YAEC Chemistry Lab Spectrum name: 107F_7SEPT2005_1432.An1

Sample description

FSS-NOL-06-01-015-F-SD

Spectrum Filename: C:\GammaVision\Spectra\107F_7SEPT2005_1432.An1

Acquisition information

Start time:	07-Sep-2005 14:33:46
Live time:	2000
Real time:	2002
Dead time:	0.11 %
Detector ID:	2

Detector system

Det 107- DSPE- 634

Calibration

Filename: D7_1LSa.Clb

Detector 107 Calibration for 1 Liter Sand Marinelli

Energy Calibration

Created:	29-Oct-2004 06:48:53
Zero offset:	0.157 keV
Gain:	0.500 keV/channel
Quadratic:	-1.676E-08 keV/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: 1.9560E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9560E+03) =
5.1125E+02

Detection limit method: Nureg 4.16

Random error: 1.0000000E+00

Systematic error: 1.0000000E+00

Fraction Limit: 0.000%

Background width: average of five points.

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

Corrections	Status	Comments
Decay correct to date:	YES	25-Aug-2005 14:27:00
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: 0.0950

***** 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
74.39	287.	14.51	1.18	2.842E-02				
74.39	287.	14.51	1.18	2.842E-02	74.81	9.600	7.163E-01	PB212
77.30	502.	8.45	1.18	2.978E-02	77.11	10.700	1.087E+00	PB214
					77.11	17.500	6.707E-01	PB212
87.10	143.	39.91	1.50	3.284E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
129.57	158.	34.70	1.96	3.819E-02				

129.57	158.	34.70	1.96	3.819E-02	131.28	20.000	1.428E-01	PA234
185.82	182.	23.26	1.90	3.611E-02	185.99	3.280	1.059E+00	RA226
209.49	131.	29.82	1.24	3.427E-02				
238.73	1078.	4.09	1.30	3.188E-02	238.63	43.100	5.336E-01	PB212
241.38	211.	19.64	1.30	3.167E-02	241.00	3.900	1.165E+00	RA224
					241.92	7.470	6.121E-01	PB214
269.30	129.	27.01	1.49	2.951E-02				
295.27	299.	8.81	1.34	2.769E-02				
295.27	299.	8.81	1.34	2.769E-02	295.22	19.200	3.826E-01	PB214
300.80	82.	26.35	1.34	2.732E-02				
328.20	125.	29.28	1.15	2.559E-02				
338.45	288.	12.21	1.55	2.500E-02	338.40	12.010	6.540E-01	AC228
352.04	561.	7.27	1.66	2.426E-02	351.99	37.100	4.267E-01	PB214
409.58	71.	32.15	1.58	2.154E-02				
463.45	89.	28.45	1.21	1.953E-02				
463.45	89.	28.45	1.21	1.953E-02	463.51	10.000	3.069E-01	SB125
510.79	218.	14.41	1.95	1.808E-02	510.72	22.500	3.132E-01	TL208
583.18	434.	6.73	2.19	1.629E-02	583.14	86.000	2.115E-01	TL208
609.37	391.	6.11	1.56	1.574E-02	609.32	46.090	3.683E-01	BI214
662.01	272.	9.91	1.69	1.476E-02	661.62	84.620	1.485E-01	CS137
727.44	142.	16.39	1.43	1.374E-02	727.17	11.800	5.995E-01	BI212
768.86	68.	28.89	1.14	1.318E-02				
785.49	35.	40.93	1.68	1.297E-02	785.42	2.000	PBC<MDA	BI212
795.03	54.	26.80	1.68	1.284E-02	795.76	85.400	3.460E-02	CS134
911.12	359.	7.92	1.93	1.161E-02	911.07	29.000	7.281E-01	AC228
963.93	50.	27.05	1.80	1.114E-02				
963.93	50.	27.05	1.80	1.114E-02	964.00	14.580	PBC<MDA	EU152
969.05	186.	8.98	1.80	1.109E-02	968.90	17.460	6.548E-01	AC228
1119.64	144.	15.92	2.11	9.974E-03	1120.28	15.040	6.603E-01	BI214
1460.80	1790.	2.44	2.29	8.191E-03	1460.75	10.700	1.408E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1620.86	19.	33.17	0.62	7.569E-03	1620.56	2.750	6.472E-01	Bl212
1764.49	82.	12.25	1.91	7.084E-03	1764.51	15.920	4.975E-01	Bl214

********** 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	
148.44	74.67	727.	287.	0.144	43.54	1.177	Bl-207	D
154.26	77.58	651.	502.	0.251	25.36	1.180	PB-214	D
258.80	129.57	1046.	129.	0.065	109.19	1.955	AC-228	s
418.61	209.49	558.	131.	0.065	89.46	1.241	AC-228	
477.10	238.84	430.	1078.	0.539	12.26	1.297	PB-212	D
482.39	241.48	751.	211.	0.105	58.91	1.299	PB-214	D
538.24	269.30	389.	129.	0.065	81.03	1.491	AC-228	s
600.70	300.54	313.	106.	0.053	76.48	1.835	PB-212	s
656.02	328.20	368.	125.	0.062	87.83	1.149	AC-228	s
818.76	409.58	180.	71.	0.036	96.45	1.575	AC-228	
1537.29	768.86	103.	68.	0.034	72.91	1.141	Bl-214	M
1927.51	963.82	66.	51.	0.026	78.97	1.796	EU-152	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	149.34	74.84	1777.	256.	0.128	71.18	1.500s
PB-214	153.89	77.11	1493.	464.	0.232	37.55	1.500D
PB-212	153.89	77.11	1488.	469.	0.234	37.55	1.500D
EU-155	173.87	87.10	1555.	143.	0.071	119.72	1.500
RA-226	371.28	185.82	640.	182.	0.091	69.79	1.895s
PB-212	477.09	238.73	874.	1076.	0.538	14.57	1.500s
PB-214	590.20	295.29	385.	304.	0.152	31.79	1.500
AC-228	676.52	338.45	308.	284.	0.142	36.62	1.547
PB-214	703.66	352.02	263.	511.	0.255	18.68	1.500s
SB-125	926.14	463.27	194.	72.	0.036	85.56	1.500
TL-208	1021.18	510.79	242.	184.	0.092	43.22	1.949s
TL-208	1165.94	583.18	131.	429.	0.214	20.19	2.188s
BI-214	1218.22	609.32	94.	387.	0.193	18.33	1.558D
CS-137	1323.60	662.01	134.	268.	0.134	29.74	1.686s

YAEC Chemistry Lab Spectrum name: 107F_7SEPT2005_1432.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bl-212	1454.45	727.44	109.	141.	0.070	49.17	1.426s
CS-134	1589.62	795.03	81.	54.	0.027	80.39	1.684s
AC-228	1821.80	911.12	106.	355.	0.177	23.75	1.930
AC-228	1937.36	968.90	60.	184.	0.092	28.07	1.799D
Bl-214	2238.84	1119.64	102.	143.	0.072	47.77	2.109s
K-40	2921.20	1460.80	27.	1786.	0.893	7.33	2.286
Bl-212	3241.35	1620.86	7.	19.	0.010	99.50	0.623s
Bl-214	3528.63	1764.49	5.	81.	0.041	36.76	1.905

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

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

BE-7 1.1233E-01

477.56 1.123E-01 %(2.523E-01 7.63E-02 G

K-40 1.4077E+01

1460.75 1.408E+01 (P 2.130E-01 3.45E-01 G

MN-54 2.3097E-03

834.81 2.310E-03 %(P 2.920E-02 8.46E-03 G

CO-57 1.3064E-02

122.07 1.306E-02 %(P 3.185E-02 9.63E-03 G K

136.43-3.795E-03 & P 2.613E-01 7.79E-02 G

CO-60 -2.9772E-03

1332.51-2.977E-03 %(P 3.400E-02 9.42E-03 G K

1173.23-7.209E-03 % P 4.193E-02 1.21E-02 G K

Sr-85 -2.0697E-02

514.00-2.070E-02 %(3.733E-02 1.14E-02 G

Kr-85 -4.4256E+02

513.99-4.426E+02 %(P 7.537E+02 2.29E+02 G

Y-88 -3.1438E-03

1836.01-3.144E-03 %(P 2.437E-02 6.53E-03 G K

898.02-1.128E-03 & P 2.026E-02 5.46E-03 G

NB-94 -2.7527E-03

871.10-2.753E-03 &(P 2.443E-02 7.04E-03 G K

702.50-3.939E-03 & P 2.638E-02 7.70E-03 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.6421E-02						
		722.95	-1.642E-02	%(	3.666E-02	1.11E-02	G K
		614.37	5.767E-03	%	2.603E-02	7.68E-03	G
		433.93	-8.946E-04	% P	1.906E-02	5.44E-03	G
CD-109	1.6062E-02						
		88.04	1.606E-02	%(P	1.038E+00	3.11E-01	G
SN-113	5.5694E-03						
		391.71	5.569E-03	%(P	3.260E-02	9.59E-03	G K
		255.04	1.256E-02	&	1.228E+00	3.63E-01	G
SB-125	7.3964E-02						
		427.95	1.199E-02	&(P	7.101E-02	2.09E-02	G K
		600.77	-6.340E-03	& P	1.147E-01	3.27E-02	G
		636.15	-3.304E-02	% P	2.285E-01	6.68E-02	G
		463.51	2.574E-01	(P	2.412E-01	7.63E-02	G
		176.29	-5.068E-02	& P	4.073E-01	1.22E-01	G
I-131	1.5202E-02						
		364.48	1.520E-02	&(	6.862E-02	2.03E-02	G K
		636.97	-1.160E-01	%	1.114E+00	3.26E-01	G
		284.29	2.352E-02	%	8.551E-01	2.50E-01	G
CS-134	1.1588E-02						
		604.66	-8.545E-03	%(P	2.757E-02	8.21E-03	G K
		795.76	3.460E-02	*(P	2.845E-02	9.36E-03	G
		569.29	3.816E-02	%	1.466E-01	4.35E-02	G
		801.84	-1.003E-01	& P	3.314E-01	9.85E-02	G

CS-137 1.4851E-01

661.62 1.485E-01 @(P 3.129E-02 1.49E-02 G

CE-139 -8.6396E-03

165.85-8.640E-03 %(P 3.606E-02 1.08E-02 G

EU-152 -1.0602E-02

121.78-1.060E-02 %(P 7.272E-02 2.17E-02 G K

344.30 6.312E-03 & P 7.010E-02 2.06E-02 G

1408.08 4.604E-02 % P 9.429E-02 2.85E-02 G

964.00-1.230E-02 & P 3.118E-01 9.14E-02 G

1112.07 2.540E-02 % P 2.451E-01 7.10E-02 G

778.90 1.860E-02 % P 1.909E-01 5.52E-02 G

EU-154 2.7532E-02

123.10 2.753E-02 %(P 6.679E-02 2.02E-02 G K

1274.80-1.477E-03 & P 9.525E-02 2.71E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30-7.852E-02 % P 1.683E-01 5.09E-02 G
                      1004.80-1.022E-02 % P 1.379E-01 3.92E-02 G

EU-155       9.2300E-02
                       86.45 9.230E-02  (  1.204E-01 3.68E-02 G K
                      105.31 3.554E-02 % P 1.395E-01 4.20E-02 G

HG-203       1.4975E-02
                      279.17 1.497E-02 %(P 3.381E-02 1.02E-02 G K
                       72.87-2.210E-01 % P 1.031E+00 3.10E-01 G
                       70.83-1.060E+00 &   1.716E+00 5.23E-01 G
                       82.50-5.590E-01 %   2.173E+00 6.55E-01 G

TL-208       2.1154E-01
                      583.14 2.115E-01 *(P 2.764E-02 1.44E-02 G
                      510.72 3.132E-01 + P 1.276E-01 5.34E-02 G

PB-212       5.7635E-01
                      238.63 5.405E-01 *(P 7.059E-02 2.66E-02 G K
                                         Energy duplication
                       77.11 6.259E-01 *(  2.436E-01 7.83E-02 G
                       74.81 6.469E-01 &(P 5.029E-01 1.56E-01 G

PB-214       3.9305E-01
                      351.99 3.919E-01 *(P 6.005E-02 2.46E-02 G K
                      295.22 3.953E-01  (P 1.224E-01 4.25E-02 G
                                         Energy duplication
                       77.11 1.013E+00 + P 3.990E-01 1.28E-01 G
                      241.92 7.399E-03 % P 5.017E-01 1.50E-01 G

BI-212       6.0849E-01
```

727.17 5.995E-01 *(P 2.191E-01 9.92E-02 G K
1620.56 6.472E-01 (P 4.844E-01 2.20E-01 G
785.42 9.303E-01 % P 1.268E+00 3.95E-01 G

BI-214 3.6833E-01
609.32 3.683E-01 (P 4.564E-02 2.28E-02 G K
1764.51 4.975E-01 + P 7.912E-02 6.16E-02 G
1120.28 6.603E-01 + P 2.290E-01 1.06E-01 G

RA-224 5.4050E-01
241.00 5.405E-01 %(P 8.595E-01 2.62E-01 G

RA-226 1.0590E+00
185.99 1.059E+00 *(7.039E-01 2.46E-01 G

AC-228 6.9099E-01
911.07 7.281E-01 (P 1.041E-01 5.83E-02 G K
968.90 6.548E-01 (P 1.389E-01 6.20E-02 G
338.40 6.540E-01 (P 1.943E-01 8.07E-02 G

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

TH-227      -2.3048E-01
                    236.00-2.305E-01 %(P 3.145E-01 9.62E-02 G K
                    256.25-3.827E-03 % P 3.579E-01 1.06E-01 G

PA-234      -2.2918E-02
                     98.44-2.292E-02 %(  1.228E-01 3.69E-02 G K
                    946.00-6.149E-03 &   1.219E-01 3.47E-02 G
                    131.28 2.577E-02 %   1.420E-01 4.26E-02 G
                     94.67-5.087E-02 %   2.236E-01 6.73E-02 G
                    883.24 4.629E-03 &   2.217E-01 6.35E-02 G
                    926.70-7.611E-03 &   2.169E-01 6.16E-02 G
                    569.26 5.582E-02 %   2.149E-01 6.37E-02 G

TH-234       3.8518E-01
                     63.29 3.852E-01 %(P 1.439E+00 4.32E-01 G K
                     92.80 5.976E-01 % P 1.213E+00 3.67E-01 G
                     92.38-2.913E-02 % P 1.434E+00 4.28E-01 G

AM-241      -2.8396E-02
                     59.54-2.840E-02 &(P 1.830E-01 5.48E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	9.4883E-02	1.1233E-01	2.2886E-01	2.2896E-01	2.132E-01
K-40	1.4077E+01	1.4077E+01	1.0347E+00	1.3273E+00	
MN-54 #A	2.2440E-03	2.3097E-03	2.5376E-02	2.5376E-02	2.837E-02
CO-57 #B	1.2635E-02	1.3064E-02	2.8903E-02	2.8912E-02	3.080E-02
CO-60 #B	-2.9633E-03	-2.9772E-03	2.1263E-01	2.1263E-01	3.384E-02
Sr-85 #A	-1.8011E-02	-2.0697E-02	3.4130E-02	3.4151E-02	3.249E-02
Kr-85 #A	-4.4252E+02	-4.4256E+02	7.7383E+02	7.7428E+02	7.536E+02
Y-88 #B	-2.8889E-03	-3.1438E-03	3.5205E-02	3.5206E-02	2.239E-02
NB-94 #B	-2.7527E-03	-2.7527E-03	2.2369E-02	2.2370E-02	2.443E-02
Ag-108M#B	-1.6418E-02	-1.6421E-02	3.3267E-02	3.3281E-02	3.666E-02
CD-109 #A	1.5746E-02	1.6062E-02	9.3166E-01	9.3166E-01	1.018E+00
SN-113 #B	5.1499E-03	5.5694E-03	2.8773E-02	2.8775E-02	3.014E-02
SB-125 #F	7.3308E-02	7.3964E-02	6.5754E-02	6.5899E-02	7.038E-02
I-131 #B	4.9544E-03	1.5202E-02	6.1003E-02	6.1010E-02	2.236E-02
CS-134 #B	1.1451E-02	1.1588E-02	9.4062E-03	9.4311E-03	2.724E-02
CS-137 #	1.4839E-01	1.4851E-01	4.4746E-02	4.5598E-02	
CE-139 #A	-8.0914E-03	-8.6396E-03	3.3146E-02	3.3150E-02	3.377E-02
EU-152 #B	-1.0581E-02	-1.0602E-02	6.6178E-02	6.6180E-02	7.257E-02
EU-154 #B	2.7452E-02	2.7532E-02	6.0612E-02	6.0631E-02	6.659E-02
EU-155 #A	9.1841E-02	9.2300E-02	1.1051E-01	1.1062E-01	1.198E-01
HG-203 #B	1.2341E-02	1.4975E-02	3.0668E-02	3.0681E-02	2.786E-02
TL-208 #	2.1154E-01	2.1154E-01	4.3157E-02	4.4929E-02	

PB-212 #	5.7635E-01	5.7635E-01	8.5180E-02	9.1730E-02	7.059E-02
PB-214 #	3.9305E-01	3.9305E-01	7.3458E-02	7.7039E-02	6.005E-02
BI-212	6.0849E-01	6.0849E-01	3.0191E-01	3.0405E-01	
BI-214	3.6833E-01	3.6833E-01	6.8253E-02	7.1635E-02	
RA-224 #A	5.4050E-01	5.4050E-01	7.8578E-01	7.8643E-01	8.595E-01
RA-226 #	1.0589E+00	1.0590E+00	7.3905E-01	7.4169E-01	
AC-228	6.9099E-01	6.9099E-01	1.2092E-01	1.2763E-01	
TH-227 #B	-2.3048E-01	-2.3048E-01	2.8988E-01	2.9020E-01	3.145E-01
PA-234 #B	-2.2918E-02	-2.2918E-02	1.1059E-01	1.1060E-01	1.228E-01
TH-234 #B	3.8518E-01	3.8518E-01	1.2957E+00	1.2959E+00	1.439E+00
AM-241 #A	-2.8394E-02	-2.8396E-02	1.7351E-01	1.7352E-01	1.830E-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) 1.7163586E+01 pCi/gm

Total Decayed Activity (1120.2 to 2000.1 keV) 1.7163725E+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_20OCT2005_1309.An1

Sample description

NOL-006-01-04R WET

Spectrum Filename: C:\GammaVision\Spectra\101_20OCT2005_1309.An1

Acquisition information

Start time:	20-Oct-2005 13:10:28
Live time:	1000
Real time:	1001
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: 1.9040E+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 20-Oct-2005 12:25:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1537

***** 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	133.	20.08	1.00	1.651E-02				
74.78	133.	20.08	1.00	1.651E-02	74.81	9.600	1.164E+00	PB212
74.99	119.	31.74	1.50	1.654E-02				
74.99	119.	31.74	1.50	1.654E-02	74.81	9.600	PBC<MDA	PB212
77.07	169.	21.95	1.50	1.720E-02	77.11	10.700	1.289E+00	PB214
					77.11	17.500	7.969E-01	PB212
77.18	198.	13.68	1.01	1.720E-02	77.11	10.700	1.524E+00	PB214

					77.11	17.500	9.319E-01	PB212
90.17	74.	29.14	1.02	1.961E-02				
93.04	65.	33.56	1.02	1.993E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.57	91.	32.30	1.29	2.110E-02				
209.45	82.	28.26	1.33	1.721E-02				
238.76	482.	5.47	1.12	1.557E-02	238.63	43.100	1.013E+00	PB212
241.58	89.	21.83	1.12	1.542E-02	241.00	3.900	2.087E+00	RA224
					241.92	7.470	1.093E+00	PB214
269.85	66.	29.86	1.22	1.402E-02				
295.41	102.	13.98	1.16	1.292E-02	295.22	19.200	5.769E-01	PB214
300.18	43.	26.89	1.16	1.273E-02				
338.50	113.	22.45	1.28	1.135E-02	338.40	12.010	1.164E+00	AC228
352.06	190.	11.90	1.52	1.092E-02	351.99	37.100	6.637E-01	PB214
462.77	37.	36.76	0.93	8.355E-03				
462.77	37.	36.76	0.93	8.355E-03	463.51	10.000	6.139E-01	SB125
510.66	90.	16.56	2.01	7.591E-03	510.72	22.500	6.814E-01	TL208
583.19	162.	10.23	1.29	6.684E-03	583.14	86.000	3.966E-01	TL208
609.46	119.	11.34	1.17	6.411E-03	609.32	46.090	5.708E-01	BI214
727.81	36.	27.24	0.94	5.439E-03	727.17	11.800	7.904E-01	BI212
911.40	93.	12.85	1.46	4.445E-03	911.07	29.000	1.009E+00	AC228
969.12	45.	19.18	1.21	4.211E-03	968.90	17.460	8.578E-01	AC228
1120.60	40.	24.77	1.66	3.711E-03	1120.28	15.040	1.015E+00	BI214
1460.84	366.	5.23	1.78	2.942E-03	1460.75	10.700	1.645E+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
149.14	74.72	289.	133.	0.133	60.25	1.005	Bl-207 D
179.92	90.28	198.	74.	0.074	87.43	1.016	PB-214 ID
185.66	93.15	208.	65.	0.065	100.67	1.018	U-235 ID
256.75	128.57	290.	123.	0.123	64.69	1.288	AC-228 s
418.58	209.45	184.	82.	0.083	84.79	1.328	AC-228 s
477.21	238.74	106.	482.	0.482	16.40	1.122	PB-212 D
539.43	269.85	123.	66.	0.066	89.59	1.221	AC-228
599.57	299.91	62.	47.	0.047	87.30	0.943	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	149.54	74.99	686.	119.	0.119	95.21	1.499
PB-214	153.79	77.11	274.	198.	0.198	41.03	1.007D
PB-212	153.79	77.11	604.	169.	0.169	65.86	1.499D
PB-212	477.27	238.78	265.	458.	0.458	20.43	1.499

RA-224	483.13	241.71	310.	65.	0.065	120.11	1.499
PB-214	483.54	241.92	91.	82.	0.082	59.15	1.124D
PB-214	590.01	295.13	90.	117.	0.117	47.83	1.121
AC-228	676.79	338.50	144.	112.	0.112	67.35	1.284
PB-214	703.92	352.06	93.	190.	0.190	35.71	1.521s
SB-125	925.85	462.98	39.	32.	0.032	96.71	1.499
TL-208	1021.26	510.66	52.	82.	0.082	49.67	2.008s
TL-208	1166.39	583.19	32.	161.	0.161	30.70	1.294s
Bi-214	1218.95	609.46	27.	119.	0.119	34.01	1.174
Bi-212	1455.78	727.81	21.	36.	0.036	81.72	0.936s
AC-228	1823.15	911.40	15.	92.	0.092	38.55	1.459s
AC-228	1938.65	969.12	14.	44.	0.044	57.54	1.206
Bi-214	2241.79	1120.60	19.	40.	0.040	74.32	1.661
K-40	2922.70	1460.84	1.	365.	0.365	15.68	1.776

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	&(	6.326E-01	1.78E-01 G
K-40		1.6450E+01					
			1460.75	1.645E+01	(P	3.465E-01	8.63E-01 G
MN-54		-1.9854E-02					
			834.81	-1.985E-02	%(P	7.068E-02	2.04E-02 G
CO-57		4.1917E-03					
			122.07	4.192E-03	%(	6.234E-02	1.84E-02 G K
			136.43	4.198E-02	%	6.319E-01	1.87E-01 G
CO-60		8.4708E-03					
			1332.51	8.471E-03	&(P	8.252E-02	2.22E-02 G K
			1173.23	-8.184E-03	& P	1.119E-01	3.11E-02 G K
Sr-85		6.0070E-04					
			514.00	6.007E-04	%(	8.513E-02	2.43E-02 G
Kr-85		-2.2832E+00					
			513.99	-2.283E+00	%(P	1.982E+03	5.64E+02 G
Y-88		2.8609E-04					
			1836.01	2.861E-04	%(	6.966E-02	1.63E-02 G K

898.02-1.398E-02 & P 7.868E-02 2.21E-02 G

NB-94 -3.5853E-03

871.10-3.585E-03 %(P 8.398E-02 2.32E-02 G K

702.50 9.141E-04 % P 6.783E-02 1.86E-02 G K

Ag-108M -1.8963E-02

722.95-1.896E-02 %(9.195E-02 2.66E-02 G K

614.37-1.368E-02 % P 7.809E-02 2.24E-02 G

433.93 5.779E-03 % 5.252E-02 1.48E-02 G

CD-109 -4.8508E-01

88.04-4.851E-01 &(P 2.419E+00 7.24E-01 G

SN-113 5.2782E-02

391.71 5.278E-02 %(8.202E-02 2.55E-02 G K

255.04-1.990E-01 % P 2.776E+00 8.09E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3581E-01						
		427.95	-1.040E-03	&(P	1.960E-01	5.50E-02	G K
		600.77	6.899E-02	& P	3.237E-01	9.29E-02	G
		636.15	6.486E-02	& P	4.667E-01	1.30E-01	G
		463.51	5.409E-01	(P	5.438E-01	1.78E-01	G
		176.29	1.110E-01	% P	9.138E-01	2.70E-01	G
I-131	1.5170E-02						
		364.48	1.517E-02	&(	6.681E-02	1.96E-02	G K
		636.97	8.473E-02	&	6.679E-01	1.84E-01	G
		284.29	-2.176E-01	%	1.002E+00	2.96E-01	G
CS-134	-3.0930E-03						
		604.66	-3.093E-03	%(P	1.485E-01	4.33E-02	G K
		795.76	-6.919E-04	% P	6.567E-02	1.71E-02	G
		569.29	2.473E-02	% P	3.456E-01	9.54E-02	G
		801.84	-1.020E-01	%	8.293E-01	2.32E-01	G
CS-137	6.9856E-03						
		661.62	6.986E-03	&(P	8.347E-02	2.34E-02	G
CE-139	1.7691E-03						
		165.85	1.769E-03	%(P	7.775E-02	2.29E-02	G
EU-152	-4.8852E-03						
		121.78	-4.885E-03	%(P	1.622E-01	4.74E-02	G K
		344.30	1.006E-02	% P	2.251E-01	6.47E-02	G
		1408.08	1.787E-03	& P	2.542E-01	5.90E-02	G
		964.00	2.565E-01	% P	7.240E-01	2.15E-01	G
		1112.07	1.201E-01	% P	6.694E-01	1.89E-01	G

778.90-1.242E-01 % P 6.603E-01 1.90E-01 G

EU-154 1.1175E-02

123.10 1.117E-02 %(P 1.574E-01 4.66E-02 G K

1274.80-1.340E-04 % P 3.313E-01 9.06E-02 G

723.30-1.076E-01 % P 4.551E-01 1.32E-01 G

1004.80-3.631E-02 & P 4.540E-01 1.24E-01 G

EU-155 1.7039E-01

86.45 1.704E-01 %(2.585E-01 7.91E-02 G K

105.31 9.957E-02 % 2.889E-01 8.69E-02 G

HG-203 5.5944E-03

279.17 5.594E-03 &(7.326E-02 2.13E-02 G K

72.87-3.579E-01 % P 1.788E+00 5.35E-01 G

70.83 2.555E-01 % 3.241E+00 9.65E-01 G

82.50-1.039E+00 % 4.019E+00 1.21E+00 G

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

TL-208      3.9659E-01
                 583.14 3.966E-01  (P 7.218E-02 4.09E-02 G
                 510.72 6.814E-01 + P 3.019E-01 1.24E-01 G

PB-212      9.8530E-01
                 238.63 9.679E-01  (P 1.661E-01 6.64E-02 G K
                                    Energy duplication
                  77.11 7.969E-01 -   5.527E-01 1.75E-01 G
                  74.81 1.064E+00 &(P 1.116E+00 3.45E-01 G

PB-214      6.6473E-01
                 351.99 6.637E-01 *(P 1.673E-01 7.94E-02 G K
                 295.22 6.667E-01  (P 2.692E-01 1.07E-01 G
                                    Energy duplication
                  77.11 1.524E+00 + P 6.161E-01 2.10E-01 G
                 241.92 1.012E+00 + P 5.819E-01 2.00E-01 G

BI-212      7.9036E-01
                 727.17 7.904E-01  (P 5.345E-01 2.18E-01 G K
                1620.56 3.291E-01 %   2.595E+00 6.78E-01 G
                 785.42 8.836E-01 % P 4.669E+00 1.35E+00 G

BI-214      5.7078E-01
                 609.32 5.708E-01  (P 1.296E-01 6.50E-02 G K
                1764.51 2.282E-01 % P 5.550E-01 1.65E-01 G
                1120.28 1.015E+00 + P 5.868E-01 2.53E-01 G

RA-224      1.5303E+00
                 241.00 1.530E+00  (P 1.996E+00 6.16E-01 G
```

```
RA-226       1.3383E+00
                185.99 1.338E+00 %(  1.873E+00 5.77E-01 G

AC-228       9.9578E-01
                911.07 1.009E+00 @(P 2.307E-01 1.31E-01 G K
                968.90 8.578E-01  (P 3.835E-01 1.66E-01 G
                338.40 1.164E+00  (P 6.109E-01 2.64E-01 G

TH-227      -2.9407E-01
                236.00-2.941E-01 &(P 7.551E-01 2.28E-01 G K
                256.25-5.030E-02 % P 8.115E-01 2.35E-01 G

PA-234       6.2660E-02
                 98.44 6.266E-02 %(  2.651E-01 7.93E-02 G K
                946.00 0.000E+00 &   6.579E-01 1.86E-01 G
                131.28-1.262E-01 %   3.729E-01 1.12E-01 G
                 94.67-7.275E-02 %   5.299E-01 1.58E-01 G
                883.24 9.098E-02 %   5.092E-01 1.42E-01 G
                926.70-1.477E-01 %   8.284E-01 2.37E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26 1.162E-01 % 5.350E-01 1.54E-01 G

TH-234 -5.7845E-01
63.29-5.784E-01 %(P 3.716E+00 1.10E+00 G K
92.80 1.547E+00 & P 2.635E+00 8.02E-01 G
92.38 1.690E+00 & P 3.127E+00 9.49E-01 G

AM-241 -2.0317E-03
59.54-2.032E-03 %(P 4.942E-01 1.46E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	0.0000E+00	0.0000E+00	5.3397E-01	5.3397E-01	6.324E-01
K-40		1.6450E+01	1.6450E+01	2.5876E+00	2.7495E+00	
MN-54	#A	-1.9852E-02	-1.9854E-02	6.5029E-02	6.5039E-02	7.067E-02
CO-57	#B	4.1913E-03	4.1917E-03	5.5093E-02	5.5093E-02	6.234E-02
CO-60	#B	8.4707E-03	8.4708E-03	6.6680E-02	6.6682E-02	8.252E-02

Sr-85 #A	6.0049E-04	6.0070E-04	7.2900E-02	7.2900E-02	8.510E-02
Kr-85 #A	-2.2832E+00	-2.2832E+00	2.0227E+03	2.0227E+03	1.982E+03
Y-88 #B	2.8604E-04	2.8609E-04	4.8834E-02	4.8834E-02	6.964E-02
NB-94 #B	-3.5853E-03	-3.5853E-03	7.7885E-02	7.7885E-02	8.398E-02
Ag-108M#B	-1.8963E-02	-1.8963E-02	7.9773E-02	7.9781E-02	9.195E-02
CD-109 #A	-4.8505E-01	-4.8508E-01	2.2143E+00	2.2145E+00	2.419E+00
SN-113 #B	5.2772E-02	5.2782E-02	7.6467E-02	7.6525E-02	8.201E-02
SB-125 #B	1.3581E-01	1.3581E-01	1.3433E-01	1.3455E-01	1.960E-01
I-131 #B	1.5129E-02	1.5170E-02	5.8694E-02	5.8700E-02	6.663E-02
CS-134 #B	-3.0929E-03	-3.0930E-03	2.0514E-01	2.0514E-01	1.485E-01
CS-137 #A	6.9856E-03	6.9856E-03	7.0068E-02	7.0070E-02	8.347E-02
CE-139 #A	1.7688E-03	1.7691E-03	6.8664E-02	6.8664E-02	7.774E-02
EU-152 #B	-4.8852E-03	-4.8852E-03	2.0644E-01	2.0644E-01	1.622E-01
EU-154 #B	1.1175E-02	1.1175E-02	1.3975E-01	1.3975E-01	1.574E-01
EU-155 #B	1.7038E-01	1.7039E-01	2.3721E-01	2.3739E-01	2.585E-01
HG-203 #B	5.5918E-03	5.5944E-03	6.4047E-02	6.4048E-02	7.323E-02
TL-208 #	3.9659E-01	3.9659E-01	1.2265E-01	1.2468E-01	
PB-212 #	9.8530E-01	9.8530E-01	2.0264E-01	2.1014E-01	1.661E-01
PB-214	6.6473E-01	6.6473E-01	1.9974E-01	2.0324E-01	
BI-212	7.9036E-01	7.9036E-01	6.5204E-01	6.5357E-01	
BI-214	5.7078E-01	5.7078E-01	1.9504E-01	1.9769E-01	
RA-224 #A	1.5303E+00	1.5303E+00	1.8481E+00	1.8502E+00	1.996E+00
RA-226 #A	1.3383E+00	1.3383E+00	1.7305E+00	1.7322E+00	1.873E+00
AC-228	9.9578E-01	9.9578E-01	3.2362E-01	3.2848E-01	
TH-227 #B	-2.9407E-01	-2.9407E-01	6.9134E-01	6.9154E-01	7.551E-01
PA-234 #B	6.2660E-02	6.2660E-02	2.3785E-01	2.3787E-01	2.651E-01
TH-234 #B	-5.7845E-01	-5.7845E-01	5.3463E+00	5.3464E+00	3.716E+00
AM-241 #A	-2.0317E-03	-2.0317E-03	3.8935E-01	3.8935E-01	4.942E-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) 1.9868147E+01 pCi/gm

Total Decayed Activity (269.6 to 1999.1 keV) 1.9868147E+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_2SEPT2005_0949.An1

Sample description

FSS-NOL-06-01-060-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_2SEPT2005_0949.An1

Acquisition information

Start time:	02-Sep-2005 09:51:08
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: 1.9500E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9500E+03) =
5.1282E+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: 101F_2SEPT2005_0949.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	31-Aug-2005 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. 14 cutoff 20.00000 %

Energy Calibration

Normalized diff: 0.2512

***** 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
74.34	156.	21.84	1.00	1.651E-02				
74.34	156.	21.84	1.00	1.651E-02	74.81	9.600	PBC<MDA	PB212
77.34	383.	8.93	1.01	1.736E-02	77.11	10.700	1.428E+00	PB214
					77.11	17.500	8.815E-01	PB212
86.46	96.	32.44	1.01	1.915E-02	86.45	32.740	1.065E-01	EU155
89.83	110.	25.87	1.02	1.960E-02				
92.89	144.	20.84	1.02	1.994E-02	92.38	2.570	PBC<MDA	TH234

					92.80	3.000	PBC<MDA TH234	
129.35	94.	38.99	1.00	2.109E-02				
129.35	94.	38.99	1.00	2.109E-02	131.28	20.000	1.545E-01	PA234
185.44	160.	21.37	1.26	1.861E-02				
185.44	160.	21.37	1.26	1.861E-02	185.99	3.280	1.825E+00	RA226
209.51	109.	26.37	1.09	1.720E-02				
238.87	844.	4.02	1.12	1.556E-02	238.63	43.100	8.648E-01	PB212
241.48	118.	21.44	1.12	1.542E-02	241.00	3.900	PBC<MDA RA224	
270.28	72.	30.88	1.07	1.400E-02				
277.00	55.	31.14	0.99	1.370E-02				
295.49	164.	11.81	1.16	1.291E-02	295.22	19.200	4.536E-01	PB214
300.09	49.	33.09	1.16	1.272E-02				
338.73	144.	16.60	0.93	1.134E-02	338.40	12.010	7.210E-01	AC228
352.16	279.	9.85	1.14	1.092E-02	351.99	37.100	4.730E-01	PB214
409.07	70.	31.94	1.56	9.429E-03				
463.46	38.	39.34	1.50	8.342E-03	463.51	10.000	PBC<MDA SB125	
510.77	109.	22.50	1.37	7.590E-03	510.72	22.500	3.760E-01	TL208
583.45	292.	8.14	1.41	6.681E-03	583.14	86.000	3.485E-01	TL208
609.71	156.	12.16	1.37	6.409E-03	609.32	46.090	3.632E-01	BI214
727.71	53.	28.48	1.05	5.439E-03	723.30	19.700	3.400E-01	EU154
					727.17	11.800	5.667E-01	BI212
795.39	26.	35.35	1.50	5.016E-03	795.76	85.400	PBC<MDA CS134	
911.55	186.	10.49	1.68	4.444E-03	911.07	29.000	9.917E-01	AC228
959.88	22.	31.08	1.61	4.231E-03	964.00	14.580	2.512E-01	EU152
968.55	132.	11.91	1.55	4.213E-03	968.90	17.460	1.232E+00	AC228
1000.78	32.	36.98	1.18	4.094E-03				
1120.56	73.	24.76	0.95	3.711E-03	1120.28	15.040	9.042E-01	BI214
1461.05	708.	3.89	1.93	2.942E-03	1460.75	10.700	1.553E+01	K40
1764.92	30.	22.06	2.07	2.481E-03	1764.51	15.920	5.291E-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
179.24	90.21	347.	110.	0.055	77.62	1.016	PB-214 ID
258.31	129.35	542.	94.	0.047	116.98	0.997	AC-228 I
418.69	209.51	309.	109.	0.054	79.11	1.090	AC-228 s
477.43	238.85	155.	844.	0.422	12.07	1.122	PB-212 D
482.66	241.47	260.	118.	0.059	64.32	1.123	PB-214 D
540.29	270.28	192.	72.	0.036	92.65	1.073	AC-228
599.94	300.10	106.	49.	0.024	99.28	1.165	PB-212 ID
817.99	409.07	136.	70.	0.035	95.81	1.563	CS-138 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	149.25	74.84	1157.	197.	0.098	74.40	1.499s
PB-214	153.79	77.11	1039.	323.	0.161	44.97	1.499D
PB-212	153.79	77.11	1035.	327.	0.163	44.97	1.499D
EU-155	173.89	87.15	1057.	127.	0.063	112.21	1.499

TH-234	185.88	93.15	979.	156.	0.078	82.37	1.499s
TH-234	185.87	93.14	952.	158.	0.079	82.62	1.499s
RA-226	372.04	186.19	533.	100.	0.050	102.62	1.499s
PB-212	477.37	238.84	449.	707.	0.353	16.82	1.499
PB-214	590.61	295.43	235.	164.	0.082	45.42	1.499
AC-228	677.24	338.73	173.	142.	0.071	49.80	0.927
PB-214	704.29	352.25	149.	265.	0.132	26.62	1.499s
SB-125	926.81	463.46	101.	38.	0.019	118.02	1.499s
TL-208	1021.49	510.77	148.	93.	0.046	67.50	1.368s
TL-208	1166.91	583.45	80.	289.	0.145	24.41	1.408
BI-214	1219.46	609.71	69.	155.	0.077	36.49	1.365
BI-212	1455.58	727.71	61.	53.	0.026	85.43	1.047
CS-134	1591.01	795.39	31.	26.	0.013	106.05	1.502s
AC-228	1823.45	911.55	59.	185.	0.092	31.47	1.681s
EU-152	1920.17	959.88	14.	22.	0.011	93.25	1.612s
AC-228	1937.52	968.55	35.	131.	0.065	35.73	1.549s
BI-214	2241.70	1120.56	61.	73.	0.036	74.29	0.950s
K-40	2923.12	1461.05	13.	706.	0.353	11.68	1.928

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bi-214	3531.28	1764.92	4.	30.	0.015	66.17	2.066

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Activity Code	MDA Value pCi/gm	COMMENTS
BE-7		7.0037E-02					
			477.56	7.004E-02	%(	3.855E-01	1.13E-01 G
K-40		1.5531E+01					
			1460.75	1.553E+01	(P	4.348E-01	6.07E-01 G
MN-54		2.9748E-02					
			834.81	2.975E-02	%(P	4.210E-02	1.33E-02 G
CO-57		-1.0425E-03					
			122.07	-1.042E-03	&(	5.168E-02	1.54E-02 G K
			136.43	1.274E-01	&	3.719E-01	1.12E-01 G
CO-60		1.7160E-02					
			1332.51	1.716E-02	%(P	5.506E-02	1.61E-02 G K
			1173.23	1.709E-02	% P	6.178E-02	1.81E-02 G K
Sr-85		-6.6260E-03					

514.00-6.626E-03 %(5.264E-02 1.54E-02 G

Kr-85 -1.7589E+02

513.99-1.759E+02 %(P 1.198E+03 3.49E+02 G

Y-88 4.7865E-03

1836.01 4.787E-03 &(3.453E-02 8.89E-03 G K

898.02 1.854E-02 % P 4.786E-02 1.43E-02 G

NB-94 -1.9971E-04

871.10-1.997E-04 &(P 4.711E-02 1.30E-02 G K

702.50 7.310E-03 % P 3.966E-02 1.14E-02 G K

Ag-108M 1.4252E-02

722.95 1.425E-02 &(5.031E-02 1.48E-02 G K

614.37-2.116E-02 % P 5.398E-02 1.62E-02 G

433.93-3.374E-03 & 4.594E-02 1.33E-02 G

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

CD-109      -1.4584E-01
                    88.04-1.458E-01 &(P 1.550E+00 4.64E-01 G

SN-113      -1.2879E-02
                   391.71-1.288E-02 %(  6.551E-02 1.93E-02 G K
                   255.04-6.717E-01 % P 1.973E+00 5.93E-01 G

SB-125       4.8509E-02
                   427.95-4.114E-02 %(P 1.441E-01 4.28E-02 G K
                   600.77 2.346E-02 & P 2.440E-01 7.02E-02 G
                   636.15 4.112E-02 % P 4.097E-01 1.18E-01 G
                   463.51 3.139E-01 *(P 4.114E-01 1.28E-01 G
                   176.29-1.201E-01 % P 6.645E-01 1.98E-01 G

I-131       -3.3388E-03
                   364.48-3.339E-03 &(  5.645E-02 1.65E-02 G K
                   636.97-1.777E-02 &   7.603E-01 2.17E-01 G
                   284.29 4.642E-02 &   7.464E-01 2.19E-01 G

CS-134       1.9868E-02
                   604.66 1.623E-04 %(P 4.477E-02 1.27E-02 G K
                   795.76 4.239E-02 *(P 4.661E-02 1.52E-02 G
                   569.29 5.373E-02 % P 2.264E-01 6.59E-02 G
                   801.84 1.459E-01 %   4.987E-01 1.46E-01 G

CS-137       7.1563E-03
                   661.62 7.156E-03 &(P 4.803E-02 1.37E-02 G

CE-139      -5.2250E-03
                   165.85-5.225E-03 %(P 5.223E-02 1.56E-02 G
```

EU-152 8.0201E-02

121.78-5.062E-03 &(P 1.415E-01 4.20E-02 G K

344.30-2.835E-02 % P 1.467E-01 4.33E-02 G

1408.08 5.409E-02 % P 2.157E-01 6.14E-02 G

964.00 2.512E-01 ?(P 2.278E-01 7.97E-02 G

1112.07-8.098E-02 % P 4.637E-01 1.33E-01 G

778.90 2.374E-04 & P 3.263E-01 9.04E-02 G

EU-154 5.3348E-02

123.10 5.335E-02 %(P 8.949E-02 2.73E-02 G K

1274.80 1.500E-02 & P 1.614E-01 4.51E-02 G

723.30 5.316E-02 & P 2.602E-01 7.59E-02 G

1004.80-1.456E-03 % P 3.219E-01 8.97E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.4035E-01						
		86.45	1.403E-01	(	1.710E-01	5.25E-02	G K
		105.31	9.258E-02	%	1.970E-01	5.97E-02	G
HG-203	-1.7565E-02						
		279.17	-1.757E-02	%(	5.477E-02	1.64E-02	G K
		72.87	-2.967E-01	% P	1.197E+00	3.60E-01	G
		70.83	-4.655E-01	&	2.239E+00	6.73E-01	G
		82.50	-8.722E-01	&	2.664E+00	8.04E-01	G
TL-208	3.5424E-01						
		583.14	3.485E-01	(P	5.347E-02	2.86E-02	G
		510.72	3.760E-01	*(P	2.413E-01	9.92E-02	G
PB-212	7.5274E-01						
		238.63	7.297E-01	(P	1.047E-01	4.13E-02	G K
							Energy duplication
		77.11	7.518E-01	(	3.514E-01	1.13E-01	G
		74.81	8.578E-01	?(P	7.035E-01	2.18E-01	G
PB-214	4.5473E-01						
		351.99	4.527E-01	@(P	1.018E-01	4.05E-02	G K
		295.22	4.587E-01	(P	2.069E-01	7.02E-02	G
							Energy duplication
		77.11	1.216E+00	+ P	5.757E-01	1.84E-01	G
		241.92	1.703E-01	% P	5.655E-01	1.70E-01	G
BI-212	5.6671E-01						
		727.17	5.667E-01	(P	4.235E-01	1.64E-01	G K
		1620.56	2.178E-01	%	1.608E+00	4.35E-01	G

785.42 2.508E-02 % P 2.099E+00 5.81E-01 G

BI-214 3.6318E-01

609.32 3.632E-01 (P 9.719E-02 4.45E-02 G K

1764.51 5.291E-01 + P 2.077E-01 1.18E-01 G

1120.28 9.042E-01 + P 4.862E-01 2.25E-01 G

RA-224 8.5605E-01

241.00 8.561E-01 %(P 1.378E+00 4.20E-01 G

RA-226 1.1350E+00

185.99 1.135E+00 @(1.254E+00 3.88E-01 G

AC-228 1.0822E+00

911.07 9.917E-01 @(P 2.077E-01 1.05E-01 G K

968.90 1.232E+00 *(P 2.861E-01 1.48E-01 G

338.40 7.210E-01 - P 3.256E-01 1.22E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	2.4739E-03						
		236.00	2.474E-03	%(P	4.912E-01	1.46E-01	G K
		256.25	2.923E-02	& P	5.657E-01	1.66E-01	G
PA-234	1.2852E-02						
		98.44	1.285E-02	%(	1.884E-01	5.62E-02	G K
		946.00	-3.053E-04	&	2.615E-01	7.28E-02	G
		131.28	2.351E-03	%	2.020E-01	6.00E-02	G
		94.67	-9.050E-02	%	3.310E-01	9.97E-02	G
		883.24	6.699E-02	%	3.530E-01	1.01E-01	G
		926.70	-6.249E-02	%	4.285E-01	1.22E-01	G
		569.26	8.442E-02	%	3.338E-01	9.76E-02	G
TH-234	1.2810E+00						
		63.29	2.973E-01	%(P	2.208E+00	6.59E-01	G K
		92.80	1.840E+00	(P	1.701E+00	5.27E-01	G
		92.38	2.121E+00	(P	2.017E+00	6.23E-01	G
AM-241	2.6855E-03						
		59.54	2.686E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	6.8450E-02	7.0037E-02	3.3804E-01	3.3806E-01	3.768E-01
K-40	1.5531E+01	1.5531E+01	1.8205E+00	2.0210E+00	
MN-54 #A	2.9632E-02	2.9748E-02	3.9851E-02	3.9886E-02	4.194E-02
CO-57 #B	-1.0378E-03	-1.0425E-03	4.6144E-02	4.6144E-02	5.145E-02
CO-60 #B	1.7149E-02	1.7160E-02	4.8333E-02	4.8343E-02	5.503E-02
Sr-85 #A	-6.5022E-03	-6.6260E-03	4.6210E-02	4.6211E-02	5.165E-02
Kr-85 #A	-1.7589E+02	-1.7589E+02	1.3961E+03	1.3961E+03	1.198E+03
Y-88 #B	4.7319E-03	4.7865E-03	2.6661E-02	2.6663E-02	3.414E-02
NB-94 #B	-1.9971E-04	-1.9971E-04	1.0434E-02	1.0434E-02	4.711E-02
Ag-108M#B	1.4251E-02	1.4252E-02	4.4423E-02	4.4431E-02	5.031E-02
CD-109 #A	-1.4545E-01	-1.4584E-01	1.4790E+00	1.4790E+00	1.545E+00
SN-113 #B	-1.2743E-02	-1.2879E-02	5.8027E-02	5.8031E-02	6.482E-02
SB-125 #B	4.8450E-02	4.8509E-02	5.9444E-02	5.9508E-02	1.439E-01
I-131 #B	-2.8676E-03	-3.3388E-03	4.9359E-02	4.9360E-02	4.848E-02
CS-134 #B	1.9836E-02	1.9868E-02	2.1406E-02	2.1435E-02	4.470E-02
CS-137 #A	7.1555E-03	7.1563E-03	4.1228E-02	4.1230E-02	4.802E-02
CE-139 #A	-5.1787E-03	-5.2250E-03	4.9326E-02	4.9327E-02	5.176E-02
EU-152 #B	8.0180E-02	8.0201E-02	7.6330E-02	7.6460E-02	1.415E-01
EU-154 #B	5.3327E-02	5.3348E-02	8.1852E-02	8.1905E-02	8.945E-02
EU-155 #A	1.4025E-01	1.4035E-01	1.5748E-01	1.5767E-01	1.709E-01
HG-203 #B	-1.7110E-02	-1.7565E-02	4.9323E-02	4.9333E-02	5.335E-02
TL-208	3.5424E-01	3.5424E-01	8.7196E-02	8.9464E-02	

PB-212 #	7.5274E-01	7.5274E-01	1.2774E-01	1.3463E-01	1.047E-01
PB-214 #	4.5473E-01	4.5473E-01	1.2089E-01	1.2359E-01	1.018E-01
BI-212	5.6671E-01	5.6671E-01	4.9040E-01	4.9144E-01	
BI-214	3.6318E-01	3.6318E-01	1.3346E-01	1.3503E-01	
RA-224 #A	8.5605E-01	8.5605E-01	1.2612E+00	1.2621E+00	1.378E+00
RA-226 #A	1.1350E+00	1.1350E+00	1.1648E+00	1.1665E+00	1.254E+00
AC-228	1.0822E+00	1.0822E+00	2.5956E-01	2.6667E-01	
TH-227 #B	2.4739E-03	2.4739E-03	4.3749E-01	4.3749E-01	4.912E-01
PA-234 #B	1.2852E-02	1.2852E-02	1.6862E-01	1.6862E-01	1.884E-01
TH-234 #B	1.2810E+00	1.2810E+00	1.0997E+00	1.1019E+00	2.208E+00
AM-241 #A	2.6855E-03	2.6855E-03	2.5529E-01	2.5529E-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

YAEC Chemistry Lab Spectrum name: 101F_2SEPT2005_0949.An1

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

Total Activity (270.1 to 1999.1 keV) 1.7897667E+01 pCi/gm

Total Decayed Activity (270.1 to 1999.1 keV) 1.7897667E+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_2SEPT2005_1049.An1

Sample description

FSS-NOL-06-01-078-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_2SEPT2005_1049.An1

Acquisition information

Start time:	02-Sep-2005 10:50:22
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: 2.0250E+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	01-Sep-2005 13:05:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2588

***** 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	214.	24.06	1.50	1.654E-02				
74.83	214.	24.06	1.50	1.654E-02	74.81	9.600	8.998E-01	PB212
77.23	297.	17.68	1.50	1.720E-02	77.11	17.500	6.588E-01	PB212
					77.11	10.700	1.064E+00	PB214
77.23	293.	17.68	1.50	1.720E-02	77.11	17.500	6.505E-01	PB212
					77.11	10.700	1.064E+00	PB214
87.14	104.	30.25	1.01	1.921E-02				

93.34	150.	21.36	1.02	1.996E-02	92.38	2.570	PBC<MDA TH234	
					92.80	3.000	PBC<MDA TH234	
					98.44	25.100	1.954E-01	PA234
185.57	146.	25.65	0.91	1.861E-02				
185.57	146.	25.65	0.91	1.861E-02	185.99	3.280	1.596E+00	RA226
209.24	97.	35.77	0.85	1.722E-02				
238.95	815.	4.35	1.12	1.556E-02	238.63	43.100	8.039E-01	PB212
242.21	94.	27.06	1.12	1.539E-02				
270.04	78.	37.71	1.15	1.401E-02				
295.33	175.	17.56	1.06	1.292E-02	295.22	19.200	4.649E-01	PB214
327.29	58.	38.23	1.23	1.172E-02				
338.87	155.	17.37	1.35	1.133E-02	338.40	12.010	7.481E-01	AC228
352.03	249.	12.92	1.53	1.092E-02	351.99	37.100	4.067E-01	PB214
462.82	62.	37.63	1.16	8.354E-03				
462.82	62.	37.63	1.16	8.354E-03	463.51	10.000	PBC<MDA SB125	
510.85	138.	19.19	1.18	7.589E-03	510.72	22.500	4.766E-01	TL208
583.45	258.	12.30	1.42	6.681E-03	583.14	86.000	2.963E-01	TL208
609.39	211.	13.02	1.56	6.412E-03	609.32	46.090	4.748E-01	BI214
662.01	135.	16.58	1.55	5.934E-03	661.62	84.620	1.781E-01	CS137
727.71	43.	34.68	1.00	5.439E-03				
911.33	151.	15.34	1.74	4.445E-03	911.07	29.000	7.739E-01	AC228
968.89	77.	37.01	0.83	4.212E-03				
968.89	77.	37.01	0.83	4.212E-03	968.90	17.460	6.922E-01	AC228
1121.26	52.	33.50	0.75	3.711E-03	1120.28	15.040	6.256E-01	BI214
1173.61	793.	4.07	1.41	3.564E-03	1173.23	99.860	1.487E+00	CO60
1332.98	733.	4.05	2.04	3.189E-03	1332.51	99.980	1.534E+00	CO60
1461.19	658.	3.96	2.01	2.942E-03	1460.75	10.700	1.391E+01	K40
1764.53	34.	19.58	1.66	2.481E-03	1764.51	15.920	5.704E-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	
173.87	87.26	442.	104.	0.052	90.74	1.014	PB-214	lD
418.15	209.24	459.	97.	0.048	107.31	0.854	AC-228	
477.59	238.95	220.	815.	0.407	13.05	1.122	PB-212	D
484.12	242.21	280.	94.	0.047	81.19	1.124	PB-214	D
539.80	270.04	326.	78.	0.039	113.13	1.146	AC-228	s
654.34	327.29	187.	58.	0.029	114.70	1.226	AC-228	s
925.54	462.82	175.	62.	0.031	112.88	1.158	CS-138	l
1455.57	727.71	78.	43.	0.022	97.17	0.995	J-132	

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	149.23	74.83	1288.	214.	0.107	72.17	1.499	s
PB-212	153.79	77.11	1232.	297.	0.149	53.04	1.499	D
PB-214	153.79	77.11	1236.	293.	0.147	53.04	1.499	D
TH-234	186.00	93.21	1141.	156.	0.078	88.55	1.499	s

TH-234	185.93	93.17	1115.	159.	0.080	88.63	1.499s
RA-226	372.13	186.24	703.	110.	0.055	105.84	1.499s
PB-212	477.59	238.94	644.	696.	0.348	19.01	1.499
PB-214	590.74	295.50	329.	157.	0.079	53.84	1.499s
AC-228	677.19	338.70	264.	151.	0.075	50.98	1.499
PB-214	704.16	352.18	215.	219.	0.110	34.46	1.499s
TL-208	1021.65	510.85	192.	122.	0.061	57.57	1.183s
TL-208	1166.91	583.45	194.	255.	0.128	36.90	1.420
BI-214	1218.81	609.39	167.	210.	0.105	39.07	1.559s
CS-137	1324.12	662.01	123.	134.	0.067	49.74	1.545s
AC-228	1823.57	911.61	136.	135.	0.067	44.12	1.578
AC-228	1938.21	968.90	152.	56.	0.028	101.01	1.616D
BI-214	2243.11	1121.26	90.	52.	0.026	100.50	0.751s
CO-60	2347.88	1173.61	76.	793.	0.396	12.22	1.406s
CO-60	2666.82	1332.98	34.	733.	0.366	12.16	2.044
K-40	2923.40	1461.19	9.	656.	0.328	11.88	2.014
BI-214	3530.50	1764.53	3.	34.	0.017	58.74	1.663

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.7226E-02					
			477.56	1.723E-02	%(	4.557E-01	1.32E-01 G
K-40		1.3907E+01					
			1460.75	1.391E+01	(P	3.518E-01	5.53E-01 G
MN-54		1.8152E-02					
			834.81	1.815E-02	%(P	6.749E-02	2.00E-02 G
CO-57		1.2299E-02					
			122.07	1.230E-02	%(	4.898E-02	1.47E-02 G K
			136.43	5.478E-02	%	3.052E-01	9.11E-02 G
CO-60		1.5105E+00					
			1332.51	1.534E+00	(P	6.261E-02	6.22E-02 G K
			1173.23	1.487E+00	@(P	8.129E-02	6.06E-02 G K
Sr-85		-1.4534E-02					
			514.00	-1.453E-02	%(	6.528E-02	1.94E-02 G
Kr-85		-3.5685E+02					
			513.99	-3.569E+02	%(P	1.496E+03	4.44E+02 G
Y-88		4.3083E-03					
			1836.01	4.308E-03	%(	5.010E-02	1.33E-02 G K

898.02-1.061E-02 & P 8.846E-02 2.58E-02 G

NB-94 -5.5878E-05

871.10-5.588E-05 %(P 7.676E-02 2.21E-02 G K

702.50 1.518E-03 % P 5.832E-02 1.68E-02 G K

Ag-108M 9.1670E-03

722.95 9.167E-03 %(6.674E-02 1.95E-02 G K

614.37-3.821E-02 & P 7.590E-02 2.31E-02 G

433.93 1.525E-02 % 5.543E-02 1.65E-02 G

CD-109 -1.0899E-01

88.04-1.090E-01 %(P 1.341E+00 4.01E-01 G

SN-113 -2.2760E-02

391.71-2.276E-02 %(7.427E-02 2.22E-02 G K

255.04-2.470E-01 % P 2.281E+00 6.78E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	3.9567E-02						
		427.95	3.957E-02	%(P	1.595E-01	4.74E-02	G K
		600.77	5.425E-02	% P	2.642E-01	7.75E-02	G
		636.15	-3.809E-02	% P	5.160E-01	1.50E-01	G
		463.51	3.008E-01	% P	5.108E-01	1.56E-01	G
		176.29	-1.611E-02	% P	7.011E-01	2.08E-01	G
I-131	5.3462E-04						
		364.48	5.346E-04	&(	5.703E-02	1.66E-02	G K
		636.97	-1.522E-01	%	9.502E-01	2.80E-01	G
		284.29	7.903E-02	&	6.294E-01	1.86E-01	G
CS-134	-1.7499E-02						
		604.66	-1.750E-02	&(P	6.840E-02	2.03E-02	G K
		795.76	4.227E-02	% P	8.664E-02	2.63E-02	G
		569.29	-8.647E-04	% P	3.658E-01	1.06E-01	G
		801.84	2.780E-01	%	6.136E-01	1.85E-01	G
CS-137	1.7815E-01						
		661.62	1.781E-01	*(P	7.222E-02	2.97E-02	G
CE-139	1.9342E-05						
		165.85	1.934E-05	%(P	5.257E-02	1.56E-02	G
EU-152	3.5625E-02						
		121.78	3.562E-02	%(P	1.470E-01	4.41E-02	G K
		344.30	-6.272E-03	& P	1.580E-01	4.62E-02	G
		1408.08	1.054E-01	% P	1.920E-01	5.96E-02	G
		964.00	1.005E-02	& P	6.559E-01	1.90E-01	G
		1112.07	-1.738E-02	% P	7.069E-01	2.04E-01	G

778.90-1.282E-01 % P 5.439E-01 1.61E-01 G

EU-154 1.4604E-02

123.10 1.460E-02 &(P 1.145E-01 3.43E-02 G K

1274.80 3.012E-02 & P 1.569E-01 4.49E-02 G

723.30-1.749E-01 % P 3.976E-01 1.20E-01 G

1004.80-6.007E-02 & P 4.924E-01 1.44E-01 G

EU-155 7.8552E-03

86.45 7.855E-03 %(1.457E-01 4.34E-02 G K

105.31 6.207E-02 & 2.177E-01 6.55E-02 G

HG-203 -1.2519E-03

279.17-1.252E-03 &(5.887E-02 1.74E-02 G K

72.87-7.003E-01 & P 1.244E+00 3.78E-01 G

70.83 6.951E-01 % 1.983E+00 5.99E-01 G

82.50 9.060E-02 & 2.076E+00 6.18E-01 G

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

TL-208       2.9628E-01
                    583.14 2.963E-01  (P 7.845E-02 3.68E-02 G
                    510.72 4.766E-01 + P 2.629E-01 1.03E-01 G

PB-212       6.8222E-01
                    238.63 6.917E-01  (P 1.203E-01 4.42E-02 G K
                                          Energy duplication
                     77.11 6.588E-01  (  3.685E-01 1.16E-01 G
                     74.81 8.998E-01 + P 7.142E-01 2.22E-01 G

PB-214       3.8230E-01
                    351.99 3.613E-01  (P 1.169E-01 4.19E-02 G K
                    295.22 4.228E-01 *(P 2.347E-01 7.67E-02 G
                                          Energy duplication
                     77.11 1.064E+00 + P 6.037E-01 1.90E-01 G
                    241.92-2.978E-03 % P 7.883E-01 2.34E-01 G

BI-212      -1.5014E-01
                    727.17-1.501E-01 %(P 5.242E-01 1.55E-01 G K
                   1620.56-4.392E-02 %   1.606E+00 4.18E-01 G
                    785.42 7.774E-01 % P 3.716E+00 1.10E+00 G

BI-214       5.2398E-01
                    609.32 4.748E-01 *(P 1.420E-01 6.22E-02 G K
                   1764.51 5.704E-01  (P 1.874E-01 1.13E-01 G
                   1120.28 6.256E-01  (P 5.601E-01 2.11E-01 G

RA-224       6.1110E-01
                    241.00 6.111E-01 %(P 1.428E+00 4.32E-01 G
```

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RA-226      1.2085E+00
                185.99 1.208E+00 *(  1.382E+00 4.26E-01 G

AC-228      7.1014E-01
                911.07 6.985E-01  (P 2.952E-01 1.04E-01 G K
                                     Energy duplication
                968.90 5.044E-01 - P 5.463E-01 1.72E-01 G
                338.40 7.383E-01  (P 3.838E-01 1.27E-01 G

TH-227     -3.6188E-01
                236.00-3.619E-01 &(P 5.603E-01 1.71E-01 G K
                256.25 3.768E-02 % P 7.012E-01 2.08E-01 G

PA-234     -1.4989E-02
                 98.44-1.499E-02 %(  1.584E-01 4.72E-02 G K
                946.00 0.000E+00 &   5.330E-01 1.55E-01 G
                131.28 6.796E-02 &   2.238E-01 6.74E-02 G
                 94.67-1.558E-01 &   3.682E-01 1.11E-01 G
                883.24 0.000E+00 &   6.483E-01 1.87E-01 G
                926.70-1.620E-01 %   9.445E-01 2.79E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	-2.947E-02 %		4.191E-01	1.21E-01	G
TH-234	1.5961E+00						
			Energy duplication				
		63.29	1.162E+00 %(P		2.253E+00	6.83E-01	G K
		92.80	1.779E+00 *(P		1.771E+00	5.46E-01	G
		92.38	2.041E+00 *(P		2.095E+00	6.44E-01	G
AM-241	7.1021E-03						
		59.54	7.102E-03 %(P		3.186E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	1.7025E-02	1.7226E-02	3.9652E-01	3.9652E-01	4.504E-01
K-40	1.3907E+01	1.3907E+01	1.6576E+00	1.8344E+00	
MN-54 #A	1.8116E-02	1.8152E-02	5.9881E-02	5.9890E-02	6.736E-02
CO-57 #B	1.2270E-02	1.2299E-02	4.4151E-02	4.4156E-02	4.887E-02
CO-60	1.5100E+00	1.5105E+00	1.3021E-01	1.5569E-01	

Sr-85 #A	-1.4394E-02	-1.4534E-02	5.8230E-02	5.8236E-02	6.465E-02
Kr-85 #A	-3.5685E+02	-3.5685E+02	1.5251E+03	1.5253E+03	1.496E+03
Y-88 #B	4.2830E-03	4.3083E-03	4.0033E-02	4.0033E-02	4.980E-02
NB-94 #B	-5.5877E-05	-5.5878E-05	1.2062E-01	1.2062E-01	7.676E-02
Ag-108M#B	9.1669E-03	9.1670E-03	5.8395E-02	5.8397E-02	6.674E-02
CD-109 #A	-1.0884E-01	-1.0899E-01	1.3001E+00	1.3001E+00	1.339E+00
SN-113 #B	-2.2636E-02	-2.2760E-02	6.6650E-02	6.6662E-02	7.387E-02
SB-125 #B	3.9543E-02	3.9567E-02	1.4219E-01	1.4221E-01	1.595E-01
I-131 #B	4.9443E-04	5.3462E-04	4.9886E-02	4.9886E-02	5.274E-02
CS-134 #B	-1.7485E-02	-1.7499E-02	6.5620E-02	6.5627E-02	6.834E-02
CS-137 #	1.7814E-01	1.7815E-01	8.9194E-02	8.9760E-02	
CE-139 #A	1.9254E-05	1.9342E-05	4.6811E-02	4.6811E-02	5.233E-02
EU-152 #B	3.5620E-02	3.5625E-02	1.3242E-01	1.3244E-01	1.469E-01
EU-154 #B	1.4601E-02	1.4604E-02	1.0278E-01	1.0278E-01	1.145E-01
EU-155 #B	7.8525E-03	7.8552E-03	1.3027E-01	1.3028E-01	1.456E-01
HG-203 #B	-1.2351E-03	-1.2519E-03	5.2162E-02	5.2162E-02	5.809E-02
TL-208	2.9628E-01	2.9628E-01	1.1035E-01	1.1161E-01	
PB-212 #	6.8222E-01	6.8222E-01	1.3082E-01	1.3638E-01	1.203E-01
PB-214 #	3.8230E-01	3.8230E-01	1.2350E-01	1.2537E-01	1.169E-01
BI-212 #B	-1.5014E-01	-1.5014E-01	5.1054E-01	5.1061E-01	5.242E-01
BI-214	5.2398E-01	5.2398E-01	2.0578E-01	2.0790E-01	
RA-224 #A	6.1110E-01	6.1110E-01	1.2957E+00	1.2962E+00	1.428E+00
RA-226 #A	1.2085E+00	1.2085E+00	1.2790E+00	1.2809E+00	1.382E+00
AC-228 #	7.1014E-01	7.1014E-01	2.4281E-01	2.4610E-01	2.952E-01
TH-227 #B	-3.6188E-01	-3.6188E-01	5.1748E-01	5.1788E-01	5.603E-01
PA-234 #B	-1.4989E-02	-1.4989E-02	1.4164E-01	1.4164E-01	1.584E-01
TH-234 #B	1.5961E+00	1.5961E+00	1.1718E+00	1.1751E+00	2.253E+00
AM-241 #A	7.1021E-03	7.1021E-03	2.8498E-01	2.8498E-01	3.186E-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) 1.6415331E+01 pCi/gm

Total Decayed Activity (269.6 to 1999.1 keV) 1.6415834E+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_2SEPT2005_1325.An1

Sample description

FSS-NOL-06-01-068-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_2SEPT2005_1325.An1

Acquisition information

Start time:	02-Sep-2005 13:26:33
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: 1.9090E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9090E+03) =
5.2383E+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	01-Sep-2005 11:10:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2330

***** 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	179.	26.87	1.50	1.654E-02	70.83	3.520	2.413E+00	HG203
					74.81	9.600	7.959E-01	PB212
77.08	275.	17.21	1.50	1.720E-02	77.11	10.700	1.058E+00	PB214
					77.11	17.500	6.466E-01	PB212
77.08	279.	17.21	1.50	1.720E-02	77.11	10.700	1.058E+00	PB214
					77.11	17.500	6.553E-01	PB212
93.28	146.	28.79	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234

					92.80	3.000	1.735E+00	TH234
					94.67	15.500	PBC<MDA	PA234
185.87	160.	22.20	1.67	1.859E-02				
185.87	160.	22.20	1.67	1.859E-02	185.99	3.280	1.862E+00	RA226
209.74	97.	32.74	1.20	1.719E-02				
238.85	753.	4.32	1.12	1.557E-02	238.63	43.100	7.873E-01	PB212
241.86	124.	19.44	1.12	1.541E-02	241.00	3.900	1.452E+00	RA224
295.52	159.	17.27	0.83	1.291E-02	295.22	19.200	4.478E-01	PB214
300.68	66.	36.68	1.22	1.270E-02				
338.33	148.	17.93	1.05	1.135E-02	338.40	12.010	7.593E-01	AC228
352.23	263.	10.15	0.94	1.092E-02	351.99	37.100	4.555E-01	PB214
463.31	37.	32.59	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125
511.09	92.	25.73	1.50	7.585E-03	510.72	22.500	3.153E-01	TL208
583.46	206.	10.33	1.42	6.681E-03	583.14	86.000	2.507E-01	TL208
609.38	212.	8.88	1.63	6.412E-03	609.32	46.090	5.041E-01	BI214
662.24	106.	16.77	1.21	5.932E-03	661.62	84.620	1.481E-01	CS137
727.43	63.	20.84	1.51	5.441E-03	727.17	11.800	6.902E-01	BI212
911.29	137.	10.70	1.83	4.446E-03	911.07	29.000	7.424E-01	AC228
968.04	134.	12.51	1.56	4.215E-03	968.90	17.460	1.288E+00	AC228
1120.46	65.	18.40	1.56	3.710E-03	1120.28	15.040	8.196E-01	BI214
1173.80	57.	27.72	1.44	3.565E-03	1173.23	99.860	1.139E-01	CO60
1333.02	36.	23.17	0.71	3.190E-03	1332.51	99.980	7.974E-02	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.19	621.	4.19	2.08	2.942E-03	1460.75	10.700	1.391E+01	K40
1765.18	43.	16.28	2.35	2.481E-03	1764.51	15.920	7.770E-01	Bl214

********** 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	
419.15	209.74	354.	97.	0.049	98.21	1.203	NP-239	
477.42	238.73	151.	752.	0.376	12.95	1.122	PB-212	D
601.12	300.68	200.	66.	0.033	110.03	1.217	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	149.41	74.92	1132.	179.	0.089	80.60	1.499s
PB-214	153.79	77.11	1015.	275.	0.137	51.64	1.499D
PB-212	153.79	77.11	1011.	279.	0.139	51.64	1.499D
TH-234	186.15	93.28	893.	146.	0.073	86.38	1.499s
RA-226	371.71	186.03	445.	110.	0.055	86.19	1.499s
PB-212	477.29	238.80	408.	618.	0.309	18.17	1.499

RA-224	481.70	241.00	528.	91.	0.045	111.20	1.123D
PB-214	590.78	295.52	224.	138.	0.069	51.92	1.499
AC-228	676.43	338.33	183.	146.	0.073	53.80	1.053
PB-214	704.29	352.25	157.	229.	0.115	30.18	1.499
SB-125	926.52	463.31	62.	37.	0.019	97.78	1.499s
TL-208	1021.66	510.86	118.	63.	0.031	74.51	1.459s
TL-208	1166.93	583.46	79.	204.	0.102	30.98	1.419
BI-214	1218.80	609.38	56.	210.	0.105	26.64	1.631s
CS-137	1324.57	662.24	71.	105.	0.053	50.31	1.212s
BI-212	1455.44	727.65	35.	41.	0.021	74.92	1.499
AC-228	1822.92	911.29	31.	135.	0.068	32.09	1.830s
AC-228	1936.49	968.04	43.	134.	0.067	37.54	1.558s
BI-214	2241.51	1120.46	26.	65.	0.032	55.19	1.561s
CO-60	2348.25	1173.80	58.	57.	0.029	83.17	1.443
CO-60	2666.89	1333.02	14.	36.	0.018	69.52	0.706s
K-40	2923.39	1461.19	15.	619.	0.309	12.58	2.077
BI-214	3531.79	1765.18	3.	43.	0.022	48.84	2.347

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-6.3014E-02					
			477.56	-6.301E-02	%(	4.726E-01	1.38E-01 G
K-40		1.3907E+01					
			1460.75	1.391E+01	(P	4.732E-01	5.85E-01 G
MN-54		-5.0981E-03					
			834.81	-5.098E-03	%(P	5.301E-02	1.50E-02 G
CO-57		1.0265E-02					
			122.07	1.027E-02	%(	5.116E-02	1.53E-02 G K
			136.43	1.355E-01	%	3.895E-01	1.17E-01 G
CO-60		9.6804E-02					
			1332.51	7.974E-02	@(P	4.485E-02	1.85E-02 G K
			1173.23	1.139E-01	(P	7.584E-02	3.17E-02 G K
Sr-85		-1.8105E-02					
			514.00	-1.811E-02	&(	5.514E-02	1.65E-02 G
Kr-85		-4.3880E+02					
			513.99	-4.388E+02	&(P	1.263E+03	3.76E+02 G
Y-88		7.3532E-03					
			1836.01	7.353E-03	%(	3.553E-02	9.55E-03 G K

898.02-1.137E-02 % P 5.687E-02 1.64E-02 G

NB-94 1.9842E-03

871.10 1.984E-03 &(P 3.779E-02 1.03E-02 G K

702.50 4.478E-03 & P 4.979E-02 1.43E-02 G K

Ag-108M -1.3377E-02

722.95-1.338E-02 %(5.235E-02 1.53E-02 G K

614.37 2.321E-03 % P 1.822E-02 4.81E-03 G

433.93-9.195E-03 % 4.998E-02 1.47E-02 G

CD-109 9.5320E-01

88.04 9.532E-01 %(P 1.393E+00 4.26E-01 G

SN-113 -5.1538E-03

391.71-5.154E-03 &(6.110E-02 1.78E-02 G K

255.04-2.907E-01 % P 1.844E+00 5.46E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.0387E-02						
		427.95	-1.328E-02	%(P	1.317E-01	3.82E-02	G K
		600.77	2.548E-02	% P	2.358E-01	6.77E-02	G
		636.15	1.290E-01	% P	3.623E-01	1.08E-01	G
		463.51	3.180E-01	(P	3.355E-01	1.08E-01	G
		176.29	8.859E-03	% P	5.489E-01	1.62E-01	G
I-131	1.5768E-02						
		364.48	1.577E-02	&(	4.933E-02	1.47E-02	G K
		636.97	1.197E-01	%	6.512E-01	1.89E-01	G
		284.29	1.606E-01	%	6.495E-01	1.93E-01	G
CS-134	-2.7318E-02						
		604.66	-2.732E-02	&(P	6.335E-02	1.91E-02	G K
		795.76	-6.908E-04	% P	7.089E-02	2.01E-02	G
		569.29	3.661E-02	% P	2.826E-01	8.16E-02	G
		801.84	1.664E-02	%	5.055E-01	1.41E-01	G
CS-137	1.4811E-01						
		661.62	1.481E-01	@(P	5.910E-02	2.51E-02	G
CE-139	-7.6581E-03						
		165.85	-7.658E-03	&(P	5.241E-02	1.56E-02	G
EU-152	3.2928E-02						
		121.78	3.293E-02	%(P	1.488E-01	4.46E-02	G K
		344.30	7.568E-03	% P	1.460E-01	4.25E-02	G
		1408.08	3.355E-02	% P	2.168E-01	5.98E-02	G
		964.00	1.664E-02	% P	5.481E-01	1.57E-01	G
		1112.07	5.909E-04	% P	3.471E-01	9.38E-02	G

778.90-5.870E-02 & P 3.530E-01 1.01E-01 G

EU-154 -6.1789E-04

123.10-6.179E-04 %(P 8.258E-02 2.44E-02 G K

1274.80 3.068E-02 % P 1.536E-01 4.38E-02 G

723.30-6.326E-02 & P 2.379E-01 6.95E-02 G

1004.80 4.477E-02 % P 3.111E-01 8.88E-02 G

EU-155 -9.6463E-03

86.45-9.646E-03 %(1.732E-01 5.17E-02 G K

105.31 5.786E-02 % 2.015E-01 6.06E-02 G

HG-203 2.1005E-02

279.17 2.101E-02 &(3.757E-02 1.15E-02 G K

72.87-3.163E-01 % P 1.111E+00 3.34E-01 G

70.83 3.168E-01 & 1.775E+00 5.31E-01 G

82.50-1.927E-01 % 2.342E+00 6.99E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5287E-01						
		583.14	2.507E-01	(P	5.446E-02	2.62E-02	G
		510.72	2.610E-01	(P	2.211E-01	8.14E-02	G
PB-212	6.5255E-01						
		238.63	6.514E-01	(P	1.021E-01	3.98E-02	G K
					Energy duplication		
		77.11	6.553E-01	*(	3.548E-01	1.13E-01	G
		74.81	7.959E-01	& P	7.112E-01	2.20E-01	G
PB-214	3.9806E-01						
		351.99	4.003E-01	(P	1.066E-01	4.06E-02	G K
		295.22	3.938E-01	(P	2.070E-01	6.90E-02	G
					Energy duplication		
		77.11	1.058E+00	+ P	5.814E-01	1.84E-01	G
		241.92	1.536E-01	% P	7.224E-01	2.16E-01	G
BI-212	4.5494E-01						
		727.17	4.549E-01	(P	3.319E-01	1.15E-01	G K
		1620.56	3.603E-01	%	1.390E+00	3.90E-01	G
		785.42	3.645E-01	% P	2.080E+00	5.95E-01	G
BI-214	5.0414E-01						
		609.32	5.041E-01	*(P	8.964E-02	4.50E-02	G K
		1764.51	7.770E-01	+ P	1.842E-01	1.28E-01	G
		1120.28	8.196E-01	+ P	3.380E-01	1.52E-01	G
RA-224	1.0649E+00						
		241.00	1.065E+00	(P	1.290E+00	3.98E-01	G

```
RA-226       1.2778E+00
                 185.99 1.278E+00 *(  1.173E+00 3.67E-01 G

AC-228       7.4734E-01
                 911.07 7.424E-01 *(P 1.568E-01 8.05E-02 G K
                 968.90 1.288E+00 + P 3.210E-01 1.62E-01 G
                 338.40 7.593E-01  (P 3.413E-01 1.38E-01 G

TH-227       2.5271E-03
                 236.00 2.527E-03 &(P 4.409E-01 1.31E-01 G K
                 256.25-5.704E-03 % P 5.600E-01 1.64E-01 G

PA-234      -2.0853E-02
                  98.44-2.085E-02 %(  1.887E-01 5.64E-02 G K
                 946.00-7.295E-02 %   3.023E-01 8.84E-02 G
                 131.28 1.034E-01 &   1.890E-01 5.75E-02 G
                  94.67-4.818E-03 %   3.237E-01 9.64E-02 G
                 883.24-6.091E-02 &   4.256E-01 1.22E-01 G
                 926.70 1.085E-01 %   3.760E-01 1.10E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26 7.958E-02 % 3.851E-01 1.12E-01 G

TH-234 1.1905E+00
63.29 7.716E-01 %(P 2.087E+00 6.28E-01 G K
92.80 1.735E+00 &(P 1.684E+00 5.21E-01 G
92.38-2.245E-01 & P 2.067E+00 6.13E-01 G

AM-241 -4.9833E-02
59.54-4.983E-02 &(P 3.037E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-6.2124E-02	-6.3014E-02	4.1501E-01	4.1502E-01	4.660E-01
K-40		1.3907E+01	1.3907E+01	1.7558E+00	1.9236E+00	
MN-54	#A	-5.0857E-03	-5.0981E-03	5.7519E-02	5.7520E-02	5.288E-02
CO-57	#B	1.0237E-02	1.0265E-02	4.6010E-02	4.6014E-02	5.102E-02
CO-60		9.6766E-02	9.6804E-02	5.2601E-02	5.2885E-02	

Sr-85	#A	-1.7895E-02	-1.8105E-02	4.9444E-02	4.9455E-02	5.450E-02
Kr-85	#A	-4.3880E+02	-4.3880E+02	1.2684E+03	1.2686E+03	1.263E+03
Y-88	#B	7.3011E-03	7.3532E-03	2.8650E-02	2.8653E-02	3.528E-02
NB-94	#B	1.9842E-03	1.9842E-03	3.1025E-02	3.1025E-02	3.779E-02
Ag-108M	#B	-1.3377E-02	-1.3377E-02	4.6042E-02	4.6048E-02	5.235E-02
CD-109	#A	9.5161E-01	9.5320E-01	1.2774E+00	1.2785E+00	1.391E+00
SN-113	#B	-5.1200E-03	-5.1538E-03	5.3338E-02	5.3339E-02	6.070E-02
SB-125	#B	7.0334E-02	7.0387E-02	7.1480E-02	7.1590E-02	1.316E-01
I-131	#B	1.4348E-02	1.5768E-02	4.4153E-02	4.4162E-02	4.488E-02
CS-134	#B	-2.7291E-02	-2.7318E-02	6.0168E-02	6.0188E-02	6.329E-02
CS-137	#	1.4810E-01	1.4811E-01	7.5142E-02	7.5607E-02	
CE-139	#A	-7.6159E-03	-7.6581E-03	4.8763E-02	4.8765E-02	5.212E-02
EU-152	#B	3.2923E-02	3.2928E-02	1.3392E-01	1.3393E-01	1.488E-01
EU-154	#B	-6.1774E-04	-6.1789E-04	7.3032E-01	7.3032E-01	8.256E-02
EU-155	#B	-9.6423E-03	-9.6463E-03	1.5521E-01	1.5521E-01	1.731E-01
HG-203	#B	2.0666E-02	2.1005E-02	3.4433E-02	3.4454E-02	3.696E-02
TL-208		2.5287E-01	2.5287E-01	7.9242E-02	8.0520E-02	
PB-212	#	6.5255E-01	6.5255E-01	1.1973E-01	1.2528E-01	1.021E-01
PB-214	#	3.9806E-01	3.9806E-01	1.2094E-01	1.2301E-01	1.066E-01
BI-212	#	4.5494E-01	4.5494E-01	3.4644E-01	3.4740E-01	3.319E-01
BI-214		5.0414E-01	5.0414E-01	1.3501E-01	1.3798E-01	
RA-224	A	1.0649E+00	1.0649E+00	1.1935E+00	1.1950E+00	
RA-226	#	1.2778E+00	1.2778E+00	1.1014E+00	1.1038E+00	1.173E+00
AC-228		7.4734E-01	7.4734E-01	2.3752E-01	2.4125E-01	
TH-227	#B	2.5271E-03	2.5271E-03	3.9156E-01	3.9156E-01	4.409E-01
PA-234	#B	-2.0853E-02	-2.0853E-02	1.6913E-01	1.6913E-01	1.887E-01
TH-234	#B	1.1905E+00	1.1905E+00	1.0718E+00	1.0738E+00	2.087E+00
AM-241	#A	-4.9833E-02	-4.9833E-02	2.9566E-01	2.9568E-01	3.037E-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 (277.1 to 1999.1 keV) 1.6720737E+01 pCi/gm

