G
		176.29	-8.053E-02	% P	4.557E-01	1.36E-01	G
I-131	2.6061E-03						
		364.48	2.606E-03	&(	4.563E-02	1.34E-02	G K
		636.97	3.139E-03	%	5.416E-01	1.55E-01	G
		284.29	-1.857E-03	&	5.339E-01	1.56E-01	G
CS-134	2.3348E-02						
		604.66	3.070E-03	&(P	7.463E-02	2.23E-02	G K
		795.76	4.652E-02	*(P	3.072E-02	1.04E-02	G
		569.29	2.501E-03	&	1.697E-01	4.91E-02	G
		801.84	-1.491E-01	% P	3.482E-01	1.05E-01	G
CS-137	5.7807E-03						
		661.62	5.781E-03	%(P	3.487E-02	1.02E-02	G
CE-139	-4.3618E-03						
		165.85	-4.362E-03	%(P	3.763E-02	1.13E-02	G
EU-152	-2.1434E-03						
		121.78	-2.143E-03	&(P	1.040E-01	3.10E-02	G K
		344.30	-2.174E-02	% P	9.390E-02	2.79E-02	G
		1408.08	-7.655E-03	% P	1.260E-01	3.46E-02	G
		964.00	-3.162E-03	& P	3.948E-01	1.16E-01	G
		1112.07	-7.751E-02	& P	2.913E-01	8.60E-02	G
		778.90	1.141E-01	% P	1.909E-01	5.87E-02	G
EU-154	-5.1818E-03						
		123.10	-5.182E-03	%(P	7.548E-02	2.25E-02	G K
		1274.80	-1.826E-02	% P	1.039E-01	3.02E-02	G
		723.30	-2.057E-03	% P	1.577E-01	4.54E-02	G
		1004.80	2.930E-02	% P	1.692E-01	4.92E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.0577E-01						
		86.45	1.058E-01	(	1.293E-01	3.96E-02	G K
		105.31	2.805E-02	% P	1.529E-01	4.59E-02	G
HG-203	2.1727E-02						
		279.17	2.173E-02	&(P	3.141E-02	9.64E-03	G K
		72.87	-4.229E-01	& P	1.072E+00	3.24E-01	G
		70.83	2.930E-01	%	1.593E+00	4.79E-01	G
		82.50	-7.239E-01	%	2.243E+00	6.77E-01	G
TL-208	2.2924E-01						
		583.14	2.292E-01	(P	2.695E-02	1.41E-02	G
		510.72	3.473E-01	+ P	1.394E-01	5.71E-02	G
PB-212	7.0291E-01						
		238.63	6.983E-01	(P	5.193E-02	2.50E-02	G K
							Energy duplication
		77.11	4.509E-01	}	2.035E-01	5.49E-02	G
		74.81	8.434E-01	+ P	3.797E-01	1.23E-01	G
PB-214	4.7997E-01						
		351.99	4.602E-01	*(P	8.539E-02	4.03E-02	G K
		295.22	5.182E-01	*(P	1.408E-01	5.84E-02	G
							Energy duplication
		77.11	4.047E-01	} P	4.442E-01	1.21E-01	G
		241.92	6.665E-01	+ P	3.290E-01	1.08E-01	G
BI-212	5.4717E-01						
		727.17	5.472E-01	(P	2.271E-01	9.31E-02	G K
		1620.56	9.790E-01	+ P	4.347E-01	2.36E-01	G
		785.42	4.757E-01	% P	1.457E+00	4.33E-01	G
BI-214	4.4346E-01						
		609.32	4.431E-01	@(P	7.872E-02	4.03E-02	G K
		1764.51	4.446E-01	(P	8.499E-02	5.94E-02	G
		1120.28	6.832E-01	+ P	2.798E-01	1.30E-01	G
RA-224	2.6546E-01						
		241.00	2.655E-01	%(P	9.821E-01	2.96E-01	G
RA-226	1.5247E+00						
		185.99	1.525E+00	*(	7.868E-01	2.79E-01	G
AC-228	8.9694E-01						
		911.07	8.969E-01	(P	1.268E-01	6.98E-02	G K
		968.90	1.144E+00	+ P	2.161E-01	1.10E-01	G
		338.40	7.302E-01	- P	1.964E-01	8.04E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -3.3841E-01
                          236.00-3.384E-01 ?(P 3.477E-01 1.07E-01 G K
                          256.25-8.448E-02 % P 3.705E-01 1.10E-01 G

PA-234      -1.3197E-02
                           98.44-1.320E-02 %(  1.353E-01 4.05E-02 G K
                          946.00-3.880E-02 &   1.818E-01 5.36E-02 G
                          131.28 8.047E-03 &   1.630E-01 4.87E-02 G
                           94.67-1.224E-02 %   2.500E-01 7.48E-02 G
                          883.24 1.086E-02 &   2.361E-01 6.76E-02 G
                          926.70 3.545E-02 &   2.568E-01 7.43E-02 G
                          569.26 3.701E-03 &   2.505E-01 7.24E-02 G

TH-234       9.0473E-01
                           63.29 2.282E-01 &(P 1.679E+00 5.02E-01 G K
                           92.80 1.244E+00 @(P 1.296E+00 3.98E-01 G
                           92.38 1.535E+00 *(P 1.526E+00 4.70E-01 G

AM-241       6.3916E-02
                           59.54 6.392E-02 &(P 1.934E-01 5.83E-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 - 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	3.5975E-02	3.8483E-02	2.1137E-01	2.1138E-01	2.241E-01
K-40		1.5064E+01	1.5064E+01	1.1325E+00	1.4402E+00	
MN-54	#A	4.9109E-04	4.9679E-04	3.2318E-02	3.2318E-02	3.676E-02
CO-57	#B	1.8369E-04	1.8616E-04	2.8961E-02	2.8961E-02	3.203E-02
CO-60	#B	2.4421E-02	2.4467E-02	2.6115E-02	2.6155E-02	2.724E-02
Sr-85	#A	-1.5730E-02	-1.6627E-02	3.4918E-02	3.4932E-02	3.642E-02
Kr-85	#A	-3.9319E+02	-3.9321E+02	8.8847E+02	8.8878E+02	8.448E+02
Y-88	#B	-2.5672E-03	-2.6554E-03	4.6363E-02	4.6363E-02	2.630E-02
NB-94	#B	-1.4646E-03	-1.4646E-03	2.5213E-02	2.5213E-02	2.614E-02
Ag-108M	#B	-7.1980E-04	-7.1985E-04	5.2669E-02	5.2669E-02	5.948E-02
CD-109	#A	-4.4882E-01	-4.5240E-01	9.5819E-01	9.5852E-01	1.037E+00
SN-113	#B	-7.9837E-03	-8.2373E-03	4.9743E-02	4.9746E-02	4.247E-02
SB-125	#B	5.8270E-02	5.8477E-02	6.3688E-02	6.3782E-02	8.324E-02
I-131	#B	1.6658E-03	2.6061E-03	4.0167E-02	4.0168E-02	2.917E-02
CS-134	#B	2.3237E-02	2.3348E-02	1.5727E-02	1.5788E-02	7.427E-02
CS-137	#A	5.7788E-03	5.7807E-03	3.0548E-02	3.0550E-02	3.486E-02
CE-139	#A	-4.2491E-03	-4.3618E-03	3.5186E-02	3.5187E-02	3.666E-02
EU-152	#B	-2.1418E-03	-2.1434E-03	1.0183E-01	1.0183E-01	1.039E-01
EU-154	#B	-5.1758E-03	-5.1818E-03	7.5145E-02	7.5146E-02	7.540E-02
EU-155	#A	1.0556E-01	1.0577E-01	1.1890E-01	1.1905E-01	1.291E-01
HG-203	#B	2.0113E-02	2.1727E-02	2.8926E-02	2.8955E-02	2.908E-02
TL-208		2.2924E-01	2.2924E-01	4.2353E-02	4.4464E-02	
PB-212		7.0291E-01	7.0291E-01	7.5345E-02	8.6025E-02	
PB-214		4.7997E-01	4.7997E-01	1.0274E-01	1.0658E-01	
BI-212		5.4717E-01	5.4717E-01	2.7954E-01	2.8140E-01	
BI-214		4.4346E-01	4.4346E-01	1.0751E-01	1.1065E-01	
RA-224	#A	2.6546E-01	2.6546E-01	8.8668E-01	8.8682E-01	9.821E-01
RA-226	#	1.5247E+00	1.5247E+00	8.3818E-01	8.4300E-01	
AC-228		8.9694E-01	8.9694E-01	2.0933E-01	2.1593E-01	
TH-227	#A	-3.3841E-01	-3.3841E-01	3.2268E-01	3.2330E-01	3.477E-01
PA-234	#B	-1.3197E-02	-1.3197E-02	1.2147E-01	1.2147E-01	1.353E-01
TH-234	#B	9.0473E-01	9.0473E-01	8.3022E-01	8.3173E-01	1.679E+00
AM-241	#A	6.3915E-02	6.3916E-02	1.7494E-01	1.7498E-01	1.934E-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 (269.7 to 2000.1 keV) 1.9888330E+01 pCi/gm
Total Decayed Activity (269.7 to 2000.1 keV) 1.9888340E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107F_13DEC2005_1609.An1

Sample description
FSS-NOL-05-02-013-F

Spectrum Filename: C:\GammaVision\Spectra\107F_13DEC2005_1609.An1

Acquisition information

Start time:	13-Dec-2005 16:09:27
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/channel^2

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:	1.9400E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.9400E+03) = 5.1546E+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	08-Dec-2005 14:56:00
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. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3086