Total Decayed Activity (277.1 to 1999.1 keV) 1.6720785E+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_2SEPT2005_1417.An1

Sample description

FSS-NOL-06-01-043-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_2SEPT2005_1417.An1

Acquisition information

Start time:	02-Sep-2005 14:18:51
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: 1.9790E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9790E+03) =
5.0531E+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-Aug-2005 13:15:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2182

***** 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	204.	24.34	1.50	1.654E-02	70.83	3.520	2.702E+00	HG203
					74.81	9.600	8.786E-01	PB212
77.18	287.	17.09	1.50	1.720E-02	77.11	10.700	1.065E+00	PB214
					77.11	17.500	6.509E-01	PB212
77.18	291.	17.09	1.50	1.720E-02	77.11	10.700	1.065E+00	PB214
					77.11	17.500	6.593E-01	PB212
84.19	70.	41.14	1.01	1.874E-02				

84.19	70.	41.14	1.01	1.874E-02	86.45	32.740	7.646E-02	EU155
87.30	186.	16.26	1.01	1.922E-02				
90.18	98.	31.57	1.02	1.960E-02	88.04	3.790	PBC<MDA	CD109
93.18	122.	25.83	1.02	1.994E-02	92.80	3.000	PBC<MDA	TH234
186.76	127.	28.79	1.11	1.854E-02	185.99	3.280	1.418E+00	RA226
209.48	66.	37.61	1.04	1.720E-02				
238.84	884.	4.00	1.12	1.557E-02	238.63	43.100	8.935E-01	PB212
242.01	93.	22.30	1.12	1.540E-02	241.00	3.900	PBC<MDA	RA224
270.60	129.	22.57	1.74	1.399E-02				
295.18	182.	15.96	1.16	1.292E-02				
295.18	182.	15.96	1.16	1.292E-02	295.22	19.200	4.972E-01	PB214
300.45	74.	29.38	0.84	1.271E-02				
327.62	64.	31.52	0.84	1.171E-02				
338.70	141.	12.89	1.00	1.134E-02	338.40	12.010	6.959E-01	AC228
352.10	318.	9.75	1.18	1.092E-02	351.99	37.100	5.333E-01	PB214
463.75	69.	25.83	1.27	8.337E-03	463.51	10.000	5.505E-01	SB125
510.81	137.	14.32	1.66	7.589E-03	510.72	22.500	4.829E-01	TL208
583.36	243.	9.89	1.45	6.682E-03	583.14	86.000	2.856E-01	TL208
609.47	179.	12.09	1.29	6.411E-03	609.32	46.090	4.105E-01	BI214
					614.37	90.393	2.122E-01	Ag108M
662.03	117.	14.36	1.75	5.934E-03	661.62	84.620	1.578E-01	CS137
726.96	81.	23.85	1.56	5.444E-03	727.17	11.800	8.508E-01	BI212
911.45	167.	11.42	1.54	4.445E-03	911.07	29.000	8.755E-01	AC228
968.96	129.	14.20	0.94	4.212E-03	968.90	17.460	1.189E+00	AC228
1120.62	69.	18.95	1.11	3.710E-03	1120.28	15.040	8.395E-01	BI214
1461.26	702.	3.89	1.91	2.942E-03	1460.75	10.700	1.517E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1765.14	45.	14.91	1.54	2.481E-03	1764.51	15.920	7.703E-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
167.95	84.21	379.	70.	0.035	123.41	1.012	TA-182 ID
174.17	87.33	447.	150.	0.075	64.62	1.014	PB-214 D
179.93	90.21	466.	82.	0.041	116.05	1.016	PB-214 D
185.92	93.20	440.	117.	0.058	81.18	1.018	U-235 D
418.63	209.48	275.	66.	0.033	112.82	1.044	AC-228
477.39	238.75	183.	884.	0.442	12.00	1.122	PB-212 D
483.71	241.91	169.	93.	0.047	66.90	1.124	PB-214 D
540.92	270.60	265.	129.	0.064	67.70	1.744	AC-228 s
600.66	300.45	165.	74.	0.037	81.74	0.840	PB-212
655.02	327.62	140.	64.	0.032	94.55	0.843	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	149.12	74.77	1202.	204.	0.102	73.03	1.499
PB-214	153.79	77.11	1093.	287.	0.143	51.28	1.499D
PB-212	153.79	77.11	1089.	291.	0.145	51.28	1.499D
TH-234	185.73	93.08	964.	120.	0.060	107.55	1.499s
RA-226	372.35	186.35	557.	95.	0.048	109.64	1.499s
PB-212	477.34	238.82	448.	764.	0.382	15.84	1.499
PB-214	590.65	295.45	202.	166.	0.083	42.63	1.499
AC-228	677.19	338.70	102.	139.	0.069	38.68	0.999
PB-214	704.21	352.21	179.	251.	0.125	29.24	1.499
SB-125	926.51	463.31	106.	51.	0.025	92.99	1.499s
TL-208	1021.56	510.81	104.	121.	0.060	42.96	1.661s
TL-208	1166.73	583.36	104.	240.	0.120	29.67	1.445
BI-214	1218.98	609.47	91.	178.	0.089	36.28	1.291
CS-137	1324.16	662.03	58.	116.	0.058	43.08	1.752s
BI-212	1454.07	726.96	79.	80.	0.040	71.55	1.556s
AC-228	1823.25	911.45	62.	165.	0.083	34.26	1.541
AC-228	1938.33	968.96	58.	128.	0.064	42.61	0.944s
BI-214	2241.82	1120.62	34.	69.	0.034	56.86	1.110s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2923.54	1461.26	15.	700.	0.350	11.66	1.914
Bl-214	3531.71	1765.14	0.	45.	0.022	44.72	1.541

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.1617E-01					
			477.56	-1.162E-01	% (	4.622E-01	1.37E-01 G
K-40		1.5171E+01					
			1460.75	1.517E+01	(P	4.564E-01	5.92E-01 G
MN-54		3.4168E-02					
			834.81	3.417E-02	%(P	4.728E-02	1.49E-02 G
CO-57		2.7903E-03					
			122.07	2.790E-03	%(	5.025E-02	1.50E-02 G K
			136.43	-3.291E-03	&	4.340E-01	1.29E-01 G
CO-60		3.5040E-02					
			1332.51	3.504E-02	%(P	6.295E-02	1.94E-02 G K
			1173.23	3.671E-02	% P	7.077E-02	2.16E-02 G K

```
Sr-85       -2.8004E-02
                514.00-2.800E-02 %(  6.290E-02 1.90E-02 G

Kr-85       -6.5750E+02
                513.99-6.575E+02 %(P 1.425E+03 4.30E+02 G

Y-88         0.0000E+00
               1836.01 0.000E+00 %(  8.865E-02 2.45E-02 G K
                898.02-1.102E-02 % P 5.149E-02 1.48E-02 G

NB-94       -8.9109E-03
                871.10-8.911E-03 &(P 4.248E-02 1.22E-02 G K
                702.50 3.590E-03 % P 4.766E-02 1.36E-02 G K

Ag-108M     -6.3675E-03
                722.95-6.368E-03 &(  6.166E-02 1.78E-02 G K
                614.37-1.595E-03 % P 5.515E-02 1.58E-02 G
                433.93 9.088E-04 &   4.958E-02 1.44E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	4.8893E-02						
		88.04	4.889E-02	%(P	1.465E+00	4.38E-01	G
SN-113	-4.4780E-03						
		391.71	-4.478E-03	%(	6.336E-02	1.85E-02	G K
		255.04	-3.160E-01	% P	2.019E+00	6.00E-01	G
SB-125	1.2854E-01						
		427.95	3.169E-02	%(P	1.318E-01	3.89E-02	G K
		600.77	-2.595E-03	% P	2.627E-01	7.50E-02	G
		636.15	-8.610E-02	% P	3.983E-01	1.16E-01	G
		463.51	4.152E-01	*(P	4.152E-01	1.32E-01	G
		176.29	8.924E-02	% P	6.601E-01	1.97E-01	G
I-131	4.8287E-03						
		364.48	4.829E-03	%(	5.068E-02	1.48E-02	G K
		636.97	-2.050E-01	&	7.216E-01	2.13E-01	G
		284.29	-1.345E-01	%	8.011E-01	2.38E-01	G
CS-134	-4.8221E-03						
		604.66	-4.822E-03	%(P	4.936E-02	1.42E-02	G K
		795.76	1.235E-02	% P	5.972E-02	1.74E-02	G
		569.29	-2.882E-03	% P	3.378E-01	9.70E-02	G
		801.84	7.794E-02	%	5.371E-01	1.54E-01	G
CS-137	1.5783E-01						
		661.62	1.578E-01	*(P	5.188E-02	2.29E-02	G
CE-139	2.4979E-04						
		165.85	2.498E-04	&(P	5.307E-02	1.57E-02	G

EU-152 -1.4298E-02

121.78-1.430E-02 &(P 1.520E-01 4.54E-02 G K

344.30-1.738E-03 % P 1.530E-01 4.45E-02 G

1408.08-2.612E-02 % P 2.600E-01 7.17E-02 G

964.00 2.123E-01 % P 4.299E-01 1.30E-01 G

1112.07 6.374E-02 & P 4.401E-01 1.26E-01 G

778.90 1.366E-01 % P 3.154E-01 9.49E-02 G

EU-154 8.6193E-03

123.10 8.619E-03 &(P 1.085E-01 3.24E-02 G K

1274.80 1.986E-02 & P 1.929E-01 5.48E-02 G

723.30-3.665E-02 & P 2.877E-01 8.32E-02 G

1004.80 3.951E-03 % P 2.730E-01 7.52E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	2.3035E-03						
		86.45	2.303E-03	%(	1.532E-01	4.56E-02	G K
		105.31	1.237E-01	%	2.007E-01	6.12E-02	G
HG-203	2.6262E-02						
		279.17	2.626E-02	&(	4.502E-02	1.38E-02	G K
		72.87	-3.673E-01	% P	1.249E+00	3.76E-01	G
		70.83	-1.104E+00	%	2.091E+00	6.35E-01	G
		82.50	6.416E-02	%	2.212E+00	6.58E-01	G
TL-208	2.8559E-01						
		583.14	2.856E-01	(P	5.955E-02	2.85E-02	G
		510.72	4.829E-01	+ P	2.011E-01	7.83E-02	G
PB-212	7.9564E-01						
		238.63	7.772E-01	(P	1.031E-01	4.14E-02	G K
					Energy duplication		
		77.11	6.593E-01	-	3.550E-01	1.13E-01	G
		74.81	8.786E-01	&(P	7.064E-01	2.19E-01	G
PB-214	4.3417E-01						
		351.99	4.225E-01	(P	1.096E-01	4.15E-02	G K
		295.22	4.568E-01	(P	1.897E-01	6.56E-02	G
					Energy duplication		
		77.11	1.065E+00	+ P	5.815E-01	1.84E-01	G
		241.92	-4.096E-01	% P	7.616E-01	2.31E-01	G
BI-212	8.5078E-01						
		727.17	8.508E-01	@(P	4.691E-01	2.05E-01	G K
		1620.56	6.189E-01	%	1.510E+00	4.51E-01	G

785.42-1.614E-02 % P 2.976E+00 8.47E-01 G

BI-214 4.1053E-01

609.32 4.105E-01 (P 1.091E-01 5.00E-02 G K

1764.51 7.703E-01 + P 1.274E-01 1.16E-01 G

1120.28 8.395E-01 + P 3.675E-01 1.60E-01 G

RA-224 7.1109E-01

241.00 7.111E-01 %(P 1.301E+00 3.96E-01 G

RA-226 1.0658E+00

185.99 1.066E+00 *(1.262E+00 3.90E-01 G

AC-228 8.7552E-01

911.07 8.755E-01 (P 2.081E-01 1.01E-01 G K

968.90 1.189E+00 + P 3.544E-01 1.70E-01 G

338.40 6.959E-01 - P 2.494E-01 9.12E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-2.2582E-01						
		236.00	-2.258E-01	%(	P 4.872E-01	1.48E-01	G K
		256.25	9.655E-02	%	P 4.799E-01	1.42E-01	G
PA-234	5.4889E-04						
		98.44	5.489E-04	%(	1.636E-01	4.86E-02	G K
		946.00	-3.497E-02	&	3.077E-01	8.84E-02	G
		131.28	5.218E-02	&	2.290E-01	6.88E-02	G
		94.67	-1.007E-01	%	3.417E-01	1.03E-01	G
		883.24	6.148E-02	%	3.654E-01	1.04E-01	G
		926.70	1.604E-01	%	4.346E-01	1.29E-01	G
		569.26	0.000E+00	%	4.992E-01	1.44E-01	G
TH-234	8.0053E-01						
		63.29	3.613E-01	%(	P 2.189E+00	6.54E-01	G K
		92.80	1.372E+00	(	P 1.687E+00	5.17E-01	G
		92.38	-1.013E-01	%	P 2.004E+00	5.94E-01	G
AM-241	-3.4498E-02						
		59.54	-3.450E-02	%(	P 2.976E-01	8.89E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	-1.1313E-01	-1.1617E-01	4.1092E-01	4.1097E-01	4.501E-01
K-40	1.5171E+01	1.5171E+01	1.7748E+00	1.9710E+00	
MN-54 #A	3.4014E-02	3.4168E-02	4.4646E-02	4.4687E-02	4.706E-02
CO-57 #B	2.7757E-03	2.7903E-03	4.4920E-02	4.4920E-02	4.999E-02
CO-60 #B	3.5014E-02	3.5040E-02	5.8124E-02	5.8157E-02	6.290E-02
Sr-85 #A	-2.7399E-02	-2.8004E-02	5.7063E-02	5.7085E-02	6.154E-02
Kr-85 #A	-6.5749E+02	-6.5750E+02	1.3898E+03	1.3903E+03	1.425E+03
Y-88 #B	0.0000E+00	0.0000E+00	7.3527E-02	7.3527E-02	8.748E-02
NB-94 #B	-8.9109E-03	-8.9109E-03	3.8230E-02	3.8233E-02	4.248E-02
Ag-108M#B	-6.3674E-03	-6.3675E-03	5.3482E-02	5.3483E-02	6.166E-02
CD-109 #A	4.8740E-02	4.8893E-02	1.3126E+00	1.3126E+00	1.461E+00
SN-113 #B	-4.4232E-03	-4.4780E-03	5.5380E-02	5.5381E-02	6.258E-02
SB-125 #B	1.2836E-01	1.2854E-01	1.2295E-01	1.2317E-01	1.317E-01
I-131 #B	4.0484E-03	4.8287E-03	4.4264E-02	4.4265E-02	4.249E-02
CS-134 #B	-4.8130E-03	-4.8221E-03	5.6355E-02	5.6356E-02	4.927E-02
CS-137 #	1.5781E-01	1.5783E-01	6.8514E-02	6.9092E-02	
CE-139 #A	2.4722E-04	2.4979E-04	4.7244E-02	4.7244E-02	5.253E-02
EU-152 #B	-1.4294E-02	-1.4298E-02	1.5367E-01	1.5367E-01	1.520E-01
EU-154 #B	8.6153E-03	8.6193E-03	9.7098E-02	9.7099E-02	1.084E-01
EU-155 #B	2.3017E-03	2.3035E-03	1.3689E-01	1.3689E-01	1.531E-01
HG-203 #B	2.5475E-02	2.6262E-02	4.1280E-02	4.1307E-02	4.367E-02
TL-208	2.8559E-01	2.8559E-01	8.5581E-02	8.7089E-02	

PB-212 #	7.9564E-01	7.9564E-01	1.2703E-01	1.3475E-01	1.031E-01
PB-214 #	4.3417E-01	4.3417E-01	1.1332E-01	1.1595E-01	1.096E-01
BI-212 #	8.5078E-01	8.5078E-01	6.1386E-01	6.1574E-01	
BI-214	4.1053E-01	4.1053E-01	1.4985E-01	1.5164E-01	
RA-224 #A	7.1109E-01	7.1109E-01	1.1873E+00	1.1880E+00	1.301E+00
RA-226 #A	1.0658E+00	1.0658E+00	1.1686E+00	1.1701E+00	1.262E+00
AC-228	8.7552E-01	8.7552E-01	3.0332E-01	3.0733E-01	
TH-227 #B	-2.2582E-01	-2.2582E-01	4.4951E-01	4.4969E-01	4.872E-01
PA-234 #B	5.4889E-04	5.4889E-04	1.4566E-01	1.4566E-01	1.636E-01
TH-234 #B	8.0053E-01	8.0053E-01	9.0534E-01	9.0643E-01	2.189E+00
AM-241 #A	-3.4498E-02	-3.4498E-02	2.9863E-01	2.9863E-01	2.976E-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_2SEPT2005_1417.An1

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

Total Activity (270.1 to 1999.1 keV) 1.7751713E+01 pCi/gm

Total Decayed Activity (270.1 to 1999.1 keV) 1.7751734E+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_2SEPT2005_1458.An1

Sample description

FSS-NOL-06-01-065-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_2SEPT2005_1458.An1

Acquisition information

Start time:	02-Sep-2005 15:00:46
Live time:	2000
Real time:	2002
Dead time:	0.07 %
Detector ID:	1

Detector system

Det 101- DSPE-633

Calibration

Filename: D1_1LSa.Clb

Detector 101 1.0 Liter Marinelli Sand

Energy Calibration

Created:	03-Sep-2004 08:50:48
Zero offset:	0.244 keV
Gain:	0.500 keV/channel
Quadratic:	-2.493E-08 keV/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: 1.9170E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9170E+03) =
5.2165E+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 01-Sep-2005 09:54:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1432

***** 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	183.	24.35	1.50	1.654E-02				
74.81	183.	24.35	1.50	1.654E-02	74.81	9.600	8.129E-01	PB212
77.19	290.	15.42	1.50	1.720E-02	77.11	10.700	1.110E+00	PB214
					77.11	17.500	6.785E-01	PB212
77.19	293.	15.42	1.50	1.720E-02	77.11	10.700	1.110E+00	PB214
					77.11	17.500	6.872E-01	PB212
90.05	71.	39.23	1.02	1.960E-02				

93.31	129.	21.80	1.02	1.996E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.32	101.	30.59	1.11	1.856E-02	185.99	3.280	1.166E+00	RA226
209.64	93.	27.63	1.11	1.720E-02				
238.86	705.	4.47	1.12	1.555E-02	238.63	43.100	7.335E-01	PB212
241.71	89.	22.11	1.12	1.540E-02	241.00	3.900	1.028E+00	RA224
270.51	59.	36.46	1.50	1.399E-02				
295.54	146.	11.83	1.16	1.291E-02	295.22	19.200	4.100E-01	PB214
299.84	51.	30.71	1.16	1.273E-02				
338.49	132.	20.47	0.94	1.135E-02	338.40	12.010	6.713E-01	AC228
352.09	235.	10.17	1.20	1.092E-02	351.99	37.100	4.060E-01	PB214
463.24	57.	37.25	1.01	8.346E-03				
463.24	57.	37.25	1.01	8.346E-03	463.51	10.000	4.732E-01	SB125
510.61	99.	19.34	1.25	7.592E-03	510.72	22.500	3.421E-01	TL208
583.44	227.	8.78	1.13	6.681E-03	583.14	86.000	2.756E-01	TL208
609.51	176.	10.12	1.23	6.411E-03	609.32	46.090	4.178E-01	BI214
727.56	29.	34.89	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
795.37	39.	32.71	1.52	5.018E-03				
795.37	39.	32.71	1.52	5.018E-03	795.76	85.400	6.422E-02	CS134
835.59	24.	34.21	0.94	4.801E-03	834.81	99.978	PBC<MDA	MN54
911.43	167.	9.02	1.75	4.445E-03	911.07	29.000	9.049E-01	AC228
968.77	102.	13.84	1.54	4.213E-03	968.90	17.460	9.727E-01	AC228
1120.19	75.	22.92	1.04	3.711E-03	1120.28	15.040	9.425E-01	BI214
1461.31	517.	4.59	1.81	2.941E-03	1460.75	10.700	1.152E+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
179.68	90.21	354.	71.	0.036	117.70	1.016	PB-214 lD
418.95	209.64	244.	93.	0.046	82.90	1.111	NP-239 sM
477.43	239.00	144.	705.	0.352	13.41	1.122	PB-212 D
483.11	241.84	147.	89.	0.044	66.32	1.124	PB-214 D
540.75	270.51	177.	59.	0.030	109.37	1.500	AC-228 s
599.42	299.83	155.	57.	0.028	109.85	1.077	TH-227

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	963.	183.	0.092	73.06	1.499
PB-214	153.79	77.11	882.	290.	0.145	46.27	1.499D
PB-212	153.79	77.11	878.	293.	0.147	46.27	1.499D
TH-234	185.77	93.09	855.	140.	0.070	85.49	1.499s
TH-234	185.76	93.09	811.	150.	0.075	80.94	1.499s

RA-226	372.21	186.28	436.	111.	0.055	85.01	1.499s
PB-212	477.44	238.87	357.	554.	0.277	19.02	1.499
PB-214	590.66	295.46	181.	128.	0.064	50.93	1.499
AC-228	676.77	338.49	189.	130.	0.065	61.42	0.944
PB-214	703.92	352.06	106.	210.	0.105	28.96	1.499
TL-208	1021.17	510.61	102.	83.	0.041	58.02	1.253s
TL-208	1166.88	583.44	61.	225.	0.112	26.35	1.131
BI-214	1219.06	609.51	54.	175.	0.088	30.37	1.234
BI-212	1455.27	727.56	41.	29.	0.015	104.68	1.499
CS-134	1591.31	795.54	23.	32.	0.016	81.69	1.502
MN-54	1671.44	835.59	21.	24.	0.012	102.64	0.939s
AC-228	1823.20	911.43	23.	166.	0.083	27.05	1.750s
AC-228	1937.96	968.77	30.	101.	0.051	41.53	1.538
BI-214	2240.96	1120.19	49.	75.	0.037	68.76	1.041s
K-40	2923.64	1461.31	12.	515.	0.257	13.76	1.808

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-8.1536E-02					
			477.56	-8.154E-02	%(	3.741E-01	1.10E-01 G
K-40		1.1520E+01					
			1460.75	1.152E+01	(P	4.293E-01	5.31E-01 G
MN-54		3.4843E-02					
			834.81	3.484E-02	(P	3.564E-02	1.21E-02 G
CO-57		-1.0735E-02					
			122.07	-1.074E-02	%(	4.521E-02	1.36E-02 G K
			136.43	9.655E-02	%	3.099E-01	9.31E-02 G
CO-60		7.1971E-03					
			1332.51	7.197E-03	%(P	5.044E-02	1.41E-02 G K
			1173.23	5.271E-03	% P	7.462E-02	2.13E-02 G K
Sr-85		-1.1492E-02					
			514.00	-1.149E-02	%(	5.168E-02	1.53E-02 G
Kr-85		-2.8726E+02					
			513.99	-2.873E+02	%(P	1.183E+03	3.48E+02 G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	7.992E-02	2.18E-02 G K

898.02-6.068E-03 % P 4.649E-02 1.31E-02 G

NB-94 -2.0315E-04

871.10-2.032E-04 &(P 5.086E-02 1.42E-02 G K

702.50 7.169E-03 % P 4.786E-02 1.38E-02 G K

Ag-108M 9.1112E-05

722.95 9.111E-05 &(5.016E-02 1.41E-02 G K

614.37-1.358E-02 % P 5.236E-02 1.54E-02 G

433.93 7.298E-03 & 3.944E-02 1.15E-02 G

CD-109 -1.0717E-01

88.04-1.072E-01 &(P 1.458E+00 4.36E-01 G

SN-113 0.0000E+00

391.71 0.000E+00 %(5.859E-02 1.69E-02 G K

255.04-2.080E-01 & P 1.708E+00 5.04E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-6.7801E-03						
		427.95	-6.780E-03	%(P	9.714E-02	2.75E-02	G K
		600.77	-1.994E-03	& P	1.942E-01	5.40E-02	G
		636.15	1.600E-02	% P	3.661E-01	1.03E-01	G
		463.51	3.015E-01	% P	4.044E-01	1.26E-01	G
		176.29	-9.603E-02	% P	5.894E-01	1.75E-01	G
I-131	8.4532E-03						
		364.48	8.453E-03	%(	4.432E-02	1.30E-02	G K
		636.97	-1.398E-01	%	6.703E-01	1.95E-01	G
		284.29	0.000E+00	%	6.481E-01	1.89E-01	G
CS-134	1.6326E-02						
		604.66	-1.568E-02	&(P	5.370E-02	1.59E-02	G K
		795.76	5.290E-02	(P	4.158E-02	1.46E-02	G
		569.29	-2.113E-02	& P	2.776E-01	7.92E-02	G
		801.84	-3.108E-04	%	4.387E-01	1.20E-01	G
CS-137	1.0514E-02						
		661.62	1.051E-02	&(P	4.532E-02	1.31E-02	G
CE-139	-1.1046E-03						
		165.85	-1.105E-03	%(P	4.877E-02	1.44E-02	G
EU-152	-3.1695E-02						
		121.78	-3.169E-02	%(P	1.357E-01	4.06E-02	G K
		344.30	-1.565E-02	% P	1.377E-01	4.02E-02	G
		1408.08	-2.873E-02	& P	2.629E-01	7.25E-02	G
		964.00	-6.426E-02	% P	3.985E-01	1.14E-01	G
		1112.07	-7.125E-02	% P	4.377E-01	1.25E-01	G

778.90-2.156E-02 & P 3.093E-01 8.63E-02 G

EU-154 -8.2631E-03

123.10-8.263E-03 %(P 9.719E-02 2.89E-02 G K

1274.80-2.576E-02 & P 1.791E-01 5.09E-02 G

723.30-3.596E-03 & P 2.133E-01 5.92E-02 G

1004.80 3.766E-02 & P 2.441E-01 6.87E-02 G

EU-155 -2.4016E-03

86.45-2.402E-03 %(1.677E-01 5.00E-02 G K

105.31 3.258E-02 % 1.907E-01 5.70E-02 G

HG-203 5.4559E-04

279.17 5.456E-04 %(4.217E-02 1.23E-02 G K

72.87-2.904E-01 % P 1.035E+00 3.11E-01 G

70.83-5.729E-02 & 1.315E+00 3.89E-01 G

82.50-4.544E-01 % 2.375E+00 7.12E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8936E-01						
		583.14	2.756E-01	(P	4.805E-02	2.45E-02	G
		510.72	3.421E-01	*(P	2.056E-01	7.89E-02	G
PB-212	6.1238E-01						
		238.63	5.820E-01	(P	9.536E-02	3.73E-02	G K
					Energy duplication		
		77.11	6.872E-01	(	3.296E-01	1.06E-01	G
		74.81	8.129E-01	+ P	6.541E-01	2.04E-01	G
PB-214	3.6542E-01						
		351.99	3.659E-01	(P	8.813E-02	3.57E-02	G K
		295.22	3.646E-01	(P	1.856E-01	6.27E-02	G
					Energy duplication		
		77.11	1.110E+00	+ P	5.402E-01	1.73E-01	G
		241.92	4.333E-02	% P	6.547E-01	1.94E-01	G
BI-212	3.2254E-01						
		727.17	3.225E-01	(P	3.559E-01	1.15E-01	G K
		1620.56	3.069E-01	%	1.797E+00	4.97E-01	G
		785.42	-1.444E-01	% P	1.867E+00	5.16E-01	G
BI-214	4.1784E-01						
		609.32	4.178E-01	(P	8.799E-02	4.26E-02	G K
		1764.51	1.302E-01	% P	2.246E-01	7.10E-02	G
		1120.28	9.425E-01	+ P	4.478E-01	2.17E-01	G
RA-224	-1.1790E-01						
		241.00	-1.179E-01	%(P	5.815E-01	1.70E-01	G

```
RA-226       1.2791E+00
                 185.99 1.279E+00  (  1.156E+00 3.62E-01 G

AC-228       9.3041E-01
                 911.07 9.049E-01 @(P 1.382E-01 8.26E-02 G K
                 968.90 9.727E-01  (P 2.687E-01 1.36E-01 G
                 338.40 6.713E-01 - P 3.455E-01 1.40E-01 G

TH-227      -6.4045E-02
                 236.00-6.404E-02 %(P 4.028E-01 1.20E-01 G K
                 256.25 1.198E-01 % P 4.806E-01 1.43E-01 G

PA-234      -6.0063E-02
                  98.44-6.006E-02 &(  1.670E-01 5.04E-02 G K
                 946.00 9.848E-04 %   2.668E-01 7.43E-02 G
                 131.28-8.000E-03 %   1.709E-01 5.06E-02 G
                  94.67-1.034E-01 %   3.067E-01 9.25E-02 G
                 883.24 0.000E+00 &   4.282E-01 1.19E-01 G
                 926.70-3.843E-02 &   4.585E-01 1.29E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	-2.658E-02	&	4.100E-01	1.17E-01	G
TH-234	1.3716E+00						
		63.29	7.010E-01	%(	P 2.012E+00	6.05E-01	G K
		92.80	1.766E+00	(	P 1.599E+00	4.96E-01	G
		92.38	1.929E+00	&(	P 1.920E+00	5.92E-01	G
AM-241	-5.5521E-02						
		59.54	-5.552E-02	&(	P 2.789E-01	8.35E-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	-8.0263E-02	-8.1536E-02	3.2916E-01	3.2919E-01	3.683E-01
K-40	1.1520E+01	1.1520E+01	1.5919E+00	1.7198E+00	
MN-54 #A	3.4749E-02	3.4843E-02	3.6395E-02	3.6448E-02	
CO-57 #B	-1.0702E-02	-1.0735E-02	4.0663E-02	4.0667E-02	4.507E-02
CO-60 #B	7.1940E-03	7.1971E-03	4.2154E-02	4.2156E-02	5.042E-02

Sr-85	#A	-1.1344E-02	-1.1492E-02	4.5786E-02	4.5791E-02	5.101E-02
Kr-85	#A	-2.8726E+02	-2.8726E+02	1.2472E+03	1.2473E+03	1.183E+03
Y-88	#B	0.0000E+00	0.0000E+00	6.5381E-02	6.5381E-02	7.929E-02
NB-94	#B	-2.0315E-04	-2.0315E-04	1.1327E-02	1.1327E-02	5.086E-02
Ag-108M	#B	9.1110E-05	9.1112E-05	4.2171E-02	4.2171E-02	5.016E-02
CD-109	#A	-1.0697E-01	-1.0717E-01	1.4219E+00	1.4219E+00	1.455E+00
SN-113	#B	0.0000E+00	0.0000E+00	5.0569E-02	5.0569E-02	5.816E-02
SB-125	#B	-6.7745E-03	-6.7801E-03	1.0654E-01	1.0654E-01	9.706E-02
I-131	#B	7.6138E-03	8.4532E-03	3.9001E-02	3.9004E-02	3.992E-02
CS-134	#B	1.6308E-02	1.6326E-02	1.3510E-02	1.3542E-02	5.364E-02
CS-137	#A	1.0513E-02	1.0514E-02	3.9319E-02	3.9323E-02	4.532E-02
CE-139	#A	-1.0979E-03	-1.1046E-03	5.6652E-02	5.6652E-02	4.848E-02
EU-152	#B	-3.1689E-02	-3.1695E-02	1.2899E-01	1.2901E-01	1.356E-01
EU-154	#B	-8.2608E-03	-8.2631E-03	1.0408E-01	1.0408E-01	9.717E-02
EU-155	#B	-2.4005E-03	-2.4016E-03	1.4999E-01	1.4999E-01	1.676E-01
HG-203	#B	5.3583E-04	5.4559E-04	3.6841E-02	3.6841E-02	4.142E-02
TL-208		2.8936E-01	2.8936E-01	7.7055E-02	7.8770E-02	
PB-212	#	6.1238E-01	6.1238E-01	1.1780E-01	1.2277E-01	9.536E-02
PB-214	#	3.6542E-01	3.6542E-01	1.0684E-01	1.0881E-01	8.813E-02
BI-212	#A	3.2254E-01	3.2254E-01	3.4543E-01	3.4591E-01	3.559E-01
BI-214		4.1784E-01	4.1784E-01	1.2771E-01	1.2988E-01	
RA-224	#A	-1.1790E-01	-1.1790E-01	5.8812E-01	5.8816E-01	5.815E-01
RA-226	#	1.2791E+00	1.2791E+00	1.0873E+00	1.0897E+00	1.156E+00
AC-228		9.3041E-01	9.3041E-01	2.3248E-01	2.3835E-01	
TH-227	#B	-6.4045E-02	-6.4045E-02	3.7998E-01	3.8000E-01	4.028E-01
PA-234	#B	-6.0063E-02	-6.0063E-02	1.5113E-01	1.5117E-01	1.670E-01
TH-234	#B	1.3716E+00	1.3716E+00	1.1560E+00	1.1585E+00	2.012E+00
AM-241	#A	-5.5521E-02	-5.5521E-02	2.6925E-01	2.6927E-01	2.789E-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) 1.3192396E+01 pCi/gm

Total Decayed Activity (270.1 to 1999.1 keV) 1.3192490E+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_2SEPT2005_1539.An1

Sample description

FSS-NOL-06-01-073-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_2SEPT2005_1539.An1

Acquisition information

Start time:	02-Sep-2005 15:39:41
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: 1.8500E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8500E+03) =
5.4054E+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	01-Sep-2005 11:27:00
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: 0.2408

***** 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	151.	31.90	1.50	1.654E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.21	257.	18.48	1.50	1.720E-02	77.11	10.700	1.022E+00	PB214
					77.11	17.500	6.246E-01	PB212
77.21	261.	18.48	1.50	1.720E-02	77.11	10.700	1.022E+00	PB214
					77.11	17.500	6.336E-01	PB212
83.51	111.	32.96	1.30	1.861E-02	82.50	2.240	2.002E+00	HG203

87.51	118.	26.13	1.01	1.927E-02				
87.51	118.	26.13	1.01	1.927E-02	88.04	3.790	PBC<MDA	CD109
186.03	97.	32.41	1.01	1.858E-02	185.99	3.280	1.165E+00	RA226
238.91	618.	5.25	1.12	1.556E-02	238.63	43.100	6.656E-01	PB212
241.79	107.	25.68	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
295.47	124.	19.89	1.15	1.291E-02	295.22	19.200	3.605E-01	PB214
327.94	80.	32.33	0.84	1.170E-02				
338.62	155.	19.22	1.39	1.134E-02	338.40	12.010	8.173E-01	AC228
352.20	269.	11.61	0.91	1.092E-02	351.99	37.100	4.809E-01	PB214
511.10	54.	31.62	1.17	7.585E-03	510.72	22.500	PBC<MDA	TL208
583.33	201.	13.26	1.13	6.682E-03	583.14	86.000	2.519E-01	TL208
609.45	174.	14.63	1.41	6.411E-03	609.32	46.090	4.263E-01	BI214
662.06	407.	8.14	1.48	5.934E-03	661.62	84.620	5.906E-01	CS137
727.88	49.	29.41	1.44	5.438E-03	727.17	11.800	PBC<MDA	BI212
911.33	170.	12.44	1.33	4.445E-03	911.07	29.000	9.524E-01	AC228
968.16	107.	23.33	1.23	4.215E-03	968.90	17.460	1.054E+00	AC228
1121.39	42.	36.01	0.83	3.711E-03	1120.28	15.040	5.526E-01	BI214
1173.67	905.	3.57	1.73	3.564E-03	1173.23	99.860	1.858E+00	CO60
1332.95	763.	3.88	1.93	3.189E-03	1332.51	99.980	1.748E+00	CO60
1461.25	568.	4.28	2.06	2.942E-03	1460.75	10.700	1.313E+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	
174.85	87.64	713.	143.	0.072	82.99	0.926	PB-214	
477.51	238.87	218.	618.	0.309	15.76	1.122	PB-212	D
483.28	241.75	321.	107.	0.053	77.03	1.124	PB-214	D
655.66	327.94	232.	80.	0.040	97.00	0.838	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	149.47	74.95	1177.	151.	0.076	95.70	1.499
PB-214	153.79	77.11	1037.	257.	0.129	55.43	1.499D
PB-212	153.79	77.11	1034.	261.	0.131	55.43	1.499D
RA-226	372.10	186.22	604.	106.	0.053	102.68	1.499
PB-212	477.54	238.92	614.	510.	0.255	24.21	1.499
PB-214	590.67	295.46	306.	132.	0.066	61.17	1.499
AC-228	677.03	338.62	272.	153.	0.076	57.67	1.385s
PB-214	704.25	352.23	224.	234.	0.117	33.16	1.499s

TL-208	1166.67	583.33	161.	198.	0.099	39.78	1.133
BI-214	1218.93	609.45	149.	172.	0.086	43.90	1.415s
CS-137	1324.20	662.06	178.	406.	0.203	24.41	1.476
BI-212	1455.53	727.69	113.	51.	0.026	95.82	1.499
AC-228	1823.01	911.33	113.	168.	0.084	37.33	1.329s
AC-228	1936.74	968.16	152.	106.	0.053	69.99	1.233s
BI-214	2243.38	1121.39	72.	42.	0.021	108.04	0.826s
CO-60	2348.00	1173.67	53.	905.	0.453	10.70	1.730
CO-60	2666.74	1332.95	29.	763.	0.381	11.64	1.931
K-40	2923.53	1461.25	9.	566.	0.283	12.84	2.059

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.1408E-01					
			477.56	-1.141E-01	%(	5.669E-01	1.68E-01 G
K-40		1.3127E+01					
			1460.75	1.313E+01	(P	3.904E-01	5.64E-01 G
MN-54		2.7902E-03					
			834.81	2.790E-03	&(P	7.746E-02	2.23E-02 G
CO-57		-6.7084E-03					
			122.07	-6.708E-03	&(	5.717E-02	1.71E-02 G K
			136.43	3.513E-03	%	4.774E-01	1.42E-01 G
CO-60		1.8029E+00					
			1332.51	1.748E+00	(P	6.379E-02	6.78E-02 G K
			1173.23	1.858E+00	(P	7.518E-02	6.63E-02 G K
Sr-85		-1.7002E-02					
			514.00	-1.700E-02	&(	7.360E-02	2.19E-02 G
Kr-85		-4.1452E+02					
			513.99	-4.145E+02	&(P	1.642E+03	4.88E+02 G
Y-88		1.1538E-02					
			1836.01	1.154E-02	%(	4.347E-02	1.22E-02 G K

898.02 2.874E-02 % P 8.839E-02 2.64E-02 G

NB-94 -3.6599E-04

871.10-3.660E-04 %(P 7.520E-02 2.15E-02 G K

702.50 2.897E-04 % P 6.957E-02 2.01E-02 G K

Ag-108M 0.0000E+00

722.95 0.000E+00 %(1.058E-01 3.09E-02 G K

614.37-8.036E-04 % P 8.130E-02 2.36E-02 G

433.93 1.749E-02 % 6.331E-02 1.89E-02 G

CD-109 1.7347E-02

88.04 1.735E-02 %(P 1.617E+00 4.83E-01 G

SN-113 -9.1723E-03

391.71-9.172E-03 %(9.190E-02 2.71E-02 G K

255.04-8.995E-01 % P 2.568E+00 7.74E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-8.9232E-04						
		427.95	-8.923E-04	%(P	1.905E-01	5.55E-02	G K
		600.77	-1.867E-02	% P	3.288E-01	9.52E-02	G
		636.15	-3.012E-03	& P	5.447E-01	1.56E-01	G
		463.51	3.563E-01	% P	5.461E-01	1.68E-01	G
		176.29	6.086E-02	% P	7.394E-01	2.20E-01	G
I-131	-1.2450E-02						
		364.48	-1.245E-02	%(	7.031E-02	2.08E-02	G K
		636.97	2.386E-01	%	9.693E-01	2.87E-01	G
		284.29	1.339E-01	&	8.393E-01	2.49E-01	G
CS-134	-7.7906E-03						
		604.66	-7.791E-03	%(P	6.973E-02	2.04E-02	G K
		795.76	2.499E-02	% P	7.948E-02	2.36E-02	G
		569.29	-2.887E-02	% P	4.015E-01	1.17E-01	G
		801.84	3.978E-02	&	9.028E-01	2.61E-01	G
CS-137	5.9063E-01						
		661.62	5.906E-01	(P	9.428E-02	4.82E-02	G
CE-139	-2.1213E-04						
		165.85	-2.121E-04	%(P	6.012E-02	1.79E-02	G
EU-152	-2.8479E-02						
		121.78	-2.848E-02	%(P	1.631E-01	4.88E-02	G K
		344.30	-4.999E-03	& P	1.826E-01	5.34E-02	G
		1408.08	-1.501E-02	% P	1.933E-01	5.04E-02	G
		964.00	2.328E-01	% P	7.151E-01	2.14E-01	G
		1112.07	1.465E-01	& P	6.807E-01	2.00E-01	G

778.90-3.497E-02 % P 5.383E-01 1.55E-01 G

EU-154 -7.0626E-04

123.10-7.063E-04 %(P 1.007E-01 2.98E-02 G K

1274.80 3.343E-02 & P 1.857E-01 5.32E-02 G

723.30-8.336E-02 & P 4.048E-01 1.19E-01 G

1004.80-1.241E-01 % P 5.949E-01 1.76E-01 G

EU-155 -7.0958E-02

86.45-7.096E-02 &(1.906E-01 5.76E-02 G K

105.31-4.614E-02 % 2.243E-01 6.73E-02 G

HG-203 -2.8555E-03

279.17-2.855E-03 &(6.522E-02 1.93E-02 G K

72.87-1.107E-01 % P 1.273E+00 3.81E-01 G

70.83-6.448E-01 % 2.241E+00 6.75E-01 G

82.50 1.211E-01 & 2.685E+00 8.01E-01 G

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Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-208       2.5188E-01
                   583.14 2.519E-01  (P 7.852E-02 3.38E-02 G
                   510.72 1.616E-01 % P 2.373E-01 7.28E-02 G

PB-212       5.9367E-01
                   238.63 5.545E-01  (P 1.286E-01 4.53E-02 G K
                                        Energy duplication
                    77.11 6.336E-01  (  3.701E-01 1.17E-01 G
                    74.81 6.968E-01 &(P 7.478E-01 2.30E-01 G

PB-214       4.0988E-01
                   351.99 4.213E-01 @(P 1.304E-01 4.70E-02 G K
                   295.22 3.879E-01  (P 2.479E-01 8.02E-02 G
                                        Energy duplication
                    77.11 1.022E+00 + P 6.063E-01 1.91E-01 G
                   241.92-3.257E-01 % P 8.047E-01 2.43E-01 G

BI-212       5.8450E-01
                   727.17 5.845E-01  (P 5.941E-01 1.89E-01 G K
                  1620.56-8.845E-03 %   1.726E+00 4.43E-01 G
                   785.42 1.190E+00 % P 3.160E+00 9.45E-01 G

BI-214       4.5736E-01
                   609.32 4.263E-01 *(P 1.470E-01 6.28E-02 G K
                  1764.51-3.575E-02 % P 3.101E-01 8.02E-02 G
                  1120.28 5.526E-01 *(P 5.522E-01 2.01E-01 G

RA-224       9.9933E-01
                   241.00 9.993E-01 &(P 1.505E+00 4.60E-01 G
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RA-226       1.2694E+00
                185.99 1.269E+00  (  1.405E+00 4.34E-01 G

AC-228       9.5490E-01
                911.07 9.524E-01 @(P 2.958E-01 1.20E-01 G K
                968.90 1.054E+00 *(P 5.974E-01 2.47E-01 G
                338.40 8.173E-01 *(P 4.267E-01 1.59E-01 G

TH-227      -1.3091E-01
                236.00-1.309E-01 %(P 5.083E-01 1.53E-01 G K
                256.25 4.634E-02 % P 6.780E-01 2.00E-01 G

PA-234      -1.1746E-02
                 98.44-1.175E-02 %(  2.174E-01 6.49E-02 G K
                946.00 8.854E-02 &   4.733E-01 1.39E-01 G
                131.28-6.519E-02 %   2.494E-01 7.50E-02 G
                 94.67 2.216E-01 %   3.250E-01 9.94E-02 G
                883.24 2.018E-01 %   6.882E-01 2.05E-01 G
                926.70 1.701E-01 %   8.754E-01 2.58E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26-3.825E-02 % 5.941E-01 1.73E-01 G

TH-234 4.3731E-01
63.29 4.373E-01 &(P 2.355E+00 7.04E-01 G K
92.80 1.073E+00 % P 1.945E+00 5.91E-01 G
92.38-1.707E-01 % P 2.354E+00 7.00E-01 G

AM-241 -1.2603E-02
59.54-1.260E-02 %(P 3.268E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	-1.1235E-01	-1.1408E-01	5.0336E-01	5.0340E-01	5.583E-01
K-40	1.3127E+01	1.3127E+01	1.6919E+00	1.8473E+00	
MN-54 #A	2.7829E-03	2.7902E-03	6.6985E-02	6.6985E-02	7.726E-02
CO-57 #B	-6.6882E-03	-6.7084E-03	5.1293E-02	5.1294E-02	5.700E-02
CO-60	1.8021E+00	1.8029E+00	1.4254E-01	1.7520E-01	

Sr-85 #A	-1.6790E-02	-1.7002E-02	6.5733E-02	6.5740E-02	7.268E-02
Kr-85 #A	-4.1452E+02	-4.1452E+02	1.6625E+03	1.6626E+03	1.642E+03
Y-88 #B	1.1450E-02	1.1538E-02	3.6627E-02	3.6633E-02	4.314E-02
NB-94 #B	-3.6599E-04	-3.6599E-04	2.3931E-01	2.3931E-01	7.520E-02
Ag-108M#B	0.0000E+00	0.0000E+00	9.2660E-02	9.2661E-02	1.058E-01
CD-109 #A	1.7315E-02	1.7347E-02	1.4483E+00	1.4483E+00	1.614E+00
SN-113 #B	-9.1076E-03	-9.1723E-03	8.1384E-02	8.1385E-02	9.125E-02
SB-125 #B	-8.9160E-04	-8.9232E-04	1.0856E-01	1.0856E-01	1.903E-01
I-131 #B	-1.1251E-02	-1.2450E-02	6.2536E-02	6.2540E-02	6.353E-02
CS-134 #B	-7.7822E-03	-7.7906E-03	7.3496E-02	7.3497E-02	6.965E-02
CS-137	5.9058E-01	5.9063E-01	1.4447E-01	1.4828E-01	
CE-139 #A	-2.1088E-04	-2.1213E-04	3.2767E-01	3.2767E-01	5.976E-02
EU-152 #B	-2.8474E-02	-2.8479E-02	1.5634E-01	1.5635E-01	1.630E-01
EU-154 #B	-7.0607E-04	-7.0626E-04	1.8181E+00	1.8181E+00	1.007E-01
EU-155 #B	-7.0926E-02	-7.0958E-02	1.7285E-01	1.7289E-01	1.905E-01
HG-203 #B	-2.8060E-03	-2.8555E-03	5.7871E-02	5.7872E-02	6.409E-02
TL-208	2.5188E-01	2.5188E-01	1.0139E-01	1.0239E-01	
PB-212 #	5.9367E-01	5.9367E-01	1.4546E-01	1.4928E-01	1.286E-01
PB-214 #	4.0988E-01	4.0988E-01	1.3706E-01	1.3900E-01	1.304E-01
BI-212 #A	5.8450E-01	5.8450E-01	5.6746E-01	5.6842E-01	5.941E-01
BI-214 #	4.5736E-01	4.5736E-01	2.0206E-01	2.0371E-01	
RA-224 #A	9.9933E-01	9.9933E-01	1.3805E+00	1.3816E+00	1.505E+00
RA-226 #A	1.2694E+00	1.2694E+00	1.3034E+00	1.3054E+00	1.405E+00
AC-228 #	9.5490E-01	9.5490E-01	3.1530E-01	3.1989E-01	
TH-227 #B	-1.3091E-01	-1.3091E-01	4.7052E-01	4.7058E-01	5.083E-01
PA-234 #B	-1.1746E-02	-1.1746E-02	1.9482E-01	1.9482E-01	2.174E-01
TH-234 #B	4.3731E-01	4.3731E-01	2.1132E+00	2.1134E+00	2.355E+00
AM-241 #A	-1.2603E-02	-1.2603E-02	4.0806E-01	4.0806E-01	3.268E-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 (256.6 to 1999.1 keV) 1.7184309E+01 pCi/gm

Total Decayed Activity (256.6 to 1999.1 keV) 1.7185114E+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_6SEP2005_1459.An1

Sample description

FSS-NOL-06-01-081-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_6SEP2005_1459.An1

Acquisition information

Start time:	06-Sep-2005 15:00:01
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: 1.9280E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9280E+03) =
5.1867E+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: 101F_6SEP2005_1459.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	02-Sep-2005 07:30:00
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: 0.1007

***** 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
74.34	146.	23.42	1.00	1.651E-02				
74.34	146.	23.42	1.00	1.651E-02	74.81	9.600	PBC<MDA	PB212
77.39	339.	9.42	1.01	1.738E-02	77.11	17.500	7.886E-01	PB212
					77.11	10.700	1.276E+00	PB214
84.84	136.	20.24	1.22	1.884E-02	82.50	2.240	2.460E+00	HG203
93.06	130.	32.56	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234

					94.67	15.500	PBC<MDA	PA234
186.40	123.	27.19	1.50	1.858E-02	185.99	3.280	1.418E+00	RA226
209.42	74.	31.81	1.01	1.721E-02				
238.83	761.	4.39	1.12	1.557E-02	238.63	43.100	7.880E-01	PB212
241.69	94.	24.76	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
270.33	82.	27.07	1.35	1.400E-02				
277.28	70.	39.11	0.81	1.368E-02				
295.36	170.	13.31	0.88	1.291E-02	295.22	19.200	4.747E-01	PB214
301.19	92.	24.60	1.06	1.268E-02				
327.86	59.	28.70	0.94	1.170E-02				
338.52	184.	14.17	1.40	1.135E-02	338.40	12.010	9.349E-01	AC228
352.15	253.	8.69	1.03	1.092E-02	351.99	37.100	4.339E-01	PB214
463.07	39.	38.20	1.50	8.342E-03				
463.07	39.	38.20	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125
510.81	99.	23.56	1.30	7.589E-03	510.72	22.500	3.418E-01	TL208
583.45	262.	9.52	1.16	6.681E-03	583.14	86.000	3.159E-01	TL208
609.49	149.	13.13	1.54	6.411E-03	609.32	46.090	3.507E-01	BI214
662.02	105.	20.70	1.70	5.934E-03	661.62	84.620	1.453E-01	CS137
727.39	55.	27.22	1.67	5.441E-03	727.17	11.800	5.885E-01	BI212
911.19	138.	12.80	1.41	4.446E-03	911.07	29.000	7.405E-01	AC228
965.14	38.	24.05	1.61	4.226E-03	964.00	14.580	PBC<MDA	EU152
969.32	84.	14.60	1.62	4.210E-03	968.90	17.460	7.928E-01	AC228
1120.62	86.	18.27	1.85	3.710E-03	1120.28	15.040	1.073E+00	BI214
1173.28	142.	14.27	0.94	3.565E-03	1173.23	99.860	2.797E-01	CO60
1332.69	129.	12.52	1.35	3.190E-03	1332.51	99.980	2.833E-01	CO60
1461.02	657.	4.05	1.67	2.942E-03	1460.75	10.700	1.458E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.80	10.	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	
418.51	209.42	240.	74.	0.037	95.42	1.010	AC-228	
477.36	238.76	178.	761.	0.380	13.17	1.122	PB-212	D
483.09	241.62	225.	94.	0.047	74.27	1.124	PB-214	D
540.38	270.33	178.	82.	0.041	81.21	1.345	AC-228	s
554.30	277.28	241.	70.	0.035	101.05	0.811	TL-208	
602.14	301.19	168.	92.	0.046	73.79	1.062	PB-212	s
655.50	327.86	109.	59.	0.030	86.11	0.944	AC-228	s
1931.49	965.24	24.	37.	0.018	75.56	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	149.41	74.92	1067.	193.	0.096	72.93	1.499
PB-212	153.79	77.11	947.	301.	0.151	46.70	1.499D

PB-214	153.79	77.11	951.	297.	0.149	46.70	1.499D
TH-234	185.70	93.06	922.	130.	0.065	97.69	1.499s
RA-226	372.46	186.40	500.	123.	0.062	81.56	1.499s
PB-212	477.37	238.84	422.	620.	0.310	18.30	1.499
PB-214	590.57	295.41	213.	149.	0.075	47.63	1.499s
AC-228	676.82	338.52	173.	182.	0.091	42.51	1.399s
PB-214	704.20	352.20	125.	254.	0.127	26.26	1.499
SB-125	926.03	463.07	103.	39.	0.020	114.60	1.499s
TL-208	1021.71	510.89	133.	54.	0.027	74.96	1.499s
TL-208	1166.85	583.42	86.	223.	0.111	26.38	1.499
BI-214	1219.01	609.49	79.	148.	0.074	39.40	1.535
CS-137	1324.12	662.02	106.	104.	0.052	62.11	1.699s
BI-212	1454.93	727.39	60.	54.	0.027	81.67	1.672s
AC-228	1822.74	911.19	55.	136.	0.068	38.41	1.407
AC-228	1938.21	968.90	36.	83.	0.041	44.53	1.616D
BI-214	2241.84	1120.62	44.	85.	0.043	54.80	1.852s
CO-60	2347.21	1173.28	64.	142.	0.071	42.82	0.943s
CO-60	2666.23	1332.69	25.	129.	0.064	37.55	1.349s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2923.07	1461.02	13.	655.	0.327	12.14	1.670
Bl-214	3531.04	1764.80	4.	10.	0.005	119.26	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		4.0451E-03					
			477.56	4.045E-03	&(	3.951E-01	1.13E-01 G
K-40		1.4580E+01					
			1460.75	1.458E+01	(P	4.355E-01	5.92E-01 G
MN-54		2.1817E-02					
			834.81	2.182E-02	&(P	5.305E-02	1.59E-02 G
CO-57		3.8223E-03					
			122.07	3.822E-03	%(	4.907E-02	1.46E-02 G K
			136.43	2.541E-02	%	4.095E-01	1.22E-01 G
CO-60		2.8151E-01					
			1332.51	2.833E-01	*(P	5.754E-02	3.55E-02 G K
			1173.23	2.797E-01	@(P	7.895E-02	4.00E-02 G K

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Sr-85       -1.8505E-02
                514.00-1.850E-02 &(  6.264E-02 1.87E-02 G

Kr-85       -4.3339E+02
                513.99-4.334E+02 &(P 1.385E+03 4.12E+02 G

Y-88         0.0000E+00
               1836.01 0.000E+00 %(  2.236E-02 3.03E-03 G K
                898.02 1.012E-02 % P 5.732E-02 1.65E-02 G

NB-94        1.1868E-02
                871.10 1.187E-02 %(P 4.862E-02 1.41E-02 G K
                702.50 1.699E-02 % P 4.592E-02 1.37E-02 G K

Ag-108M     -6.8923E-03
                722.95-6.892E-03 &(  6.048E-02 1.75E-02 G K
                614.37-1.505E-03 & P 4.109E-02 1.15E-02 G
                433.93 1.467E-02 %   4.695E-02 1.40E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.5310E-01						
		88.04	1.531E-01	%(P	1.413E+00	4.23E-01	G
SN-113	-1.2377E-02						
		391.71	-1.238E-02	%(	6.601E-02	1.95E-02	G K
		255.04	-8.708E-03	& P	2.012E+00	5.91E-01	G
SB-125	7.4235E-02						
		427.95	-1.288E-02	%(P	1.368E-01	3.97E-02	G K
		600.77	-1.335E-03	% P	2.688E-01	7.67E-02	G
		636.15	1.601E-01	% P	3.567E-01	1.08E-01	G
		463.51	3.321E-01	*(P	4.210E-01	1.32E-01	G
		176.29	2.479E-02	% P	5.987E-01	1.77E-01	G
I-131	9.4857E-05						
		364.48	9.486E-05	%(	7.038E-02	2.04E-02	G K
		636.97	3.229E-01	%	7.939E-01	2.38E-01	G
		284.29	-1.323E-01	&	9.806E-01	2.90E-01	G
CS-134	-1.5248E-02						
		604.66	-1.525E-02	&(P	5.468E-02	1.61E-02	G K
		795.76	2.628E-02	% P	5.567E-02	1.68E-02	G
		569.29	9.039E-02	& P	2.548E-01	7.58E-02	G
		801.84	6.392E-02	%	5.295E-01	1.51E-01	G
CS-137	1.4529E-01						
		661.62	1.453E-01	@(P	7.069E-02	3.03E-02	G
CE-139	-1.3856E-02						
		165.85	-1.386E-02	%(P	5.306E-02	1.59E-02	G

EU-152 -1.5366E-03

121.78-1.537E-03 %(P 1.397E-01 4.14E-02 G K

344.30-3.643E-03 & P 1.293E-01 3.73E-02 G

1408.08 1.215E-01 % P 1.831E-01 5.90E-02 G

964.00-1.182E-01 & P 5.559E-01 1.63E-01 G

1112.07-9.965E-02 & P 5.063E-01 1.47E-01 G

778.90 1.709E-01 % P 3.745E-01 1.13E-01 G

EU-154 -3.3668E-03

123.10-3.367E-03 %(P 1.019E-01 3.03E-02 G K

1274.80 1.443E-02 & P 1.650E-01 4.61E-02 G

723.30-3.696E-02 & P 2.794E-01 8.06E-02 G

1004.80-4.794E-02 % P 3.205E-01 9.17E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.1954E-03						
		86.45	1.195E-03	&(	1.708E-01	5.09E-02	G K
		105.31	2.116E-02	&	2.020E-01	6.03E-02	G
HG-203	4.6539E-03						
		279.17	4.654E-03	%(	4.276E-02	1.25E-02	G K
		72.87	-6.667E-01	& P	1.312E+00	3.98E-01	G
		70.83	-1.090E-02	&	2.089E+00	6.22E-01	G
		82.50	-1.855E+00	&	2.524E+00	7.73E-01	G
TL-208	2.7188E-01						
		583.14	2.719E-01	(P	5.600E-02	2.42E-02	G
		510.72	2.201E-01	- P	2.314E-01	7.14E-02	G
PB-212	6.6254E-01						
		238.63	6.470E-01	(P	1.027E-01	3.99E-02	G K
					Energy duplication		
		77.11	7.008E-01	(	3.402E-01	1.09E-01	G
		74.81	8.516E-01	& P	6.838E-01	2.13E-01	G
PB-214	4.3321E-01						
		351.99	4.395E-01	(P	9.490E-02	3.88E-02	G K
		295.22	4.210E-01	*(P	1.998E-01	6.76E-02	G
					Energy duplication		
		77.11	1.132E+00	+ P	5.575E-01	1.78E-01	G
		241.92	-1.020E-01	% P	6.830E-01	2.04E-01	G
BI-212	5.8846E-01						
		727.17	5.885E-01	*(P	4.237E-01	1.62E-01	G K
		1620.56	-1.538E-02	&	1.245E+00	3.02E-01	G

785.42 1.284E+00 % P 2.111E+00 6.54E-01 G

BI-214 3.5072E-01

609.32 3.507E-01 (P 1.047E-01 4.64E-02 G K

1764.51 1.740E-01 - P 2.052E-01 7.23E-02 G

1120.28 1.073E+00 + P 4.204E-01 1.97E-01 G

RA-224 4.3791E-01

241.00 4.379E-01 &(P 1.268E+00 3.82E-01 G

RA-226 1.4177E+00

185.99 1.418E+00 *(1.229E+00 3.85E-01 G

AC-228 7.9542E-01

911.07 7.405E-01 (P 2.022E-01 9.61E-02 G K

968.90 7.907E-01 (P 2.924E-01 1.18E-01 G

338.40 9.349E-01 (P 3.293E-01 1.34E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.0386E-01						
		236.00	-1.039E-01	%(P	4.668E-01	1.40E-01	G K
		256.25	1.064E-01	& P	5.752E-01	1.71E-01	G
PA-234	-5.2753E-03						
		98.44	-5.275E-03	&(	1.708E-01	5.08E-02	G K
		946.00	5.889E-02	%	2.825E-01	8.20E-02	G
		131.28	4.408E-03	%	2.124E-01	6.31E-02	G
		94.67	6.029E-04	%	3.243E-01	9.66E-02	G
		883.24	2.299E-02	&	3.631E-01	1.01E-01	G
		926.70	4.371E-03	%	4.368E-01	1.21E-01	G
		569.26	1.375E-01	&	3.753E-01	1.12E-01	G
TH-234	1.0103E+00						
		63.29	6.127E-01	%(P	2.083E+00	6.25E-01	G K
		92.80	1.527E+00	@(P	1.694E+00	5.21E-01	G
		92.38	-6.140E-02	& P	2.021E+00	6.00E-01	G
AM-241	-1.3113E-03						
		59.54	-1.311E-03	&(P	2.568E-01	7.60E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	3.8249E-03	4.0451E-03	3.3830E-01	3.3830E-01	3.736E-01
K-40	1.4580E+01	1.4580E+01	1.7757E+00	1.9575E+00	
MN-54 #A	2.1609E-02	2.1817E-02	4.7709E-02	4.7725E-02	5.255E-02
CO-57 #B	3.7802E-03	3.8223E-03	4.3862E-02	4.3862E-02	4.853E-02
CO-60 #	2.8108E-01	2.8151E-01	8.0231E-02	8.1793E-02	
Sr-85 #A	-1.7671E-02	-1.8505E-02	5.6086E-02	5.6096E-02	5.982E-02
Kr-85 #A	-4.3337E+02	-4.3339E+02	1.3906E+03	1.3908E+03	1.385E+03
Y-88 #B	0.0000E+00	0.0000E+00	9.1009E-03	9.1025E-03	2.174E-02
NB-94 #B	1.1868E-02	1.1868E-02	4.2442E-02	4.2447E-02	4.862E-02
Ag-108M#B	-6.8919E-03	-6.8923E-03	5.2417E-02	5.2418E-02	6.048E-02
CD-109 #A	1.5209E-01	1.5310E-01	1.2675E+00	1.2675E+00	1.403E+00
SN-113 #B	-1.2060E-02	-1.2377E-02	5.8387E-02	5.8392E-02	6.432E-02
SB-125 #B	7.4016E-02	7.4235E-02	8.8196E-02	8.8295E-02	1.364E-01
I-131 #B	6.5404E-05	9.4857E-05	6.1157E-02	6.1157E-02	4.852E-02
CS-134 #B	-1.5188E-02	-1.5248E-02	5.3008E-02	5.3015E-02	5.447E-02
CS-137 #	1.4525E-01	1.4529E-01	9.0997E-02	9.1367E-02	
CE-139 #A	-1.3558E-02	-1.3856E-02	4.8804E-02	4.8810E-02	5.192E-02
EU-152 #B	-1.5356E-03	-1.5366E-03	4.6595E-01	4.6595E-01	1.396E-01
EU-154 #B	-3.3635E-03	-3.3668E-03	1.4275E-01	1.4275E-01	1.018E-01
EU-155 #B	1.1934E-03	1.1954E-03	1.5279E-01	1.5279E-01	1.705E-01
HG-203 #B	4.3646E-03	4.6539E-03	3.7643E-02	3.7644E-02	4.010E-02
TL-208 #	2.7188E-01	2.7188E-01	7.2480E-02	7.4090E-02	5.600E-02

PB-212 #	6.6254E-01	6.6254E-01	1.2242E-01	1.2802E-01	1.027E-01
PB-214 #	4.3321E-01	4.3321E-01	1.1467E-01	1.1725E-01	9.490E-02
BI-212 #	5.8846E-01	5.8846E-01	4.8661E-01	4.8775E-01	
BI-214	3.5072E-01	3.5072E-01	1.3923E-01	1.4063E-01	
RA-224 #A	4.3791E-01	4.3791E-01	1.1456E+00	1.1458E+00	1.268E+00
RA-226 #	1.4177E+00	1.4177E+00	1.1562E+00	1.1590E+00	1.229E+00
AC-228	7.9542E-01	7.9542E-01	1.9457E-01	1.9969E-01	
TH-227 #B	-1.0386E-01	-1.0386E-01	4.3369E-01	4.3373E-01	4.668E-01
PA-234 #B	-5.2753E-03	-5.2753E-03	1.5232E-01	1.5232E-01	1.708E-01
TH-234 #B	1.0103E+00	1.0103E+00	1.0339E+00	1.0354E+00	2.083E+00
AM-241 #A	-1.3112E-03	-1.3113E-03	1.0886E+00	1.0886E+00	2.568E-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_6SEP2005_1459.An1

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

Total Activity (1120.2 to 1999.1 keV) 1.6740831E+01 pCi/gm

Total Decayed Activity (1120.2 to 1999.1 keV) 1.6741306E+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_6SEP2005_1603.An1

Sample description

FSS-NOL-06-01-047-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_6SEP2005_1603.An1

Acquisition information

Start time:	06-Sep-2005 16:03:50
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: 1.8910E+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	31-Aug-2005 13:36:00
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: 0.2303

***** 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	179.	25.38	1.50	1.654E-02				
74.83	179.	25.38	1.50	1.654E-02	74.81	9.600	8.076E-01	PB212
77.15	283.	16.05	1.50	1.720E-02	77.11	17.500	6.727E-01	PB212
					77.11	10.700	1.086E+00	PB214
77.15	280.	16.05	1.50	1.720E-02	77.11	17.500	6.638E-01	PB212
					77.11	10.700	1.086E+00	PB214
90.21	55.	40.73	0.00	1.960E-02				

128.50	110.	30.01	0.72	2.110E-02				
186.13	88.	29.64	0.96	1.857E-02	185.99	3.280	1.027E+00	RA226
209.18	52.	37.33	1.00	1.722E-02				
238.87	658.	4.58	1.12	1.556E-02	238.63	43.100	6.940E-01	PB212
241.87	92.	20.87	1.12	1.540E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.02	87.	25.64	0.64	1.401E-02				
277.25	61.	31.34	1.08	1.369E-02				
295.54	190.	14.72	1.17	1.291E-02	295.22	19.200	5.414E-01	PB214
338.49	127.	17.25	1.45	1.135E-02	338.40	12.010	6.549E-01	AC228
352.08	266.	8.16	1.16	1.092E-02	351.99	37.100	4.660E-01	PB214
463.36	42.	31.47	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125
511.02	111.	18.28	2.23	7.586E-03	510.72	22.500	3.982E-01	TL208
					513.99	0.004	2.424E+03	Kr85
					514.00	99.270	1.133E-01	Sr85
583.42	219.	9.14	1.29	6.681E-03	583.14	86.000	2.695E-01	TL208
609.43	198.	10.40	1.36	6.412E-03	609.32	46.090	4.751E-01	Bi214
662.26	66.	20.85	1.63	5.932E-03	661.62	84.620	9.279E-02	CS137
727.56	63.	21.19	1.10	5.440E-03	727.17	11.800	6.945E-01	Bi212
911.44	145.	10.93	1.93	4.445E-03	911.07	29.000	7.932E-01	AC228
959.10	15.	38.60	1.61	4.231E-03	964.00	14.580	PBC<MDA	EU152
968.58	112.	13.79	1.57	4.213E-03	968.90	17.460	1.085E+00	AC228
1120.94	43.	36.99	0.86	3.711E-03	1120.28	15.040	5.457E-01	Bi214
1461.11	571.	4.45	1.90	2.942E-03	1460.75	10.700	1.290E+01	K40
1765.00	29.	18.57	1.12	2.481E-03	1764.51	15.920	5.167E-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
256.61	128.50	413.	122.	0.061	75.71	0.716	AC-228 s
418.04	209.18	171.	52.	0.026	112.00	0.999	AC-228
477.45	238.86	126.	658.	0.329	13.75	1.122	PB-212 D
483.44	241.85	140.	92.	0.046	62.61	1.124	PB-214 D
539.76	270.02	169.	87.	0.043	76.93	0.637	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	74.83	1012.	179.	0.090	76.15	1.499
PB-212	153.79	77.11	893.	283.	0.142	48.16	1.499D
PB-214	153.79	77.11	897.	280.	0.140	48.16	1.499D
RA-226	372.07	186.21	462.	95.	0.047	101.24	1.499s
PB-212	477.43	238.86	401.	542.	0.271	20.01	1.499
PB-214	590.65	295.45	189.	159.	0.079	43.29	1.499
AC-228	676.77	338.49	133.	125.	0.062	51.74	1.454s

PB-214	704.01	352.11	113.	257.	0.129	25.37	1.499s
SB-125	926.61	463.36	72.	42.	0.021	94.40	1.499s
TL-208	1021.99	511.02	105.	95.	0.048	54.83	2.227s
TL-208	1166.85	583.42	61.	217.	0.108	27.42	1.291
BI-214	1218.89	609.43	64.	196.	0.098	31.20	1.360s
CS-137	1324.60	662.26	47.	65.	0.033	62.56	1.625
BI-212	1455.28	727.56	41.	62.	0.031	63.58	1.099s
AC-228	1823.22	911.44	30.	143.	0.072	32.80	1.935s
EU-152	1918.61	959.10	11.	15.	0.008	115.79	1.612s
AC-228	1937.57	968.58	34.	112.	0.056	41.36	1.571s
BI-214	2242.47	1120.94	60.	43.	0.021	110.97	0.865s
K-40	2923.23	1461.11	17.	569.	0.284	13.34	1.903
BI-214	3531.43	1765.00	0.	29.	0.014	55.71	1.118s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-3.0018E-02					
			477.56	-3.002E-02	%(	3.616E-01	1.03E-01 G
K-40		1.2904E+01					
			1460.75	1.290E+01	(P	5.037E-01	5.76E-01 G
MN-54		1.7875E-02					
			834.81	1.787E-02	%(P	3.694E-02	1.12E-02 G
CO-57		1.2516E-02					
			122.07	1.252E-02	%(	4.402E-02	1.32E-02 G K
			136.43	-1.077E-01	&	3.796E-01	1.14E-01 G
CO-60		8.0655E-03					
			1332.51	8.066E-03	%(P	5.277E-02	1.48E-02 G K
			1173.23	1.539E-02	% P	5.867E-02	1.71E-02 G K
Sr-85		-2.6181E-02					
			514.00	-2.618E-02	%(	6.002E-02	1.81E-02 G
Kr-85		-5.9214E+02					
			513.99	-5.921E+02	%(P	1.303E+03	3.92E+02 G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	5.187E-02	1.32E-02 G K

898.02-3.232E-03 % P 5.529E-02 1.55E-02 G

NB-94 1.9346E-02

871.10 1.935E-02 &(P 4.112E-02 1.25E-02 G K

702.50-5.656E-03 & P 5.174E-02 1.49E-02 G K

Ag-108M -1.5929E-02

722.95-1.593E-02 %(6.160E-02 1.82E-02 G K

614.37-1.521E-02 % P 5.666E-02 1.67E-02 G

433.93-1.127E-02 % 4.304E-02 1.27E-02 G

CD-109 -4.5207E-01

88.04-4.521E-01 %(P 1.292E+00 3.89E-01 G

SN-113 -8.0810E-04

391.71-8.081E-04 %(6.100E-02 1.76E-02 G K

255.04 3.684E-01 & P 1.734E+00 5.15E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.2866E-02						
		427.95	-9.937E-03	&(P	1.292E-01	3.73E-02	G K
		600.77	-1.446E-03	% P	1.998E-01	5.56E-02	G
		636.15	-2.957E-03	& P	3.854E-01	1.08E-01	G
		463.51	3.576E-01	*(P	3.624E-01	1.16E-01	G
		176.29	4.834E-02	% P	5.931E-01	1.76E-01	G
I-131	-2.9541E-02						
		364.48	-2.954E-02	%(	8.069E-02	2.42E-02	G K
		636.97	-3.388E-02	&	8.835E-01	2.48E-01	G
		284.29	1.141E-02	&	9.527E-01	2.77E-01	G
CS-134	-8.7009E-03						
		604.66	-8.701E-03	%(P	4.319E-02	1.25E-02	G K
		795.76	2.456E-02	% P	5.423E-02	1.64E-02	G
		569.29	-6.477E-02	& P	2.818E-01	8.23E-02	G
		801.84	-5.385E-02	&	5.121E-01	1.45E-01	G
CS-137	9.2795E-02						
		661.62	9.279E-02	(P	4.921E-02	1.96E-02	G
CE-139	-8.3724E-03						
		165.85	-8.372E-03	%(P	5.182E-02	1.55E-02	G
EU-152	8.1120E-02						
		121.78	3.317E-02	%(P	1.316E-01	3.95E-02	G K
		344.30	-7.462E-03	% P	1.388E-01	4.02E-02	G
		1408.08	4.128E-02	& P	1.877E-01	5.22E-02	G
		964.00	1.773E-01	?(P	2.112E-01	7.05E-02	G
		1112.07	6.313E-02	% P	3.689E-01	1.05E-01	G

778.90 5.780E-02 & P 3.162E-01 9.05E-02 G

EU-154 1.8270E-02

123.10 1.827E-02 &(P 9.366E-02 2.80E-02 G K

1274.80-1.228E-02 % P 1.557E-01 4.31E-02 G

723.30-9.484E-03 % P 4.190E-01 1.22E-01 G

1004.80-6.244E-02 % P 3.516E-01 1.02E-01 G

EU-155 8.5372E-03

86.45 8.537E-03 %(1.719E-01 5.13E-02 G K

105.31 9.000E-02 % 1.891E-01 5.74E-02 G

HG-203 -1.1070E-02

279.17-1.107E-02 %(5.344E-02 1.59E-02 G K

72.87-4.954E-01 & P 1.293E+00 3.91E-01 G

70.83 5.321E-01 % 2.059E+00 6.19E-01 G

82.50-4.724E-01 & 2.659E+00 7.97E-01 G

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

TL-208       2.6954E-01
                   583.14 2.695E-01  (P 4.868E-02 2.49E-02 G
                   510.72 3.982E-01 + P 2.110E-01 8.50E-02 G

PB-212       6.0483E-01
                   238.63 5.773E-01  (P 1.022E-01 3.89E-02 G K
                                          Energy duplication
                    77.11 6.727E-01  (  3.370E-01 1.08E-01 G
                    74.81 8.076E-01 & P 6.793E-01 2.11E-01 G

PB-214       4.5477E-01
                   351.99 4.537E-01 @(P 9.200E-02 3.87E-02 G K
                   295.22 4.568E-01  (P 1.925E-01 6.67E-02 G
                                          Energy duplication
                    77.11 1.086E+00 + P 5.523E-01 1.77E-01 G
                   241.92 3.038E-02 % P 7.189E-01 2.13E-01 G

BI-212       6.9455E-01
                   727.17 6.945E-01 *(P 3.604E-01 1.49E-01 G K
                  1620.56-2.708E-02 %   2.065E+00 5.49E-01 G
                   785.42 2.225E-01 % P 2.382E+00 6.76E-01 G

BI-214       4.9747E-01
                   609.32 4.751E-01 @(P 9.634E-02 4.97E-02 G K
                  1764.51 5.167E-01  (P 1.333E-01 9.74E-02 G
                  1120.28 5.457E-01  (P 4.984E-01 2.04E-01 G

RA-224       7.5264E-01
                   241.00 7.526E-01 %(P 1.244E+00 3.80E-01 G
```

```
RA-226       1.1094E+00
                 185.99 1.109E+00 *(  1.207E+00 3.74E-01 G

AC-228       7.5271E-01
                 911.07 7.932E-01  (P 1.562E-01 8.79E-02 G K
                 968.90 1.085E+00 + P 2.916E-01 1.51E-01 G
                 338.40 6.549E-01  (P 2.960E-01 1.15E-01 G

TH-227      -1.1256E-01
                 236.00-1.126E-01 %(P 3.899E-01 1.17E-01 G K
                 256.25 5.588E-02 & P 5.474E-01 1.61E-01 G

PA-234      -4.6498E-02
                  98.44-4.650E-02 %(  1.683E-01 5.06E-02 G K
                 946.00 0.000E+00 %   2.356E-01 6.47E-02 G
                 131.28-2.074E-02 &   1.989E-01 5.93E-02 G
                  94.67-2.893E-02 &   3.166E-01 9.45E-02 G
                 883.24 5.795E-03 %   3.337E-01 9.10E-02 G
                 926.70 6.258E-02 &   4.236E-01 1.20E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	-9.108E-02	&	4.145E-01	1.21E-01	G
TH-234	1.0529E+00						
		63.29	1.053E+00	%(P	1.991E+00	6.03E-01	G K
		92.80	1.095E+00	& P	1.611E+00	4.92E-01	G
		92.38	1.134E+00	& P	1.931E+00	5.86E-01	G
AM-241	-2.0458E-03						
		59.54	-2.046E-03	&(P	2.951E-01	8.76E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-2.7732E-02	-3.0018E-02	3.1039E-01	3.1040E-01	3.341E-01
K-40		1.2904E+01	1.2904E+01	1.7277E+00	1.8752E+00	
MN-54	#A	1.7634E-02	1.7875E-02	3.3595E-02	3.3610E-02	3.644E-02
CO-57	#B	1.2321E-02	1.2516E-02	3.9661E-02	3.9667E-02	4.334E-02
CO-60	#B	8.0478E-03	8.0655E-03	4.4336E-02	4.4339E-02	5.266E-02

Sr-85 #A	-2.4527E-02	-2.6181E-02	5.4387E-02	5.4407E-02	5.623E-02
Kr-85 #A	-5.9211E+02	-5.9214E+02	1.2840E+03	1.2844E+03	1.303E+03
Y-88 #B	0.0000E+00	0.0000E+00	3.9503E-02	3.9503E-02	4.985E-02
NB-94 #B	1.9346E-02	1.9346E-02	3.7372E-02	3.7388E-02	4.112E-02
Ag-108M#B	-1.5927E-02	-1.5929E-02	5.4455E-02	5.4462E-02	6.159E-02
CD-109 #A	-4.4787E-01	-4.5207E-01	1.1924E+00	1.1927E+00	1.280E+00
SN-113 #B	-7.7894E-04	-8.0810E-04	5.2725E-02	5.2725E-02	5.880E-02
SB-125 #B	8.2520E-02	8.2866E-02	8.0948E-02	8.1083E-02	1.286E-01
I-131 #B	-1.7456E-02	-2.9541E-02	7.2611E-02	7.2630E-02	4.768E-02
CS-134 #B	-8.6522E-03	-8.7009E-03	4.4017E-02	4.4020E-02	4.294E-02
CS-137	9.2759E-02	9.2795E-02	5.8844E-02	5.9077E-02	
CE-139 #A	-8.1188E-03	-8.3724E-03	4.8110E-02	4.8112E-02	5.025E-02
EU-152 #B	8.1046E-02	8.1120E-02	9.6761E-02	9.6866E-02	1.315E-01
EU-154 #B	1.8245E-02	1.8270E-02	8.3993E-02	8.4000E-02	9.353E-02
EU-155 #B	8.5173E-03	8.5372E-03	1.5394E-01	1.5394E-01	1.715E-01
HG-203 #B	-1.0109E-02	-1.1070E-02	4.7656E-02	4.7660E-02	4.880E-02
TL-208	2.6954E-01	2.6954E-01	7.4725E-02	7.6261E-02	
PB-212 #	6.0483E-01	6.0483E-01	1.2242E-01	1.2710E-01	1.022E-01
PB-214 #	4.5477E-01	4.5477E-01	1.1528E-01	1.1810E-01	9.200E-02
BI-212 #	6.9455E-01	6.9455E-01	4.4635E-01	4.4807E-01	
BI-214	4.9747E-01	4.9747E-01	1.5607E-01	1.5858E-01	
RA-224 #A	7.5264E-01	7.5264E-01	1.1388E+00	1.1396E+00	1.244E+00
RA-226 #A	1.1094E+00	1.1094E+00	1.1231E+00	1.1249E+00	1.207E+00
AC-228	7.5271E-01	7.5271E-01	2.3431E-01	2.3814E-01	
TH-227 #B	-1.1256E-01	-1.1256E-01	3.6184E-01	3.6190E-01	3.899E-01
PA-234 #B	-4.6498E-02	-4.6498E-02	1.5173E-01	1.5175E-01	1.683E-01
TH-234 #B	1.0529E+00	1.0529E+00	1.8098E+00	1.8107E+00	1.991E+00
AM-241 #A	-2.0457E-03	-2.0458E-03	4.6670E-01	4.6670E-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 (263.6 to 1999.1 keV) 1.5211131E+01 pCi/gm

Total Decayed Activity (263.6 to 1999.1 keV) 1.5211166E+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_6SEPT2005_1116.An1

Sample description

FSS-NOL-06-01-044-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_6SEPT2005_1116.An1

Acquisition information

Start time:	06-Sep-2005 11:16:32
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: 2.1290E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1290E+03) =
4.6970E+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-Aug-2005 13:59:00
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: 0.0709

***** 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	201.	19.31	1.00	1.651E-02				
74.35	201.	19.31	1.00	1.651E-02	74.81	9.600	7.825E-01	PB212
77.35	454.	8.42	1.01	1.736E-02	77.11	10.700	1.553E+00	PB214
					77.11	17.500	9.577E-01	PB212
86.86	88.	36.95	1.01	1.915E-02	86.45	32.740	8.917E-02	EU155
90.26	96.	34.08	1.02	1.960E-02	88.04	3.790	PBC<MDA	CD109
93.25	157.	20.92	1.02	1.993E-02	92.38	2.570	PBC<MDA	TH234

					92.80	3.000	PBC<MDA	TH234
186.26	152.	16.52	1.08	1.858E-02	185.99	3.280	1.585E+00	RA226
209.51	124.	27.54	1.12	1.720E-02				
238.83	956.	3.85	1.12	1.557E-02	238.63	43.100	8.984E-01	PB212
241.59	162.	16.76	1.12	1.542E-02	241.00	3.900	1.704E+00	RA224
270.39	112.	26.44	1.71	1.400E-02				
295.47	211.	13.94	1.23	1.291E-02	295.22	19.200	5.348E-01	PB214
300.78	53.	40.63	1.14	1.270E-02				
338.49	175.	16.66	1.08	1.135E-02	338.40	12.010	8.061E-01	AC228
352.07	374.	7.59	0.92	1.092E-02	351.99	37.100	5.829E-01	PB214
463.40	71.	24.83	1.45	8.344E-03				
463.40	71.	24.83	1.45	8.344E-03	463.51	10.000	5.329E-01	SB125
510.85	127.	14.80	1.69	7.589E-03	510.72	22.500	4.113E-01	TL208
583.29	311.	7.67	1.39	6.683E-03	583.14	86.000	3.408E-01	TL208
609.38	268.	7.59	1.32	6.412E-03	609.32	46.090	5.732E-01	BI214
728.21	59.	24.57	1.23	5.436E-03	727.17	11.800	5.764E-01	BI212
768.08	50.	33.43	1.50	5.179E-03				
795.29	25.	39.40	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134
911.28	198.	9.52	1.81	4.446E-03	911.07	29.000	9.635E-01	AC228
968.12	139.	12.18	1.40	4.215E-03	968.90	17.460	1.192E+00	AC228
1120.25	57.	27.01	2.01	3.711E-03	1120.28	15.040	6.439E-01	BI214
1460.84	793.	3.68	1.89	2.942E-03	1460.75	10.700	1.595E+01	K40
1764.76	42.	16.50	1.78	2.481E-03	1764.51	15.920	6.678E-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	653.	201.	0.101	57.94	1.004	Bl-207 D
154.27	77.72	504.	454.	0.227	25.25	1.007	PB-214 D
173.29	86.81	480.	88.	0.044	110.84	1.013	Bl-207 lD
180.10	90.21	482.	96.	0.048	102.25	1.016	PB-214 lD
185.94	93.20	517.	141.	0.071	72.71	1.018	U-235 D
418.70	209.51	417.	124.	0.062	82.63	1.115	AC-228
477.37	238.71	201.	956.	0.478	11.56	1.122	PB-212 D
540.51	270.39	286.	112.	0.056	79.33	1.708	AC-228 s
601.31	300.78	181.	53.	0.027	121.88	1.141	PB-212
703.94	352.07	437.	92.	0.046	101.11	0.920	PB-214
1536.36	768.08	70.	50.	0.025	83.46	1.505	Bl-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-212	149.27	74.85	1389.	215.	0.107	74.47	1.499s

PB-214	153.79	77.11	1227.	385.	0.192	41.13	1.499D
PB-212	153.79	77.11	1224.	388.	0.194	41.13	1.499D
TH-234	185.83	93.13	1074.	152.	0.076	90.98	1.499
RA-226	371.66	186.00	364.	117.	0.058	74.54	0.926
PB-212	477.32	238.81	526.	785.	0.392	16.23	1.499
RA-224	481.70	241.00	635.	135.	0.067	83.15	1.123D
PB-214	590.68	295.47	264.	215.	0.107	37.67	1.499s
AC-228	676.76	338.49	236.	173.	0.087	49.98	1.081s
PB-214	703.93	352.07	142.	280.	0.140	25.24	1.499
SB-125	926.10	463.10	98.	66.	0.033	71.69	1.499
TL-208	1021.63	510.85	99.	111.	0.055	44.40	1.690s
TL-208	1166.59	583.29	88.	309.	0.154	23.01	1.393
BI-214	1218.79	609.38	57.	267.	0.133	22.77	1.315
BI-212	1456.58	728.21	55.	58.	0.029	73.72	1.233s
CS-134	1590.81	795.29	38.	25.	0.013	118.20	1.502s
AC-228	1822.90	911.28	52.	196.	0.098	28.56	1.809
AC-228	1936.65	968.12	44.	138.	0.069	36.53	1.399s
BI-214	2241.10	1120.25	60.	57.	0.028	81.03	2.010

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2922.70	1460.84	16.	791.	0.396	11.04	1.891s
Bl-214	3530.95	1764.76	2.	42.	0.021	49.49	1.781

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.3007E-01					
			477.56	1.301E-01	%(	3.653E-01	1.09E-01 G
K-40		1.5949E+01					
			1460.75	1.595E+01	@(P	4.290E-01	5.89E-01 G
MN-54		7.0623E-03					
			834.81	7.062E-03	&(P	4.956E-02	1.42E-02 G
CO-57		-3.8556E-03					
			122.07	-3.856E-03	&(	5.040E-02	1.50E-02 G K
			136.43	-6.516E-02	&	4.339E-01	1.30E-01 G
CO-60		4.2936E-03					
			1332.51	4.294E-03	&(P	5.351E-02	1.49E-02 G K
			1173.23	2.414E-02	% P	6.896E-02	2.05E-02 G K

Sr-85 -2.4450E-02

514.00-2.445E-02 %(6.097E-02 1.84E-02 G

Kr-85 -5.5311E+02

513.99-5.531E+02 %(P 1.326E+03 3.98E+02 G

Y-88 -3.6698E-03

1836.01-3.670E-03 %(3.931E-02 1.02E-02 G K

898.02 1.354E-02 % P 4.379E-02 1.28E-02 G

NB-94 -1.8292E-04

871.10-1.829E-04 %(P 5.223E-02 1.47E-02 G K

702.50 8.700E-04 % P 4.477E-02 1.27E-02 G K

Ag-108M 1.9009E-03

722.95 1.901E-03 %(4.672E-02 1.32E-02 G K

614.37 7.022E-03 % P 4.125E-02 1.19E-02 G

433.93-5.961E-03 & 4.510E-02 1.32E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	2.6239E-01						
		88.04	2.624E-01	%(P	1.424E+00	4.28E-01	G
SN-113	7.8144E-03						
		391.71	7.814E-03	&(	6.302E-02	1.85E-02	G K
		255.04	-1.913E-01	& P	1.972E+00	5.84E-01	G
SB-125	1.3258E-01						
		427.95	6.538E-03	%(P	1.114E-01	3.20E-02	G K
		600.77	-1.211E-03	& P	2.618E-01	7.50E-02	G
		636.15	6.612E-02	& P	3.899E-01	1.13E-01	G
		463.51	5.057E-01	(P	3.736E-01	1.23E-01	G
		176.29	-1.170E-02	& P	6.478E-01	1.92E-01	G
I-131	-2.1367E-03						
		364.48	-2.137E-03	&(	8.084E-02	2.36E-02	G K
		636.97	-1.153E-01	&	1.118E+00	3.24E-01	G
		284.29	-1.278E-01	%	1.064E+00	3.15E-01	G
CS-134	7.3088E-03						
		604.66	-1.907E-02	%(P	5.614E-02	1.67E-02	G K
		795.76	3.745E-02	*(P	4.702E-02	1.50E-02	G
		569.29	2.078E-02	& P	2.721E-01	7.83E-02	G
		801.84	1.413E-01	%	4.261E-01	1.26E-01	G
CS-137	-1.2633E-02						
		661.62	-1.263E-02	%(P	5.937E-02	1.73E-02	G
CE-139	-1.4164E-03						
		165.85	-1.416E-03	%(P	4.860E-02	1.44E-02	G

EU-152 -8.0561E-04

121.78-8.056E-04 &(P 1.481E-01 4.41E-02 G K

344.30-2.032E-02 & P 1.508E-01 4.44E-02 G

1408.08 1.189E-01 % P 1.725E-01 5.58E-02 G

964.00 7.039E-03 % P 8.447E-01 2.48E-01 G

1112.07 1.084E-01 & P 4.699E-01 1.37E-01 G

778.90-4.533E-02 & P 3.555E-01 1.02E-01 G

EU-154 -6.7796E-04

123.10-6.780E-04 %(P 1.062E-01 3.16E-02 G K

1274.80 3.643E-02 % P 1.278E-01 3.71E-02 G

723.30 1.460E-02 % P 1.786E-01 5.01E-02 G

1004.80-6.841E-02 & P 3.599E-01 1.05E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-5.5704E-03						
		86.45	-5.570E-03	%(	1.705E-01	5.10E-02	G K
		105.31	7.752E-02	%	1.995E-01	6.03E-02	G
HG-203	2.4990E-02						
		279.17	2.499E-02	%(	4.401E-02	1.34E-02	G K
		72.87	-1.198E-01	% P	1.175E+00	3.52E-01	G
		70.83	-6.320E-01	&	2.293E+00	6.91E-01	G
		82.50	-1.160E+00	%	2.563E+00	7.77E-01	G
TL-208	3.5540E-01						
		583.14	3.408E-01	(P	5.136E-02	2.63E-02	G
		510.72	4.113E-01	*(P	1.827E-01	6.97E-02	G
PB-212	7.7718E-01						
		238.63	7.419E-01	(P	1.036E-01	4.05E-02	G K
					Energy duplication		
		77.11	8.189E-01	(	3.494E-01	1.12E-01	G
		74.81	8.593E-01	?(P	7.052E-01	2.19E-01	G
PB-214	4.3852E-01						
		351.99	4.385E-01	(P	9.136E-02	3.72E-02	G K
		295.22	5.500E-01	+ P	2.005E-01	6.96E-02	G
					Energy duplication		
		77.11	1.327E+00	+ P	5.723E-01	1.84E-01	G
		241.92	3.845E-01	% P	7.171E-01	2.18E-01	G
BI-212	5.7638E-01						
		727.17	5.764E-01	*(P	3.673E-01	1.43E-01	G K
		1620.56	3.259E-01	%	1.190E+00	3.35E-01	G

785.42-2.248E-01 % P 2.374E+00 6.77E-01 G

BI-214 6.0653E-01

609.32 5.732E-01 (P 8.145E-02 4.37E-02 G K

1764.51 6.678E-01 (P 1.605E-01 1.11E-01 G

1120.28 6.439E-01 (P 4.426E-01 1.75E-01 G

RA-224 1.4170E+00

241.00 1.417E+00 (P 1.266E+00 3.95E-01 G

RA-226 1.2184E+00

185.99 1.218E+00 (9.541E-01 3.03E-01 G

AC-228 1.0493E+00

911.07 9.635E-01 (P 1.792E-01 9.26E-02 G K

968.90 1.192E+00 @(P 2.899E-01 1.46E-01 G

338.40 8.061E-01 - P 3.459E-01 1.36E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-2.0280E-01						
		236.00	-2.028E-01	%(	P 4.567E-01	1.38E-01	G K
		256.25	-3.620E-02	%	P 5.073E-01	1.49E-01	G
PA-234	-1.3134E-03						
		98.44	-1.313E-03	%(	1.793E-01	5.34E-02	G K
		946.00	7.371E-02	%	2.395E-01	7.06E-02	G
		131.28	4.648E-03	%	1.886E-01	5.61E-02	G
		94.67	-7.975E-02	%	3.308E-01	9.95E-02	G
		883.24	8.750E-02	%	3.696E-01	1.07E-01	G
		926.70	-1.233E-01	&	4.167E-01	1.22E-01	G
		569.26	3.314E-02	&	4.010E-01	1.16E-01	G
TH-234	8.1022E-01						
		63.29	1.920E-01	%(	P 2.240E+00	6.69E-01	G K
		92.80	1.614E+00	(	P 1.653E+00	5.09E-01	G
		92.38	-3.470E-01	%	P 2.045E+00	6.10E-01	G
AM-241	5.0182E-02						
		59.54	5.018E-02	%(	P 3.054E-01	9.15E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	1.2050E-01	1.3007E-01	3.2731E-01	3.2739E-01	3.384E-01
K-40 #	1.5949E+01	1.5949E+01	1.7667E+00	1.9832E+00	
MN-54 #A	6.9706E-03	7.0623E-03	4.2745E-02	4.2747E-02	4.892E-02
CO-57 #B	-3.7977E-03	-3.8556E-03	4.5148E-02	4.5148E-02	4.965E-02
CO-60 #B	4.2845E-03	4.2936E-03	4.4636E-02	4.4636E-02	5.340E-02
Sr-85 #A	-2.2959E-02	-2.4450E-02	5.5112E-02	5.5129E-02	5.725E-02
Kr-85 #A	-5.5309E+02	-5.5311E+02	1.2985E+03	1.2989E+03	1.325E+03
Y-88 #B	-3.5320E-03	-3.6698E-03	3.0480E-02	3.0481E-02	3.783E-02
NB-94 #B	-1.8292E-04	-1.8292E-04	1.1765E-02	1.1765E-02	5.223E-02
Ag-108M#B	1.9007E-03	1.9009E-03	3.9651E-02	3.9651E-02	4.672E-02
CD-109 #A	2.6003E-01	2.6239E-01	1.2827E+00	1.2828E+00	1.411E+00
SN-113 #B	7.5422E-03	7.8144E-03	5.5472E-02	5.5473E-02	6.083E-02
SB-125 #F	1.3205E-01	1.3258E-01	9.7123E-02	9.7412E-02	1.109E-01
I-131 #B	-1.2863E-03	-2.1367E-03	7.0731E-02	7.0731E-02	4.866E-02
CS-134 #B	7.2693E-03	7.3088E-03	8.7822E-03	8.7919E-03	5.583E-02
CS-137 #A	-1.2628E-02	-1.2633E-02	6.2048E-02	6.2053E-02	5.935E-02
CE-139 #A	-1.3749E-03	-1.4164E-03	5.2440E-02	5.2440E-02	4.718E-02
EU-152 #B	-8.0490E-04	-8.0561E-04	2.0746E-01	2.0746E-01	1.480E-01
EU-154 #B	-6.7707E-04	-6.7796E-04	1.7302E-01	1.7302E-01	1.060E-01
EU-155 #B	-5.5579E-03	-5.5704E-03	1.5291E-01	1.5291E-01	1.701E-01
HG-203 #B	2.2894E-02	2.4990E-02	4.0311E-02	4.0335E-02	4.032E-02
TL-208	3.5540E-01	3.5540E-01	8.2407E-02	8.4818E-02	

PB-212 #	7.7718E-01	7.7718E-01	1.2715E-01	1.3452E-01	1.036E-01
PB-214 #	4.3852E-01	4.3852E-01	1.1148E-01	1.1420E-01	9.136E-02
BI-212 #	5.7638E-01	5.7638E-01	4.2985E-01	4.3108E-01	
BI-214	6.0653E-01	6.0653E-01	1.3865E-01	1.4283E-01	
RA-224	1.4170E+00	1.4170E+00	1.1845E+00	1.1872E+00	
RA-226	1.2184E+00	1.2184E+00	9.0816E-01	9.1077E-01	
AC-228	1.0493E+00	1.0493E+00	2.4494E-01	2.5201E-01	
TH-227 #B	-2.0280E-01	-2.0280E-01	4.2122E-01	4.2138E-01	4.567E-01
PA-234 #B	-1.3134E-03	-1.3134E-03	1.6021E-01	1.6021E-01	1.793E-01
TH-234 #B	8.1022E-01	8.1022E-01	7.6717E-01	7.6848E-01	2.240E+00
AM-241 #A	5.0180E-02	5.0182E-02	2.7459E-01	2.7461E-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_6SEPT2005_1116.An1

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

Total Activity (270.1 to 1999.1 keV) 2.1172277E+01 pCi/gm

Total Decayed Activity (270.1 to 1999.1 keV) 2.1172285E+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_6SEPT2005_1320.An1

Sample description

FSS-NOL-06-01-052-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_6SEPT2005_1320.An1

Acquisition information

Start time:	06-Sep-2005 13:21:31
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: 2.1090E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1090E+03) =
4.7416E+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-Aug-2005 14:43:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1336

***** 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	226.	15.67	1.00	1.651E-02				
74.67	226.	15.67	1.00	1.651E-02	74.81	9.600	8.915E-01	PB212
77.23	354.	9.57	1.01	1.725E-02	77.11	10.700	1.219E+00	PB214
					77.11	17.500	7.533E-01	PB212
87.33	154.	19.71	1.01	1.925E-02				
89.87	124.	23.24	1.02	1.959E-02	88.04	3.790	PBC<MDA	CD109
93.46	118.	24.84	1.02	1.998E-02	92.80	3.000	PBC<MDA	TH234

					94.67	15.500	2.431E-01	PA234
128.27	94.	36.93	1.02	2.111E-02				
186.49	133.	29.92	1.30	1.855E-02	185.99	3.280	1.402E+00	RA226
209.31	109.	31.71	1.04	1.721E-02				
238.85	873.	3.97	1.12	1.557E-02	238.63	43.100	8.272E-01	PB212
242.03	125.	17.25	1.12	1.540E-02	241.00	3.900	1.317E+00	RA224
					241.92	7.470	PBC<MDA	PB214
270.33	122.	19.87	1.64	1.400E-02				
295.29	209.	14.08	1.15	1.292E-02	295.22	19.200	5.350E-01	PB214
328.27	65.	38.33	1.00	1.169E-02				
338.70	157.	12.76	0.88	1.134E-02	338.40	12.010	7.259E-01	AC228
352.06	344.	7.89	1.02	1.092E-02	351.99	37.100	5.399E-01	PB214
463.25	61.	27.87	0.85	8.346E-03				
463.25	61.	27.87	0.85	8.346E-03	463.51	10.000	4.562E-01	SB125
510.96	118.	18.54	1.15	7.587E-03	510.72	22.500	3.818E-01	TL208
583.36	271.	7.10	1.39	6.682E-03	583.14	86.000	2.999E-01	TL208
609.45	280.	9.31	1.36	6.411E-03	609.32	46.090	6.046E-01	BI214
727.29	53.	29.53	0.86	5.442E-03	727.17	11.800	5.220E-01	BI212
794.66	54.	30.33	1.53	5.022E-03				
794.66	54.	30.33	1.53	5.022E-03	795.76	85.400	8.134E-02	CS134
911.34	166.	10.36	1.82	4.445E-03	911.07	29.000	8.181E-01	AC228
965.15	30.	30.01	1.61	4.226E-03	964.00	14.580	PBC<MDA	EU152
969.19	92.	13.11	1.62	4.210E-03	968.90	17.460	7.963E-01	AC228
1120.50	72.	21.16	1.11	3.710E-03	1120.28	15.040	8.199E-01	BI214
1461.00	629.	4.11	1.59	2.942E-03	1460.75	10.700	1.275E+01	K40
1764.73	54.	15.17	2.44	2.481E-03	1764.51	15.920	8.802E-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	
148.90	74.72	515.	226.	0.113	47.01	1.005	Bl-207	D
154.03	77.28	397.	354.	0.177	28.71	1.007	PB-214	D
174.23	87.51	386.	154.	0.077	59.13	1.014	PB-214	lD
179.33	90.06	354.	124.	0.062	69.73	1.016	PB-214	lD
418.29	209.31	414.	109.	0.054	95.14	1.041	AC-228	s
477.41	238.77	165.	873.	0.436	11.92	1.122	PB-212	D
540.39	270.33	184.	122.	0.061	59.61	1.641	AC-228	s
656.32	328.27	200.	65.	0.033	115.00	1.000	RH-106M	s
1931.66	965.38	29.	27.	0.013	104.59	1.614	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	149.35	74.89	1243.	208.	0.104	73.07	1.499
PB-214	153.79	77.11	1082.	316.	0.158	46.72	1.499D
PB-212	153.79	77.11	1078.	320.	0.160	46.72	1.499D

TH-234	185.88	93.15	994.	119.	0.059	110.21	1.499s
PA-234	185.34	92.88	776.	101.	0.051	120.17	1.499s
RA-226	372.30	186.32	570.	117.	0.058	90.93	1.499s
PB-212	477.30	238.80	471.	738.	0.369	16.49	1.499
RA-224	481.70	241.00	589.	95.	0.048	111.29	1.123D
PB-214	590.58	295.41	219.	183.	0.091	40.45	1.499
AC-228	677.19	338.70	113.	154.	0.077	38.29	0.875
PB-214	704.04	352.12	136.	325.	0.162	22.38	1.499
SB-125	926.43	463.27	83.	52.	0.026	82.36	1.499
TL-208	1021.86	510.96	128.	102.	0.051	55.61	1.146s
TL-208	1166.74	583.36	48.	269.	0.135	21.31	1.389
BI-214	1218.94	609.45	109.	279.	0.139	27.93	1.356
BI-212	1455.56	727.70	60.	30.	0.015	118.32	1.499s
CS-134	1590.90	795.34	47.	27.	0.013	122.03	1.502
AC-228	1823.02	911.34	39.	165.	0.082	31.09	1.824s
AC-228	1938.21	968.90	25.	91.	0.046	38.60	1.616D
BI-214	2241.58	1120.50	45.	71.	0.036	63.49	1.107s
K-40	2923.03	1461.00	12.	626.	0.313	12.32	1.592

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bi-214	3530.89	1764.73	4.	54.	0.027	45.52	2.439s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Activity Code	MDA Value pCi/gm	COMMENTS
BE-7		3.8871E-02					
			477.56	3.887E-02	%(	3.157E-01	9.08E-02 G
K-40		1.2749E+01					
			1460.75	1.275E+01	(P	3.779E-01	5.26E-01 G
MN-54		1.2482E-02					
			834.81	1.248E-02	&(P	4.273E-02	1.25E-02 G
CO-57		-5.3095E-03					
			122.07	-5.310E-03	%(	3.829E-02	1.14E-02 G K
			136.43	4.298E-03	&	3.618E-01	1.07E-01 G
CO-60		-1.7448E-04					
			1332.51	-1.745E-04	%(P	4.854E-02	1.30E-02 G K
			1173.23	8.544E-03	& P	4.983E-02	1.42E-02 G K
Sr-85		-1.2827E-02					

514.00-1.283E-02 %(5.452E-02 1.62E-02 G

Kr-85 -3.0170E+02

513.99-3.017E+02 %(P 1.186E+03 3.50E+02 G

Y-88 0.0000E+00

1836.01 0.000E+00 &(2.066E-02 2.80E-03 G K

898.02-2.061E-03 % P 4.061E-02 1.11E-02 G

NB-94 -7.2851E-03

871.10-7.285E-03 &(P 4.866E-02 1.40E-02 G K

702.50 2.300E-03 % P 4.446E-02 1.27E-02 G K

Ag-108M 0.0000E+00

722.95 0.000E+00 %(7.627E-02 2.21E-02 G K

614.37-8.525E-03 % P 5.172E-02 1.51E-02 G

433.93 2.727E-03 & 4.538E-02 1.32E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	3.9543E-01						
		88.04	3.954E-01	&(P	1.358E+00	4.09E-01	G
SN-113	-7.4250E-03						
		391.71	-7.425E-03	%(	6.140E-02	1.80E-02	G K
		255.04	-4.166E-01	% P	1.791E+00	5.34E-01	G
SB-125	1.0270E-01						
		427.95	1.780E-03	%(P	1.423E-01	4.12E-02	G K
		600.77	-1.607E-04	& P	2.163E-01	6.12E-02	G
		636.15	5.604E-02	& P	4.146E-01	1.20E-01	G
		463.51	4.014E-01	(P	3.474E-01	1.13E-01	G
		176.29	-1.663E-02	& P	5.830E-01	1.72E-01	G
I-131	-1.5259E-02						
		364.48	-1.526E-02	%(	8.024E-02	2.37E-02	G K
		636.97	-2.538E-01	&	1.023E+00	3.01E-01	G
		284.29	-1.361E-02	%	9.111E-01	2.66E-01	G
CS-134	1.3668E-02						
		604.66	-9.336E-03	&(P	5.522E-02	1.62E-02	G K
		795.76	3.996E-02	(P	5.221E-02	1.65E-02	G
		569.29	1.287E-02	& P	2.385E-01	6.78E-02	G
		801.84	-6.180E-04	%	4.609E-01	1.28E-01	G
CS-137	7.6027E-03						
		661.62	7.603E-03	%(P	5.665E-02	1.64E-02	G
CE-139	-1.3329E-02						
		165.85	-1.333E-02	%(P	4.654E-02	1.40E-02	G

EU-152 -2.6577E-03

121.78-2.658E-03 &(P 1.337E-01 3.97E-02 G K

344.30 1.166E-02 & P 1.311E-01 3.83E-02 G

1408.08-1.769E-03 % P 2.536E-01 6.85E-02 G

964.00-1.670E-02 % P 7.840E-01 2.29E-01 G

1112.07 1.153E-01 % P 3.855E-01 1.13E-01 G

778.90-7.938E-02 % P 3.747E-01 1.09E-01 G

EU-154 -2.8695E-02

123.10-2.869E-02 %(P 1.064E-01 3.20E-02 G K

1274.80-1.659E-02 & P 1.721E-01 4.87E-02 G

723.30-3.799E-02 % P 2.547E-01 7.37E-02 G

1004.80-4.360E-02 & P 3.015E-01 8.64E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	2.7472E-02						
		86.45	2.747E-02	%(	1.396E-01	4.19E-02	G K
		105.31	1.038E-01	%	1.996E-01	6.06E-02	G
HG-203	2.8189E-02						
		279.17	2.819E-02	&(	4.439E-02	1.36E-02	G K
		72.87	-5.381E-01	& P	1.287E+00	3.89E-01	G
		70.83	6.059E-01	%	1.871E+00	5.64E-01	G
		82.50	-5.838E-01	&	2.662E+00	8.00E-01	G
TL-208	2.9986E-01						
		583.14	2.999E-01	(P	3.900E-02	2.15E-02	G
		510.72	3.818E-01	+ P	2.081E-01	8.20E-02	G
PB-212	6.9762E-01						
		238.63	7.048E-01	(P	9.913E-02	3.91E-02	G K
							Energy duplication
		77.11	6.800E-01	@(	3.314E-01	1.06E-01	G
		74.81	8.378E-01	& P	6.738E-01	2.09E-01	G
PB-214	4.9926E-01						
		351.99	5.135E-01	(P	9.011E-02	3.85E-02	G K
		295.22	4.717E-01	(P	1.850E-01	6.42E-02	G
							Energy duplication
		77.11	1.099E+00	+ P	5.430E-01	1.73E-01	G
		241.92	-2.539E-02	% P	7.341E-01	2.18E-01	G
BI-212	3.0188E-01						
		727.17	3.019E-01	(P	3.861E-01	1.22E-01	G K
		1620.56	6.796E-01	%	1.324E+00	4.10E-01	G

785.42 1.052E+00 % P 2.189E+00 6.64E-01 G

BI-214 6.0462E-01

609.32 6.046E-01 (P 1.114E-01 5.65E-02 G K

1764.51 8.802E-01 + P 1.901E-01 1.35E-01 G

1120.28 8.199E-01 + P 3.883E-01 1.74E-01 G

RA-224 1.0148E+00

241.00 1.015E+00 (P 1.231E+00 3.79E-01 G

RA-226 1.2293E+00

185.99 1.229E+00 @(1.198E+00 3.73E-01 G

AC-228 7.9226E-01

911.07 8.181E-01 *(P 1.588E-01 8.58E-02 G K

968.90 7.951E-01 (P 2.256E-01 1.03E-01 G

338.40 7.259E-01 (P 2.452E-01 9.40E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.3893E-01						
		236.00	-1.389E-01	%(	P 4.495E-01	1.35E-01	G K
		256.25	-2.677E-02	&	P 5.473E-01	1.61E-01	G
PA-234	3.9349E-02						
		98.44	-6.539E-02	%(	1.767E-01	5.34E-02	G K
		946.00	-1.622E-03	%	2.486E-01	6.94E-02	G
		131.28	-4.081E-02	&	2.155E-01	6.46E-02	G
		94.67	2.090E-01	&(	2.728E-01	8.37E-02	G
		883.24	-3.171E-02	&	4.260E-01	1.21E-01	G
		926.70	0.000E+00	&	4.255E-01	1.18E-01	G
		569.26	2.251E-02	&	3.509E-01	1.00E-01	G
TH-234	9.7084E-01						
		63.29	7.385E-01	%(	P 2.078E+00	6.26E-01	G K
		92.80	1.273E+00	(	P 1.606E+00	4.92E-01	G
		92.38	-1.737E-01	&	P 1.874E+00	5.56E-01	G
AM-241	1.4173E-02						
		59.54	1.417E-02	%(	P 2.660E-01	7.92E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Counting pCi/gm	Total pCi/gm	MDA pCi/gm
BE-7 #A	3.5985E-02	3.8871E-02	2.7231E-01	2.7231E-01	2.922E-01	
K-40	1.2749E+01	1.2749E+01	1.5766E+00	1.7334E+00		
MN-54 #A	1.2318E-02	1.2482E-02	3.7549E-02	3.7555E-02	4.217E-02	
CO-57 #B	-5.2291E-03	-5.3095E-03	3.4225E-02	3.4226E-02	3.771E-02	
CO-60 #B	-1.7410E-04	-1.7448E-04	6.7845E-03	6.7845E-03	4.843E-02	
Sr-85 #A	-1.2037E-02	-1.2827E-02	4.8483E-02	4.8489E-02	5.116E-02	
Kr-85 #A	-3.0169E+02	-3.0170E+02	1.2259E+03	1.2260E+03	1.186E+03	
Y-88 #B	0.0000E+00	0.0000E+00	8.4085E-03	8.4100E-03	1.987E-02	
NB-94 #B	-7.2851E-03	-7.2851E-03	4.4074E-02	4.4076E-02	4.866E-02	
Ag-108M#B	0.0000E+00	0.0000E+00	6.6249E-02	6.6249E-02	7.627E-02	
CD-109 #A	3.9185E-01	3.9543E-01	1.2275E+00	1.2277E+00	1.346E+00	
SN-113 #B	-7.1640E-03	-7.4250E-03	5.3961E-02	5.3962E-02	5.924E-02	
SB-125 #B	1.0228E-01	1.0270E-01	8.6932E-02	8.7125E-02	1.417E-01	
I-131 #B	-9.1411E-03	-1.5259E-02	7.1186E-02	7.1192E-02	4.807E-02	
CS-134 #B	1.3594E-02	1.3668E-02	1.6942E-02	1.6960E-02	5.491E-02	
CS-137 #A	7.5998E-03	7.6027E-03	4.9194E-02	4.9196E-02	5.663E-02	
CE-139 #A	-1.2935E-02	-1.3329E-02	4.2791E-02	4.2798E-02	4.516E-02	
EU-152 #B	-2.6554E-03	-2.6577E-03	2.2433E-01	2.2433E-01	1.336E-01	
EU-154 #B	-2.8657E-02	-2.8695E-02	1.0068E-01	1.0069E-01	1.063E-01	
EU-155 #B	2.7410E-02	2.7472E-02	1.2557E-01	1.2558E-01	1.393E-01	
HG-203 #B	2.5804E-02	2.8189E-02	4.0863E-02	4.0894E-02	4.063E-02	
TL-208	2.9986E-01	2.9986E-01	6.4470E-02	6.6659E-02		

PB-212 #	6.9762E-01	6.9762E-01	1.1599E-01	1.2250E-01	9.913E-02
PB-214 #	4.9926E-01	4.9926E-01	1.1241E-01	1.1589E-01	9.011E-02
BI-212 #A	3.0188E-01	3.0188E-01	3.6518E-01	3.6558E-01	3.861E-01
BI-214	6.0462E-01	6.0462E-01	1.6955E-01	1.7296E-01	
RA-224 A	1.0148E+00	1.0148E+00	1.1378E+00	1.1392E+00	
RA-226 #	1.2293E+00	1.2293E+00	1.1178E+00	1.1200E+00	1.198E+00
AC-228	7.9226E-01	7.9226E-01	1.6723E-01	1.7312E-01	
TH-227 #B	-1.3893E-01	-1.3893E-01	4.1513E-01	4.1520E-01	4.495E-01
PA-234 #B	3.9349E-02	3.9349E-02	4.7287E-02	4.7337E-02	1.767E-01
TH-234 #B	9.7084E-01	9.7084E-01	1.1258E+00	1.1271E+00	2.078E+00
AM-241 #A	1.4173E-02	1.4173E-02	2.3753E-01	2.3753E-01	2.660E-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) 1.5460107E+01 pCi/gm

Total Decayed Activity (1120.2 to 1999.1 keV) 1.5460107E+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_6SEPT2005_1410.An1

Sample description

FSS-NOL-06-01-069-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_6SEPT2005_1410.An1

Acquisition information

Start time:	06-Sep-2005 14:11:44
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: 1.7840E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7840E+03) =
5.6054E+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	01-Sep-2005 11:05:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1957

***** 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
74.48	163.	20.37	1.00	1.651E-02	72.87	6.400		PBC<MDA HG203
					74.81	9.600	7.507E-01	PB212
77.39	314.	10.01	1.01	1.734E-02	77.11	10.700	1.277E+00	PB214
					77.11	17.500	7.899E-01	PB212
186.02	114.	29.07	1.20	1.858E-02	185.99	3.280	1.423E+00	RA226
209.05	94.	36.24	1.09	1.723E-02				
238.85	636.	4.76	1.12	1.557E-02	238.63	43.100	7.109E-01	PB212

241.86	100.	23.50	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.21	61.	34.02	0.97	1.400E-02				
295.32	172.	15.76	1.15	1.292E-02	295.22	19.200	5.186E-01	PB214
300.48	54.	36.76	1.33	1.271E-02				
338.79	176.	15.97	1.16	1.134E-02	338.40	12.010	9.687E-01	AC228
352.08	259.	8.58	0.85	1.092E-02	351.99	37.100	4.809E-01	PB214
510.78	80.	24.37	1.65	7.590E-03	510.72	22.500	2.837E-01	TL208
583.34	189.	8.88	1.62	6.682E-03	583.14	86.000	2.459E-01	TL208
609.39	180.	10.63	1.16	6.412E-03	609.32	46.090	4.595E-01	BI214
661.79	278.	7.46	1.59	5.936E-03	661.62	84.620	4.178E-01	CS137
727.01	57.	30.49	0.98	5.444E-03	727.17	11.800	6.643E-01	BI212
794.74	28.	35.07	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134
911.51	116.	13.69	1.53	4.445E-03	911.07	29.000	6.734E-01	AC228
969.07	74.	25.29	1.80	4.212E-03	968.90	17.460	7.589E-01	AC228
1120.31	49.	31.14	1.16	3.711E-03	1120.28	15.040	6.571E-01	BI214
1173.50	133.	12.88	1.49	3.564E-03	1173.23	99.860	2.841E-01	CO60
1332.54	102.	12.08	1.70	3.190E-03	1332.51	99.980	2.415E-01	CO60
1461.11	520.	4.52	1.94	2.942E-03	1460.75	10.700	1.245E+01	K40
1764.95	25.	20.00	2.50	2.481E-03	1764.51	15.920	4.710E-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	
148.52	74.72	467.	163.	0.081	61.12	1.005	Bl-207	D
154.34	77.62	337.	314.	0.157	30.04	1.007	PB-214	D
417.77	209.05	400.	94.	0.047	108.73	1.085	AC-228	s
477.39	238.76	140.	636.	0.318	14.28	1.122	PB-212	D
483.43	241.78	225.	100.	0.050	70.51	1.124	PB-214	D
540.15	270.21	168.	61.	0.031	102.05	0.975	AC-228	
600.72	300.48	143.	54.	0.027	110.27	1.335	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	149.60	75.01	989.	171.	0.085	78.96	1.499
PB-214	153.79	77.11	920.	268.	0.134	50.61	1.499D
PB-212	153.79	77.11	916.	272.	0.136	50.61	1.499D
RA-226	371.88	186.11	433.	115.	0.058	81.45	1.499s
PB-212	477.30	238.80	422.	542.	0.271	20.35	1.499

RA-224	483.35	241.83	479.	80.	0.040	119.19	1.499
PB-214	590.57	295.41	221.	140.	0.070	51.10	1.499
AC-228	677.37	338.79	202.	174.	0.087	47.92	1.163s
PB-214	704.03	352.12	127.	245.	0.122	27.11	1.499
TL-208	1021.50	510.78	116.	64.	0.032	73.10	1.649s
TL-208	1166.69	583.34	46.	187.	0.093	26.63	1.617
BI-214	1218.81	609.39	66.	179.	0.090	31.89	1.157
CS-137	1323.66	661.79	57.	277.	0.139	22.37	1.587
BI-212	1454.08	726.97	71.	67.	0.034	80.63	1.000
CS-134	1589.71	794.74	36.	28.	0.014	105.21	1.502s
AC-228	1823.38	911.51	49.	115.	0.057	41.06	1.534
AC-228	1936.65	968.12	90.	91.	0.046	73.45	1.823s
BI-214	2241.21	1120.31	56.	48.	0.024	93.43	1.158s
CO-60	2347.65	1173.50	51.	133.	0.067	38.65	1.492
CO-60	2665.94	1332.54	14.	102.	0.051	36.23	1.702s
K-40	2923.24	1461.11	9.	518.	0.259	13.57	1.944
BI-214	3531.33	1764.95	0.	25.	0.012	60.00	2.498

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.5993E-01					
			477.56	1.599E-01	%(	4.634E-01	1.38E-01 G
K-40		1.2451E+01					
			1460.75	1.245E+01	(P	4.104E-01	5.66E-01 G
MN-54		-8.6802E-03					
			834.81	-8.680E-03	%(P	5.504E-02	1.57E-02 G
CO-57		-1.6142E-02					
			122.07	-1.614E-02	%(	5.517E-02	1.66E-02 G K
			136.43	1.040E-03	%	4.276E-01	1.27E-01 G
CO-60		2.6279E-01					
			1332.51	2.415E-01	@(P	4.865E-02	2.92E-02 G K
			1173.23	2.841E-01	(P	7.655E-02	3.66E-02 G K
Sr-85		-1.9999E-02					
			514.00	-2.000E-02	&(	5.850E-02	1.75E-02 G
Kr-85		-4.6458E+02					
			513.99	-4.646E+02	&(P	1.284E+03	3.82E+02 G
Y-88		-2.0906E-04					
			1836.01	-2.091E-04	%(	4.058E-02	9.64E-03 G K

898.02 8.549E-03 & P 5.106E-02 1.45E-02 G

NB-94 -9.3874E-03

871.10-9.387E-03 %(P 6.129E-02 1.77E-02 G K

702.50-5.993E-05 % P 5.309E-02 1.50E-02 G K

Ag-108M 1.1052E-02

722.95 1.105E-02 %(5.500E-02 1.60E-02 G K

614.37 3.121E-04 & P 6.092E-02 1.74E-02 G

433.93 1.523E-02 % 4.372E-02 1.31E-02 G

CD-109 -8.2894E-02

88.04-8.289E-02 %(P 1.533E+00 4.57E-01 G

SN-113 -6.8050E-03

391.71-6.805E-03 %(6.841E-02 2.00E-02 G K

255.04 2.700E-01 % P 2.091E+00 6.19E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	4.5406E-03						
		427.95	4.541E-03	%(P	1.115E-01	3.16E-02	G K
		600.77	3.182E-03	% P	2.314E-01	6.51E-02	G
		636.15	1.031E-02	& P	4.416E-01	1.25E-01	G
		463.51	3.441E-01	% P	4.847E-01	1.50E-01	G
		176.29	-1.902E-02	% P	6.835E-01	2.02E-01	G
I-131	1.8867E-02						
		364.48	1.887E-02	%(	6.997E-02	2.07E-02	G K
		636.97	-7.118E-03	&	1.035E+00	2.93E-01	G
		284.29	-8.623E-02	&	1.049E+00	3.08E-01	G
CS-134	2.0517E-02						
		604.66	-5.083E-03	%(P	5.109E-02	1.46E-02	G K
		795.76	4.977E-02	(P	5.443E-02	1.77E-02	G
		569.29	6.689E-02	% P	2.824E-01	8.26E-02	G
		801.84	-6.872E-02	%	5.498E-01	1.56E-01	G
CS-137	4.1778E-01						
		661.62	4.178E-01	(P	5.714E-02	3.13E-02	G
CE-139	-1.0654E-03						
		165.85	-1.065E-03	&(P	5.352E-02	1.58E-02	G
EU-152	6.0114E-02						
		121.78	6.011E-02	%(P	1.268E-01	3.84E-02	G K
		344.30	-2.207E-02	% P	1.742E-01	5.12E-02	G
		1408.08	6.764E-02	% P	2.165E-01	6.25E-02	G
		964.00	1.260E-01	% P	4.766E-01	1.40E-01	G
		1112.07	4.199E-02	& P	5.322E-01	1.51E-01	G

778.90 1.791E-02 & P 3.393E-01 9.46E-02 G

EU-154 -2.9752E-02

123.10-2.975E-02 %(P 1.114E-01 3.34E-02 G K

1274.80-3.358E-02 & P 2.245E-01 6.45E-02 G

723.30 5.329E-02 & P 2.178E-01 6.32E-02 G

1004.80 4.677E-02 % P 3.467E-01 9.90E-02 G

EU-155 -1.2923E-03

86.45-1.292E-03 %(1.906E-01 5.69E-02 G K

105.31 1.371E-02 % 2.138E-01 6.37E-02 G

HG-203 -3.9970E-03

279.17-3.997E-03 &(4.971E-02 1.46E-02 G K

72.87-1.565E-01 % P 1.310E+00 3.92E-01 G

70.83 1.455E-01 & 1.698E+00 5.05E-01 G

82.50 5.754E-01 % 2.646E+00 7.94E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5376E-01						
		583.14	2.459E-01	(P	4.539E-02	2.21E-02	G
		510.72	2.837E-01	*(P	2.347E-01	8.65E-02	G
PB-212	6.3216E-01						
		238.63	6.111E-01	(P	1.111E-01	4.19E-02	G K
					Energy duplication		
		77.11	6.841E-01	(	3.617E-01	1.15E-01	G
		74.81	8.141E-01	& P	7.121E-01	2.21E-01	G
PB-214	4.4668E-01						
		351.99	4.572E-01	(P	1.032E-01	4.17E-02	G K
		295.22	4.264E-01	(P	2.199E-01	7.35E-02	G
					Energy duplication		
		77.11	1.104E+00	+ P	5.927E-01	1.89E-01	G
		241.92	3.233E-02	% P	7.896E-01	2.35E-01	G
BI-212	7.9399E-01						
		727.17	7.940E-01	(P	4.940E-01	2.15E-01	G K
		1620.56	-1.146E-03	%	1.592E+00	3.99E-01	G
		785.42	1.437E+00	% P	2.293E+00	7.13E-01	G
BI-214	4.6245E-01						
		609.32	4.595E-01	(P	1.038E-01	4.92E-02	G K
		1764.51	4.710E-01	(P	1.413E-01	9.59E-02	G
		1120.28	6.571E-01	+ P	5.083E-01	2.06E-01	G
RA-224	1.0103E+00						
		241.00	1.010E+00	(P	1.316E+00	4.05E-01	G

```
RA-226       1.4344E+00
                 185.99 1.434E+00 *(  1.239E+00 3.89E-01 G

AC-228       8.1433E-01
                 911.07 6.734E-01  (P 2.083E-01 9.37E-02 G K
                 968.90 9.422E-01 @(P 4.820E-01 2.33E-01 G
                 338.40 9.687E-01 @(P 3.828E-01 1.57E-01 G

TH-227      -2.0629E-01
                 236.00-2.063E-01 %(P 4.711E-01 1.42E-01 G K
                 256.25 6.446E-02 & P 6.116E-01 1.81E-01 G

PA-234      -2.1367E-02
                  98.44-2.137E-02 %(  1.870E-01 5.58E-02 G K
                 946.00 9.081E-02 %   2.902E-01 8.56E-02 G
                 131.28 1.569E-02 %   1.906E-01 5.66E-02 G
                  94.67 2.199E-03 %   3.392E-01 1.01E-01 G
                 883.24 7.385E-02 %   4.122E-01 1.18E-01 G
                 926.70-5.333E-02 &   4.636E-01 1.31E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	1.036E-01 %	4.155E-01	1.22E-01	G	
TH-234	5.9523E-01						
		63.29	5.952E-01 %(P	2.242E+00	6.72E-01	G K	
		92.80	9.788E-01 % P	1.746E+00	5.30E-01	G	
		92.38	7.826E-01 & P	1.886E+00	5.68E-01	G	
AM-241	-2.2844E-02						
		59.54	-2.284E-02 %(P	2.547E-01	7.56E-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 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	1.4963E-01	1.5993E-01	4.1512E-01	4.1522E-01	4.335E-01
K-40		1.2451E+01	1.2451E+01	1.6972E+00	1.8372E+00	
MN-54	#A	-8.5819E-03	-8.6802E-03	5.5050E-02	5.5052E-02	5.442E-02
CO-57	#B	-1.5931E-02	-1.6142E-02	4.9807E-02	4.9815E-02	5.445E-02
CO-60		2.6230E-01	2.6279E-01	6.9674E-02	7.1238E-02	

Sr-85	#A	-1.8932E-02	-1.9999E-02	5.2493E-02	5.2505E-02	5.538E-02
Kr-85	#A	-4.6456E+02	-4.6458E+02	1.2914E+03	1.2917E+03	1.284E+03
Y-88	#B	-2.0220E-04	-2.0906E-04	2.8916E-02	2.8916E-02	3.924E-02
NB-94	#B	-9.3874E-03	-9.3874E-03	5.5509E-02	5.5512E-02	6.129E-02
Ag-108M	#B	1.1052E-02	1.1052E-02	4.7916E-02	4.7920E-02	5.500E-02
CD-109	#A	-8.2246E-02	-8.2894E-02	1.5438E+00	1.5438E+00	1.521E+00
SN-113	#B	-6.5980E-03	-6.8050E-03	5.9869E-02	5.9870E-02	6.633E-02
SB-125	#B	4.5247E-03	4.5406E-03	9.4948E-02	9.4948E-02	1.111E-01
I-131	#B	1.2124E-02	1.8867E-02	6.2218E-02	6.2228E-02	4.496E-02
CS-134	#B	2.0420E-02	2.0517E-02	2.1907E-02	2.1938E-02	5.085E-02
CS-137		4.1764E-01	4.1778E-01	9.3751E-02	9.6677E-02	
CE-139	#A	-1.0382E-03	-1.0654E-03	6.4501E-02	6.4501E-02	5.215E-02
EU-152	#B	6.0068E-02	6.0114E-02	1.1530E-01	1.1535E-01	1.267E-01
EU-154	#B	-2.9718E-02	-2.9752E-02	1.0594E-01	1.0595E-01	1.113E-01
EU-155	#B	-1.2897E-03	-1.2923E-03	1.7061E-01	1.7061E-01	1.903E-01
HG-203	#B	-3.7034E-03	-3.9970E-03	4.3740E-02	4.3741E-02	4.606E-02
TL-208		2.5376E-01	2.5376E-01	6.8427E-02	6.9913E-02	
PB-212	#	6.3216E-01	6.3216E-01	1.3008E-01	1.3490E-01	1.111E-01
PB-214	#	4.4668E-01	4.4668E-01	1.2208E-01	1.2466E-01	1.032E-01
BI-212		7.9399E-01	7.9399E-01	6.4662E-01	6.4818E-01	
BI-214		4.6245E-01	4.6245E-01	1.4839E-01	1.5067E-01	
RA-224	#A	1.0103E+00	1.0103E+00	1.2149E+00	1.2163E+00	1.316E+00
RA-226	#	1.4344E+00	1.4344E+00	1.1683E+00	1.1711E+00	1.239E+00
AC-228		8.1433E-01	8.1433E-01	2.6562E-01	2.6958E-01	
TH-227	#B	-2.0629E-01	-2.0629E-01	4.3534E-01	4.3549E-01	4.711E-01
PA-234	#B	-2.1367E-02	-2.1367E-02	1.6750E-01	1.6750E-01	1.870E-01
TH-234	#B	5.9523E-01	5.9523E-01	2.0156E+00	2.0158E+00	2.242E+00
AM-241	#A	-2.2843E-02	-2.2844E-02	2.7421E-01	2.7421E-01	2.547E-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) 1.5455522E+01 pCi/gm

Total Decayed Activity (270.1 to 1999.1 keV) 1.5456141E+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_29AUG2005_1027.An1

Sample description

FSS NOL-06-01-012-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\101F_29AUG2005_1027.An1

Acquisition information

Start time: 29-Aug-2005 10:27:29
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: 2.2410E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.2410E+03) =
4.4623E+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	27-Aug-2005 11:15:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1909

***** 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
74.48	190.	17.57	1.00	1.653E-02				
74.48	190.	17.57	1.00	1.653E-02	74.81	9.600	7.003E-01	PB212
77.43	305.	11.54	1.01	1.736E-02	77.11	10.700	9.865E-01	PB214
					77.11	17.500	6.106E-01	PB212
87.23	113.	41.64	1.50	1.910E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
185.83	98.	35.17	1.34	1.859E-02				

185.83	98.	35.17	1.34	1.859E-02	185.99	3.280	9.676E-01	RA226
209.12	74.	32.99	1.21	1.723E-02				
238.77	846.	4.00	1.12	1.557E-02	238.63	43.100	7.548E-01	PB212
241.87	121.	18.34	1.12	1.540E-02	241.00	3.900	1.207E+00	RA224
					241.92	7.470	PBC<MDA	PB214
270.27	94.	26.58	1.29	1.400E-02				
295.27	147.	13.99	1.31	1.292E-02	295.22	19.200	3.530E-01	PB214
327.86	72.	28.56	1.17	1.170E-02				
338.38	152.	20.20	1.04	1.135E-02	338.40	12.010	6.645E-01	AC228
351.97	317.	10.93	1.13	1.093E-02				
351.97	317.	10.93	1.13	1.093E-02	351.99	37.100	4.681E-01	PB214
463.11	53.	26.71	1.50	8.342E-03	463.51	10.000	3.818E-01	SB125
510.50	126.	20.56	1.30	7.594E-03	510.72	22.500	3.876E-01	TL208
583.17	241.	9.49	1.29	6.684E-03	583.14	86.000	2.503E-01	TL208
609.34	207.	10.46	1.50	6.412E-03	609.32	46.090	4.193E-01	BI214
726.88	66.	26.71	1.00	5.445E-03	727.17	11.800	6.133E-01	BI212
860.51	27.	29.86	0.96	4.677E-03				
911.12	149.	11.86	1.57	4.446E-03	911.07	29.000	6.881E-01	AC228
968.21	118.	15.86	1.45	4.215E-03	968.90	17.460	9.649E-01	AC228
1120.54	54.	28.38	1.76	3.710E-03	1120.28	15.040	5.750E-01	BI214
1460.65	635.	4.07	1.99	2.943E-03	1460.75	10.700	1.213E+01	K40
1764.20	34.	17.15	0.79	2.481E-03	1764.51	15.920	5.123E-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
148.52	74.77	460.	190.	0.095	52.71	1.005	Bl-207 D
154.42	77.72	466.	305.	0.152	34.61	1.007	PB-214 D
371.31	185.83	452.	98.	0.049	105.51	1.335	U-235 l
417.92	209.12	261.	74.	0.037	98.97	1.211	AC-228
477.26	238.75	149.	846.	0.423	12.00	1.122	PB-212 D
540.26	270.27	214.	94.	0.047	79.73	1.290	AC-228 s
655.49	327.86	142.	72.	0.036	85.68	1.173	AC-228
1721.31	860.51	19.	27.	0.014	89.58	0.964	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	149.05	74.74	1211.	187.	0.093	79.65	1.499
PB-214	153.79	77.11	1075.	284.	0.142	51.44	1.499D
PB-212	153.79	77.11	1071.	287.	0.144	51.44	1.499D
EU-155	174.03	87.23	1059.	113.	0.057	124.92	1.499

PB-212	477.22	238.76	478.	705.	0.353	17.15	1.499
RA-224	481.70	241.00	523.	110.	0.055	91.94	1.123D
PB-214	590.29	295.27	241.	151.	0.076	49.28	1.499
AC-228	676.54	338.38	251.	150.	0.075	60.61	1.041
PB-214	703.79	352.00	151.	296.	0.148	24.55	1.499
SB-125	926.11	463.11	79.	53.	0.026	80.12	1.499s
TL-208	1020.95	510.50	155.	110.	0.055	61.67	1.301s
TL-208	1166.35	583.17	96.	239.	0.119	28.47	1.285s
Bi-214	1218.72	609.34	83.	205.	0.103	31.38	1.497s
Bi-212	1453.92	726.88	73.	65.	0.033	80.13	1.003
AC-228	1822.58	911.12	50.	147.	0.074	35.58	1.569
AC-228	1936.83	968.21	62.	118.	0.059	47.57	1.455s
Bi-214	2241.67	1120.54	50.	53.	0.027	85.15	1.762
K-40	2922.32	1460.65	12.	633.	0.317	12.20	1.991
Bi-214	3529.84	1764.20	0.	34.	0.017	51.45	0.787s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS
BE-7		1.1968E-01				
			477.56	1.197E-01	%(	3.148E-01 9.43E-02 G
K-40		1.2126E+01				
			1460.75	1.213E+01	(P	3.595E-01 4.95E-01 G
MN-54		1.3090E-02				
			834.81	1.309E-02	&(P	4.054E-02 1.19E-02 G
CO-57		-3.3679E-03				
			122.07	-3.368E-03	&(	4.668E-02 1.39E-02 G K
			136.43	-9.320E-02	%	3.654E-01 1.10E-01 G
CO-60		6.9186E-04				
			1332.51	6.919E-04	%(P	4.462E-02 1.20E-02 G K
			1173.23	4.064E-02	& P	5.684E-02 1.79E-02 G K
Sr-85		-1.5924E-02				
			514.00	-1.592E-02	%(	4.944E-02 1.48E-02 G
Kr-85		-3.8253E+02				
			513.99	-3.825E+02	%(P	1.122E+03 3.34E+02 G
Y-88		4.3109E-03				
			1836.01	4.311E-03	%(	3.128E-02 8.09E-03 G K

898.02 1.064E-02 & P 4.827E-02 1.40E-02 G

NB-94 2.9599E-04

871.10 2.960E-04 %(P 2.966E-02 7.94E-03 G K

702.50-1.311E-02 % P 4.522E-02 1.34E-02 G K

Ag-108M -2.2044E-02

722.95-2.204E-02 &(6.054E-02 1.81E-02 G K

614.37-9.538E-03 % P 4.881E-02 1.43E-02 G

433.93-5.041E-03 % 4.222E-02 1.23E-02 G

CD-109 3.1292E-02

88.04 3.129E-02 %(P 1.292E+00 3.86E-01 G

SN-113 3.4059E-03

391.71 3.406E-03 %(5.317E-02 1.54E-02 G K

255.04 3.293E-01 % P 1.567E+00 4.66E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.7752E-02						
		427.95	-2.498E-02	%(	P 1.280E-01	3.77E-02	G K
		600.77	6.255E-02	&	P 1.769E-01	5.26E-02	G
		636.15	5.096E-02	&	P 3.512E-01	1.01E-01	G
		463.51	3.818E-01	*(	P 3.196E-01	1.05E-01	G
		176.29	-4.746E-03	%	P 5.747E-01	1.70E-01	G
I-131	1.0645E-02						
		364.48	1.065E-02	%(	4.943E-02	1.46E-02	G K
		636.97	2.274E-01	%	5.349E-01	1.61E-01	G
		284.29	-8.931E-02	%	7.046E-01	2.08E-01	G
CS-134	-5.0860E-03						
		604.66	-5.086E-03	%(	P 4.448E-02	1.28E-02	G K
		795.76	2.889E-02	%	P 4.249E-02	1.33E-02	G
		569.29	-3.293E-03	%	P 2.230E-01	6.28E-02	G
		801.84	1.223E-01	&	4.448E-01	1.30E-01	G
CS-137	1.2816E-02						
		661.62	1.282E-02	&(	P 4.462E-02	1.31E-02	G
CE-139	1.3011E-02						
		165.85	1.301E-02	%(	P 4.275E-02	1.29E-02	G
EU-152	-7.1909E-03						
		121.78	-7.191E-03	&(	P 1.345E-01	4.01E-02	G K
		344.30	-1.224E-02	%	P 1.302E-01	3.81E-02	G
		1408.08	4.709E-02	%	P 1.695E-01	4.84E-02	G
		964.00	-1.571E-02	&	P 7.229E-01	2.11E-01	G
		1112.07	1.982E-01	%	P 4.032E-01	1.23E-01	G

778.90-7.749E-02 % P 3.547E-01 1.03E-01 G

EU-154 -4.1237E-03

123.10-4.124E-03 %(P 9.547E-02 2.84E-02 G K

1274.80 3.894E-02 & P 1.112E-01 3.27E-02 G

723.30-2.843E-02 & P 2.890E-01 8.38E-02 G

1004.80 1.599E-02 % P 2.214E-01 6.13E-02 G

EU-155 1.0950E-01

86.45 1.095E-01 (1.490E-01 4.56E-02 G K

105.31 2.713E-03 % 1.909E-01 5.69E-02 G

HG-203 6.5218E-05

279.17 6.522E-05 &(4.184E-02 1.22E-02 G K

72.87-4.268E-01 & P 1.112E+00 3.36E-01 G

70.83-1.348E+00 % 1.892E+00 5.78E-01 G

82.50 1.601E-02 % 2.475E+00 7.39E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5031E-01						
		583.14	2.503E-01	@(P	5.083E-02	2.40E-02	G
		510.72	3.876E-01	+ P	2.146E-01	9.13E-02	G
PB-212	6.2967E-01						
		238.63	6.337E-01	(P	9.396E-02	3.65E-02	G K
					Energy duplication		
		77.11	5.757E-01	(	3.109E-01	9.87E-02	G
		74.81	7.101E-01	&(P	6.263E-01	1.94E-01	G
PB-214	4.4094E-01						
		351.99	4.409E-01	(P	8.918E-02	3.63E-02	G K
		295.22	3.674E-01	- P	1.824E-01	6.11E-02	G
					Energy duplication		
		77.11	9.294E-01	+ P	5.093E-01	1.61E-01	G
		241.92	-5.658E-03	% P	7.024E-01	2.09E-01	G
BI-212	6.1330E-01						
		727.17	6.133E-01	(P	3.984E-01	1.65E-01	G K
		1620.56	-1.627E-01	%	1.357E+00	3.63E-01	G
		785.42	-1.426E-02	% P	2.039E+00	5.68E-01	G
BI-214	4.6888E-01						
		609.32	4.193E-01	*(P	9.189E-02	4.41E-02	G K
		1764.51	5.123E-01	*(P	1.125E-01	8.90E-02	G
		1120.28	5.750E-01	(P	3.845E-01	1.64E-01	G
RA-224	1.1027E+00						
		241.00	1.103E+00	(P	1.094E+00	3.40E-01	G

```
RA-226       6.9132E-01
                 185.99 6.913E-01 %(  1.141E+00 3.48E-01 G

AC-228       6.8116E-01
                 911.07 6.881E-01  (P 1.666E-01 8.26E-02 G K
                 968.90 9.649E-01 + P 3.238E-01 1.54E-01 G
                 338.40 6.645E-01  (P 3.385E-01 1.36E-01 G

TH-227      -1.4527E-01
                 236.00-1.453E-01 %(P 3.958E-01 1.19E-01 G K
                 256.25-1.271E-01 & P 5.418E-01 1.62E-01 G

PA-234      -3.9684E-02
                  98.44-3.968E-02 %(  1.711E-01 5.14E-02 G K
                 946.00 1.730E-02 %   2.212E-01 6.24E-02 G
                 131.28 2.016E-03 %   1.946E-01 5.79E-02 G
                  94.67 1.453E-02 &   2.845E-01 8.49E-02 G
                 883.24 4.310E-02 &   3.198E-01 9.07E-02 G
                 926.70-1.527E-02 %   4.078E-01 1.14E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26-5.270E-03 % 3.193E-01 9.02E-02 G

TH-234 1.0630E-01
63.29 1.063E-01 &(P 1.974E+00 5.87E-01 G K
92.80 7.106E-01 % P 1.556E+00 4.71E-01 G
92.38-1.457E-01 & P 1.609E+00 4.76E-01 G

AM-241 1.1498E-02
59.54 1.150E-02 %(P 2.591E-01 7.71E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	1.1666E-01	1.1968E-01	2.8279E-01	2.8287E-01	3.069E-01
K-40		1.2126E+01	1.2126E+01	1.4851E+00	1.6355E+00	
MN-54	#A	1.3033E-02	1.3090E-02	3.5843E-02	3.5851E-02	4.036E-02
CO-57	#B	-3.3510E-03	-3.3679E-03	4.1798E-02	4.1798E-02	4.645E-02
CO-60	#B	6.9137E-04	6.9186E-04	3.6079E-02	3.6079E-02	4.459E-02

Sr-85	#A	-1.5592E-02	-1.5924E-02	4.4337E-02	4.4346E-02	4.842E-02
Kr-85	#A	-3.8253E+02	-3.8253E+02	1.1241E+03	1.1243E+03	1.122E+03
Y-88	#B	4.2561E-03	4.3109E-03	2.4282E-02	2.4283E-02	3.088E-02
NB-94	#B	2.9599E-04	2.9599E-04	2.3814E-02	2.3814E-02	2.966E-02
Ag-108M	#B	-2.2043E-02	-2.2044E-02	5.4382E-02	5.4396E-02	6.054E-02
CD-109	#A	3.1198E-02	3.1292E-02	1.1567E+00	1.1567E+00	1.288E+00
SN-113	#B	3.3658E-03	3.4059E-03	4.6344E-02	4.6345E-02	5.254E-02
SB-125	#B	7.7648E-02	7.7752E-02	6.4000E-02	6.4151E-02	1.279E-01
I-131	#B	8.9847E-03	1.0645E-02	4.3871E-02	4.3876E-02	4.172E-02
CS-134	#B	-5.0768E-03	-5.0860E-03	4.8661E-02	4.8662E-02	4.440E-02
CS-137	#A	1.2815E-02	1.2816E-02	3.9314E-02	3.9321E-02	4.462E-02
CE-139	#A	1.2882E-02	1.3011E-02	3.8557E-02	3.8564E-02	4.233E-02
EU-152	#B	-7.1888E-03	-7.1909E-03	1.4884E-01	1.4884E-01	1.345E-01
EU-154	#B	-4.1219E-03	-4.1237E-03	1.1679E-01	1.1679E-01	9.542E-02
EU-155	#A	1.0941E-01	1.0950E-01	1.3678E-01	1.3692E-01	1.489E-01
HG-203	#B	6.3338E-05	6.5218E-05	3.6719E-02	3.6719E-02	4.064E-02
TL-208	#	2.5031E-01	2.5031E-01	7.1967E-02	7.3344E-02	
PB-212	#	6.2967E-01	6.2967E-01	1.0896E-01	1.1462E-01	9.396E-02
PB-214	#	4.4094E-01	4.4094E-01	1.0897E-01	1.1178E-01	8.918E-02
BI-212		6.1330E-01	6.1330E-01	4.9656E-01	4.9777E-01	
BI-214		4.6888E-01	4.6888E-01	1.4794E-01	1.5029E-01	
RA-224		1.1027E+00	1.1027E+00	1.0205E+00	1.0224E+00	
RA-226	#A	6.9132E-01	6.9132E-01	1.0442E+00	1.0450E+00	1.141E+00
AC-228		6.8116E-01	6.8116E-01	2.4272E-01	2.4575E-01	
TH-227	#B	-1.4527E-01	-1.4527E-01	3.6543E-01	3.6552E-01	3.958E-01
PA-234	#B	-3.9684E-02	-3.9684E-02	1.5428E-01	1.5430E-01	1.711E-01
TH-234	#B	1.0630E-01	1.0630E-01	1.7625E+00	1.7625E+00	1.974E+00
AM-241	#A	1.1498E-02	1.1498E-02	2.3143E-01	2.3143E-01	2.591E-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) 1.5242363E+01 pCi/gm

Total Decayed Activity (270.1 to 1999.1 keV) 1.5242363E+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: 101F_29AUG2005_1114.An1

Sample description

FSS NOL-06-01-007-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\101F_29AUG2005_1114.An1

Acquisition information

Start time: 29-Aug-2005 11:14:16
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: 1.8660E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8660E+03) =
5.3591E+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	27-Aug-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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0753

***** 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	123.	26.44	1.00	1.651E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.24	313.	9.82	1.01	1.731E-02	77.11	10.700	1.215E+00	PB214
					77.11	17.500	7.521E-01	PB212
93.01	108.	37.39	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.34	73.	40.78	1.27	2.109E-02				

186.64	148.	23.74	1.48	1.854E-02	185.99	3.280	1.760E+00	RA226
209.36	85.	27.52	0.82	1.721E-02				
238.87	428.	8.13	1.50	1.540E-02	238.63	43.100	PBC<MDA	PB212
238.79	730.	4.33	1.12	1.556E-02	238.63	43.100	7.805E-01	PB212
241.60	105.	21.71	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
270.43	49.	35.87	1.08	1.399E-02				
295.09	167.	15.35	1.18	1.293E-02				
295.09	167.	15.35	1.18	1.293E-02	295.22	19.200	4.826E-01	PB214
300.54	82.	24.79	1.34	1.271E-02				
338.63	194.	11.37	1.10	1.134E-02	338.40	12.010	1.020E+00	AC228
352.16	269.	8.81	1.15	1.092E-02	351.99	37.100	4.771E-01	PB214
463.82	65.	24.43	1.52	8.336E-03	463.51	10.000	5.525E-01	SB125
510.76	84.	20.82	2.08	7.590E-03	510.72	22.500	2.882E-01	TL208
583.22	202.	9.54	1.21	6.684E-03	583.14	86.000	2.516E-01	TL208
609.30	169.	10.85	1.25	6.413E-03	609.32	46.090	4.104E-01	BI214
661.67	102.	16.90	1.28	5.937E-03	661.62	84.620	1.463E-01	CS137
727.15	47.	38.80	1.66	5.443E-03				
727.15	47.	38.80	1.66	5.443E-03	727.17	11.800	5.223E-01	BI212
794.42	50.	28.16	1.03	5.024E-03				
794.42	50.	28.16	1.03	5.024E-03	795.76	85.400	8.364E-02	CS134
911.17	144.	12.48	1.29	4.446E-03	911.07	29.000	7.994E-01	AC228
968.62	116.	15.42	1.44	4.213E-03	968.90	17.460	1.135E+00	AC228
1121.11	39.	28.38	1.69	3.711E-03	1120.28	15.040	5.102E-01	BI214
1173.33	90.	20.85	1.64	3.564E-03	1173.23	99.860	1.837E-01	CO60
1460.62	559.	4.31	1.94	2.943E-03	1460.75	10.700	1.281E+01	K40
1763.91	34.	18.32	1.23	2.481E-03	1764.51	15.920	6.190E-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
148.45	74.72	463.	123.	0.061	79.32	1.005	Bl-207 D
154.05	77.51	315.	313.	0.156	29.47	1.007	PB-214 D
258.29	129.34	356.	103.	0.052	82.75	1.272	AC-228 s
418.40	209.36	231.	85.	0.043	82.55	0.818	AC-228
477.27	238.90	134.	730.	0.365	12.98	1.122	PB-212 D
482.90	241.71	209.	105.	0.053	65.12	1.124	PB-214 D
540.59	270.43	130.	49.	0.024	107.62	1.076	AC-228
600.83	300.54	137.	82.	0.041	69.22	1.337	PB-212 s
2347.32	1173.33	92.	56.	0.028	83.47	1.640	CO-60 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	149.52	74.98	992.	144.	0.072	92.64	1.499s
PB-214	153.79	77.11	874.	275.	0.138	48.28	1.499D
PB-212	153.79	77.11	870.	279.	0.140	48.28	1.499D

TH-234	185.61	93.01	865.	108.	0.054	112.18	1.499
RA-226	372.08	186.21	441.	121.	0.061	78.40	1.499s
PB-212	477.23	238.76	410.	581.	0.291	19.08	1.499
RA-224	482.92	241.61	489.	80.	0.040	120.38	1.499s
PB-214	477.44	238.87	394.	428.	0.214	24.39	1.499s
PB-214	590.19	295.22	199.	157.	0.079	44.39	1.499s
AC-228	677.04	338.63	111.	192.	0.096	34.12	1.095s
PB-214	703.97	352.09	121.	255.	0.128	25.96	1.499
SB-125	926.12	463.11	76.	51.	0.026	81.25	1.499s
TL-208	1021.45	510.76	90.	68.	0.034	62.47	2.081s
TL-208	1166.44	583.22	65.	200.	0.100	28.63	1.207
BI-214	1218.63	609.30	61.	167.	0.084	32.56	1.253
CS-137	1323.43	661.67	62.	102.	0.051	50.70	1.281s
CS-134	1589.92	794.85	30.	26.	0.013	106.20	1.502
AC-228	1822.70	911.17	55.	142.	0.071	37.43	1.293
AC-228	1937.66	968.62	52.	115.	0.058	46.26	1.443
BI-214	2242.82	1121.11	33.	39.	0.020	85.13	1.689s
CO-60	2347.42	1173.38	53.	35.	0.017	102.54	1.746s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2922.26	1460.62	8.	557.	0.278	12.94	1.943
Bl-214	3529.26	1763.91	2.	34.	0.017	54.95	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	Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-2.5955E-02					
			477.56	-2.596E-02	%(	4.315E-01	1.25E-01 G
K-40		1.2810E+01					
			1460.75	1.281E+01	(P	3.670E-01	5.55E-01 G
MN-54		1.0510E-02					
			834.81	1.051E-02	%(P	4.021E-02	1.16E-02 G
CO-57		1.1434E-02					
			122.07	1.143E-02	&(	5.027E-02	1.51E-02 G K
			136.43	9.562E-02	%	3.815E-01	1.14E-01 G
CO-60		5.4191E-02					
			1332.51	3.808E-02	%(P	5.344E-02	1.71E-02 G K
			1173.23	7.032E-02	*(P	7.465E-02	2.41E-02 G K

```
Sr-85       -1.6840E-02
                514.00-1.684E-02 %(  5.220E-02 1.56E-02 G

Kr-85       -4.0692E+02
                513.99-4.069E+02 %(P 1.186E+03 3.52E+02 G

Y-88         0.0000E+00
               1836.01 0.000E+00 %(  2.275E-02 3.09E-03 G K
                898.02 1.684E-04 & P 5.647E-02 1.57E-02 G

NB-94        1.1402E-04
                871.10 1.140E-04 &(P 5.139E-02 1.43E-02 G K
                702.50-8.859E-03 % P 5.700E-02 1.66E-02 G K

Ag-108M     -2.0089E-02
                722.95-2.009E-02 &(  6.219E-02 1.85E-02 G K
                614.37-8.835E-03 % P 4.979E-02 1.45E-02 G
                433.93-2.628E-03 %   4.529E-02 1.31E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	2.2326E-01						
		88.04	2.233E-01	%(P	1.390E+00	4.16E-01	G
SN-113	1.9252E-02						
		391.71	1.925E-02	&(	5.406E-02	1.62E-02	G K
		255.04	1.926E-02	& P	1.807E+00	5.29E-01	G
SB-125	1.1781E-01						
		427.95	7.627E-03	%(P	1.326E-01	3.82E-02	G K
		600.77	3.388E-02	% P	2.175E-01	6.26E-02	G
		636.15	-5.600E-02	% P	3.903E-01	1.12E-01	G
		463.51	4.440E-01	*(P	3.775E-01	1.24E-01	G
		176.29	-1.617E-01	% P	6.530E-01	1.95E-01	G
I-131	-2.2482E-03						
		364.48	-2.248E-03	%(	5.307E-02	1.54E-02	G K
		636.97	-3.612E-03	&	6.924E-01	1.94E-01	G
		284.29	5.847E-02	%	7.407E-01	2.18E-01	G
CS-134	1.3235E-02						
		604.66	-1.336E-02	%(P	5.296E-02	1.55E-02	G K
		795.76	4.363E-02	(P	4.801E-02	1.57E-02	G
		569.29	-2.385E-03	& P	2.670E-01	7.51E-02	G
		801.84	-4.214E-02	&	4.763E-01	1.33E-01	G
CS-137	1.4634E-01						
		661.62	1.463E-01	@(P	5.701E-02	2.49E-02	G
CE-139	9.2995E-03						
		165.85	9.300E-03	%(P	4.954E-02	1.48E-02	G

EU-152 1.5752E-03

121.78 1.575E-03 %(P 1.472E-01 4.37E-02 G K

344.30-2.870E-03 & P 1.403E-01 4.05E-02 G

1408.08 1.136E-01 % P 1.652E-01 5.41E-02 G

964.00 3.020E-01 & P 4.579E-01 1.42E-01 G

1112.07 2.497E-03 % P 3.938E-01 1.08E-01 G

778.90 1.935E-01 % P 3.098E-01 9.66E-02 G

EU-154 2.6524E-02

123.10 2.652E-02 %(P 1.026E-01 3.08E-02 G K

1274.80-1.801E-02 % P 1.856E-01 5.23E-02 G

723.30-5.510E-04 % P 2.158E-01 5.98E-02 G

1004.80 6.759E-02 % P 2.596E-01 7.51E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	0.0000E+00						
		86.45	0.000E+00	%(	1.766E-01	5.26E-02	G K
		105.31	5.153E-02	%	1.957E-01	5.88E-02	G
HG-203	-1.6362E-04						
		279.17	-1.636E-04	%(	4.997E-02	1.46E-02	G K
		72.87	2.243E-01	% P	1.175E+00	3.53E-01	G
		70.83	-1.491E-02	%	2.488E+00	7.44E-01	G
		82.50	-2.577E-01	&	2.470E+00	7.38E-01	G
TL-208	2.5920E-01						
		583.14	2.516E-01	(P	5.084E-02	2.43E-02	G
		510.72	2.882E-01	(P	1.990E-01	7.42E-02	G
PB-212	6.4235E-01						
		238.63	6.273E-01	(P	1.048E-01	4.03E-02	G K
							Energy duplication
		77.11	6.716E-01	@(	3.371E-01	1.08E-01	G
		74.81	6.565E-01	&(P	6.818E-01	2.10E-01	G
PB-214	4.5689E-01						
		351.99	4.559E-01	(P	9.644E-02	3.98E-02	G K
		295.22	4.588E-01	*(P	1.997E-01	6.87E-02	G
							Energy duplication
		77.11	1.084E+00	+ P	5.525E-01	1.77E-01	G
		241.92	2.696E+00	+ P	5.997E-01	2.20E-01	G
BI-212	3.2024E-01						
		727.17	3.202E-01	%(P	4.267E-01	1.34E-01	G K
		1620.56	-5.211E-03	%	1.757E+00	4.53E-01	G

785.42 1.209E+00 % P 2.134E+00 6.57E-01 G

BI-214 4.3495E-01

609.32 4.104E-01 (P 9.546E-02 4.48E-02 G K

1764.51 6.190E-01 + P 1.775E-01 1.15E-01 G

1120.28 5.102E-01 *(P 3.808E-01 1.46E-01 G

RA-224 9.6560E-01

241.00 9.656E-01 (P 1.271E+00 3.91E-01 G

RA-226 1.4405E+00

185.99 1.440E+00 (1.195E+00 3.76E-01 G

AC-228 8.6402E-01

911.07 7.994E-01 (P 2.087E-01 1.01E-01 G K

968.90 1.135E+00 + P 3.567E-01 1.76E-01 G

338.40 1.020E+00 *(P 2.752E-01 1.17E-01 G

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

TH-227      -1.0967E-01
                    236.00-1.097E-01 &(P 4.561E-01 1.37E-01 G K
                    256.25 4.305E-02 % P 5.932E-01 1.75E-01 G

PA-234      -1.0774E-02
                     98.44-1.077E-02 %(  1.821E-01 5.42E-02 G K
                    946.00-5.921E-03 &   2.071E-01 5.64E-02 G
                    131.28-6.050E-02 %   2.169E-01 6.52E-02 G
                     94.67-5.025E-02 &   3.360E-01 1.01E-01 G
                    883.24-2.886E-02 &   4.754E-01 1.35E-01 G
                    926.70 3.322E-02 &   4.596E-01 1.29E-01 G
                    569.26 8.244E-05 &   4.035E-01 1.14E-01 G

TH-234       8.4536E-01
                     63.29 4.847E-01 %(P 2.362E+00 7.07E-01 G K
                     92.80 1.314E+00  (P 1.696E+00 5.19E-01 G
                     92.38-1.692E-01 & P 2.106E+00 6.24E-01 G

AM-241       2.4881E-02
                     59.54 2.488E-02 &(P 3.217E-01 9.60E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	-2.5297E-02	-2.5955E-02	3.7372E-01	3.7373E-01	4.206E-01
K-40	1.2810E+01	1.2810E+01	1.6645E+00	1.8150E+00	
MN-54 #A	1.0463E-02	1.0510E-02	3.4858E-02	3.4863E-02	4.003E-02
CO-57 #B	1.1376E-02	1.1434E-02	4.5233E-02	4.5238E-02	5.001E-02
CO-60 #F	5.4152E-02	5.4191E-02	4.5922E-02	4.6024E-02	5.340E-02
Sr-85 #A	-1.6488E-02	-1.6840E-02	4.6719E-02	4.6729E-02	5.111E-02
Kr-85 #A	-4.0691E+02	-4.0692E+02	1.2017E+03	1.2019E+03	1.186E+03
Y-88 #B	0.0000E+00	0.0000E+00	9.2617E-03	9.2633E-03	2.246E-02
NB-94 #B	1.1402E-04	1.1402E-04	4.2910E-02	4.2910E-02	5.139E-02
Ag-108M#B	-2.0088E-02	-2.0089E-02	5.5449E-02	5.5461E-02	6.219E-02
CD-109 #A	2.2259E-01	2.2326E-01	1.2493E+00	1.2494E+00	1.386E+00
SN-113 #B	1.9024E-02	1.9252E-02	4.8471E-02	4.8484E-02	5.342E-02
SB-125 #B	1.1765E-01	1.1781E-01	9.8437E-02	9.8661E-02	1.324E-01
I-131 #B	-1.8956E-03	-2.2482E-03	4.6064E-02	4.6064E-02	4.474E-02
CS-134 #B	1.3211E-02	1.3235E-02	1.4283E-02	1.4303E-02	5.286E-02
CS-137 #	1.4632E-01	1.4634E-01	7.4846E-02	7.5302E-02	
CE-139 #A	9.2072E-03	9.2995E-03	4.4395E-02	4.4398E-02	4.905E-02
EU-152 #B	1.5747E-03	1.5752E-03	1.3119E-01	1.3119E-01	1.472E-01
EU-154 #B	2.6512E-02	2.6524E-02	9.2372E-02	9.2384E-02	1.025E-01
EU-155 #B	0.0000E+00	0.0000E+00	1.5790E-01	1.5790E-01	1.764E-01
HG-203 #B	-1.5888E-04	-1.6362E-04	4.3845E-02	4.3845E-02	4.852E-02
TL-208	2.5920E-01	2.5920E-01	7.5086E-02	7.6501E-02	

PB-212 #	6.4235E-01	6.4235E-01	1.2383E-01	1.2904E-01	1.048E-01
PB-214 #	4.5689E-01	4.5689E-01	1.1870E-01	1.2147E-01	9.644E-02
BI-212 #B	3.2024E-01	3.2024E-01	4.0223E-01	4.0264E-01	4.267E-01
BI-214	4.3495E-01	4.3495E-01	1.4257E-01	1.4468E-01	
RA-224 #A	9.6560E-01	9.6560E-01	1.1727E+00	1.1740E+00	1.271E+00
RA-226 #	1.4405E+00	1.4405E+00	1.1293E+00	1.1322E+00	1.195E+00
AC-228	8.6402E-01	8.6402E-01	2.2152E-01	2.2684E-01	
TH-227 #B	-1.0967E-01	-1.0967E-01	4.2343E-01	4.2348E-01	4.561E-01
PA-234 #B	-1.0774E-02	-1.0774E-02	1.6271E-01	1.6271E-01	1.821E-01
TH-234 #B	8.4536E-01	8.4536E-01	1.0024E+00	1.0035E+00	2.362E+00
AM-241 #A	2.4880E-02	2.4881E-02	2.8795E-01	2.8795E-01	3.217E-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) 1.4514668E+01 pCi/gm

Total Decayed Activity (270.1 to 1999.1 keV) 1.4514688E+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: 101F_31AUG2005_1144.An1

Sample description

FSS-NOL-06-01-021-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_31AUG2005_1144.An1

Acquisition information

Start time:	31-Aug-2005 11:45:00
Live time:	2000
Real time:	2071
Dead time:	3.43 %
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: 1.7820E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7820E+03) =
5.6117E+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 29-Aug-2005 15:15:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1141

***** 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
59.75	671.	31.36	1.20	8.706E-03	59.54	36.300	PBC<MDA	AM241
94.54	1832.	10.19	1.02	2.007E-02				
94.54	1832.	10.19	1.02	2.007E-02	94.67	15.500	4.465E+00	PA234
98.54	2858.	6.59	1.02	2.040E-02	98.44	25.100	4.235E+00	PA234
111.34	833.	21.95	1.03	2.102E-02				
238.75	657.	35.29	1.50	1.557E-02	238.63	43.100	PBC<MDA	PB212
609.34	263.	37.93	1.43	6.412E-03	609.32	46.090	6.709E-01	BI214

661.64	229687.	0.21	1.46	5.937E-03	661.62	84.620	3.467E+02	CS137
723.10	54.	24.50	1.45	5.472E-03				
723.10	54.	24.50	1.45	5.472E-03	722.95	90.499	8.248E-02	Ag108M
					723.30	19.700	PBC<MDA	EU154
727.55	47.	28.40	1.46	5.442E-03	727.17	11.800	5.481E-01	Bi212
795.52	35.	39.39	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134
911.16	133.	13.55	1.58	4.446E-03	911.07	29.000	7.712E-01	AC228
968.96	85.	25.03	1.81	4.212E-03	968.90	17.460	8.691E-01	AC228
1004.85	64.	22.71	1.29	4.080E-03	1004.80	17.600	6.734E-01	EU154
1120.05	58.	31.26	1.20	3.711E-03				
1120.05	58.	31.26	1.20	3.711E-03	1120.28	15.040	7.761E-01	Bi214
1173.46	51.	27.94	2.54	3.565E-03	1173.23	99.860	1.097E-01	CO60
1274.12	95.	21.63	2.24	3.318E-03				
1274.12	95.	21.63	2.24	3.318E-03	1274.80	35.500	6.102E-01	EU154
1332.06	42.	29.70	1.50	3.191E-03	1332.51	99.980	9.924E-02	CO60
1460.67	619.	4.17	1.63	2.943E-03	1460.75	10.700	1.485E+01	K40
1764.27	20.	28.78	2.11	2.481E-03	1764.51	15.920	3.933E-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
119.06	59.75	20787.	671.	0.336	94.09	1.202	AM-241 I

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
222.42	111.41	25513.	750.	0.375	91.07	1.608	TE-132	s
1218.72	609.34	3116.	263.	0.131	113.80	1.431	Bl-214	l
1446.48	722.91	60.	55.	0.028	72.06	1.454	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
PA-234	188.68	94.55	42422.	1448.	0.724	60.86	1.499
PA-234	196.64	98.53	43030.	2875.	1.437	31.12	1.499
PB-212	477.21	238.75	27088.	657.	0.329	105.88	1.499
CS-137	1323.37	661.64	2983.	229686.	114.843	0.64	1.457
Ag-108M	1446.89	723.37	131.	42.	0.021	124.57	1.499
Bl-212	1454.49	727.17	59.	49.	0.024	78.44	1.457D
CS-134	1591.27	795.52	82.	35.	0.018	118.16	1.502s
AC-228	1822.76	911.20	59.	127.	0.064	36.21	1.578
AC-228	1938.09	968.84	90.	59.	0.029	77.67	1.616
EU-154	2009.79	1004.67	57.	49.	0.025	77.98	1.639s
Bl-214	2241.05	1120.23	66.	38.	0.019	101.92	1.713
CO-60	2347.58	1173.46	51.	51.	0.026	83.82	2.541s
EU-154	2549.27	1274.25	42.	58.	0.029	61.25	1.810s
CO-60	2664.96	1332.06	31.	42.	0.021	89.10	1.501

K-40	2922.36	1460.67	15.	617.	0.308	12.51	1.629
Bl-214	3529.97	1764.27	8.	20.	0.010	86.35	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 -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm	pCi/gm	COMMENTS

BE-7 -9.6256E-01

477.56-9.626E-01 %(5.729E+00 1.73E+00 G

K-40 1.4854E+01

1460.75 1.485E+01 (P 5.040E-01 6.21E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	1.7795E-02						
		834.81	1.780E-02	&(P	6.615E-02	1.95E-02	G
CO-57	-9.1522E-03						
		122.07	-9.152E-03	%(	3.267E-01	9.88E-02	G K
		136.43	4.820E-01	%	3.074E+00	9.31E-01	G
CO-60	1.0446E-01						
		1332.51	9.924E-02	(P	6.846E-02	2.95E-02	G K
		1173.23	1.097E-01	(P	7.641E-02	3.07E-02	G K
Sr-85	-2.5210E-02						
		514.00	-2.521E-02	%(	4.330E-01	1.31E-01	G
Kr-85	-7.0546E+02						
		513.99	-7.055E+02	%(P	9.802E+03	2.96E+03	G
Y-88	2.2083E-03						
		1836.01	2.208E-03	&(	5.146E-02	1.32E-02	G K
		898.02	-9.009E-04	& P	6.379E-02	1.79E-02	G
NB-94	-3.2006E-03						
		871.10	-3.201E-03	%(P	5.667E-02	1.60E-02	G K
		702.50	1.878E-03	& P	6.742E-02	1.94E-02	G K
Ag-108M	6.4353E-02						
		722.95	6.435E-02	(	8.590E-02	2.67E-02	G K
		614.37	-6.875E-02	% P	3.274E-01	9.87E-02	G
		433.93	1.161E-01	%	6.267E-01	1.90E-01	G