***** 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
74.82	386.	12.21	1.18	2.842E-02	74.81	9.600	9.730E-01	PB212
77.00	531.	9.86	1.18	2.946E-02	77.11	17.500	7.150E-01	PB212
					77.11	10.700	1.159E+00	PB214
87.05	163.	25.33	1.19	3.306E-02	86.45	32.740	1.058E-01	EU155
					88.04	3.790	PBC<MDA	CD109
89.94	126.	31.43	1.19	3.379E-02				
93.36	226.	18.32	1.19	3.455E-02	92.38	2.570	1.726E+00	TH234
					92.80	3.000	1.396E+00	TH234
185.50	216.	24.31	1.67	3.614E-02	185.99	3.280	1.270E+00	RA226
209.21	182.	24.83	2.07	3.429E-02				
238.60	1421.	3.40	1.30	3.189E-02	238.63	43.100	7.120E-01	PB212
					241.00	3.900	7.991E+00	RA224
241.65	288.	12.14	1.30	3.165E-02	241.92	7.470	8.440E-01	PB214
270.13	176.	22.08	1.54	2.945E-02				
277.44	66.	40.23	0.91	2.892E-02				
277.44	66.	40.23	0.91	2.892E-02	279.17	81.500	PBC<MDA	HG203
295.03	332.	8.37	1.34	2.769E-02	295.22	19.200	4.286E-01	PB214
300.36	110.	21.00	1.34	2.733E-02				
328.20	151.	23.80	2.25	2.559E-02				
338.13	357.	11.29	1.32	2.502E-02	338.40	12.010	8.207E-01	AC228
351.80	664.	6.64	1.47	2.427E-02	351.99	37.100	5.101E-01	PB214
462.93	65.	32.03	1.50	1.953E-02	463.51	10.000	PBC<MDA	SB125
510.34	273.	14.00	2.10	1.809E-02	510.72	22.500	4.098E-01	TL208
583.00	560.	5.19	1.59	1.629E-02	583.14	86.000	2.762E-01	TL208
609.06	533.	6.05	1.62	1.575E-02	609.32	46.090	5.078E-01	BI214
660.82	79.	23.17	2.21	1.477E-02	661.62	84.620	4.397E-02	CS137
727.03	151.	16.76	2.04	1.374E-02	727.17	11.800	6.431E-01	BI212

794.70	71.	27.44	1.50	1.285E-02				
794.70	71.	27.44	1.50	1.285E-02	795.76	85.400	4.523E-02	CS134
860.05	101.	19.83	2.06	1.212E-02				
910.62	416.	7.19	2.38	1.161E-02	911.07	29.000	8.529E-01	AC228
967.79	336.	8.25	1.46	1.110E-02	968.90	17.460	1.200E+00	AC228
1119.58	104.	20.31	2.49	9.974E-03	1120.28	15.040	4.790E-01	BI214
1172.63	75.	36.58	0.84	9.641E-03	1173.23	99.860	5.122E-02	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.27	64.	20.80	1.04	8.773E-03	1332.51	99.980	5.111E-02	CO60
1460.07	2298.	2.17	2.29	8.194E-03	1460.75	10.700	1.823E+01	K40
1763.49	111.	9.49	1.82	7.087E-03	1764.51	15.920	6.801E-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	
173.77	87.27	771.	163.	0.082	76.00	1.187	PB-214	D
179.54	90.15	725.	126.	0.063	94.28	1.189	PB-214	D
186.38	93.57	747.	226.	0.113	54.95	1.191	U-235	D
418.05	209.21	717.	182.	0.091	74.48	2.066	AC-228	s
539.88	270.13	475.	176.	0.088	66.23	1.538	AC-228	s
600.27	300.33	305.	130.	0.065	67.87	1.581	PB-212	M
656.02	328.20	380.	151.	0.075	71.39	2.253	AC-228	s
1588.96	794.70	108.	75.	0.037	68.25	1.496	AC-228	
1719.66	860.05	100.	101.	0.051	59.48	2.063	TL-208	

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	149.29	74.81	915.	389.	0.194	35.96	1.178D
PB-212	153.89	77.11	962.	344.	0.172	34.76	1.179A
PB-214	153.89	77.11	1652.	191.	0.095	83.59	1.500A
EU-155	174.16	87.25	1780.	154.	0.077	118.59	1.500
TH-234	185.97	93.15	1710.	219.	0.110	79.49	1.500s
TH-234	185.93	93.13	1679.	208.	0.104	78.30	1.500s
RA-226	370.65	185.50	940.	216.	0.108	72.92	1.668s
TH-227	471.36	235.87	1531.	-170.	-0.085	100.59	1.500s
PB-212	476.89	238.63	474.	1403.	0.701	10.22	1.297D
RA-224	476.88	238.62	702.	1395.	0.698	11.35	1.500
PB-214	483.47	241.92	519.	272.	0.136	39.67	1.299D
PB-214	589.60	294.99	419.	355.	0.178	32.48	1.481
AC-228	675.87	338.13	399.	354.	0.177	33.87	1.316
PB-214	703.21	351.80	382.	659.	0.330	19.92	1.468s
SB-125	925.45	462.93	203.	65.	0.032	96.08	1.500s
TL-208	1020.27	510.34	331.	239.	0.120	42.00	2.099s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1165.58	583.00	124.	555.	0.278	15.58	1.590s
BI-214	1217.70	609.06	153.	529.	0.264	18.14	1.617
Ag-108M	1222.48	611.45	225.	-72.	-0.036	94.87	1.561s
CS-137	1321.22	660.82	121.	79.	0.039	69.52	2.214s
BI-212	1453.63	727.03	145.	150.	0.075	50.28	2.037s
AC-228	1820.80	910.62	134.	412.	0.206	21.56	2.384s
AC-228	1935.14	967.79	133.	334.	0.167	24.76	1.465
BI-214	2238.74	1119.58	115.	103.	0.052	60.92	2.495s
CO-60	2344.84	1172.63	191.	71.	0.035	109.74	0.843s
CO-60	2664.12	1332.27	48.	64.	0.032	62.39	1.042s
K-40	2919.73	1460.07	42.	2293.	1.147	6.51	2.288
BI-214	3526.63	1763.49	1.	110.	0.055	28.47	1.818s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-1.3084E-02					
			477.56	-1.308E-02	&(	2.649E-01 7.76E-02 G	
K-40		1.8227E+01					
			1460.75	1.823E+01	(P	2.605E-01 3.96E-01 G	
MN-54		-7.9702E-05					
			834.81	-7.970E-05	%(P	3.213E-02 9.27E-03 G	
CO-57		-6.9259E-03					
			122.07	-6.926E-03	%(P	3.610E-02 1.08E-02 G K	
			136.43	5.547E-02	% P	2.821E-01 8.48E-02 G	
CO-60		5.1165E-02					
			1332.51	5.111E-02	(P	2.778E-02 1.12E-02 G K	
			1173.23	5.122E-02	(P	4.871E-02 1.98E-02 G K	
Sr-85		-2.3297E-02					
			514.00	-2.330E-02	%(	3.709E-02 1.13E-02 G	
Kr-85		-5.3660E+02					
			513.99	-5.366E+02	%(P	8.147E+02 2.48E+02 G	
Y-88		3.1202E-03					
			1836.01	3.120E-03	%(P	1.890E-02 5.11E-03 G K	
			898.02	-1.009E-03	% P	3.734E-02 1.07E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	3.1640E-03						
		871.10	3.164E-03	&(P	3.067E-02	8.93E-03	G K
		702.50	2.419E-03	% P	3.020E-02	8.82E-03	G K
Ag-108M	-2.0708E-02						
		722.95	-2.071E-02	%(	4.129E-02	1.25E-02	G K
		614.37	-3.562E-02	+	3.579E-02	1.13E-02	G
		433.93	6.923E-03	% P	2.791E-02	8.30E-03	G
CD-109	-4.9196E-02						
		88.04	-4.920E-02	%(P	1.187E+00	3.56E-01	G
SN-113	-9.2562E-03						
		391.71	-9.256E-03	%(P	4.050E-02	1.20E-02	G K
		255.04	-1.615E-01	%	1.213E+00	3.61E-01	G
SB-125	5.7712E-02						
		427.95	-9.926E-04	%(P	7.752E-02	2.25E-02	G K
		600.77	-4.257E-03	% P	1.145E-01	3.26E-02	G
		636.15	-5.515E-04	% P	2.155E-01	6.19E-02	G
		463.51	2.315E-01	*(P	2.471E-01	7.74E-02	G
		176.29	7.852E-02	% P	4.543E-01	1.36E-01	G
I-131	1.5594E-02						
		364.48	1.559E-02	%(	4.190E-02	1.26E-02	G K
		636.97	3.203E-02	%	5.076E-01	1.47E-01	G
		284.29	1.296E-01	%	6.297E-01	1.88E-01	G
CS-134	-2.1931E-02						
		604.66	-2.193E-02	%(P	3.759E-02	1.15E-02	G K
		795.76	-2.626E-03	% P	3.585E-02	1.04E-02	G
		569.29	3.279E-02	&	1.783E-01	5.27E-02	G
		801.84	-7.473E-02	% P	3.738E-01	1.10E-01	G
CS-137	4.3966E-02						
		661.62	4.397E-02	(P	3.010E-02	1.06E-02	G
CE-139	2.3152E-03						
		165.85	2.315E-03	&(P	3.587E-02	1.07E-02	G
EU-152	-1.9070E-02						
		121.78	-1.907E-02	%(P	1.072E-01	3.22E-02	G K
		344.30	2.253E-03	% P	8.941E-02	2.63E-02	G
		1408.08	2.585E-02	% P	1.129E-01	3.25E-02	G
		964.00	5.453E-03	% P	3.390E-01	9.95E-02	G
		1112.07	2.775E-02	& P	2.751E-01	8.01E-02	G
		778.90	2.366E-02	% P	2.056E-01	5.98E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	1.3894E-02						
		123.10	1.389E-02	%(P	7.903E-02	2.37E-02	G K
		1274.80	-5.155E-03	% P	9.104E-02	2.60E-02	G
		723.30	-9.320E-02	% P	1.957E-01	5.93E-02	G
		1004.80	-2.225E-03	& P	1.831E-01	5.26E-02	G
EU-155	1.0009E-01						
		86.45	1.001E-01	(	1.294E-01	3.96E-02	G K
		105.31	4.210E-02	% P	1.421E-01	4.28E-02	G
HG-203	-1.6043E-03						
		279.17	-1.604E-03	&(P	3.347E-02	9.90E-03	G K
		72.87	-3.845E-01	& P	9.880E-01	2.99E-01	G
		70.83	9.336E-01	%	1.525E+00	4.64E-01	G
		82.50	-1.242E+00	%	2.002E+00	6.10E-01	G
TL-208	2.7619E-01						
		583.14	2.762E-01	@(P	2.710E-02	1.45E-02	G
		510.72	4.098E-01	+ P	1.497E-01	6.54E-02	G
PB-212	7.1712E-01						
		238.63	7.107E-01	(P	5.280E-02	2.45E-02	G K
							Energy duplication
		77.11	4.631E-01	}	1.981E-01	5.37E-02	G
		74.81	9.900E-01	+ P	3.659E-01	1.20E-01	G
PB-214	4.9507E-01						
		351.99	5.101E-01	*(P	7.258E-02	3.41E-02	G K
		295.22	4.660E-01	(P	1.285E-01	5.11E-02	G
							Energy duplication
		77.11	4.196E-01	} P	4.229E-01	1.17E-01	G
		241.92	8.021E-01	+ P	3.209E-01	1.07E-01	G
BI-212	6.4309E-01						
		727.17	6.431E-01	(P	2.529E-01	1.09E-01	G K
		1620.56	-8.160E-02	% P	8.074E-01	2.20E-01	G
		785.42	8.559E-01	% P	1.504E+00	4.59E-01	G
BI-214	5.0068E-01						
		609.32	5.078E-01	(P	5.796E-02	3.09E-02	G K
		1764.51	6.801E-01	+ P	4.552E-02	6.50E-02	G
		1120.28	4.790E-01	(P	2.446E-01	9.81E-02	G
RA-224	7.8594E+00						
		241.00	7.859E+00	?(P	7.109E-01	2.98E-01	G
RA-226	1.2701E+00						
		185.99	1.270E+00	*(	8.564E-01	3.09E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