```
CD-109       3.0357E+00
                    88.04 3.036E+00 &(P 9.544E+00 2.89E+00 G

SN-113      -1.1784E-01
                   391.71-1.178E-01 %(  7.631E-01 2.31E-01 G K
                   255.04-1.112E+00 & P 1.304E+01 3.94E+00 G

SB-125       5.0920E-01
                   427.95 5.092E-01 %(P 1.857E+00 5.62E-01 G K
                   600.77-1.001E-01 % P 1.499E+00 4.50E-01 G
                   636.15 3.805E-01 & P 2.494E+00 7.51E-01 G
                   463.51-1.649E-01 % P 5.046E+00 1.52E+00 G
                   176.29 3.820E-01 % P 5.280E+00 1.60E+00 G

I-131       -1.9292E-01
                   364.48-1.929E-01 %(  6.135E-01 1.86E-01 G K
                   636.97 7.735E-01 %   4.625E+00 1.39E+00 G
```

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                     284.29-1.212E+00 &   7.342E+00 2.22E+00 G

CS-134       1.5613E-04
                     604.66-5.471E-02 %(P 3.090E-01 9.31E-02 G K
                     795.76 6.286E-02 *(P 7.975E-02 2.50E-02 G
                     569.29 4.799E-02 % P 2.022E+00 6.08E-01 G
                     801.84 1.716E-01 %   7.134E-01 2.09E-01 G

CS-137       3.4671E+02
                     661.62 3.467E+02  (P 3.883E-01 7.42E-01 G

CE-139      -1.0094E-01
                     165.85-1.009E-01 %(P 3.892E-01 1.18E-01 G

EU-152      -5.1598E-01
                     121.78-5.160E-01 &(P 1.071E+00 3.25E-01 G K
                     344.30-2.559E-01 & P 1.435E+00 4.34E-01 G
                    1408.08 3.043E-02 % P 2.599E-01 7.16E-02 G
                     964.00-2.455E-02 % P 6.429E-01 1.85E-01 G
                    1112.07 1.991E-01 % P 5.371E-01 1.60E-01 G
                     778.90 1.436E-01 % P 4.243E-01 1.26E-01 G

EU-154       4.3468E-01
                                        Energy duplication
                     123.10 4.487E-01 %(P 8.355E-01 2.54E-01 G K
                    1274.80 3.769E-01  (P 2.123E-01 7.70E-02 G
                     723.30 2.869E-01 % P 3.868E-01 1.20E-01 G
                    1004.80 5.191E-01 *(P 4.011E-01 1.35E-01 G

EU-155       1.7897E-01
                      86.45 1.790E-01 %(  1.151E+00 3.49E-01 G K
```

105.31 2.462E-02 & 1.502E+00 4.55E-01 G

HG-203 -5.5666E-02

279.17-5.567E-02 %(4.634E-01 1.40E-01 G K

72.87-8.402E-01 % P 7.249E+00 2.19E+00 G

70.83-7.045E-01 % 1.364E+01 4.13E+00 G

82.50-4.868E+00 & 1.782E+01 5.40E+00 G

TL-208 2.2809E-01

583.14 2.281E-01 %(P 3.715E-01 1.13E-01 G

510.72 6.223E-01 % P 1.987E+00 6.01E-01 G

PB-212 7.4256E-01

238.63 7.426E-01 (P 8.695E-01 2.65E-01 G K

Energy duplication

77.11 9.936E-01 % 2.340E+00 7.10E-01 G

74.81 1.436E+00 % P 4.541E+00 1.38E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.4481E-01						
		351.99	3.448E-01	&(P	1.126E+00	3.41E-01	G K
		295.22	4.802E-01	% P	2.004E+00	6.07E-01	G
					Energy duplication		
		77.11	1.610E+00	% P	3.827E+00	1.16E+00	G
		241.92	1.284E-01	% P	4.931E+00	1.49E+00	G
BI-212	5.7490E-01						
		727.17	5.749E-01	(P	4.557E-01	1.52E-01	G K
		1620.56	2.701E-01	%	1.957E+00	5.36E-01	G
		785.42	1.214E+00	% P	3.242E+00	9.70E-01	G
BI-214	4.1531E-01						
		609.32	3.903E-01	%(P	6.343E-01	1.93E-01	G K
		1764.51	3.933E-01	(P	3.068E-01	1.16E-01	G
		1120.28	5.154E-01	?(P	5.510E-01	1.77E-01	G
RA-224	1.1158E-01						
		241.00	1.116E-01	&(P	9.297E+00	2.81E+00	G
RA-226	6.9867E+00						
		185.99	6.987E+00	%(	1.108E+01	3.37E+00	G
AC-228	6.9631E-01						
		911.07	7.494E-01	(P	2.264E-01	9.18E-02	G K
		968.90	6.081E-01	(P	4.845E-01	1.59E-01	G
		338.40	2.548E-01	% P	3.269E+00	9.88E-01	G
TH-227	-1.3378E-01						
		236.00	-1.338E-01	&(P	3.373E+00	1.02E+00	G K

256.25 2.129E+00 & P 5.290E+00 1.60E+00 G

PA-234 3.9804E+00

98.44 4.259E+00 (1.436E+00 4.42E-01 G K

946.00-6.972E-02 % 3.458E-01 1.01E-01 G

131.28 2.930E-01 % 1.633E+00 4.95E-01 G

94.67 3.529E+00 (2.345E+00 7.16E-01 G

883.24-1.472E-01 % 6.584E-01 1.94E-01 G

926.70 8.202E-02 & 5.007E-01 1.44E-01 G

569.26 6.278E-02 % 2.994E+00 9.00E-01 G

TH-234 -4.9136E+00

63.29-4.914E+00 %(P 1.462E+01 4.43E+00 G K

92.80-5.519E-01 % P 1.230E+01 3.72E+00 G

92.38-6.740E+00 % P 1.429E+01 4.34E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	1.4214E+00						
		59.54	1.421E+00	%(P	2.055E+00	6.24E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-9.3967E-01	-9.6256E-01	5.2010E+00	5.2013E+00	5.593E+00
K-40		1.4854E+01	1.4854E+01	1.8645E+00	2.0447E+00	
MN-54	#A	1.7722E-02	1.7795E-02	5.8441E-02	5.8450E-02	6.587E-02
CO-57	#B	-9.1088E-03	-9.1522E-03	2.9648E-01	2.9648E-01	3.252E-01
CO-60		1.0439E-01	1.0446E-01	6.4047E-02	6.4319E-02	
Sr-85	#A	-2.4715E-02	-2.5210E-02	3.9193E-01	3.9194E-01	4.245E-01
Kr-85	#A	-7.0545E+02	-7.0546E+02	9.5939E+03	9.5939E+03	9.802E+03
Y-88	#B	2.1818E-03	2.2083E-03	3.9697E-02	3.9698E-02	5.084E-02
NB-94	#B	-3.2006E-03	-3.2006E-03	5.4966E-02	5.4967E-02	5.667E-02
Ag-108M	#A	6.4351E-02	6.4353E-02	8.0167E-02	8.0250E-02	8.590E-02
CD-109	#A	3.0271E+00	3.0357E+00	8.6796E+00	8.6812E+00	9.517E+00

SN-113 #B	-1.1654E-01	-1.1784E-01	6.9272E-01	6.9275E-01	7.547E-01
SB-125 #B	5.0855E-01	5.0920E-01	1.6875E+00	1.6877E+00	1.855E+00
I-131 #B	-1.6442E-01	-1.9292E-01	5.5759E-01	5.5770E-01	5.229E-01
CS-134 #B	1.5586E-04	1.5613E-04	1.8666E-04	1.8686E-04	3.085E-01
CS-137	3.4667E+02	3.4671E+02	2.2274E+00	1.9717E+01	
CE-139 #A	-9.9999E-02	-1.0094E-01	3.5491E-01	3.5496E-01	3.856E-01
EU-152 #B	-5.1583E-01	-5.1598E-01	9.7819E-01	9.7861E-01	1.070E+00
EU-154 #B	4.3450E-01	4.3468E-01	2.6636E-01	2.6744E-01	8.352E-01
EU-155 #B	1.7884E-01	1.7897E-01	1.0460E+00	1.0460E+00	1.150E+00
HG-203 #B	-5.4151E-02	-5.5666E-02	4.2055E-01	4.2056E-01	4.508E-01
TL-208 #A	2.2809E-01	2.2809E-01	3.3895E-01	3.3920E-01	3.715E-01
PB-212 #A	7.4256E-01	7.4256E-01	7.9358E-01	7.9469E-01	8.695E-01
PB-214 #B	3.4481E-01	3.4481E-01	1.0230E+00	1.0232E+00	1.126E+00
BI-212	5.7490E-01	5.7490E-01	4.5724E-01	4.5839E-01	
BI-214 #B	4.1531E-01	4.1531E-01	2.7818E-01	2.7917E-01	6.343E-01
RA-224 #A	1.1158E-01	1.1158E-01	8.4335E+00	8.4336E+00	9.297E+00
RA-226 #A	6.9867E+00	6.9867E+00	1.0100E+01	1.0108E+01	1.108E+01
AC-228 #	6.9631E-01	6.9631E-01	2.5580E-01	2.5881E-01	2.264E-01
TH-227 #B	-1.3378E-01	-1.3378E-01	3.1480E+00	3.1480E+00	3.373E+00
PA-234 #	3.9804E+00	3.9804E+00	1.2387E+00	1.2582E+00	1.436E+00
TH-234 #B	-4.9136E+00	-4.9136E+00	1.4109E+01	1.4112E+01	1.462E+01
AM-241 #A	1.4214E+00	1.4214E+00	1.8730E+00	1.8747E+00	2.055E+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 (785.4 to 1999.1 keV) 3.6220761E+02 pCi/gm

Total Decayed Activity (785.4 to 1999.1 keV) 3.6224823E+02 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_31AUG2005_1222.An1

Sample description

FSS-NOL-06-01-033-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_31AUG2005_1222.An1

Acquisition information

Start time:	31-Aug-2005 12:22:36
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: 2.0270E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0270E+03) =
4.9334E+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	30-Aug-2005 10:36:00
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: 0.1181

***** 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
74.30	176.	19.95	1.00	1.651E-02				
74.30	176.	19.95	1.00	1.651E-02	74.81	9.600	7.155E-01	PB212
77.27	403.	8.55	1.01	1.736E-02	77.11	10.700	1.447E+00	PB214
					77.11	17.500	8.927E-01	PB212
87.10	155.	19.02	1.01	1.923E-02	86.45	32.740	1.658E-01	EU155
					88.04	3.790	PBC<MDA	CD109
89.95	97.	31.47	1.02	1.960E-02				

93.16	167.	18.25	1.02	1.996E-02	92.38	2.570	2.036E+00	TH234
					92.80	3.000	1.793E+00	TH234
104.83	103.	34.94	0.83	2.078E-02				
104.83	103.	34.94	0.83	2.078E-02	105.31	21.800	1.521E-01	EU155
186.28	172.	19.03	1.59	1.857E-02	185.99	3.280	1.886E+00	RA226
209.26	98.	28.58	0.86	1.722E-02				
238.82	816.	4.16	1.12	1.556E-02	238.63	43.100	8.044E-01	PB212
241.76	110.	22.52	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
269.98	88.	30.06	1.36	1.402E-02				
295.34	164.	15.70	1.00	1.292E-02	295.22	19.200	4.360E-01	PB214
300.39	40.	41.38	0.89	1.271E-02				
328.11	52.	38.61	0.76	1.169E-02				
338.47	181.	14.65	1.21	1.135E-02	338.40	12.010	8.746E-01	AC228
352.14	260.	10.94	1.32	1.092E-02	351.99	37.100	4.238E-01	PB214
409.35	36.	36.04	1.57	9.423E-03				
463.04	78.	28.41	1.62	8.350E-03				
463.04	78.	28.41	1.62	8.350E-03	463.51	10.000	6.139E-01	SB125
511.14	127.	16.43	1.18	7.584E-03	510.72	22.500	4.340E-01	TL208
583.24	266.	8.31	1.38	6.683E-03	583.14	86.000	3.053E-01	TL208
609.45	188.	11.70	1.47	6.411E-03	609.32	46.090	4.207E-01	BI214
727.02	78.	26.46	1.14	5.444E-03	727.17	11.800	8.026E-01	BI212
794.28	56.	29.32	1.02	5.024E-03				
911.14	147.	9.86	1.75	4.446E-03	911.07	29.000	7.524E-01	AC228
964.39	27.	40.77	1.61	4.231E-03	964.00	14.580	PBC<MDA	EU152
969.26	89.	19.23	1.35	4.211E-03	968.90	17.460	8.003E-01	AC228
1119.71	55.	27.70	1.51	3.711E-03	1120.28	15.040	6.620E-01	BI214
1460.71	712.	3.90	1.95	2.943E-03	1460.75	10.700	1.504E+01	K40
1620.70	17.	34.55	1.45	2.682E-03	1620.56	2.750	1.537E+00	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.48	28.	18.90	1.37	2.481E-03	1764.51	15.920	4.652E-01	Bl214

********** 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	
148.16	74.72	526.	176.	0.088	59.86	1.004	Bl-207	D
154.10	77.69	392.	403.	0.202	25.64	1.007	PB-214	D
179.48	90.21	420.	97.	0.049	94.42	1.016	PB-214	lD
209.24	104.83	523.	103.	0.052	104.83	0.828	U-235	l
418.19	209.26	312.	98.	0.049	85.74	0.864	AC-228	s
477.34	238.83	169.	816.	0.408	12.49	1.122	PB-212	D
483.23	241.77	252.	110.	0.055	67.56	1.124	PB-214	D
539.68	269.98	226.	88.	0.044	90.19	1.358	AC-228	s
600.53	300.39	117.	40.	0.020	124.15	0.894	PB-212	
655.99	328.11	150.	52.	0.026	115.83	0.759	AC-228	s
818.55	409.35	64.	36.	0.018	108.11	1.566	AC-228	s
1588.79	794.28	58.	58.	0.029	67.77	1.017	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	Centroid	Background	Net Area	Intensity	Uncert	FWHM

	Channel	Energy	Counts	Counts	Cts/Sec	3 Sigma %	keV
PB-212	149.06	74.75	1156.	200.	0.100	73.33	1.499s
PB-214	153.79	77.11	1046.	359.	0.179	40.96	1.499D
PB-212	153.79	77.11	1043.	362.	0.181	40.96	1.499D
TH-234	185.59	93.00	1019.	165.	0.082	79.89	1.499s
TH-234	185.60	93.01	984.	171.	0.085	78.30	1.499s
RA-226	371.80	186.07	472.	156.	0.078	63.67	1.499s
PB-212	477.32	238.81	427.	674.	0.337	17.21	1.499
RA-224	482.94	241.62	528.	92.	0.046	109.47	1.499s
PB-214	590.80	295.53	200.	148.	0.074	46.85	1.499
AC-228	676.73	338.47	176.	179.	0.089	43.95	1.210s
PB-214	703.91	352.06	115.	248.	0.124	26.14	1.499
SB-125	926.12	463.11	109.	59.	0.029	82.82	1.499s
TL-208	1022.22	511.14	113.	111.	0.056	49.30	1.176s
TL-208	1166.49	583.24	74.	263.	0.132	24.92	1.379
BI-214	1218.93	609.45	88.	186.	0.093	35.09	1.467
BI-212	1454.19	727.02	88.	77.	0.039	79.38	1.136s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1822.63	911.14	28.	146.	0.073	29.58	1.753s
EU-152	1929.19	964.39	49.	27.	0.013	122.30	1.612s
AC-228	1938.93	969.26	61.	88.	0.044	57.70	1.352
Bl-214	2240.01	1119.71	58.	55.	0.028	83.09	1.512
K-40	2922.44	1460.71	16.	710.	0.355	11.70	1.951
Bl-212	3242.64	1620.70	5.	17.	0.009	103.65	1.451
Bl-214	3530.39	1764.48	0.	28.	0.014	56.69	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		7.7734E-02					
			477.56	7.773E-02	%(	3.978E-01	1.17E-01 G
K-40		1.5037E+01					
			1460.75	1.504E+01	(P	4.506E-01	5.88E-01 G
MN-54		1.2291E-02					
			834.81	1.229E-02	&(P	5.232E-02	1.53E-02 G
CO-57		-2.1147E-02					
			122.07	-2.115E-02	%(	5.299E-02	1.60E-02 G K
			136.43	-1.320E-03	&	3.888E-01	1.16E-01 G

```
CO-60       -1.3048E-03
                1332.51-1.305E-03 %(P 4.695E-02 1.26E-02 G K
                1173.23-2.810E-04 & P 6.410E-02 1.79E-02 G K

Sr-85       -1.0011E-02
                514.00-1.001E-02 &(  5.334E-02 1.57E-02 G

Kr-85       -2.5263E+02
                513.99-2.526E+02 &(P 1.222E+03 3.59E+02 G

Y-88         0.0000E+00
                1836.01 0.000E+00 %(  4.683E-02 1.19E-02 G K
                898.02 1.593E-02 % P 3.767E-02 1.13E-02 G

NB-94        5.0359E-03
                871.10 5.036E-03 %(P 4.011E-02 1.13E-02 G K
                702.50-2.597E-05 & P 3.734E-02 1.04E-02 G K
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	1.5239E-02						
		722.95	1.524E-02	&(	3.616E-02	1.09E-02	G K
		614.37	-3.454E-03	% P	5.205E-02	1.50E-02	G
		433.93	1.274E-02	&	3.422E-02	1.02E-02	G
CD-109	-1.3045E-01						
		88.04	-1.304E-01	%(P	1.552E+00	4.65E-01	G
SN-113	0.0000E+00						
		391.71	0.000E+00	%(	5.847E-02	1.69E-02	G K
		255.04	1.930E-02	% P	1.817E+00	5.34E-01	G
SB-125	1.1606E-01						
		427.95	-3.474E-03	%(P	1.278E-01	3.68E-02	G K
		600.77	-7.207E-03	% P	2.386E-01	6.80E-02	G
		636.15	7.942E-02	% P	3.166E-01	9.22E-02	G
		463.51	4.699E-01	*(P	4.116E-01	1.33E-01	G
		176.29	-6.698E-02	% P	5.824E-01	1.73E-01	G
I-131	-5.9068E-03						
		364.48	-5.907E-03	%(	4.898E-02	1.43E-02	G K
		636.97	1.853E-01	%	4.774E-01	1.42E-01	G
		284.29	1.370E-01	%	6.354E-01	1.89E-01	G
CS-134	4.7227E-04						
		604.66	4.723E-04	%(P	9.162E-02	2.69E-02	G K
		795.76	-3.974E-03	% P	6.433E-02	1.83E-02	G
		569.29	4.724E-02	& P	2.646E-01	7.70E-02	G
		801.84	1.641E-02	%	5.425E-01	1.53E-01	G

```
CS-137      2.7311E-03
                661.62 2.731E-03 %(P 6.089E-02 1.74E-02 G

CE-139     -9.9504E-03
                165.85-9.950E-03 %(P 4.688E-02 1.40E-02 G

EU-152      1.1603E-01
                121.78 2.839E-02 &(P 1.281E-01 3.84E-02 G K
                344.30 4.522E-03 % P 1.320E-01 3.83E-02 G
                1408.08-1.053E-02 % P 1.884E-01 4.92E-02 G
                964.00 2.918E-01  (P 3.833E-01 1.21E-01 G
                1112.07 8.136E-02 % P 4.760E-01 1.38E-01 G
                778.90 5.574E-03 % P 3.524E-01 9.89E-02 G

EU-154     -3.4552E-02
                123.10-3.455E-02 %(P 1.040E-01 3.13E-02 G K
                1274.80-2.818E-02 & P 1.853E-01 5.31E-02 G
```

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30-3.328E-02 & P 2.553E-01 7.35E-02 G
                      1004.80-5.099E-03 % P 3.229E-01 9.05E-02 G

EU-155      -1.3627E-02
                       86.45-1.363E-02 &(  1.720E-01 5.15E-02 G K
                      105.31 1.324E-01 %   1.870E-01 5.73E-02 G

HG-203       2.3078E-02
                      279.17 2.308E-02 &(  4.187E-02 1.28E-02 G K
                       72.87-6.552E-01 & P 1.213E+00 3.68E-01 G
                       70.83-1.212E+00 %   2.004E+00 6.11E-01 G
                       82.50-6.283E-01 &   2.488E+00 7.49E-01 G

TL-208       3.0526E-01
                      583.14 3.053E-01  (P 4.956E-02 2.56E-02 G
                      510.72 4.340E-01 + P 2.038E-01 8.16E-02 G

PB-212       6.6974E-01
                      238.63 6.697E-01  (P 9.838E-02 3.88E-02 G K
                                         Energy duplication
                       77.11 8.025E-01 +   3.392E-01 1.10E-01 G
                       74.81 8.379E-01 + P 6.766E-01 2.10E-01 G

PB-214       4.0468E-01
                      351.99 4.086E-01  (P 8.661E-02 3.59E-02 G K
                      295.22 3.970E-01  (P 1.842E-01 6.27E-02 G
                                         Energy duplication
                       77.11 1.299E+00 + P 5.558E-01 1.79E-01 G
                      241.92 2.881E-01 % P 6.766E-01 2.05E-01 G

BI-212       9.4137E-01
```

727.17 8.026E-01 *(P 4.811E-01 2.14E-01 G K
1620.56 1.537E+00 (1.187E+00 5.31E-01 G
785.42 4.121E-01 % P 2.290E+00 6.61E-01 G

BI-214 4.3208E-01
609.32 4.207E-01 (P 1.044E-01 4.95E-02 G K
1764.51 4.652E-01 (P 1.244E-01 8.93E-02 G
1120.28 6.620E-01 + P 4.548E-01 1.85E-01 G

RA-224 1.0192E+00
241.00 1.019E+00 &(P 1.215E+00 3.75E-01 G

RA-226 1.7087E+00
185.99 1.709E+00 *(1.136E+00 3.63E-01 G

AC-228 7.9180E-01
911.07 7.524E-01 (P 1.426E-01 7.51E-02 G K
968.90 8.003E-01 (P 3.537E-01 1.55E-01 G
338.40 8.746E-01 @(P 3.158E-01 1.30E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-5.5687E-02						
		236.00	-5.569E-02	%(P	4.304E-01	1.28E-01	G K
		256.25	-6.780E-03	% P	5.423E-01	1.59E-01	G
PA-234	-1.4426E-02						
		98.44	-1.443E-02	&(	1.761E-01	5.25E-02	G K
		946.00	-4.557E-02	&	2.739E-01	7.90E-02	G
		131.28	3.896E-02	&	2.167E-01	6.50E-02	G
		94.67	-8.861E-02	%	3.307E-01	9.96E-02	G
		883.24	-7.131E-02	%	4.215E-01	1.22E-01	G
		926.70	-3.945E-02	%	4.323E-01	1.22E-01	G
		569.26	7.424E-02	&	3.910E-01	1.14E-01	G
TH-234	1.3295E+00						
		63.29	3.405E-01	&(P	2.084E+00	6.22E-01	G K
		92.80	1.907E+00	@(P	1.663E+00	5.16E-01	G
		92.38	2.156E+00	&(P	1.980E+00	6.12E-01	G
AM-241	-5.4856E-03						
		59.54	-5.486E-03	&(P	2.560E-01	7.59E-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:	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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	7.6658E-02	7.7734E-02	3.5036E-01	3.5039E-01	3.923E-01
K-40	1.5037E+01	1.5037E+01	1.7653E+00	1.9591E+00	
MN-54 #A	1.2262E-02	1.2291E-02	4.5826E-02	4.5832E-02	5.219E-02
CO-57 #B	-2.1089E-02	-2.1147E-02	4.8069E-02	4.8083E-02	5.284E-02
CO-60 #B	-1.3043E-03	-1.3048E-03	4.9968E-02	4.9968E-02	4.694E-02
Sr-85 #A	-9.8965E-03	-1.0011E-02	4.7209E-02	4.7212E-02	5.273E-02
Kr-85 #A	-2.5263E+02	-2.5263E+02	1.3055E+03	1.3056E+03	1.222E+03
Y-88 #B	0.0000E+00	0.0000E+00	3.5667E-02	3.5667E-02	4.651E-02
NB-94 #B	5.0359E-03	5.0359E-03	3.3902E-02	3.3903E-02	4.011E-02
Ag-108M#B	1.5239E-02	1.5239E-02	3.2569E-02	3.2580E-02	3.616E-02
CD-109 #A	-1.3024E-01	-1.3045E-01	1.4889E+00	1.4889E+00	1.550E+00
SN-113 #B	0.0000E+00	0.0000E+00	5.0609E-02	5.0609E-02	5.809E-02
SB-125 #B	1.1597E-01	1.1606E-01	9.8486E-02	9.8704E-02	1.277E-01
I-131 #B	-5.3844E-03	-5.9068E-03	4.3023E-02	4.3024E-02	4.465E-02
CS-134 #B	4.7181E-04	4.7227E-04	8.0795E-02	8.0795E-02	9.153E-02
CS-137 #A	2.7309E-03	2.7311E-03	5.2337E-02	5.2337E-02	6.088E-02
CE-139 #A	-9.8966E-03	-9.9504E-03	4.3262E-02	4.3266E-02	4.663E-02
EU-152 #B	1.1601E-01	1.1603E-01	1.4433E-01	1.4448E-01	1.281E-01
EU-154 #B	-3.4544E-02	-3.4552E-02	9.7914E-02	9.7932E-02	1.040E-01
EU-155 #B	-1.3621E-02	-1.3627E-02	1.5438E-01	1.5439E-01	1.719E-01
HG-203 #B	2.2712E-02	2.3078E-02	3.8309E-02	3.8331E-02	4.121E-02
TL-208	3.0526E-01	3.0526E-01	7.6773E-02	7.8687E-02	

PB-212 #	6.6974E-01	6.6974E-01	1.1628E-01	1.2229E-01	9.838E-02
PB-214 #	4.0468E-01	4.0468E-01	1.0664E-01	1.0906E-01	8.661E-02
BI-212	9.4137E-01	9.4137E-01	6.1652E-01	6.1881E-01	
BI-214	4.3208E-01	4.3208E-01	1.4593E-01	1.4796E-01	
RA-224 #A	1.0192E+00	1.0192E+00	1.1244E+00	1.1259E+00	1.215E+00
RA-226 #	1.7087E+00	1.7087E+00	1.0880E+00	1.0923E+00	1.136E+00
AC-228	7.9180E-01	7.9180E-01	2.0882E-01	2.1356E-01	
TH-227 #B	-5.5687E-02	-5.5687E-02	4.0827E-01	4.0828E-01	4.304E-01
PA-234 #B	-1.4426E-02	-1.4426E-02	1.5764E-01	1.5765E-01	1.761E-01
TH-234 #B	1.3295E+00	1.3295E+00	1.0787E+00	1.0812E+00	2.084E+00
AM-241 #A	-5.4856E-03	-5.4856E-03	4.7080E-01	4.7080E-01	2.560E-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) 1.7507185E+01 pCi/gm

Total Decayed Activity (269.6 to 1999.1 keV) 1.7507185E+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_31AUG2005_1259.An1

Sample description

FSS-NOL-06-01-039-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_31AUG2005_1259.An1

Acquisition information

Start time: 31-Aug-2005 12:59:47
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: 1.8360E+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 30-Aug-2005 11:06:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0630

***** 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	123.	27.74	1.00	1.651E-02				
74.37	123.	27.74	1.00	1.651E-02	74.81	9.600	PBC<MDA	PB212
77.37	292.	11.94	1.01	1.736E-02	77.11	10.700	1.155E+00	PB214
					77.11	17.500	7.150E-01	PB212
186.25	96.	29.40	1.42	1.857E-02	185.99	3.280	1.154E+00	RA226
238.80	619.	5.37	1.12	1.557E-02	238.63	43.100	6.720E-01	PB212
238.87	306.	12.70	1.50	1.540E-02	238.63	43.100	PBC<MDA	PB212

241.38	95.	26.79	1.12	1.543E-02	241.00	3.900		PBC<MDA RA224
295.37	140.	15.95	1.16	1.292E-02				
295.37	140.	15.95	1.16	1.292E-02	295.22	19.200	4.098E-01	PB214
300.16	49.	38.30	1.16	1.273E-02				
338.60	130.	22.54	1.44	1.134E-02	338.40	12.010	6.880E-01	AC228
352.05	282.	12.85	1.26	1.092E-02	351.99	37.100	5.089E-01	PB214
510.98	90.	22.78	1.68	7.587E-03	510.72	22.500	3.166E-01	TL208
583.23	213.	14.05	1.56	6.684E-03	583.14	86.000	2.697E-01	TL208
609.48	158.	13.90	1.05	6.411E-03	609.32	46.090	3.915E-01	BI214
661.74	539.	5.77	1.58	5.936E-03	661.62	84.620	7.890E-01	CS137
911.14	110.	20.11	1.11	4.446E-03	911.07	29.000	6.149E-01	AC228
968.80	108.	25.07	2.00	4.213E-03				
968.80	108.	25.07	2.00	4.213E-03	968.90	17.460	1.070E+00	AC228
1120.40	41.	39.42	1.71	3.711E-03	1120.28	15.040		PBC<MDA BI214
1173.17	926.	4.35	1.80	3.565E-03	1173.23	99.860	1.915E+00	CO60
1332.48	777.	3.88	1.82	3.190E-03	1332.51	99.980	1.794E+00	CO60
1460.82	525.	4.70	1.73	2.942E-03	1460.75	10.700	1.222E+01	K40
1764.28	26.	19.61	0.83	2.481E-03	1764.51	15.920	4.763E-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	
148.30	74.72	522.	123.	0.062	83.23	1.005	BI-207	D
154.30	77.72	464.	292.	0.146	35.82	1.007	PB-214	D
477.30	238.79	242.	619.	0.310	16.10	1.122	PB-212	D
482.46	241.37	276.	95.	0.047	80.36	1.123	RA-224	D
600.08	300.01	155.	49.	0.025	114.91	1.165	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	149.22	74.83	1213.	131.	0.066	110.85	1.499s
PB-214	153.79	77.11	1030.	277.	0.139	51.60	1.499D
PB-212	153.79	77.11	1027.	281.	0.140	51.60	1.499D
RA-226	371.94	186.14	695.	105.	0.053	110.23	1.499s
PB-212	477.31	238.81	642.	527.	0.264	23.89	1.499
PB-214	477.44	238.87	604.	306.	0.153	38.11	1.499
PB-214	590.19	295.22	438.	130.	0.065	72.25	1.499D

AC-228	676.71	338.46	300.	107.	0.053	73.22	1.499s
PB-214	703.94	352.07	231.	252.	0.126	31.48	1.499
TL-208	1021.89	510.98	147.	73.	0.037	68.35	1.679s
TL-208	1166.46	583.23	197.	211.	0.105	42.15	1.556s
BI-214	1218.99	609.48	122.	157.	0.079	41.70	1.051
CS-137	1323.57	661.74	139.	539.	0.269	17.31	1.584s
AC-228	1822.71	911.18	157.	89.	0.045	65.80	1.578s
AC-228	1938.39	968.99	159.	78.	0.039	75.61	1.616s
BI-214	2241.39	1120.40	114.	41.	0.021	118.25	1.713s
CO-60	2346.98	1173.17	151.	926.	0.463	13.05	1.800
CO-60	2665.80	1332.48	31.	777.	0.389	11.65	1.817
K-40	2922.66	1460.82	22.	523.	0.261	14.11	1.732
BI-214	3530.00	1764.28	0.	26.	0.013	58.83	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		5.0008E-02					
			477.56	5.001E-02	&(	6.056E-01	1.78E-01 G
K-40		1.2225E+01					
			1460.75	1.222E+01	(P	5.753E-01	5.78E-01 G
MN-54		2.0835E-02					
			834.81	2.083E-02	%(P	8.205E-02	2.43E-02 G
CO-57		-7.8261E-03					
			122.07	-7.826E-03	%(	5.683E-02	1.70E-02 G K
			136.43	2.057E-01	&	4.092E-01	1.24E-01 G
CO-60		1.8545E+00					
			1332.51	1.794E+00	(P	6.585E-02	6.97E-02 G K
			1173.23	1.915E+00	(P	1.242E-01	8.33E-02 G K
Sr-85		-2.7243E-02					
			514.00	-2.724E-02	%(	7.201E-02	2.17E-02 G
Kr-85		-6.4370E+02					
			513.99	-6.437E+02	%(P	1.647E+03	4.94E+02 G
Y-88		-2.0494E-03					
			1836.01	-2.049E-03	&(	5.509E-02	1.44E-02 G K

898.02-1.228E-02 % P 1.037E-01 3.04E-02 G

NB-94 3.5384E-02

871.10 3.538E-02 %(P 7.988E-02 2.41E-02 G K

702.50-1.965E-03 % P 5.237E-02 1.49E-02 G K

Ag-108M -1.5822E-03

722.95-1.582E-03 &(9.687E-02 2.82E-02 G K

614.37-2.727E-02 % P 7.821E-02 2.34E-02 G

433.93 1.430E-02 & 6.419E-02 1.91E-02 G

CD-109 1.0663E+00

88.04 1.066E+00 %(P 1.536E+00 4.69E-01 G

SN-113 -1.8728E-02

391.71-1.873E-02 %(8.621E-02 2.56E-02 G K

255.04 1.717E-02 % P 2.361E+00 6.97E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.6310E-02						
		427.95	8.631E-02	&(P	1.773E-01	5.38E-02	G K
		600.77	-7.301E-03	& P	3.353E-01	9.68E-02	G
		636.15	-5.549E-02	& P	5.846E-01	1.70E-01	G
		463.51	3.132E-01	% P	5.324E-01	1.63E-01	G
		176.29	1.694E-01	% P	6.865E-01	2.06E-01	G
I-131	-7.0889E-03						
		364.48	-7.089E-03	%(	7.267E-02	2.14E-02	G K
		636.97	1.738E-01	&	9.323E-01	2.74E-01	G
		284.29	4.188E-01	%	8.881E-01	2.69E-01	G
CS-134	-1.9570E-02						
		604.66	-1.957E-02	%(P	7.395E-02	2.20E-02	G K
		795.76	3.842E-02	& P	8.903E-02	2.68E-02	G
		569.29	-1.054E-02	% P	3.476E-01	9.98E-02	G
		801.84	-2.479E-01	%	8.919E-01	2.65E-01	G
CS-137	7.8895E-01						
		661.62	7.890E-01	@(P	8.460E-02	4.56E-02	G
CE-139	2.0519E-02						
		165.85	2.052E-02	&(P	6.063E-02	1.83E-02	G
EU-152	-2.4830E-02						
		121.78	-2.483E-02	%(P	1.663E-01	4.97E-02	G K
		344.30	-4.784E-02	% P	2.129E-01	6.34E-02	G
		1408.08	5.051E-02	& P	1.786E-01	5.06E-02	G
		964.00	7.197E-03	% P	7.536E-01	2.19E-01	G
		1112.07	-2.047E-01	% P	8.400E-01	2.49E-01	G

778.90 1.486E-01 % P 6.162E-01 1.82E-01 G

EU-154 4.6555E-03

123.10 4.656E-03 &(P 1.214E-01 3.62E-02 G K

1274.80-2.825E-02 % P 2.236E-01 6.41E-02 G

723.30-1.197E-01 % P 3.988E-01 1.19E-01 G

1004.80 1.743E-01 % P 4.885E-01 1.46E-01 G

EU-155 1.2258E-01

86.45 1.226E-01 &(1.835E-01 5.60E-02 G K

105.31 6.831E-02 % 2.332E-01 7.02E-02 G

HG-203 -7.5875E-03

279.17-7.588E-03 %(6.437E-02 1.91E-02 G K

72.87-5.855E-01 & P 1.187E+00 3.59E-01 G

70.83 3.629E-01 & 2.173E+00 6.52E-01 G

82.50-7.554E-01 % 2.730E+00 8.22E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7941E-01						
		583.14	2.697E-01	@(P	8.729E-02	3.83E-02	G
		510.72	3.166E-01	(P	2.548E-01	8.79E-02	G
PB-212	6.0963E-01						
		238.63	5.784E-01	(P	1.325E-01	4.66E-02	G K
							Energy duplication
		77.11	6.867E-01	(	3.717E-01	1.18E-01	G
		74.81	6.094E-01	?(P	7.648E-01	2.34E-01	G
PB-214	4.3323E-01						
		351.99	4.581E-01	(P	1.335E-01	4.85E-02	G K
							Energy duplication
		295.22	3.852E-01	(P	2.975E-01	9.40E-02	G
							Energy duplication
		77.11	1.108E+00	+ P	6.090E-01	1.93E-01	G
		241.92	1.955E+00	+ P	7.503E-01	2.49E-01	G
BI-212	3.2313E-01						
		727.17	3.231E-01	%(P	5.782E-01	1.77E-01	G K
		1620.56	6.285E-01	%	1.639E+00	4.85E-01	G
		785.42	8.383E-01	% P	3.847E+00	1.13E+00	G
BI-214	4.3869E-01						
		609.32	3.915E-01	(P	1.348E-01	5.48E-02	G K
		1764.51	4.763E-01	(P	1.373E-01	9.50E-02	G
		1120.28	5.436E-01	?(P	6.921E-01	2.16E-01	G
RA-224	9.2567E-01						
		241.00	9.257E-01	&(P	1.566E+00	4.77E-01	G

```
RA-226       1.2706E+00
                  185.99 1.271E+00  (  1.516E+00 4.67E-01 G

AC-228       6.0505E-01
                  911.07 5.103E-01  (P 3.483E-01 1.14E-01 G K
                  968.90 7.826E-01  (P 6.153E-01 1.99E-01 G
                  338.40 5.757E-01  (P 4.507E-01 1.43E-01 G

TH-227      -1.6477E-01
                  236.00-1.648E-01 %(P 5.663E-01 1.70E-01 G K
                  256.25 1.829E-01 % P 7.358E-01 2.20E-01 G

PA-234      -5.6536E-02
                   98.44-5.654E-02 %(  1.938E-01 5.83E-02 G K
                  946.00 6.470E-02 &   5.201E-01 1.53E-01 G
                  131.28-7.361E-02 %   2.578E-01 7.76E-02 G
                   94.67-8.919E-02 %   3.497E-01 1.05E-01 G
                  883.24-2.366E-01 %   7.900E-01 2.36E-01 G
                  926.70-2.309E-01 &   9.379E-01 2.78E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	-1.101E-02	%	5.141E-01	1.48E-01	G
TH-234	3.2886E-01						
		63.29	3.289E-01	%(P	2.330E+00	6.95E-01	G K
		92.80	1.086E+00	% P	1.906E+00	5.79E-01	G
		92.38	4.992E-03	& P	1.838E+00	5.44E-01	G
AM-241	7.6952E-04						
		59.54	7.695E-04	&(P	2.462E-01	7.27E-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	4.9312E-02	5.0008E-02	5.3310E-01	5.3311E-01	5.972E-01
K-40	1.2225E+01	1.2225E+01	1.7326E+00	1.8652E+00	
MN-54 #A	2.0785E-02	2.0835E-02	7.2851E-02	7.2861E-02	8.185E-02
CO-57 #B	-7.8044E-03	-7.8261E-03	5.1016E-02	5.1018E-02	5.667E-02
CO-60	1.8538E+00	1.8545E+00	1.6224E-01	1.9314E-01	

Sr-85	#A	-2.6931E-02	-2.7243E-02	6.5006E-02	6.5024E-02	7.118E-02
Kr-85	#A	-6.4370E+02	-6.4370E+02	1.6108E+03	1.6112E+03	1.647E+03
Y-88	#B	-2.0351E-03	-2.0494E-03	4.3132E-02	4.3132E-02	5.471E-02
NB-94	#B	3.5384E-02	3.5384E-02	7.2367E-02	7.2394E-02	7.988E-02
Ag-108M	#B	-1.5821E-03	-1.5822E-03	8.4650E-02	8.4650E-02	9.687E-02
CD-109	#A	1.0645E+00	1.0663E+00	1.4078E+00	1.4091E+00	1.533E+00
SN-113	#B	-1.8607E-02	-1.8728E-02	7.6887E-02	7.6895E-02	8.565E-02
SB-125	#B	8.6246E-02	8.6310E-02	1.6135E-01	1.6142E-01	1.772E-01
I-131	#B	-6.4592E-03	-7.0889E-03	6.4305E-02	6.4306E-02	6.621E-02
CS-134	#B	-1.9550E-02	-1.9570E-02	7.0901E-02	7.0910E-02	7.388E-02
CS-137	#	7.8890E-01	7.8895E-01	1.3682E-01	1.4390E-01	
CE-139	#A	2.0408E-02	2.0519E-02	5.4829E-02	5.4841E-02	6.030E-02
EU-152	#B	-2.4826E-02	-2.4830E-02	1.6087E-01	1.6088E-01	1.662E-01
EU-154	#B	4.6544E-03	4.6555E-03	1.0852E-01	1.0852E-01	1.214E-01
EU-155	#B	1.2253E-01	1.2258E-01	1.6810E-01	1.6824E-01	1.835E-01
HG-203	#B	-7.4667E-03	-7.5875E-03	5.7342E-02	5.7344E-02	6.334E-02
TL-208	#	2.7941E-01	2.7941E-01	1.1910E-01	1.2014E-01	
PB-212	#	6.0963E-01	6.0963E-01	1.4735E-01	1.5132E-01	1.325E-01
PB-214	#	4.3323E-01	4.3323E-01	1.3746E-01	1.3963E-01	1.335E-01
BI-212	#B	3.2313E-01	3.2313E-01	5.2976E-01	5.3007E-01	5.782E-01
BI-214		4.3869E-01	4.3869E-01	1.8423E-01	1.8589E-01	
RA-224	#A	9.2567E-01	9.2567E-01	1.4312E+00	1.4321E+00	1.566E+00
RA-226	#A	1.2706E+00	1.2706E+00	1.4006E+00	1.4024E+00	1.516E+00
AC-228	#	6.0505E-01	6.0505E-01	2.5445E-01	2.5673E-01	3.483E-01
TH-227	#B	-1.6477E-01	-1.6477E-01	5.2259E-01	5.2268E-01	5.663E-01
PA-234	#B	-5.6536E-02	-5.6536E-02	1.7496E-01	1.7499E-01	1.938E-01
TH-234	#B	3.2886E-01	3.2886E-01	2.0863E+00	2.0864E+00	2.330E+00
AM-241	#A	7.6952E-04	7.6952E-04	2.1823E-01	2.1823E-01	2.462E-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) 1.5585440E+01 pCi/gm

Total Decayed Activity (277.6 to 1999.1 keV) 1.5586213E+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_31AUG2005_1336.An1

Sample description

FSS-NOL-06-01-041-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_31AUG2005_1336.An1

Acquisition information

Start time:	31-Aug-2005 13:37:03
Live time:	2000
Real time:	2007
Dead time:	0.33 %
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: 1.9420E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9420E+03) =
5.1493E+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 30-Aug-2005 11:12:00
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: 0.0262

***** 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	184.	37.75	1.50	1.654E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.01	255.	26.90	1.50	1.720E-02				
77.01	255.	26.90	1.50	1.720E-02	77.11	10.700	9.640E-01	PB214
					77.11	17.500	PBC<MDA	PB212
77.01	259.	26.90	1.50	1.720E-02				
77.01	259.	26.90	1.50	1.720E-02	77.11	10.700	9.640E-01	PB214

					77.11	17.500	5.980E-01	PB212
238.84	581.	10.84	1.07	1.556E-02	238.63	43.100	5.960E-01	PB212
295.39	134.	28.83	1.46	1.291E-02	295.22	19.200	PBC<MDA	PB214
339.02	193.	22.61	1.43	1.133E-02	338.40	12.010	9.731E-01	AC228
352.00	261.	13.83	0.89	1.092E-02	351.99	37.100	4.447E-01	PB214
463.04	88.	39.44	1.36	8.350E-03				
463.04	88.	39.44	1.36	8.350E-03	463.51	10.000	PBC<MDA	SB125
511.84	147.	33.22	1.36	7.574E-03	510.72	22.500	5.336E-01	TL208
					513.99	0.004	3.128E+03	Kr85
					514.00	99.270	1.382E-01	Sr85
583.32	159.	25.18	1.22	6.683E-03	583.14	86.000	1.898E-01	TL208
609.42	196.	14.66	1.38	6.412E-03	609.32	46.090	4.600E-01	Bi214
661.59	1148.	4.90	1.43	5.938E-03	661.62	84.620	1.589E+00	CS137
910.68	205.	25.58	1.90	4.448E-03				
910.68	205.	25.58	1.90	4.448E-03	911.07	29.000	1.096E+00	AC228
1173.17	6094.	1.58	1.67	3.565E-03	1173.23	99.860	1.192E+01	CO60
1332.42	5366.	1.44	1.81	3.190E-03	1332.51	99.980	1.171E+01	CO60
1460.75	578.	4.50	2.08	2.942E-03	1460.75	10.700	1.272E+01	K40
1764.78	37.	20.18	2.00	2.481E-03	1764.51	15.920	6.546E-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
925.98	463.04	505.	88.	0.044	118.33	1.361	AC-228 l
1023.63	511.84	746.	147.	0.073	99.67	1.360	RH-106M 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	149.44	74.94	2468.	184.	0.092	113.25	1.499s
PB-214	153.79	77.11	2296.	255.	0.128	80.70	1.499D
PB-212	153.79	77.11	2292.	259.	0.129	80.70	1.499D
PB-212	477.35	238.82	1978.	559.	0.279	35.66	1.499
PB-214	590.95	295.60	1228.	140.	0.070	107.61	1.499s
AC-228	676.79	338.50	910.	158.	0.079	83.48	1.499s
PB-214	703.92	352.06	882.	273.	0.136	49.30	1.499
TL-208	1166.57	583.28	640.	141.	0.070	78.93	1.499s
BI-214	1218.74	609.35	425.	221.	0.111	46.71	1.735s
CS-137	1323.27	661.59	652.	1147.	0.574	14.70	1.426

AC-228	1822.99	911.32	826.	118.	0.059	104.97	1.578s
CO-60	2347.00	1173.17	640.	6094.	3.047	4.75	1.667
CO-60	2665.68	1332.42	126.	5366.	2.683	4.32	1.809
K-40	2922.51	1460.75	22.	576.	0.288	13.51	2.084
Bl-214	3531.00	1764.78	6.	37.	0.019	60.54	2.005s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

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

BE-7 5.7772E-03

477.56 5.777E-03 &(9.503E-01 2.82E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	1.2724E+01						
		1460.75	1.272E+01	(P	5.460E-01	5.75E-01	G
MN-54	-2.7387E-02						
		834.81	-2.739E-02	%(P	1.437E-01	4.28E-02	G
CO-57	-3.1336E-02						
		122.07	-3.134E-02	%(	8.864E-02	2.68E-02	G K
		136.43	-1.592E-01	%	7.524E-01	2.27E-01	G
CO-60	1.1814E+01						
		1332.51	1.171E+01	(P	1.200E-01	1.68E-01	G K
		1173.23	1.192E+01	(P	2.359E-01	1.89E-01	G K
Sr-85	-1.4711E-02						
		514.00	-1.471E-02	&(	1.198E-01	3.58E-02	G
Kr-85	-3.6054E+02						
		513.99	-3.605E+02	&(P	2.734E+03	8.16E+02	G
Y-88	5.8970E-05						
		1836.01	5.897E-05	&(	5.604E-02	1.46E-02	G K
		898.02	-6.463E-02	% P	2.238E-01	6.74E-02	G
NB-94	4.8546E-02						
		871.10	4.855E-02	%(P	1.785E-01	5.36E-02	G K
		702.50	3.118E-02	% P	1.398E-01	4.19E-02	G K
Ag-108M	5.4910E-03						
		722.95	5.491E-03	&(	1.665E-01	4.94E-02	G K

614.37 4.787E-04 % P 1.358E-01 4.02E-02 G
433.93 4.260E-02 % 1.122E-01 3.39E-02 G

CD-109 2.6781E-02
88.04 2.678E-02 %(P 2.056E+00 6.16E-01 G

SN-113 2.2151E-02
391.71 2.215E-02 &(1.229E-01 3.67E-02 G K
255.04 1.126E-01 % P 4.286E+00 1.28E+00 G

SB-125 -8.3635E-02
427.95-8.364E-02 %(P 3.514E-01 1.05E-01 G K
600.77-1.077E-01 % P 6.614E-01 1.97E-01 G
636.15 2.302E-01 & P 1.141E+00 3.41E-01 G
463.51 5.806E-01 % P 1.048E+00 3.19E-01 G
176.29-8.644E-02 % P 1.244E+00 3.73E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	2.1320E-02						
		364.48	2.132E-02	%(	1.211E-01	3.63E-02	G K
		636.97	4.054E-01	&	1.873E+00	5.61E-01	G
		284.29	-2.422E-01	&	1.626E+00	4.88E-01	G
CS-134	-8.0000E-02						
		604.66	-8.000E-02	%(P	1.372E-01	4.18E-02	G K
		795.76	1.748E-02	% P	1.873E-01	5.58E-02	G
		569.29	1.175E-01	& P	7.753E-01	2.31E-01	G
		801.84	-1.506E-02	%	1.995E+00	5.92E-01	G
CS-137	1.5888E+00						
		661.62	1.589E+00	(P	1.685E-01	7.79E-02	G
CE-139	2.9622E-02						
		165.85	2.962E-02	%(P	9.341E-02	2.82E-02	G
EU-152	-9.0198E-02						
		121.78	-9.020E-02	%(P	2.663E-01	8.05E-02	G K
		344.30	-2.809E-02	% P	3.342E-01	9.98E-02	G
		1408.08	3.642E-03	% P	3.018E-01	8.28E-02	G
		964.00	-5.272E-01	% P	1.626E+00	4.90E-01	G
		1112.07	-1.625E-01	& P	1.555E+00	4.63E-01	G
		778.90	2.367E-02	& P	1.125E+00	3.33E-01	G
EU-154	-4.5348E-03						
		123.10	-4.535E-03	&(P	1.838E-01	5.51E-02	G K
		1274.80	-1.272E-02	% P	2.325E-01	6.62E-02	G
		723.30	1.828E-02	& P	7.295E-01	2.16E-01	G
		1004.80	-8.061E-03	& P	1.241E+00	3.69E-01	G

EU-155 -1.2221E-02

86.45-1.222E-02 &(2.554E-01 7.67E-02 G K

105.31-3.321E-02 % 3.502E-01 1.05E-01 G

HG-203 6.6561E-04

279.17 6.656E-04 %(9.175E-02 2.73E-02 G K

72.87-4.470E-01 & P 1.524E+00 4.60E-01 G

70.83-4.666E-01 & 3.030E+00 9.12E-01 G

82.50-4.750E-01 % 3.798E+00 1.14E+00 G

TL-208 1.7047E-01

583.14 1.705E-01 @(P 1.460E-01 4.56E-02 G

510.72 2.578E-01 % P 5.244E-01 1.58E-01 G

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

PB-212       5.8470E-01
                    238.63 5.793E-01  (P 2.177E-01 6.96E-02 G K
                                          Energy duplication
                     77.11 5.980E-01  (  5.220E-01 1.61E-01 G
                     74.81 8.073E-01 & P 1.026E+00 3.13E-01 G

PB-214       4.4250E-01
                    351.99 4.680E-01  (P 2.423E-01 7.75E-02 G K
                    295.22 3.933E-01  (P 4.656E-01 1.43E-01 G
                                          Energy duplication
                     77.11 9.640E-01 + P 8.543E-01 2.63E-01 G
                    241.92-4.896E-01 % P 1.334E+00 4.03E-01 G

BI-212      -4.1941E-02
                    727.17-4.194E-02 %(P 1.292E+00 3.83E-01 G K
                   1620.56 4.169E-01 &   1.678E+00 4.75E-01 G
                    785.42-2.032E+00 % P 7.592E+00 2.28E+00 G

BI-214       5.5496E-01
                    609.32 5.205E-01 *(P 2.325E-01 8.15E-02 G K
                   1764.51 6.546E-01 @(P 2.461E-01 1.34E-01 G
                   1120.28 2.626E-01 % P 1.344E+00 4.02E-01 G

RA-224      -7.6174E-02
                    241.00-7.617E-02 &(P 2.463E+00 7.38E-01 G

RA-226       1.1561E+00
                    185.99 1.156E+00 %(  2.351E+00 7.13E-01 G

AC-228       6.8699E-01
```

911.07 6.384E-01 *(P 7.372E-01 2.27E-01 G K
968.90 5.424E-01 % P 1.213E+00 3.67E-01 G
338.40 8.044E-01 *(P 7.316E-01 2.27E-01 G

TH-227 -2.4378E-01
236.00-2.438E-01 %(P 7.494E-01 2.26E-01 G K
256.25-3.082E-01 % P 1.356E+00 4.08E-01 G

PA-234 3.3839E-04
98.44 3.384E-04 %(3.233E-01 9.70E-02 G K
946.00-7.530E-02 & 1.174E+00 3.51E-01 G
131.28-6.059E-02 % 3.835E-01 1.15E-01 G
94.67-1.559E-01 % 5.390E-01 1.63E-01 G
883.24 1.018E-01 & 1.397E+00 4.15E-01 G
926.70-3.081E-01 % 1.954E+00 5.85E-01 G
569.26 1.769E-01 & 1.149E+00 3.43E-01 G

Nuclide Ave activity Energy Activity Code Peak MDA Comments

TH-234 4.2250E-01

63.29 4.225E-01 %(P 3.482E+00 1.05E+00 G K

92.80 1.816E+00 % P 2.806E+00 8.54E-01 G

92.38 1.994E+00 % P 3.305E+00 1.00E+00 G

AM-241 -9.9632E-02

59.54-9.963E-02 %(P 4.589E-01 1.38E-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

- -

***** 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	5.6953E-03	5.7772E-03	8.4454E-01	8.4454E-01	9.368E-01
K-40		1.2724E+01	1.2724E+01	1.7265E+00	1.8702E+00	
MN-54	#A	-2.7320E-02	-2.7387E-02	1.3436E-01	1.3437E-01	1.433E-01
CO-57	#B	-3.1248E-02	-3.1336E-02	8.0431E-02	8.0450E-02	8.839E-02
CO-60		1.1810E+01	1.1814E+01	3.7891E-01	7.6758E-01	
Sr-85	#A	-1.4539E-02	-1.4711E-02	1.0729E-01	1.0729E-01	1.184E-01

Kr-85	#A	-3.6054E+02	-3.6054E+02	2.8164E+03	2.8164E+03	2.734E+03
Y-88	#B	5.8549E-05	5.8970E-05	4.3765E-02	4.3765E-02	5.564E-02
NB-94	#B	4.8546E-02	4.8546E-02	1.6083E-01	1.6085E-01	1.785E-01
Ag-108M	#B	5.4909E-03	5.4910E-03	1.4835E-01	1.4835E-01	1.665E-01
CD-109	#A	2.6736E-02	2.6781E-02	1.8487E+00	1.8487E+00	2.052E+00
SN-113	#B	2.2004E-02	2.2151E-02	1.1015E-01	1.1016E-01	1.221E-01
SB-125	#B	-8.3572E-02	-8.3635E-02	3.2298E-01	3.2301E-01	3.511E-01
I-131	#B	1.9390E-02	2.1320E-02	1.0887E-01	1.0888E-01	1.102E-01
CS-134	#B	-7.9919E-02	-8.0000E-02	1.2747E-01	1.2755E-01	1.371E-01
CS-137		1.5887E+00	1.5888E+00	2.3381E-01	2.5045E-01	
CE-139	#A	2.9458E-02	2.9622E-02	8.4645E-02	8.4661E-02	9.289E-02
EU-152	#B	-9.0183E-02	-9.0198E-02	2.4625E-01	2.4630E-01	2.662E-01
EU-154	#B	-4.5337E-03	-4.5348E-03	2.3008E-01	2.3008E-01	1.837E-01
EU-155	#B	-1.2215E-02	-1.2221E-02	2.3002E-01	2.3002E-01	2.553E-01
HG-203	#B	6.5480E-04	6.6561E-04	8.1983E-02	8.1983E-02	9.026E-02
TL-208	#	1.7047E-01	1.7047E-01	1.3681E-01	1.3715E-01	1.460E-01
PB-212	#	5.8470E-01	5.8470E-01	2.1078E-01	2.1335E-01	2.177E-01
PB-214	#	4.4250E-01	4.4250E-01	2.1973E-01	2.2115E-01	2.423E-01
BI-212	#B	-4.1941E-02	-4.1941E-02	1.6380E+00	1.6380E+00	1.292E+00
BI-214	#	5.5496E-01	5.5496E-01	2.1415E-01	2.1643E-01	
RA-224	#A	-7.6174E-02	-7.6174E-02	2.7539E+00	2.7539E+00	2.463E+00
RA-226	#A	1.1561E+00	1.1561E+00	2.1401E+00	2.1411E+00	2.351E+00
AC-228	#A	6.8699E-01	6.8699E-01	4.6762E-01	4.6923E-01	7.372E-01
TH-227	#B	-2.4378E-01	-2.4378E-01	6.8848E-01	6.8862E-01	7.494E-01
PA-234	#B	3.3839E-04	3.3839E-04	2.9098E-01	2.9098E-01	3.233E-01
TH-234	#B	4.2250E-01	4.2250E-01	3.1371E+00	3.1371E+00	3.482E+00
AM-241	#A	-9.9631E-02	-9.9632E-02	4.3143E-01	4.3146E-01	4.589E-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) 2.6677601E+01 pCi/gm

Total Decayed Activity (50.2 to 1999.1 keV) 2.6682390E+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_20OCT2005_1315.An1

Sample description

NOL-06-01-001-R WET

Spectrum Filename: C:\GammaVision\Spectra\102_20OCT2005_1315.An1

Acquisition information

Start time:	20-Oct-2005 13:16:14
Live time:	1000
Real time:	1012
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: 2.5160E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.5160E+03) =
3.9746E+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 20-Oct-2005 12:17:00
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: 0.3829

***** 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
69.46	77.	30.96	1.09	7.089E-03				
77.16	105.	31.63	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.105E+00	PB214
77.16	105.	31.63	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.105E+00	PB214
238.74	413.	7.97	1.21	1.380E-02	238.63	43.100	7.451E-01	PB212
295.39	112.	14.79	1.47	1.146E-02	295.22	19.200	5.456E-01	PB214

300.85	26.	40.44	0.93	1.126E-02				
328.15	56.	35.23	1.27	1.037E-02				
338.31	85.	23.62	1.55	1.006E-02	338.40	12.010	7.557E-01	AC228
352.22	125.	11.88	1.46	9.673E-03	351.99	37.100	3.728E-01	PB214
463.50	46.	26.29	1.09	7.365E-03				
463.50	46.	26.29	1.09	7.365E-03	463.51	10.000	6.568E-01	SB125
509.90	74.	19.67	1.57	6.705E-03	510.72	22.500	5.291E-01	TL208
583.72	110.	15.35	1.81	5.884E-03	583.14	86.000	2.328E-01	TL208
609.67	103.	13.05	1.34	5.646E-03	609.32	46.090	4.253E-01	BI214
661.80	86.	17.26	1.01	5.228E-03	661.62	84.620	2.088E-01	CS137
911.89	84.	11.91	1.14	3.919E-03	911.07	29.000	7.951E-01	AC228
969.82	53.	20.58	1.54	3.715E-03	968.90	17.460	8.768E-01	AC228
1120.95	34.	30.28	1.72	3.283E-03	1120.28	15.040	7.397E-01	BI214
1173.69	24.	34.53	1.85	3.157E-03	1173.23	99.860	PBC<MDA	CO60
1461.55	324.	5.56	2.11	2.620E-03	1460.75	10.700	1.241E+01	K40
1765.67	16.	25.00	1.50	2.225E-03	1764.51	15.920	4.838E-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
477.10	238.74	525.	104.	0.104	97.74	1.213	PB-212

YAEC Chemistry Lab Spectrum name: 102_20OCT2005_1315.An1

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected
601.35	300.85	44.	26.	0.026	121.31	0.927	PB-212 s
655.96	328.15	107.	56.	0.056	105.70	1.270	AC-228
926.75	463.50	34.	46.	0.046	78.87	1.086	SB-125 l

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

This section based on library: FSS_Rev_1.Lib

********** 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	499.	105.	0.105	94.89	1.500D
PB-214	153.80	77.11	499.	105.	0.105	94.89	1.500D
PB-212	477.18	238.77	280.	259.	0.259	33.17	1.500
PB-214	590.52	295.43	88.	108.	0.108	46.67	1.500s
AC-228	676.29	338.31	106.	85.	0.085	70.85	1.551s
PB-214	704.02	352.17	56.	116.	0.116	38.99	1.500
TL-208	1019.58	509.90	41.	74.	0.074	59.00	1.572s
TL-208	1167.27	583.72	50.	110.	0.110	46.04	1.813s
BI-214	1219.20	609.67	29.	103.	0.103	39.16	1.338
CS-137	1323.49	661.80	32.	86.	0.086	51.79	1.007s
AC-228	1823.92	911.89	6.	84.	0.084	35.73	1.137s
AC-228	1939.85	969.82	22.	53.	0.053	61.75	1.538s
BI-214	2242.29	1120.95	24.	34.	0.034	90.84	1.724
CO-60	2347.84	1173.69	22.	24.	0.024	103.59	1.854s

K-40	2924.00	1461.55	0.	324.	0.324	16.67	2.108
Bl-214	3532.81	1765.67	0.	16.	0.016	75.00	1.498s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

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

BE-7 3.9939E-02

477.56 3.994E-02 %(4.423E-01 1.25E-01 G

K-40 1.2409E+01

1460.75 1.241E+01 (P 2.823E-01 6.90E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	-4.7567E-03						
		834.81	-4.757E-03	%(	P	6.634E-02	1.83E-02 G
CO-57	8.1074E-04						
		122.07	8.107E-04	%(		6.785E-02	2.00E-02 G K
		136.43	5.448E-02	&		5.774E-01	1.71E-01 G
CO-60	5.9257E-02						
		1332.51	3.726E-02	%(	P	6.766E-02	2.11E-02 G K
		1173.23	8.128E-02	(		8.371E-02	2.81E-02 G K
Sr-85	-1.9860E-02						
		514.00	-1.986E-02	%(		6.904E-02	2.04E-02 G
Kr-85	-4.5818E+02						
		513.99	-4.582E+02	%(		1.593E+03	4.71E+02 G
Y-88	-1.6518E-05						
		1836.01	-1.652E-05	&(	P	8.470E-02	2.16E-02 G K
		898.02	-4.275E-03	%	P	7.002E-02	1.90E-02 G
NB-94	-9.9048E-03						
		871.10	-9.905E-03	&(		7.096E-02	2.00E-02 G K
		702.50	-3.136E-03	%		5.239E-02	1.44E-02 G K
Ag-108M	1.2528E-02						
		722.95	1.253E-02	%(		6.112E-02	1.74E-02 G K
		614.37	4.616E-03	%	P	4.559E-02	1.25E-02 G
		433.93	3.695E-02	%		5.132E-02	1.62E-02 G

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CD-109       6.7929E-01
                  88.04 6.793E-01 %(P 2.482E+00 7.45E-01 G

SN-113       0.0000E+00
                 391.71 0.000E+00 %(  9.024E-02 2.58E-02 G K
                 255.04-3.747E-02 &   2.362E+00 6.85E-01 G

SB-125       2.9541E-02
                 427.95 2.954E-02 &(P 1.074E-01 3.09E-02 G K
                 600.77 1.382E-01 % P 2.706E-01 8.27E-02 G
                 636.15 1.064E-01 & P 5.092E-01 1.47E-01 G
                 463.51 2.815E-01 % P 4.439E-01 1.38E-01 G
                 176.29 1.071E-01 % P 8.437E-01 2.50E-01 G

I-131       -1.0331E-03
                 364.48-1.033E-03 %(  5.104E-02 1.44E-02 G K
                 636.97 1.335E-01 &   8.302E-01 2.37E-01 G
```

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      284.29-7.358E-02 %   7.161E-01 2.08E-01 G

CS-134      -9.4824E-03
                      604.66-9.482E-03 %(  6.265E-02 1.79E-02 G K
                      795.76 2.880E-02 %   6.396E-02 1.93E-02 G
                      569.29 0.000E+00 %   4.004E-01 1.12E-01 G
                      801.84 3.589E-02 & P 6.494E-01 1.77E-01 G

CS-137       2.0876E-01
                      661.62 2.088E-01 @(  7.057E-02 3.61E-02 G

CE-139      -3.5692E-03
                      165.85-3.569E-03 %(P 6.666E-02 1.96E-02 G

EU-152       3.2038E-02
                      121.78 3.204E-02 %(P 1.814E-01 5.39E-02 G K
                      344.30 3.339E-02 %   1.880E-01 5.50E-02 G
                     1408.08 4.359E-02 %   2.871E-01 7.72E-02 G
                      964.00-4.395E-03 % P 4.431E-01 1.18E-01 G
                     1112.07-3.834E-04 %   5.725E-01 1.54E-01 G
                      778.90-3.647E-02 % P 5.060E-01 1.41E-01 G

EU-154       1.7406E-02
                      123.10 1.741E-02 %(P 1.431E-01 4.24E-02 G K
                     1274.80 6.999E-03 %   2.400E-01 6.49E-02 G
                      723.30-1.269E-03 % P 5.146E-01 1.47E-01 G
                     1004.80-6.877E-02 &   4.480E-01 1.27E-01 G

EU-155       9.0519E-02
                       86.45 9.052E-02 %(P 3.159E-01 9.48E-02 G K
                      105.31 3.898E-03 %   2.909E-01 8.57E-02 G
```

```
HG-203      -1.4487E-03
                279.17-1.449E-03 &(P 6.245E-02 1.81E-02 G K
                 72.87-1.389E+00 %   2.490E+00 7.58E-01 G
                 70.83-3.174E+00 &   4.724E+00 1.45E+00 G
                 82.50-1.588E+00 %   4.831E+00 1.45E+00 G

TL-208      2.3284E-01
                583.14 2.328E-01  (P 7.577E-02 3.58E-02 G
                510.72 5.291E-01 +   2.316E-01 1.04E-01 G

PB-212      4.6708E-01
                238.63 4.671E-01  (  1.456E-01 5.16E-02 G K
                                     Energy duplication
                 77.11 6.756E-01 +   6.872E-01 2.14E-01 G
                 74.81 8.841E-01 & P 1.438E+00 4.39E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.4671E-01						
		351.99	3.467E-01	(P	1.124E-01	4.51E-02	G K
		295.22	5.280E-01 +		2.260E-01	8.21E-02	G
					Energy duplication		
		77.11	1.105E+00 +		1.124E+00	3.49E-01	G
		241.92	4.732E-01 &		8.386E-01	2.56E-01	G
BI-212	2.6536E-01						
		727.17	2.654E-01 %(		5.044E-01	1.55E-01	G K
		1620.56	2.088E-01 %	P	2.085E+00	5.28E-01	G
		785.42	-4.803E-01 %	P	3.310E+00	9.37E-01	G
BI-214	4.4036E-01						
		609.32	4.253E-01 (		1.145E-01	5.56E-02	G K
		1764.51	4.838E-01 (P		2.235E-01	1.21E-01	G
		1120.28	7.397E-01 +		5.556E-01	2.24E-01	G
RA-224	9.8866E-01						
		241.00	9.887E-01 %(P		1.617E+00	4.94E-01	G
RA-226	9.6719E-01						
		185.99	9.672E-01 %(P		1.650E+00	5.03E-01	G
AC-228	8.1141E-01						
		911.07	7.951E-01 @(P		1.317E-01	9.49E-02	G K
		968.90	8.768E-01 *(P		4.067E-01	1.81E-01	G
		338.40	7.557E-01 *(		4.507E-01	1.78E-01	G
TH-227	-7.6314E-02						
		236.00	-7.631E-02 %(P		6.170E-01	1.83E-01	G K

256.25 2.653E-01 % 5.557E-01 1.68E-01 G

PA-234 7.9744E-05

98.44 7.974E-05 &(3.047E-01 9.00E-02 G K

946.00 0.000E+00 % 5.225E-01 1.47E-01 G

131.28-1.523E-02 & 3.055E-01 9.04E-02 G

94.67 4.275E-04 % 5.485E-01 1.62E-01 G

883.24 1.068E-01 % 5.396E-01 1.53E-01 G

926.70 1.692E-01 % 4.624E-01 1.36E-01 G

569.26 0.000E+00 % 5.940E-01 1.66E-01 G

TH-234 1.4618E+00

63.29 1.462E+00 %(P 5.409E+00 1.62E+00 G K

92.80 4.229E-02 & 2.959E+00 8.77E-01 G

92.38 1.144E+00 & P 3.469E+00 1.04E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	-1.9294E-01						
		59.54	-1.929E-01	%(	8.765E-01	2.62E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	3.9918E-02	3.9939E-02	3.7375E-01	3.7376E-01	4.420E-01
K-40	1.2409E+01	1.2409E+01	2.0686E+00	2.1826E+00	
MN-54 #A	-4.7563E-03	-4.7567E-03	6.1591E-02	6.1592E-02	6.633E-02
CO-57 #B	8.1066E-04	8.1074E-04	5.9976E-02	5.9976E-02	6.784E-02
CO-60 #B	5.9256E-02	5.9257E-02	5.8897E-02	5.8991E-02	6.766E-02
Sr-85 #A	-1.9851E-02	-1.9860E-02	6.1268E-02	6.1278E-02	6.901E-02
Kr-85 #A	-4.5818E+02	-4.5818E+02	1.4137E+03	1.4139E+03	1.593E+03
Y-88 #B	-1.6514E-05	-1.6518E-05	4.2449E-04	4.2449E-04	8.467E-02
NB-94 #B	-9.9048E-03	-9.9048E-03	6.0090E-02	6.0092E-02	7.096E-02
Ag-108M#B	1.2528E-02	1.2528E-02	5.2296E-02	5.2300E-02	6.112E-02
CD-109 #A	6.7925E-01	6.7929E-01	2.2340E+00	2.2343E+00	2.482E+00

SN-113 #B	0.0000E+00	0.0000E+00	7.7414E-02	7.7414E-02	9.022E-02
SB-125 #B	2.9541E-02	2.9541E-02	9.2794E-02	9.2809E-02	1.074E-01
I-131 #B	-1.0294E-03	-1.0331E-03	4.3122E-02	4.3122E-02	5.086E-02
CS-134 #B	-9.4820E-03	-9.4824E-03	5.3826E-02	5.3829E-02	6.265E-02
CS-137 #	2.0876E-01	2.0876E-01	1.0811E-01	1.0875E-01	
CE-139 #A	-3.5684E-03	-3.5692E-03	6.4913E-02	6.4914E-02	6.665E-02
EU-152 #B	3.2037E-02	3.2038E-02	1.6167E-01	1.6168E-01	1.814E-01
EU-154 #B	1.7406E-02	1.7406E-02	1.2732E-01	1.2733E-01	1.431E-01
EU-155 #B	9.0518E-02	9.0519E-02	2.8453E-01	2.8457E-01	3.158E-01
HG-203 #B	-1.4478E-03	-1.4487E-03	5.8206E-02	5.8206E-02	6.241E-02
TL-208	2.3284E-01	2.3284E-01	1.0740E-01	1.0820E-01	
PB-212 #	4.6708E-01	4.6708E-01	1.5495E-01	1.5715E-01	1.456E-01
PB-214 #	3.4671E-01	3.4671E-01	1.3540E-01	1.3679E-01	1.124E-01
BI-212 #B	2.6536E-01	2.6536E-01	4.6414E-01	4.6437E-01	5.044E-01
BI-214	4.4036E-01	4.4036E-01	1.7245E-01	1.7421E-01	
RA-224 #A	9.8866E-01	9.8866E-01	1.4833E+00	1.4844E+00	1.617E+00
RA-226 #A	9.6719E-01	9.6719E-01	1.5093E+00	1.5103E+00	1.650E+00
AC-228 #	8.1141E-01	8.1141E-01	2.7203E-01	2.7581E-01	
TH-227 #B	-7.6314E-02	-7.6314E-02	5.6318E-01	5.6320E-01	6.170E-01
PA-234 #B	7.9744E-05	7.9744E-05	2.7002E-01	2.7002E-01	3.047E-01
TH-234 #B	1.4618E+00	1.4618E+00	4.8615E+00	4.8621E+00	5.409E+00
AM-241 #A	-1.9294E-01	-1.9294E-01	7.8640E-01	7.8647E-01	8.765E-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) 1.4101922E+01 pCi/gm

Total Decayed Activity (50.2 to 1999.0 keV) 1.4101922E+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_31AUG2005_1142.An1

Sample description

FSS-NOL-06-01-026-F-I

Spectrum Filename: C:\GammaVision\Spectra\102_31AUG2005_1142.An1

Acquisition information

Start time:	31-Aug-2005 11:42:27
Live time:	2000
Real time:	2020
Dead time:	1.00 %
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: 1.7030E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7030E+03) =
5.8720E+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 30-Aug-2005 08:48:00
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: 0.1484

***** 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
74.48	97.	28.08	1.10	8.758E-03				
74.48	97.	28.08	1.10	8.758E-03	74.81	9.600	PBC<MDA	PB212
77.18	186.	16.46	1.10	9.574E-03	77.11	10.700	1.446E+00	PB214
					77.11	17.500	8.843E-01	PB212
93.21	111.	37.18	1.50	1.333E-02	92.80	3.000	PBC<MDA	TH234
186.06	95.	34.21	1.46	1.626E-02	185.99	3.280	PBC<MDA	RA226
238.75	603.	4.81	1.21	1.379E-02	238.63	43.100	8.041E-01	PB212

241.40	99.	21.29	1.22	1.367E-02	241.00	3.900	1.449E+00	RA224
					241.92	7.470	7.677E-01	PB214
269.77	72.	33.27	1.17	1.245E-02				
295.43	125.	13.94	1.25	1.146E-02	295.22	19.200	4.503E-01	PB214
300.34	54.	27.65	1.26	1.128E-02				
327.74	62.	32.85	1.31	1.038E-02				
338.48	128.	16.74	1.34	1.006E-02	338.40	12.010	8.380E-01	AC228
352.04	154.	12.99	1.23	9.677E-03	351.99	37.100	3.390E-01	PB214
462.95	69.	27.75	0.99	7.374E-03				
462.95	69.	27.75	0.99	7.374E-03	463.51	10.000	7.273E-01	SB125
511.35	131.	15.35	2.00	6.687E-03	510.72	22.500	6.880E-01	TL208
583.39	189.	10.32	1.42	5.888E-03	583.14	86.000	2.948E-01	TL208
609.52	141.	11.14	1.57	5.648E-03	609.32	46.090	4.294E-01	BI214
727.61	34.	29.45	1.55	4.794E-03	727.17	11.800	4.787E-01	BI212
794.94	27.	34.63	1.23	4.424E-03				
794.94	27.	34.63	1.23	4.424E-03	795.76	85.400	5.598E-02	CS134
911.47	128.	13.44	1.62	3.920E-03	911.07	29.000	8.928E-01	AC228
968.63	93.	17.70	2.45	3.718E-03	964.00	14.580	1.361E+00	EU152
					968.90	17.460	1.141E+00	AC228
1120.22	27.	36.54	1.82	3.283E-03	1120.28	15.040	PBC<MDA	BI214
1461.22	554.	4.25	2.11	2.620E-03	1460.75	10.700	1.567E+01	K40
1764.66	22.	21.32	2.12	2.225E-03	1764.51	15.920	4.908E-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
148.54	74.52	324.	97.	0.049	84.24	1.098	BI-207 D
153.94	77.22	376.	186.	0.093	49.38	1.100	PB-214 D
477.12	238.86	119.	603.	0.301	14.42	1.215	PB-212 D
482.44	241.52	171.	99.	0.049	63.86	1.217	PB-214 D
539.18	269.77	178.	72.	0.036	99.82	1.169	AC-228
600.33	300.34	146.	70.	0.035	90.29	1.301	PB-212
655.14	327.74	138.	62.	0.031	98.55	1.307	AC-228 s
1022.48	511.35	128.	78.	0.039	70.70	2.000	RH-106M s
1589.89	794.94	24.	25.	0.013	100.34	1.233	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	814.	179.	0.089	71.32	1.500D
PB-212	153.80	77.11	814.	179.	0.089	71.32	1.500D
TH-234	186.00	93.21	800.	111.	0.056	111.54	1.500

RA-226	372.00	186.19	389.	81.	0.040	102.99	1.500s
PB-212	477.14	238.75	326.	555.	0.277	18.78	1.500
RA-224	482.46	241.41	370.	80.	0.040	106.01	1.500
PB-214	590.65	295.50	163.	115.	0.057	54.95	1.500s
AC-228	676.64	338.48	126.	128.	0.064	50.22	1.341
PB-214	703.91	352.11	118.	152.	0.076	38.68	1.500
SB-125	925.90	463.07	68.	33.	0.017	111.67	1.500
TL-208	1021.72	510.97	101.	59.	0.029	82.14	1.499s
TL-208	1166.76	583.46	55.	174.	0.087	28.94	1.499
BI-214	1218.89	609.52	39.	141.	0.070	33.43	1.569
BI-212	1455.18	727.61	33.	34.	0.017	88.35	1.554s
AC-228	1823.08	911.47	47.	128.	0.064	40.31	1.624
AC-228	1937.47	968.63	49.	93.	0.047	53.09	2.451s
BI-214	2240.84	1120.22	34.	27.	0.013	109.63	1.819
K-40	2923.35	1461.22	0.	554.	0.277	12.75	2.106
BI-214	3530.77	1764.66	0.	22.	0.011	63.96	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	%(	4.666E-01	1.33E-01 G
K-40		1.5672E+01					
			1460.75	1.567E+01	(P	2.086E-01	6.66E-01 G
MN-54		-2.8062E-03					
			834.81	-2.806E-03	%(P	5.992E-02	1.67E-02 G
CO-57		1.7226E-02					
			122.07	1.723E-02	&(	5.433E-02	1.63E-02 G K
			136.43	9.422E-02	%	4.883E-01	1.46E-01 G
CO-60		-2.1792E-04					
			1332.51	-2.179E-04	&(P	3.418E-02	7.99E-03 G K
			1173.23	3.290E-02	%	7.578E-02	2.28E-02 G K
Sr-85		-7.1884E-03					
			514.00	-7.188E-03	&(	6.757E-02	1.97E-02 G
Kr-85		-1.6324E+02					
			513.99	-1.632E+02	&(	1.541E+03	4.50E+02 G
Y-88		-2.4576E-05					
			1836.01	-2.458E-05	%(P	2.760E-02	3.74E-03 G K

898.02-1.153E-03 % P 6.159E-02 1.68E-02 G

NB-94 1.0541E-02

871.10 1.054E-02 %(5.176E-02 1.48E-02 G K

702.50 1.899E-02 % 4.960E-02 1.48E-02 G K

Ag-108M -9.7900E-04

722.95-9.790E-04 &(6.790E-02 1.92E-02 G K

614.37-1.103E-02 % P 5.897E-02 1.71E-02 G

433.93 5.026E-05 % 3.070E-02 8.40E-03 G

CD-109 1.0938E-02

88.04 1.094E-02 %(P 2.386E+00 7.10E-01 G

SN-113 1.5195E-03

391.71 1.519E-03 &(7.127E-02 2.05E-02 G K

255.04-5.207E-01 & 2.130E+00 6.34E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.2966E-01						
		427.95	5.205E-02	%(P	1.206E-01	3.62E-02	G K
		600.77	4.775E-02	& P	2.897E-01	8.39E-02	G
		636.15	-2.675E-02	% P	4.147E-01	1.16E-01	G
		463.51	3.594E-01	(P	4.447E-01	1.40E-01	G
		176.29	-1.374E-01	% P	7.518E-01	2.23E-01	G
I-131	-1.4992E-03						
		364.48	-1.499E-03	%(	4.224E-02	1.19E-02	G K
		636.97	-1.087E-03	%	6.588E-01	1.82E-01	G
		284.29	-1.056E-01	%	8.351E-01	2.46E-01	G
CS-134	-1.6893E-02						
		604.66	-1.689E-02	%(	6.183E-02	1.83E-02	G K
		795.76	2.392E-03	%	7.064E-02	1.98E-02	G
		569.29	0.000E+00	%	3.850E-01	1.10E-01	G
		801.84	-1.923E-03	% P	6.092E-01	1.68E-01	G
CS-137	1.1866E-02						
		661.62	1.187E-02	&(	6.693E-02	1.94E-02	G
CE-139	6.5400E-04						
		165.85	6.540E-04	%(P	5.881E-02	1.74E-02	G
EU-152	1.9625E-02						
		121.78	1.963E-02	%(P	1.686E-01	5.01E-02	G K
		344.30	2.790E-02	&	1.726E-01	5.08E-02	G
		1408.08	6.029E-02	%	2.408E-01	6.81E-02	G
		964.00	6.332E-02	% P	5.440E-01	1.56E-01	G
		1112.07	1.122E-01	&	5.463E-01	1.58E-01	G

778.90-1.023E-03 & P 5.142E-01 1.45E-01 G

EU-154 4.5606E-03

123.10 4.561E-03 &(P 1.046E-01 3.09E-02 G K

1274.80 2.208E-02 & 2.039E-01 5.71E-02 G

723.30-1.629E-03 & P 2.283E-01 6.22E-02 G

1004.80 1.114E-02 & 3.396E-01 9.35E-02 G

EU-155 -2.2791E-02

86.45-2.279E-02 %(P 3.046E-01 9.08E-02 G K

105.31-5.769E-04 % 2.648E-01 7.84E-02 G

HG-203 -1.4830E-02

279.17-1.483E-02 &(P 6.044E-02 1.80E-02 G K

72.87 3.260E-02 % 2.509E+00 7.49E-01 G

70.83-2.307E-01 % 3.719E+00 1.11E+00 G

82.50-1.342E-01 % 4.430E+00 1.32E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8058E-01						
		583.14	2.728E-01	(P	5.835E-02	2.64E-02	G
		510.72	3.102E-01	*(	2.604E-01	8.49E-02	G
PB-212	7.7157E-01						
		238.63	7.399E-01	(	1.158E-01	4.63E-02	G K
					Energy duplication		
		77.11	8.496E-01	(	6.447E-01	2.02E-01	G
		74.81	7.116E-01	& P	1.310E+00	3.98E-01	G
PB-214	3.6277E-01						
		351.99	3.366E-01	(P	1.178E-01	4.35E-02	G K
		295.22	4.133E-01	@(	2.243E-01	7.57E-02	G
					Energy duplication		
		77.11	1.390E+00	+	1.054E+00	3.30E-01	G
		241.92	2.296E-01	%	8.087E-01	2.43E-01	G
BI-212	4.7866E-01						
		727.17	4.787E-01	(	4.159E-01	1.41E-01	G K
		1620.56	4.754E-01	& P	1.871E+00	5.22E-01	G
		785.42	1.400E+00	% P	2.513E+00	7.74E-01	G
BI-214	4.4212E-01						
		609.32	4.294E-01	(	9.706E-02	4.79E-02	G K
		1764.51	4.908E-01	(P	1.651E-01	1.05E-01	G
		1120.28	4.295E-01	(	4.823E-01	1.57E-01	G
RA-224	1.1849E+00						
		241.00	1.185E+00	?(P	1.371E+00	4.25E-01	G