AC-228       8.4344E-01
                          911.07 8.529E-01 @(P 1.172E-01 6.19E-02 G K
                          968.90 1.200E+00 + P 2.033E-01 9.96E-02 G
                          338.40 8.207E-01  (P 2.223E-01 9.34E-02 G

TH-227      -3.2889E-01
                          236.00-3.289E-01 ?(P 3.584E-01 1.10E-01 G K
                          256.25 1.164E-01 % P 3.681E-01 1.11E-01 G

PA-234       1.0334E-03
                           98.44 1.033E-03 &(  1.370E-01 4.09E-02 G K
                          946.00 1.103E-02 &   1.550E-01 4.49E-02 G
                          131.28-4.199E-02 &   1.600E-01 4.82E-02 G
                           94.67-1.110E-01 %   2.622E-01 7.94E-02 G
                          883.24 2.727E-02 &   2.715E-01 7.92E-02 G
                          926.70-3.363E-02 &   2.639E-01 7.68E-02 G
                          569.26 4.825E-02 &   2.633E-01 7.79E-02 G

TH-234       1.1150E+00
                           63.29 4.814E-01 %(P 1.675E+00 5.04E-01 G K
                           92.80 1.408E+00 *(P 1.308E+00 4.02E-01 G
                           92.38 1.735E+00 *(P 1.544E+00 4.76E-01 G

AM-241      -4.8146E-02
                           59.54-4.815E-02 %(P 2.184E-01 6.57E-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
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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	-1.2254E-02	-1.3084E-02	2.3277E-01	2.3277E-01	2.481E-01
K-40		1.8227E+01	1.8227E+01	1.1889E+00	1.6039E+00	
MN-54	#A	-7.8813E-05	-7.9702E-05	5.4818E-02	5.4818E-02	3.177E-02
CO-57	#B	-6.8367E-03	-6.9259E-03	3.3105E-02	3.3108E-02	3.564E-02
CO-60		5.1072E-02	5.1165E-02	3.3792E-02	3.3927E-02	
Sr-85	#A	-2.2073E-02	-2.3297E-02	3.4048E-02	3.4076E-02	3.514E-02
Kr-85	#A	-5.3658E+02	-5.3660E+02	8.2348E+02	8.2409E+02	8.147E+02
Y-88	#B	3.0194E-03	3.1202E-03	1.5324E-02	1.5325E-02	1.829E-02
NB-94	#B	3.1640E-03	3.1640E-03	2.6796E-02	2.6797E-02	3.067E-02
Ag-108M	#B	-2.0706E-02	-2.0708E-02	3.7627E-02	3.7647E-02	4.129E-02
CD-109	#A	-4.8817E-02	-4.9196E-02	1.1484E+00	1.1484E+00	1.178E+00
SN-113	#B	-8.9788E-03	-9.2562E-03	4.3904E-02	4.3907E-02	3.929E-02
SB-125	#B	5.7513E-02	5.7712E-02	5.7859E-02	5.7959E-02	7.725E-02
I-131	#B	1.0089E-02	1.5594E-02	3.7815E-02	3.7826E-02	2.711E-02
CS-134	#B	-2.1829E-02	-2.1931E-02	3.5138E-02	3.5161E-02	3.741E-02
CS-137		4.3952E-02	4.3966E-02	3.1935E-02	3.2041E-02	
CE-139	#A	2.2570E-03	2.3152E-03	3.2145E-02	3.2146E-02	3.497E-02
EU-152	#B	-1.9055E-02	-1.9070E-02	9.7482E-02	9.7488E-02	1.071E-01
EU-154	#B	1.3878E-02	1.3894E-02	7.1220E-02	7.1224E-02	7.894E-02
EU-155	#A	9.9899E-02	1.0009E-01	1.1870E-01	1.1883E-01	1.291E-01
HG-203	#B	-1.4881E-03	-1.6043E-03	5.0384E-02	5.0384E-02	3.104E-02
TL-208	#	2.7619E-01	2.7619E-01	4.3376E-02	4.6342E-02	
PB-212		7.1712E-01	7.1712E-01	7.4127E-02	8.5373E-02	
PB-214		4.9507E-01	4.9507E-01	9.5393E-02	9.9774E-02	
BI-212	#	6.4309E-01	6.4309E-01	3.2616E-01	3.2836E-01	
BI-214		5.0068E-01	5.0068E-01	9.1552E-02	9.6209E-02	
RA-224	#	7.8594E+00	7.8594E+00	8.9385E-01	1.0072E+00	7.109E-01
RA-226	#	1.2700E+00	1.2701E+00	9.2616E-01	9.2919E-01	
AC-228		8.4344E-01	8.4344E-01	1.7092E-01	1.7803E-01	
TH-227	#A	-3.2889E-01	-3.2889E-01	3.3137E-01	3.3194E-01	3.584E-01
PA-234	#B	1.0334E-03	1.0334E-03	1.2280E-01	1.2280E-01	1.370E-01
TH-234	#B	1.1150E+00	1.1150E+00	9.1842E-01	9.2050E-01	1.675E+00
AM-241	#A	-4.8145E-02	-4.8146E-02	2.0347E-01	2.0349E-01	2.184E-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 (269.7 to 2000.1 keV) 2.3067947E+01 pCi/gm
Total Decayed Activity (269.7 to 2000.1 keV) 2.3068066E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107F_13DEC2005_1647.An1

Sample description
FSS-NOL-05-02-011-F

Spectrum Filename: C:\GammaVision\Spectra\107F_13DEC2005_1647.An1

Acquisition information
Start time: 13-Dec-2005 16:47:08
Live time: 2000
Real time: 2003
Dead time: 0.13 %
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/channel^2

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: 1.9030E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9030E+03) =
5.2549E+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	08-Dec-2005 13:10:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3608

***** 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	394.	11.32	1.18	2.842E-02				
74.71	394.	11.32	1.18	2.842E-02	74.81	9.600	1.013E+00	PB212
76.98	559.	8.44	1.18	2.950E-02				
76.98	559.	8.44	1.18	2.950E-02	77.11	17.500	7.674E-01	PB212
					77.11	10.700	1.244E+00	PB214
86.79	229.	17.21	1.19	3.294E-02	86.45	32.740	1.513E-01	EU155
89.50	136.	28.66	1.19	3.364E-02				
93.27	253.	15.84	1.19	3.449E-02	92.38	2.570	1.972E+00	TH234
					92.80	3.000	1.604E+00	TH234
128.22	193.	30.91	1.85	3.816E-02				
185.69	239.	21.68	1.36	3.612E-02	185.99	3.280	1.434E+00	RA226
238.58	1370.	3.51	1.30	3.190E-02				
238.58	1370.	3.51	1.30	3.190E-02	238.63	43.100	6.997E-01	PB212
241.70	191.	17.26	1.30	3.165E-02				
241.70	191.	17.26	1.30	3.165E-02	241.92	7.470	5.689E-01	PB214
270.03	93.	33.77	1.13	2.946E-02				
295.03	280.	9.40	1.34	2.769E-02				
295.03	280.	9.40	1.34	2.769E-02	295.22	19.200	3.685E-01	PB214
300.66	86.	25.15	1.34	2.731E-02				
328.13	120.	29.83	1.36	2.560E-02				
338.34	343.	10.69	1.71	2.501E-02	338.40	12.010	8.026E-01	AC228
351.69	531.	7.57	1.53	2.427E-02				
351.69	531.	7.57	1.53	2.427E-02	351.99	37.100	4.148E-01	PB214
462.48	130.	23.36	1.42	1.956E-02				
462.48	130.	23.36	1.42	1.956E-02	463.51	10.000	4.634E-01	SB125
510.55	234.	13.92	1.47	1.809E-02	510.72	22.500	3.506E-01	TL208
582.95	550.	6.68	1.84	1.629E-02	583.14	86.000	2.765E-01	TL208