```
RA-226       1.2002E+00
                 185.99 1.200E+00  (P 1.408E+00 4.35E-01 G

AC-228       9.5577E-01
                 911.07 8.928E-01  (P 2.419E-01 1.20E-01 G K
                 968.90 1.141E+00  (P 4.304E-01 2.02E-01 G
                 338.40 8.380E-01  (  3.619E-01 1.40E-01 G

TH-227      -2.2676E-01
                 236.00-2.268E-01 %(P 5.106E-01 1.54E-01 G K
                 256.25 5.377E-03 %   6.294E-01 1.84E-01 G

PA-234      -6.1088E-02
                  98.44-6.109E-02 &(  2.605E-01 7.81E-02 G K
                 946.00-1.345E-02 %   3.076E-01 8.56E-02 G
                 131.28 1.555E-01 &   2.162E-01 6.65E-02 G
                  94.67-1.027E-01 %   4.805E-01 1.44E-01 G
                 883.24 3.712E-02 &   5.016E-01 1.41E-01 G
                 926.70 0.000E+00 %   6.268E-01 1.75E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	0.000E+00	%	5.706E-01	1.63E-01	G
TH-234	1.3166E+00						
		63.29	6.311E-01	&(P	5.140E+00	1.53E+00	G K
		92.80	2.208E+00	(	2.669E+00	8.21E-01	G
		92.38	5.460E-01	& P	3.002E+00	8.99E-01	G
AM-241	7.6093E-02						
		59.54	7.609E-02	%(	7.255E-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

- -

***** 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	0.0000E+00	0.0000E+00	3.9787E-01	3.9787E-01	4.599E-01
K-40		1.5672E+01	1.5672E+01	1.9981E+00	2.1831E+00	
MN-54	#A	-2.7992E-03	-2.8062E-03	6.6909E-02	6.6910E-02	5.977E-02
CO-57	#B	1.7177E-02	1.7226E-02	4.8981E-02	4.8991E-02	5.417E-02
CO-60	#B	-2.1783E-04	-2.1792E-04	3.7302E-03	3.7302E-03	3.417E-02

Sr-85 #A	-7.1028E-03	-7.1884E-03	5.9183E-02	5.9184E-02	6.676E-02
Kr-85 #A	-1.6324E+02	-1.6324E+02	1.3498E+03	1.3498E+03	1.541E+03
Y-88 #B	-2.4397E-05	-2.4576E-05	1.4745E-04	1.4746E-04	2.740E-02
NB-94 #B	1.0541E-02	1.0541E-02	4.4454E-02	4.4458E-02	5.176E-02
Ag-108M#B	-9.7898E-04	-9.7900E-04	5.7471E-02	5.7471E-02	6.790E-02
CD-109 #A	1.0919E-02	1.0938E-02	2.1303E+00	2.1303E+00	2.382E+00
SN-113 #B	1.5092E-03	1.5195E-03	6.1520E-02	6.1520E-02	7.079E-02
SB-125 #F	1.2956E-01	1.2966E-01	1.5151E-01	1.5168E-01	1.205E-01
I-131 #B	-1.3611E-03	-1.4992E-03	3.5831E-02	3.5832E-02	3.834E-02
CS-134 #B	-1.6875E-02	-1.6893E-02	5.4786E-02	5.4794E-02	6.177E-02
CS-137 #A	1.1865E-02	1.1866E-02	5.8183E-02	5.8187E-02	6.693E-02
CE-139 #A	6.5031E-04	6.5400E-04	5.2117E-02	5.2117E-02	5.848E-02
EU-152 #B	1.9622E-02	1.9625E-02	1.5043E-01	1.5043E-01	1.686E-01
EU-154 #B	4.5594E-03	4.5606E-03	9.2570E-02	9.2570E-02	1.045E-01
EU-155 #B	-2.2781E-02	-2.2791E-02	5.5134E-01	5.5134E-01	3.045E-01
HG-203 #B	-1.4585E-02	-1.4830E-02	5.4570E-02	5.4576E-02	5.944E-02
TL-208 #	2.8058E-01	2.8058E-01	8.1395E-02	8.2904E-02	5.835E-02
PB-212 #	7.7157E-01	7.7157E-01	1.4492E-01	1.5125E-01	1.158E-01
PB-214 #	3.6277E-01	3.6277E-01	1.2199E-01	1.2367E-01	1.178E-01
BI-212 #	4.7866E-01	4.7866E-01	4.2288E-01	4.2373E-01	4.159E-01
BI-214	4.4212E-01	4.4212E-01	1.4778E-01	1.4985E-01	
RA-224 #A	1.1849E+00	1.1849E+00	1.2744E+00	1.2761E+00	1.371E+00
RA-226 #A	1.2002E+00	1.2002E+00	1.3045E+00	1.3062E+00	1.408E+00
AC-228	9.5577E-01	9.5577E-01	2.6604E-01	2.7140E-01	
TH-227 #B	-2.2676E-01	-2.2676E-01	4.6944E-01	4.6961E-01	5.106E-01
PA-234 #B	-6.1088E-02	-6.1088E-02	2.3434E-01	2.3436E-01	2.605E-01
TH-234 #B	1.3166E+00	1.3166E+00	1.4686E+00	1.4704E+00	5.140E+00
AM-241 #A	7.6093E-02	7.6093E-02	6.4832E-01	6.4833E-01	7.255E-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) 1.7070250E+01 pCi/gm

Total Decayed Activity (269.7 to 1999.0 keV) 1.7070250E+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_2SEPT2005_1329.An1

Sample description

FSS-NOL-06-01-055-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_2SEPT2005_1329.An1

Acquisition information

Start time:	02-Sep-2005 13:30:49
Live time:	2000
Real time:	2026
Dead time:	1.30 %
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: 2.1120E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1120E+03) =
4.7348E+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-Aug-2005 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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1672

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.18	235.	20.88	1.50	9.541E-03	77.11	10.700	1.474E+00	PB214
					77.11	17.500	9.013E-01	PB212
77.18	235.	20.88	1.50	9.541E-03	77.11	10.700	1.474E+00	PB214
					77.11	17.500	9.013E-01	PB212
93.42	136.	29.29	1.65	1.345E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.182E+00	TH234
					94.67	15.500	4.115E-01	PA234

186.15	117.	26.48	1.06	1.626E-02	185.99	3.280	1.345E+00	RA226
209.41	89.	35.68	1.56	1.519E-02				
238.75	799.	4.19	1.21	1.380E-02	238.63	43.100	8.596E-01	PB212
242.01	121.	18.89	1.22	1.365E-02	241.00	3.900	1.441E+00	RA224
					241.92	7.470	7.622E-01	PB214
270.50	92.	28.20	1.50	1.242E-02				
277.30	53.	39.65	0.78	1.214E-02				
295.36	165.	12.13	1.25	1.146E-02	295.22	19.200	4.799E-01	PB214
300.54	45.	35.11	1.26	1.127E-02				
328.56	65.	32.98	1.31	1.035E-02				
338.50	201.	17.23	1.18	1.006E-02	338.40	12.010	1.064E+00	AC228
352.08	270.	9.66	1.04	9.676E-03	351.99	37.100	4.799E-01	PB214
511.06	105.	16.90	1.45	6.690E-03	510.72	22.500	4.460E-01	TL208
583.48	235.	11.47	1.54	5.887E-03	583.14	86.000	2.960E-01	TL208
609.34	204.	9.68	1.21	5.649E-03	609.32	46.090	5.023E-01	BI214
727.31	59.	30.39	1.54	4.793E-03	727.17	11.800	6.673E-01	BI212
859.57	65.	27.49	0.76	4.127E-03				
911.42	147.	12.59	1.66	3.921E-03	911.07	29.000	8.279E-01	AC228
968.64	102.	15.56	1.54	3.719E-03	968.90	17.460	1.005E+00	AC228
1119.62	85.	22.33	1.69	3.283E-03	1120.28	15.040	1.104E+00	BI214
1461.13	766.	3.64	1.80	2.620E-03	1460.75	10.700	1.747E+01	K40
1764.83	26.	19.61	0.70	2.225E-03	1764.51	15.920	4.680E-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
418.44	209.41	379.	89.	0.044	107.03	1.563	AC-228 s
477.12	238.76	161.	799.	0.400	12.57	1.215	PB-212 D
483.65	242.02	203.	121.	0.061	56.66	1.217	PB-214 D
540.64	270.50	226.	92.	0.046	84.60	1.503	AC-228 s
554.25	277.30	165.	57.	0.029	103.45	0.775	TL-208 s
600.73	300.65	100.	45.	0.022	105.33	1.258	PB-212 lD
656.78	328.56	167.	65.	0.033	98.94	1.306	RH-106M s
1719.22	859.57	62.	65.	0.032	63.45	0.759	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	1089.	235.	0.118	62.65	1.500D
PB-212	153.80	77.11	1089.	235.	0.118	62.65	1.500D
TH-234	185.92	93.17	1023.	145.	0.072	96.92	1.500s
PA-234	185.84	93.13	771.	147.	0.074	83.74	1.500s

RA-226	371.92	186.15	385.	112.	0.056	79.45	1.059s
PB-212	477.16	238.76	470.	687.	0.344	17.61	1.500
RA-224	483.25	241.81	549.	91.	0.046	112.10	1.500
PB-214	590.41	295.38	228.	166.	0.083	45.13	1.500
AC-228	676.69	338.50	270.	201.	0.101	51.70	1.185
PB-214	703.78	352.05	140.	249.	0.125	27.63	1.500
TL-208	1021.90	511.06	84.	105.	0.052	50.71	1.449s
TL-208	1166.79	583.48	133.	234.	0.117	34.40	1.540
BI-214	1218.52	609.34	65.	204.	0.102	29.05	1.215s
BI-212	1454.57	727.31	75.	59.	0.030	91.17	1.541s
AC-228	1822.97	911.42	62.	147.	0.074	37.78	1.657
AC-228	1937.48	968.64	50.	102.	0.051	46.69	1.541
BI-214	2239.63	1119.62	73.	85.	0.043	66.98	1.686s
K-40	2923.17	1461.13	4.	766.	0.383	10.93	1.799
BI-214	3531.12	1764.83	0.	26.	0.013	58.83	0.696s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		8.9997E-02					
			477.56	9.000E-02	%(	3.799E-01	1.12E-01 G
K-40		1.7470E+01					
			1460.75	1.747E+01	(P	2.836E-01	6.37E-01 G
MN-54		2.2440E-02					
			834.81	2.244E-02	&(P	5.653E-02	1.69E-02 G
CO-57		7.7495E-03					
			122.07	7.750E-03	%(	5.690E-02	1.70E-02 G K
			136.43	-1.454E-01	%	4.882E-01	1.47E-01 G
CO-60		1.1424E-02					
			1332.51	1.142E-02	%(P	4.975E-02	1.42E-02 G K
			1173.23	8.355E-03	%	8.226E-02	2.37E-02 G K
Sr-85		-2.1729E-02					
			514.00	-2.173E-02	%(	6.524E-02	1.95E-02 G
Kr-85		-4.9119E+02					
			513.99	-4.912E+02	%(	1.475E+03	4.42E+02 G
Y-88		-1.6608E-04					
			1836.01	-1.661E-04	%(P	5.967E-02	1.56E-02 G K

898.02 1.119E-02 & P 5.796E-02 1.67E-02 G

NB-94 -7.0689E-04

871.10-7.069E-04 &(5.392E-02 1.51E-02 G K

702.50 9.699E-03 % 5.250E-02 1.53E-02 G K

Ag-108M 1.6156E-03

722.95 1.616E-03 %(8.916E-02 2.59E-02 G K

614.37-3.150E-02 % P 6.416E-02 1.95E-02 G

433.93 9.388E-03 % 4.936E-02 1.45E-02 G

CD-109 -1.6634E-01

88.04-1.663E-01 %(P 2.295E+00 6.86E-01 G

SN-113 -3.8381E-03

391.71-3.838E-03 &(7.206E-02 2.10E-02 G K

255.04-2.400E-01 & 2.068E+00 6.13E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	2.3916E-02						
		427.95	2.392E-02	%(P	1.382E-01	4.04E-02	G K
		600.77	2.835E-03	& P	2.529E-01	7.18E-02	G
		636.15	8.562E-02	% P	3.632E-01	1.06E-01	G
		463.51	2.112E-01	% P	4.478E-01	1.35E-01	G
		176.29	-1.685E-02	& P	6.083E-01	1.79E-01	G
I-131	4.5264E-03						
		364.48	4.526E-03	%(	5.820E-02	1.70E-02	G K
		636.97	1.835E-01	&	6.059E-01	1.78E-01	G
		284.29	1.288E-01	%	7.130E-01	2.11E-01	G
CS-134	-1.3711E-02						
		604.66	-1.371E-02	%(	5.713E-02	1.69E-02	G K
		795.76	4.265E-02	%	6.602E-02	2.05E-02	G
		569.29	-2.656E-02	%	3.027E-01	8.72E-02	G
		801.84	-8.180E-02	% P	6.762E-01	1.95E-01	G
CS-137	1.6491E-02						
		661.62	1.649E-02	%(	5.227E-02	1.55E-02	G
CE-139	7.2615E-03						
		165.85	7.262E-03	%(P	5.829E-02	1.74E-02	G
EU-152	1.6742E-02						
		121.78	1.674E-02	&(P	1.725E-01	5.15E-02	G K
		344.30	1.041E-02	&	1.588E-01	4.65E-02	G
		1408.08	5.343E-02	%	2.659E-01	7.56E-02	G
		964.00	-9.465E-02	& P	5.497E-01	1.60E-01	G
		1112.07	2.225E-01	%	4.931E-01	1.49E-01	G

778.90-3.244E-02 % P 4.026E-01 1.15E-01 G

EU-154 5.7720E-03

123.10 5.772E-03 %(P 1.276E-01 3.80E-02 G K

1274.80 7.362E-02 & 1.900E-01 5.67E-02 G

723.30-1.314E-01 % P 3.528E-01 1.06E-01 G

1004.80 7.077E-02 % 2.643E-01 7.67E-02 G

EU-155 1.1115E-01

86.45 1.112E-01 &(P 2.561E-01 7.75E-02 G K

105.31 5.335E-02 & 2.558E-01 7.67E-02 G

HG-203 -2.7913E-03

279.17-2.791E-03 &(P 4.384E-02 1.28E-02 G K

72.87-1.951E-01 % 1.961E+00 5.87E-01 G

70.83-1.613E-02 % 3.493E+00 1.04E+00 G

82.50-1.219E+00 % 4.089E+00 1.23E+00 G

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

TL-208       2.9595E-01
                   583.14 2.960E-01  (P 7.123E-02 3.40E-02 G
                   510.72 4.460E-01 +   1.929E-01 7.54E-02 G

PB-212       7.3901E-01
                   238.63 7.390E-01  (  1.115E-01 4.34E-02 G K
                                        Energy duplication
                    77.11 9.013E-01 +   5.996E-01 1.88E-01 G
                    74.81 7.293E-01 & P 1.252E+00 3.81E-01 G

PB-214       4.5738E-01
                   351.99 4.446E-01  (P 1.032E-01 4.10E-02 G K
                   295.22 4.822E-01  (  2.126E-01 7.25E-02 G
                                        Energy duplication
                    77.11 1.474E+00 +   9.806E-01 3.08E-01 G
                   241.92 4.475E-01 %   7.295E-01 2.23E-01 G

BI-212       6.6733E-01
                   727.17 6.673E-01 *(  4.871E-01 2.03E-01 G K
                  1620.56 8.244E-01 % P 1.604E+00 4.92E-01 G
                   785.42 6.843E-01 % P 2.845E+00 8.34E-01 G

BI-214       4.9349E-01
                   609.32 5.023E-01 @(  9.870E-02 4.86E-02 G K
                  1764.51 4.680E-01  (P 1.331E-01 9.21E-02 G
                  1120.28 1.104E+00 +   5.503E-01 2.46E-01 G

RA-224       1.0910E+00
                   241.00 1.091E+00 ?(P 1.340E+00 4.13E-01 G
```

```
RA-226       1.3448E+00
                 185.99 1.345E+00 *(P 1.129E+00 3.70E-01 G

AC-228       9.2941E-01
                 911.07 8.279E-01  (P 2.214E-01 1.04E-01 G K
                 968.90 1.005E+00  (P 3.516E-01 1.56E-01 G
                 338.40 1.064E+00  (  4.199E-01 1.84E-01 G

TH-227      -3.5389E-01
                 236.00-3.539E-01 %(P 5.359E-01 1.64E-01 G K
                 256.25-6.945E-02 %   6.040E-01 1.79E-01 G

PA-234       1.7752E-01
                  98.44 1.274E-02 &(  2.544E-01 7.59E-02 G K
                 946.00-7.280E-02 &   3.483E-01 1.02E-01 G
                 131.28 4.161E-02 &   2.549E-01 7.63E-02 G
                  94.67 4.444E-01 &(  3.987E-01 1.24E-01 G
                 883.24 2.389E-01 %   3.936E-01 1.22E-01 G
                 926.70-8.625E-02 %   5.265E-01 1.52E-01 G
```

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                     569.26-3.934E-02 %   4.482E-01 1.29E-01 G

TH-234       2.0376E+00
                     63.29 1.822E+00 &(P 4.614E+00 1.39E+00 G K
                     92.80 2.318E+00 *(  2.428E+00 7.49E-01 G
                     92.38-4.206E-02 % P 2.896E+00 8.63E-01 G

AM-241       1.0824E-02
                     59.54 1.082E-02 &(  7.000E-01 2.08E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	8.7757E-02	8.9997E-02	3.3481E-01	3.3484E-01	3.704E-01
K-40		1.7470E+01	1.7470E+01	1.9103E+00	2.1472E+00	
MN-54	#A	2.2344E-02	2.2440E-02	5.0786E-02	5.0802E-02	5.628E-02
CO-57	#B	7.7110E-03	7.7495E-03	5.1011E-02	5.1012E-02	5.662E-02
CO-60	#B	1.1416E-02	1.1424E-02	4.2502E-02	4.2507E-02	4.972E-02

Sr-85	#A	-2.1283E-02	-2.1729E-02	5.8630E-02	5.8643E-02	6.390E-02
Kr-85	#A	-4.9118E+02	-4.9119E+02	1.3257E+03	1.3260E+03	1.475E+03
Y-88	#B	-1.6400E-04	-1.6608E-04	5.9642E-02	5.9642E-02	5.892E-02
NB-94	#B	-7.0689E-04	-7.0689E-04	4.5333E-02	4.5333E-02	5.392E-02
Ag-108M	#B	1.6156E-03	1.6156E-03	7.7690E-02	7.7690E-02	8.915E-02
CD-109	#A	-1.6585E-01	-1.6634E-01	2.6333E+00	2.6333E+00	2.288E+00
SN-113	#B	-3.7935E-03	-3.8381E-03	6.3064E-02	6.3065E-02	7.122E-02
SB-125	#B	2.3884E-02	2.3916E-02	1.2131E-01	1.2132E-01	1.381E-01
I-131	#B	3.8288E-03	4.5264E-03	5.0926E-02	5.0927E-02	4.923E-02
CS-134	#B	-1.3686E-02	-1.3711E-02	5.0596E-02	5.0602E-02	5.703E-02
CS-137	#A	1.6489E-02	1.6491E-02	4.6397E-02	4.6406E-02	5.227E-02
CE-139	#A	7.1908E-03	7.2615E-03	5.2187E-02	5.2189E-02	5.772E-02
EU-152	#B	1.6737E-02	1.6742E-02	1.5441E-01	1.5441E-01	1.724E-01
EU-154	#B	5.7695E-03	5.7720E-03	1.1404E-01	1.1404E-01	1.275E-01
EU-155	#B	1.1107E-01	1.1115E-01	2.3244E-01	2.3252E-01	2.559E-01
HG-203	#B	-2.7118E-03	-2.7913E-03	4.0217E-02	4.0218E-02	4.259E-02
TL-208		2.9595E-01	2.9595E-01	1.0198E-01	1.0332E-01	
PB-212	#	7.3901E-01	7.3901E-01	1.3012E-01	1.3657E-01	1.115E-01
PB-214	#	4.5738E-01	4.5738E-01	1.2106E-01	1.2375E-01	1.032E-01
BI-212	#	6.6733E-01	6.6733E-01	6.0842E-01	6.0957E-01	
BI-214		4.9349E-01	4.9349E-01	1.4336E-01	1.4601E-01	
RA-224	#A	1.0910E+00	1.0910E+00	1.2386E+00	1.2401E+00	1.340E+00
RA-226	#	1.3448E+00	1.3448E+00	1.1109E+00	1.1135E+00	
AC-228		9.2941E-01	9.2941E-01	2.4563E-01	2.5111E-01	
TH-227	#B	-3.5389E-01	-3.5389E-01	4.9442E-01	4.9482E-01	5.359E-01
PA-234	#B	1.7752E-01	1.7752E-01	1.4865E-01	1.4898E-01	2.544E-01
TH-234	#B	2.0376E+00	2.0376E+00	1.9749E+00	1.9782E+00	4.614E+00
AM-241	#A	1.0824E-02	1.0824E-02	6.2519E-01	6.2519E-01	7.000E-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) 2.1201052E+01 pCi/gm

Total Decayed Activity (270.2 to 1999.0 keV) 2.1201056E+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_2SEPT2005_1423.An1

Sample description

FSS-NOL-06-01-053-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_2SEPT2005_1423.An1

Acquisition information

Start time:	02-Sep-2005 14:24:45
Live time:	2000
Real time:	2026
Dead time:	1.27 %
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: 2.1940E+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 31-Aug-2005 14:48:00
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: 0.2028

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.87	121.	29.60	1.10	8.957E-03	74.81	9.600	PBC<MDA	PB212
77.06	296.	11.96	1.10	9.614E-03	77.11	10.700	1.784E+00	PB214
					77.11	17.500	1.091E+00	PB212
186.39	137.	26.01	1.51	1.625E-02	185.99	3.280	1.530E+00	RA226
238.79	837.	4.05	1.21	1.380E-02	238.63	43.100	8.666E-01	PB212
241.59	116.	20.78	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.976E-01	PB214

269.94	96.	29.10	1.20	1.244E-02				
295.17	155.	17.88	1.04	1.147E-02				
295.17	155.	17.88	1.04	1.147E-02	295.22	19.200	4.342E-01	PB214
300.54	52.	39.10	0.70	1.127E-02				
338.49	130.	20.07	1.13	1.006E-02	338.40	12.010	6.627E-01	AC228
351.99	274.	8.65	1.38	9.679E-03				
351.99	274.	8.65	1.38	9.679E-03	351.99	37.100	4.697E-01	PB214
463.47	63.	30.98	1.60	7.365E-03				
463.47	63.	30.98	1.60	7.365E-03	463.51	10.000	5.146E-01	SB125
511.13	93.	24.00	1.59	6.690E-03	510.72	22.500	3.786E-01	TL208
583.60	257.	9.34	1.12	5.886E-03	583.14	86.000	3.121E-01	TL208
609.64	198.	11.13	1.04	5.647E-03	609.32	46.090	4.674E-01	BI214
719.41	23.	30.24	1.55	4.820E-03	722.95	90.499	3.211E-02	Ag108M
727.26	74.	24.31	1.88	4.794E-03	727.17	11.800	8.068E-01	BI212
795.15	46.	29.97	1.60	4.423E-03				
795.15	46.	29.97	1.60	4.423E-03	795.76	85.400	7.455E-02	CS134
911.55	183.	10.88	1.80	3.920E-03	911.07	29.000	9.876E-01	AC228
968.85	130.	15.03	1.48	3.718E-03	968.90	17.460	1.233E+00	AC228
1120.84	50.	29.41	1.89	3.282E-03	1120.28	15.040	6.287E-01	BI214
1461.34	790.	3.64	2.04	2.620E-03	1460.75	10.700	1.736E+01	K40
1765.13	38.	16.22	2.62	2.225E-03	1764.51	15.920	6.592E-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	
149.31	75.17	580.	121.	0.060	88.79	1.098	PB-214	D
153.69	77.36	478.	296.	0.148	35.89	1.100	PB-214	D
477.22	238.83	157.	837.	0.419	12.16	1.215	PB-212	D
482.81	241.62	230.	116.	0.058	62.35	1.217	PB-214	D
539.52	269.94	266.	96.	0.048	87.30	1.205	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	1072.	265.	0.132	55.60	1.500	D
PB-212	153.80	77.11	1072.	265.	0.132	55.60	1.500	D
RA-226	372.02	186.21	543.	116.	0.058	86.52	1.500	s
PB-212	477.13	238.75	482.	717.	0.359	17.16	1.500	s
PB-214	590.41	295.38	242.	143.	0.071	52.61	1.500	s
AC-228	676.65	338.49	204.	130.	0.065	60.21	1.127	
PB-214	703.66	351.99	150.	293.	0.146	24.92	1.500	D

SB-125	926.16	463.21	80.	49.	0.025	85.26	1.500s
TL-208	1022.04	511.13	125.	93.	0.046	72.00	1.586s
TL-208	1167.04	583.60	103.	257.	0.128	28.01	1.124
Bi-214	1219.12	609.64	92.	198.	0.099	33.40	1.041s
Ag-108M	1438.77	719.41	12.	23.	0.011	90.72	1.551s
Bi-212	1454.47	727.26	76.	74.	0.037	72.94	1.879s
CS-134	1590.24	795.11	44.	31.	0.015	106.88	1.601s
AC-228	1823.23	911.55	63.	182.	0.091	32.64	1.798
AC-228	1937.91	968.85	63.	130.	0.065	45.10	1.482
Bi-214	2240.95	1120.28	43.	41.	0.020	82.53	1.819D
K-40	2923.58	1461.34	8.	790.	0.395	10.91	2.042
Bi-214	3531.72	1765.13	0.	38.	0.019	48.67	2.622

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-6.5124E-02					
			477.56	-6.512E-02	&(	4.605E-01	1.35E-01 G
K-40		1.7357E+01					
			1460.75	1.736E+01	(P	3.445E-01	6.32E-01 G
MN-54		2.0722E-02					
			834.81	2.072E-02	%(P	5.105E-02	1.53E-02 G
CO-57		-8.8033E-04					
			122.07	-8.803E-04	&(	5.519E-02	1.64E-02 G K
			136.43	1.392E-03	%	4.623E-01	1.38E-01 G
CO-60		-2.1963E-03					
			1332.51	-2.196E-03	&(P	6.022E-02	1.66E-02 G K
			1173.23	1.227E-02	%	6.877E-02	1.99E-02 G K
Sr-85		-1.2156E-02					
			514.00	-1.216E-02	%(	5.782E-02	1.71E-02 G
Kr-85		-2.7537E+02					
			513.99	-2.754E+02	%(	1.307E+03	3.87E+02 G
Y-88		-5.8714E-03					
			1836.01	-5.871E-03	%(P	5.401E-02	1.46E-02 G K

898.02 2.170E-02 % P 5.423E-02 1.62E-02 G

NB-94 1.7775E-02

871.10 1.777E-02 %(4.555E-02 1.36E-02 G K

702.50 0.000E+00 & 5.796E-02 1.66E-02 G K

Ag-108M 3.2108E-02

722.95 3.211E-02 ?(2.688E-02 9.71E-03 G K

614.37-1.371E-02 % P 5.714E-02 1.68E-02 G

433.93 5.966E-03 % 4.509E-02 1.32E-02 G

CD-109 2.6588E-01

88.04 2.659E-01 %(P 2.111E+00 6.32E-01 G

SN-113 -3.8334E-03

391.71-3.833E-03 &(7.225E-02 2.11E-02 G K

255.04-2.743E-02 & 1.857E+00 5.45E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.1223E-01						
		427.95	1.143E-02	%(P	1.471E-01	4.28E-02	G K
		600.77	-8.178E-04	% P	2.695E-01	7.69E-02	G
		636.15	-4.883E-02	% P	4.100E-01	1.18E-01	G
		463.51	4.106E-01	*(P	3.708E-01	1.20E-01	G
		176.29	1.397E-02	& P	6.741E-01	2.00E-01	G
I-131	-9.8795E-03						
		364.48	-9.880E-03	%(	5.521E-02	1.63E-02	G K
		636.97	-1.749E-01	%	7.086E-01	2.08E-01	G
		284.29	-1.321E-01	%	8.074E-01	2.39E-01	G
CS-134	3.1202E-02						
		604.66	1.478E-02	&(	4.469E-02	1.33E-02	G K
		795.76	4.996E-02	*(	5.496E-02	1.78E-02	G
		569.29	6.737E-02	&	2.337E-01	6.88E-02	G
		801.84	7.558E-02	% P	6.065E-01	1.74E-01	G
CS-137	2.6687E-02						
		661.62	2.669E-02	&(	4.007E-02	1.26E-02	G
CE-139	-6.3561E-03						
		165.85	-6.356E-03	%(P	5.528E-02	1.65E-02	G
EU-152	4.0744E-02						
		121.78	4.074E-02	&(P	1.490E-01	4.47E-02	G K
		344.30	2.874E-02	&	1.575E-01	4.66E-02	G
		1408.08	7.713E-02	&	1.897E-01	5.66E-02	G
		964.00	1.041E-01	% P	2.375E-01	7.13E-02	G
		1112.07	0.000E+00	%	6.417E-01	1.83E-01	G

778.90-7.943E-04 % P 4.120E-01 1.16E-01 G

EU-154 -1.6399E-02

123.10-1.640E-02 %(P 1.192E-01 3.56E-02 G K

1274.80 2.119E-03 % 1.817E-01 5.04E-02 G

723.30-1.780E-01 & P 3.547E-01 1.08E-01 G

1004.80 1.523E-02 & 3.046E-01 8.53E-02 G

EU-155 1.4043E-01

86.45 1.404E-01 %(P 2.566E-01 7.79E-02 G K

105.31 6.646E-02 % 2.478E-01 7.45E-02 G

HG-203 1.3577E-03

279.17 1.358E-03 &(P 5.308E-02 1.56E-02 G K

72.87-3.719E-01 % 2.124E+00 6.38E-01 G

70.83 4.368E-02 % 3.536E+00 1.05E+00 G

82.50-2.663E-01 % 4.047E+00 1.21E+00 G

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

TL-208       3.2592E-01
                    583.14 3.121E-01  (P 6.089E-02 2.92E-02 G
                    510.72 3.786E-01 *(  2.245E-01 9.09E-02 G

PB-212       7.4226E-01
                    238.63 7.423E-01 @(  1.087E-01 4.25E-02 G K
                                         Energy duplication
                     77.11 9.769E-01 +   5.728E-01 1.81E-01 G
                     74.81 5.853E-01 & P 1.209E+00 3.67E-01 G

PB-214       5.0222E-01
                                         Energy duplication
                    351.99 5.022E-01  (P 1.027E-01 4.18E-02 G K
                    295.22 3.992E-01 -   2.103E-01 7.00E-02 G
                                         Energy duplication
                     77.11 1.598E+00 +   9.368E-01 2.96E-01 G
                    241.92 1.423E-01 %   7.389E-01 2.21E-01 G

BI-212       8.0680E-01
                    727.17 8.068E-01  (  4.715E-01 1.96E-01 G K
                   1620.56-3.135E-02 & P 1.610E+00 4.05E-01 G
                    785.42 1.337E+00 % P 2.311E+00 7.12E-01 G

BI-214       4.7820E-01
                    609.32 4.674E-01 @(  1.124E-01 5.21E-02 G K
                   1764.51 6.592E-01 + P 1.281E-01 1.07E-01 G
                   1120.28 5.112E-01  (  4.153E-01 1.41E-01 G

RA-224       6.9889E-01
                    241.00 6.989E-01 %(P 1.343E+00 4.08E-01 G
```

```
RA-226      1.3340E+00
                185.99 1.334E+00  (P 1.285E+00 4.00E-01 G

AC-228      1.0799E+00
                911.07 9.876E-01  (P 2.144E-01 1.08E-01 G K
                968.90 1.233E+00  (P 3.768E-01 1.85E-01 G
                338.40 6.627E-01 -   3.531E-01 1.33E-01 G

TH-227      2.2922E-02
                236.00 2.292E-02 %(P 3.606E-01 1.07E-01 G K
                256.25 1.515E-02 &   5.322E-01 1.56E-01 G

PA-234      4.6235E-04
                 98.44 4.623E-04 %(  2.369E-01 7.05E-02 G K
                946.00 0.000E+00 %   3.788E-01 1.08E-01 G
                131.28 6.016E-04 %   2.501E-01 7.44E-02 G
                 94.67-4.653E-03 %   4.404E-01 1.31E-01 G
                883.24-1.020E-01 %   4.621E-01 1.35E-01 G
                926.70-5.805E-02 &   4.858E-01 1.39E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26 7.197E-02 & 3.433E-01 9.97E-02 G

TH-234 7.1188E-01
63.29 7.119E-01 %(P 4.352E+00 1.30E+00 G K
92.80 1.522E+00 % 2.366E+00 7.22E-01 G
92.38 1.521E+00 & P 2.782E+00 8.46E-01 G

AM-241 -2.4363E-01
59.54-2.436E-01 %(6.789E-01 2.05E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-6.3468E-02	-6.5124E-02	4.0432E-01	4.0434E-01	4.488E-01
K-40		1.7357E+01	1.7357E+01	1.8948E+00	2.1305E+00	
MN-54	#A	2.0630E-02	2.0722E-02	4.5895E-02	4.5909E-02	5.082E-02
CO-57	#B	-8.7586E-04	-8.8033E-04	4.9217E-02	4.9217E-02	5.491E-02
CO-60	#B	-2.1947E-03	-2.1963E-03	5.8103E-02	5.8103E-02	6.018E-02

Sr-85	#A	-1.1901E-02	-1.2156E-02	5.1314E-02	5.1319E-02	5.660E-02
Kr-85	#A	-2.7537E+02	-2.7537E+02	1.1599E+03	1.1600E+03	1.307E+03
Y-88	#B	-5.7962E-03	-5.8714E-03	4.4034E-02	4.4035E-02	5.332E-02
NB-94	#B	1.7775E-02	1.7775E-02	4.0823E-02	4.0835E-02	4.555E-02
Ag-108M	#	3.2107E-02	3.2108E-02	2.9130E-02	2.9185E-02	2.688E-02
CD-109	#A	2.6508E-01	2.6588E-01	1.8967E+00	1.8967E+00	2.104E+00
SN-113	#B	-3.7878E-03	-3.8334E-03	6.3329E-02	6.3330E-02	7.139E-02
SB-125	#B	1.1207E-01	1.1223E-01	9.8703E-02	9.8904E-02	1.469E-01
I-131	#B	-8.3264E-03	-9.8795E-03	4.8773E-02	4.8776E-02	4.653E-02
CS-134	#B	3.1145E-02	3.1202E-02	3.3348E-02	3.3394E-02	4.461E-02
CS-137	#A	2.6684E-02	2.6687E-02	3.7767E-02	3.7797E-02	4.006E-02
CE-139	#A	-6.2929E-03	-6.3561E-03	5.2652E-02	5.2653E-02	5.473E-02
EU-152	#B	4.0732E-02	4.0744E-02	1.3420E-01	1.3422E-01	1.489E-01
EU-154	#B	-1.6392E-02	-1.6399E-02	1.0933E-01	1.0933E-01	1.191E-01
EU-155	#B	1.4032E-01	1.4043E-01	2.3384E-01	2.3397E-01	2.564E-01
HG-203	#B	1.3182E-03	1.3577E-03	4.6817E-02	4.6818E-02	5.154E-02
TL-208		3.2592E-01	3.2592E-01	9.1425E-02	9.3236E-02	
PB-212	#	7.4226E-01	7.4226E-01	1.2735E-01	1.3399E-01	1.087E-01
PB-214	#	5.0222E-01	5.0222E-01	1.2534E-01	1.2847E-01	1.027E-01
BI-212		8.0680E-01	8.0680E-01	5.8847E-01	5.9021E-01	
BI-214		4.7820E-01	4.7820E-01	1.5973E-01	1.6197E-01	
RA-224	#A	6.9889E-01	6.9889E-01	1.2235E+00	1.2241E+00	1.343E+00
RA-226	#	1.3339E+00	1.3340E+00	1.1987E+00	1.2011E+00	1.285E+00
AC-228		1.0799E+00	1.0799E+00	3.0081E-01	3.0685E-01	
TH-227	#B	2.2922E-02	2.2922E-02	3.1974E-01	3.1975E-01	3.606E-01
PA-234	#B	4.6235E-04	4.6235E-04	2.1152E-01	2.1152E-01	2.369E-01
TH-234	#B	7.1188E-01	7.1188E-01	3.9082E+00	3.9084E+00	4.352E+00
AM-241	#A	-2.4363E-01	-2.4363E-01	6.1482E-01	6.1497E-01	6.789E-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 (1460.5 to 1999.0 keV) 2.0048231E+01 pCi/gm

Total Decayed Activity (1460.5 to 1999.0 keV) 2.0048231E+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_2SEPT2005_1503.An1

Sample description

FSS-NOL-06-01-067-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_2SEPT2005_1503.An1

Acquisition information

Start time:	02-Sep-2005 15:04:00
Live time:	2000
Real time:	2032
Dead time:	1.56 %
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: 1.8010E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8010E+03) =
5.5525E+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	01-Sep-2005 10:52:00
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: 0.2663

***** 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
76.43	311.	14.74	1.17	9.340E-03	74.81	9.600	2.724E+00	PB212
					77.11	10.700	2.289E+00	PB214
					77.11	17.500	1.399E+00	PB212
92.19	150.	33.92	0.79	1.321E-02				
92.19	150.	33.92	0.79	1.321E-02	92.38	2.570		PBC<MDA TH234
					92.80	3.000	2.818E+00	TH234
128.92	103.	41.42	1.31	1.714E-02				

186.17	88.	30.91	1.12	1.626E-02	185.99	3.280	PBC<MDA	RA226
238.85	740.	6.68	1.13	1.379E-02	238.63	43.100	9.327E-01	PB212
295.37	151.	13.65	1.25	1.145E-02	295.22	19.200	5.158E-01	PB214
300.27	53.	34.13	1.26	1.128E-02				
338.27	125.	22.61	1.00	1.006E-02	338.40	12.010	7.769E-01	AC228
351.95	263.	11.54	1.39	9.680E-03				
351.95	263.	11.54	1.39	9.680E-03	351.99	37.100	5.486E-01	PB214
510.90	132.	19.61	1.04	6.693E-03	510.72	22.500	6.550E-01	TL208
583.56	169.	15.70	1.02	5.886E-03	583.14	86.000	2.494E-01	TL208
609.76	208.	13.96	1.37	5.645E-03	609.32	46.090	5.994E-01	BI214
661.93	235.	12.04	0.95	5.227E-03	661.62	84.620	3.985E-01	CS137
727.70	54.	26.39	1.73	4.791E-03	727.17	11.800	7.136E-01	BI212
911.75	133.	21.59	1.26	3.919E-03	911.07	29.000	8.759E-01	AC228
969.56	52.	37.62	1.16	3.716E-03	968.90	17.460	PBC<MDA	AC228
1120.66	90.	27.08	1.33	3.282E-03	1120.28	15.040	1.368E+00	BI214
1173.54	696.	4.28	1.77	3.156E-03	1173.23	99.860	1.656E+00	CO60
1332.94	628.	4.31	2.18	2.833E-03	1332.51	99.980	1.664E+00	CO60
1461.35	453.	4.74	2.06	2.620E-03	1460.75	10.700	1.211E+01	K40
1765.03	24.	20.80	2.24	2.225E-03	1764.51	15.920	5.139E-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
183.96	92.19	941.	150.	0.075	101.77	0.785	NP-237 l
257.42	128.92	656.	113.	0.057	99.92	1.315	AC-228
371.96	186.17	326.	88.	0.044	92.74	1.122	PA-234 l
477.32	238.85	1121.	151.	0.076	97.06	1.129	PB-212
600.20	300.41	138.	53.	0.027	102.38	1.258	PB-212 lD
703.58	351.95	403.	72.	0.036	123.85	1.391	PB-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	153.80	77.11	958.	205.	0.102	67.50	1.500D
PB-212	153.80	77.11	958.	205.	0.102	67.50	1.500D
PB-212	477.21	238.79	569.	528.	0.264	23.19	1.500
PB-214	590.34	295.34	280.	143.	0.071	55.74	1.500
AC-228	676.22	338.27	250.	125.	0.063	67.82	0.998
PB-214	703.75	352.03	224.	191.	0.095	39.65	1.500s

TL-208	1021.58	510.90	152.	132.	0.066	58.84	1.041s
TL-208	1166.94	583.56	149.	168.	0.084	47.10	1.016
Bl-214	1219.38	609.76	155.	208.	0.104	41.89	1.369s
CS-137	1323.75	661.93	145.	235.	0.117	36.12	0.945s
Bl-212	1455.35	727.70	67.	54.	0.027	79.18	1.734
AC-228	1823.64	911.75	182.	133.	0.066	64.77	1.258
AC-228	1939.32	969.56	114.	52.	0.026	112.85	1.158s
Bl-214	2241.72	1120.66	112.	90.	0.045	81.24	1.328s
CO-60	2347.56	1173.54	59.	696.	0.348	12.84	1.774
CO-60	2666.59	1332.94	24.	628.	0.314	12.93	2.178
K-40	2923.60	1461.35	2.	453.	0.226	14.21	2.063
Bl-214	3531.51	1765.03	1.	24.	0.012	62.40	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.9277E-01					
			477.56	-1.928E-01	%(	6.371E-01	1.90E-01 G
K-40		1.2112E+01					
			1460.75	1.211E+01	(P	2.637E-01	5.74E-01 G
MN-54		2.3271E-02					
			834.81	2.327E-02	%(P	7.930E-02	2.35E-02 G
CO-57		1.6245E-02					
			122.07	1.624E-02	%(	5.971E-02	1.79E-02 G K
			136.43	8.381E-03	&	4.859E-01	1.44E-01 G
CO-60		1.6603E+00					
			1332.51	1.664E+00	(P	6.751E-02	7.17E-02 G K
			1173.23	1.656E+00	(	9.198E-02	7.09E-02 G K
Sr-85		-4.9813E-03					
			514.00	-4.981E-03	%(	6.877E-02	2.01E-02 G
Kr-85		-3.2712E+01					
			513.99	-3.271E+01	%(	1.478E+03	4.28E+02 G
Y-88		-1.2942E-04					
			1836.01	-1.294E-04	%(P	5.766E-02	1.46E-02 G K

898.02 7.190E-03 % P 1.189E-01 3.46E-02 G

NB-94 1.6289E-02

871.10 1.629E-02 &(9.874E-02 2.90E-02 G K

702.50-1.289E-03 % 7.044E-02 2.02E-02 G K

Ag-108M 1.7035E-02

722.95 1.703E-02 &(9.412E-02 2.77E-02 G K

614.37-4.149E-04 % P 5.736E-02 1.62E-02 G

433.93 1.422E-02 % 6.721E-02 1.99E-02 G

CD-109 -2.2314E-01

88.04-2.231E-01 %(P 2.676E+00 8.00E-01 G

SN-113 -1.2893E-02

391.71-1.289E-02 %(9.746E-02 2.88E-02 G K

255.04-3.261E-01 & 2.721E+00 8.09E-01 G

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

SB-125      -5.4208E-02
                 427.95-5.421E-02 %(P 2.151E-01 6.38E-02 G K
                 600.77-5.926E-02 % P 3.749E-01 1.10E-01 G
                 636.15 1.256E-01 & P 5.559E-01 1.63E-01 G
                 463.51 3.179E-01 % P 5.764E-01 1.76E-01 G
                 176.29-5.864E-02 % P 8.342E-01 2.47E-01 G

I-131        2.0451E-02
                 364.48 2.045E-02 %(  7.725E-02 2.30E-02 G K
                 636.97-3.143E-02 &   1.014E+00 2.91E-01 G
                 284.29-3.001E-01 &   1.078E+00 3.23E-01 G

CS-134      -3.2913E-04
                 604.66-3.291E-04 &(  6.573E-02 1.88E-02 G K
                 795.76 1.304E-02 &   9.740E-02 2.84E-02 G
                 569.29 3.124E-03 %   4.190E-01 1.21E-01 G
                 801.84 3.280E-01 % P 8.709E-01 2.61E-01 G

CS-137       3.9850E-01
                 661.62 3.985E-01  (  9.975E-02 4.80E-02 G

CE-139      -8.3220E-04
                 165.85-8.322E-04 %(P 6.983E-02 2.07E-02 G

EU-152       4.9551E-02
                 121.78 4.955E-02 %(P 1.797E-01 5.40E-02 G K
                 344.30 4.581E-02 %   2.015E-01 5.99E-02 G
                1408.08 5.271E-02 %   2.851E-01 8.02E-02 G
                 964.00-2.177E-01 % P 7.994E-01 2.37E-01 G
                1112.07-1.591E-01 %   7.972E-01 2.34E-01 G
```

778.90-3.782E-02 & P 6.616E-01 1.91E-01 G

EU-154 -1.9278E-02

123.10-1.928E-02 %(P 1.473E-01 4.40E-02 G K

1274.80-2.914E-02 % 2.362E-01 6.74E-02 G

723.30-2.205E-01 & P 5.139E-01 1.55E-01 G

1004.80-6.994E-02 % 6.355E-01 1.85E-01 G

EU-155 5.5024E-02

86.45 5.502E-02 %(P 3.018E-01 9.05E-02 G K

105.31 8.423E-02 & 2.912E-01 8.76E-02 G

HG-203 2.6914E-02

279.17 2.691E-02 %(P 6.501E-02 1.96E-02 G K

72.87-4.500E-01 & 2.425E+00 7.29E-01 G

70.83-1.384E-02 % 4.189E+00 1.25E+00 G

82.50-1.116E+00 & 4.802E+00 1.44E+00 G

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

TL-208       2.4944E-01
                   583.14 2.494E-01  (P 8.816E-02 3.93E-02 G
                   510.72 6.550E-01 +   3.001E-01 1.29E-01 G

PB-212       6.6567E-01
                   238.63 6.657E-01  (  1.436E-01 5.15E-02 G K
                                        Energy duplication
                    77.11 9.198E-01 +   6.604E-01 2.07E-01 G
                    74.81 5.109E-01 & P 1.417E+00 4.28E-01 G

PB-214       4.2839E-01
                   351.99 3.985E-01 @(P 1.513E-01 5.28E-02 G K
                   295.22 4.861E-01  (  2.750E-01 9.03E-02 G
                                        Energy duplication
                    77.11 1.504E+00 +   1.080E+00 3.38E-01 G
                   241.92 4.057E-01 %   8.797E-01 2.67E-01 G

BI-212       7.1359E-01
                   727.17 7.136E-01  (  5.426E-01 1.88E-01 G K
                  1620.56-3.820E-02 % P 2.493E+00 6.56E-01 G
                   785.42-5.926E-01 & P 4.398E+00 1.28E+00 G

BI-214       5.7744E-01
                   609.32 5.994E-01 @(  1.750E-01 8.37E-02 G K
                  1764.51 5.139E-01 ?(P 1.561E-01 1.07E-01 G
                  1120.28 1.368E+00 +   7.906E-01 3.70E-01 G

RA-224       8.3449E-01
                   241.00 8.345E-01 &(P 1.681E+00 5.10E-01 G
```

```
RA-226       1.0516E+00
                 185.99 1.052E+00 %(P 1.614E+00 4.93E-01 G

AC-228       8.4692E-01
                 911.07 8.759E-01  (P 4.329E-01 1.90E-01 G K
                 968.90 6.007E-01 - P 6.065E-01 2.26E-01 G
                 338.40 7.769E-01  (  4.743E-01 1.76E-01 G

TH-227       3.7483E-03
                 236.00 3.748E-03 %(P 5.963E-01 1.77E-01 G K
                 256.25-1.019E-01 %   8.007E-01 2.38E-01 G

PA-234      -2.6949E-02
                  98.44-2.695E-02 &(  2.883E-01 8.61E-02 G K
                 946.00 1.158E-01 &   4.275E-01 1.26E-01 G
                 131.28-5.003E-02 &   2.819E-01 8.44E-02 G
                  94.67-1.681E-03 %   5.145E-01 1.53E-01 G
                 883.24 1.109E-01 %   7.593E-01 2.22E-01 G
                 926.70-4.793E-02 %   9.992E-01 2.90E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26 1.076E-01 % 5.971E-01 1.75E-01 G

TH-234 1.2323E+00
63.29 1.232E+00 &(P 5.114E+00 1.54E+00 G K
92.80 1.743E+00 % 2.914E+00 8.88E-01 G
92.38 1.548E+00 % P 3.493E+00 1.06E+00 G

AM-241 -6.6927E-03
59.54-6.693E-03 &(8.104E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	-1.8985E-01	-1.9277E-01	5.7048E-01	5.7059E-01	6.275E-01
K-40	1.2112E+01	1.2112E+01	1.7213E+00	1.8507E+00	
MN-54 #A	2.3211E-02	2.3271E-02	7.0460E-02	7.0472E-02	7.909E-02
CO-57 #B	1.6196E-02	1.6245E-02	5.3788E-02	5.3795E-02	5.953E-02
CO-60	1.6596E+00	1.6603E+00	1.5124E-01	1.7764E-01	

Sr-85 #A	-4.9191E-03	-4.9813E-03	6.0199E-02	6.0199E-02	6.791E-02
Kr-85 #A	-3.2712E+01	-3.2712E+01	1.2840E+03	1.2840E+03	1.478E+03
Y-88 #B	-1.2844E-04	-1.2942E-04	6.2947E-02	6.2947E-02	5.722E-02
NB-94 #B	1.6289E-02	1.6289E-02	8.6924E-02	8.6929E-02	9.874E-02
Ag-108M#B	1.7034E-02	1.7035E-02	8.3049E-02	8.3054E-02	9.412E-02
CD-109 #A	-2.2274E-01	-2.2314E-01	2.9760E+00	2.9760E+00	2.671E+00
SN-113 #B	-1.2802E-02	-1.2893E-02	8.6311E-02	8.6314E-02	9.678E-02
SB-125 #B	-5.4165E-02	-5.4208E-02	2.1519E-01	2.1521E-01	2.149E-01
I-131 #B	1.8481E-02	2.0451E-02	6.9107E-02	6.9117E-02	6.981E-02
CS-134 #B	-3.2878E-04	-3.2913E-04	5.6544E-02	5.6544E-02	6.566E-02
CS-137	3.9847E-01	3.9850E-01	1.4393E-01	1.4566E-01	
CE-139 #A	-8.2729E-04	-8.3220E-04	1.1333E-01	1.1333E-01	6.942E-02
EU-152 #B	4.9543E-02	4.9551E-02	1.6187E-01	1.6189E-01	1.796E-01
EU-154 #B	-1.9273E-02	-1.9278E-02	1.3524E-01	1.3524E-01	1.473E-01
EU-155 #B	5.4999E-02	5.5024E-02	2.7156E-01	2.7157E-01	3.017E-01
HG-203 #B	2.6448E-02	2.6914E-02	5.8887E-02	5.8906E-02	6.388E-02
TL-208	2.4944E-01	2.4944E-01	1.1777E-01	1.1860E-01	
PB-212 #	6.6567E-01	6.6567E-01	1.5438E-01	1.5883E-01	1.436E-01
PB-214 #	4.2839E-01	4.2839E-01	1.4663E-01	1.4858E-01	1.513E-01
BI-212	7.1359E-01	7.1359E-01	5.6504E-01	5.6646E-01	
BI-214 #	5.7744E-01	5.7744E-01	2.1752E-01	2.1992E-01	
RA-224 #A	8.3449E-01	8.3449E-01	1.5298E+00	1.5305E+00	1.681E+00
RA-226 #A	1.0516E+00	1.0516E+00	1.4779E+00	1.4791E+00	1.614E+00
AC-228	8.4692E-01	8.4692E-01	3.9746E-01	4.0029E-01	
TH-227 #B	3.7483E-03	3.7483E-03	5.3114E-01	5.3114E-01	5.963E-01
PA-234 #B	-2.6949E-02	-2.6949E-02	2.5828E-01	2.5828E-01	2.883E-01
TH-234 #B	1.2323E+00	1.2323E+00	4.6060E+00	4.6065E+00	5.114E+00
AM-241 #A	-6.6926E-03	-6.6927E-03	7.2331E-01	7.2331E-01	8.103E-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) 1.6557171E+01 pCi/gm

Total Decayed Activity (50.2 to 1999.0 keV) 1.6557903E+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_2SEPT2005_1543.An1

Sample description

FSS-NOL-06-01-054-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_2SEPT2005_1543.An1

Acquisition information

Start time:	02-Sep-2005 15:45:29
Live time:	2000
Real time:	2027
Dead time:	1.33 %
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: 1.8930E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8930E+03) =
5.2826E+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-Aug-2005 14:50:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1948

***** 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	162.	32.75	1.50	8.847E-03				
74.96	162.	32.75	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.16	259.	19.74	1.50	9.541E-03	77.11	10.700	1.813E+00	PB214
					77.11	17.500	1.109E+00	PB212
77.16	259.	19.74	1.50	9.541E-03	77.11	10.700	1.813E+00	PB214
					77.11	17.500	1.109E+00	PB212
93.22	125.	38.47	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234

					92.80	3.000	2.224E+00	TH234
186.21	117.	25.01	1.34	1.626E-02	185.99	3.280	1.506E+00	RA226
238.76	843.	4.14	1.21	1.380E-02	238.63	43.100	1.011E+00	PB212
241.68	147.	17.97	1.22	1.366E-02	241.00	3.900	1.948E+00	RA224
					241.92	7.470	1.028E+00	PB214
270.17	66.	40.01	1.03	1.243E-02				
295.34	196.	10.53	1.25	1.146E-02	295.22	19.200	6.355E-01	PB214
300.38	52.	30.88	1.26	1.128E-02				
328.32	55.	31.97	0.75	1.036E-02				
338.52	167.	14.97	1.03	1.006E-02	338.40	12.010	9.867E-01	AC228
352.15	317.	9.30	1.35	9.674E-03	351.99	37.100	6.294E-01	PB214
463.07	82.	23.46	1.45	7.372E-03				
463.07	82.	23.46	1.45	7.372E-03	463.51	10.000	7.809E-01	SB125
510.55	163.	13.55	1.67	6.697E-03	510.72	22.500	7.715E-01	TL208
583.46	266.	9.04	1.51	5.887E-03	583.14	86.000	3.739E-01	TL208
609.66	209.	11.38	1.51	5.646E-03	609.32	46.090	5.727E-01	BI214
727.63	61.	20.47	0.92	4.791E-03	727.17	11.800	7.672E-01	BI212
795.22	32.	33.84	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
911.48	217.	8.81	1.84	3.920E-03	911.07	29.000	1.359E+00	AC228
968.82	142.	12.16	1.74	3.718E-03	968.90	17.460	1.561E+00	AC228
1120.41	68.	28.28	1.90	3.283E-03	1120.28	15.040	9.773E-01	BI214
1461.30	750.	3.72	1.98	2.620E-03	1460.75	10.700	1.910E+01	K40
1765.01	35.	16.90	1.07	2.225E-03	1764.51	15.920	7.035E-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	
477.14	238.78	188.	843.	0.421	12.43	1.215	PB-212	D
482.99	241.70	275.	147.	0.073	53.91	1.217	PB-214	D
539.98	270.17	256.	66.	0.033	120.02	1.033	AC-228	
600.22	300.28	120.	59.	0.030	87.92	1.501	PB-212	
656.31	328.32	121.	55.	0.027	95.90	0.754	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	149.51	74.96	1375.	162.	0.081	98.24	1.500s
PB-214	153.80	77.11	1180.	259.	0.130	59.21	1.500D
PB-212	153.80	77.11	1180.	259.	0.130	59.21	1.500D
TH-234	186.02	93.22	1086.	125.	0.062	115.41	1.500s
RA-226	372.03	186.21	356.	113.	0.056	75.03	1.345
PB-212	477.14	238.76	590.	713.	0.357	18.30	1.500s
RA-224	482.62	241.50	691.	99.	0.049	115.33	1.500

PB-214	590.24	295.29	232.	203.	0.102	38.14	1.500
AC-228	676.72	338.52	176.	167.	0.083	44.90	1.032s
PB-214	703.97	352.14	125.	324.	0.162	22.13	1.500
SB-125	926.65	463.45	71.	63.	0.032	66.10	1.500s
TL-208	1020.88	510.55	101.	163.	0.081	40.65	1.669s
TL-208	1166.76	583.46	95.	265.	0.133	27.12	1.510
BI-214	1219.16	609.66	108.	209.	0.104	34.15	1.510
BI-212	1455.22	727.63	39.	61.	0.030	61.41	0.916s
CS-134	1590.47	795.22	43.	32.	0.016	101.52	1.601s
AC-228	1823.09	911.48	46.	217.	0.108	26.42	1.839
AC-228	1937.85	968.82	52.	142.	0.071	36.47	1.736
BI-214	2241.21	1120.41	78.	68.	0.034	84.85	1.902
K-40	2923.50	1461.30	7.	750.	0.375	11.16	1.977
BI-214	3531.49	1765.01	0.	35.	0.017	50.71	1.070s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		2.0622E-03					
			477.56	2.062E-03	&(	5.270E-01	1.52E-01 G
K-40		1.9099E+01					
			1460.75	1.910E+01	(P	3.772E-01	7.11E-01 G
MN-54		-2.6918E-03					
			834.81	-2.692E-03	%(P	6.857E-02	1.95E-02 G
CO-57		-5.3505E-03					
			122.07	-5.351E-03	%(	7.207E-02	2.15E-02 G K
			136.43	1.260E-02	&	5.487E-01	1.63E-01 G
CO-60		-6.7138E-03					
			1332.51	-6.714E-03	%(P	7.376E-02	2.07E-02 G K
			1173.23	3.057E-02	%	9.054E-02	2.69E-02 G K
Sr-85		-3.5713E-02					
			514.00	-3.571E-02	%(	7.473E-02	2.27E-02 G
Kr-85		-8.0669E+02					
			513.99	-8.067E+02	%(	1.688E+03	5.12E+02 G
Y-88		3.7500E-03					
			1836.01	3.750E-03	%(P	5.665E-02	1.48E-02 G K

898.02 1.316E-03 % P 6.874E-02 1.93E-02 G

NB-94 -1.0740E-02

871.10-1.074E-02 %(6.415E-02 1.85E-02 G K

702.50-2.403E-02 % 6.385E-02 1.91E-02 G K

Ag-108M 3.6051E-03

722.95 3.605E-03 &(1.100E-01 3.21E-02 G K

614.37-2.710E-02 % P 6.762E-02 2.03E-02 G

433.93-1.602E-02 % 5.748E-02 1.71E-02 G

CD-109 -1.6556E-02

88.04-1.656E-02 &(P 2.541E+00 7.58E-01 G

SN-113 4.2564E-03

391.71 4.256E-03 &(8.506E-02 2.49E-02 G K

255.04-5.687E-02 & 2.471E+00 7.29E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.2593E-01						
		427.95	-3.902E-02	%(P	1.645E-01	4.84E-02	G K
		600.77	8.630E-02	% P	2.655E-01	7.88E-02	G
		636.15	6.734E-04	% P	5.451E-01	1.56E-01	G
		463.51	6.142E-01	*(P	4.078E-01	1.39E-01	G
		176.29	2.345E-02	& P	8.446E-01	2.51E-01	G
I-131	-1.1924E-03						
		364.48	-1.192E-03	&(	7.514E-02	2.19E-02	G K
		636.97	-1.608E-01	%	9.785E-01	2.85E-01	G
		284.29	-1.997E-01	%	9.460E-01	2.82E-01	G
CS-134	1.7135E-02						
		604.66	-2.132E-02	&(	6.772E-02	2.02E-02	G K
		795.76	6.108E-02	*(	6.330E-02	2.07E-02	G
		569.29	-6.920E-02	%	3.355E-01	9.83E-02	G
		801.84	-6.400E-03	& P	7.558E-01	2.14E-01	G
CS-137	1.1953E-02						
		661.62	1.195E-02	&(	7.292E-02	2.13E-02	G
CE-139	2.6166E-02						
		165.85	2.617E-02	&(P	5.872E-02	1.78E-02	G
EU-152	-9.5613E-03						
		121.78	-9.561E-03	%(P	2.102E-01	6.27E-02	G K
		344.30	7.431E-03	%	1.739E-01	5.08E-02	G
		1408.08	6.175E-02	%	2.757E-01	7.85E-02	G
		964.00	5.627E-02	% P	4.433E-01	1.27E-01	G
		1112.07	-1.096E-01	%	7.157E-01	2.08E-01	G

778.90-8.602E-02 % P 5.150E-01 1.50E-01 G

EU-154 1.9882E-02

123.10 1.988E-02 %(P 1.503E-01 4.50E-02 G K

1274.80 1.559E-02 % 1.539E-01 4.24E-02 G

723.30-9.977E-03 & P 5.401E-01 1.58E-01 G

1004.80 2.164E-02 % 3.723E-01 1.05E-01 G

EU-155 -2.6910E-02

86.45-2.691E-02 %(P 2.960E-01 8.84E-02 G K

105.31 2.113E-02 % 2.764E-01 8.24E-02 G

HG-203 1.9596E-02

279.17 1.960E-02 &(P 5.608E-02 1.68E-02 G K

72.87-8.177E-01 % 2.650E+00 8.00E-01 G

70.83 5.204E-02 % 3.821E+00 1.14E+00 G

82.50 2.877E-01 & 4.526E+00 1.35E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.7388E-01						
		583.14	3.739E-01	(P	6.773E-02	3.39E-02	G
		510.72	7.715E-01	+	2.350E-01	1.05E-01	G
PB-212	8.5578E-01						
		238.63	8.558E-01	@(	1.390E-01	5.22E-02	G K
					Energy duplication		
		77.11	1.109E+00	+	6.960E-01	2.19E-01	G
		74.81	1.359E+00	& P	1.475E+00	4.53E-01	G
PB-214	6.4943E-01						
		351.99	6.444E-01	(P	1.088E-01	4.76E-02	G K
		295.22	6.593E-01	(	2.392E-01	8.38E-02	G
					Energy duplication		
		77.11	1.813E+00	+	1.138E+00	3.58E-01	G
		241.92	2.220E-01	%	9.502E-01	2.85E-01	G
BI-212	7.6725E-01						
		727.17	7.672E-01	(	4.024E-01	1.57E-01	G K
		1620.56	5.720E-01	% P	1.758E+00	5.05E-01	G
		785.42	9.521E-01	% P	3.386E+00	1.00E+00	G
BI-214	6.0631E-01						
		609.32	5.727E-01	(	1.403E-01	6.52E-02	G K
		1764.51	7.035E-01	(P	1.485E-01	1.19E-01	G
		1120.28	9.773E-01	+	6.357E-01	2.76E-01	G
RA-224	1.3214E+00						
		241.00	1.321E+00	?(P	1.673E+00	5.14E-01	G

```
RA-226       1.5058E+00
                 185.99 1.506E+00  (P 1.213E+00 3.92E-01 G

AC-228       1.4352E+00
                 911.07 1.359E+00  (P 2.163E-01 1.20E-01 G K
                 968.90 1.561E+00  (P 3.995E-01 1.90E-01 G
                 338.40 9.867E-01 -   3.813E-01 1.48E-01 G

TH-227      -4.4579E-01
                 236.00-4.458E-01 %(P 6.698E-01 2.05E-01 G K
                 256.25 6.466E-02 &   7.335E-01 2.17E-01 G

PA-234       1.0577E-02
                  98.44 1.058E-02 %(  2.806E-01 8.37E-02 G K
                 946.00 7.258E-02 %   2.645E-01 7.71E-02 G
                 131.28-8.029E-02 %   2.934E-01 8.83E-02 G
                  94.67-2.384E-01 %   5.353E-01 1.62E-01 G
                 883.24 8.874E-02 &   4.789E-01 1.38E-01 G
                 926.70 2.291E-03 &   5.938E-01 1.67E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26-1.025E-01 % 4.969E-01 1.45E-01 G

TH-234 1.5943E+00
63.29 1.110E+00 %(P 5.406E+00 1.62E+00 G K
92.80 2.224E+00 (2.790E+00 8.55E-01 G
92.38-4.693E-02 & P 3.231E+00 9.63E-01 G

AM-241 1.0061E-01
59.54 1.006E-01 %(8.113E-01 2.43E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	2.0083E-03	2.0622E-03	4.5545E-01	4.5545E-01	5.132E-01
K-40		1.9099E+01	1.9099E+01	2.1313E+00	2.3856E+00	
MN-54	#A	-2.6796E-03	-2.6918E-03	7.6592E-02	7.6592E-02	6.826E-02
CO-57	#B	-5.3226E-03	-5.3505E-03	6.4574E-02	6.4575E-02	7.170E-02
CO-60	#B	-6.7089E-03	-6.7138E-03	6.5797E-02	6.5798E-02	7.371E-02

Sr-85 #A	-3.4943E-02	-3.5713E-02	6.7977E-02	6.8007E-02	7.312E-02
Kr-85 #A	-8.0668E+02	-8.0669E+02	1.5355E+03	1.5362E+03	1.688E+03
Y-88 #B	3.7007E-03	3.7500E-03	4.4508E-02	4.4509E-02	5.590E-02
NB-94 #B	-1.0740E-02	-1.0740E-02	5.5628E-02	5.5631E-02	6.415E-02
Ag-108M#B	3.6050E-03	3.6051E-03	9.6397E-02	9.6397E-02	1.100E-01
CD-109 #A	-1.6505E-02	-1.6556E-02	1.4487E+01	1.4487E+01	2.533E+00
SN-113 #B	4.2044E-03	4.2564E-03	7.4586E-02	7.4586E-02	8.402E-02
SB-125 #B	1.2575E-01	1.2593E-01	8.5270E-02	8.5562E-02	1.642E-01
I-131 #B	-1.0003E-03	-1.1924E-03	6.5737E-02	6.5737E-02	6.303E-02
CS-134 #B	1.7103E-02	1.7135E-02	1.7397E-02	1.7423E-02	6.759E-02
CS-137 #A	1.1952E-02	1.1953E-02	6.3784E-02	6.3788E-02	7.291E-02
CE-139 #A	2.5898E-02	2.6166E-02	5.3325E-02	5.3345E-02	5.812E-02
EU-152 #B	-9.5584E-03	-9.5613E-03	2.4578E-01	2.4578E-01	2.101E-01
EU-154 #B	1.9873E-02	1.9882E-02	1.3495E-01	1.3496E-01	1.502E-01
EU-155 #B	-2.6889E-02	-2.6910E-02	4.4972E-01	4.4972E-01	2.957E-01
HG-203 #B	1.9010E-02	1.9596E-02	5.0530E-02	5.0542E-02	5.441E-02
TL-208	3.7388E-01	3.7388E-01	1.0155E-01	1.0369E-01	
PB-212 #	8.5578E-01	8.5578E-01	1.5660E-01	1.6380E-01	1.390E-01
PB-214 #	6.4943E-01	6.4943E-01	1.4324E-01	1.4780E-01	1.088E-01
BI-212	7.6725E-01	7.6725E-01	4.7114E-01	4.7310E-01	
BI-214	6.0631E-01	6.0631E-01	1.8566E-01	1.8875E-01	
RA-224 #A	1.3214E+00	1.3214E+00	1.5420E+00	1.5437E+00	1.673E+00
RA-226	1.5058E+00	1.5058E+00	1.1745E+00	1.1776E+00	
AC-228	1.4352E+00	1.4352E+00	3.2335E-01	3.3323E-01	
TH-227 #B	-4.4579E-01	-4.4579E-01	6.1716E-01	6.1767E-01	6.698E-01
PA-234 #B	1.0577E-02	1.0577E-02	2.5098E-01	2.5098E-01	2.806E-01
TH-234 #B	1.5943E+00	1.5943E+00	1.8400E+00	1.8422E+00	5.406E+00
AM-241 #A	1.0061E-01	1.0061E-01	7.2819E-01	7.2821E-01	8.113E-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) 2.3787487E+01 pCi/gm

Total Decayed Activity (269.7 to 1999.0 keV) 2.3787491E+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_6SEP2005_1538.An1

Sample description

FSS-NOL-06-01-051-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEP2005_1538.An1

Acquisition information

Start time:	06-Sep-2005 15:38:49
Live time:	2000
Real time:	2026
Dead time:	1.27 %
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: 2.0970E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0970E+03) =
4.7687E+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-Aug-2005 14:40:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1502

***** 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
74.56	174.	20.06	1.10	8.817E-03	72.87	6.400	2.324E+00	HG203
					74.81	9.600	1.295E+00	PB212
77.29	270.	12.52	1.10	9.638E-03	77.11	17.500	1.044E+00	PB212
					77.11	10.700	1.707E+00	PB214
86.67	84.	39.18	0.92	1.204E-02	86.45	32.740	PBC<MDA	EU155
93.37	89.	37.24	1.32	1.344E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.432E+00	TH234

129.14	80.	41.58	1.05	1.715E-02				
129.14	80.	41.58	1.05	1.715E-02	131.28	20.000	1.493E-01	PA234
185.88	93.	30.22	1.27	1.627E-02				
185.88	93.	30.22	1.27	1.627E-02	185.99	3.280	PBC<MDA	RA226
209.15	90.	31.25	1.00	1.520E-02				
238.72	764.	4.38	1.21	1.380E-02	238.63	43.100	8.275E-01	PB212
241.58	116.	27.61	1.22	1.367E-02	241.00	3.900	1.387E+00	RA224
					241.92	7.470	7.337E-01	PB214
277.49	71.	39.23	1.15	1.214E-02				
277.49	71.	39.23	1.15	1.214E-02	279.17	81.500	5.067E-02	HG203
295.36	192.	10.53	1.25	1.146E-02	295.22	19.200	5.626E-01	PB214
300.15	56.	28.83	1.26	1.129E-02				
328.09	46.	38.91	1.48	1.037E-02				
338.05	175.	17.03	1.49	1.007E-02	338.40	12.010	9.323E-01	AC228
352.21	299.	9.41	1.19	9.673E-03	351.99	37.100	5.359E-01	PB214
463.35	63.	21.96	2.01	7.367E-03				
463.35	63.	21.96	2.01	7.367E-03	463.51	10.000	5.417E-01	SB125
511.22	115.	20.44	1.42	6.688E-03	510.72	22.500	4.920E-01	TL208
583.21	256.	8.08	1.36	5.889E-03	583.14	86.000	3.249E-01	TL208
609.50	222.	9.09	1.35	5.648E-03	609.32	46.090	5.504E-01	BI214
727.62	34.	34.92	1.55	4.794E-03	727.17	11.800	PBC<MDA	BI212
911.39	187.	10.08	1.72	3.921E-03	911.07	29.000	1.058E+00	AC228
964.95	36.	25.46	1.72	3.731E-03	964.00	14.580	PBC<MDA	EU152
969.40	87.	13.01	1.72	3.716E-03	968.90	17.460	8.640E-01	AC228
1121.45	67.	18.70	1.21	3.280E-03	1120.28	15.040	8.744E-01	BI214
1461.14	680.	3.87	1.97	2.620E-03	1460.75	10.700	1.563E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.95	35.	16.90	2.07	2.225E-03	1764.51	15.920	6.351E-01	Bl214

********** 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	
186.32	93.37	530.	89.	0.044	111.72	1.319	U-235	I
417.91	209.15	322.	90.	0.045	93.74	1.004	AC-228	
554.63	277.49	250.	71.	0.035	117.68	1.149	NP-239	I
599.95	300.15	135.	47.	0.023	113.65	0.898	PB-212	M
655.85	328.09	122.	46.	0.023	116.74	1.481	AC-228	s
1931.09	965.05	24.	38.	0.019	73.19	1.715	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	149.20	74.81	497.	197.	0.098	51.81	1.098D
PB-212	153.80	77.11	541.	214.	0.107	40.97	1.100A
PA-234	257.73	129.07	560.	103.	0.051	102.22	1.500s

RA-226	371.79	186.09	494.	90.	0.045	104.47	1.500s
PB-212	476.89	238.63	178.	764.	0.382	13.14	1.215D
PB-214	483.47	241.92	282.	100.	0.050	77.18	1.217D
PB-214	590.36	295.35	192.	190.	0.095	40.87	1.325
AC-228	675.78	338.05	222.	175.	0.087	51.08	1.495s
PB-214	704.10	352.21	164.	299.	0.149	28.22	1.192s
SB-125	926.21	463.23	64.	58.	0.029	68.56	1.500s
TL-208	1022.21	511.22	125.	115.	0.058	61.32	1.419s
TL-208	1166.25	583.21	62.	255.	0.128	24.24	1.365
Bl-214	1218.85	609.50	67.	222.	0.111	27.28	1.351
Bl-212	1455.19	727.62	52.	34.	0.017	104.76	1.554s
AC-228	1822.93	911.39	42.	187.	0.093	30.23	1.724
AC-228	1938.01	968.90	29.	87.	0.044	41.41	1.718D
Bl-214	2243.29	1121.45	30.	67.	0.034	56.10	1.213s
K-40	2923.19	1461.14	3.	680.	0.340	11.60	1.968
Bl-214	3531.37	1764.95	0.	35.	0.017	50.71	2.073

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		7.7252E-02					
			477.56	7.725E-02	%(	4.452E-01	1.30E-01 G
K-40		1.5626E+01					
			1460.75	1.563E+01	(P	2.493E-01	6.04E-01 G
MN-54		-2.1113E-03					
			834.81	-2.111E-03	%(P	7.892E-02	2.27E-02 G
CO-57		1.8293E-02					
			122.07	1.829E-02	&(	5.324E-02	1.60E-02 G K
			136.43	4.385E-02	&	4.078E-01	1.21E-01 G
CO-60		-1.4921E-03					
			1332.51	-1.492E-03	&(P	5.877E-02	1.60E-02 G K
			1173.23	1.820E-03	%	6.561E-02	1.83E-02 G K
Sr-85		-1.8241E-02					
			514.00	-1.824E-02	%(	6.484E-02	1.93E-02 G
Kr-85		-3.9479E+02					
			513.99	-3.948E+02	%(	1.403E+03	4.18E+02 G
Y-88		-8.2204E-03					
			1836.01	-8.220E-03	%(P	5.535E-02	1.51E-02 G K

898.02-7.518E-04 & P 4.778E-02 1.29E-02 G

NB-94 1.7428E-03

871.10 1.743E-03 &(5.172E-02 1.45E-02 G K

702.50 1.561E-02 & 4.467E-02 1.33E-02 G K

Ag-108M 5.8413E-03

722.95 5.841E-03 &(5.158E-02 1.47E-02 G K

614.37-2.741E-02 & P 6.756E-02 2.03E-02 G

433.93-1.713E-02 % 5.230E-02 1.56E-02 G

CD-109 -1.2319E+00

88.04-1.232E+00 %(P 1.922E+00 5.86E-01 G

SN-113 2.3010E-04

391.71 2.301E-04 %(6.828E-02 1.97E-02 G K

255.04 2.204E-01 & 2.048E+00 6.06E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3713E-01						
		427.95	1.162E-02	&(P	1.413E-01	4.09E-02	G K
		600.77	8.437E-02	% P	1.850E-01	5.59E-02	G
		636.15	-5.992E-02	% P	3.961E-01	1.14E-01	G
		463.51	5.086E-01	(P	3.515E-01	1.19E-01	G
		176.29	-1.464E-01	% P	7.267E-01	2.17E-01	G
I-131	-1.9869E-02						
		364.48	-1.987E-02	%(	8.123E-02	2.41E-02	G K
		636.97	-1.429E-01	%	1.009E+00	2.90E-01	G
		284.29	1.515E-01	%	1.140E+00	3.37E-01	G
CS-134	-1.6863E-02						
		604.66	-1.686E-02	&(	5.754E-02	1.71E-02	G K
		795.76	3.201E-02	%	5.926E-02	1.82E-02	G
		569.29	3.976E-02	%	2.778E-01	8.03E-02	G
		801.84	5.342E-02	% P	5.941E-01	1.69E-01	G
CS-137	1.4678E-02						
		661.62	1.468E-02	&(	5.949E-02	1.75E-02	G
CE-139	-2.0450E-04						
		165.85	-2.045E-04	%(P	5.821E-02	1.73E-02	G
EU-152	5.3141E-02						
		121.78	5.314E-02	&(P	1.587E-01	4.78E-02	G K
		344.30	-1.384E-02	%	1.592E-01	4.67E-02	G
		1408.08	6.532E-02	%	2.076E-01	6.02E-02	G
		964.00	1.170E-02	% P	8.334E-01	2.43E-01	G
		1112.07	1.260E-01	%	4.250E-01	1.25E-01	G

778.90-5.003E-02 % P 3.658E-01 1.04E-01 G

EU-154 4.4279E-03

123.10 4.428E-03 &(P 1.282E-01 3.82E-02 G K

1274.80 4.523E-02 & 2.150E-01 6.24E-02 G

723.30 3.870E-02 & P 2.551E-01 7.36E-02 G

1004.80-7.408E-03 & 3.143E-01 8.74E-02 G

EU-155 1.3615E-01

86.45 1.361E-01 %(P 2.625E-01 7.96E-02 G K

105.31-2.338E-03 % 2.476E-01 7.36E-02 G

HG-203 3.0368E-02

279.17 3.037E-02 &(P 4.906E-02 1.50E-02 G K

72.87-1.114E+00 & 2.428E+00 7.36E-01 G

70.83-6.064E-01 % 4.101E+00 1.23E+00 G

82.50-3.039E-02 & 4.679E+00 1.40E+00 G

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

TL-208       3.2491E-01
                   583.14 3.249E-01  (P 4.998E-02 2.63E-02 G
                   510.72 4.920E-01 +   2.345E-01 1.01E-01 G

PB-212       8.2758E-01
                   238.63 8.276E-01  (  7.020E-02 3.62E-02 G K
                                        Energy duplication
                    77.11 8.276E-01 }   4.287E-01 1.13E-01 G
                    74.81 1.492E+00 + P 8.092E-01 2.62E-01 G

PB-214       5.5337E-01
                   351.99 5.359E-01 @(P 1.121E-01 5.05E-02 G K
                   295.22 5.562E-01  (  1.970E-01 7.58E-02 G
                                        Energy duplication
                    77.11 9.595E-02 }   9.622E-01 2.30E-01 G
                   241.92 6.328E-01  (  5.114E-01 1.63E-01 G

BI-212       3.8336E-01
                   727.17 3.834E-01 *(  4.145E-01 1.34E-01 G K
                  1620.56 3.539E-01 % P 1.620E+00 4.48E-01 G
                   785.42 9.628E-02 % P 2.566E+00 7.24E-01 G

BI-214       5.7216E-01
                   609.32 5.504E-01  (  1.008E-01 5.01E-02 G K
                  1764.51 6.351E-01  (P 1.341E-01 1.08E-01 G
                  1120.28 8.744E-01 +   3.685E-01 1.64E-01 G

RA-224       9.4141E-01
                   241.00 9.414E-01 %(P 1.382E+00 4.23E-01 G
```

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RA-226       1.0826E+00
                 185.99 1.083E+00  (P 1.284E+00 3.96E-01 G

AC-228       9.7473E-01
                 911.07 1.058E+00  (P 1.869E-01 1.07E-01 G K
                 968.90 8.652E-01  (P 2.754E-01 1.19E-01 G
                 338.40 9.323E-01 @(  3.850E-01 1.59E-01 G

TH-227      -2.1319E-01
                 236.00-2.132E-01 &(P 4.941E-01 1.49E-01 G K
                 256.25-8.418E-02 &   6.499E-01 1.93E-01 G

PA-234       1.2564E-01
                  98.44 7.275E-02 %(  2.275E-01 6.85E-02 G K
                 946.00-6.636E-02 &   3.360E-01 9.79E-02 G
                 131.28 1.920E-01 &(  2.114E-01 6.54E-02 G
                  94.67-1.199E-01 %   4.701E-01 1.41E-01 G
                 883.24-1.843E-02 %   4.314E-01 1.21E-01 G
                 926.70 2.365E-02 &   5.232E-01 1.48E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26-2.050E-02 % 4.414E-01 1.26E-01 G

TH-234 3.4137E-01
63.29 3.414E-01 %(P 4.930E+00 1.47E+00 G K
92.80 1.583E+00 % 2.481E+00 7.57E-01 G
92.38 1.389E-01 % P 2.926E+00 8.74E-01 G

AM-241 5.3607E-02
59.54 5.361E-02 %(6.889E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	7.1426E-02	7.7252E-02	3.9052E-01	3.9054E-01	4.116E-01
K-40		1.5626E+01	1.5626E+01	1.8128E+00	2.0137E+00	
MN-54	#A	-2.0832E-03	-2.1113E-03	9.3327E-02	9.3327E-02	7.787E-02
CO-57	#B	1.8011E-02	1.8293E-02	4.8130E-02	4.8141E-02	5.242E-02
CO-60	#B	-1.4889E-03	-1.4921E-03	6.1057E-02	6.1057E-02	5.864E-02