609.04	339.	8.16	1.67	1.575E-02	609.32	46.090	3.273E-01	BI214
726.85	125.	21.17	1.73	1.375E-02	727.17	11.800	5.435E-01	BI212
794.62	74.	21.25	1.68	1.284E-02	795.76	85.400	4.813E-02	CS134
860.03	97.	22.49	1.03	1.212E-02				
910.80	391.	6.77	1.70	1.161E-02	911.07	29.000	8.155E-01	AC228
934.00	56.	26.21	0.93	1.140E-02				
963.99	63.	21.66	1.80	1.113E-02				
963.99	63.	21.66	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152
968.49	208.	8.70	1.80	1.110E-02	968.90	17.460	7.531E-01	AC228
1119.39	85.	18.18	1.77	9.976E-03	1120.28	15.040	3.969E-01	BI214
1332.77	28.	34.94	2.03	8.773E-03	1332.51	99.980	PBC<MDA	CO60
1459.97	1936.	2.30	2.15	8.194E-03	1460.75	10.700	1.565E+01	K40
1588.22	55.	16.94	1.61	7.687E-03				
1763.58	67.	13.63	2.16	7.084E-03	1764.51	15.920	4.238E-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	
149.09	74.67	798.	394.	0.197	33.97	1.178	BI-207	D
153.63	76.94	836.	559.	0.280	25.33	1.179	PB-214	D
178.66	89.52	695.	136.	0.068	85.97	1.188	PB-214	lD
256.10	128.22	1131.	227.	0.114	65.82	1.853	AC-228	s
476.80	238.59	470.	1370.	0.685	10.52	1.297	PB-212	D
483.03	241.71	446.	191.	0.095	51.77	1.299	PB-214	D
539.69	270.03	374.	93.	0.047	101.30	1.128	AC-228	s
600.95	300.67	286.	107.	0.054	72.77	1.175	PB-212	
655.88	328.13	363.	120.	0.060	89.50	1.359	AC-228	s
924.56	462.48	239.	130.	0.065	57.00	1.419	CS-138	
1719.62	860.03	110.	97.	0.048	67.47	1.028	TL-208	s
1867.56	934.00	52.	56.	0.028	67.48	0.926	BI-214	s
1926.76	963.98	71.	52.	0.026	81.16	1.796	EU-152	D
3176.06	1588.22	10.	55.	0.028	50.81	1.609	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

********** 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	149.32	74.83	2022.	316.	0.158	61.95	1.500s
PB-212	153.89	77.11	1724.	507.	0.253	37.22	1.500D
PB-214	153.89	77.11	1729.	502.	0.251	37.22	1.500D
EU-155	173.74	87.04	1602.	205.	0.103	85.37	1.500
TH-234	185.47	92.90	1542.	263.	0.131	63.98	1.500
TH-234	185.45	92.89	1499.	257.	0.129	61.57	1.500
RA-226	371.03	185.69	875.	239.	0.120	65.03	1.362s
PB-212	476.75	238.56	914.	1386.	0.693	12.10	1.500s
PB-214	589.74	295.06	384.	285.	0.143	33.50	1.500s
AC-228	676.29	338.34	316.	339.	0.170	32.08	1.712s
PB-214	703.20	351.79	273.	462.	0.231	20.32	1.500s
TL-208	1020.69	510.55	271.	201.	0.100	41.76	1.473s
TL-208	1165.49	582.95	215.	545.	0.273	20.03	1.835s
BI-214	1217.65	609.04	151.	334.	0.167	24.47	1.665s
BI-212	1453.27	726.85	158.	124.	0.062	63.51	1.731
CS-134	1588.81	794.62	89.	74.	0.037	63.75	1.684s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1821.17	910.80	95.	387.	0.193	20.32	1.704s
AC-228	1937.36	968.90	67.	205.	0.103	26.53	1.799D
BI-214	2238.34	1119.39	67.	84.	0.042	54.55	1.772
CO-60	2665.13	1332.77	51.	28.	0.014	104.81	2.031s
K-40	2919.54	1459.97	19.	1932.	0.966	6.90	2.155
BI-214	3526.81	1763.58	5.	67.	0.034	40.90	2.155

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		4.2975E-02					
			477.56	4.297E-02	%(	2.427E-01 7.16E-02	G
K-40		1.5650E+01					
			1460.75	1.565E+01	(P	1.884E-01 3.61E-01	G
MN-54		4.5524E-04					
			834.81	4.552E-04	&(P	3.558E-02 1.03E-02	G
CO-57		-9.4370E-03					
			122.07	-9.437E-03	%(P	3.663E-02 1.10E-02	G K
			136.43	3.950E-02	% P	2.681E-01 8.03E-02	G
CO-60		2.3093E-02					
			1332.51	2.309E-02	*(P	2.920E-02 9.13E-03	G K
			1173.23	1.690E-02	% P	3.973E-02 1.19E-02	G K
Sr-85		-1.7953E-02					
			514.00	-1.795E-02	%(	3.654E-02 1.11E-02	G
Kr-85		-4.1974E+02					
			513.99	-4.197E+02	%(P	8.020E+02 2.42E+02	G
Y-88		-8.7573E-04					
			1836.01	-8.757E-04	%(P	2.487E-02 6.52E-03	G K
			898.02	-8.482E-04	& P	2.772E-02 7.78E-03	G
NB-94		3.4783E-05					
			871.10	3.478E-05	&(P	2.895E-02 8.30E-03	G K
			702.50	-7.102E-04	& P	2.559E-02 7.35E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	0.0000E+00						
		722.95	0.000E+00	%(	5.549E-02	1.64E-02	G K
		614.37	-1.688E-02	&	3.332E-02	1.01E-02	G
		433.93	1.901E-04	% P	2.525E-02	7.33E-03	G
CD-109	-3.2031E-02						
		88.04	-3.203E-02	%(P	1.182E+00	3.54E-01	G
SN-113	-5.7283E-03						
		391.71	-5.728E-03	&(P	3.943E-02	1.16E-02	G K
		255.04	4.574E-02	&	1.310E+00	3.89E-01	G
SB-125	-1.6236E-03						
		427.95	-1.624E-03	&(P	7.954E-02	2.31E-02	G K
		600.77	7.020E-04	& P	1.388E-01	4.01E-02	G
		636.15	-2.498E-03	% P	2.389E-01	6.89E-02	G
		463.51	-1.027E-02	% P	2.586E-01	7.50E-02	G
		176.29	-9.260E-02	% P	4.441E-01	1.33E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	%(	4.577E-02	1.34E-02	G K
		636.97	1.073E-01	%	5.706E-01	1.68E-01	G
		284.29	-1.111E-01	%	6.386E-01	1.90E-01	G
CS-134	2.3148E-02						
		604.66	1.286E-03	&(P	6.533E-02	1.95E-02	G K
		795.76	4.813E-02	*(P	3.030E-02	1.03E-02	G
		569.29	-1.893E-02	%	1.823E-01	5.35E-02	G
		801.84	-1.711E-03	% P	3.925E-01	1.14E-01	G
CS-137	1.1066E-02						
		661.62	1.107E-02	%(P	3.551E-02	1.06E-02	G
CE-139	7.6873E-03						
		165.85	7.687E-03	%(P	3.623E-02	1.09E-02	G
EU-152	-2.9100E-02						
		121.78	-2.910E-02	%(P	1.032E-01	3.11E-02	G K
		344.30	-3.664E-04	% P	6.844E-02	1.99E-02	G
		1408.08	1.926E-02	% P	1.166E-01	3.31E-02	G
		964.00	6.003E-04	& P	3.712E-01	1.09E-01	G
		1112.07	-3.288E-03	& P	2.764E-01	7.94E-02	G
		778.90	2.826E-03	% P	2.431E-01	7.03E-02	G
EU-154	-2.0644E-02						
		123.10	-2.064E-02	%(P	7.475E-02	2.25E-02	G K
		1274.80	-2.842E-02	& P	1.059E-01	3.13E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-7.704E-02 % P 1.901E-01 5.72E-02 G
                         1004.80-3.757E-02 % P 1.944E-01 5.71E-02 G

EU-155       1.3579E-01
                           86.45 1.358E-01  (  1.252E-01 3.86E-02 G K
                          105.31 3.829E-02 % P 1.472E-01 4.43E-02 G

HG-203       1.6194E-02
                          279.17 1.619E-02 %(P 2.911E-02 8.86E-03 G K
                           72.87-3.840E-01 & P 1.019E+00 3.08E-01 G
                           70.83-1.725E-02 &   1.708E+00 5.12E-01 G
                           82.50-7.472E-01 &   2.025E+00 6.12E-01 G

TL-208       2.7649E-01
                          583.14 2.765E-01 @(P 3.597E-02 1.86E-02 G
                          510.72 3.506E-01 + P 1.387E-01 5.70E-02 G

PB-212       7.1006E-01
                          238.63 7.160E-01 *(P 7.417E-02 2.92E-02 G K
                                                          Energy duplication
                           77.11 6.955E-01 *(  2.692E-01 8.63E-02 G
                           74.81 8.195E-01 + P 5.509E-01 1.71E-01 G

PB-214       3.7050E-01
                          351.99 3.649E-01 *(P 6.289E-02 2.50E-02 G K
                          295.22 3.814E-01  (P 1.256E-01 4.33E-02 G
                                                          Energy duplication
                           77.11 1.127E+00 + P 4.409E-01 1.41E-01 G
                          241.92-3.170E-01 % P 5.607E-01 1.70E-01 G

BI-212       5.4349E-01
                          727.17 5.435E-01  (P 2.683E-01 1.16E-01 G K
                         1620.56 3.574E-01 % P 7.817E-01 2.35E-01 G
                          785.42 2.970E-01 % P 1.511E+00 4.44E-01 G

BI-214       3.4440E-01
                          609.32 3.273E-01  (P 5.863E-02 2.70E-02 G K
                         1764.51 4.238E-01 + P 8.065E-02 5.85E-02 G
                         1120.28 3.969E-01  (P 1.937E-01 7.29E-02 G

RA-224       2.9855E-02
                          241.00 2.986E-02 %(P 9.525E-01 2.85E-01 G

RA-226       1.4345E+00
                          185.99 1.434E+00 *(  8.428E-01 3.11E-01 G

AC-228       7.9398E-01
                          911.07 8.155E-01 *(P 1.017E-01 5.58E-02 G K
                          968.90 7.524E-01  (P 1.496E-01 6.73E-02 G
                          338.40 8.026E-01 @(P 2.022E-01 8.66E-02 G
```

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.3988E-01
                          236.00-2.399E-01 %(P 3.397E-01 1.04E-01 G K
                          256.25 2.740E-02 & P 3.608E-01 1.07E-01 G

PA-234       5.5383E-02
                           98.44 5.538E-02 %(  1.340E-01 4.05E-02 G K
                          946.00-1.466E-03 &   1.181E-01 3.33E-02 G
                          131.28-2.642E-02 %   1.563E-01 4.69E-02 G
                           94.67-1.566E-01 %   2.528E-01 7.70E-02 G
                          883.24-1.531E-02 &   2.211E-01 6.36E-02 G
                          926.70 1.118E-01 &   2.135E-01 6.52E-02 G
                          569.26-2.795E-02 %   2.691E-01 7.90E-02 G

TH-234       1.3138E+00
                           63.29 4.306E-01 %(P 1.554E+00 4.67E-01 G K
                           92.80 1.772E+00  (P 1.261E+00 3.92E-01 G
                           92.38 2.119E+00  (P 1.496E+00 4.66E-01 G

AM-241      -1.4256E-02
                           59.54-1.426E-02 %(P 2.093E-01 6.26E-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 - 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	4.0195E-02	4.2975E-02	2.1489E-01	2.1490E-01	2.270E-01
K-40		1.5650E+01	1.5650E+01	1.0821E+00	1.4231E+00	
MN-54	#A	4.5006E-04	4.5524E-04	3.0979E-02	3.0979E-02	3.517E-02
CO-57	#B	-9.3130E-03	-9.4370E-03	3.3515E-02	3.3519E-02	3.615E-02
CO-60	#B	2.3050E-02	2.3093E-02	2.7402E-02	2.7436E-02	2.915E-02
Sr-85	#A	-1.6991E-02	-1.7953E-02	3.3271E-02	3.3287E-02	3.459E-02
Kr-85	#A	-4.1972E+02	-4.1974E+02	8.2874E+02	8.2911E+02	8.020E+02
Y-88	#B	-8.4689E-04	-8.7573E-04	3.1818E-02	3.1818E-02	2.405E-02
NB-94	#B	3.4783E-05	3.4783E-05	2.4891E-02	2.4891E-02	2.895E-02
Ag-108M	#B	0.0000E+00	0.0000E+00	4.9118E-02	4.9118E-02	5.549E-02
CD-109	#A	-3.1780E-02	-3.2031E-02	1.1907E+00	1.1907E+00	1.173E+00
SN-113	#B	-5.5534E-03	-5.7283E-03	4.8291E-02	4.8292E-02	3.823E-02
SB-125	#B	-1.6179E-03	-1.6236E-03	1.9452E-01	1.9452E-01	7.926E-02
I-131	#B	0.0000E+00	0.0000E+00	4.0244E-02	4.0244E-02	2.936E-02
CS-134	#B	2.3039E-02	2.3148E-02	1.4862E-02	1.4925E-02	6.502E-02
CS-137	#A	1.1063E-02	1.1066E-02	3.1670E-02	3.1676E-02	3.550E-02
CE-139	#A	7.4903E-03	7.6873E-03	3.2638E-02	3.2641E-02	3.530E-02
EU-152	#B	-2.9078E-02	-2.9100E-02	9.3849E-02	9.3863E-02	1.031E-01
EU-154	#B	-2.0620E-02	-2.0644E-02	6.9186E-02	6.9196E-02	7.466E-02
EU-155	#	1.3552E-01	1.3579E-01	1.1593E-01	1.1617E-01	1.250E-01
HG-203	#B	1.4999E-02	1.6194E-02	2.6584E-02	2.6601E-02	2.696E-02
TL-208	#	2.7649E-01	2.7649E-01	5.5831E-02	5.8170E-02	
PB-212	#	7.1006E-01	7.1006E-01	8.6913E-02	9.6502E-02	7.417E-02
PB-214	#	3.7050E-01	3.7050E-01	7.3640E-02	7.6822E-02	6.289E-02
BI-212		5.4349E-01	5.4349E-01	3.4877E-01	3.5024E-01	
BI-214		3.4440E-01	3.4440E-01	8.5352E-02	8.7742E-02	
RA-224	#A	2.9855E-02	2.9855E-02	8.5356E-01	8.5356E-01	9.525E-01
RA-226	#	1.4345E+00	1.4345E+00	9.3286E-01	9.3670E-01	
AC-228		7.9398E-01	7.9398E-01	1.2386E-01	1.3244E-01	
TH-227	#B	-2.3988E-01	-2.3988E-01	3.1270E-01	3.1302E-01	3.397E-01
PA-234	#B	5.5383E-02	5.5383E-02	1.2163E-01	1.2167E-01	1.340E-01
TH-234	#B	1.3138E+00	1.3138E+00	8.6612E-01	8.6918E-01	1.554E+00
AM-241	#A	-1.4256E-02	-1.4256E-02	2.0957E-01	2.0957E-01	2.093E-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) 1.9043074E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.9043083E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107F_13DEC2005_1723.An1

Sample description
FSS-NOL-05-02-026-F

Spectrum Filename: C:\GammaVision\Spectra\107F_13DEC2005_1723.An1

Acquisition information
Start time: 13-Dec-2005 17:23:53
Live time: 2000
Real time: 2003
Dead time: 0.16 %
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/channel^2

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: 2.0440E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0440E+03) =
4.8924E+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	08-Dec-2005 11:05:00
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. 24 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2682

***** 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
74.82	429.	11.28	1.18	2.849E-02	74.81	9.600	1.037E+00	PB212
77.12	393.	10.44	1.18	2.957E-02	77.11	17.500	7.509E-01	PB212
					77.11	10.700	1.218E+00	PB214
77.16	187.	29.50	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
83.67	117.	31.23	0.00	3.202E-02				
87.16	200.	21.93	1.19	3.312E-02	86.45	32.740	1.235E-01	EU155
					88.04	3.790	PBC<MDA	CD109
92.90	185.	29.38	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.93	194.	30.24	1.50	3.429E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.97	235.	23.16	1.48	3.610E-02	185.99	3.280	1.310E+00	RA226
209.56	216.	22.50	1.41	3.426E-02				
238.86	1968.	3.99	1.50	3.188E-02	238.63	43.100	9.388E-01	PB212
					241.00	3.900	1.051E+01	RA224
241.83	220.	16.78	1.30	3.163E-02	241.92	7.470	6.167E-01	PB214
260.07	83.	31.60	1.50	3.050E-02	256.25	6.800	PBC<MDA	TH227
270.47	156.	28.44	1.89	2.943E-02				
295.09	322.	9.44	1.34	2.769E-02	295.22	19.200	3.952E-01	PB214
300.50	88.	28.12	1.34	2.733E-02				
338.13	354.	11.70	1.98	2.502E-02	338.40	12.010	7.723E-01	AC228
351.74	617.	7.09	1.86	2.427E-02	351.99	37.100	4.496E-01	PB214
462.65	181.	18.35	1.95	1.956E-02				
462.65	181.	18.35	1.95	1.956E-02	463.51	10.000	6.044E-01	SB125
510.35	256.	10.59	1.90	1.809E-02	510.72	22.500	3.613E-01	TL208
582.77	531.	6.28	1.92	1.630E-02	583.14	86.000	2.484E-01	TL208

609.12	455.	8.37	1.82	1.575E-02	604.66	97.600	1.954E-01	CS134
					609.32	46.090	4.108E-01	BI214
661.53	249.	17.00	1.30	1.477E-02	661.62	84.620	1.299E-01	CS137
727.03	111.	18.32	1.46	1.374E-02	727.17	11.800	4.473E-01	BI212
794.07	108.	27.48	2.51	1.286E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
794.07	108.	27.48	2.51	1.286E-02	795.76	85.400	6.536E-02	CS134
860.15	68.	25.71	1.39	1.211E-02				
893.00	53.	34.52	0.95	1.178E-02				
910.58	395.	8.80	1.93	1.161E-02	911.07	29.000	7.678E-01	AC228
964.59	79.	23.48	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152
968.26	210.	10.13	1.80	1.110E-02	968.90	17.460	7.099E-01	AC228
1119.72	169.	19.91	2.84	9.970E-03	1120.28	15.040	7.470E-01	BI214
1172.55	626.	5.47	1.86	9.641E-03	1173.23	99.860	4.283E-01	CO60
1331.70	548.	5.66	1.94	8.777E-03	1332.51	99.980	4.110E-01	CO60
1459.95	2311.	2.14	2.31	8.194E-03	1460.75	10.700	1.740E+01	K40
1763.83	97.	10.15	1.61	7.086E-03	1764.51	15.920	5.634E-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	
418.76	209.56	822.	216.	0.108	67.51	1.413	AC-228	s