Sr-85	#A	-1.7100E-02	-1.8241E-02	5.7955E-02	5.7964E-02	6.078E-02
Kr-85	#A	-3.9477E+02	-3.9479E+02	1.2543E+03	1.2545E+03	1.403E+03
Y-88	#B	-7.9038E-03	-8.2204E-03	4.5499E-02	4.5501E-02	5.322E-02
NB-94	#B	1.7428E-03	1.7428E-03	4.3472E-02	4.3472E-02	5.172E-02
Ag-108M	#B	5.8407E-03	5.8413E-03	4.4202E-02	4.4203E-02	5.158E-02
CD-109	#A	-1.2206E+00	-1.2319E+00	1.8172E+00	1.8185E+00	1.904E+00
SN-113	#B	2.2188E-04	2.3010E-04	5.9235E-02	5.9235E-02	6.584E-02
SB-125	#B	1.3656E-01	1.3713E-01	9.6521E-02	9.6828E-02	1.407E-01
I-131	#B	-1.1803E-02	-1.9869E-02	7.2219E-02	7.2228E-02	4.825E-02
CS-134	#B	-1.6770E-02	-1.6863E-02	5.1264E-02	5.1273E-02	5.722E-02
CS-137	#A	1.4672E-02	1.4678E-02	5.2437E-02	5.2444E-02	5.947E-02
CE-139	#A	-1.9836E-04	-2.0450E-04	2.4612E+00	2.4612E+00	5.646E-02
EU-152	#B	5.3093E-02	5.3141E-02	1.4340E-01	1.4343E-01	1.586E-01
EU-154	#B	4.4219E-03	4.4279E-03	1.1457E-01	1.1457E-01	1.281E-01
EU-155	#B	1.3584E-01	1.3615E-01	2.3895E-01	2.3907E-01	2.619E-01
HG-203	#B	2.7758E-02	3.0368E-02	4.5116E-02	4.5148E-02	4.484E-02
TL-208		3.2491E-01	3.2491E-01	7.8881E-02	8.0961E-02	
PB-212		8.2758E-01	8.2758E-01	1.0871E-01	1.1821E-01	
PB-214		5.5337E-01	5.5337E-01	1.5636E-01	1.5941E-01	
BI-212	#A	3.8336E-01	3.8336E-01	4.0160E-01	4.0218E-01	4.145E-01
BI-214		5.7216E-01	5.7216E-01	1.5606E-01	1.5933E-01	
RA-224	#A	9.4141E-01	9.4141E-01	1.2684E+00	1.2695E+00	1.382E+00
RA-226	#A	1.0826E+00	1.0826E+00	1.1873E+00	1.1888E+00	1.284E+00
AC-228		9.7473E-01	9.7473E-01	2.3522E-01	2.4149E-01	
TH-227	#B	-2.1319E-01	-2.1319E-01	4.5338E-01	4.5354E-01	4.941E-01
PA-234	#B	1.2564E-01	1.2564E-01	1.2843E-01	1.2862E-01	2.275E-01
TH-234	#B	3.4137E-01	3.4137E-01	4.4164E+00	4.4164E+00	4.930E+00
AM-241	#A	5.3606E-02	5.3607E-02	6.1655E-01	6.1656E-01	6.889E-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) 1.8878319E+01 pCi/gm

Total Decayed Activity (1119.8 to 1999.0 keV) 1.8878319E+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_6SEP2005_1617.An1

Sample description

FSS-NOL-06-01-056-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEP2005_1617.An1

Acquisition information

Start time:	06-Sep-2005 16:17:27
Live time:	2000
Real time:	2026
Dead time:	1.27 %
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: 1.9620E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9620E+03) =
5.0968E+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-Aug-2005 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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1577

***** 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	210.	15.84	1.10	8.847E-03	70.83	3.520	5.948E+00	HG203
					74.81	9.600	1.703E+00	PB212
77.05	169.	16.02	1.10	9.541E-03	77.11	17.500	1.015E+00	PB212
					77.11	10.700	1.661E+00	PB214
93.03	129.	35.84	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.220E+00	TH234
93.03	121.	38.29	1.50	1.325E-02	92.38	2.570	PBC<MDA	TH234

					92.80	3.000	PBC<MDA	TH234
185.68	138.	28.35	0.96	1.628E-02				
185.68	138.	28.35	0.96	1.628E-02	185.99	3.280	1.723E+00	RA226
238.75	822.	4.17	1.21	1.380E-02	238.63	43.100	9.519E-01	PB212
242.19	93.	24.09	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.252E-01	PB214
295.38	201.	14.74	1.37	1.146E-02	295.22	19.200	6.283E-01	PB214
328.74	76.	28.69	1.03	1.035E-02				
338.61	159.	17.90	0.98	1.005E-02	338.40	12.010	9.041E-01	AC228
352.09	286.	8.53	1.26	9.676E-03	351.99	37.100	5.488E-01	PB214
462.96	85.	22.72	1.21	7.373E-03				
462.96	85.	22.72	1.21	7.373E-03	463.51	10.000	7.837E-01	SB125
511.10	151.	15.58	1.21	6.690E-03	510.72	22.500	6.904E-01	TL208
583.43	258.	9.44	1.61	5.887E-03	583.14	86.000	3.508E-01	TL208
609.46	254.	8.94	1.51	5.648E-03	609.32	46.090	6.708E-01	BI214
727.69	78.	19.65	1.10	4.791E-03	727.17	11.800	9.448E-01	BI212
911.34	163.	10.04	1.51	3.921E-03	911.07	29.000	9.851E-01	AC228
968.98	131.	16.85	1.66	3.718E-03	968.90	17.460	1.394E+00	AC228
1120.60	50.	29.49	1.00	3.282E-03	1120.28	15.040	7.002E-01	BI214
1461.16	737.	3.78	2.07	2.620E-03	1460.75	10.700	1.811E+01	K40
1765.27	38.	16.22	0.81	2.225E-03	1764.51	15.920	7.371E-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
657.15	328.74	150.	76.	0.038	86.06	1.025	LA-140 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	149.20	74.81	466.	210.	0.105	47.53	1.098D
PB-212	153.80	77.11	492.	169.	0.084	48.05	1.100A
TH-234	185.64	93.03	1042.	121.	0.061	114.86	1.500s
TH-234	185.63	93.03	1003.	129.	0.064	107.53	1.500s
RA-226	372.07	186.23	557.	100.	0.050	99.56	1.500s
PB-212	476.89	238.63	177.	821.	0.411	12.52	1.215D
PB-214	483.47	241.92	264.	99.	0.050	75.77	1.217D
PB-214	590.41	295.38	241.	201.	0.100	44.22	1.368
AC-228	676.90	338.61	202.	159.	0.079	53.71	0.984
PB-214	703.86	352.09	125.	286.	0.143	25.60	1.260
SB-125	926.31	463.28	97.	56.	0.028	81.61	1.500s

TL-208	1021.99	511.10	115.	151.	0.075	46.74	1.210s
TL-208	1166.69	583.43	94.	258.	0.129	28.33	1.606
Bl-214	1218.77	609.46	81.	254.	0.127	26.82	1.513
Bl-212	1455.34	727.69	48.	78.	0.039	58.95	1.096s
AC-228	1822.83	911.34	36.	163.	0.081	30.13	1.511s
AC-228	1938.17	968.98	82.	131.	0.066	50.56	1.655
Bl-214	2241.60	1120.60	53.	50.	0.025	88.47	1.001s
K-40	2923.22	1461.16	10.	737.	0.369	11.35	2.072
Bl-214	3532.00	1765.27	0.	38.	0.019	48.67	0.812s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		2.5652E-01					
			477.56	2.565E-01	%(	4.771E-01	1.46E-01 G
K-40		1.8108E+01					
			1460.75	1.811E+01	(P	4.240E-01	6.85E-01 G
MN-54		-2.2233E-02					
			834.81	-2.223E-02	&(P	6.799E-02	2.02E-02 G
CO-57		-1.4019E-02					
			122.07	-1.402E-02	%(	6.650E-02	2.00E-02 G K
			136.43	-1.007E-01	%	5.208E-01	1.56E-01 G
CO-60		8.0306E-04					
			1332.51	8.031E-04	&(P	5.778E-02	1.56E-02 G K
			1173.23	2.376E-02	%	7.407E-02	2.19E-02 G K
Sr-85		-1.4390E-02					
			514.00	-1.439E-02	%(	7.068E-02	2.09E-02 G
Kr-85		-3.0953E+02					
			513.99	-3.095E+02	%(	1.529E+03	4.53E+02 G
Y-88		-2.2027E-05					
			1836.01	-2.203E-05	&(P	9.115E-02	2.49E-02 G K

898.02-1.164E-03 % P 8.780E-02 2.50E-02 G

NB-94 -7.0463E-05

871.10-7.046E-05 &(4.330E-02 1.18E-02 G K

702.50 0.000E+00 % 7.083E-02 2.04E-02 G K

Ag-108M -1.3961E-02

722.95-1.396E-02 %(6.204E-02 1.81E-02 G K

614.37-2.234E-02 % P 5.790E-02 1.73E-02 G

433.93 1.587E-02 % 4.879E-02 1.45E-02 G

CD-109 9.3167E-03

88.04 9.317E-03 &(P 2.268E+00 6.76E-01 G

SN-113 -1.0840E-02

391.71-1.084E-02 &(7.741E-02 2.27E-02 G K

255.04-1.674E-01 & 2.350E+00 6.95E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.7476E-01						
		427.95	5.509E-02	%(	P 1.557E-01	4.65E-02	G K
		600.77	7.041E-02	&	P 2.066E-01	6.11E-02	G
		636.15	4.595E-02	&	P 4.701E-01	1.35E-01	G
		463.51	5.290E-01	@(	P 4.554E-01	1.48E-01	G
		176.29	5.418E-02	%	P 7.805E-01	2.32E-01	G
I-131	2.0280E-02						
		364.48	2.028E-02	&(	8.822E-02	2.61E-02	G K
		636.97	-1.463E-02	&	1.294E+00	3.69E-01	G
		284.29	1.173E-01	&	1.267E+00	3.74E-01	G
CS-134	-8.1496E-03						
		604.66	-8.150E-03	&(	6.548E-02	1.91E-02	G K
		795.76	4.331E-02	%	6.476E-02	2.02E-02	G
		569.29	-3.079E-02	&	3.039E-01	8.74E-02	G
		801.84	1.187E-01	%	P 6.240E-01	1.81E-01	G
CS-137	9.3766E-03						
		661.62	9.377E-03	%(	6.528E-02	1.89E-02	G
CE-139	-1.1639E-02						
		165.85	-1.164E-02	%(	P 6.071E-02	1.82E-02	G
EU-152	-4.4096E-02						
		121.78	-4.410E-02	%(	P 1.975E-01	5.93E-02	G K
		344.30	-1.005E-02	%	1.678E-01	4.91E-02	G
		1408.08	8.470E-02	%	2.268E-01	6.70E-02	G
		964.00	-1.168E-01	%	P 5.104E-01	1.49E-01	G
		1112.07	-7.003E-02	%	5.250E-01	1.50E-01	G

778.90 1.240E-02 % P 5.284E-01 1.51E-01 G

EU-154 3.8518E-02

123.10 3.852E-02 %(P 1.310E-01 3.94E-02 G K

1274.80 7.453E-03 % 2.162E-01 6.06E-02 G

723.30-6.619E-02 % P 2.995E-01 8.75E-02 G

1004.80-2.906E-02 % 3.756E-01 1.07E-01 G

EU-155 6.3918E-02

86.45 6.392E-02 %(P 2.747E-01 8.25E-02 G K

105.31-4.793E-02 % 2.570E-01 7.69E-02 G

HG-203 -3.0963E-03

279.17-3.096E-03 %(P 6.280E-02 1.85E-02 G K

72.87-1.219E+00 & 2.577E+00 7.81E-01 G

70.83-2.655E+00 % 4.391E+00 1.34E+00 G

82.50-9.169E-01 % 4.726E+00 1.42E+00 G

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

TL-208       3.5081E-01
                   583.14 3.508E-01  (P 6.512E-02 3.32E-02 G
                   510.72 6.904E-01 +   2.409E-01 1.08E-01 G

PB-212       9.6948E-01
                   238.63 9.509E-01  (  7.483E-02 3.97E-02 G K
                                        Energy duplication
                    77.11 6.956E-01 }   4.375E-01 1.11E-01 G
                    74.81 1.703E+00 + P 8.378E-01 2.74E-01 G

PB-214       5.8686E-01
                   351.99 5.488E-01  (P 1.051E-01 4.69E-02 G K
                   295.22 6.283E-01  (  2.349E-01 9.27E-02 G
                                        Energy duplication
                    77.11 4.987E-01 }   9.941E-01 2.53E-01 G
                   241.92 6.694E-01  (  5.295E-01 1.69E-01 G

BI-212       9.4481E-01
                   727.17 9.448E-01 @(  4.277E-01 1.86E-01 G K
                  1620.56-3.511E-02 & P 1.996E+00 5.13E-01 G
                   785.42 5.635E-01 % P 2.832E+00 8.23E-01 G

BI-214       6.9027E-01
                   609.32 6.708E-01  (  1.184E-01 6.00E-02 G K
                  1764.51 7.371E-01  (P 1.433E-01 1.20E-01 G
                  1120.28 7.002E-01  (  5.101E-01 2.07E-01 G

RA-224      -1.2296E-03
                   241.00-1.230E-03 %(P 1.463E+00 4.33E-01 G
```

```
RA-226       1.2960E+00
                 185.99 1.296E+00 @(P 1.455E+00 4.49E-01 G

AC-228       9.6140E-01
                 911.07 9.851E-01 @(P 1.865E-01 9.91E-02 G K
                 968.90 1.394E+00 + P 4.755E-01 2.35E-01 G
                 338.40 9.041E-01  (  3.934E-01 1.62E-01 G

TH-227      -2.9716E-01
                 236.00-2.972E-01 &(P 5.593E-01 1.70E-01 G K
                 256.25 9.450E-04 &   6.689E-01 1.97E-01 G

PA-234      -1.3720E-02
                  98.44-1.372E-02 &(  2.653E-01 7.91E-02 G K
                 946.00-2.905E-02 &   3.332E-01 9.51E-02 G
                 131.28 7.059E-02 &   2.540E-01 7.64E-02 G
                  94.67-1.192E-01 %   4.956E-01 1.49E-01 G
                 883.24 0.000E+00 %   5.206E-01 1.46E-01 G
                 926.70-5.795E-02 %   4.964E-01 1.41E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	-1.910E-02	&	5.000E-01	1.43E-01	G
TH-234	2.0595E+00						
		63.29	1.674E+00	%(P	4.806E+00	1.45E+00	G K
		92.80	2.220E+00	(	2.588E+00	7.96E-01	G
		92.38	2.457E+00	(P	3.098E+00	9.50E-01	G
AM-241	-1.8391E-01						
		59.54	-1.839E-01	&(	7.268E-01	2.18E-01	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes: 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	2.3713E-01	2.5652E-01	4.3701E-01	4.3725E-01	4.411E-01
K-40		1.8108E+01	1.8108E+01	2.0549E+00	2.2924E+00	
MN-54	#A	-2.1936E-02	-2.2233E-02	6.2432E-02	6.2445E-02	6.708E-02
CO-57	#B	-1.3803E-02	-1.4019E-02	5.9864E-02	5.9869E-02	6.548E-02
CO-60	#B	8.0131E-04	8.0306E-04	4.6740E-02	4.6740E-02	5.766E-02

Sr-85 #A	-1.3489E-02	-1.4390E-02	6.2765E-02	6.2770E-02	6.625E-02
Kr-85 #A	-3.0951E+02	-3.0953E+02	1.3578E+03	1.3580E+03	1.529E+03
Y-88 #B	-2.1177E-05	-2.2027E-05	9.8044E-04	9.8044E-04	8.763E-02
NB-94 #B	-7.0463E-05	-7.0463E-05	3.5275E-02	3.5275E-02	4.330E-02
Ag-108M#B	-1.3959E-02	-1.3961E-02	5.4443E-02	5.4449E-02	6.204E-02
CD-109 #A	9.2309E-03	9.3167E-03	2.0280E+00	2.0280E+00	2.247E+00
SN-113 #B	-1.0452E-02	-1.0840E-02	6.8239E-02	6.8242E-02	7.464E-02
SB-125 #F	1.7403E-01	1.7476E-01	1.4653E-01	1.4686E-01	1.550E-01
I-131 #B	1.2034E-02	2.0280E-02	7.8346E-02	7.8354E-02	5.235E-02
CS-134 #B	-8.1044E-03	-8.1496E-03	5.7341E-02	5.7343E-02	6.512E-02
CS-137 #A	9.3730E-03	9.3766E-03	5.6759E-02	5.6762E-02	6.525E-02
CE-139 #A	-1.1289E-02	-1.1639E-02	5.6635E-02	5.6639E-02	5.888E-02
EU-152 #B	-4.4057E-02	-4.4096E-02	1.8797E-01	1.8799E-01	1.973E-01
EU-154 #B	3.8466E-02	3.8518E-02	1.1827E-01	1.1829E-01	1.308E-01
EU-155 #B	6.3770E-02	6.3918E-02	2.4761E-01	2.4763E-01	2.741E-01
HG-203 #B	-2.8296E-03	-3.0963E-03	5.8067E-02	5.8068E-02	5.739E-02
TL-208	3.5081E-01	3.5081E-01	9.9533E-02	1.0146E-01	
PB-212	9.6948E-01	9.6948E-01	1.2135E-01	1.3299E-01	
PB-214	5.8686E-01	5.8686E-01	1.5044E-01	1.5401E-01	
BI-212 #	9.4481E-01	9.4481E-01	5.5693E-01	5.5944E-01	
BI-214	6.9027E-01	6.9027E-01	1.8514E-01	1.8915E-01	
RA-224 #A	-1.2296E-03	-1.2296E-03	1.5320E+00	1.5320E+00	1.463E+00
RA-226 #A	1.2960E+00	1.2960E+00	1.3476E+00	1.3496E+00	1.455E+00
AC-228	9.6140E-01	9.6140E-01	2.9003E-01	2.9501E-01	
TH-227 #B	-2.9716E-01	-2.9716E-01	5.1426E-01	5.1453E-01	5.593E-01
PA-234 #B	-1.3720E-02	-1.3720E-02	2.3728E-01	2.3728E-01	2.653E-01
TH-234 #B	2.0595E+00	2.0595E+00	2.0879E+00	2.0910E+00	4.806E+00
AM-241 #A	-1.8391E-01	-1.8391E-01	6.5514E-01	6.5522E-01	7.268E-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) 2.2611721E+01 pCi/gm

Total Decayed Activity (277.7 to 1999.0 keV) 2.2611721E+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_6SEPT2005_1127.An1

Sample description

FSS-NOL-06-01-045-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEPT2005_1127.An1

Acquisition information

Start time:	06-Sep-2005 11:42:43
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: 2.0670E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0670E+03) =
4.8379E+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-Aug-2005 13:29:00
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: 0.1149

***** 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	125.	36.72	1.50	8.847E-03				
74.80	125.	36.72	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.07	244.	18.80	1.50	9.541E-03	77.11	10.700	1.561E+00	PB214
					77.11	17.500	9.547E-01	PB212
77.07	244.	18.80	1.50	9.541E-03	77.11	10.700	1.561E+00	PB214
					77.11	17.500	9.547E-01	PB212
86.63	124.	37.59	0.87	1.203E-02	86.45	32.740	PBC<MDA	EU155

93.04	108.	36.14	1.57	1.338E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.759E+00	TH234
185.87	103.	30.72	1.34	1.627E-02				
185.87	103.	30.72	1.34	1.627E-02	185.99	3.280	PBC<MDA	RA226
209.54	94.	30.96	1.67	1.518E-02				
238.75	843.	5.64	1.15	1.380E-02	238.63	43.100	9.261E-01	PB212
					241.00	3.900	1.030E+01	RA224
270.03	86.	31.71	1.01	1.244E-02				
295.02	195.	13.40	1.55	1.147E-02				
295.02	195.	13.40	1.55	1.147E-02	295.22	19.200	5.785E-01	PB214
327.85	37.	37.64	1.66	1.037E-02				
338.62	179.	14.70	1.13	1.005E-02	338.40	12.010	9.691E-01	AC228
351.98	285.	11.17	1.31	9.679E-03				
351.98	285.	11.17	1.31	9.679E-03	351.99	37.100	5.186E-01	PB214
462.99	50.	27.59	1.50	7.365E-03	463.51	10.000	4.447E-01	SB125
510.90	121.	18.06	1.44	6.693E-03	510.72	22.500	5.269E-01	TL208
583.00	266.	9.11	1.29	5.891E-03	583.14	86.000	3.423E-01	TL208
609.24	218.	11.14	1.57	5.650E-03	609.32	46.090	5.474E-01	BI214
661.45	37.	39.75	1.64	5.231E-03	661.62	84.620	5.498E-02	CS137
727.01	40.	37.58	1.19	4.795E-03	727.17	11.800	4.623E-01	BI212
769.08	45.	29.06	0.90	4.557E-03				
785.50	23.	37.36	1.59	4.472E-03	785.42	2.000	PBC<MDA	BI212
794.82	57.	25.08	1.25	4.424E-03				
794.82	57.	25.08	1.25	4.424E-03	795.76	85.400	9.997E-02	CS134
911.17	166.	9.78	1.48	3.922E-03	911.07	29.000	9.500E-01	AC228
967.95	116.	16.54	2.64	3.718E-03	964.00	14.580	1.394E+00	EU152
					968.90	17.460	1.168E+00	AC228
1119.67	57.	33.84	1.63	3.283E-03	1120.28	15.040	7.547E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.65	606.	4.10	2.13	2.621E-03	1460.75	10.700	1.413E+01	K40
1764.88	37.	16.44	1.03	2.225E-03	1764.51	15.920	6.812E-01	Bl214

********** 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	
172.85	86.63	826.	124.	0.062	112.78	0.874	NP-237	l
185.65	93.04	638.	108.	0.054	108.42	1.567	TH-234	l
418.70	209.54	312.	94.	0.047	92.87	1.675	AC-228	s
477.14	238.75	1143.	142.	0.071	104.45	1.155	PB-212	
539.71	270.03	245.	86.	0.043	95.13	1.005	AC-228	
655.37	327.85	85.	37.	0.019	112.91	1.658	AC-228	s
1538.15	769.08	42.	45.	0.023	75.72	0.903	Bl-214	sM

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	
PB-212	149.17	74.80	1051.	125.	0.063	110.17	1.500	s

PB-214	153.80	77.11	928.	244.	0.122	56.39	1.500D
PB-212	153.80	77.11	928.	244.	0.122	56.39	1.500D
RA-226	371.58	185.98	498.	107.	0.054	89.12	1.500
PB-212	477.09	238.73	440.	671.	0.335	17.61	1.500
PB-214	590.29	295.32	220.	167.	0.084	44.17	1.500s
AC-228	676.92	338.62	166.	179.	0.090	44.11	1.128s
PB-214	703.66	351.99	132.	242.	0.121	27.80	1.500D
SB-125	925.73	462.99	77.	50.	0.025	82.76	1.500s
TL-208	1021.58	510.90	106.	121.	0.061	54.17	1.439s
TL-208	1165.82	583.00	87.	265.	0.133	27.33	1.287
BI-214	1218.33	609.24	93.	218.	0.109	33.43	1.569
CS-137	1322.80	661.45	65.	37.	0.019	119.25	1.638
BI-212	1453.98	727.01	62.	40.	0.020	112.75	1.192
BI-212	1571.01	785.50	26.	23.	0.012	112.09	1.594
CS-134	1589.80	794.89	35.	37.	0.019	83.17	1.601
AC-228	1822.48	911.17	28.	165.	0.083	29.33	1.482
AC-228	1936.10	967.95	63.	116.	0.058	49.61	2.639s
BI-214	2239.74	1119.67	70.	57.	0.029	101.51	1.629

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2922.21	1460.65	3.	606.	0.303	12.29	2.131
Bl-214	3531.22	1764.88	0.	37.	0.018	49.32	1.032s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		8.0724E-02					
			477.56	8.072E-02	&(	4.697E-01	1.37E-01 G
K-40		1.4129E+01					
			1460.75	1.413E+01	(P	2.498E-01	5.79E-01 G
MN-54		1.2114E-02					
			834.81	1.211E-02	%(P	5.142E-02	1.49E-02 G
CO-57		-2.3383E-02					
			122.07	-2.338E-02	&(	5.968E-02	1.80E-02 G K
			136.43	-2.651E-03	%	4.604E-01	1.37E-01 G
CO-60		1.1932E-02					
			1332.51	1.193E-02	%(P	5.778E-02	1.65E-02 G K
			1173.23	2.350E-02	&	7.838E-02	2.32E-02 G K

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Sr-85       -1.6056E-02
                514.00-1.606E-02 %(  6.324E-02 1.88E-02 G

Kr-85       -3.4819E+02
                513.99-3.482E+02 %(  1.370E+03 4.07E+02 G

Y-88        -2.0046E-03
               1836.01-2.005E-03 %(P 4.373E-02 1.09E-02 G K
                898.02 1.118E-02 & P 5.394E-02 1.55E-02 G

NB-94        0.0000E+00
                871.10 0.000E+00 %(  6.505E-02 1.84E-02 G K
                702.50-1.074E-02 %   4.488E-02 1.31E-02 G K

Ag-108M     -2.3565E-02
                722.95-2.356E-02 &(  7.073E-02 2.11E-02 G K
                614.37-9.426E-03 % P 5.208E-02 1.51E-02 G
                433.93-9.982E-03 %   5.468E-02 1.61E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	8.4110E-02						
		88.04	8.411E-02	%(P	2.207E+00	6.59E-01	G
SN-113	1.2164E-02						
		391.71	1.216E-02	&(	6.148E-02	1.81E-02	G K
		255.04	3.501E-01	&	2.168E+00	6.44E-01	G
SB-125	1.1855E-01						
		427.95	8.355E-03	%(P	1.610E-01	4.67E-02	G K
		600.77	-2.483E-02	& P	2.513E-01	7.21E-02	G
		636.15	6.634E-02	& P	3.768E-01	1.09E-01	G
		463.51	4.447E-01	(P	3.875E-01	1.26E-01	G
		176.29	6.539E-02	& P	6.434E-01	1.91E-01	G
I-131	-1.3611E-02						
		364.48	-1.361E-02	%(	8.744E-02	2.57E-02	G K
		636.97	6.884E-02	%	7.779E-01	2.18E-01	G
		284.29	-1.057E-01	%	1.201E+00	3.54E-01	G
CS-134	3.0277E-02						
		604.66	0.000E+00	%(	1.191E-01	3.52E-02	G K
		795.76	6.488E-02	(	5.253E-02	1.80E-02	G
		569.29	-1.314E-02	%	2.313E-01	6.51E-02	G
		801.84	-7.373E-02	& P	6.085E-01	1.74E-01	G
CS-137	5.4980E-02						
		661.62	5.498E-02	(	5.945E-02	2.18E-02	G
CE-139	-1.1142E-02						
		165.85	-1.114E-02	%(P	5.427E-02	1.62E-02	G

EU-152 -3.6927E-02

121.78-3.693E-02 &(P 1.717E-01 5.15E-02 G K

344.30-3.578E-02 % 1.592E-01 4.72E-02 G

1408.08 1.837E-02 % 2.385E-01 6.46E-02 G

964.00 6.238E-02 & P 6.239E-01 1.81E-01 G

1112.07 1.108E-01 % 3.780E-01 1.10E-01 G

778.90-1.693E-02 & P 3.308E-01 9.21E-02 G

EU-154 3.8837E-03

123.10 3.884E-03 &(P 1.138E-01 3.38E-02 G K

1274.80 0.000E+00 & 2.370E-01 6.68E-02 G

723.30 6.051E-03 & P 4.126E-01 1.20E-01 G

1004.80 7.183E-02 % 3.122E-01 9.05E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.2441E-01						
		86.45	1.244E-01	%(P	2.461E-01	7.46E-02	G K
		105.31	7.740E-02	%	2.599E-01	7.83E-02	G
HG-203	2.3544E-02						
		279.17	2.354E-02	%(P	4.790E-02	1.45E-02	G K
		72.87	-6.845E-01	%	2.278E+00	6.87E-01	G
		70.83	-8.443E-01	%	3.847E+00	1.16E+00	G
		82.50	1.670E-01	%	4.315E+00	1.29E+00	G
TL-208	3.4228E-01						
		583.14	3.423E-01	(P	5.954E-02	3.12E-02	G
		510.72	5.269E-01	+	2.196E-01	9.51E-02	G
PB-212	7.3721E-01						
		238.63	7.372E-01	(	1.103E-01	4.33E-02	G K
					Energy duplication		
		77.11	9.547E-01	+	5.665E-01	1.79E-01	G
		74.81	9.652E-01	+ P	1.184E+00	3.63E-01	G
PB-214	4.5986E-01						
					Energy duplication		
		351.99	4.408E-01	(P	1.023E-01	4.09E-02	G K
		295.22	4.967E-01	(	2.131E-01	7.31E-02	G
					Energy duplication		
		77.11	1.561E+00	+	9.266E-01	2.93E-01	G
		241.92	-3.499E-02	%	7.919E-01	2.36E-01	G
BI-212	6.4098E-01						
		727.17	4.623E-01	(	4.554E-01	1.74E-01	G K

1620.56-5.168E-02 % P 1.535E+00 3.78E-01 G
785.42 1.695E+00 (P 1.938E+00 6.34E-01 G

BI-214 6.1549E-01
609.32 5.474E-01 (1.196E-01 6.10E-02 G K
1764.51 6.812E-01 (P 1.360E-01 1.12E-01 G
1120.28 7.547E-01 (5.521E-01 2.55E-01 G

RA-224 3.9374E-01
241.00 3.937E-01 %(P 1.233E+00 3.70E-01 G

RA-226 1.3126E+00
185.99 1.313E+00 (P 1.307E+00 4.06E-01 G

AC-228 1.0190E+00
911.07 9.500E-01 (P 1.566E-01 9.30E-02 G K
968.90 1.168E+00 @(P 3.999E-01 1.93E-01 G
338.40 9.691E-01 *(3.395E-01 1.43E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.5055E-01						
		236.00	-1.505E-01	%(	P	4.880E-01	1.47E-01 G K
		256.25	1.319E-01	&		5.153E-01	1.54E-01 G
PA-234	3.1141E-03						
		98.44	3.114E-03	&(		2.529E-01	7.53E-02 G K
		946.00	-7.961E-02	%		3.283E-01	9.62E-02 G
		131.28	-1.952E-02	&		2.479E-01	7.39E-02 G
		94.67	-1.181E-01	&		4.572E-01	1.38E-01 G
		883.24	1.116E-02	%		4.371E-01	1.22E-01 G
		926.70	-3.431E-02	%		4.341E-01	1.21E-01 G
		569.26	1.355E-02	%		4.203E-01	1.20E-01 G
TH-234	2.7220E-01						
		63.29	2.722E-01	%(	P	4.606E+00	1.37E+00 G K
		92.80	1.539E+00	%		2.405E+00	7.34E-01 G
		92.38	-1.452E-01	%	P	2.861E+00	8.53E-01 G
AM-241	-9.4755E-03						
		59.54	-9.476E-03	%(		6.849E-01	2.04E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	7.4747E-02	8.0724E-02	4.1248E-01	4.1251E-01	4.349E-01
K-40	1.4129E+01	1.4129E+01	1.7371E+00	1.9095E+00	
MN-54 #A	1.1956E-02	1.2114E-02	4.4842E-02	4.4847E-02	5.075E-02
CO-57 #B	-2.3030E-02	-2.3383E-02	5.4101E-02	5.4116E-02	5.878E-02
CO-60 #B	1.1907E-02	1.1932E-02	4.9439E-02	4.9444E-02	5.766E-02
Sr-85 #A	-1.5070E-02	-1.6056E-02	5.6344E-02	5.6351E-02	5.936E-02
Kr-85 #A	-3.4818E+02	-3.4819E+02	1.2210E+03	1.2212E+03	1.370E+03
Y-88 #B	-1.9288E-03	-2.0046E-03	3.3512E-02	3.3513E-02	4.208E-02
NB-94 #B	0.0000E+00	0.0000E+00	5.5273E-02	5.5273E-02	6.505E-02
Ag-108M#B	-2.3563E-02	-2.3565E-02	6.3261E-02	6.3275E-02	7.072E-02
CD-109 #A	8.3351E-02	8.4110E-02	1.9765E+00	1.9765E+00	2.187E+00
SN-113 #B	1.1737E-02	1.2164E-02	5.4222E-02	5.4227E-02	5.933E-02
SB-125 #B	1.1807E-01	1.1855E-01	1.0116E-01	1.0137E-01	1.603E-01
I-131 #B	-8.1658E-03	-1.3611E-02	7.7212E-02	7.7215E-02	5.246E-02
CS-134 #B	3.0112E-02	3.0277E-02	2.5181E-02	2.5238E-02	1.185E-01
CS-137 A	5.4959E-02	5.4980E-02	6.5561E-02	6.5634E-02	
CE-139 #A	-1.0814E-02	-1.1142E-02	5.0599E-02	5.0603E-02	5.267E-02
EU-152 #B	-3.6894E-02	-3.6927E-02	1.6445E-01	1.6446E-01	1.716E-01
EU-154 #B	3.8786E-03	3.8837E-03	1.0143E-01	1.0143E-01	1.137E-01
EU-155 #B	1.2413E-01	1.2441E-01	2.2393E-01	2.2403E-01	2.455E-01
HG-203 #B	2.1557E-02	2.3544E-02	4.3616E-02	4.3636E-02	4.386E-02
TL-208	3.4228E-01	3.4228E-01	9.3674E-02	9.5623E-02	

PB-212 #	7.3721E-01	7.3721E-01	1.2979E-01	1.3622E-01	1.103E-01
PB-214 #	4.5986E-01	4.5986E-01	1.2005E-01	1.2280E-01	1.023E-01
BI-212	6.4098E-01	6.4098E-01	5.0992E-01	5.1119E-01	
BI-214	6.1549E-01	6.1549E-01	2.0574E-01	2.0862E-01	
RA-224 #A	3.9374E-01	3.9374E-01	1.1109E+00	1.1112E+00	1.233E+00
RA-226 #	1.3126E+00	1.3126E+00	1.2184E+00	1.2207E+00	1.307E+00
AC-228	1.0190E+00	1.0190E+00	2.4660E-01	2.5314E-01	
TH-227 #B	-1.5055E-01	-1.5055E-01	4.4736E-01	4.4744E-01	4.880E-01
PA-234 #B	3.1141E-03	3.1141E-03	2.2588E-01	2.2588E-01	2.529E-01
TH-234 #B	2.7220E-01	2.7220E-01	4.1181E+00	4.1181E+00	4.606E+00
AM-241 #A	-9.4753E-03	-9.4755E-03	6.1106E-01	6.1106E-01	6.848E-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_6SEPT2005_1127.An1

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

Total Activity (50.2 to 1999.0 keV) 1.6802160E+01 pCi/gm

Total Decayed Activity (50.2 to 1999.0 keV) 1.6802179E+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_6SEPT2005_1327.An1

Sample description

FSS-NOL-06-01-061-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEPT2005_1327.An1

Acquisition information

Start time:	06-Sep-2005 13:27:47
Live time:	2000
Real time:	2025
Dead time:	1.21 %
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: 2.1410E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1410E+03) =
4.6707E+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	01-Sep-2005 09:45:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0885

***** 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	140.	34.40	1.50	8.847E-03				
74.81	140.	34.40	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.07	229.	20.70	1.50	9.541E-03	77.11	10.700	1.419E+00	PB214
					77.11	17.500	8.673E-01	PB212
77.07	229.	20.70	1.50	9.541E-03	77.11	10.700	1.419E+00	PB214
					77.11	17.500	8.673E-01	PB212
86.53	141.	35.84	0.95	1.201E-02	86.45	32.740	PBC<MDA	EU155

93.13	109.	40.95	1.50	1.333E-02	92.38	2.570	PBC<MDA TH234
					92.80	3.000	1.719E+00 TH234
93.16	108.	41.48	1.50	1.325E-02	92.38	2.570	PBC<MDA TH234
					92.80	3.000	PBC<MDA TH234
128.05	99.	34.69	1.29	1.711E-02			
186.20	81.	40.71	1.69	1.626E-02	185.99	3.280	PBC<MDA RA226
238.72	759.	4.28	1.21	1.380E-02	238.63	43.100	8.054E-01 PB212
241.49	99.	30.75	1.22	1.367E-02	241.00	3.900	PBC<MDA RA224
					241.92	7.470	6.121E-01 PB214
270.21	112.	21.23	1.63	1.243E-02			
295.20	172.	13.12	1.38	1.147E-02			
295.20	172.	13.12	1.38	1.147E-02	295.22	19.200	4.935E-01 PB214
300.64	77.	28.70	1.16	1.127E-02			
327.89	61.	27.04	1.99	1.037E-02			
338.68	162.	13.14	1.14	1.005E-02	338.40	12.010	8.442E-01 AC228
352.12	321.	8.88	1.38	9.675E-03	351.99	37.100	5.636E-01 PB214
463.17	54.	30.88	1.47	7.370E-03			
463.17	54.	30.88	1.47	7.370E-03	463.51	10.000	4.554E-01 SB125
510.48	129.	16.53	1.56	6.698E-03	510.72	22.500	5.409E-01 TL208
583.14	272.	8.91	1.41	5.890E-03	583.14	86.000	3.384E-01 TL208
609.45	217.	8.34	1.57	5.648E-03	609.32	46.090	5.258E-01 BI214
727.29	79.	15.52	1.31	4.793E-03	727.17	11.800	8.792E-01 BI212
795.18	30.	36.54	0.84	4.422E-03			
795.18	30.	36.54	0.84	4.422E-03	795.76	85.400	4.974E-02 CS134
911.21	185.	10.09	1.38	3.921E-03	911.07	29.000	1.025E+00 AC228
968.91	117.	12.54	1.65	3.718E-03	968.90	17.460	1.138E+00 AC228
1119.99	57.	22.12	2.42	3.283E-03	1120.28	15.040	7.286E-01 BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.01	589.	4.26	1.64	2.620E-03	1460.75	10.700	1.325E+01	K40
1764.72	34.	17.15	1.01	2.225E-03	1764.51	15.920	6.042E-01	Bl214

********** 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	
172.63	86.53	928.	141.	0.071	107.52	0.954	Bl-207	l
372.02	186.20	417.	81.	0.040	122.13	1.690	PA-234	l
477.08	238.71	148.	759.	0.380	12.83	1.215	PB-212	D
482.61	241.47	413.	99.	0.049	92.25	1.217	PB-214	D
540.06	270.21	189.	112.	0.056	63.70	1.629	AC-228	s
600.93	300.64	169.	77.	0.038	79.87	1.158	PB-212	s
655.45	327.89	100.	61.	0.030	81.11	1.994	AC-228	s
1590.37	795.18	36.	30.	0.015	109.61	0.835	AC-228	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	149.19	74.81	1140.	140.	0.070	103.19	1.500s

PB-214	153.80	77.11	1013.	229.	0.115	62.10	1.500D
PB-212	153.80	77.11	1013.	229.	0.115	62.10	1.500D
TH-234	185.84	93.13	940.	109.	0.054	122.86	1.500s
PB-212	477.08	238.72	423.	645.	0.323	17.96	1.500
PB-214	590.16	295.25	195.	171.	0.085	41.69	1.500
AC-228	677.03	338.68	120.	162.	0.081	39.41	1.139
PB-214	703.81	352.06	138.	296.	0.148	24.24	1.500
SB-125	926.09	463.17	102.	49.	0.024	94.33	1.500s
TL-208	1020.75	510.48	99.	129.	0.065	49.59	1.558s
TL-208	1166.11	583.14	90.	272.	0.136	26.72	1.408
BI-214	1218.76	609.45	48.	217.	0.108	25.03	1.575
BI-212	1454.54	727.29	27.	79.	0.039	46.55	1.306s
AC-228	1822.57	911.21	48.	185.	0.092	30.26	1.379
AC-228	1938.03	968.91	30.	117.	0.059	37.63	1.650
BI-214	2240.38	1119.99	34.	57.	0.029	66.37	2.418s
K-40	2922.93	1461.01	12.	589.	0.294	12.78	1.645
BI-214	3530.90	1764.72	0.	34.	0.017	51.45	1.011s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.5198E-03					
			477.56	1.520E-03	&(	4.777E-01	1.37E-01 G
K-40		1.3254E+01					
			1460.75	1.325E+01	(P	4.266E-01	5.65E-01 G
MN-54		-6.7136E-03					
			834.81	-6.714E-03	%(P	5.371E-02	1.53E-02 G
CO-57		2.4605E-02					
			122.07	2.461E-02	%(	5.483E-02	1.66E-02 G K
			136.43	-8.213E-04	%	4.547E-01	1.35E-01 G
CO-60		1.4533E-04					
			1332.51	1.453E-04	%(P	5.964E-02	1.63E-02 G K
			1173.23	7.051E-03	%	4.593E-02	1.29E-02 G K
Sr-85		-2.1731E-02					
			514.00	-2.173E-02	%(	6.240E-02	1.87E-02 G
Kr-85		-4.7543E+02					
			513.99	-4.754E+02	%(	1.363E+03	4.09E+02 G
Y-88		-7.3688E-03					
			1836.01	-7.369E-03	%(P	5.474E-02	1.49E-02 G K

898.02-3.134E-03 & P 7.269E-02 2.06E-02 G

NB-94 0.0000E+00

871.10 0.000E+00 %(5.784E-02 1.63E-02 G K

702.50 1.563E-02 & 4.726E-02 1.40E-02 G K

Ag-108M -1.5938E-03

722.95-1.594E-03 %(1.028E-01 3.00E-02 G K

614.37-4.278E-02 % P 6.481E-02 2.00E-02 G

433.93 7.223E-03 % 4.503E-02 1.32E-02 G

CD-109 -4.9752E-01

88.04-4.975E-01 %(P 1.883E+00 5.66E-01 G

SN-113 1.1894E-02

391.71 1.189E-02 %(5.777E-02 1.70E-02 G K

255.04-3.980E-01 & 2.070E+00 6.16E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.2355E-01						
		427.95	2.329E-02	%(P	1.104E-01	3.22E-02	G K
		600.77	-1.820E-02	& P	2.567E-01	7.36E-02	G
		636.15	-5.882E-02	% P	4.470E-01	1.29E-01	G
		463.51	4.203E-01	@(P	4.281E-01	1.36E-01	G
		176.29	8.857E-02	% P	6.932E-01	2.06E-01	G
I-131	9.3524E-03						
		364.48	9.352E-03	&(	6.339E-02	1.85E-02	G K
		636.97	-1.303E-01	&	1.043E+00	3.02E-01	G
		284.29	-1.625E-01	%	1.040E+00	3.08E-01	G
CS-134	1.2155E-03						
		604.66	1.215E-03	&(	1.103E-01	3.26E-02	G K
		795.76	3.625E-02	%	5.375E-02	1.68E-02	G
		569.29	-3.362E-02	%	3.090E-01	8.95E-02	G
		801.84	1.493E-01	% P	5.492E-01	1.61E-01	G
CS-137	2.3047E-02						
		661.62	2.305E-02	%(	5.585E-02	1.68E-02	G
CE-139	-1.9964E-02						
		165.85	-1.996E-02	%(P	5.759E-02	1.74E-02	G
EU-152	9.7167E-02						
		121.78	9.717E-02	%(P	1.594E-01	4.86E-02	G K
		344.30	4.697E-03	%	1.294E-01	3.75E-02	G
		1408.08	7.679E-02	&	2.611E-01	7.60E-02	G
		964.00	-2.748E-02	% P	3.838E-01	1.08E-01	G
		1112.07	3.616E-02	&	4.009E-01	1.12E-01	G

778.90-7.473E-02 % P 4.549E-01 1.32E-01 G

EU-154 -1.1748E-03

123.10-1.175E-03 &(P 1.168E-01 3.47E-02 G K

1274.80 1.539E-03 % 1.866E-01 5.17E-02 G

723.30-1.033E-01 % P 2.796E-01 8.34E-02 G

1004.80-5.574E-02 % 3.267E-01 9.40E-02 G

EU-155 1.6600E-01

86.45 1.660E-01 %(P 2.464E-01 7.52E-02 G K

105.31-2.058E-02 % 2.588E-01 7.72E-02 G

HG-203 3.8865E-03

279.17 3.886E-03 &(P 5.252E-02 1.55E-02 G K

72.87-9.010E-01 % 2.226E+00 6.74E-01 G

70.83 5.453E-02 & 4.480E+00 1.34E+00 G

82.50-8.943E-01 % 3.922E+00 1.18E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.3842E-01						
		583.14	3.384E-01	(P	5.859E-02	3.02E-02	G
		510.72	5.409E-01	+	2.055E-01	8.94E-02	G
PB-212	6.8433E-01						
		238.63	6.843E-01	(	1.046E-01	4.10E-02	G K
					Energy duplication		
		77.11	8.673E-01	+	5.710E-01	1.80E-01	G
		74.81	1.039E+00	& P	1.189E+00	3.65E-01	G
PB-214	5.0907E-01						
		351.99	5.195E-01	(P	1.011E-01	4.20E-02	G K
		295.22	4.889E-01	(	1.946E-01	6.79E-02	G
					Energy duplication		
		77.11	1.419E+00	+	9.338E-01	2.94E-01	G
		241.92	2.701E-01	%	6.972E-01	2.11E-01	G
BI-212	8.7921E-01						
		727.17	8.792E-01	(	3.014E-01	1.36E-01	G K
		1620.56	3.763E-01	% P	1.609E+00	4.48E-01	G
		785.42	7.424E-01	% P	2.539E+00	7.48E-01	G
BI-214	5.4592E-01						
		609.32	5.258E-01	(	8.491E-02	4.39E-02	G K
		1764.51	6.042E-01	(P	1.313E-01	1.04E-01	G
		1120.28	7.286E-01	+	3.820E-01	1.61E-01	G
RA-224	8.1232E-01						
		241.00	8.123E-01	%(P	1.271E+00	3.88E-01	G

```
RA-226       8.4485E-01
                 185.99 8.448E-01 %(P 1.288E+00 3.93E-01 G

AC-228       1.0678E+00
                 911.07 1.025E+00  (P 1.946E-01 1.04E-01 G K
                 968.90 1.138E+00  (P 2.743E-01 1.43E-01 G
                 338.40 8.442E-01 -   2.813E-01 1.11E-01 G

TH-227      -2.1288E-01
                 236.00-2.129E-01 %(P 4.167E-01 1.27E-01 G K
                 256.25 3.073E-02 &   5.181E-01 1.52E-01 G

PA-234       7.0681E-02
                  98.44 7.068E-02 %(  2.360E-01 7.11E-02 G K
                 946.00-5.266E-02 %   3.340E-01 9.68E-02 G
                 131.28-9.909E-02 %   2.431E-01 7.35E-02 G
                  94.67 1.799E-02 %   3.606E-01 1.07E-01 G
                 883.24 9.794E-06 &   3.512E-01 9.58E-02 G
                 926.70 9.382E-02 &   4.104E-01 1.18E-01 G
```

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                     569.26-4.964E-02 %   4.562E-01 1.32E-01 G

TH-234       1.2749E+00
                     63.29 9.334E-01 %(P 4.450E+00 1.33E+00 G K
                     92.80 1.719E+00 *(  2.298E+00 7.04E-01 G
                     92.38 1.993E+00 % P 2.732E+00 8.36E-01 G

AM-241      -1.7944E-01
                     59.54-1.794E-01 &(  6.693E-01 2.01E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	1.4215E-03	1.5198E-03	4.1243E-01	4.1243E-01	4.468E-01
K-40		1.3254E+01	1.3254E+01	1.6946E+00	1.8506E+00	
MN-54	#A	-6.6372E-03	-6.7136E-03	5.0667E-02	5.0669E-02	5.310E-02
CO-57	#B	2.4282E-02	2.4605E-02	4.9824E-02	4.9842E-02	5.411E-02
CO-60	#B	1.4506E-04	1.4533E-04	4.8783E-02	4.8783E-02	5.953E-02

Sr-85 #A	-2.0565E-02	-2.1731E-02	5.6105E-02	5.6118E-02	5.905E-02
Kr-85 #A	-4.7541E+02	-4.7543E+02	1.2259E+03	1.2262E+03	1.363E+03
Y-88 #B	-7.1259E-03	-7.3688E-03	4.4850E-02	4.4852E-02	5.293E-02
NB-94 #B	0.0000E+00	0.0000E+00	4.8845E-02	4.8845E-02	5.784E-02
Ag-108M#B	-1.5937E-03	-1.5938E-03	9.0101E-02	9.0101E-02	1.028E-01
CD-109 #A	-4.9361E-01	-4.9752E-01	1.8404E+00	1.8406E+00	1.868E+00
SN-113 #B	1.1530E-02	1.1894E-02	5.0963E-02	5.0967E-02	5.601E-02
SB-125 #F	1.2312E-01	1.2355E-01	1.2024E-01	1.2044E-01	1.100E-01
I-131 #B	5.9969E-03	9.3524E-03	5.5508E-02	5.5510E-02	4.065E-02
CS-134 #B	1.2097E-03	1.2155E-03	9.7676E-02	9.7676E-02	1.098E-01
CS-137 #A	2.3039E-02	2.3047E-02	5.0355E-02	5.0371E-02	5.583E-02
CE-139 #A	-1.9452E-02	-1.9964E-02	5.3157E-02	5.3168E-02	5.611E-02
EU-152 #B	9.7092E-02	9.7167E-02	1.4577E-01	1.4587E-01	1.592E-01
EU-154 #B	-1.1734E-03	-1.1748E-03	1.4430E-01	1.4430E-01	1.167E-01
EU-155 #B	1.6567E-01	1.6600E-01	2.2559E-01	2.2577E-01	2.460E-01
HG-203 #B	3.5996E-03	3.8865E-03	4.6361E-02	4.6362E-02	4.864E-02
TL-208	3.3842E-01	3.3842E-01	9.0569E-02	9.2539E-02	
PB-212 #	6.8433E-01	6.8433E-01	1.2291E-01	1.2877E-01	1.046E-01
PB-214 #	5.0907E-01	5.0907E-01	1.2279E-01	1.2607E-01	1.011E-01
BI-212 #	8.7921E-01	8.7921E-01	4.0930E-01	4.1226E-01	
BI-214	5.4592E-01	5.4592E-01	1.3665E-01	1.4004E-01	
RA-224 #A	8.1232E-01	8.1232E-01	1.1650E+00	1.1659E+00	1.271E+00
RA-226 #A	8.4484E-01	8.4485E-01	1.1800E+00	1.1809E+00	1.288E+00
AC-228	1.0678E+00	1.0678E+00	2.5799E-01	2.6486E-01	
TH-227 #B	-2.1288E-01	-2.1288E-01	3.8370E-01	3.8388E-01	4.167E-01
PA-234 #B	7.0681E-02	7.0681E-02	2.1316E-01	2.1319E-01	2.360E-01
TH-234 #B	1.2749E+00	1.2749E+00	1.5663E+00	1.5679E+00	4.450E+00
AM-241 #A	-1.7943E-01	-1.7944E-01	6.0369E-01	6.0377E-01	6.692E-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) 1.6085297E+01 pCi/gm

Total Decayed Activity (270.2 to 1999.0 keV) 1.6085297E+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_6SEPT2005_1414.An1

Sample description

FSS-NOL-06-01-057-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEPT2005_1414.An1

Acquisition information

Start time:	06-Sep-2005 14:15:55
Live time:	2000
Real time:	2023
Dead time:	1.15 %
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: 1.9720E+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	31-Aug-2005 15:31:00
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: 0.1865

***** 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
77.11	200.	22.83	1.50	9.541E-03	77.11	10.700	1.345E+00	PB214
					77.11	17.500	8.224E-01	PB212
77.11	200.	22.83	1.50	9.541E-03	77.11	10.700	1.345E+00	PB214
					77.11	17.500	8.224E-01	PB212
186.26	116.	29.53	1.70	1.625E-02	185.99	3.280	1.438E+00	RA226
209.26	102.	26.89	1.51	1.519E-02				
238.71	732.	4.38	1.21	1.380E-02	238.63	43.100	8.431E-01	PB212

242.04	117.	19.59	1.22	1.365E-02	241.00	3.900	1.486E+00	RA224
					241.92	7.470	7.860E-01	PB214
295.28	161.	11.87	1.25	1.148E-02				
295.28	161.	11.87	1.25	1.148E-02	295.22	19.200	5.001E-01	PB214
300.55	57.	26.23	1.26	1.129E-02				
338.40	158.	15.88	1.18	1.006E-02	338.40	12.010	8.933E-01	AC228
351.97	274.	12.08	1.33	9.679E-03				
351.97	274.	12.08	1.33	9.679E-03	351.99	37.100	5.214E-01	PB214
511.14	116.	16.51	1.28	6.689E-03	510.72	22.500	5.254E-01	TL208
583.38	220.	10.40	1.74	5.888E-03	583.14	86.000	2.971E-01	TL208
609.38	186.	9.88	1.19	5.649E-03	609.32	46.090	4.893E-01	BI214
727.84	62.	27.75	0.90	4.790E-03	727.17	11.800	7.510E-01	BI212
786.21	26.	37.43	1.59	4.472E-03	785.42	2.000	PBC<MDA	BI212
795.18	31.	32.46	1.60	4.420E-03	795.76	85.400	5.595E-02	CS134
911.78	137.	11.40	1.11	3.919E-03	911.07	29.000	8.229E-01	AC228
964.75	29.	40.24	1.71	3.734E-03	964.00	14.580	PBC<MDA	EU152
968.95	107.	18.85	1.01	3.718E-03	968.90	17.460	1.129E+00	AC228
1120.56	52.	23.88	1.93	3.283E-03	1120.28	15.040	7.272E-01	BI214
1461.06	588.	4.18	2.23	2.620E-03	1460.75	10.700	1.438E+01	K40
1764.94	24.	22.54	2.24	2.225E-03	1764.51	15.920	4.653E-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	
418.13	209.26	282.	102.	0.051	80.67	1.506	AC-228	s
477.04	238.63	149.	732.	0.366	13.15	1.215	PB-212	D
483.71	241.96	204.	117.	0.058	58.76	1.217	PB-214	D
599.90	300.12	118.	51.	0.026	99.02	1.103	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	946.	200.	0.100	68.48	1.500D
PB-212	153.80	77.11	946.	200.	0.100	68.48	1.500D
RA-226	371.84	186.12	452.	91.	0.045	99.13	1.500s
PB-212	476.89	238.63	406.	606.	0.303	18.63	1.500D
RA-224	482.62	241.50	497.	84.	0.042	115.38	1.500
PB-214	590.16	295.25	201.	158.	0.079	44.90	1.500
AC-228	676.48	338.40	162.	158.	0.079	47.65	1.182
PB-214	703.66	351.99	126.	258.	0.129	26.18	1.500

TL-208	1022.06	511.14	86.	116.	0.058	49.52	1.280s
TL-208	1166.60	583.38	92.	220.	0.110	31.20	1.744s
BI-214	1218.62	609.38	56.	186.	0.093	29.64	1.194
BI-212	1455.63	727.84	65.	62.	0.031	83.25	0.897s
BI-212	1572.43	786.21	36.	26.	0.013	112.30	1.594
CS-134	1590.38	795.18	34.	31.	0.015	97.37	1.601s
AC-228	1823.71	911.78	32.	137.	0.068	34.19	1.113s
EU-152	1929.70	964.75	54.	29.	0.014	120.73	1.714s
AC-228	1938.11	968.95	75.	107.	0.053	56.56	1.015s
BI-214	2241.51	1120.56	34.	52.	0.026	71.64	1.931
K-40	2923.03	1461.06	4.	588.	0.294	12.53	2.229
BI-214	3531.34	1764.94	3.	24.	0.012	67.63	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		5.7144E-02					
			477.56	5.714E-02	&(	4.451E-01	1.29E-01 G
K-40		1.4378E+01					
			1460.75	1.438E+01	(P	2.838E-01	6.01E-01 G
MN-54		-1.4090E-02					
			834.81	-1.409E-02	%(P	5.523E-02	1.61E-02 G
CO-57		2.5686E-03					
			122.07	2.569E-03	%(	6.139E-02	1.83E-02 G K
			136.43	1.414E-01	%	4.570E-01	1.38E-01 G
CO-60		-1.0013E-04					
			1332.51	-1.001E-04	%(P	6.121E-02	1.66E-02 G K
			1173.23	8.343E-03	%	7.919E-02	2.26E-02 G K
Sr-85		-1.8275E-02					
			514.00	-1.827E-02	%(	6.728E-02	2.00E-02 G
Kr-85		-3.9592E+02					
			513.99	-3.959E+02	%(	1.458E+03	4.34E+02 G
Y-88		-2.1900E-05					
			1836.01	-2.190E-05	%(P	5.615E-02	1.43E-02 G K

898.02-8.443E-03 % P 6.155E-02 1.74E-02 G

NB-94 4.0725E-03

871.10 4.073E-03 %(5.021E-02 1.41E-02 G K

702.50 1.709E-02 % 5.361E-02 1.59E-02 G K

Ag-108M -1.4669E-02

722.95-1.467E-02 &(3.520E-02 1.05E-02 G K

614.37 3.007E-04 % P 5.542E-02 1.57E-02 G

433.93-4.625E-03 % 4.801E-02 1.39E-02 G

CD-109 8.8165E-02

88.04 8.816E-02 &(P 2.380E+00 7.11E-01 G

SN-113 -8.3585E-03

391.71-8.358E-03 %(7.200E-02 2.11E-02 G K

255.04-4.006E-01 % 2.071E+00 6.15E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	2.5102E-02						
		427.95	2.510E-02	%(P	1.317E-01	3.84E-02	G K
		600.77	7.247E-02	% P	2.424E-01	7.15E-02	G
		636.15	-5.106E-02	% P	4.394E-01	1.26E-01	G
		463.51	2.614E-01	% P	4.384E-01	1.34E-01	G
		176.29	-1.475E-02	& P	5.870E-01	1.72E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	%(	8.162E-02	2.35E-02	G K
		636.97	-1.431E-01	%	1.086E+00	3.13E-01	G
		284.29	-3.515E-01	%	1.070E+00	3.21E-01	G
CS-134	1.4551E-02						
		604.66	-2.167E-02	%(	6.295E-02	1.88E-02	G K
		795.76	5.595E-02	*(	5.466E-02	1.82E-02	G
		569.29	9.294E-02	&	2.985E-01	8.85E-02	G
		801.84	1.820E-01	& P	5.396E-01	1.60E-01	G
CS-137	-1.1003E-02						
		661.62	-1.100E-02	&(	6.196E-02	1.80E-02	G
CE-139	5.0274E-03						
		165.85	5.027E-03	%(P	5.433E-02	1.61E-02	G
EU-152	9.3068E-02						
		121.78	-4.210E-02	%(P	1.767E-01	5.30E-02	G K
		344.30	-3.183E-02	%	1.715E-01	5.07E-02	G
		1408.08	-2.811E-03	%	2.242E-01	5.85E-02	G
		964.00	3.641E-01	&(P	4.671E-01	1.48E-01	G
		1112.07	-1.194E-02	%	5.033E-01	1.41E-01	G

778.90 1.906E-01 % P 3.508E-01 1.08E-01 G

EU-154 1.5318E-02

123.10 1.532E-02 %(P 1.189E-01 3.55E-02 G K

1274.80-4.485E-02 % 2.136E-01 6.19E-02 G

723.30-9.586E-03 & P 4.465E-01 1.30E-01 G

1004.80 9.287E-02 % 2.966E-01 8.71E-02 G

EU-155 1.6380E-01

86.45 1.638E-01 %(P 2.638E-01 8.03E-02 G K

105.31-1.027E-02 % 2.738E-01 8.15E-02 G

HG-203 -7.0512E-05

279.17-7.051E-05 &(P 5.240E-02 1.53E-02 G K

72.87-5.572E-01 % 2.373E+00 7.14E-01 G

70.83 3.122E-01 % 4.293E+00 1.28E+00 G

82.50-1.718E+00 & 4.543E+00 1.37E+00 G

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Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TL-208       2.9708E-01
                   583.14 2.971E-01 @(P 6.427E-02 3.10E-02 G
                   510.72 5.254E-01 +   2.084E-01 8.68E-02 G

PB-212       7.3420E-01
                                        Energy duplication
                   238.63 6.984E-01  (  1.112E-01 4.34E-02 G K
                                        Energy duplication
                    77.11 8.224E-01  (  5.993E-01 1.88E-01 G
                    74.81 6.176E-01 & P 1.288E+00 3.91E-01 G

PB-214       4.9269E-01
                   351.99 4.929E-01  (P 1.049E-01 4.31E-02 G K
                   295.22 4.923E-01  (  2.141E-01 7.37E-02 G
                                        Energy duplication
                    77.11 1.345E+00 +   9.802E-01 3.07E-01 G
                   241.92 4.905E-01 %   7.387E-01 2.26E-01 G

BI-212       7.5105E-01
                   727.17 7.510E-01  (  4.879E-01 2.08E-01 G K
                  1620.56-5.015E-02 & P 1.874E+00 4.77E-01 G
                   785.42 2.017E+00 + P 2.336E+00 7.56E-01 G

BI-214       4.8311E-01
                   609.32 4.893E-01  (  9.899E-02 4.83E-02 G K
                  1764.51 4.653E-01 ?(P 2.039E-01 1.05E-01 G
                  1120.28 7.272E-01 +   4.125E-01 1.74E-01 G

RA-224       1.0794E+00
                   241.00 1.079E+00  (P 1.367E+00 4.21E-01 G
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RA-226       1.1654E+00
                 185.99 1.165E+00 *(P 1.307E+00 4.04E-01 G

AC-228       8.4349E-01
                 911.07 8.229E-01 @(P 1.762E-01 9.40E-02 G K
                 968.90 1.129E+00 + P 4.547E-01 2.13E-01 G
                 338.40 8.933E-01  (  3.513E-01 1.42E-01 G

TH-227      -1.1441E-01
                 236.00-1.144E-01 %(P 5.104E-01 1.53E-01 G K
                 256.25-1.090E-01 %   6.080E-01 1.80E-01 G

PA-234       3.6805E-02
                  98.44 3.680E-02 &(  2.626E-01 7.86E-02 G K
                 946.00-6.057E-02 %   3.216E-01 9.32E-02 G
                 131.28 4.092E-02 &   2.118E-01 6.33E-02 G
                  94.67-8.959E-02 &   4.547E-01 1.36E-01 G
                 883.24 1.409E-01 &   3.932E-01 1.17E-01 G
                 926.70-5.539E-02 %   4.608E-01 1.30E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	1.360E-01	&	4.407E-01	1.31E-01	G
TH-234	7.6901E-01						
		63.29	7.690E-01	%(P	4.744E+00	1.42E+00	G K
		92.80	1.480E+00	%	2.474E+00	7.54E-01	G
		92.38	1.612E+00	% P	2.962E+00	9.00E-01	G
AM-241	2.0005E-01						
		59.54	2.000E-01	&(	5.455E-01	1.64E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	5.2898E-02	5.7144E-02	3.8714E-01	3.8715E-01	4.120E-01
K-40		1.4378E+01	1.4378E+01	1.8021E+00	1.9745E+00	
MN-54	#A	-1.3906E-02	-1.4090E-02	5.0729E-02	5.0735E-02	5.450E-02
CO-57	#B	2.5296E-03	2.5686E-03	5.4805E-02	5.4805E-02	6.046E-02
CO-60	#B	-9.9914E-05	-1.0013E-04	1.6225E-01	1.6225E-01	6.108E-02

Sr-85 #A	-1.7149E-02	-1.8275E-02	6.0059E-02	6.0068E-02	6.313E-02
Kr-85 #A	-3.9590E+02	-3.9592E+02	1.3011E+03	1.3013E+03	1.458E+03
Y-88 #B	-2.1069E-05	-2.1900E-05	5.6280E-04	5.6280E-04	5.402E-02
NB-94 #B	4.0725E-03	4.0725E-03	4.2298E-02	4.2299E-02	5.021E-02
Ag-108M#B	-1.4668E-02	-1.4669E-02	3.1639E-02	3.1649E-02	3.520E-02
CD-109 #A	8.7367E-02	8.8165E-02	2.1324E+00	2.1324E+00	2.358E+00
SN-113 #B	-8.0644E-03	-8.3585E-03	6.3175E-02	6.3177E-02	6.947E-02
SB-125 #B	2.5000E-02	2.5102E-02	1.1529E-01	1.1530E-01	1.312E-01
I-131 #B	0.0000E+00	0.0000E+00	7.0596E-02	7.0596E-02	4.888E-02
CS-134 #B	1.4472E-02	1.4551E-02	1.4168E-02	1.4192E-02	6.261E-02
CS-137 #A	-1.0999E-02	-1.1003E-02	5.4027E-02	5.4031E-02	6.194E-02
CE-139 #A	4.8789E-03	5.0274E-03	4.8416E-02	4.8417E-02	5.272E-02
EU-152 #B	9.2985E-02	9.3068E-02	1.1326E-01	1.1338E-01	1.765E-01
EU-154 #B	1.5298E-02	1.5318E-02	1.0639E-01	1.0640E-01	1.187E-01
EU-155 #B	1.6343E-01	1.6380E-01	2.4101E-01	2.4118E-01	2.632E-01
HG-203 #B	-6.4541E-05	-7.0512E-05	8.4900E-03	8.4900E-03	4.796E-02
TL-208 #	2.9708E-01	2.9708E-01	9.2869E-02	9.4353E-02	
PB-212 #	7.3420E-01	7.3420E-01	1.3676E-01	1.4283E-01	1.112E-01
PB-214 #	4.9269E-01	4.9269E-01	1.2809E-01	1.3104E-01	1.049E-01
BI-212	7.5105E-01	7.5105E-01	6.2524E-01	6.2665E-01	
BI-214	4.8311E-01	4.8311E-01	1.4320E-01	1.4574E-01	
RA-224 #A	1.0794E+00	1.0794E+00	1.2625E+00	1.2640E+00	1.367E+00
RA-226 #A	1.1654E+00	1.1654E+00	1.2120E+00	1.2137E+00	1.307E+00
AC-228	8.4349E-01	8.4349E-01	2.4749E-01	2.5197E-01	
TH-227 #B	-1.1441E-01	-1.1441E-01	4.6884E-01	4.6888E-01	5.104E-01
PA-234 #B	3.6805E-02	3.6805E-02	2.3568E-01	2.3569E-01	2.626E-01
TH-234 #B	7.6901E-01	7.6901E-01	4.2588E+00	4.2590E+00	4.744E+00
AM-241 #A	2.0004E-01	2.0005E-01	4.9323E-01	4.9335E-01	5.455E-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) 1.6752312E+01 pCi/gm

Total Decayed Activity (269.2 to 1999.0 keV) 1.6752312E+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_9SEP2005_1301.An1

Sample description

FSS NOL-06-01-087

Spectrum Filename: C:\GammaVision\Spectra\102F_9SEP2005_1301.An1

Acquisition information

Start time:	09-Sep-2005 13:01:52
Live time:	2000
Real time:	2025
Dead time:	1.23 %
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: 1.7160E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7160E+03) =
5.8275E+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 07-Sep-2005 11:36:00
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: 0.1415

***** 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	77.	40.02	1.10	8.817E-03				
74.40	77.	40.02	1.10	8.817E-03	74.81	9.600	PBC<MDA	PB212
77.22	224.	13.28	1.10	9.664E-03	77.11	10.700	1.731E+00	PB214
					77.11	17.500	1.058E+00	PB212
128.33	95.	40.01	0.69	1.712E-02				
185.67	154.	21.48	1.73	1.628E-02				
185.67	154.	21.48	1.73	1.628E-02	185.99	3.280	2.200E+00	RA226

238.72	646.	4.84	1.21	1.380E-02	238.63	43.100	8.557E-01	PB212
241.99	104.	20.50	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	8.009E-01	PB214
269.73	86.	27.29	1.43	1.245E-02				
295.37	156.	12.47	1.25	1.146E-02	295.22	19.200	5.579E-01	PB214
300.19	63.	25.38	1.26	1.129E-02				
338.55	168.	17.80	1.36	1.006E-02	338.40	12.010	1.096E+00	AC228
352.09	277.	11.67	1.37	9.676E-03	351.99	37.100	6.069E-01	PB214
462.72	32.	39.45	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
510.90	122.	18.60	1.85	6.693E-03	510.72	22.500	6.368E-01	TL208
583.21	220.	12.16	1.42	5.889E-03	583.14	86.000	3.416E-01	TL208
609.51	181.	14.09	1.13	5.648E-03	609.32	46.090	5.468E-01	BI214
661.78	153.	10.44	1.26	5.228E-03	661.62	84.620	2.720E-01	CS137
727.81	79.	22.39	1.67	4.790E-03	727.17	11.800	1.100E+00	BI212
911.27	131.	11.65	2.11	3.921E-03	911.07	29.000	9.027E-01	AC228
968.46	96.	19.28	1.01	3.719E-03	968.90	17.460	1.170E+00	AC228
1120.32	80.	24.64	1.56	3.283E-03	1120.28	15.040	1.270E+00	BI214
1173.49	198.	12.18	1.68	3.156E-03	1173.23	99.860	4.948E-01	CO60
1332.85	175.	9.76	1.57	2.833E-03	1332.51	99.980	4.871E-01	CO60
1461.15	530.	4.50	1.85	2.620E-03	1460.75	10.700	1.489E+01	K40
1764.62	34.	17.15	1.37	2.225E-03	1764.51	15.920	7.538E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
148.37	74.71	434.	77.	0.038	120.05	1.098	Bl-207 D
154.01	77.53	332.	224.	0.112	39.83	1.100	PB-214 D
256.26	128.33	530.	105.	0.052	97.95	0.686	AC-228 s
477.07	238.76	166.	646.	0.323	14.52	1.215	PB-212 D
483.60	242.02	174.	104.	0.052	61.50	1.217	PB-214 D
539.10	269.73	186.	86.	0.043	81.88	1.430	AC-228 s
600.07	300.21	124.	56.	0.028	93.40	0.818	PB-212
703.86	352.09	405.	80.	0.040	112.54	1.371	PB-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	153.80	77.11	894.	205.	0.102	65.46	1.500D
PB-212	153.80	77.11	894.	205.	0.102	65.46	1.500D
RA-226	371.54	185.97	449.	104.	0.052	87.54	1.500s
PB-212	477.14	238.75	439.	564.	0.282	20.19	1.500

RA-224	483.18	241.78	486.	78.	0.039	122.60	1.500
PB-214	590.38	295.36	214.	150.	0.075	48.06	1.500s
AC-228	676.77	338.55	221.	168.	0.084	53.41	1.360
PB-214	703.80	352.06	182.	197.	0.099	35.93	1.500
SB-125	925.18	462.72	73.	32.	0.016	118.34	1.500
TL-208	1021.58	510.90	115.	122.	0.061	55.81	1.852s
TL-208	1166.25	583.21	121.	220.	0.110	36.47	1.415s
BI-214	1218.88	609.51	123.	181.	0.090	42.27	1.126
CS-137	1323.46	661.78	44.	153.	0.076	31.32	1.262
BI-212	1455.58	727.81	65.	79.	0.040	67.18	1.668s
AC-228	1822.69	911.27	38.	130.	0.065	34.96	2.109s
AC-228	1937.12	968.46	68.	96.	0.048	57.85	1.008s
BI-214	2241.03	1120.32	74.	80.	0.040	73.92	1.561
CO-60	2347.45	1173.49	89.	198.	0.099	36.54	1.676
CO-60	2666.41	1332.85	31.	175.	0.088	29.27	1.573
K-40	2923.21	1461.15	8.	530.	0.265	13.49	1.849
BI-214	3531.31	1764.92	2.	21.	0.010	71.41	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		8.3689E-02					
			477.56	8.369E-02	%(	5.455E-01	1.59E-01 G
K-40		1.4885E+01					
			1460.75	1.489E+01	(P	4.451E-01	6.70E-01 G
MN-54		-2.3631E-02					
			834.81	-2.363E-02	&(P	7.730E-02	2.29E-02 G
CO-57		5.8512E-04					
			122.07	5.851E-04	%(	7.168E-02	2.13E-02 G K
			136.43	-1.702E-02	%	4.896E-01	1.45E-01 G
CO-60		4.9093E-01					
			1332.51	4.871E-01	(P	7.957E-02	4.76E-02 G K
			1173.23	4.948E-01	(	1.167E-01	6.03E-02 G K
Sr-85		-2.4359E-02					
			514.00	-2.436E-02	%(	7.123E-02	2.13E-02 G
Kr-85		-5.5069E+02					
			513.99	-5.507E+02	%(	1.609E+03	4.82E+02 G
Y-88		-3.9343E-03					
			1836.01	-3.934E-03	%(P	5.762E-02	1.49E-02 G K

898.02 1.715E-02 & P 7.669E-02 2.23E-02 G

NB-94 1.8754E-02

871.10 1.875E-02 %(5.877E-02 1.73E-02 G K

702.50-1.067E-02 % 7.106E-02 2.07E-02 G K

Ag-108M -2.7898E-02

722.95-2.790E-02 %(8.536E-02 2.54E-02 G K

614.37-1.414E-02 & P 7.356E-02 2.15E-02 G

433.93 5.466E-04 & 6.431E-02 1.86E-02 G

CD-109 1.2475E+00

88.04 1.248E+00 %(P 2.227E+00 6.77E-01 G

SN-113 -5.0465E-05

391.71-5.047E-05 %(6.189E-02 1.76E-02 G K

255.04-1.616E-01 % 2.396E+00 7.06E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.1294E-01						
		427.95	3.497E-02	&(P	1.762E-01	5.18E-02	G K
		600.77	-7.006E-02	& P	3.739E-01	1.10E-01	G
		636.15	-1.957E-02	& P	4.864E-01	1.38E-01	G
		463.51	3.437E-01	(P	4.548E-01	1.42E-01	G
		176.29	-1.641E-01	& P	8.339E-01	2.48E-01	G
I-131	1.1756E-02						
		364.48	1.176E-02	&(	7.272E-02	2.14E-02	G K
		636.97	-1.692E-01	&	1.139E+00	3.32E-01	G
		284.29	-1.423E-01	%	1.065E+00	3.16E-01	G
CS-134	-1.9165E-02						
		604.66	-1.917E-02	&(	7.121E-02	2.11E-02	G K
		795.76	4.054E-02	%	7.649E-02	2.34E-02	G
		569.29	-6.065E-02	&	3.812E-01	1.11E-01	G
		801.84	-1.341E-01	% P	8.246E-01	2.39E-01	G
CS-137	2.7196E-01						
		661.62	2.720E-01	(	5.996E-02	2.84E-02	G
CE-139	1.3004E-02						
		165.85	1.300E-02	%(P	6.306E-02	1.89E-02	G
EU-152	-7.2003E-02						
		121.78	-7.200E-02	%(P	1.999E-01	6.03E-02	G K
		344.30	-3.816E-02	%	1.862E-01	5.51E-02	G
		1408.08	1.490E-02	%	2.682E-01	7.16E-02	G
		964.00	1.255E-01	& P	6.240E-01	1.82E-01	G
		1112.07	-2.835E-04	%	6.510E-01	1.83E-01	G

778.90 1.099E-02 & P 5.301E-01 1.50E-01 G

EU-154 -3.7696E-02

123.10-3.770E-02 %(P 1.487E-01 4.46E-02 G K

1274.80 2.128E-02 % 2.147E-01 6.03E-02 G

723.30-1.475E-01 % P 4.178E-01 1.25E-01 G

1004.80 0.000E+00 % 5.513E-01 1.57E-01 G

EU-155 1.6063E-01

86.45 1.606E-01 %(P 2.856E-01 8.68E-02 G K

105.31 4.737E-02 % 2.920E-01 8.73E-02 G

HG-203 -1.1137E-02

279.17-1.114E-02 &(P 6.694E-02 1.99E-02 G K

72.87-4.084E-01 % 2.341E+00 7.02E-01 G

70.83-3.295E-01 % 2.930E+00 8.70E-01 G

82.50-1.341E+00 % 4.776E+00 1.44E+00 G

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

TL-208       3.4155E-01
                   583.14 3.416E-01 *(P 8.401E-02 4.16E-02 G
                   510.72 6.368E-01 +   2.756E-01 1.19E-01 G

PB-212       7.4663E-01
                   238.63 7.466E-01  (  1.328E-01 5.03E-02 G K
                                        Energy duplication
                    77.11 9.648E-01 +   6.699E-01 2.11E-01 G
                    74.81 6.372E-01 & P 1.408E+00 4.26E-01 G

PB-214       4.6820E-01
                   351.99 4.324E-01  (P 1.437E-01 5.19E-02 G K
                   295.22 5.374E-01 @(  2.538E-01 8.61E-02 G
                                        Energy duplication
                    77.11 1.578E+00 +   1.096E+00 3.44E-01 G
                   241.92 3.369E-01 %   8.878E-01 2.68E-01 G

BI-212       1.0997E+00
                   727.17 1.100E+00 *(  5.607E-01 2.46E-01 G K
                  1620.56-4.009E-02 % P 3.122E+00 8.44E-01 G
                   785.42-3.132E-03 % P 4.065E+00 1.16E+00 G

BI-214       5.2498E-01
                   609.32 5.468E-01  (  1.646E-01 7.71E-02 G K
                  1764.51 4.617E-01 ?(P 2.061E-01 1.10E-01 G
                  1120.28 1.270E+00 +   6.843E-01 3.13E-01 G