540.57	270.47	623.	156.	0.078	85.31	1.885	AC-228	s
600.42	300.40	377.	119.	0.060	80.37	1.192	PB-212	M
924.90	462.65	386.	73.	0.036	120.32	1.955	CS-138	s
1719.87	860.15	108.	68.	0.034	77.12	1.390	TL-208	
1928.12	964.87	129.	83.	0.042	66.65	1.796	AC-228	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-212	149.29	74.81	979.	429.	0.215	33.83	1.178D
PB-212	153.89	77.11	1031.	393.	0.196	31.33	1.179A
PB-214	153.89	77.11	1733.	187.	0.094	88.51	1.500A
EU-155	173.82	87.08	1975.	166.	0.083	116.20	1.500s
TH-234	185.52	92.93	1778.	194.	0.097	90.73	1.500
TH-234	185.47	92.90	1731.	185.	0.093	88.14	1.500
RA-226	371.58	185.97	1006.	235.	0.117	69.48	1.480
TH-227	470.72	235.54	1609.	-173.	-0.087	101.06	1.500s
PB-212	476.89	238.63	535.	1443.	0.721	10.28	1.297D
PB-214	483.47	241.92	584.	220.	0.110	50.35	1.299D
TH-227	519.77	260.07	324.	83.	0.042	94.79	1.500
PB-214	589.61	294.99	508.	362.	0.181	33.97	1.766s
AC-228	675.88	338.13	457.	351.	0.175	35.11	1.983s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	703.10	351.74	410.	612.	0.306	21.26	1.862s
SB-125	925.08	462.74	245.	105.	0.053	67.45	1.500s
TL-208	1020.29	510.35	218.	222.	0.111	31.76	1.896s
TL-208	1165.11	582.77	199.	526.	0.263	18.85	1.923s
BI-214	1217.83	609.12	297.	451.	0.225	25.10	1.823
CS-137	1322.63	661.53	347.	245.	0.123	51.01	1.300s
BI-212	1453.64	727.03	127.	110.	0.055	54.95	1.461
CS-134	1588.03	794.23	114.	88.	0.044	60.36	1.684s
AC-228	1820.73	910.58	213.	391.	0.195	26.40	1.933
AC-228	1937.36	968.90	124.	208.	0.104	30.34	1.799D
BI-214	2239.01	1119.72	229.	169.	0.085	59.72	2.837s
CO-60	2344.67	1172.55	170.	622.	0.311	16.40	1.855
CO-60	2662.99	1331.70	94.	544.	0.272	16.98	1.935
K-40	2919.51	1459.95	37.	2306.	1.153	6.42	2.313
BI-214	3527.32	1763.83	1.	96.	0.048	30.46	1.611s

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		3.6160E-02					
			477.56	3.616E-02	%(	2.739E-01 8.10E-02 G	
K-40		1.7397E+01					
			1460.75	1.740E+01	(P	2.335E-01 3.73E-01 G	
MN-54		-2.3165E-04					
			834.81	-2.317E-04	&(P	3.937E-02 1.15E-02 G	
CO-57		-2.4755E-03					
			122.07	-2.476E-03	%(P	3.554E-02 1.06E-02 G K	
			136.43	-3.057E-02	% P	2.505E-01 7.50E-02 G	
CO-60		4.1963E-01					
			1332.51	4.110E-01	(P	3.612E-02 2.34E-02 G K	
			1173.23	4.283E-01	(P	4.365E-02 2.36E-02 G K	
Sr-85		-2.9050E-02					
			514.00	-2.905E-02	%(	4.013E-02 1.23E-02 G	
Kr-85		-6.5959E+02					
			513.99	-6.596E+02	%(P	8.785E+02 2.69E+02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	1.0177E-03						
		1836.01	1.018E-03	%(P	1.650E-02	4.21E-03	G K
		898.02	-6.075E-03	& P	4.076E-02	1.19E-02	G
NB-94	-7.8881E-03						
		871.10	-7.888E-03	&(P	3.451E-02	1.02E-02	G K
		702.50	-2.499E-04	& P	3.458E-02	1.01E-02	G K
Ag-108M	-1.8349E-02						
		722.95	-1.835E-02	&(	4.233E-02	1.28E-02	G K
		614.37	-1.875E-04	%	3.352E-02	9.79E-03	G
		433.93	1.146E-02	% P	2.823E-02	8.50E-03	G
CD-109	9.5628E-03						
		88.04	9.563E-03	%(P	1.142E+00	3.42E-01	G
SN-113	-8.3703E-03						
		391.71	-8.370E-03	%(P	4.324E-02	1.28E-02	G K
		255.04	3.764E-01	%	1.244E+00	3.74E-01	G
SB-125	9.3417E-02						
		427.95	3.998E-03	%(P	8.247E-02	2.42E-02	G K
		600.77	2.987E-02	% P	1.570E-01	4.64E-02	G
		636.15	-5.094E-02	% P	2.221E-01	6.55E-02	G
		463.51	3.581E-01	*(P	2.569E-01	8.27E-02	G
		176.29	-6.910E-03	% P	4.449E-01	1.33E-01	G
I-131	-3.3271E-03						
		364.48	-3.327E-03	%(	4.586E-02	1.35E-02	G K
		636.97	0.000E+00	%	6.470E-01	1.89E-01	G
		284.29	2.499E-02	&	7.059E-01	2.10E-01	G
CS-134	2.7395E-02						
		604.66	4.852E-03	&(P	4.667E-02	1.39E-02	G K
		795.76	5.316E-02	(P	3.180E-02	1.08E-02	G
		569.29	3.465E-02	%	1.690E-01	5.01E-02	G
		801.84	1.269E-02	% P	3.603E-01	1.05E-01	G
CS-137	1.2988E-01						
		661.62	1.299E-01	*(P	4.733E-02	2.24E-02	G
CE-139	9.3173E-03						
		165.85	9.317E-03	%(P	3.648E-02	1.10E-02	G
EU-152	-1.9889E-03						
		121.78	-1.989E-03	%(P	1.079E-01	3.23E-02	G K
		344.30	1.848E-02	% P	9.171E-02	2.73E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1408.08	5.117E-02	% P	1.154E-01	3.47E-02	G
		964.00	9.896E-02	& P	3.565E-01	1.07E-01	G
		1112.07	-8.688E-02	% P	3.296E-01	9.80E-02	G
		778.90	5.093E-02	% P	2.257E-01	6.67E-02	G
EU-154	-1.9187E-03						
		123.10	-1.919E-03	%(P	6.952E-02	2.08E-02	G K
		1274.80	2.955E-02	% P	1.025E-01	3.04E-02	G
		723.30	-7.578E-02	& P	1.986E-01	5.98E-02	G
		1004.80	4.952E-02	% P	1.792E-01	5.31E-02	G
EU-155	1.0206E-01						
		86.45	1.021E-01	*(	1.293E-01	3.95E-02	G K
		105.31	2.136E-03	& P	1.586E-01	4.75E-02	G
HG-203	1.6579E-03						
		279.17	1.658E-03	%(P	2.954E-02	8.73E-03	G K
		72.87	-5.935E-02	% P	8.631E-01	2.59E-01	G
		70.83	6.668E-02	&	1.519E+00	4.55E-01	G
		82.50	-9.720E-01	%	1.949E+00	5.91E-01	G
TL-208	2.4845E-01						
		583.14	2.484E-01	*(P	3.227E-02	1.57E-02	G
		510.72	3.613E-01	+ P	1.161E-01	4.40E-02	G
PB-212	7.1040E-01						
		238.63	6.939E-01	(P	5.315E-02	2.40E-02	G K
							Energy duplication
		77.11	5.019E-01	}	1.946E-01	5.24E-02	G
		74.81	1.037E+00	+ P	3.589E-01	1.18E-01	G
PB-214	4.5001E-01						
		351.99	4.496E-01	*(P	7.130E-02	3.21E-02	G K
		295.22	4.507E-01	*(P	1.340E-01	5.17E-02	G
							Energy duplication
		77.11	3.912E-01	} P	4.110E-01	1.15E-01	G
		241.92	6.167E-01	+ P	3.226E-01	1.04E-01	G
BI-212	4.4729E-01						
		727.17	4.473E-01	(P	2.254E-01	8.29E-02	G K
		1620.56	5.250E-02	% P	6.993E-01	1.89E-01	G
		785.42	3.362E-01	% P	1.671E+00	4.94E-01	G
BI-214	4.1084E-01						
		609.32	4.108E-01	(P	7.566E-02	3.47E-02	G K
		1764.51	5.634E-01	+ P	4.321E-02	5.77E-02	G
		1120.28	7.470E-01	+ P	3.226E-01	1.49E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RA-224	2.9827E-02						
		241.00	2.983E-02	%(P	1.005E+00	3.01E-01	G
RA-226	1.3098E+00						
		185.99	1.310E+00	(	8.405E-01	3.03E-01	G
AC-228	7.5179E-01						
		911.07	7.678E-01	(P	1.389E-01	6.83E-02	G K
		968.90	7.110E-01	(P	1.862E-01	7.27E-02	G
		338.40	7.723E-01	*(P	2.253E-01	9.11E-02	G
TH-227	-3.1829E-01						
		236.00	-3.183E-01	?(P	3.487E-01	1.07E-01	G K
		256.25	2.654E-01	+ P	2.761E-01	8.61E-02	G
PA-234	4.2444E-02						
		98.44	4.244E-02	%(	1.364E-01	4.12E-02	G K
		946.00	-1.074E-03	%	2.104E-01	6.15E-02	G
		131.28	1.841E-03	&	1.612E-01	4.82E-02	G
		94.67	-9.769E-02	%	2.482E-01	7.51E-02	G
		883.24	3.670E-02	&	2.670E-01	7.83E-02	G
		926.70	-1.318E-02	%	3.986E-01	1.17E-01	G
		569.26	5.099E-02	%	2.496E-01	7.39E-02	G
TH-234	8.2000E-01						
		63.29	1.171E-01	%(P	1.638E+00	4.90E-01	G K
		92.80	1.187E+00	(P	1.260E+00	3.86E-01	G
		92.38	1.458E+00	(P	1.494E+00	4.59E-01	G
AM-241	3.3972E-02						
		59.54	3.397E-02	%(P	2.109E-01	6.34E-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 Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	3.3772E-02	3.6160E-02	2.4290E-01	2.4290E-01	2.558E-01
K-40		1.7397E+01	1.7397E+01	1.1191E+00	1.5192E+00	
MN-54	#A	-2.2896E-04	-2.3165E-04	2.9573E-02	2.9573E-02	3.891E-02
CO-57	#B	-2.4423E-03	-2.4755E-03	3.3415E-02	3.3415E-02	3.506E-02
CO-60		4.1883E-01	4.1963E-01	4.9870E-02	5.5689E-02	
Sr-85	#A	-2.7461E-02	-2.9050E-02	3.6978E-02	3.7018E-02	3.793E-02
Kr-85	#A	-6.5956E+02	-6.5959E+02	8.7209E+02	8.7296E+02	8.785E+02
Y-88	#B	9.8350E-04	1.0177E-03	1.2623E-02	1.2623E-02	1.595E-02
NB-94	#B	-7.8881E-03	-7.8881E-03	3.1272E-02	3.1276E-02	3.451E-02
Ag-108M	#B	-1.8347E-02	-1.8349E-02	3.8386E-02	3.8401E-02	4.232E-02
CD-109	A	9.4862E-03	9.5628E-03	1.0267E+00	1.0267E+00	1.133E+00
SN-113	#B	-8.1092E-03	-8.3703E-03	4.7385E-02	4.7388E-02	4.189E-02
SB-125	#F	9.3081E-02	9.3417E-02	6.4693E-02	6.4928E-02	8.218E-02
I-131	#B	-2.1135E-03	-3.3271E-03	4.0612E-02	4.0612E-02	2.913E-02
CS-134	#B	2.7263E-02	2.7395E-02	1.6636E-02	1.6714E-02	4.645E-02
CS-137	#	1.2984E-01	1.2988E-01	6.7204E-02	6.7640E-02	
CE-139	#A	9.0733E-03	9.3173E-03	3.2941E-02	3.2946E-02	3.553E-02
EU-152	#B	-1.9873E-03	-1.9889E-03	1.0523E-01	1.0523E-01	1.079E-01
EU-154	#B	-1.9165E-03	-1.9187E-03	7.9474E-02	7.9474E-02	6.944E-02
EU-155	#A	1.0186E-01	1.0206E-01	1.1860E-01	1.1873E-01	1.290E-01
HG-203	#B	1.5331E-03	1.6579E-03	2.6204E-02	2.6205E-02	2.731E-02
TL-208	#	2.4845E-01	2.4845E-01	4.7232E-02	4.9459E-02	
PB-212		7.1040E-01	7.1040E-01	7.3814E-02	8.4905E-02	
PB-214		4.5001E-01	4.5001E-01	9.1196E-02	9.4990E-02	
BI-212		4.4729E-01	4.4729E-01	2.4868E-01	2.5008E-01	
BI-214		4.1084E-01	4.1084E-01	1.0412E-01	1.0691E-01	
RA-224	#A	2.9827E-02	2.9827E-02	9.0251E-01	9.0251E-01	1.005E+00
RA-226		1.3098E+00	1.3098E+00	9.1004E-01	9.1332E-01	
AC-228		7.5179E-01	7.5179E-01	1.3514E-01	1.4224E-01	
TH-227	#A	-3.1829E-01	-3.1829E-01	3.2218E-01	3.2273E-01	3.487E-01

PA-234 #B	4.2444E-02	4.2444E-02	1.2352E-01	1.2354E-01	1.364E-01

TH-234 #B	8.2000E-01	8.2000E-01	7.7448E-01	7.7581E-01	1.638E+00
AM-241 #A	3.3971E-02	3.3972E-02	1.9005E-01	1.9006E-01	2.108E-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 (1038.2 to 2000.1 keV) 2.2274477E+01 pCi/gm
Total Decayed Activity (1038.2 to 2000.1 keV) 2.2275322E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

YAEC Chemistry Lab Spectrum name: 107F_13DEC2005_1801.An1

Sample description
FSS-NOL-05-02-026-F-RC

Spectrum Filename: C:\GammaVision\Spectra\107F_13DEC2005_1801.An1

Acquisition information
Start time: 13-Dec-2005 18:01:18
Live time: 2000
Real time: 2003
Dead time: 0.16 %
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/channel^2

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: 2.0440E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0440E+03) =
4.8924E+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	08-Dec-2005 11:05:00
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: 0.3586

***** 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
74.72	341.	13.99	1.18	2.849E-02	74.81	9.600	8.230E-01	PB212
77.02	376.	11.90	1.18	2.957E-02	77.11	17.500	7.081E-01	PB212
					77.11	10.700	1.148E+00	PB214
77.24	156.	35.23	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
92.89	159.	35.30	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.92	165.	37.15	1.50	3.429E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.90	227.	19.51	1.35	3.611E-02	185.99	3.280	1.270E+00	RA226
238.92	1871.	4.19	1.58	3.187E-02	238.63	43.100	8.925E-01	PB212
241.89	182.	20.81	1.30	3.163E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.082E-01	PB214
270.18	120.	31.12	1.15	2.945E-02				
295.21	284.	10.45	1.34	2.768E-02	295.22	19.200	3.477E-01	PB214
300.40	86.	29.25	1.34	2.734E-02				
328.04	114.	34.65	1.98	2.560E-02				
338.34	338.	13.15	1.63	2.501E-02	338.40	12.010	7.375E-01	AC228
351.67	594.	8.15	1.61	2.428E-02	351.99	37.100	4.325E-01	PB214
462.68	130.	24.44	1.40	1.955E-02				
462.68	130.	24.44	1.40	1.955E-02	463.51	10.000	4.335E-01	SB125
510.80	213.	16.55	2.19	1.808E-02	510.72	22.500	2.918E-01	TL208
582.88	578.	7.04	1.81	1.630E-02	583.14	86.000	2.706E-01	TL208
609.05	484.	7.30	1.85	1.575E-02	609.32	46.090	4.366E-01	BI214
661.41	230.	16.09	1.92	1.477E-02	661.62	84.620	1.198E-01	CS137
727.11	120.	20.53	1.78	1.374E-02	727.17	11.800	4.832E-01	BI212
794.77	120.	19.99	1.30	1.285E-02				

794.77	120.	19.99	1.30	1.285E-02	795.76	85.400	7.239E-02	CS134
910.63	370.	7.91	2.21	1.161E-02	911.07	29.000	7.184E-01	AC228
968.00	298.	12.44	1.59	1.110E-02	968.90	17.460	1.010E+00	AC228
1119.54	104.	25.14	1.31	9.975E-03	1120.28	15.040	4.564E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1172.47	628.	6.54	2.27	9.642E-03	1173.23	99.860	4.290E-01	CO60
1331.65	554.	5.37	2.24	8.777E-03	1332.51	99.980	4.155E-01	CO60
1459.98	2313.	2.15	2.18	8.194E-03	1460.75	10.700	1.741E+01	K40
1619.61	32.	36.96	1.96	7.569E-03	1620.56	2.750	1.007E+00	BI212
1763.53	95.	13.23	2.65	7.084E-03	1764.51	15.920	5.552E-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	
539.99	270.18	510.	120.	0.060	93.37	1.150	AC-228	s
600.42	300.27	277.	86.	0.043	87.74	1.341	PB-212	lD
655.69	328.04	482.	114.	0.057	103.94	1.980	AC-228	s
924.96	462.68	283.	133.	0.066	59.87	1.398	CS-138	s
1589.10	794.77	212.	55.	0.027	119.94	1.303	AC-228	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	149.29	74.81	992.	341.	0.170	41.97	1.178D
PB-212	153.89	77.11	1032.	376.	0.188	35.69	1.179A
PB-214	153.89	77.11	1846.	156.	0.078	105.69	1.500A
TH-234	185.50	92.92	1980.	165.	0.082	111.44	1.500s
TH-234	185.44	92.89	1922.	159.	0.080	105.90	1.500s
RA-226	371.44	185.90	757.	227.	0.114	58.52	1.349s
TH-227	471.52	235.94	1828.	-194.	-0.097	96.28	1.500s
PB-212	476.89	238.63	568.	1323.	0.661	11.08	1.297D
PB-214	483.47	241.92	635.	182.	0.091	62.42	1.299D
PB-214	589.79	295.08	408.	302.	0.151	34.91	1.493s
AC-228	676.29	338.34	500.	335.	0.167	39.45	1.634s
PB-214	702.96	351.67	491.	589.	0.294	24.46	1.613s
TL-208	1021.20	510.80	346.	180.	0.090	49.66	2.193s
TL-208	1165.35	582.88	304.	573.	0.287	21.11	1.813s
BI-214	1217.68	609.05	222.	479.	0.240	21.89	1.851s
CS-137	1322.39	661.41	289.	226.	0.113	48.28	1.924s
BI-212	1453.79	727.11	168.	119.	0.059	61.58	1.782
CS-134	1588.55	794.49	143.	65.	0.032	85.98	1.684s
AC-228	1820.83	910.63	166.	366.	0.183	23.72	2.206s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1935.56	968.00	258.	296.	0.148	37.31	1.589
BI-214	2238.65	1119.54	183.	104.	0.052	75.41	1.311s
CO-60	2344.51	1172.47	239.	623.	0.312	19.61	2.273s
CO-60	2662.88	1331.65	93.	550.	0.275	16.10	2.241
K-40	2919.56	1459.98	35.	2308.	1.154	6.45	2.175
BI-212	3238.84	1619.61	23.	32.	0.016	110.88	1.959
BI-214	3526.72	1763.53	11.	95.	0.047	39.70	2.650

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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm		COMMENTS
BE-7		8.5124E-02						
			477.56	8.512E-02	%(	2.648E-01	7.94E-02	G
K-40		1.7412E+01						
			1460.75	1.741E+01	(P	2.279E-01	3.75E-01	G
MN-54		8.3682E-03						
			834.81	8.368E-03	&(P	3.270E-02	9.71E-03	G
CO-57		7.9079E-03						
			122.07	7.908E-03	%(P	3.585E-02	1.08E-02	G K
			136.43	-1.658E-03	& P	2.920E-01	8.73E-02	G
CO-60		4.2224E-01						
			1332.51	4.155E-01	(P	3.596E-02	2.24E-02	G K
			1173.23	4.290E-01	*(P	5.142E-02	2.82E-02	G K
Sr-85		-1.9374E-02						