RA-224       1.1514E+00
                   241.00 1.151E+00 ?(P 1.555E+00 4.78E-01 G
```

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RA-226       1.5322E+00
                 185.99 1.532E+00  (P 1.498E+00 4.66E-01 G

AC-228       1.0224E+00
                 911.07 9.027E-01 @(P 2.167E-01 1.05E-01 G K
                 968.90 1.170E+00  (P 4.975E-01 2.26E-01 G
                 338.40 1.096E+00  (  4.690E-01 1.95E-01 G

TH-227      -1.0003E-02
                 236.00-1.000E-02 &(P 5.098E-01 1.51E-01 G K
                 256.25-8.385E-04 %   7.313E-01 2.15E-01 G

PA-234       1.0487E-01
                  98.44 1.049E-01 %(  2.609E-01 7.88E-02 G K
                 946.00 0.000E+00 &   4.489E-01 1.28E-01 G
                 131.28-2.918E-04 &   2.877E-01 8.54E-02 G
                  94.67-1.052E-02 &   4.582E-01 1.36E-01 G
                 883.24 1.665E-01 &   5.864E-01 1.73E-01 G
                 926.70-8.099E-02 %   7.555E-01 2.18E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	-8.977E-02	&	5.644E-01	1.64E-01	G
TH-234	4.3201E-01						
		63.29	4.320E-01	%(P	4.415E+00	1.31E+00	G K
		92.80	1.863E+00	%	2.678E+00	8.19E-01	G
		92.38	1.698E-01	% P	3.141E+00	9.36E-01	G
AM-241	5.5254E-02						
		59.54	5.525E-02	%(	6.985E-01	2.08E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	8.1481E-02	8.3689E-02	4.7828E-01	4.7830E-01	5.311E-01
K-40		1.4885E+01	1.4885E+01	2.0086E+00	2.1754E+00	
MN-54	#A	-2.3523E-02	-2.3631E-02	7.0929E-02	7.0942E-02	7.695E-02
CO-57	#B	5.8204E-04	5.8512E-04	6.3929E-02	6.3929E-02	7.130E-02
CO-60		4.9057E-01	4.9093E-01	1.1495E-01	1.1820E-01	

Sr-85 #A	-2.3828E-02	-2.4359E-02	6.3967E-02	6.3982E-02	6.968E-02
Kr-85 #A	-5.5068E+02	-5.5069E+02	1.4447E+03	1.4450E+03	1.609E+03
Y-88 #B	-3.8820E-03	-3.9343E-03	4.5274E-02	4.5275E-02	5.685E-02
NB-94 #B	1.8754E-02	1.8754E-02	5.1976E-02	5.1986E-02	5.877E-02
Ag-108M#B	-2.7897E-02	-2.7898E-02	7.6289E-02	7.6305E-02	8.535E-02
CD-109 #A	1.2436E+00	1.2475E+00	2.0322E+00	2.0334E+00	2.220E+00
SN-113 #B	-4.9843E-05	-5.0465E-05	5.2830E-02	5.2830E-02	6.113E-02
SB-125 #B	1.1278E-01	1.1294E-01	1.4009E-01	1.4023E-01	1.760E-01
I-131 #B	9.8432E-03	1.1756E-02	6.4182E-02	6.4185E-02	6.089E-02
CS-134 #B	-1.9129E-02	-1.9165E-02	6.3290E-02	6.3300E-02	7.107E-02
CS-137	2.7192E-01	2.7196E-01	8.5174E-02	8.6531E-02	
CE-139 #A	1.2870E-02	1.3004E-02	5.6563E-02	5.6568E-02	6.240E-02
EU-152 #B	-7.1981E-02	-7.2003E-02	1.8797E-01	1.8801E-01	1.998E-01
EU-154 #B	-3.7679E-02	-3.7696E-02	1.3563E-01	1.3565E-01	1.486E-01
EU-155 #B	1.6051E-01	1.6063E-01	2.6039E-01	2.6055E-01	2.853E-01
HG-203 #B	-1.0801E-02	-1.1137E-02	6.0419E-02	6.0423E-02	6.492E-02
TL-208	3.4155E-01	3.4155E-01	1.2478E-01	1.2625E-01	
PB-212 #	7.4663E-01	7.4663E-01	1.5078E-01	1.5649E-01	1.328E-01
PB-214 #	4.6820E-01	4.6820E-01	1.4058E-01	1.4302E-01	1.437E-01
BI-212 #	1.0997E+00	1.0997E+00	7.3886E-01	7.4143E-01	
BI-214	5.2498E-01	5.2498E-01	2.1849E-01	2.2047E-01	
RA-224 #A	1.1514E+00	1.1514E+00	1.4327E+00	1.4341E+00	1.555E+00
RA-226 #	1.5322E+00	1.5322E+00	1.3989E+00	1.4015E+00	1.498E+00
AC-228	1.0224E+00	1.0224E+00	2.9371E-01	2.9926E-01	
TH-227 #B	-1.0003E-02	-1.0003E-02	6.0406E-01	6.0406E-01	5.098E-01
PA-234 #B	1.0487E-01	1.0487E-01	2.3655E-01	2.3662E-01	2.609E-01
TH-234 #B	4.3201E-01	4.3201E-01	3.9367E+00	3.9368E+00	4.415E+00
AM-241 #A	5.5253E-02	5.5254E-02	6.2296E-01	6.2297E-01	6.984E-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) 1.8636389E+01 pCi/gm

Total Decayed Activity (269.7 to 1999.0 keV) 1.8636789E+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: 102F_9SEP2005_1340.An1

Sample description

FSS NOL-06-01-085-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_9SEP2005_1340.An1

Acquisition information

Start time:	09-Sep-2005 13:40:09
Live time:	2000
Real time:	2029
Dead time:	1.43 %
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: 1.8950E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8950E+03) =
5.2770E+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 07-Sep-2005 11:25:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1712

***** 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	138.	33.39	1.50	8.847E-03				
74.94	138.	33.39	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.14	168.	27.57	1.50	9.541E-03	77.11	10.700	1.175E+00	PB214
					77.11	17.500	7.187E-01	PB212
77.14	168.	27.57	1.50	9.541E-03	77.11	10.700	1.175E+00	PB214
					77.11	17.500	7.187E-01	PB212
93.10	97.	33.23	1.17	1.339E-02	92.38	2.570	PBC<MDA	TH234

					92.80	3.000	1.722E+00	TH234
186.09	107.	37.83	1.71	1.626E-02	185.99	3.280	PBC<MDA	RA226
209.18	79.	35.77	1.02	1.520E-02				
215.08	79.	37.34	0.98	1.492E-02				
238.80	700.	7.79	1.17	1.380E-02	238.63	43.100	8.384E-01	PB212
270.69	65.	36.14	1.21	1.241E-02				
295.29	124.	22.25	1.44	1.146E-02	295.22	19.200	4.017E-01	PB214
338.74	122.	25.82	0.87	1.005E-02	338.40	12.010	7.183E-01	AC228
352.16	202.	14.54	1.46	9.674E-03	351.99	37.100	4.004E-01	PB214
510.66	116.	20.09	1.34	6.696E-03	510.72	22.500	5.468E-01	TL208
583.31	209.	13.90	1.65	5.888E-03	583.14	86.000	2.937E-01	TL208
609.74	201.	12.80	1.54	5.646E-03	609.32	46.090	5.499E-01	BI214
661.90	408.	6.88	1.40	5.227E-03	661.62	84.620	6.579E-01	CS137
727.61	37.	38.35	1.55	4.794E-03	723.30	19.700	PBC<MDA	EU154
					727.17	11.800	4.708E-01	BI212
911.35	122.	13.85	2.08	3.921E-03	911.07	29.000	7.610E-01	AC228
969.31	76.	19.72	1.87	3.717E-03	968.90	17.460	8.290E-01	AC228
1120.92	87.	20.21	1.67	3.283E-03	1120.28	15.040	1.251E+00	BI214
1133.65	28.	33.82	0.72	3.250E-03				
1173.48	392.	7.47	1.97	3.156E-03	1173.23	99.860	8.865E-01	CO60
1332.82	345.	5.93	1.99	2.833E-03	1332.51	99.980	8.698E-01	CO60
1461.16	548.	4.33	1.77	2.620E-03	1460.75	10.700	1.392E+01	K40
1765.19	30.	19.19	0.56	2.225E-03	1764.51	15.920	6.122E-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	
371.80	186.09	566.	107.	0.053	113.49	1.705	PA-234	l
417.98	209.18	329.	79.	0.040	107.31	1.023	AC-228	s
429.77	215.08	346.	79.	0.040	112.02	0.982	TB-160	
477.22	238.80	1188.	159.	0.079	95.22	1.173	PB-212	
541.03	270.69	218.	65.	0.032	108.42	1.206	AC-228	s
2267.72	1133.65	27.	28.	0.014	101.45	0.724	-	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	149.46	74.94	1044.	138.	0.069	100.18	1.500s
PB-214	153.80	77.11	992.	168.	0.084	82.72	1.500D
PB-212	153.80	77.11	992.	168.	0.084	82.72	1.500D
TH-234	185.47	92.95	980.	128.	0.064	105.96	1.500
TH-234	185.50	92.96	966.	126.	0.063	108.02	1.500
PB-212	477.08	238.73	541.	558.	0.279	21.77	1.500

PB-214	590.45	295.40	293.	125.	0.062	64.08	1.500
AC-228	676.63	338.48	240.	80.	0.040	89.03	1.500
PB-214	703.98	352.15	204.	194.	0.097	37.81	1.500s
TL-208	1021.10	510.66	136.	116.	0.058	60.28	1.342
TL-208	1166.45	583.31	155.	209.	0.104	41.71	1.649s
BI-214	1219.34	609.74	124.	201.	0.100	38.39	1.545s
CS-137	1323.70	661.90	119.	408.	0.204	20.64	1.395
BI-212	1455.17	727.61	84.	37.	0.019	115.05	1.554s
AC-228	1823.07	911.46	74.	115.	0.058	42.10	1.679s
AC-228	1938.87	969.33	76.	66.	0.033	66.70	1.718
BI-214	2242.24	1120.92	59.	87.	0.043	60.64	1.668s
CO-60	2347.42	1173.48	105.	392.	0.196	22.41	1.966
CO-60	2666.35	1332.82	20.	345.	0.173	17.80	1.994
K-40	2923.23	1461.16	5.	547.	0.274	12.98	1.770
BI-214	3531.84	1765.19	2.	30.	0.015	57.56	0.563s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.0837E-01					
			477.56	1.084E-01	%(	4.492E-01	1.32E-01 G
K-40		1.3922E+01					
			1460.75	1.392E+01	(P	3.217E-01	6.03E-01 G
MN-54		1.4452E-02					
			834.81	1.445E-02	%(P	6.603E-02	1.93E-02 G
CO-57		2.2506E-03					
			122.07	2.251E-03	&(	5.385E-02	1.60E-02 G K
			136.43	1.246E-02	&	5.381E-01	1.60E-01 G
CO-60		8.7817E-01					
			1332.51	8.698E-01	(P	5.889E-02	5.16E-02 G K
			1173.23	8.865E-01	(	1.144E-01	6.62E-02 G K
Sr-85		-2.3403E-02					
			514.00	-2.340E-02	&(	6.798E-02	2.04E-02 G
Kr-85		-5.2833E+02					
			513.99	-5.283E+02	&(	1.535E+03	4.60E+02 G
Y-88		-5.8390E-03					
			1836.01	-5.839E-03	%(P	4.736E-02	1.24E-02 G K

898.02-2.223E-03 & P 8.167E-02 2.31E-02 G

NB-94 0.0000E+00

871.10 0.000E+00 &(9.224E-02 2.66E-02 G K

702.50-7.317E-03 % 6.248E-02 1.81E-02 G K

Ag-108M 6.3780E-04

722.95 6.378E-04 &(8.010E-02 2.30E-02 G K

614.37-3.522E-02 % P 8.317E-02 2.51E-02 G

433.93 1.377E-02 % 6.274E-02 1.86E-02 G

CD-109 -5.1911E-01

88.04-5.191E-01 %(P 1.971E+00 5.92E-01 G

SN-113 1.3760E-03

391.71 1.376E-03 &(8.548E-02 2.49E-02 G K

255.04 4.057E-01 % 2.153E+00 6.40E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-2.4818E-03						
		427.95	-2.482E-03	&(P	1.849E-01	5.35E-02	G K
		600.77	-1.073E-01	% P	3.527E-01	1.05E-01	G
		636.15	1.727E-01	% P	5.023E-01	1.50E-01	G
		463.51	3.045E-01	% P	6.128E-01	1.86E-01	G
		176.29	-1.173E-02	% P	7.827E-01	2.32E-01	G
I-131	-1.1969E-03						
		364.48	-1.197E-03	%(	8.330E-02	2.44E-02	G K
		636.97	-2.402E-02	&	1.083E+00	3.12E-01	G
		284.29	1.922E-01	%	1.006E+00	3.00E-01	G
CS-134	-1.1543E-02						
		604.66	-1.154E-02	%(	6.108E-02	1.79E-02	G K
		795.76	4.102E-02	%	7.623E-02	2.33E-02	G
		569.29	0.000E+00	&	4.718E-01	1.37E-01	G
		801.84	9.908E-02	& P	8.319E-01	2.41E-01	G
CS-137	6.5790E-01						
		661.62	6.579E-01	(	8.623E-02	4.53E-02	G
CE-139	-6.2200E-03						
		165.85	-6.220E-03	%(P	6.493E-02	1.93E-02	G
EU-152	-1.6208E-02						
		121.78	-1.621E-02	%(P	1.957E-01	5.83E-02	G K
		344.30	-2.528E-03	%	1.969E-01	5.76E-02	G
		1408.08	9.539E-04	%	2.678E-01	7.11E-02	G
		964.00	1.961E-01	% P	6.529E-01	1.94E-01	G
		1112.07	2.047E-02	%	7.565E-01	2.17E-01	G

778.90 6.437E-02 & P 5.105E-01 1.48E-01 G

EU-154 3.6294E-02

123.10 3.629E-02 &(P 1.367E-01 4.11E-02 G K

1274.80-1.998E-02 & 2.023E-01 5.70E-02 G

723.30-2.334E-04 & P 3.566E-01 1.02E-01 G

1004.80-1.040E-01 % 5.217E-01 1.53E-01 G

EU-155 1.1757E-01

86.45 1.176E-01 %(P 2.764E-01 8.36E-02 G K

105.31 1.922E-02 % 2.883E-01 8.60E-02 G

HG-203 5.1670E-04

279.17 5.167E-04 %(P 5.671E-02 1.66E-02 G K

72.87-6.413E-01 % 2.333E+00 7.03E-01 G

70.83 3.580E-02 % 3.756E+00 1.12E+00 G

82.50-9.262E-02 % 4.118E+00 1.23E+00 G

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

TL-208       2.9366E-01
                    583.14 2.937E-01 @(P 8.560E-02 4.09E-02 G
                    510.72 5.468E-01 +   2.706E-01 1.10E-01 G

PB-212       6.8334E-01
                    238.63 6.690E-01  (  1.332E-01 4.85E-02 G K
                                          Energy duplication
                     77.11 7.187E-01 &(  6.385E-01 1.98E-01 G
                     74.81 1.160E+00 + P 1.287E+00 3.96E-01 G

PB-214       3.9228E-01
                    351.99 3.859E-01  (P 1.376E-01 4.87E-02 G K
                    295.22 4.046E-01  (  2.674E-01 8.64E-02 G
                                          Energy duplication
                     77.11 1.175E+00 &   1.044E+00 3.24E-01 G
                    241.92 2.608E-02 %   8.901E-01 2.65E-01 G

BI-212       4.7075E-01
                    727.17 4.708E-01  (  5.722E-01 1.81E-01 G K
                   1620.56 5.900E-01 % P 1.427E+00 4.22E-01 G
                    785.42 9.119E-02 % P 3.616E+00 1.04E+00 G

BI-214       5.6593E-01
                    609.32 5.499E-01 @(  1.497E-01 7.04E-02 G K
                   1764.51 6.122E-01  (P 1.727E-01 1.18E-01 G
                   1120.28 1.251E+00 +   5.578E-01 2.53E-01 G

RA-224      -2.4646E-01
                    241.00-2.465E-01 &(P 1.479E+00 4.41E-01 G
```

```
RA-226       1.0318E+00
                 185.99 1.032E+00 %(P 1.547E+00 4.73E-01 G

AC-228       7.2640E-01
                 911.07 7.242E-01  (P 2.687E-01 1.02E-01 G K
                 968.90 7.301E-01  (P 4.762E-01 1.62E-01 G
                 338.40 4.702E-01 -   4.418E-01 1.40E-01 G

TH-227      -1.2093E-01
                 236.00-1.209E-01 %(P 5.725E-01 1.72E-01 G K
                 256.25-9.393E-02 &   7.577E-01 2.25E-01 G

PA-234       5.0647E-02
                  98.44 5.065E-02 %(  2.694E-01 8.07E-02 G K
                 946.00 1.135E-02 %   4.915E-01 1.42E-01 G
                 131.28-6.805E-02 &   2.877E-01 8.64E-02 G
                  94.67-2.138E-01 %   5.263E-01 1.59E-01 G
                 883.24 1.397E-01 %   6.890E-01 2.02E-01 G
                 926.70-1.528E-01 %   7.716E-01 2.26E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	0.000E+00	&	6.987E-01	2.03E-01	G
TH-234	1.3775E+00						
		63.29	-1.517E-01	&(P	5.089E+00	1.51E+00	G K
		92.80	2.246E+00	(	2.631E+00	8.09E-01	G
		92.38	2.684E+00	(P	3.111E+00	9.57E-01	G
AM-241	1.9046E-01						
		59.54	1.905E-01	&(	6.641E-01	2.00E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	1.0546E-01	1.0837E-01	3.9681E-01	3.9685E-01	4.371E-01
K-40		1.3922E+01	1.3922E+01	1.8081E+00	1.9696E+00	
MN-54	#A	1.4385E-02	1.4452E-02	5.7829E-02	5.7834E-02	6.572E-02
CO-57	#B	2.2386E-03	2.2506E-03	4.7908E-02	4.7909E-02	5.357E-02
CO-60		8.7751E-01	8.7817E-01	1.2565E-01	1.3497E-01	

Sr-85 #A	-2.2885E-02	-2.3403E-02	6.1100E-02	6.1114E-02	6.647E-02
Kr-85 #A	-5.2832E+02	-5.2833E+02	1.3793E+03	1.3797E+03	1.535E+03
Y-88 #B	-5.7600E-03	-5.8390E-03	3.7492E-02	3.7493E-02	4.672E-02
NB-94 #B	0.0000E+00	0.0000E+00	7.9664E-02	7.9664E-02	9.224E-02
Ag-108M#B	6.3778E-04	6.3780E-04	6.8959E-02	6.8959E-02	8.010E-02
CD-109 #A	-5.1745E-01	-5.1911E-01	1.9369E+00	1.9371E+00	1.965E+00
SN-113 #B	1.3588E-03	1.3760E-03	7.4738E-02	7.4738E-02	8.440E-02
SB-125 #B	-2.4783E-03	-2.4818E-03	1.6220E+00	1.6220E+00	1.846E-01
I-131 #B	-9.9921E-04	-1.1969E-03	7.3150E-02	7.3150E-02	6.954E-02
CS-134 #B	-1.1521E-02	-1.1543E-02	5.3692E-02	5.3696E-02	6.096E-02
CS-137	6.5781E-01	6.5790E-01	1.3576E-01	1.4069E-01	
CE-139 #A	-6.1547E-03	-6.2200E-03	6.2524E-02	6.2524E-02	6.425E-02
EU-152 #B	-1.6203E-02	-1.6208E-02	2.0487E-01	2.0487E-01	1.956E-01
EU-154 #B	3.6277E-02	3.6294E-02	1.2327E-01	1.2329E-01	1.366E-01
EU-155 #B	1.1748E-01	1.1757E-01	2.5080E-01	2.5088E-01	2.762E-01
HG-203 #B	5.0085E-04	5.1670E-04	4.9814E-02	4.9814E-02	5.497E-02
TL-208	2.9366E-01	2.9366E-01	1.2274E-01	1.2384E-01	
PB-212 #	6.8334E-01	6.8334E-01	1.4875E-01	1.5362E-01	1.332E-01
PB-214 #	3.9228E-01	3.9228E-01	1.4602E-01	1.4767E-01	1.376E-01
BI-212 #A	4.7075E-01	4.7075E-01	5.4159E-01	5.4223E-01	5.722E-01
BI-214	5.6593E-01	5.6593E-01	1.9618E-01	1.9873E-01	
RA-224 #A	-2.4646E-01	-2.4646E-01	1.4997E+00	1.4998E+00	1.479E+00
RA-226 #A	1.0318E+00	1.0318E+00	1.4175E+00	1.4187E+00	1.547E+00
AC-228 #	7.2640E-01	7.2640E-01	2.8673E-01	2.8961E-01	2.687E-01
TH-227 #B	-1.2093E-01	-1.2093E-01	5.2583E-01	5.2588E-01	5.725E-01
PA-234 #B	5.0647E-02	5.0647E-02	2.4221E-01	2.4222E-01	2.694E-01
TH-234 #B	1.3775E+00	1.3775E+00	1.4730E+00	1.4750E+00	5.089E+00
AM-241 #A	1.9046E-01	1.9046E-01	5.9882E-01	5.9891E-01	6.641E-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) 1.6316608E+01 pCi/gm

Total Decayed Activity (50.2 to 1999.0 keV) 1.6317358E+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: 102F_9SEP2005_1441.An1

Sample description

FSS NOL-06-01-084-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_9SEP2005_1441.An1

Acquisition information

Start time:	09-Sep-2005 14:42:03
Live time:	2000
Real time:	2022
Dead time:	1.08 %
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: 1.8420E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8420E+03) =
5.4289E+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	07-Sep-2005 11:18:00
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: 0.1837

***** 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
77.11	174.	24.47	1.50	9.541E-03	77.11	17.500	7.627E-01	PB212
					77.11	10.700	1.247E+00	PB214
77.11	174.	24.47	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.247E+00	PB214
89.59	92.	29.47	1.11	1.271E-02				
93.51	100.	27.07	1.11	1.349E-02	92.80	3.000	1.842E+00	TH234
					94.67	15.500	3.475E-01	PA234

128.49	67.	40.66	0.92	1.713E-02				
167.70	48.	37.49	0.00	1.697E-02				
186.10	109.	29.40	1.61	1.626E-02	185.99	3.280	1.432E+00	RA226
209.27	71.	39.12	1.47	1.519E-02				
238.73	600.	4.83	1.21	1.380E-02	238.63	43.100	7.396E-01	PB212
242.05	80.	23.81	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.762E-01	PB214
269.98	48.	40.85	1.69	1.244E-02				
295.38	155.	16.91	1.27	1.146E-02	295.22	19.200	5.152E-01	PB214
338.34	100.	23.12	0.98	1.006E-02	338.40	12.010	6.096E-01	AC228
351.98	232.	12.63	1.27	9.679E-03				
351.98	232.	12.63	1.27	9.679E-03	351.99	37.100	4.736E-01	PB214
463.02	47.	27.23	1.50	7.365E-03	463.51	10.000	4.734E-01	SB125
510.90	98.	19.30	1.48	6.693E-03	510.72	22.500	4.783E-01	TL208
583.30	148.	13.89	1.25	5.888E-03	583.14	86.000	2.135E-01	TL208
601.15	26.	29.45	1.50	5.690E-03	600.77	18.400	PBC<MDA	SB125
					604.66	97.600	3.444E-02	CS134
609.45	188.	11.16	1.60	5.648E-03	609.32	46.090	5.311E-01	BI214
661.73	183.	10.06	1.33	5.229E-03	661.62	84.620	3.028E-01	CS137
727.64	44.	30.95	1.59	4.791E-03	727.17	11.800	5.641E-01	BI212
911.38	114.	16.28	2.00	3.921E-03	911.07	29.000	7.313E-01	AC228
968.06	114.	15.53	1.52	3.721E-03	968.90	17.460	1.286E+00	AC228
1120.22	76.	22.89	1.43	3.283E-03	1120.28	15.040	1.128E+00	BI214
1173.85	89.	16.24	1.93	3.155E-03	1173.23	99.860	2.073E-01	CO60
1332.69	85.	14.46	1.97	2.833E-03	1332.51	99.980	2.195E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.22	463.	4.84	1.78	2.620E-03	1460.75	10.700	1.210E+01	K40
1765.01	12.	38.51	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
178.76	89.73	322.	92.	0.046	88.41	1.109	PB-214 ID
256.57	128.49	313.	80.	0.040	99.23	0.916	AC-228
418.15	209.27	288.	71.	0.035	117.36	1.469	AC-228 s
477.09	238.70	120.	600.	0.300	14.50	1.215	PB-212 D
483.73	242.01	142.	80.	0.040	71.43	1.217	PB-214 D
539.61	269.98	144.	48.	0.024	122.54	1.690	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	153.80	77.11	815.	174.	0.087	73.40	1.500D
PB-214	153.80	77.11	815.	174.	0.087	73.40	1.500D
TH-234	185.81	93.12	702.	111.	0.056	104.85	1.500s

RA-226	371.55	185.97	378.	81.	0.040	101.73	1.500s
PB-212	477.09	238.73	373.	536.	0.268	20.03	1.500
PB-214	590.37	295.36	172.	129.	0.064	50.69	1.500
AC-228	676.36	338.34	157.	100.	0.050	69.36	0.980
PB-214	703.91	352.12	126.	219.	0.109	29.68	1.500
SB-125	925.80	463.02	66.	47.	0.024	81.69	1.500s
TL-208	1021.57	510.90	77.	98.	0.049	57.91	1.478s
TL-208	1166.43	583.30	89.	147.	0.074	41.66	1.245
CS-134	1202.15	601.15	16.	26.	0.013	88.35	1.499
BI-214	1218.75	609.45	72.	188.	0.094	33.47	1.597s
CS-137	1323.36	661.73	48.	183.	0.091	30.18	1.334
BI-212	1455.24	727.64	48.	44.	0.022	92.85	1.594
AC-228	1822.89	911.38	55.	113.	0.057	48.84	2.004s
AC-228	1936.32	968.06	43.	114.	0.057	46.60	1.524s
BI-214	2240.84	1120.22	48.	76.	0.038	68.68	1.431s
CO-60	2348.17	1173.85	40.	89.	0.045	48.73	1.933
CO-60	2666.07	1332.69	18.	85.	0.042	43.37	1.975s
K-40	2923.35	1461.22	9.	463.	0.231	14.51	1.777

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bi-214	3531.49	1765.01	5.	12.	0.006	115.53	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	Energy keV	Peak Activity pCi/gm	Activity Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.6399E-01					
			477.56	-1.640E-01	%(	5.144E-01	1.53E-01 G
K-40		1.2101E+01					
			1460.75	1.210E+01	(P	4.457E-01	5.86E-01 G
MN-54		1.2432E-02					
			834.81	1.243E-02	%(P	5.381E-02	1.56E-02 G
CO-57		-2.1488E-03					
			122.07	-2.149E-03	&(	5.456E-02	1.62E-02 G K
			136.43	3.231E-03	%	3.682E-01	1.08E-01 G
CO-60		2.1342E-01					
			1332.51	2.195E-01	@(P	5.865E-02	3.18E-02 G K
			1173.23	2.073E-01	(	7.496E-02	3.37E-02 G K
Sr-85		-2.1376E-02					

514.00-2.138E-02 &(6.154E-02 1.84E-02 G

Kr-85 -4.8231E+02

513.99-4.823E+02 &(1.389E+03 4.15E+02 G

Y-88 7.8941E-03

1836.01 7.894E-03 &(P 4.696E-02 1.25E-02 G K

898.02-1.209E-03 % P 6.457E-02 1.78E-02 G

NB-94 -1.4741E-02

871.10-1.474E-02 %(6.546E-02 1.91E-02 G K

702.50-8.102E-03 % 4.941E-02 1.42E-02 G K

Ag-108M 2.0909E-03

722.95 2.091E-03 %(6.140E-02 1.74E-02 G K

614.37-2.505E-02 % P 5.882E-02 1.77E-02 G

433.93-1.583E-02 % 4.524E-02 1.35E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-5.6841E-02						
		88.04	-5.684E-02	%(P	2.217E+00	6.60E-01	G
SN-113	-1.0056E-02						
		391.71	-1.006E-02	%(	6.551E-02	1.91E-02	G K
		255.04	-3.891E-01	%	2.022E+00	6.00E-01	G
SB-125	1.4514E-01						
		427.95	3.422E-02	%(P	1.479E-01	4.34E-02	G K
		600.77	7.894E-02	& P	2.470E-01	7.30E-02	G
		636.15	6.405E-02	% P	4.047E-01	1.16E-01	G
		463.51	4.734E-01	*(P	4.049E-01	1.33E-01	G
		176.29	-7.492E-02	& P	6.993E-01	2.07E-01	G
I-131	2.7191E-03						
		364.48	2.719E-03	&(	5.326E-02	1.53E-02	G K
		636.97	1.298E-01	%	7.021E-01	2.02E-01	G
		284.29	0.000E+00	%	9.560E-01	2.80E-01	G
CS-134	3.4440E-02						
		604.66	3.444E-02	?(	2.852E-02	1.01E-02	G K
		795.76	1.044E-02	%	5.835E-02	1.67E-02	G
		569.29	2.974E-02	%	2.863E-01	8.18E-02	G
		801.84	6.533E-02	% P	5.892E-01	1.67E-01	G
CS-137	3.0277E-01						
		661.62	3.028E-01	(	5.825E-02	3.05E-02	G
CE-139	-1.9201E-02						
		165.85	-1.920E-02	%(P	5.643E-02	1.70E-02	G

EU-152 -1.5560E-02

121.78-1.556E-02 &(P 1.699E-01 5.05E-02 G K

344.30-2.321E-02 % 1.740E-01 5.12E-02 G

1408.08 2.030E-02 % 2.113E-01 5.60E-02 G

964.00-3.101E-03 & P 8.485E-01 2.46E-01 G

1112.07-1.176E-02 & 4.584E-01 1.26E-01 G

778.90-1.091E-02 % P 4.780E-01 1.35E-01 G

EU-154 9.7358E-03

123.10 9.736E-03 %(P 1.175E-01 3.49E-02 G K

1274.80-5.732E-03 % 1.964E-01 5.42E-02 G

723.30-1.621E-01 % P 3.675E-01 1.11E-01 G

1004.80-5.225E-02 % 3.158E-01 8.98E-02 G

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

EU-155       1.1400E-01
                    86.45 1.140E-01 %(P 2.573E-01 7.78E-02 G K
                   105.31 5.760E-02 &   2.502E-01 7.50E-02 G

HG-203      -3.1397E-04
                   279.17-3.140E-04 &(P 4.898E-02 1.42E-02 G K
                    72.87-1.555E-01 %   1.814E+00 5.41E-01 G
                    70.83-1.142E+00 &   4.009E+00 1.21E+00 G
                    82.50-3.265E-02 %   4.501E+00 1.34E+00 G

TL-208       2.1347E-01
                   583.14 2.135E-01  (P 6.746E-02 2.97E-02 G
                   510.72 4.783E-01 +   2.121E-01 9.23E-02 G

PB-212       6.9073E-01
                   238.63 6.615E-01  (  1.144E-01 4.42E-02 G K
                                        Energy duplication
                    77.11 7.627E-01 @(  5.965E-01 1.87E-01 G
                    74.81 7.565E-01 & P 1.236E+00 3.76E-01 G

PB-214       4.4112E-01
                   351.99 4.474E-01  (P 1.125E-01 4.43E-02 G K
                   295.22 4.289E-01  (  2.128E-01 7.25E-02 G
                                        Energy duplication
                    77.11 1.247E+00 +   9.756E-01 3.05E-01 G
                   241.92 9.586E-02 %   7.567E-01 2.25E-01 G

BI-212       5.6413E-01
                   727.17 5.641E-01  (  4.517E-01 1.75E-01 G K
                  1620.56-5.458E-02 % P 2.041E+00 5.22E-01 G
```

785.42 3.572E-01 % P 2.966E+00 8.50E-01 G

BI-214 5.3112E-01

609.32 5.311E-01 @(1.194E-01 5.93E-02 G K

1764.51 2.526E-01 - P 2.747E-01 9.80E-02 G

1120.28 1.128E+00 + 5.204E-01 2.58E-01 G

RA-224 1.7182E-02

241.00 1.718E-02 %(P 1.390E+00 4.10E-01 G

RA-226 1.1082E+00

185.99 1.108E+00 (P 1.283E+00 3.97E-01 G

AC-228 6.9566E-01

911.07 7.313E-01 @(P 2.396E-01 1.19E-01 G K

968.90 1.286E+00 + P 3.769E-01 2.00E-01 G

338.40 6.096E-01 (3.706E-01 1.41E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-2.3738E-01						
		236.00	-2.374E-01	%(	P	5.421E-01	1.64E-01 G K
		256.25	9.208E-06	&		6.274E-01	1.84E-01 G
PA-234	-2.5627E-02						
		98.44	-2.563E-02	%(		2.422E-01	7.22E-02 G K
		946.00	3.008E-02	&		2.686E-01	7.55E-02 G
		131.28	-6.453E-02	%		2.502E-01	7.51E-02 G
		94.67	6.038E-03	%		4.071E-01	1.21E-01 G
		883.24	1.986E-01	%		4.591E-01	1.38E-01 G
		926.70	1.536E-01	%		4.553E-01	1.34E-01 G
		569.26	4.385E-02	%		4.240E-01	1.21E-01 G
TH-234	1.6479E+00						
		63.29	1.344E+00	%(	P	4.720E+00	1.42E+00 G K
		92.80	2.043E+00	(		2.314E+00	7.14E-01 G
		92.38	-9.409E-02	&	P	2.708E+00	8.04E-01 G
AM-241	2.0425E-02						
		59.54	2.043E-02	%(		7.149E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	-1.5950E-01	-1.6399E-01	4.5983E-01	4.5992E-01	5.003E-01
K-40	1.2101E+01	1.2101E+01	1.7564E+00	1.8831E+00	
MN-54 #A	1.2373E-02	1.2432E-02	4.6765E-02	4.6771E-02	5.356E-02
CO-57 #B	-2.1371E-03	-2.1488E-03	4.8508E-02	4.8508E-02	5.426E-02
CO-60	2.1326E-01	2.1342E-01	6.9644E-02	7.0667E-02	
Sr-85 #A	-2.0892E-02	-2.1376E-02	5.5244E-02	5.5257E-02	6.015E-02
Kr-85 #A	-4.8231E+02	-4.8231E+02	1.2465E+03	1.2468E+03	1.389E+03
Y-88 #B	7.7850E-03	7.8941E-03	3.7598E-02	3.7601E-02	4.631E-02
NB-94 #B	-1.4741E-02	-1.4741E-02	5.7281E-02	5.7286E-02	6.546E-02
Ag-108M#B	2.0908E-03	2.0909E-03	5.2057E-02	5.2057E-02	6.140E-02
CD-109 #A	-5.6655E-02	-5.6841E-02	4.7399E+00	4.7399E+00	2.210E+00
SN-113 #B	-9.9274E-03	-1.0056E-02	5.7421E-02	5.7423E-02	6.467E-02
SB-125 #B	1.4493E-01	1.4514E-01	1.2243E-01	1.2270E-01	1.477E-01
I-131 #B	2.2607E-03	2.7191E-03	4.5932E-02	4.5932E-02	4.428E-02
CS-134 #	3.4372E-02	3.4440E-02	3.0426E-02	3.0487E-02	2.847E-02
CS-137	3.0273E-01	3.0277E-01	9.1380E-02	9.2946E-02	
CE-139 #A	-1.8995E-02	-1.9201E-02	5.2205E-02	5.2216E-02	5.582E-02
EU-152 #B	-1.5555E-02	-1.5560E-02	1.7938E-01	1.7938E-01	1.699E-01
EU-154 #B	9.7311E-03	9.7358E-03	1.0473E-01	1.0474E-01	1.174E-01
EU-155 #B	1.1391E-01	1.1400E-01	2.3349E-01	2.3358E-01	2.571E-01
HG-203 #B	-3.0413E-04	-3.1397E-04	6.7813E-02	6.7813E-02	4.745E-02
TL-208	2.1347E-01	2.1347E-01	8.9175E-02	8.9976E-02	

PB-212 #	6.9073E-01	6.9073E-01	1.3837E-01	1.4370E-01	1.144E-01
PB-214 #	4.4112E-01	4.4112E-01	1.2963E-01	1.3197E-01	1.125E-01
BI-212	5.6413E-01	5.6413E-01	5.2379E-01	5.2474E-01	
BI-214 #	5.3112E-01	5.3112E-01	1.7776E-01	1.8024E-01	
RA-224 #A	1.7182E-02	1.7182E-02	1.2313E+00	1.2313E+00	1.390E+00
RA-226 #A	1.1082E+00	1.1082E+00	1.1898E+00	1.1914E+00	1.283E+00
AC-228	6.9566E-01	6.9566E-01	2.9528E-01	2.9785E-01	
TH-227 #B	-2.3738E-01	-2.3738E-01	4.9768E-01	4.9786E-01	5.421E-01
PA-234 #B	-2.5627E-02	-2.5627E-02	2.1659E-01	2.1660E-01	2.422E-01
TH-234 #B	1.6479E+00	1.6479E+00	1.7279E+00	1.7303E+00	4.720E+00
AM-241 #A	2.0425E-02	2.0425E-02	6.3729E-01	6.3729E-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 (269.7 to 1999.0 keV) 1.4621495E+01 pCi/gm

Total Decayed Activity (269.7 to 1999.0 keV) 1.4621699E+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: 102F_14SEP2005_1554.An1

Sample description

FSS-NOL-06-01-091-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_14SEP2005_1554.An1

Acquisition information

Start time:	14-Sep-2005 15:54:40
Live time:	2000
Real time:	2020
Dead time:	0.98 %
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: 1.5910E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5910E+03) =
6.2854E+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-Sep-2005 10:37:00
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: 0.2453

***** 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	79.	34.03	1.10	8.819E-03	72.87	6.400	1.318E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.15	140.	20.49	1.10	9.527E-03				
77.15	140.	20.49	1.10	9.527E-03	77.11	17.500	7.102E-01	PB212
					77.11	10.700	1.162E+00	PB214
87.09	99.	38.19	1.50	1.199E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109

93.06	92.	41.63	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.947E+00	TH234
185.49	168.	18.53	0.84	1.629E-02				
185.49	168.	18.53	0.84	1.629E-02	185.99	3.280	2.600E+00	RA226
238.79	498.	5.54	1.21	1.380E-02	238.63	43.100	7.113E-01	PB212
241.86	79.	27.23	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.541E-01	PB214
295.30	120.	13.98	1.25	1.147E-02				
295.30	120.	13.98	1.25	1.147E-02	295.22	19.200	4.625E-01	PB214
300.08	37.	36.72	1.49	1.129E-02				
327.60	46.	39.73	1.15	1.038E-02				
338.74	128.	18.28	1.17	1.005E-02	338.40	12.010	8.970E-01	AC228
351.86	197.	11.78	0.99	9.682E-03				
351.86	197.	11.78	0.99	9.682E-03	351.99	37.100	4.651E-01	PB214
463.24	59.	36.10	1.55	7.369E-03				
463.24	59.	36.10	1.55	7.369E-03	463.51	10.000	6.613E-01	SB125
511.47	114.	18.43	1.87	6.685E-03	510.72	22.500	6.428E-01	TL208
					513.99	0.004	3.385E+03	Kr85
					514.00	99.270	1.501E-01	Sr85
583.63	126.	11.45	1.26	5.885E-03	583.14	86.000	2.098E-01	TL208
609.73	134.	11.77	1.58	5.646E-03	609.32	46.090	4.388E-01	Bl214
632.02	21.	29.54	1.50	5.425E-03	636.15	11.200	2.919E-01	SB125
662.01	312.	8.23	1.83	5.227E-03	661.62	84.620	5.989E-01	CS137
911.54	78.	19.10	2.07	3.920E-03	911.07	29.000	5.808E-01	AC228
968.85	86.	16.74	0.76	3.718E-03	968.90	17.460	1.120E+00	AC228
1120.51	42.	28.55	0.61	3.283E-03	1120.28	15.040	7.293E-01	Bl214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1174.00	167.	9.60	1.96	3.155E-03	1173.23	99.860	4.503E-01	CO60
1332.85	140.	12.13	1.81	2.833E-03	1332.51	99.980	4.198E-01	CO60
1461.52	407.	5.12	1.89	2.620E-03	1460.75	10.700	1.231E+01	K40
1765.34	27.	19.25	1.33	2.225E-03	1764.51	15.920	6.452E-01	Bl214

********** 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	
149.19	74.72	323.	79.	0.040	102.10	1.098	Bl-207	D
153.88	77.06	339.	140.	0.070	61.47	1.100	Bl-207	D
477.22	238.78	132.	498.	0.249	16.62	1.215	PB-212	D
483.35	241.84	189.	79.	0.039	81.70	1.217	PB-214	D
599.81	300.08	76.	37.	0.019	110.16	1.488	PB-212	
654.87	327.60	112.	46.	0.023	119.18	1.149	AC-228	
926.22	463.24	115.	59.	0.029	108.29	1.548	AC-228	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	153.80	77.11	718.	128.	0.064	92.86	1.500D
PB-214	153.80	77.11	718.	128.	0.064	92.86	1.500D
EU-155	173.76	87.09	727.	99.	0.050	114.57	1.500
TH-234	185.71	93.06	683.	92.	0.046	124.90	1.500
RA-226	371.87	186.13	361.	116.	0.058	71.97	1.500
PB-212	477.24	238.81	371.	440.	0.220	23.45	1.500
PB-214	590.20	295.27	142.	129.	0.064	47.28	1.500
AC-228	677.16	338.74	134.	128.	0.064	54.85	1.174s
PB-214	703.86	352.09	109.	160.	0.080	36.36	1.500s
TL-208	1022.72	511.47	91.	114.	0.057	55.30	1.870s
TL-208	1167.10	583.63	39.	125.	0.063	34.34	1.261
BI-214	1219.31	609.73	46.	134.	0.067	35.32	1.581s
SB-125	1263.91	632.02	9.	21.	0.010	88.61	1.499s
CS-137	1323.92	662.01	87.	312.	0.156	24.70	1.826s
AC-228	1823.23	911.54	48.	78.	0.039	57.31	2.066s
AC-228	1937.90	968.85	37.	86.	0.043	50.21	0.763s
BI-214	2241.41	1120.51	34.	42.	0.021	85.66	0.613s
CO-60	2348.48	1174.00	30.	167.	0.083	28.80	1.961s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2666.41	1332.85	27.	140.	0.070	36.40	1.805
K-40	2923.95	1461.52	7.	406.	0.203	15.36	1.890
Bl-214	3532.15	1765.34	0.	27.	0.013	57.74	1.332s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.1762E-01					
			477.56	-1.176E-01	%(	5.212E-01	1.53E-01 G
K-40		1.2311E+01					
			1460.75	1.231E+01	(P	4.434E-01	6.31E-01 G
MN-54		3.2785E-03					
			834.81	3.278E-03	%(P	6.127E-02	1.71E-02 G
CO-57		-7.2696E-04					
			122.07	-7.270E-04	%(	5.913E-02	1.75E-02 G K
			136.43	8.130E-02	%	4.795E-01	1.43E-01 G
CO-60		4.3506E-01					
			1332.51	4.198E-01	(P	8.088E-02	5.10E-02 G K
			1173.23	4.503E-01	@(	7.613E-02	4.33E-02 G K

```
Sr-85      -2.0738E-02
                514.00-2.074E-02 %(  7.480E-02 2.22E-02 G

Kr-85      -4.6756E+02
                513.99-4.676E+02 %(  1.686E+03 5.01E+02 G

Y-88        8.5392E-03
               1836.01 8.539E-03 %(P 4.617E-02 1.22E-02 G K
                898.02-1.180E-02 & P 8.046E-02 2.29E-02 G

NB-94       1.8762E-02
                871.10 1.876E-02 %(  6.045E-02 1.78E-02 G K
                702.50 1.887E-02 &   5.287E-02 1.57E-02 G K

Ag-108M     2.0779E-02
                722.95 2.078E-02 %(  6.470E-02 1.91E-02 G K
                614.37-2.801E-02 & P 7.874E-02 2.35E-02 G
                433.93 1.675E-02 &   6.091E-02 1.81E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	5.0499E-02						
		88.04	5.050E-02	&(P	2.417E+00	7.19E-01	G
SN-113	1.6210E-02						
		391.71	1.621E-02	&(	6.635E-02	1.95E-02	G K
		255.04	-1.716E-01	%	1.901E+00	5.56E-01	G
SB-125	7.1879E-02						
		427.95	-1.137E-02	%(P	1.730E-01	4.96E-02	G K
		600.77	6.927E-02	& P	2.551E-01	7.46E-02	G
		636.15	2.919E-01	?(P	2.303E-01	8.65E-02	G
		463.51	3.406E-01	% P	5.807E-01	1.78E-01	G
		176.29	1.517E-01	% P	7.208E-01	2.15E-01	G
I-131	1.8016E-02						
		364.48	1.802E-02	%(	7.197E-02	2.13E-02	G K
		636.97	-1.605E-01	%	1.031E+00	2.99E-01	G
		284.29	2.367E-01	%	8.764E-01	2.61E-01	G
CS-134	-1.6425E-02						
		604.66	-1.643E-02	%(	7.289E-02	2.15E-02	G K
		795.76	3.478E-02	%	7.918E-02	2.39E-02	G
		569.29	-6.193E-02	%	3.672E-01	1.07E-01	G
		801.84	-1.932E-03	% P	7.030E-01	1.95E-01	G
CS-137	5.9894E-01						
		661.62	5.989E-01	(	8.864E-02	4.93E-02	G
CE-139	-2.7576E-04						
		165.85	-2.758E-04	%(P	6.443E-02	1.90E-02	G

```
EU-152       3.2425E-04
                 121.78 3.242E-04 %(P 1.902E-01 5.63E-02 G K
                 344.30 0.000E+00 %   1.886E-01 5.46E-02 G
                1408.08 3.754E-02 &   3.193E-01 8.79E-02 G
                 964.00-7.503E-02 & P 4.986E-01 1.42E-01 G
                1112.07 1.600E-01 %   5.176E-01 1.52E-01 G
                 778.90-2.488E-02 % P 4.492E-01 1.26E-01 G

EU-154      -5.3192E-02
                 123.10-5.319E-02 %(P 1.383E-01 4.17E-02 G K
                1274.80 1.234E-02 &   2.188E-01 6.06E-02 G
                 723.30 8.448E-02 % P 3.030E-01 8.89E-02 G
                1004.80 6.194E-02 &   4.062E-01 1.16E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	2.1493E-01						
		86.45	2.149E-01	(P	2.780E-01	8.52E-02	G K
		105.31	6.350E-02	%	2.613E-01	7.83E-02	G
HG-203	-1.3709E-02						
		279.17	-1.371E-02	%(P	6.770E-02	2.01E-02	G K
		72.87	1.044E-03	%	2.144E+00	6.37E-01	G
		70.83	-1.186E+00	&	4.200E+00	1.26E+00	G
		82.50	6.242E-02	%	4.194E+00	1.24E+00	G
TL-208	2.0976E-01						
		583.14	2.098E-01	(P	5.328E-02	2.41E-02	G
		510.72	6.428E-01	+	2.659E-01	1.19E-01	G
PB-212	6.3440E-01						
		238.63	6.282E-01	(	1.321E-01	4.91E-02	G K
					Energy duplication		
		77.11	6.497E-01	@(	6.489E-01	2.01E-01	G
		74.81	5.332E-01	& P	1.336E+00	4.04E-01	G
PB-214	4.1921E-01						
		351.99	3.788E-01	@(P	1.217E-01	4.60E-02	G K
		295.22	4.974E-01	(	2.246E-01	7.84E-02	G
					Energy duplication		
		77.11	1.063E+00	+	1.061E+00	3.29E-01	G
		241.92	3.620E-01	%	8.419E-01	2.55E-01	G
BI-212	0.0000E+00						
		727.17	0.000E+00	%(	6.265E-01	1.78E-01	G K
		1620.56	-1.710E-01	& P	2.568E+00	6.77E-01	G

785.42 9.134E-01 % P 2.970E+00 8.74E-01 G

BI-214 4.3875E-01

609.32 4.388E-01 @(1.125E-01 5.17E-02 G K

1764.51 6.452E-01 + P 1.767E-01 1.25E-01 G

1120.28 7.293E-01 + 5.113E-01 2.08E-01 G

RA-224 1.0059E+00

241.00 1.006E+00 %(P 1.486E+00 4.55E-01 G

RA-226 1.8439E+00

185.99 1.844E+00 (P 1.452E+00 4.59E-01 G

AC-228 6.7341E-01

911.07 5.808E-01 (P 2.619E-01 1.11E-01 G K

968.90 1.120E+00 + P 4.085E-01 1.87E-01 G

338.40 8.970E-01 *(3.988E-01 1.64E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-4.6721E-02						
		236.00	-4.672E-02	&(P	5.247E-01	1.55E-01	G K
		256.25	-9.711E-02	%	7.394E-01	2.19E-01	G
PA-234	-2.8389E-03						
		98.44	-2.839E-03	&(	2.630E-01	7.79E-02	G K
		946.00	1.019E-01	&	3.246E-01	9.55E-02	G
		131.28	2.223E-03	%	2.649E-01	7.84E-02	G
		94.67	4.624E-03	%	5.101E-01	1.52E-01	G
		883.24	9.590E-02	&	4.423E-01	1.27E-01	G
		926.70	-7.582E-02	&	6.694E-01	1.91E-01	G
		569.26	-8.639E-02	%	5.256E-01	1.52E-01	G
TH-234	2.0844E+00						
		63.29	2.190E+00	%(P	4.893E+00	1.48E+00	G K
		92.80	1.947E+00	(	2.643E+00	8.11E-01	G
		92.38	2.231E+00	% P	3.148E+00	9.64E-01	G
AM-241	-1.3437E-01						
		59.54	-1.344E-01	&(	7.970E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	-1.1428E-01	-1.1762E-01	4.5914E-01	4.5919E-01	5.064E-01
K-40	1.2311E+01	1.2311E+01	1.8919E+00	2.0141E+00	
MN-54 #A	3.2624E-03	3.2785E-03	5.1314E-02	5.1314E-02	6.097E-02
CO-57 #B	-7.2283E-04	-7.2696E-04	5.2406E-02	5.2406E-02	5.879E-02
CO-60	4.3471E-01	4.3506E-01	1.0099E-01	1.0390E-01	
Sr-85 #A	-2.0252E-02	-2.0738E-02	6.6718E-02	6.6728E-02	7.304E-02
Kr-85 #A	-4.6755E+02	-4.6756E+02	1.5041E+03	1.5044E+03	1.686E+03
Y-88 #B	8.4168E-03	8.5392E-03	3.6580E-02	3.6584E-02	4.551E-02
NB-94 #B	1.8762E-02	1.8762E-02	5.3304E-02	5.3315E-02	6.045E-02
Ag-108M#B	2.0778E-02	2.0779E-02	5.7365E-02	5.7377E-02	6.469E-02
CD-109 #A	5.0328E-02	5.0499E-02	2.1561E+00	2.1561E+00	2.408E+00
SN-113 #B	1.5995E-02	1.6210E-02	5.8555E-02	5.8562E-02	6.547E-02
SB-125 #B	7.1769E-02	7.1879E-02	6.3902E-02	6.4029E-02	1.727E-01
I-131 #B	1.4877E-02	1.8016E-02	6.3926E-02	6.3934E-02	5.943E-02
CS-134 #B	-1.6392E-02	-1.6425E-02	6.4362E-02	6.4368E-02	7.274E-02
CS-137	5.9886E-01	5.9894E-01	1.4795E-01	1.5172E-01	
CE-139 #A	-2.7269E-04	-2.7576E-04	4.9916E-02	4.9916E-02	6.371E-02
EU-152 #B	3.2414E-04	3.2425E-04	1.6885E-01	1.6885E-01	1.901E-01
EU-154 #B	-5.3166E-02	-5.3192E-02	1.2646E-01	1.2649E-01	1.383E-01
EU-155 #A	2.1475E-01	2.1493E-01	2.5573E-01	2.5601E-01	2.777E-01
HG-203 #B	-1.3263E-02	-1.3709E-02	6.1070E-02	6.1075E-02	6.550E-02
TL-208	2.0976E-01	2.0976E-01	7.2262E-02	7.3214E-02	

PB-212 #	6.3440E-01	6.3440E-01	1.4875E-01	1.5295E-01	1.321E-01
PB-214 #	4.1921E-01	4.1921E-01	1.2513E-01	1.2732E-01	1.217E-01
BI-212 #B	0.0000E+00	0.0000E+00	5.3333E-01	5.3333E-01	6.265E-01
BI-214	4.3875E-01	4.3875E-01	1.5497E-01	1.5691E-01	
RA-224 #A	1.0059E+00	1.0059E+00	1.3664E+00	1.3676E+00	1.486E+00
RA-226 #	1.8439E+00	1.8439E+00	1.3781E+00	1.3820E+00	1.452E+00
AC-228	6.7341E-01	6.7341E-01	2.6750E-01	2.7016E-01	
TH-227 #B	-4.6721E-02	-4.6721E-02	4.9855E-01	4.9856E-01	5.247E-01
PA-234 #B	-2.8389E-03	-2.8389E-03	2.3375E-01	2.3375E-01	2.630E-01
TH-234 #B	2.0844E+00	2.0844E+00	2.4832E+00	2.4859E+00	4.893E+00
AM-241 #A	-1.3437E-01	-1.3437E-01	7.1467E-01	7.1471E-01	7.970E-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) 1.4666492E+01 pCi/gm

Total Decayed Activity (295.2 to 1999.0 keV) 1.4666924E+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_14SEP2005_1632.An1

Sample description

FSS-NOL-06-01-094-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_14SEP2005_1632.An1

Acquisition information

Start time:	14-Sep-2005 16:32:37
Live time:	2000
Real time:	2022
Dead time:	1.08 %
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: 1.6970E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6970E+03) =
5.8928E+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-Sep-2005 14:51:00
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: 0.3489

***** 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	214.	20.00	1.50	9.541E-03	77.11	10.700	1.671E+00	PB214
					77.11	17.500	1.022E+00	PB212
77.12	214.	20.00	1.50	9.541E-03	77.11	10.700	1.671E+00	PB214
					77.11	17.500	1.022E+00	PB212
185.96	115.	26.29	1.53	1.627E-02				
185.96	115.	26.29	1.53	1.627E-02	185.99	3.280	1.644E+00	RA226
209.58	56.	40.64	0.96	1.518E-02				

238.79	592.	5.05	1.21	1.380E-02	238.63	43.100	7.921E-01	PB212
241.74	59.	35.02	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
270.81	87.	27.63	1.31	1.240E-02				
277.87	50.	35.47	1.03	1.212E-02				
277.87	50.	35.47	1.03	1.212E-02	279.17	81.500	PBC<MDA	HG203
295.48	195.	17.05	1.20	1.146E-02	295.22	19.200	7.054E-01	PB214
338.67	102.	21.97	1.53	1.005E-02	338.40	12.010	6.749E-01	AC228
352.26	240.	10.57	1.25	9.671E-03	351.99	37.100	5.305E-01	PB214
462.93	45.	41.63	0.71	7.374E-03				
462.93	45.	41.63	0.71	7.374E-03	463.51	10.000	PBC<MDA	SB125
510.52	112.	21.79	2.05	6.697E-03	510.72	22.500	5.937E-01	TL208
583.66	233.	8.81	1.24	5.885E-03	583.14	86.000	3.653E-01	TL208
609.75	185.	10.15	1.13	5.645E-03	609.32	46.090	5.646E-01	BI214
662.06	167.	13.11	1.29	5.226E-03	661.62	84.620	3.006E-01	CS137
728.02	71.	21.77	1.09	4.789E-03	727.17	11.800	1.002E+00	BI212
911.47	124.	14.24	1.78	3.920E-03	911.07	29.000	8.701E-01	AC228
968.26	107.	17.60	0.95	3.718E-03	968.90	17.460	1.315E+00	AC228
1121.01	54.	29.12	2.11	3.283E-03	1120.28	15.040	8.773E-01	BI214
1173.84	151.	15.29	1.94	3.155E-03	1173.23	99.860	3.817E-01	CO60
1333.18	100.	11.19	2.12	2.833E-03	1332.51	99.980	2.811E-01	CO60
1461.53	550.	4.30	2.11	2.620E-03	1460.75	10.700	1.562E+01	K40
1765.60	32.	17.68	1.21	2.225E-03	1764.51	15.920	7.173E-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	
418.77	209.58	220.	56.	0.028	121.93	0.960	NP-239	
477.20	238.68	151.	592.	0.296	15.15	1.215	PB-212	D
483.10	241.63	187.	59.	0.030	105.07	1.217	PB-214	D
541.26	270.81	184.	87.	0.044	82.89	1.308	AC-228	s
555.38	277.87	124.	50.	0.025	106.40	1.025	NP-239	l
925.61	462.93	102.	45.	0.023	124.90	0.711	AC-228	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-214	153.80	77.11	811.	214.	0.107	60.00	1.500	D
PB-212	153.80	77.11	811.	214.	0.107	60.00	1.500	D
RA-226	372.38	186.39	441.	90.	0.045	99.21	1.500	s
PB-212	477.14	238.76	360.	541.	0.270	19.70	1.500	
PB-214	590.48	295.41	215.	137.	0.068	52.17	1.500	s
AC-228	677.02	338.67	150.	102.	0.051	65.92	1.532	

PB-214	704.01	352.16	117.	198.	0.099	31.42	1.500s
TL-208	1020.82	510.52	125.	112.	0.056	65.36	2.052s
TL-208	1167.16	583.66	56.	232.	0.116	26.42	1.241
Bi-214	1219.36	609.75	59.	185.	0.092	30.44	1.129
CS-137	1324.01	662.06	78.	167.	0.083	39.32	1.288
Bi-212	1456.00	728.02	53.	71.	0.036	65.30	1.095
AC-228	1823.09	911.47	58.	124.	0.062	42.72	1.780
AC-228	1936.72	968.26	64.	107.	0.054	52.80	0.948s
Bi-214	2242.42	1121.01	55.	54.	0.027	87.36	2.107s
CO-60	2348.15	1173.84	78.	151.	0.075	45.88	1.942
CO-60	2667.05	1333.18	9.	100.	0.050	33.57	2.123s
K-40	2923.97	1461.53	3.	550.	0.275	12.90	2.111
Bi-214	3532.66	1765.60	0.	32.	0.016	53.03	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		7.5793E-02					
			477.56	7.579E-02	%(	5.107E-01	1.49E-01 G
K-40		1.5623E+01					
			1460.75	1.562E+01	(P	3.004E-01	6.72E-01 G
MN-54		-3.6577E-03					
			834.81	-3.658E-03	%(P	6.370E-02	1.79E-02 G
CO-57		5.9169E-04					
			122.07	5.917E-04	&(	5.999E-02	1.78E-02 G K
			136.43	-8.637E-02	%	4.973E-01	1.49E-01 G
CO-60		2.8105E-01					
			1332.51	2.811E-01	*(P	4.711E-02	3.15E-02 G K
			1173.23	3.817E-01	+	1.109E-01	5.84E-02 G K
Sr-85		-2.2400E-02					
			514.00	-2.240E-02	&(	7.359E-02	2.20E-02 G
Kr-85		-5.0556E+02					
			513.99	-5.056E+02	&(	1.662E+03	4.96E+02 G
Y-88		2.1739E-03					
			1836.01	2.174E-03	%(P	5.640E-02	1.43E-02 G K

898.02-9.498E-03 & P 7.111E-02 2.01E-02 G

NB-94 -3.4687E-03

871.10-3.469E-03 %(7.127E-02 2.02E-02 G K

702.50 2.823E-03 % 5.688E-02 1.61E-02 G K

Ag-108M 1.4333E-02

722.95 1.433E-02 %(6.504E-02 1.89E-02 G K

614.37-1.842E-02 % P 7.930E-02 2.34E-02 G

433.93-2.784E-03 & 5.895E-02 1.71E-02 G

CD-109 1.6802E-01

88.04 1.680E-01 %(P 2.292E+00 6.83E-01 G

SN-113 1.2829E-02

391.71 1.283E-02 &(7.183E-02 2.11E-02 G K

255.04-7.445E-01 % 2.364E+00 7.09E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-3.3796E-03						
		427.95	-3.380E-03	&(P	1.935E-01	5.57E-02	G K
		600.77	-3.490E-02	& P	3.099E-01	8.92E-02	G
		636.15	-1.218E-01	% P	5.745E-01	1.68E-01	G
		463.51	2.368E-01	% P	5.056E-01	1.53E-01	G
		176.29	-3.568E-02	& P	7.020E-01	2.06E-01	G
I-131	1.3327E-02						
		364.48	1.333E-02	&(	6.648E-02	1.96E-02	G K
		636.97	-1.756E-01	%	9.629E-01	2.80E-01	G
		284.29	1.457E-01	&	9.161E-01	2.71E-01	G
CS-134	0.0000E+00						
		604.66	0.000E+00	&(	1.037E-01	3.03E-02	G K
		795.76	5.291E-02	%	7.088E-02	2.24E-02	G
		569.29	2.239E-03	%	2.896E-01	8.10E-02	G
		801.84	-1.057E-03	% P	9.025E-01	2.57E-01	G
CS-137	3.0056E-01						
		661.62	3.006E-01	(	7.895E-02	3.94E-02	G
CE-139	-2.4361E-02						
		165.85	-2.436E-02	%(P	6.614E-02	1.99E-02	G
EU-152	5.6219E-03						
		121.78	5.622E-03	&(P	1.716E-01	5.08E-02	G K
		344.30	-1.051E-02	&	1.799E-01	5.24E-02	G
		1408.08	-4.013E-03	%	3.128E-01	8.38E-02	G
		964.00	1.703E-03	& P	6.505E-01	1.85E-01	G
		1112.07	1.338E-01	%	6.245E-01	1.82E-01	G

778.90 7.505E-02 % P 4.266E-01 1.22E-01 G

EU-154 6.7625E-03

123.10 6.763E-03 %(P 1.304E-01 3.87E-02 G K

1274.80 6.737E-04 % 1.814E-01 4.88E-02 G

723.30 2.773E-03 % P 2.913E-01 8.16E-02 G

1004.80-7.973E-02 & 3.847E-01 1.11E-01 G

EU-155 1.3865E-02

86.45 1.386E-02 %(P 2.990E-01 8.91E-02 G K

105.31 4.486E-02 & 2.624E-01 7.84E-02 G

HG-203 2.8235E-02

279.17 2.823E-02 &(P 5.134E-02 1.57E-02 G K

72.87-2.039E-01 % 2.287E+00 6.84E-01 G

70.83-1.708E+00 % 4.371E+00 1.32E+00 G

82.50 0.000E+00 % 4.852E+00 1.45E+00 G

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

TL-208       3.6534E-01
                   583.14 3.653E-01  (P 5.889E-02 3.23E-02 G
                   510.72 5.937E-01 +   2.894E-01 1.29E-01 G

PB-212       7.2359E-01
                   238.63 7.236E-01  (  1.220E-01 4.75E-02 G K
                                        Energy duplication
                    77.11 1.022E+00 +   6.459E-01 2.04E-01 G
                    74.81 6.798E-01 & P 1.327E+00 4.03E-01 G

PB-214       4.5833E-01
                   351.99 4.394E-01 @(P 1.179E-01 4.61E-02 G K
                   295.22 4.950E-01  (  2.568E-01 8.61E-02 G
                                        Energy duplication
                    77.11 1.671E+00 +   1.056E+00 3.34E-01 G
                   241.92 8.164E-02 %   6.417E-01 1.90E-01 G

BI-212       1.0023E+00
                   727.17 1.002E+00  (  5.148E-01 2.18E-01 G K
                  1620.56 3.230E-01 % P 1.938E+00 5.22E-01 G
                   785.42 9.668E-01 % P 2.770E+00 8.21E-01 G

BI-214       6.0379E-01
                   609.32 5.646E-01  (  1.181E-01 5.73E-02 G K
                  1764.51 7.173E-01  (P 1.657E-01 1.27E-01 G
                  1120.28 8.773E-01 +   5.990E-01 2.55E-01 G

RA-224       1.3952E-01
                   241.00 1.395E-01 &(P 1.438E+00 4.26E-01 G
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RA-226       1.3363E+00
                 185.99 1.336E+00  (P 1.500E+00 4.64E-01 G

AC-228       8.1293E-01
                 911.07 8.701E-01  (P 2.669E-01 1.24E-01 G K
                 968.90 1.315E+00 + P 4.900E-01 2.31E-01 G
                 338.40 6.749E-01  (  3.935E-01 1.48E-01 G

TH-227      -1.9906E-01
                 236.00-1.991E-01 %(P 5.248E-01 1.58E-01 G K
                 256.25-1.661E-01 %   7.044E-01 2.10E-01 G

PA-234      -8.2526E-02
                  98.44-8.253E-02 &(  2.640E-01 7.94E-02 G K
                 946.00-3.186E-03 %   3.495E-01 9.76E-02 G
                 131.28-1.633E-03 &   2.449E-01 7.25E-02 G
                  94.67 2.255E-01 %   4.490E-01 1.36E-01 G
                 883.24 2.005E-01 &   4.249E-01 1.29E-01 G
                 926.70 1.693E-01 %   4.602E-01 1.36E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26 2.753E-03 % 4.291E-01 1.20E-01 G

TH-234 7.6713E-01
63.29 7.671E-01 %(P 5.184E+00 1.55E+00 G K
92.80 1.238E+00 % 2.712E+00 8.22E-01 G
92.38 1.456E+00 & P 3.209E+00 9.72E-01 G

AM-241 -1.7398E-01
59.54-1.740E-01 %(7.826E-01 2.35E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	7.3783E-02	7.5793E-02	4.4617E-01	4.4619E-01	4.972E-01
K-40		1.5623E+01	1.5623E+01	2.0165E+00	2.1989E+00	
MN-54	#A	-3.6410E-03	-3.6577E-03	6.7027E-02	6.7027E-02	6.341E-02
CO-57	#B	5.8855E-04	5.9169E-04	5.3275E-02	5.3275E-02	5.967E-02
CO-60		2.8084E-01	2.8105E-01	9.4417E-02	9.5725E-02	

Sr-85 #A	-2.1909E-02	-2.2400E-02	6.5868E-02	6.5880E-02	7.197E-02
Kr-85 #A	-5.0555E+02	-5.0556E+02	1.4873E+03	1.4875E+03	1.662E+03
Y-88 #B	2.1448E-03	2.1739E-03	4.2881E-02	4.2881E-02	5.565E-02
NB-94 #B	-3.4687E-03	-3.4687E-03	6.0578E-02	6.0578E-02	7.127E-02
Ag-108M#B	1.4333E-02	1.4333E-02	5.6825E-02	5.6831E-02	6.504E-02
CD-109 #A	1.6748E-01	1.6802E-01	2.0495E+00	2.0495E+00	2.284E+00
SN-113 #B	1.2670E-02	1.2829E-02	6.3169E-02	6.3174E-02	7.094E-02
SB-125 #B	-3.3748E-03	-3.3796E-03	3.3445E-01	3.3445E-01	1.932E-01
I-131 #B	1.1149E-02	1.3327E-02	5.8724E-02	5.8729E-02	5.561E-02
CS-134 #B	0.0000E+00	0.0000E+00	9.0834E-02	9.0834E-02	1.035E-01
CS-137	3.0052E-01	3.0056E-01	1.1817E-01	1.1937E-01	
CE-139 #A	-2.4109E-02	-2.4361E-02	6.1099E-02	6.1114E-02	6.545E-02
EU-152 #B	5.6202E-03	5.6219E-03	1.5245E-01	1.5245E-01	1.716E-01
EU-154 #B	6.7594E-03	6.7625E-03	1.1616E-01	1.1616E-01	1.304E-01
EU-155 #B	1.3854E-02	1.3865E-02	2.6743E-01	2.6743E-01	2.988E-01
HG-203 #B	2.7378E-02	2.8235E-02	4.6989E-02	4.7015E-02	4.978E-02
TL-208	3.6534E-01	3.6534E-01	9.6709E-02	9.8859E-02	
PB-212 #	7.2359E-01	7.2359E-01	1.4256E-01	1.4823E-01	1.220E-01
PB-214 #	4.5833E-01	4.5833E-01	1.3963E-01	1.4198E-01	1.179E-01
BI-212	1.0023E+00	1.0023E+00	6.5444E-01	6.5686E-01	
BI-214	6.0379E-01	6.0379E-01	1.8381E-01	1.8691E-01	
RA-224 #A	1.3952E-01	1.3952E-01	1.2788E+00	1.2788E+00	1.438E+00
RA-226 #A	1.3363E+00	1.3363E+00	1.3919E+00	1.3939E+00	1.500E+00
AC-228	8.1293E-01	8.1293E-01	3.1946E-01	3.2270E-01	
TH-227 #B	-1.9906E-01	-1.9906E-01	4.8168E-01	4.8181E-01	5.248E-01
PA-234 #B	-8.2526E-02	-8.2526E-02	2.3835E-01	2.3839E-01	2.640E-01
TH-234 #B	7.6713E-01	7.6713E-01	4.6466E+00	4.6468E+00	5.184E+00
AM-241 #A	-1.7398E-01	-1.7398E-01	7.0393E-01	7.0400E-01	7.825E-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) 1.8988384E+01 pCi/gm

Total Decayed Activity (270.7 to 1999.0 keV) 1.8988632E+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_14SEPT2005_1119.An1

Sample description

FSS-NOL-06-01-089-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_14SEPT2005_1119.An1

Acquisition information

Start time:	14-Sep-2005 11:21:21
Live time:	2000
Real time:	2017
Dead time:	0.86 %
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: 1.6890E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6890E+03) =
5.9207E+02

Detection limit method: Nureg 4.16

Random error: 1.0000000E+00

Systematic error: 1.0000000E+00

Fraction Limit: 0.000%

Background width: average of five points.

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

Corrections	Status	Comments
Decay correct to date:	YES	12-Sep-2005 10:14:00
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: 0.2789

***** 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	98.	40.37	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.05	152.	26.06	1.50	9.541E-03				
77.05	152.	26.06	1.50	9.541E-03	77.11	17.500	7.279E-01	PB212
					77.11	10.700	1.191E+00	PB214
77.05	152.	26.06	1.50	9.541E-03				
77.05	152.	26.06	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.191E+00	PB214

185.83	84.	29.70	1.02	1.627E-02				
185.83	84.	29.70	1.02	1.627E-02	185.99	3.280	PBC<MDA	RA226
208.76	64.	39.17	1.05	1.522E-02				
238.80	570.	4.83	1.21	1.380E-02	238.63	43.100	7.667E-01	PB212
241.77	76.	24.16	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.969E-01	PB214
270.38	74.	32.49	0.81	1.242E-02				
295.50	99.	17.90	1.39	1.146E-02	295.22	19.200	3.591E-01	PB214
328.27	55.	35.90	0.88	1.036E-02				
338.54	135.	17.51	1.07	1.006E-02	338.40	12.010	8.953E-01	AC228
352.04	198.	13.69	1.23	9.677E-03	351.99	37.100	4.392E-01	PB214
462.90	51.	25.65	1.32	7.374E-03				
462.90	51.	25.65	1.32	7.374E-03	463.51	10.000	5.402E-01	SB125
510.67	88.	17.83	1.96	6.696E-03	510.72	22.500	4.653E-01	TL208
583.56	148.	12.10	1.28	5.886E-03	583.14	86.000	2.325E-01	TL208
609.56	87.	14.51	1.42	5.647E-03	609.32	46.090	2.667E-01	BI214
727.28	50.	24.66	1.45	4.794E-03	727.17	11.800	7.072E-01	BI212
795.90	33.	33.19	1.09	4.419E-03	795.76	85.400	6.924E-02	CS134
911.74	122.	13.02	1.56	3.919E-03	911.07	29.000	8.559E-01	AC228
965.05	25.	32.72	1.71	3.734E-03	964.00	14.580	3.723E-01	EU152
969.19	103.	14.51	1.44	3.717E-03	968.90	17.460	1.272E+00	AC228
1120.99	47.	35.88	1.18	3.281E-03	1120.28	15.040	7.680E-01	BI214
1461.48	383.	5.18	1.80	2.620E-03	1460.75	10.700	1.093E+01	K40
1765.84	16.	25.00	0.83	2.225E-03	1764.51	15.920	3.594E-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	
417.13	208.76	230.	64.	0.032	117.51	1.049	LU-177	
477.22	238.72	94.	570.	0.285	14.49	1.215	PB-212	D
483.18	241.70	131.	76.	0.038	72.47	1.217	PB-214	D
540.41	270.38	175.	74.	0.037	97.47	0.806	AC-228	
656.21	328.27	116.	55.	0.028	107.69	0.877	RH-106M	
925.55	462.90	60.	33.	0.016	113.98	1.323	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	149.51	74.97	781.	98.	0.049	121.12	1.500	s
PB-212	153.80	77.11	708.	152.	0.076	78.19	1.500	D
PB-214	153.80	77.11	708.	152.	0.076	78.19	1.500	D
PB-212	477.21	238.79	272.	484.	0.242	19.87	1.500	s
PB-214	590.53	295.44	141.	99.	0.050	59.08	1.500	
AC-228	676.75	338.54	129.	135.	0.068	52.52	1.072	

PB-214	704.06	352.19	115.	157.	0.078	37.52	1.500
TL-208	1021.11	510.67	50.	88.	0.044	53.48	1.956s
TL-208	1166.95	583.56	51.	147.	0.074	36.30	1.277
BI-214	1218.97	609.56	31.	87.	0.043	43.52	1.424
BI-212	1454.52	727.28	34.	50.	0.025	73.97	1.452s
CS-134	1590.34	795.16	23.	22.	0.011	111.30	1.601s
AC-228	1823.63	911.74	35.	122.	0.061	39.05	1.557s
EU-152	1930.30	965.05	22.	25.	0.013	98.15	1.714
AC-228	1938.59	969.19	29.	103.	0.052	43.52	1.439
BI-214	2241.75	1120.68	35.	27.	0.013	110.97	1.819
K-40	2923.86	1461.48	3.	383.	0.192	15.54	1.800
BI-214	3533.13	1765.84	0.	16.	0.008	75.00	0.832s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-4.9091E-02					
			477.56	-4.909E-02	%(	4.372E-01	1.26E-01 G
K-40		1.0929E+01					
			1460.75	1.093E+01	(P	3.057E-01	5.66E-01 G
MN-54		-5.1173E-03					
			834.81	-5.117E-03	&(P	5.343E-02	1.49E-02 G
CO-57		-8.0226E-03					
			122.07	-8.023E-03	&(	5.685E-02	1.69E-02 G K
			136.43	-5.388E-02	&	4.131E-01	1.23E-01 G
CO-60		5.2097E-03					
			1332.51	5.210E-03	&(P	6.462E-02	1.77E-02 G K
			1173.23	-7.049E-03	%	8.340E-02	2.36E-02 G K
Sr-85		-1.8154E-02					
			514.00	-1.815E-02	%(	6.098E-02	1.81E-02 G
Kr-85		-4.1038E+02					
			513.99	-4.104E+02	%(	1.377E+03	4.09E+02 G
Y-88		1.1085E-03					
			1836.01	1.108E-03	%(P	4.810E-02	1.17E-02 G K

898.02-1.318E-03 % P 7.665E-02 2.13E-02 G

NB-94 0.0000E+00

871.10 0.000E+00 &(5.967E-02 1.65E-02 G K

702.50 4.804E-03 & 4.137E-02 1.16E-02 G K

Ag-108M -6.4834E-04

722.95-6.483E-04 %(4.905E-02 1.34E-02 G K

614.37-1.827E-02 & P 5.588E-02 1.65E-02 G

433.93-6.196E-03 % 3.856E-02 1.11E-02 G

CD-109 -1.1675E-01

88.04-1.167E-01 %(P 2.339E+00 6.96E-01 G

SN-113 -6.4844E-03

391.71-6.484E-03 %(6.281E-02 1.81E-02 G K

255.04-1.178E-01 & 1.887E+00 5.51E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	2.7993E-02						
		427.95	2.799E-02	%(P	1.288E-01	3.74E-02	G K
		600.77	-4.070E-02	% P	2.378E-01	6.80E-02	G
		636.15	-6.850E-02	& P	4.044E-01	1.16E-01	G
		463.51	1.855E-01	% P	3.790E-01	1.14E-01	G
		176.29	2.339E-03	% P	6.678E-01	1.96E-01	G
I-131	-3.7899E-03						
		364.48	-3.790E-03	%(	5.504E-02	1.58E-02	G K
		636.97	-1.665E-01	%	8.199E-01	2.38E-01	G
		284.29	-1.113E-01	&	7.528E-01	2.21E-01	G
CS-134	2.1949E-02						
		604.66	-5.494E-04	&(	4.490E-02	1.25E-02	G K
		795.76	4.766E-02	@(	5.367E-02	1.77E-02	G
		569.29	6.988E-03	%	3.110E-01	8.76E-02	G
		801.84	-7.902E-03	& P	4.990E-01	1.35E-01	G
CS-137	1.7577E-02						
		661.62	1.758E-02	%(	5.300E-02	1.56E-02	G
CE-139	1.2000E-02						
		165.85	1.200E-02	&(P	5.450E-02	1.63E-02	G
EU-152	1.0296E-01						
		121.78	-3.133E-02	&(P	1.716E-01	5.12E-02	G K
		344.30	1.000E-02	&	1.343E-01	3.87E-02	G
		1408.08	-7.906E-03	&	2.430E-01	6.32E-02	G
		964.00	3.723E-01	(P	3.640E-01	1.23E-01	G
		1112.07	4.986E-02	&	5.605E-01	1.58E-01	G

778.90-2.075E-02 % P 2.941E-01 7.95E-02 G

EU-154 -1.1093E-02

123.10-1.109E-02 %(P 1.252E-01 3.72E-02 G K

1274.80-2.012E-02 % 1.701E-01 4.70E-02 G

723.30-3.715E-02 % P 2.587E-01 7.34E-02 G

1004.80 1.010E-01 & 2.787E-01 8.23E-02 G

EU-155 6.4487E-04

86.45 6.449E-04 &(P 2.665E-01 7.91E-02 G K

105.31 1.081E-01 % 2.517E-01 7.61E-02 G

HG-203 1.7446E-02

279.17 1.745E-02 %(P 4.827E-02 1.45E-02 G K

72.87-6.106E-01 % 2.274E+00 6.84E-01 G

70.83 1.669E+00 % 3.523E+00 1.07E+00 G

82.50-1.310E+00 % 4.247E+00 1.28E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.3250E-01						
		583.14	2.325E-01	(P	5.675E-02	2.82E-02	G
		510.72	4.653E-01	+	1.901E-01	8.29E-02	G
PB-212	6.7324E-01						
		238.63	6.510E-01	@(	1.070E-01	4.31E-02	G K
					Energy duplication		
		77.11	7.279E-01	*(	6.071E-01	1.90E-01	G
		74.81	9.213E-01	& P	1.252E+00	3.83E-01	G
PB-214	3.5297E-01						
		351.99	3.493E-01	(P	1.174E-01	4.38E-02	G K
		295.22	3.600E-01	(	2.107E-01	7.09E-02	G
					Energy duplication		
		77.11	1.191E+00	+	9.929E-01	3.10E-01	G
		241.92	1.276E-01	%	7.152E-01	2.13E-01	G
BI-212	7.0717E-01						
		727.17	7.072E-01	*(	4.226E-01	1.74E-01	G K
		1620.56	-4.117E-02	% P	2.115E+00	5.33E-01	G
		785.42	9.942E-01	% P	2.354E+00	7.07E-01	G
BI-214	2.9051E-01						
		609.32	2.667E-01	(	8.831E-02	3.87E-02	G K
		1764.51	3.594E-01	(P	1.664E-01	9.04E-02	G
		1120.28	4.314E-01	+	4.918E-01	1.60E-01	G
RA-224	6.1907E-01						
		241.00	6.191E-01	%(P	1.315E+00	3.98E-01	G

```
RA-226       9.4052E-01
                 185.99 9.405E-01 %(P 1.300E+00 3.99E-01 G

AC-228       8.6746E-01
                 911.07 8.559E-01 @(P 2.139E-01 1.12E-01 G K
                 968.90 1.272E+00 + P 3.418E-01 1.85E-01 G
                 338.40 8.953E-01  (  3.682E-01 1.57E-01 G

TH-227      -2.0357E-01
                 236.00-2.036E-01 %(P 5.057E-01 1.53E-01 G K
                 256.25 5.938E-03 &   5.558E-01 1.61E-01 G

PA-234      -2.8857E-02
                  98.44-2.886E-02 %(  2.654E-01 7.91E-02 G K
                 946.00-1.854E-02 %   2.416E-01 6.62E-02 G
                 131.28-1.444E-02 &   2.331E-01 6.91E-02 G
                  94.67 2.403E-01 %   4.278E-01 1.30E-01 G
                 883.24-6.735E-02 %   4.392E-01 1.24E-01 G
                 926.70 1.067E-02 &   4.332E-01 1.17E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	1.354E-03	%	4.629E-01	1.30E-01	G
TH-234	2.2907E+00						
		63.29	2.291E+00	&(P	4.388E+00	1.33E+00	G K
		92.80	1.284E+00	%	2.535E+00	7.70E-01	G
		92.38	1.586E+00	% P	2.886E+00	8.78E-01	G
AM-241	-6.7675E-03						
		59.54	-6.768E-03	%(	6.992E-01	2.07E-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

- -

***** 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-4.7804E-02	-4.9091E-02	3.7708E-01	3.7709E-01	4.257E-01
K-40		1.0929E+01	1.0929E+01	1.6987E+00	1.8060E+00	
MN-54	#A	-5.0941E-03	-5.1173E-03	5.2397E-02	5.2397E-02	5.319E-02
CO-57	#B	-7.9805E-03	-8.0226E-03	5.0783E-02	5.0785E-02	5.656E-02
CO-60	#B	5.2059E-03	5.2097E-03	5.3068E-02	5.3069E-02	6.457E-02

Sr-85 #A	-1.7761E-02	-1.8154E-02	5.4359E-02	5.4368E-02	5.966E-02
Kr-85 #A	-4.1037E+02	-4.1038E+02	1.2278E+03	1.2280E+03	1.377E+03
Y-88 #B	1.0938E-03	1.1085E-03	3.4952E-02	3.4952E-02	4.746E-02
NB-94 #B	0.0000E+00	0.0000E+00	4.9483E-02	4.9483E-02	5.967E-02
Ag-108M#B	-6.4832E-04	-6.4834E-04	4.0262E-02	4.0262E-02	4.905E-02
CD-109 #A	-1.1638E-01	-1.1675E-01	3.2545E+00	3.2545E+00	2.332E+00
SN-113 #B	-6.4050E-03	-6.4844E-03	5.4392E-02	5.4393E-02	6.204E-02
SB-125 #B	2.7954E-02	2.7993E-02	1.1229E-01	1.1230E-01	1.286E-01
I-131 #B	-3.1768E-03	-3.7899E-03	4.7463E-02	4.7464E-02	4.614E-02
CS-134 #B	2.1908E-02	2.1949E-02	2.4430E-02	2.4461E-02	4.482E-02
CS-137 #A	1.7574E-02	1.7577E-02	4.6944E-02	4.6954E-02	5.299E-02
CE-139 #A	1.1877E-02	1.2000E-02	4.8804E-02	4.8809E-02	5.394E-02
EU-152 #B	1.0292E-01	1.0296E-01	1.0197E-01	1.0213E-01	1.715E-01
EU-154 #B	-1.1088E-02	-1.1093E-02	1.1650E-01	1.1650E-01	1.251E-01
EU-155 #B	6.4436E-04	6.4487E-04	2.3735E-01	2.3735E-01	2.663E-01
HG-203 #B	1.6923E-02	1.7446E-02	4.3415E-02	4.3426E-02	4.682E-02
TL-208	2.3250E-01	2.3250E-01	8.4628E-02	8.5628E-02	
PB-212 #	6.7324E-01	6.7324E-01	1.3379E-01	1.3903E-01	1.070E-01
PB-214 #	3.5297E-01	3.5297E-01	1.2360E-01	1.2518E-01	1.174E-01
BI-212 #	7.0717E-01	7.0717E-01	5.2311E-01	5.2462E-01	
BI-214	2.9051E-01	2.9051E-01	1.2643E-01	1.2748E-01	
RA-224 #A	6.1907E-01	6.1907E-01	1.1951E+00	1.1956E+00	1.315E+00
RA-226 #A	9.4052E-01	9.4052E-01	1.1969E+00	1.1981E+00	1.300E+00
AC-228	8.6746E-01	8.6746E-01	2.8405E-01	2.8819E-01	
TH-227 #B	-2.0357E-01	-2.0357E-01	4.6452E-01	4.6466E-01	5.057E-01
PA-234 #B	-2.8857E-02	-2.8857E-02	2.3738E-01	2.3738E-01	2.654E-01
TH-234 #B	2.2907E+00	2.2907E+00	4.0002E+00	4.0022E+00	4.388E+00
AM-241 #A	-6.7675E-03	-6.7675E-03	6.2122E-01	6.2122E-01	6.992E-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 (270.2 to 1999.0 keV) 1.3026681E+01 pCi/gm

Total Decayed Activity (270.2 to 1999.0 keV) 1.3026681E+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_21OCT2005_1133.An1

Sample description

FSS NOL-06-01-005-R

Spectrum Filename: C:\GammaVision\Spectra\102F_21OCT2005_1133.An1

Acquisition information

Start time:	21-Oct-2005 11:33:50
Live time:	2000
Real time:	2027
Dead time:	1.33 %
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: 1.8420E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8420E+03) =
5.4289E+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	20-Oct-2005 12:32:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0838

***** 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	150.	33.65	1.50	8.847E-03	70.83	3.520	4.194E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.08	217.	23.10	1.50	9.541E-03	77.11	10.700	1.560E+00	PB214
					77.11	17.500	9.536E-01	PB212
77.08	217.	23.10	1.50	9.541E-03	77.11	10.700	1.560E+00	PB214
					77.11	17.500	9.536E-01	PB212
87.12	102.	31.55	1.11	1.216E-02				

89.62	100.	32.73	1.11	1.271E-02	88.04	3.790	PBC<MDA	CD109
93.29	133.	23.49	1.11	1.344E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.445E+00	TH234
128.48	119.	34.66	1.14	1.713E-02				
186.02	118.	31.46	1.50	1.627E-02	185.99	3.280	PBC<MDA	RA226
209.88	90.	32.56	1.34	1.516E-02				
238.60	896.	4.17	1.50	1.365E-02				
238.60	896.	4.17	1.50	1.365E-02	238.63	43.100	1.105E+00	PB212
238.65	877.	4.02	1.21	1.380E-02				
238.65	877.	4.02	1.21	1.380E-02	238.63	43.100	1.081E+00	PB212
241.52	139.	23.02	1.22	1.367E-02	241.00	3.900	1.892E+00	RA224
270.27	82.	28.29	1.49	1.243E-02				
294.65	161.	17.05	1.24	1.149E-02				
294.65	161.	17.05	1.24	1.149E-02	295.22	19.200	5.359E-01	PB214
300.21	98.	27.21	1.40	1.129E-02				
327.99	62.	31.59	1.07	1.037E-02				
338.33	183.	15.30	1.24	1.006E-02	338.40	12.010	1.110E+00	AC228
351.88	277.	8.98	1.34	9.682E-03				
351.88	277.	8.98	1.34	9.682E-03	351.99	37.100	5.656E-01	PB214
463.40	42.	38.61	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
510.79	119.	17.72	1.51	6.694E-03	510.72	22.500	5.796E-01	TL208
583.06	244.	9.57	1.27	5.891E-03	583.14	86.000	3.534E-01	TL208
608.92	205.	11.57	1.44	5.653E-03	609.32	46.090	5.787E-01	BI214
661.61	143.	14.48	1.06	5.230E-03	661.62	84.620	2.371E-01	CS137
727.36	48.	27.81	1.55	4.794E-03	727.17	11.800	6.167E-01	BI212
794.52	65.	20.66	1.13	4.426E-03				
860.99	45.	31.78	1.10	4.121E-03				
910.95	175.	9.88	1.91	3.922E-03	911.07	29.000	1.128E+00	AC228
964.38	29.	39.41	1.71	3.734E-03	964.00	14.580	PBC<MDA	EU152
969.04	96.	15.06	1.25	3.717E-03	968.90	17.460	1.090E+00	AC228
1119.93	57.	31.66	2.36	3.283E-03	1120.28	15.040	8.484E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1173.12	119.	13.78	1.44	3.157E-03	1173.23	99.860	2.763E-01	CO60
1332.22	110.	14.67	1.65	2.834E-03	1332.51	99.980	2.837E-01	CO60
1460.47	633.	4.07	1.80	2.621E-03	1460.75	10.700	1.655E+01	K40
1763.57	39.	16.01	1.00	2.225E-03	1764.51	15.920	8.058E-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	
173.83	87.21	465.	102.	0.051	94.66	1.107	PB-214	ID
178.83	89.71	480.	100.	0.050	98.18	1.109	PB-214	ID
256.55	128.48	606.	146.	0.073	75.62	1.136	AC-228	s
419.37	209.88	337.	90.	0.045	97.69	1.340	NP-239	s
476.92	238.62	182.	877.	0.438	12.05	1.215	PB-212	D
482.67	241.50	442.	139.	0.069	69.07	1.217	PB-214	D
540.19	270.27	199.	82.	0.041	84.88	1.494	AC-228	s
600.07	300.21	230.	98.	0.049	71.92	1.404	PB-212	
655.65	327.99	145.	62.	0.031	94.78	1.066	AC-228	
1589.07	794.52	40.	65.	0.032	55.62	1.131	AC-228	
1722.07	860.99	50.	45.	0.022	81.11	1.105	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	149.28	74.85	1252.	150.	0.075	100.96	1.500
PB-214	153.80	77.11	1149.	217.	0.109	69.31	1.500D
PB-212	153.80	77.11	1149.	217.	0.109	69.31	1.500D
TH-234	185.94	93.18	1113.	141.	0.071	102.60	1.500s
TH-234	185.93	93.17	1093.	142.	0.071	102.26	1.500s
RA-226	371.45	185.92	577.	123.	0.062	83.90	1.500s
PB-212	476.89	238.63	473.	784.	0.392	15.92	1.500D
PB-214	476.84	238.60	251.	896.	0.448	12.52	1.500s
PB-214	589.89	295.12	248.	136.	0.068	55.34	1.500s
AC-228	676.34	338.33	214.	183.	0.091	45.91	1.238
PB-214	703.35	351.83	146.	268.	0.134	26.45	1.500
SB-125	926.56	463.40	122.	42.	0.021	115.82	1.500s
TL-208	1021.37	510.79	105.	119.	0.060	53.15	1.509s
TL-208	1165.96	583.06	95.	244.	0.122	28.71	1.272

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bi-214	1217.68	608.92	106.	205.	0.103	34.70	1.437s
CS-137	1323.12	661.61	84.	143.	0.072	43.43	1.059
Bi-212	1454.68	727.36	64.	48.	0.024	83.42	1.554s
AC-228	1822.05	910.95	46.	175.	0.087	29.63	1.912s
EU-152	1928.95	964.38	53.	29.	0.015	118.24	1.714
AC-228	1938.29	969.04	43.	96.	0.048	45.18	1.246
Bi-214	2240.24	1119.93	73.	57.	0.029	94.98	2.361s
CO-60	2346.70	1173.12	51.	119.	0.059	41.33	1.437
CO-60	2665.14	1332.22	32.	110.	0.055	44.02	1.648s
K-40	2921.85	1460.47	8.	633.	0.316	12.20	1.801
Bi-214	3528.61	1763.57	0.	39.	0.019	48.04	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 -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS
BE-7		9.8631E-02				
			477.56	9.863E-02	&(	4.934E-01 1.45E-01 G
K-40		1.6554E+01				
			1460.75	1.655E+01	(P	4.211E-01 6.73E-01 G
MN-54		1.0128E-02				
			834.81	1.013E-02	&(P	7.236E-02 2.09E-02 G

```
CO-57        1.5161E-02
                 122.07 1.516E-02 %(  6.525E-02 1.96E-02 G K
                 136.43 4.259E-03 &   5.349E-01 1.59E-01 G

CO-60        2.8002E-01
                1332.51 2.837E-01 @(P 7.581E-02 4.16E-02 G K
                1173.23 2.763E-01  (  8.401E-02 3.81E-02 G K

Sr-85       -1.7420E-02
                 514.00-1.742E-02 %(  6.890E-02 2.05E-02 G

Kr-85       -3.9772E+02
                 513.99-3.977E+02 %(  1.574E+03 4.68E+02 G

Y-88        -1.0113E-02
                1836.01-1.011E-02 %(P 6.566E-02 1.81E-02 G K
                 898.02 5.931E-03 % P 6.297E-02 1.77E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	1.7832E-02						
		871.10	1.783E-02	%(	6.325E-02	1.86E-02	G K
		702.50	1.388E-02	&	5.965E-02	1.75E-02	G K
Ag-108M	-1.8484E-03						
		722.95	-1.848E-03	%(	6.231E-02	1.76E-02	G K
		614.37	2.099E-02	& P	4.877E-02	1.47E-02	G
		433.93	1.112E-04	%	5.650E-02	1.63E-02	G
CD-109	8.4688E-01						
		88.04	8.469E-01	%(P	2.521E+00	7.61E-01	G
SN-113	1.5821E-02						
		391.71	1.582E-02	%(	7.612E-02	2.25E-02	G K
		255.04	-3.544E-02	%	2.157E+00	6.33E-01	G
SB-125	1.0087E-01						
		427.95	-7.197E-03	%(P	1.701E-01	4.90E-02	G K
		600.77	7.060E-02	& P	2.738E-01	8.04E-02	G
		636.15	-9.378E-03	% P	5.149E-01	1.47E-01	G
		463.51	4.208E-01	*(P	5.408E-01	1.68E-01	G
		176.29	1.088E-01	% P	7.408E-01	2.21E-01	G
I-131	-4.4665E-03						
		364.48	-4.466E-03	&(	7.311E-02	2.14E-02	G K
		636.97	1.178E-01	%	8.526E-01	2.47E-01	G
		284.29	3.070E-03	%	8.362E-01	2.45E-01	G
CS-134	0.0000E+00						
		604.66	0.000E+00	%(	1.323E-01	3.91E-02	G K

795.76 1.097E-03 % 6.474E-02 1.81E-02 G
569.29 7.907E-02 & 3.776E-01 1.11E-01 G
801.84 1.333E-01 % P 6.151E-01 1.78E-01 G

CS-137 2.3709E-01
661.62 2.371E-01 (7.530E-02 3.43E-02 G

CE-139 5.5009E-03
165.85 5.501E-03 &(P 6.273E-02 1.87E-02 G

EU-152 1.5873E-01
121.78 4.199E-02 %(P 1.967E-01 5.90E-02 G K
344.30 1.045E-02 % 1.804E-01 5.28E-02 G
1408.08 8.309E-02 % 2.585E-01 7.54E-02 G
964.00 3.929E-01 (P 4.919E-01 1.56E-01 G
1112.07 4.740E-02 % 6.611E-01 1.89E-01 G
778.90-6.293E-02 % P 5.221E-01 1.51E-01 G

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

EU-154      -8.3720E-04
                 123.10-8.372E-04 &(P 1.344E-01 3.99E-02 G K
                1274.80 5.633E-02 %   1.934E-01 5.65E-02 G
                 723.30 3.309E-02 & P 3.569E-01 1.03E-01 G
                1004.80-4.737E-02 &   4.094E-01 1.17E-01 G

EU-155      -2.2923E-03
                  86.45-2.292E-03 %(P 2.579E-01 7.66E-02 G K
                 105.31 1.851E-02 %   3.101E-01 9.25E-02 G

HG-203      -6.5722E-03
                 279.17-6.572E-03 %(P 6.276E-02 1.86E-02 G K
                  72.87-4.830E-01 &   2.529E+00 7.60E-01 G
                  70.83 9.509E-01 %   3.806E+00 1.14E+00 G
                  82.50-9.135E-01 &   4.850E+00 1.46E+00 G

TL-208       3.5338E-01
                 583.14 3.534E-01  (P 6.971E-02 3.39E-02 G
                 510.72 5.796E-01 +   2.458E-01 1.03E-01 G

PB-212       9.6251E-01
                                   Energy duplication
                 238.63 9.661E-01  (  1.283E-01 5.13E-02 G K
                                   Energy duplication
                  77.11 9.536E-01 @(  7.059E-01 2.20E-01 G
                  74.81 1.295E+00 & P 1.448E+00 4.45E-01 G

PB-214       5.1527E-01
                 351.99 5.468E-01  (P 1.204E-01 4.83E-02 G K
                 295.22 4.543E-01 *(  2.536E-01 8.38E-02 G
```

Energy duplication

77.11 1.560E+00 + 1.154E+00 3.60E-01 G

241.92 6.447E+00 + 5.505E-01 2.69E-01 G

BI-212 6.1668E-01

727.17 6.167E-01 (5.173E-01 1.71E-01 G K

1620.56 5.925E-01 % P 1.883E+00 5.40E-01 G

785.42-3.102E-02 % P 3.306E+00 9.37E-01 G

BI-214 5.7873E-01

609.32 5.787E-01 @(1.426E-01 6.69E-02 G K

1764.51 8.058E-01 + P 1.526E-01 1.29E-01 G

1120.28 8.484E-01 + 6.314E-01 2.69E-01 G

RA-224 1.1789E+00

241.00 1.179E+00 %(P 1.658E+00 5.08E-01 G

RA-226 1.6926E+00

185.99 1.693E+00 (P 1.576E+00 4.91E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	1.1130E+00						
		911.07	1.128E+00	@(P	2.216E-01	1.12E-01	G K
		968.90	1.090E+00	(P	3.741E-01	1.64E-01	G
		338.40	1.110E+00	(	4.306E-01	1.70E-01	G
TH-227	-1.3080E-01						
		236.00	-1.308E-01	%(P	5.772E-01	1.73E-01	G K
		256.25	1.411E-01	%	6.965E-01	2.07E-01	G
PA-234	6.8649E-04						
		98.44	6.865E-04	%(	3.004E-01	8.95E-02	G K
		946.00	0.000E+00	&	4.395E-01	1.25E-01	G
		131.28	-9.087E-02	%	2.992E-01	9.01E-02	G
		94.67	-3.167E-01	%	5.791E-01	1.76E-01	G
		883.24	-4.285E-02	%	5.637E-01	1.61E-01	G
		926.70	7.661E-02	%	6.306E-01	1.81E-01	G
		569.26	1.172E-01	&	5.597E-01	1.64E-01	G
TH-234	1.1941E+00						
		63.29	-1.100E+00	%(P	5.428E+00	1.63E+00	G K
		92.80	2.596E+00	(	2.876E+00	8.85E-01	G
		92.38	3.039E+00	(P	3.408E+00	1.05E+00	G
AM-241	7.0169E-02						
		59.54	7.017E-02	%(	7.248E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty 3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	9.7410E-02	9.8631E-02	4.3479E-01	4.3482E-01	4.873E-01
K-40	1.6554E+01	1.6554E+01	2.0207E+00	2.2240E+00	
MN-54 #A	1.0107E-02	1.0128E-02	6.2823E-02	6.2825E-02	7.221E-02
CO-57 #B	1.5124E-02	1.5161E-02	5.8746E-02	5.8752E-02	6.509E-02
CO-60	2.7992E-01	2.8002E-01	8.4577E-02	8.6024E-02	
Sr-85 #A	-1.7243E-02	-1.7420E-02	6.1413E-02	6.1421E-02	6.820E-02
Kr-85 #A	-3.9771E+02	-3.9772E+02	1.4032E+03	1.4034E+03	1.574E+03
Y-88 #B	-1.0050E-02	-1.0113E-02	5.4452E-02	5.4455E-02	6.525E-02
NB-94 #B	1.7832E-02	1.7832E-02	5.5797E-02	5.5806E-02	6.325E-02
Ag-108M#B	-1.8483E-03	-1.8484E-03	5.2844E-02	5.2844E-02	6.231E-02
CD-109 #A	8.4563E-01	8.4688E-01	2.2820E+00	2.2825E+00	2.517E+00
SN-113 #B	1.5730E-02	1.5821E-02	6.7457E-02	6.7463E-02	7.569E-02
SB-125 #B	1.0081E-01	1.0087E-01	1.2111E-01	1.2124E-01	1.699E-01
I-131 #B	-4.1118E-03	-4.4665E-03	6.4305E-02	6.4306E-02	6.731E-02
CS-134 #B	0.0000E+00	0.0000E+00	1.1723E-01	1.1723E-01	1.322E-01
CS-137	2.3707E-01	2.3709E-01	1.0297E-01	1.0383E-01	
CE-139 #A	5.4744E-03	5.5009E-03	5.6008E-02	5.6009E-02	6.243E-02

EU-152 #B	1.5871E-01	1.5873E-01	1.8916E-01	1.8936E-01	1.967E-01
EU-154 #B	-8.3702E-04	-8.3720E-04	2.0543E-01	2.0543E-01	1.344E-01
EU-155 #B	-2.2914E-03	-2.2923E-03	4.4744E-01	4.4744E-01	2.578E-01
HG-203 #B	-6.4790E-03	-6.5722E-03	5.6867E-02	5.6869E-02	6.187E-02
TL-208	3.5338E-01	3.5338E-01	1.0163E-01	1.0355E-01	
PB-212 #	9.6251E-01	9.6251E-01	1.5327E-01	1.6251E-01	1.283E-01
PB-214 #	5.1527E-01	5.1527E-01	1.3650E-01	1.3953E-01	1.204E-01
BI-212 #	6.1668E-01	6.1668E-01	5.1444E-01	5.1560E-01	5.173E-01
BI-214	5.7873E-01	5.7873E-01	2.0082E-01	2.0343E-01	
RA-224 #A	1.1789E+00	1.1789E+00	1.5237E+00	1.5251E+00	1.658E+00
RA-226 #	1.6926E+00	1.6926E+00	1.4716E+00	1.4747E+00	1.576E+00
AC-228	1.1130E+00	1.1130E+00	2.6315E-01	2.7046E-01	
TH-227 #B	-1.3080E-01	-1.3080E-01	5.2986E-01	5.2991E-01	5.772E-01
PA-234 #B	6.8649E-04	6.8649E-04	2.6853E-01	2.6853E-01	3.004E-01
TH-234 #B	1.1941E+00	1.1941E+00	1.2211E+00	1.2229E+00	5.428E+00
AM-241 #A	7.0169E-02	7.0169E-02	6.4839E-01	6.4840E-01	7.248E-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) 1.9115988E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.9116100E+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: 102F_21OCT2005_1242.An1

Sample description

FSS NOL-06-01-001-R

Spectrum Filename: C:\GammaVision\Spectra\102F_21OCT2005_1242.An1

Acquisition information

Start time:	21-Oct-2005 12:42:37
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: 2.0940E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0940E+03) =
4.7755E+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 20-Oct-2005 12:17:00
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: 0.0951

***** 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	206.	22.82	1.50	9.541E-03	77.11	10.700	1.302E+00	PB214
					77.11	17.500	7.962E-01	PB212
77.05	206.	22.82	1.50	9.541E-03	77.11	10.700	1.302E+00	PB214
					77.11	17.500	7.962E-01	PB212
185.99	94.	30.07	0.67	1.627E-02	185.99	3.280	PBC<MDA	RA226
209.08	90.	31.70	1.11	1.520E-02				
238.73	597.	5.06	1.21	1.380E-02	238.63	43.100	6.474E-01	PB212

241.76	125.	19.12	1.22	1.366E-02	241.00	3.900	1.491E+00	RA224
					241.92	7.470	7.884E-01	PB214
270.51	51.	38.13	1.08	1.242E-02				
294.98	175.	17.02	1.01	1.147E-02				
294.98	175.	17.02	1.01	1.147E-02	295.22	19.200	5.142E-01	PB214
327.69	60.	37.98	1.11	1.038E-02				
338.37	194.	19.11	1.19	1.006E-02	338.40	12.010	1.039E+00	AC228
352.06	268.	11.03	1.24	9.677E-03	351.99	37.100	4.806E-01	PB214
463.09	54.	25.31	1.05	7.371E-03				
463.09	54.	25.31	1.05	7.371E-03	463.51	10.000	4.617E-01	SB125
510.96	117.	19.48	1.80	6.692E-03	510.72	22.500	5.012E-01	TL208
583.33	182.	10.38	1.31	5.888E-03	583.14	86.000	2.320E-01	TL208
609.41	191.	12.20	1.53	5.649E-03	609.32	46.090	4.729E-01	BI214
661.89	90.	19.26	1.58	5.228E-03	661.62	84.620	1.310E-01	CS137
727.51	38.	39.29	1.78	4.794E-03	727.17	11.800	PBC<MDA	BI212
794.73	28.	36.87	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
911.25	128.	12.04	1.42	3.921E-03	911.07	29.000	7.261E-01	AC228
968.41	161.	12.25	2.06	3.720E-03	968.90	17.460	1.602E+00	AC228
1119.71	68.	25.81	1.62	3.285E-03	1120.28	15.040	8.887E-01	BI214
1173.08	71.	28.65	1.85	3.157E-03	1173.23	99.860	1.450E-01	CO60
1332.48	36.	24.53	1.61	2.834E-03	1332.51	99.980	8.185E-02	CO60
1460.87	656.	4.18	2.07	2.621E-03	1460.75	10.700	1.510E+01	K40
1764.43	46.	14.74	1.71	2.225E-03	1764.51	15.920	8.364E-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	
371.59	185.99	333.	94.	0.047	90.20	0.672	RA-226	I
417.77	209.08	318.	90.	0.045	95.10	1.112	AC-228	
477.08	238.73	157.	597.	0.298	15.17	1.215	PB-212	D
483.16	241.77	221.	125.	0.062	57.35	1.217	PB-214	D
540.66	270.51	155.	51.	0.025	114.38	1.083	AC-228	
655.05	327.69	168.	60.	0.030	113.94	1.111	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	1002.	206.	0.103	68.47	1.500D
PB-212	153.80	77.11	1002.	206.	0.103	68.47	1.500D
PB-212	477.11	238.74	474.	544.	0.272	21.31	1.500s
RA-224	482.99	241.68	551.	90.	0.045	113.97	1.500
PB-214	590.17	295.26	268.	156.	0.078	50.60	1.500s
AC-228	676.42	338.37	304.	194.	0.097	57.34	1.186

PB-214	703.61	351.97	136.	255.	0.128	26.90	1.500
SB-125	925.87	463.06	76.	47.	0.023	86.95	1.500
TL-208	1021.71	510.96	115.	117.	0.058	58.44	1.799s
TL-208	1166.50	583.33	71.	182.	0.091	31.14	1.309s
BI-214	1218.67	609.41	103.	191.	0.095	36.59	1.532
CS-137	1323.67	661.89	72.	90.	0.045	57.78	1.576
BI-212	1454.98	727.51	70.	38.	0.019	117.88	1.780
CS-134	1589.48	794.73	39.	28.	0.014	110.60	1.601
AC-228	1822.64	911.25	41.	128.	0.064	36.13	1.418
AC-228	1937.03	968.41	56.	161.	0.081	36.75	2.064s
BI-214	2239.81	1119.71	60.	68.	0.034	77.43	1.624s
CO-60	2346.62	1173.08	79.	71.	0.035	85.94	1.846s
CO-60	2665.66	1332.48	14.	36.	0.018	73.60	1.615
K-40	2922.65	1460.87	20.	656.	0.328	12.53	2.068
BI-214	3530.27	1764.40	0.	34.	0.017	50.82	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.3503E-01					
			477.56	1.350E-01	&(	3.988E-01	1.19E-01 G
K-40		1.5105E+01					
			1460.75	1.510E+01	(P	5.378E-01	6.31E-01 G
MN-54		1.4717E-02					
			834.81	1.472E-02	%(P	5.357E-02	1.57E-02 G
CO-57		-1.5133E-02					
			122.07	-1.513E-02	%(	4.962E-02	1.49E-02 G K
			136.43	9.196E-02	%	4.219E-01	1.26E-01 G
CO-60		1.1340E-01					
			1332.51	8.185E-02	(P	4.602E-02	2.01E-02 G K
			1173.23	1.450E-01	*(	9.048E-02	4.15E-02 G K
Sr-85		-2.9507E-02					
			514.00	-2.951E-02	&(	6.242E-02	1.89E-02 G
Kr-85		-6.7792E+02					
			513.99	-6.779E+02	&(	1.428E+03	4.33E+02 G
Y-88		-1.9973E-05					
			1836.01	-1.997E-05	%(P	2.243E-02	3.04E-03 G K

898.02-1.666E-02 & P 6.795E-02 1.98E-02 G

NB-94 -9.0792E-03

871.10-9.079E-03 &(4.946E-02 1.42E-02 G K

702.50-9.841E-03 % 4.783E-02 1.39E-02 G K

Ag-108M 2.6575E-02

722.95 2.657E-02 %(6.484E-02 1.95E-02 G K

614.37 2.174E-02 % P 5.642E-02 1.69E-02 G

433.93 1.855E-02 % 5.189E-02 1.56E-02 G

CD-109 1.3189E+00

88.04 1.319E+00 %(P 1.947E+00 5.95E-01 G

SN-113 0.0000E+00

391.71 0.000E+00 &(8.292E-02 2.42E-02 G K

255.04 1.093E-02 % 1.744E+00 5.10E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0424E-01						
		427.95	4.474E-04	%(P	1.395E-01	4.00E-02	G K
		600.77	-8.562E-04	& P	2.715E-01	7.73E-02	G
		636.15	3.768E-02	& P	3.968E-01	1.13E-01	G
		463.51	4.115E-01	(P	3.800E-01	1.23E-01	G
		176.29	-7.186E-02	% P	7.034E-01	2.09E-01	G
I-131	1.2575E-02						
		364.48	1.257E-02	%(	5.395E-02	1.60E-02	G K
		636.97	3.088E-02	&	7.341E-01	2.09E-01	G
		284.29	1.291E-01	%	6.955E-01	2.06E-01	G
CS-134	2.7452E-02						
		604.66	9.795E-03	&(	4.170E-02	1.22E-02	G K
		795.76	4.763E-02	(	5.427E-02	1.76E-02	G
		569.29	9.649E-02	&	2.602E-01	7.77E-02	G
		801.84	-7.059E-02	% P	5.071E-01	1.44E-01	G
CS-137	1.3097E-01						
		661.62	1.310E-01	(	6.170E-02	2.52E-02	G
CE-139	7.6985E-03						
		165.85	7.698E-03	&(P	5.255E-02	1.57E-02	G
EU-152	3.1341E-02						
		121.78	3.134E-02	%(P	1.629E-01	4.88E-02	G K
		344.30	5.420E-02	%	1.480E-01	4.44E-02	G
		1408.08	6.025E-02	%	1.628E-01	4.79E-02	G
		964.00	2.178E-02	% P	5.858E-01	1.69E-01	G
		1112.07	-2.188E-02	%	5.205E-01	1.47E-01	G

778.90-8.108E-02 % P 4.403E-01 1.28E-01 G

EU-154 -5.0831E-05

123.10-5.083E-05 &(P 9.502E-02 2.81E-02 G K

1274.80-2.352E-02 & 2.228E-01 6.37E-02 G

723.30 1.160E-01 & P 2.981E-01 8.93E-02 G

1004.80 7.437E-02 % 3.236E-01 9.39E-02 G

EU-155 1.4460E-01

86.45 1.446E-01 %(P 2.521E-01 7.67E-02 G K

105.31-5.120E-02 & 2.563E-01 7.68E-02 G

HG-203 -1.4359E-03

279.17-1.436E-03 %(P 4.836E-02 1.42E-02 G K

72.87 3.524E-02 % 1.996E+00 5.96E-01 G

70.83-4.240E-01 & 3.469E+00 1.04E+00 G

82.50-2.858E-01 & 3.958E+00 1.18E+00 G

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

TL-208       2.3199E-01
                    583.14 2.320E-01 @(P 5.345E-02 2.41E-02 G
                    510.72 5.012E-01 +   2.257E-01 9.77E-02 G

PB-212       5.8986E-01
                    238.63 5.899E-01 @(  1.130E-01 4.19E-02 G K
                                         Energy duplication
                     77.11 7.962E-01 +   5.807E-01 1.82E-01 G
                     74.81 5.984E-01 & P 1.209E+00 3.67E-01 G

PB-214       4.5830E-01
                    351.99 4.590E-01  (P 1.024E-01 4.12E-02 G K
                    295.22 4.570E-01 @(  2.315E-01 7.71E-02 G
                                         Energy duplication
                     77.11 1.302E+00 +   9.497E-01 2.97E-01 G
                    241.92 2.702E-01 &   7.534E-01 2.27E-01 G

BI-212       4.3692E-01
                    727.17 4.369E-01  (  4.747E-01 1.72E-01 G K
                   1620.56-3.285E-02 % P 7.215E-01 9.79E-02 G
                    785.42 7.527E-03 & P 2.566E+00 7.20E-01 G

BI-214       5.1122E-01
                    609.32 4.729E-01  (  1.240E-01 5.77E-02 G K
                   1764.51 6.222E-01 ?(P 1.343E-01 1.06E-01 G
                   1120.28 8.887E-01 +   5.072E-01 2.29E-01 G

RA-224       1.0830E+00
                    241.00 1.083E+00 &(P 1.354E+00 4.17E-01 G
```

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RA-226       8.6226E-01
                                        Energy duplication
                185.99 8.623E-01 %(P 1.371E+00 4.18E-01 G

AC-228       7.2612E-01
                911.07 7.261E-01  (P 1.847E-01 8.76E-02 G K
                968.90 1.602E+00 + P 3.731E-01 1.96E-01 G
                338.40 1.039E+00 +   4.488E-01 1.99E-01 G

TH-227      -2.4285E-01
                236.00-2.428E-01 %(P 5.124E-01 1.55E-01 G K
                256.25 9.682E-02 %   4.839E-01 1.43E-01 G

PA-234      -4.8092E-02
                 98.44-4.809E-02 &(  2.654E-01 7.96E-02 G K
                946.00 8.738E-02 &   2.183E-01 6.52E-02 G
                131.28 1.895E-02 &   2.537E-01 7.57E-02 G
                 94.67-4.438E-02 %   4.785E-01 1.43E-01 G
                883.24-3.465E-02 %   4.150E-01 1.17E-01 G
                926.70 1.477E-01 &   3.900E-01 1.16E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26 1.430E-01 & 3.856E-01 1.15E-01 G

TH-234 5.2398E-02
63.29 5.240E-02 &(P 4.642E+00 1.38E+00 G K
92.80 1.502E+00 % 2.496E+00 7.60E-01 G
92.38 1.756E+00 % P 2.951E+00 8.98E-01 G

AM-241 -1.8877E-02
59.54-1.888E-02 &(6.779E-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

- -

***** 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	1.3325E-01	1.3503E-01	3.5668E-01	3.5676E-01	3.936E-01
K-40		1.5105E+01	1.5105E+01	1.8933E+00	2.0744E+00	
MN-54	#A	1.4683E-02	1.4717E-02	4.7147E-02	4.7154E-02	5.345E-02
CO-57	#B	-1.5093E-02	-1.5133E-02	4.4761E-02	4.4769E-02	4.950E-02
CO-60		1.1336E-01	1.1340E-01	6.4216E-02	6.4531E-02	

Sr-85 #A	-2.9187E-02	-2.9507E-02	5.6752E-02	5.6776E-02	6.174E-02
Kr-85 #A	-6.7791E+02	-6.7792E+02	1.2987E+03	1.2993E+03	1.428E+03
Y-88 #B	-1.9842E-05	-1.9973E-05	1.1984E-04	1.1985E-04	2.228E-02
NB-94 #B	-9.0792E-03	-9.0792E-03	4.2669E-02	4.2672E-02	4.946E-02
Ag-108M#B	2.6574E-02	2.6575E-02	5.8491E-02	5.8510E-02	6.484E-02
CD-109 #A	1.3168E+00	1.3189E+00	1.7843E+00	1.7858E+00	1.944E+00
SN-113 #B	0.0000E+00	0.0000E+00	7.2627E-02	7.2627E-02	8.241E-02
SB-125 #B	1.0417E-01	1.0424E-01	9.3625E-02	9.3808E-02	1.394E-01
I-131 #B	1.1519E-02	1.2575E-02	4.7937E-02	4.7943E-02	4.942E-02
CS-134 #B	2.7426E-02	2.7452E-02	3.0363E-02	3.0402E-02	4.166E-02
CS-137	1.3096E-01	1.3097E-01	7.5679E-02	7.6035E-02	
CE-139 #A	7.6591E-03	7.6985E-03	4.7011E-02	4.7013E-02	5.228E-02
EU-152 #B	3.1336E-02	3.1341E-02	1.4628E-01	1.4629E-01	1.629E-01
EU-154 #B	-5.0820E-05	-5.0831E-05	1.4389E-01	1.4389E-01	9.500E-02
EU-155 #B	1.4454E-01	1.4460E-01	2.2997E-01	2.3011E-01	2.520E-01
HG-203 #B	-1.4144E-03	-1.4359E-03	4.6288E-02	4.6288E-02	4.763E-02
TL-208 #	2.3199E-01	2.3199E-01	7.2393E-02	7.3554E-02	
PB-212 #	5.8986E-01	5.8986E-01	1.2571E-01	1.2999E-01	1.130E-01
PB-214 #	4.5830E-01	4.5830E-01	1.2348E-01	1.2613E-01	1.024E-01
BI-212 A	4.3692E-01	4.3692E-01	5.1505E-01	5.1564E-01	
BI-214	5.1122E-01	5.1122E-01	1.6035E-01	1.6290E-01	
RA-224 #A	1.0830E+00	1.0830E+00	1.2502E+00	1.2517E+00	1.354E+00
RA-226 #A	8.6226E-01	8.6226E-01	1.2537E+00	1.2547E+00	1.371E+00
AC-228	7.2612E-01	7.2612E-01	2.6281E-01	2.6595E-01	
TH-227 #B	-2.4285E-01	-2.4285E-01	4.7053E-01	4.7073E-01	5.124E-01
PA-234 #B	-4.8092E-02	-4.8092E-02	2.3888E-01	2.3889E-01	2.654E-01
TH-234 #B	5.2398E-02	5.2398E-02	4.1442E+00	4.1442E+00	4.642E+00
AM-241 #A	-1.8877E-02	-1.8877E-02	6.0522E-01	6.0522E-01	6.779E-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) 1.7255407E+01 pCi/gm

Total Decayed Activity (270.2 to 1999.0 keV) 1.7255457E+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: 102F_21OCT2005_1326.An1

Sample description

FSS NOL-06-01-002-R

Spectrum Filename: C:\GammaVision\Spectra\102F_21OCT2005_1326.An1

Acquisition information

Start time:	21-Oct-2005 13:26:55
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: 2.0930E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0930E+03) =
4.7778E+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	20-Oct-2005 11:52:00
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: 0.0956

***** 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
74.90	134.	37.28	1.50	8.847E-03				
74.90	134.	37.28	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.11	237.	20.83	1.50	9.541E-03	77.11	10.700	1.499E+00	PB214
					77.11	17.500	9.167E-01	PB212
77.11	237.	20.83	1.50	9.541E-03	77.11	10.700	1.499E+00	PB214
					77.11	17.500	9.167E-01	PB212
186.10	136.	25.34	1.81	1.626E-02	185.99	3.280	1.587E+00	RA226

208.61	114.	29.71	1.73	1.522E-02				
238.74	800.	4.24	1.21	1.380E-02	238.63	43.100	8.684E-01	PB212
241.79	120.	19.38	1.22	1.366E-02	241.00	3.900	1.436E+00	RA224
					241.92	7.470	7.592E-01	PB214
270.13	82.	34.82	1.02	1.243E-02				
295.29	188.	10.77	1.25	1.146E-02	295.22	19.200	5.508E-01	PB214
300.62	52.	32.49	1.26	1.127E-02				
338.54	167.	15.80	1.60	1.006E-02	338.40	12.010	8.924E-01	AC228
352.01	274.	10.93	1.24	9.678E-03	351.99	37.100	4.927E-01	PB214
463.20	73.	27.50	1.62	7.370E-03				
463.20	73.	27.50	1.62	7.370E-03	463.51	10.000	6.269E-01	SB125
510.53	144.	16.92	1.37	6.697E-03	510.72	22.500	6.151E-01	TL208
583.23	295.	7.61	1.68	5.889E-03	583.14	86.000	3.752E-01	TL208
609.35	237.	11.42	1.50	5.649E-03	609.32	46.090	5.887E-01	BI214
661.75	30.	36.42	1.28	5.228E-03	661.62	84.620	4.392E-02	CS137
726.90	70.	20.59	2.43	4.794E-03	727.17	11.800	7.989E-01	BI212
795.00	42.	30.61	1.52	4.423E-03				
795.00	42.	30.61	1.52	4.423E-03	795.76	85.400	7.209E-02	CS134
911.31	170.	8.85	1.61	3.921E-03	911.07	29.000	9.655E-01	AC228
968.20	131.	16.50	1.55	3.720E-03	968.90	17.460	1.303E+00	AC228
1120.44	67.	29.38	0.74	3.283E-03	1120.28	15.040	8.787E-01	BI214
1461.02	775.	3.65	1.96	2.620E-03	1460.75	10.700	1.783E+01	K40
1764.59	34.	18.05	2.17	2.225E-03	1764.51	15.920	6.254E-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
416.84	208.61	410.	114.	0.057	89.14	1.732	LU-177 s
477.10	238.69	176.	800.	0.400	12.72	1.215	PB-212 D
483.21	241.74	210.	120.	0.060	58.13	1.217	PB-214 D
539.90	270.13	274.	82.	0.041	104.46	1.018	AC-228 s
600.79	300.57	182.	71.	0.036	95.22	1.433	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	149.38	74.90	1247.	134.	0.067	111.83	1.500s
PB-214	153.80	77.11	1101.	237.	0.119	62.50	1.500D
PB-212	153.80	77.11	1101.	237.	0.119	62.50	1.500D
RA-226	371.71	186.05	549.	115.	0.058	87.19	1.500s
PB-212	477.03	238.70	461.	650.	0.325	18.30	1.500
PB-214	590.29	295.32	236.	170.	0.085	44.77	1.500
AC-228	676.76	338.54	189.	167.	0.083	47.40	1.602s

PB-214	703.76	352.04	162.	263.	0.131	27.62	1.500
SB-125	925.66	462.96	76.	62.	0.031	68.48	1.500
TL-208	1020.84	510.53	128.	144.	0.072	50.77	1.371s
TL-208	1166.29	583.23	68.	294.	0.147	22.83	1.675s
Bl-214	1218.53	609.34	122.	229.	0.114	33.91	1.498
CS-137	1323.41	661.75	43.	30.	0.015	109.27	1.283
Bl-212	1453.75	726.90	51.	70.	0.035	61.76	2.429s
CS-134	1590.25	795.12	43.	33.	0.017	98.37	1.601
AC-228	1822.75	911.31	25.	170.	0.085	26.55	1.608
AC-228	1936.61	968.20	84.	131.	0.065	49.49	1.551s
Bl-214	2241.28	1120.44	77.	67.	0.034	88.14	0.737s
K-40	2922.94	1461.02	4.	775.	0.387	10.94	1.961
Bl-214	3530.63	1764.59	2.	34.	0.017	54.15	2.173s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-6.4557E-02					
			477.56	-6.456E-02	&(	4.579E-01	1.34E-01 G
K-40		1.7834E+01					
			1460.75	1.783E+01	(P	2.888E-01	6.50E-01 G
MN-54		-1.8489E-02					
			834.81	-1.849E-02	%(P	6.151E-02	1.82E-02 G
CO-57		1.3727E-02					
			122.07	1.373E-02	&(	5.632E-02	1.69E-02 G K
			136.43	-7.751E-02	&	4.479E-01	1.34E-01 G
CO-60		2.9028E-02					
			1332.51	2.903E-02	&(P	6.537E-02	1.97E-02 G K
			1173.23	-1.027E-02	%	8.535E-02	2.46E-02 G K
Sr-85		-1.4300E-02					
			514.00	-1.430E-02	%(	5.680E-02	1.68E-02 G
Kr-85		-3.2454E+02					
			513.99	-3.245E+02	%(	1.296E+03	3.84E+02 G
Y-88		8.2598E-03					
			1836.01	8.260E-03	%(P	3.188E-02	8.75E-03 G K

898.02 6.315E-03 % P 4.722E-02 1.32E-02 G

NB-94 2.3037E-02

871.10 2.304E-02 %(5.167E-02 1.56E-02 G K

702.50-1.375E-02 & 5.853E-02 1.72E-02 G K

Ag-108M -3.7418E-02

722.95-3.742E-02 %(8.467E-02 2.56E-02 G K

614.37 4.790E-04 & P 5.701E-02 1.63E-02 G

433.93 1.336E-02 % 4.572E-02 1.36E-02 G

CD-109 -4.1717E-01

88.04-4.172E-01 &(P 2.041E+00 6.12E-01 G

SN-113 0.0000E+00

391.71 0.000E+00 %(7.429E-02 2.16E-02 G K

255.04 0.000E+00 % 2.200E+00 6.48E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3694E-01						
		427.95	-1.818E-03	%(P	1.476E-01	4.24E-02	G K
		600.77	-8.567E-04	% P	3.328E-01	9.59E-02	G
		636.15	-1.961E-02	% P	4.520E-01	1.29E-01	G
		463.51	5.477E-01	(P	3.806E-01	1.28E-01	G
		176.29	-8.337E-02	& P	7.149E-01	2.12E-01	G
I-131	1.2488E-02						
		364.48	1.249E-02	&(	5.856E-02	1.73E-02	G K
		636.97	2.597E-01	%	6.935E-01	2.07E-01	G
		284.29	-3.420E-02	&	6.576E-01	1.92E-01	G
CS-134	2.7220E-02						
		604.66	1.239E-03	&(	1.120E-01	3.31E-02	G K
		795.76	5.691E-02	(	5.682E-02	1.87E-02	G
		569.29	-3.112E-02	&	2.971E-01	8.57E-02	G
		801.84	1.144E-01	% P	5.350E-01	1.55E-01	G
CS-137	4.3920E-02						
		661.62	4.392E-02	(	4.849E-02	1.60E-02	G
CE-139	-1.0200E-02						
		165.85	-1.020E-02	%(P	5.995E-02	1.79E-02	G
EU-152	4.2050E-02						
		121.78	4.205E-02	%(P	1.701E-01	5.11E-02	G K
		344.30	-6.612E-03	&	1.556E-01	4.54E-02	G
		1408.08	8.853E-03	%	2.818E-01	7.69E-02	G
		964.00	1.017E-01	& P	3.592E-01	1.05E-01	G
		1112.07	-4.903E-02	%	5.184E-01	1.48E-01	G

778.90 3.376E-02 & P 4.033E-01 1.15E-01 G

EU-154 -7.9233E-03

123.10-7.923E-03 &(P 1.304E-01 3.89E-02 G K

1274.80-2.756E-02 % 2.072E-01 5.93E-02 G

723.30-1.714E-01 % P 3.839E-01 1.16E-01 G

1004.80 6.712E-02 % 3.346E-01 9.68E-02 G

EU-155 7.1011E-02

86.45 7.101E-02 %(P 2.740E-01 8.24E-02 G K

105.31-1.320E-04 % 2.777E-01 8.27E-02 G

HG-203 -3.4163E-03

279.17-3.416E-03 %(P 5.459E-02 1.61E-02 G K

72.87-5.422E-01 % 2.254E+00 6.79E-01 G

70.83 1.336E+00 % 3.008E+00 9.11E-01 G

82.50-9.651E-01 & 4.193E+00 1.26E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.7525E-01						
		583.14	3.752E-01	*(P	5.229E-02	2.86E-02	G
		510.72	6.151E-01	+	2.372E-01	1.04E-01	G
PB-212	7.0564E-01						
		238.63	7.056E-01	(	1.115E-01	4.30E-02	G K
					Energy duplication		
		77.11	9.167E-01	+	6.084E-01	1.91E-01	G
		74.81	1.022E+00	+ P	1.271E+00	3.89E-01	G
PB-214	4.8127E-01						
		351.99	4.725E-01	(P	1.116E-01	4.36E-02	G K
		295.22	4.983E-01	(	2.181E-01	7.44E-02	G
					Energy duplication		
		77.11	1.499E+00	+	9.951E-01	3.12E-01	G
		241.92	4.283E-01	%	7.365E-01	2.24E-01	G
BI-212	7.9894E-01						
		727.17	7.989E-01	*(	4.108E-01	1.64E-01	G K
		1620.56	-3.287E-02	% P	2.145E+00	5.65E-01	G
		785.42	1.387E-01	% P	2.911E+00	8.30E-01	G
BI-214	5.8224E-01						
		609.32	5.674E-01	(	1.345E-01	6.41E-02	G K
		1764.51	6.254E-01	(P	1.597E-01	1.13E-01	G
		1120.28	8.787E-01	+	5.694E-01	2.58E-01	G
RA-224	8.9584E-01						
		241.00	8.958E-01	%(P	1.382E+00	4.22E-01	G

```
RA-226       1.3934E+00
                 185.99 1.393E+00 *(P 1.354E+00 4.21E-01 G

AC-228       9.4408E-01
                 911.07 9.655E-01  (P 1.475E-01 8.56E-02 G K
                 968.90 1.303E+00 + P 4.518E-01 2.15E-01 G
                 338.40 8.924E-01  (  3.568E-01 1.41E-01 G

TH-227      -2.3654E-01
                 236.00-2.365E-01 %(P 5.270E-01 1.60E-01 G K
                 256.25 5.940E-02 &   5.794E-01 1.71E-01 G

PA-234      -4.8558E-02
                  98.44-4.856E-02 &(  2.450E-01 7.35E-02 G K
                 946.00-7.643E-04 &   2.962E-01 8.29E-02 G
                 131.28 2.672E-02 %   2.219E-01 6.62E-02 G
                  94.67-9.640E-02 %   4.938E-01 1.48E-01 G
                 883.24-1.118E-01 &   4.603E-01 1.34E-01 G
                 926.70-3.089E-03 &   5.041E-01 1.41E-01 G
```

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Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                     569.26-4.610E-02 &   4.403E-01 1.27E-01 G

TH-234       1.2299E+00
                     63.29 1.230E+00 &(P 4.283E+00 1.29E+00 G K
                     92.80 1.620E+00 %   2.547E+00 7.77E-01 G
                     92.38 1.861E+00 % P 3.026E+00 9.22E-01 G

AM-241      -9.8057E-02
                     59.54-9.806E-02 %(  6.967E-01 2.08E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-6.3670E-02	-6.4557E-02	4.0144E-01	4.0146E-01	4.516E-01
K-40		1.7834E+01	1.7834E+01	1.9506E+00	2.1924E+00	
MN-54	#A	-1.8446E-02	-1.8489E-02	5.6442E-02	5.6451E-02	6.136E-02
CO-57	#B	1.3690E-02	1.3727E-02	5.0721E-02	5.0727E-02	5.617E-02
CO-60	#B	2.9017E-02	2.9028E-02	5.9128E-02	5.9151E-02	6.534E-02

Sr-85 #A	-1.4138E-02	-1.4300E-02	5.0544E-02	5.0550E-02	5.615E-02
Kr-85 #A	-3.2453E+02	-3.2454E+02	1.1532E+03	1.1533E+03	1.296E+03
Y-88 #B	8.2028E-03	8.2598E-03	2.6241E-02	2.6245E-02	3.166E-02
NB-94 #B	2.3037E-02	2.3037E-02	4.6784E-02	4.6802E-02	5.167E-02
Ag-108M#B	-3.7418E-02	-3.7418E-02	7.6756E-02	7.6785E-02	8.467E-02
CD-109 #A	-4.1649E-01	-4.1717E-01	2.0258E+00	2.0259E+00	2.037E+00
SN-113 #B	0.0000E+00	0.0000E+00	6.4770E-02	6.4770E-02	7.382E-02
SB-125 #B	1.3684E-01	1.3694E-01	9.6094E-02	9.6401E-02	1.475E-01
I-131 #B	1.1392E-02	1.2488E-02	5.2034E-02	5.2039E-02	5.342E-02
CS-134 #B	2.7193E-02	2.7220E-02	2.6775E-02	2.6818E-02	1.119E-01
CS-137 A	4.3917E-02	4.3920E-02	4.7990E-02	4.8054E-02	
CE-139 #A	-1.0145E-02	-1.0200E-02	5.6034E-02	5.6037E-02	5.963E-02
EU-152 #B	4.2043E-02	4.2050E-02	1.5321E-01	1.5323E-01	1.701E-01
EU-154 #B	-7.9215E-03	-7.9233E-03	1.2248E-01	1.2249E-01	1.303E-01
EU-155 #B	7.0982E-02	7.1011E-02	2.4730E-01	2.4733E-01	2.738E-01
HG-203 #B	-3.3625E-03	-3.4163E-03	5.0030E-02	5.0030E-02	5.373E-02
TL-208 #	3.7525E-01	3.7525E-01	8.5772E-02	8.8319E-02	
PB-212 #	7.0564E-01	7.0564E-01	1.2910E-01	1.3504E-01	1.115E-01
PB-214 #	4.8127E-01	4.8127E-01	1.2663E-01	1.2948E-01	1.116E-01
BI-212 #	7.9894E-01	7.9894E-01	4.9346E-01	4.9549E-01	
BI-214	5.8224E-01	5.8224E-01	1.8634E-01	1.8919E-01	
RA-224 #A	8.9584E-01	8.9584E-01	1.2667E+00	1.2677E+00	1.382E+00
RA-226 #	1.3934E+00	1.3934E+00	1.2619E+00	1.2643E+00	1.354E+00
AC-228	9.4408E-01	9.4408E-01	2.5097E-01	2.5650E-01	
TH-227 #B	-2.3654E-01	-2.3654E-01	4.8358E-01	4.8376E-01	5.270E-01
PA-234 #B	-4.8558E-02	-4.8558E-02	2.2045E-01	2.2047E-01	2.450E-01
TH-234 #B	1.2299E+00	1.2299E+00	3.8640E+00	3.8646E+00	4.283E+00
AM-241 #A	-9.8057E-02	-9.8057E-02	6.2532E-01	6.2534E-01	6.967E-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) 2.0577948E+01 pCi/gm

Total Decayed Activity (269.7 to 1999.0 keV) 2.0577951E+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: 102F_21OCT2005_1414.An1

Sample description

FSS NOL-06-01-004-R

Spectrum Filename: C:\GammaVision\Spectra\102F_21OCT2005_1414.An1

Acquisition information

Start time:	21-Oct-2005 14:14:37
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: 1.6740E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6740E+03) =
5.9737E+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	20-Oct-2005 12:25:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1325

***** 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	245.	19.09	1.50	9.541E-03	77.11	10.700	1.938E+00	PB214
					77.11	17.500	1.185E+00	PB212
77.12	245.	19.09	1.50	9.541E-03	77.11	10.700	1.938E+00	PB214
					77.11	17.500	1.185E+00	PB212
87.30	132.	40.84	1.33	1.218E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
186.31	125.	29.57	0.91	1.625E-02	185.99	3.280	1.819E+00	RA226

238.71	819.	4.07	1.21	1.381E-02				
238.71	819.	4.07	1.21	1.381E-02	238.63	43.100	1.111E+00	PB212
241.70	119.	19.76	1.22	1.367E-02	241.00	3.900	1.775E+00	RA224
					241.92	7.470	9.387E-01	PB214
277.14	54.	38.64	1.19	1.215E-02				
295.27	145.	13.23	1.25	1.146E-02	295.22	19.200	5.319E-01	PB214
300.48	60.	27.38	1.26	1.128E-02				
338.34	181.	13.50	1.28	1.006E-02	338.40	12.010	1.211E+00	AC228
352.06	261.	10.65	1.23	9.677E-03	351.99	37.100	5.868E-01	PB214
462.34	81.	21.79	0.98	7.383E-03				
462.34	81.	21.79	0.98	7.383E-03	463.51	10.000	8.737E-01	SB125
510.70	114.	17.94	1.48	6.695E-03	510.72	22.500	6.125E-01	TL208
583.24	243.	9.46	1.36	5.889E-03	583.14	86.000	3.866E-01	TL208
609.54	196.	10.94	1.50	5.647E-03	609.32	46.090	6.092E-01	BI214
727.61	66.	21.96	0.71	4.794E-03	727.17	11.800	9.418E-01	BI212
795.21	49.	28.50	1.43	4.422E-03				
795.21	49.	28.50	1.43	4.422E-03	795.76	85.400	1.041E-01	CS134
860.78	48.	31.21	1.54	4.122E-03				
911.35	173.	9.15	1.61	3.921E-03	911.07	29.000	1.225E+00	AC228
968.29	173.	12.11	2.36	3.720E-03	964.00	14.580	2.562E+00	EU152
					968.90	17.460	2.151E+00	AC228
1119.96	48.	28.41	1.44	3.283E-03	1120.28	15.040	7.847E-01	BI214
1461.03	668.	4.04	1.98	2.620E-03	1460.75	10.700	1.923E+01	K40
1764.58	30.	18.26	1.06	2.225E-03	1764.51	15.920	6.816E-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	
477.06	238.58	146.	819.	0.409	12.21	1.215	PB-212	D
483.02	241.56	215.	119.	0.059	59.29	1.217	PB-214	D
553.94	277.14	152.	64.	0.032	89.84	1.195	TL-208	
600.66	300.50	174.	70.	0.035	98.58	1.439	PB-212	
1721.64	860.78	49.	48.	0.024	74.79	1.536	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-214	153.80	77.11	972.	245.	0.123	57.27	1.500	D
PB-212	153.80	77.11	972.	245.	0.123	57.27	1.500	D
CD-109	174.04	87.23	995.	113.	0.057	119.96	1.500	
RA-226	372.12	186.25	481.	96.	0.048	96.48	1.500	
PB-212	477.02	238.70	434.	682.	0.341	17.33	1.500	
PB-214	590.37	295.36	196.	134.	0.067	51.51	1.500	
AC-228	676.35	338.34	155.	181.	0.091	40.50	1.279	

PB-214	703.76	352.04	115.	243.	0.122	26.74	1.500
SB-125	925.83	463.04	85.	47.	0.023	90.97	1.500s
TL-208	1021.18	510.70	99.	114.	0.057	53.81	1.476s
TL-208	1166.31	583.24	84.	243.	0.121	28.38	1.358
BI-214	1218.94	609.54	80.	196.	0.098	32.82	1.498
BI-212	1455.17	727.61	48.	66.	0.033	65.87	0.706s
CS-134	1590.63	795.30	38.	43.	0.022	75.14	1.601s
AC-228	1822.83	911.35	24.	173.	0.086	27.46	1.608
AC-228	1936.79	968.29	70.	173.	0.086	36.33	2.361s
BI-214	2240.32	1119.96	46.	48.	0.024	85.24	1.436
K-40	2922.97	1461.03	15.	668.	0.334	12.12	1.984
BI-214	3530.62	1764.58	0.	30.	0.015	54.77	1.061s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-3.5962E-02					
			477.56	-3.596E-02	&(	5.170E-01	1.49E-01 G
K-40		1.9226E+01					
			1460.75	1.923E+01	(P	6.002E-01	7.77E-01 G
MN-54		2.6641E-02					
			834.81	2.664E-02	%(P	6.818E-02	2.04E-02 G
CO-57		1.6045E-02					
			122.07	1.605E-02	%(	6.630E-02	1.99E-02 G K
			136.43	-1.175E-01	%	5.631E-01	1.69E-01 G
CO-60		-4.3184E-03					
			1332.51	-4.318E-03	&(P	8.204E-02	2.28E-02 G K
			1173.23	2.740E-02	&	8.642E-02	2.55E-02 G K
Sr-85		-2.4011E-02					
			514.00	-2.401E-02	%(	7.208E-02	2.16E-02 G
Kr-85		-5.4806E+02					
			513.99	-5.481E+02	%(	1.645E+03	4.92E+02 G
Y-88		-2.4994E-05					
			1836.01	-2.499E-05	%(P	6.409E-02	1.63E-02 G K

898.02-1.941E-03 % P 6.072E-02 1.65E-02 G

NB-94 0.0000E+00

871.10 0.000E+00 %(7.011E-02 1.96E-02 G K

702.50 1.777E-02 & 5.571E-02 1.65E-02 G K

Ag-108M -1.3942E-02

722.95-1.394E-02 &(7.622E-02 2.22E-02 G K

614.37-1.515E-03 % P 6.878E-02 1.96E-02 G

433.93 4.355E-03 % 5.272E-02 1.52E-02 G

CD-109 1.9555E+00

88.04 1.956E+00 (P 2.587E+00 7.92E-01 G

SN-113 8.5735E-03

391.71 8.573E-03 &(8.047E-02 2.35E-02 G K

255.04-4.953E-02 % 2.348E+00 6.89E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.2134E-01						
		427.95	-1.109E-02	&(P	1.698E-01	4.88E-02	G K
		600.77	6.066E-02	% P	3.274E-01	9.55E-02	G
		636.15	-4.983E-03	& P	4.816E-01	1.35E-01	G
		463.51	5.134E-01	@(P	5.006E-01	1.61E-01	G
		176.29	-1.369E-02	% P	8.638E-01	2.55E-01	G
I-131	1.8910E-02						
		364.48	1.891E-02	&(	6.052E-02	1.80E-02	G K
		636.97	1.635E-01	&	7.852E-01	2.28E-01	G
		284.29	7.005E-02	&	8.957E-01	2.63E-01	G
CS-134	4.1791E-02						
		604.66	-3.097E-03	&(	1.277E-01	3.76E-02	G K
		795.76	9.309E-02	(	6.695E-02	2.33E-02	G
		569.29	8.554E-02	&	2.877E-01	8.47E-02	G
		801.84	-7.711E-02	% P	7.832E-01	2.24E-01	G
CS-137	2.0643E-02						
		661.62	2.064E-02	%(	6.789E-02	2.01E-02	G
CE-139	-1.2192E-02						
		165.85	-1.219E-02	%(P	6.478E-02	1.93E-02	G
EU-152	4.0235E-02						
		121.78	4.024E-02	%(P	2.013E-01	6.03E-02	G K
		344.30	-1.522E-02	&	1.789E-01	5.23E-02	G
		1408.08	8.575E-02	%	2.658E-01	7.73E-02	G
		964.00	3.056E-03	% P	8.194E-01	2.36E-01	G
		1112.07	-1.740E-02	&	4.826E-01	1.33E-01	G

778.90 6.510E-02 & P 4.450E-01 1.27E-01 G

EU-154 1.7559E-02

123.10 1.756E-02 %(P 1.444E-01 4.31E-02 G K

1274.80 1.233E-02 & 2.202E-01 6.13E-02 G

723.30-5.719E-03 & P 3.193E-01 8.99E-02 G

1004.80-3.722E-02 & 3.622E-01 1.02E-01 G

EU-155 2.2812E-01

86.45 2.281E-01 %(P 3.208E-01 9.80E-02 G K

105.31 1.435E-01 % 3.087E-01 9.36E-02 G

HG-203 -1.0785E-02

279.17-1.079E-02 &(P 6.624E-02 1.96E-02 G K

72.87-4.878E-01 % 2.596E+00 7.80E-01 G

70.83-5.137E-01 % 4.336E+00 1.30E+00 G

82.50-6.399E-01 % 5.014E+00 1.50E+00 G

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

TL-208      3.8662E-01
                 583.14 3.866E-01  (P 7.255E-02 3.66E-02 G
                 510.72 6.125E-01 +   2.626E-01 1.10E-01 G

PB-212      9.2482E-01
                 238.63 9.248E-01  (  1.355E-01 5.34E-02 G K
                                      Energy duplication
                  77.11 1.185E+00 +   7.154E-01 2.26E-01 G
                  74.81 1.027E+00 % P 1.446E+00 4.42E-01 G

PB-214      5.2764E-01
                 351.99 5.473E-01  (P 1.183E-01 4.89E-02 G K
                 295.22 4.896E-01  (  2.492E-01 8.41E-02 G
                                      Energy duplication
                  77.11 1.938E+00 +   1.170E+00 3.70E-01 G
                 241.92 3.297E-01 %   9.418E-01 2.84E-01 G

BI-212      9.4183E-01
                 727.17 9.418E-01  (  4.994E-01 2.07E-01 G K
                1620.56-4.109E-02 & P 2.010E+00 4.99E-01 G
                 785.42-2.934E-01 % P 3.027E+00 8.59E-01 G

BI-214      6.5844E-01
                 609.32 6.092E-01  (  1.380E-01 6.67E-02 G K
                1764.51 6.816E-01  (P 1.679E-01 1.25E-01 G
                1120.28 7.847E-01  (  5.610E-01 2.23E-01 G

RA-224      1.1304E+00
                 241.00 1.130E+00 %(P 1.733E+00 5.30E-01 G
```

```
RA-226       1.4598E+00
                 185.99 1.460E+00  (P 1.587E+00 4.91E-01 G

AC-228       1.2209E+00
                 911.07 1.225E+00  (P 1.827E-01 1.12E-01 G K
                 968.90 2.151E+00 + P 5.187E-01 2.61E-01 G
                 338.40 1.211E+00  (  4.054E-01 1.63E-01 G

TH-227      -3.5215E-01
                 236.00-3.521E-01 %(P 6.194E-01 1.89E-01 G K
                 256.25 1.260E-01 &   7.302E-01 2.17E-01 G

PA-234      -1.2429E-03
                  98.44-1.243E-03 %(  3.094E-01 9.21E-02 G K
                 946.00 1.241E-03 %   3.184E-01 8.80E-02 G
                 131.28 1.789E-01 %   2.476E-01 7.60E-02 G
                  94.67-1.312E-01 %   5.570E-01 1.67E-01 G
                 883.24-1.179E-02 %   5.204E-01 1.45E-01 G
                 926.70-3.764E-02 &   5.930E-01 1.66E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	1.263E-01	&	4.265E-01	1.25E-01	G
TH-234	1.1375E+00						
		63.29	1.137E+00	%(P	5.762E+00	1.73E+00	G K
		92.80	2.090E+00	%	2.965E+00	9.07E-01	G
		92.38	2.585E-01	% P	3.028E+00	9.03E-01	G
AM-241	-3.7909E-02						
		59.54	-3.791E-02	%(	8.629E-01	2.57E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-3.5463E-02	-3.5962E-02	4.4735E-01	4.4735E-01	5.099E-01
K-40		1.9226E+01	1.9226E+01	2.3302E+00	2.5678E+00	
MN-54	#A	2.6577E-02	2.6641E-02	6.1169E-02	6.1187E-02	6.802E-02
CO-57	#B	1.6001E-02	1.6045E-02	5.9662E-02	5.9669E-02	6.612E-02
CO-60	#B	-4.3167E-03	-4.3184E-03	7.5741E-02	7.5742E-02	8.200E-02

Sr-85 #A	-2.3736E-02	-2.4011E-02	6.4677E-02	6.4691E-02	7.126E-02
Kr-85 #A	-5.4806E+02	-5.4806E+02	1.4761E+03	1.4764E+03	1.645E+03
Y-88 #B	-2.4820E-05	-2.4994E-05	6.4232E-04	6.4232E-04	6.364E-02
NB-94 #B	0.0000E+00	0.0000E+00	5.8946E-02	5.8946E-02	7.011E-02
Ag-108M#B	-1.3942E-02	-1.3942E-02	6.6593E-02	6.6597E-02	7.622E-02
CD-109 #A	1.9523E+00	1.9555E+00	2.3766E+00	2.3791E+00	2.583E+00
SN-113 #B	8.5181E-03	8.5735E-03	7.0473E-02	7.0475E-02	7.995E-02
SB-125 #B	1.2125E-01	1.2134E-01	1.1404E-01	1.1424E-01	1.697E-01
I-131 #B	1.7235E-02	1.8910E-02	5.4094E-02	5.4104E-02	5.516E-02
CS-134 #B	4.1749E-02	4.1791E-02	3.1404E-02	3.1491E-02	1.275E-01
CS-137 #A	2.0641E-02	2.0643E-02	6.0195E-02	6.0207E-02	6.789E-02
CE-139 #A	-1.2126E-02	-1.2192E-02	6.0576E-02	6.0580E-02	6.443E-02
EU-152 #B	4.0229E-02	4.0235E-02	1.8083E-01	1.8084E-01	2.013E-01
EU-154 #B	1.7554E-02	1.7559E-02	1.2931E-01	1.2931E-01	1.444E-01
EU-155 #B	2.2803E-01	2.2812E-01	2.9405E-01	2.9433E-01	3.207E-01
HG-203 #B	-1.0614E-02	-1.0785E-02	5.9774E-02	5.9777E-02	6.519E-02
TL-208	3.8662E-01	3.8662E-01	1.0992E-01	1.1204E-01	
PB-212 #	9.2482E-01	9.2482E-01	1.6027E-01	1.6846E-01	1.355E-01
PB-214 #	5.2764E-01	5.2764E-01	1.4132E-01	1.4439E-01	1.183E-01
BI-212	9.4183E-01	9.4183E-01	6.2038E-01	6.2263E-01	
BI-214	6.5844E-01	6.5844E-01	2.1611E-01	2.1924E-01	
RA-224 #A	1.1304E+00	1.1304E+00	1.5886E+00	1.5899E+00	1.733E+00
RA-226 #A	1.4598E+00	1.4598E+00	1.4736E+00	1.4759E+00	1.587E+00
AC-228	1.2209E+00	1.2209E+00	2.9883E-01	3.0658E-01	
TH-227 #B	-3.5215E-01	-3.5215E-01	5.7043E-01	5.7077E-01	6.194E-01
PA-234 #B	-1.2429E-03	-1.2429E-03	2.7618E-01	2.7618E-01	3.094E-01
TH-234 #B	1.1375E+00	1.1375E+00	5.1829E+00	5.1833E+00	5.762E+00
AM-241 #A	-3.7909E-02	-3.7909E-02	7.7119E-01	7.7119E-01	8.629E-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 (276.7 to 1999.0 keV) 2.2433414E+01 pCi/gm

Total Decayed Activity (276.7 to 1999.0 keV) 2.2433414E+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: 102F_21OCT2005_1541.An1

Sample description

FSS-NOL-006-01-06-R

Spectrum Filename: C:\GammaVision\Spectra\102F_21OCT2005_1541.An1

Acquisition information

Start time:	21-Oct-2005 15:41:37
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: 1.8780E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8780E+03) =
5.3248E+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	20-Oct-2005 12:35:00
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: 0.1653

***** 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
77.04	237.	19.29	1.50	9.541E-03	77.11	17.500	1.022E+00	PB212
					77.11	10.700	1.671E+00	PB214
77.04	237.	19.29	1.50	9.541E-03	77.11	17.500	1.022E+00	PB212
					77.11	10.700	1.671E+00	PB214
93.18	85.	39.00	1.91	1.340E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.529E+00	TH234
					94.67	15.500	2.884E-01	PA234

185.90	167.	21.71	1.59	1.627E-02	185.99	3.280	2.188E+00	RA226
238.75	690.	4.51	1.21	1.380E-02	238.63	43.100	8.342E-01	PB212
242.24	106.	20.43	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.471E-01	PB214
270.28	80.	28.71	1.74	1.243E-02				
295.36	143.	12.69	1.25	1.146E-02	295.22	19.200	4.674E-01	PB214
300.50	59.	24.85	1.26	1.128E-02				
327.60	65.	29.19	0.64	1.038E-02				
338.55	148.	18.67	1.25	1.006E-02	338.40	12.010	8.791E-01	AC228
351.92	254.	11.82	1.32	9.680E-03				
351.92	254.	11.82	1.32	9.680E-03	351.99	37.100	5.082E-01	PB214
463.25	47.	34.52	1.07	7.369E-03				
463.25	47.	34.52	1.07	7.369E-03	463.51	10.000	4.484E-01	SB125
510.44	126.	17.72	1.94	6.698E-03	510.72	22.500	6.043E-01	TL208
583.38	211.	8.51	1.46	5.888E-03	583.14	86.000	2.989E-01	TL208
609.47	170.	13.69	1.25	5.648E-03	609.32	46.090	4.698E-01	BI214
661.11	68.	29.95	1.16	5.233E-03				
661.11	68.	29.95	1.16	5.233E-03	661.62	84.620	1.098E-01	CS137
727.26	37.	33.02	1.91	4.794E-03	727.17	11.800	4.681E-01	BI212
794.40	32.	31.99	1.58	4.426E-03				
794.40	32.	31.99	1.58	4.426E-03	795.76	85.400	6.031E-02	CS134
911.23	150.	10.37	1.89	3.921E-03	911.07	29.000	9.463E-01	AC228
968.08	120.	16.21	1.97	3.721E-03	968.90	17.460	1.333E+00	AC228
1120.45	49.	32.19	1.78	3.283E-03	1120.28	15.040	7.141E-01	BI214
1172.95	50.	22.88	2.37	3.157E-03	1173.23	99.860	HL>Cutoff	CO60
1332.90	66.	14.86	1.24	2.834E-03	1332.51	99.980	HL>Cutoff	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.06	562.	4.36	1.85	2.620E-03	1460.75	10.700	1.441E+01	K40
1764.64	22.	21.32	1.00	2.225E-03	1764.51	15.920	4.451E-01	Bl214

********** 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	
477.13	238.69	140.	690.	0.345	13.54	1.215	PB-212	D
484.12	242.18	181.	106.	0.053	61.29	1.217	PB-214	D
540.21	270.28	182.	80.	0.040	86.14	1.744	AC-228	s
600.58	300.46	90.	56.	0.028	82.30	0.830	PB-212	
654.86	327.60	125.	65.	0.033	87.57	0.638	AC-228	s
1322.11	661.11	98.	68.	0.034	89.86	1.156	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	153.80	77.11	928.	237.	0.119	57.87	1.500	D
PB-214	153.80	77.11	928.	237.	0.119	57.87	1.500	D
TH-234	185.35	92.89	901.	126.	0.063	103.70	1.500	s

TH-234	185.36	92.89	905.	109.	0.054	120.92	1.500s
RA-226	371.40	185.90	428.	162.	0.081	65.13	1.586s
PB-212	477.10	238.74	422.	597.	0.299	19.07	1.500
PB-214	590.28	295.31	174.	142.	0.071	46.77	1.500s
AC-228	676.87	338.60	196.	157.	0.079	53.43	1.260s
PB-214	703.76	352.04	126.	218.	0.109	29.75	1.500
SB-125	926.76	463.50	79.	38.	0.019	106.32	1.500
TL-208	1020.66	510.44	108.	126.	0.063	53.17	1.935s
TL-208	1166.59	583.38	47.	210.	0.105	25.52	1.456
BI-214	1218.79	609.47	93.	170.	0.085	41.08	1.249
BI-212	1454.48	727.26	46.	37.	0.018	99.07	1.907s
CS-134	1589.72	794.85	22.	32.	0.016	81.19	1.601
AC-228	1822.60	911.23	35.	150.	0.075	31.11	1.889
AC-228	1936.36	968.08	67.	120.	0.060	48.64	1.965
BI-214	2241.29	1120.45	54.	49.	0.024	96.57	1.777
CO-60	2346.37	1172.95	32.	50.	0.025	68.63	2.370s
CO-60	2666.49	1332.90	8.	66.	0.033	44.57	1.239s
K-40	2923.02	1461.06	9.	562.	0.281	13.08	1.853

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bi-214	3530.75	1764.64	0.	22.	0.011	63.96	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.4132E-01					
			477.56	-1.413E-01	%(	4.632E-01	1.38E-01 G
K-40		1.4410E+01					
			1460.75	1.441E+01	(P	4.372E-01	6.29E-01 G
MN-54		2.2298E-02					
			834.81	2.230E-02	&(P	3.999E-02	1.24E-02 G
CO-57		-1.5967E-02					
			122.07	-1.597E-02	%(	6.116E-02	1.84E-02 G K
			136.43	-1.229E-02	%	4.577E-01	1.36E-01 G
CO-60		1.6724E-01					
			1332.51	1.672E-01	(P	4.074E-02	2.49E-02 G K
			1173.23	1.130E-01	-	6.591E-02	2.59E-02 G K
Sr-85		-2.4669E-02					

514.00-2.467E-02 %(6.621E-02 1.99E-02 G

Kr-85 -5.6281E+02

513.99-5.628E+02 %(1.510E+03 4.54E+02 G

Y-88 2.1005E-03

1836.01 2.101E-03 %(P 5.802E-02 1.51E-02 G K

898.02 1.164E-02 % P 5.997E-02 1.72E-02 G

NB-94 -7.8280E-03

871.10-7.828E-03 %(5.391E-02 1.54E-02 G K

702.50 1.386E-02 % 4.749E-02 1.40E-02 G K

Ag-108M -6.9836E-03

722.95-6.984E-03 %(6.872E-02 1.98E-02 G K

614.37-9.506E-03 % P 5.049E-02 1.46E-02 G

433.93-1.514E-02 % 4.666E-02 1.39E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	9.9187E-03						
		88.04	9.919E-03	%(P	2.436E+00	7.26E-01	G
SN-113	2.0046E-02						
		391.71	2.005E-02	&(	6.992E-02	2.08E-02	G K
		255.04	-2.029E-01	%	2.057E+00	6.07E-01	G
SB-125	9.5065E-02						
		427.95	2.573E-03	&(P	1.351E-01	3.85E-02	G K
		600.77	6.821E-02	% P	2.391E-01	7.03E-02	G
		636.15	-8.648E-03	& P	4.612E-01	1.30E-01	G
		463.51	3.688E-01	(P	4.309E-01	1.36E-01	G
		176.29	-1.748E-02	% P	7.538E-01	2.23E-01	G
I-131	1.2682E-02						
		364.48	1.268E-02	%(	5.127E-02	1.51E-02	G K
		636.97	-4.772E-02	%	7.793E-01	2.22E-01	G
		284.29	-2.187E-01	%	8.375E-01	2.50E-01	G
CS-134	2.3626E-02						
		604.66	-9.914E-03	%(	5.591E-02	1.63E-02	G K
		795.76	6.196E-02	(	4.723E-02	1.68E-02	G
		569.29	4.871E-03	%	2.757E-01	7.75E-02	G
		801.84	2.223E-01	& P	5.626E-01	1.68E-01	G
CS-137	4.4466E-02						
		661.62	4.447E-02	%(	7.974E-02	2.44E-02	G
CE-139	5.7311E-05						
		165.85	5.731E-05	%(P	5.659E-02	1.67E-02	G

EU-152 -4.4128E-02

121.78-4.413E-02 %(P 1.827E-01 5.48E-02 G K

344.30 2.869E-03 % 1.709E-01 4.97E-02 G

1408.08 5.485E-02 % 2.502E-01 7.07E-02 G

964.00-2.284E-02 % P 6.468E-01 1.86E-01 G

1112.07-1.331E-02 % 5.457E-01 1.53E-01 G

778.90 9.983E-02 % P 4.098E-01 1.19E-01 G

EU-154 -2.5529E-02

123.10-2.553E-02 %(P 1.221E-01 3.66E-02 G K

1274.80-1.443E-02 & 2.110E-01 5.92E-02 G

723.30-9.001E-02 & P 3.712E-01 1.09E-01 G

1004.80-3.735E-02 & 3.782E-01 1.07E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	4.9931E-02						
		86.45	4.993E-02	%(P	2.743E-01	8.22E-02	G K
		105.31	1.108E-01	%	2.623E-01	7.94E-02	G
HG-203	1.4620E-02						
		279.17	1.462E-02	%(P	5.703E-02	1.70E-02	G K
		72.87	-1.003E+00	%	2.300E+00	6.97E-01	G
		70.83	5.855E-02	%	4.584E+00	1.37E+00	G
		82.50	-1.893E-01	%	4.624E+00	1.38E+00	G
TL-208	2.9888E-01						
		583.14	2.989E-01	(P	4.904E-02	2.55E-02	G
		510.72	6.043E-01	+	2.437E-01	1.07E-01	G
PB-212	7.2234E-01						
		238.63	7.223E-01	(	1.191E-01	4.59E-02	G K
							Energy duplication
		77.11	1.022E+00	+	6.234E-01	1.97E-01	G
		74.81	7.904E-01	& P	1.320E+00	4.02E-01	G
PB-214	4.4670E-01						
		351.99	4.376E-01	(P	1.104E-01	4.35E-02	G K
		295.22	4.642E-01	@(	2.099E-01	7.24E-02	G
							Energy duplication
		77.11	1.671E+00	+	1.020E+00	3.22E-01	G
		241.92	4.862E-01	%	7.859E-01	2.40E-01	G
BI-212	4.6810E-01						
		727.17	4.681E-01	*(	4.374E-01	1.55E-01	G K
		1620.56	1.172E-01	% P	1.996E+00	5.24E-01	G

785.42 8.896E-01 % P 2.494E+00 7.41E-01 G

BI-214 4.6346E-01

609.32 4.698E-01 (1.317E-01 6.44E-02 G K

1764.51 4.451E-01 (P 1.497E-01 9.53E-02 G

1120.28 7.141E-01 + 5.385E-01 2.30E-01 G

RA-224 1.0747E+00

241.00 1.075E+00 %(P 1.488E+00 4.56E-01 G

RA-226 2.1881E+00

185.99 2.188E+00 *(P 1.336E+00 4.88E-01 G

AC-228 9.4335E-01

911.07 9.463E-01 (P 1.926E-01 9.83E-02 G K

968.90 1.333E+00 + P 4.520E-01 2.16E-01 G

338.40 9.362E-01 *(4.045E-01 1.67E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.0575E-01						
		236.00	-3.058E-01	%(P	5.109E-01	1.56E-01	G K
		256.25	-6.187E-02	%	6.103E-01	1.80E-01	G
PA-234	5.9344E-02						
		98.44	5.934E-02	%(	2.447E-01	7.34E-02	G K
		946.00	-5.602E-03	%	2.742E-01	7.58E-02	G
		131.28	4.145E-02	&	2.609E-01	7.80E-02	G
		94.67	-1.947E-01	%	5.106E-01	1.54E-01	G
		883.24	-6.743E-02	&	5.180E-01	1.48E-01	G
		926.70	-6.703E-02	&	6.235E-01	1.78E-01	G
		569.26	1.772E-02	%	4.077E-01	1.15E-01	G
TH-234	1.6774E+00						
		63.29	8.170E-01	%(P	4.952E+00	1.48E+00	G K
		92.80	1.955E+00	(	2.571E+00	7.88E-01	G
		92.38	2.659E+00	(P	3.013E+00	9.28E-01	G
AM-241	3.0595E-02						
		59.54	3.059E-02	&(	7.385E-01	2.20E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	-1.3926E-01	-1.4132E-01	4.1285E-01	4.1292E-01	4.565E-01
K-40	1.4410E+01	1.4410E+01	1.8854E+00	2.0515E+00	
MN-54 #A	2.2243E-02	2.2298E-02	3.7064E-02	3.7085E-02	3.989E-02
CO-57 #B	-1.5921E-02	-1.5967E-02	5.5099E-02	5.5106E-02	6.098E-02
CO-60 #H	1.6717E-01	1.6724E-01	7.4633E-02	7.5220E-02	
Sr-85 #A	-2.4373E-02	-2.4669E-02	5.9648E-02	5.9664E-02	6.542E-02
Kr-85 #A	-5.6280E+02	-5.6281E+02	1.3605E+03	1.3609E+03	1.510E+03
Y-88 #B	2.0851E-03	2.1005E-03	4.5158E-02	4.5158E-02	5.760E-02
NB-94 #B	-7.8280E-03	-7.8280E-03	4.6097E-02	4.6099E-02	5.391E-02
Ag-108M#B	-6.9835E-03	-6.9836E-03	5.9373E-02	5.9374E-02	6.872E-02
CD-109 #A	9.9016E-03	9.9187E-03	2.1792E+00	2.1792E+00	2.432E+00
SN-113 #B	1.9910E-02	2.0046E-02	6.2367E-02	6.2378E-02	6.945E-02
SB-125 #B	9.4991E-02	9.5065E-02	1.0522E-01	1.0535E-01	1.350E-01
I-131 #B	1.1506E-02	1.2682E-02	4.5431E-02	4.5437E-02	4.651E-02
CS-134 #B	2.3601E-02	2.3626E-02	1.9182E-02	1.9228E-02	5.586E-02
CS-137 #A	4.4463E-02	4.4466E-02	7.3175E-02	7.3217E-02	7.973E-02
CE-139 #A	5.6986E-05	5.7311E-05	5.0205E-02	5.0205E-02	5.627E-02
EU-152 #B	-4.4121E-02	-4.4128E-02	1.7416E-01	1.7418E-01	1.826E-01
EU-154 #B	-2.5523E-02	-2.5529E-02	1.1154E-01	1.1155E-01	1.221E-01
EU-155 #B	4.9909E-02	4.9931E-02	2.4665E-01	2.4666E-01	2.742E-01
HG-203 #B	1.4377E-02	1.4620E-02	5.1047E-02	5.1054E-02	5.608E-02
TL-208	2.9888E-01	2.9888E-01	7.6435E-02	7.8254E-02	

PB-212 #	7.2234E-01	7.2234E-01	1.3776E-01	1.4360E-01	1.191E-01
PB-214 #	4.4670E-01	4.4670E-01	1.2388E-01	1.2639E-01	1.104E-01
BI-212 #	4.6810E-01	4.6810E-01	4.6373E-01	4.6448E-01	
BI-214	4.6346E-01	4.6346E-01	1.7665E-01	1.7856E-01	
RA-224 #A	1.0747E+00	1.0747E+00	1.3692E+00	1.3705E+00	1.488E+00
RA-226 #	2.1881E+00	2.1881E+00	1.4642E+00	1.4693E+00	
AC-228	9.4335E-01	9.4335E-01	2.9172E-01	2.9649E-01	
TH-227 #B	-3.0575E-01	-3.0575E-01	4.7144E-01	4.7176E-01	5.109E-01
PA-234 #B	5.9344E-02	5.9344E-02	2.2032E-01	2.2035E-01	2.447E-01
TH-234 #B	1.6774E+00	1.6774E+00	1.7557E+00	1.7581E+00	4.952E+00
AM-241 #A	3.0595E-02	3.0595E-02	6.5945E-01	6.5946E-01	7.385E-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) 1.8938585E+01 pCi/gm

Total Decayed Activity (270.2 to 1999.0 keV) 1.8938656E+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_21OCT2005_1628.An1

Sample description

FSS-NOL-06-01-003-R

Spectrum Filename: C:\GammaVision\Spectra\102F_21OCT2005_1628.An1

Acquisition information

Start time:	21-Oct-2005 16:28:42
Live time:	2000
Real time:	2025
Dead time:	1.21 %
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: 2.1070E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1070E+03) =
4.7461E+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	20-Oct-2005 12:05:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2671

***** 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	151.	32.87	1.50	8.847E-03				
74.79	151.	32.87	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.09	174.	28.89	1.50	9.541E-03	77.11	10.700	1.092E+00	PB214
					77.11	17.500	6.675E-01	PB212
77.09	174.	28.89	1.50	9.541E-03	77.11	10.700	1.092E+00	PB214
					77.11	17.500	6.675E-01	PB212
86.90	135.	40.88	1.12	1.209E-02	86.45	32.740	PBC<MDA	EU155

93.14	137.	28.44	1.44	1.340E-02	92.38	2.570	PBC<MDA TH234
					92.80	3.000	2.191E+00 TH234
186.32	105.	33.21	1.64	1.625E-02	185.99	3.280	PBC<MDA RA226
209.95	77.	38.42	0.94	1.516E-02			
238.76	791.	4.32	1.21	1.381E-02			
238.76	791.	4.32	1.21	1.381E-02	238.63	43.100	8.524E-01 PB212
242.37	107.	22.18	1.22	1.364E-02	241.00	3.900	PBC<MDA RA224
					241.92	7.470	6.706E-01 PB214
270.81	81.	32.10	1.29	1.240E-02			
295.31	145.	12.76	1.25	1.146E-02	295.22	19.200	4.217E-01 PB214
300.20	58.	29.31	1.26	1.129E-02			
327.53	72.	34.32	0.84	1.038E-02			
338.50	196.	16.32	1.30	1.006E-02	338.40	12.010	1.043E+00 AC228
352.13	304.	10.01	1.30	9.675E-03	351.99	37.100	5.430E-01 PB214
511.22	124.	17.75	1.64	6.688E-03	510.72	22.500	5.271E-01 TL208
583.35	220.	11.71	1.37	5.888E-03	583.14	86.000	2.780E-01 TL208
609.56	206.	11.43	1.32	5.647E-03	609.32	46.090	5.079E-01 BI214
661.88	565.	5.55	1.56	5.228E-03	661.62	84.620	8.187E-01 CS137
726.94	79.	26.37	1.45	4.795E-03	727.17	11.800	8.911E-01 BI212
911.60	155.	10.61	1.95	3.920E-03	911.07	29.000	8.733E-01 AC228
967.91	120.	14.90	1.34	3.721E-03	968.90	17.460	1.185E+00 AC228
1120.46	63.	31.98	1.45	3.283E-03	1120.28	15.040	8.235E-01 BI214
1173.39	34.	37.71	1.85	3.157E-03	1173.23	99.860	PBC<MDA CO60
1333.06	46.	28.49	1.38	2.833E-03	1332.51	99.980	1.047E-01 CO60
1461.13	639.	4.04	1.69	2.620E-03	1460.75	10.700	1.460E+01 K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1765.35	45.	14.91	1.75	2.225E-03	1764.51	15.920	8.131E-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	
173.37	86.90	1085.	135.	0.068	122.64	1.120	BI-207	I
419.52	209.95	365.	77.	0.039	115.26	0.944	NP-239	s
477.14	238.57	189.	791.	0.395	12.97	1.215	PB-212	D
484.38	242.18	226.	107.	0.053	66.53	1.217	PB-214	D
541.26	270.81	251.	81.	0.041	96.31	1.294	AC-228	s
600.00	300.17	153.	51.	0.025	111.14	1.477	PB-212	
654.72	327.53	210.	72.	0.036	102.96	0.839	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	1213.	151.	0.076	98.61	1.500	s
PB-214	153.80	77.11	1174.	174.	0.087	86.68	1.500	D
PB-212	153.80	77.11	1174.	174.	0.087	86.68	1.500	D

TH-234	185.70	93.06	1100.	155.	0.078	92.94	1.500s
TH-234	185.68	93.05	1069.	158.	0.079	91.02	1.500s
PB-212	477.11	238.74	529.	708.	0.354	17.81	1.500
PB-214	590.25	295.30	275.	126.	0.063	61.83	1.500
AC-228	676.68	338.50	260.	196.	0.098	48.95	1.301
PB-214	703.91	352.11	164.	279.	0.139	26.47	1.500
TL-208	1022.22	511.22	112.	124.	0.062	53.25	1.644s
TL-208	1166.54	583.35	111.	220.