			514.00	-1.937E-02	&(	3.791E-02	1.15E-02	G
Kr-85		-4.4838E+02						
			513.99	-4.484E+02	&(P	8.300E+02	2.51E+02	G
Y-88		-3.5098E-03						
			1836.01	-3.510E-03	%(P	2.065E-02	5.54E-03	G K
			898.02	-1.177E-03	% P	3.886E-02	1.12E-02	G
NB-94		1.3297E-03						
			871.10	1.330E-03	%(P	2.625E-02	7.56E-03	G K
			702.50	6.097E-03	% P	3.005E-02	8.89E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-3.0546E-02						
		722.95	-3.055E-02	&(	4.576E-02	1.40E-02	G K
		614.37	-1.314E-03	%	2.314E-02	6.68E-03	G
		433.93	3.534E-03	% P	3.131E-02	9.26E-03	G
CD-109	-1.2849E-02						
		88.04	-1.285E-02	%(P	1.043E+00	3.12E-01	G
SN-113	-3.3376E-03						
		391.71	-3.338E-03	&(P	4.305E-02	1.27E-02	G K
		255.04	1.963E-01	&	1.335E+00	3.99E-01	G
SB-125	-1.2427E-02						
		427.95	-1.243E-02	%(P	8.944E-02	2.64E-02	G K
		600.77	3.713E-02	% P	1.513E-01	4.49E-02	G
		636.15	1.559E-02	% P	2.557E-01	7.47E-02	G
		463.51	-1.679E-02	% P	2.782E-01	8.14E-02	G
		176.29	2.492E-02	% P	4.627E-01	1.38E-01	G
I-131	2.1701E-03						
		364.48	2.170E-03	%(	4.721E-02	1.39E-02	G K
		636.97	4.553E-02	%	5.989E-01	1.75E-01	G
		284.29	1.087E-02	%	6.680E-01	1.98E-01	G
CS-134	-3.0179E-02						
		604.66	-3.018E-02	%(P	4.116E-02	1.27E-02	G K
		795.76	3.921E-02	+ P	3.538E-02	1.13E-02	G
		569.29	1.503E-02	%	1.735E-01	5.09E-02	G
		801.84	-1.084E-01	% P	3.936E-01	1.17E-01	G
CS-137	1.1983E-01						
		661.62	1.198E-01	*(P	4.332E-02	1.96E-02	G
CE-139	-2.6274E-03						
		165.85	-2.627E-03	%(P	3.798E-02	1.14E-02	G
EU-152	2.3134E-02						
		121.78	2.313E-02	%(P	1.064E-01	3.20E-02	G K
		344.30	-1.899E-02	% P	9.662E-02	2.88E-02	G
		1408.08	6.996E-02	% P	1.218E-01	3.74E-02	G
		964.00	-2.037E-03	& P	3.861E-01	1.14E-01	G
		1112.07	-1.500E-03	& P	2.874E-01	8.31E-02	G
		778.90	-1.150E-01	% P	2.583E-01	7.79E-02	G
EU-154	-1.1833E-04						
		123.10	-1.183E-04	&(P	6.324E-02	1.88E-02	G K
		1274.80	1.748E-02	& P	1.037E-01	3.04E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-1.030E-01	& P	2.044E-01	6.20E-02	G
		1004.80	2.345E-02	& P	2.084E-01	6.10E-02	G
EU-155	7.2864E-02						
		86.45	7.286E-02	%(	1.323E-01	4.02E-02	G K
		105.31	2.503E-02	% P	1.478E-01	4.44E-02	G
HG-203	-1.3106E-03						
		279.17	-1.311E-03	&(P	3.490E-02	1.03E-02	G K
		72.87	-6.101E-01	% P	1.009E+00	3.07E-01	G
		70.83	5.768E-02	%	1.908E+00	5.73E-01	G
		82.50	-7.430E-01	%	2.095E+00	6.33E-01	G
TL-208	2.7501E-01						
		583.14	2.706E-01	*(P	3.959E-02	1.92E-02	G
		510.72	2.918E-01	*(P	1.454E-01	5.74E-02	G
PB-212	6.5701E-01						
		238.63	6.363E-01	(P	5.472E-02	2.38E-02	G K
							Energy duplication
		77.11	4.798E-01	}	1.947E-01	5.71E-02	G
		74.81	8.230E-01	+ P	3.614E-01	1.16E-01	G
PB-214	4.2435E-01						
		351.99	4.325E-01	*(P	7.787E-02	3.55E-02	G K
		295.22	3.761E-01	*(P	1.204E-01	4.44E-02	G
							Energy duplication
		77.11	3.257E-01	} P	4.239E-01	1.15E-01	G
		241.92	5.082E-01	(P	3.363E-01	1.07E-01	G
BI-212	4.8317E-01						
		727.17	4.832E-01	(P	2.577E-01	1.00E-01	G K
		1620.56	1.007E+00	+ P	8.006E-01	3.78E-01	G
		785.42	8.028E-01	% P	1.545E+00	4.69E-01	G
BI-214	4.4150E-01						
		609.32	4.366E-01	*(P	6.571E-02	3.21E-02	G K
		1764.51	5.552E-01	+ P	1.077E-01	7.42E-02	G
		1120.28	4.564E-01	(P	2.903E-01	1.16E-01	G
RA-224	1.9365E-01						
		241.00	1.936E-01	%(P	9.991E-01	3.00E-01	G
RA-226	1.2696E+00						
		185.99	1.270E+00	*(	7.308E-01	2.48E-01	G
AC-228	7.2396E-01						
		911.07	7.184E-01	@(P	1.233E-01	5.74E-02	G K
		968.90	1.010E+00	+ P	2.649E-01	1.26E-01	G
		338.40	7.375E-01	*(P	2.354E-01	9.79E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -3.5594E-01
                          236.00-3.559E-01 ?(P 3.713E-01 1.14E-01 G K
                          256.25-1.255E-02 % P 3.694E-01 1.09E-01 G

PA-234       9.9588E-03
                           98.44 9.959E-03 %(  1.321E-01 3.96E-02 G K
                          946.00-6.082E-03 %   1.805E-01 5.25E-02 G
                          131.28-4.296E-03 &   1.586E-01 4.75E-02 G
                           94.67-6.364E-02 %   2.581E-01 7.78E-02 G
                          883.24-7.953E-02 &   2.708E-01 8.07E-02 G
                          926.70 0.000E+00 %   3.627E-01 1.06E-01 G
                          569.26 2.219E-02 %   2.562E-01 7.52E-02 G

TH-234       7.6599E-01
                           63.29 2.613E-01 %(P 1.642E+00 4.93E-01 G K
                           92.80 1.020E+00  (P 1.327E+00 4.05E-01 G
                           92.38 1.236E+00  (P 1.576E+00 4.81E-01 G

AM-241      -1.7559E-02
                           59.54-1.756E-02 %(P 1.922E-01 5.75E-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
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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	7.9476E-02	8.5124E-02	2.3809E-01	2.3814E-01	2.473E-01
K-40		1.7412E+01	1.7412E+01	1.1253E+00	1.5244E+00	
MN-54	#A	8.2705E-03	8.3682E-03	2.9124E-02	2.9128E-02	3.232E-02
CO-57	#B	7.8012E-03	7.9079E-03	3.2359E-02	3.2362E-02	3.537E-02
CO-60		4.2144E-01	4.2224E-01	5.3930E-02	5.9416E-02	
Sr-85	#A	-1.8309E-02	-1.9374E-02	3.4548E-02	3.4567E-02	3.582E-02
Kr-85	#A	-4.4836E+02	-4.4838E+02	8.4492E+02	8.4533E+02	8.299E+02
Y-88	#B	-3.3912E-03	-3.5098E-03	2.6684E-02	2.6685E-02	1.995E-02
NB-94	#B	1.3297E-03	1.3297E-03	2.2677E-02	2.2677E-02	2.625E-02
Ag-108M	#B	-3.0544E-02	-3.0546E-02	4.2123E-02	4.2161E-02	4.576E-02
CD-109	#A	-1.2746E-02	-1.2849E-02	1.2207E+00	1.2207E+00	1.035E+00
SN-113	#B	-3.2329E-03	-3.3376E-03	6.4662E-02	6.4662E-02	4.170E-02
SB-125	#B	-1.2382E-02	-1.2427E-02	1.0121E-01	1.0121E-01	8.911E-02
I-131	#B	1.3755E-03	2.1701E-03	4.1771E-02	4.1771E-02	2.993E-02
CS-134	#B	-3.0033E-02	-3.0179E-02	3.8522E-02	3.8563E-02	4.096E-02
CS-137	#	1.1979E-01	1.1983E-01	5.8753E-02	5.9177E-02	
CE-139	#A	-2.5583E-03	-2.6274E-03	3.6160E-02	3.6160E-02	3.698E-02
EU-152	#B	2.3116E-02	2.3134E-02	9.6066E-02	9.6074E-02	1.063E-01
EU-154	#B	-1.1819E-04	-1.1833E-04	1.7324E-01	1.7324E-01	6.317E-02
EU-155	#B	7.2716E-02	7.2864E-02	1.2061E-01	1.2068E-01	1.320E-01
HG-203	#B	-1.2114E-03	-1.3106E-03	5.7776E-02	5.7777E-02	3.226E-02
TL-208	#	2.7501E-01	2.7501E-01	5.8519E-02	6.0731E-02	
PB-212		6.5701E-01	6.5701E-01	7.3646E-02	8.3243E-02	
PB-214		4.2435E-01	4.2435E-01	1.0470E-01	1.0766E-01	
BI-212		4.8317E-01	4.8317E-01	3.0076E-01	3.0211E-01	
BI-214		4.4150E-01	4.4150E-01	9.7521E-02	1.0095E-01	
RA-224	#A	1.9365E-01	1.9365E-01	9.0129E-01	9.0136E-01	9.991E-01
RA-226	#	1.2696E+00	1.2696E+00	7.4298E-01	7.4675E-01	
AC-228		7.2396E-01	7.2396E-01	1.6831E-01	1.7366E-01	
TH-227	#A	-3.5594E-01	-3.5594E-01	3.4317E-01	3.4382E-01	3.713E-01
PA-234	#B	9.9588E-03	9.9588E-03	1.1872E-01	1.1872E-01	1.321E-01
TH-234	#B	7.6599E-01	7.6599E-01	8.9492E-01	8.9593E-01	1.642E+00
AM-241	#A	-1.7559E-02	-1.7559E-02	1.8752E-01	1.8752E-01	1.922E-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 (269.7 to 2000.1 keV) 2.2227379E+01 pCi/gm
Total Decayed Activity (269.7 to 2000.1 keV) 2.2228231E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab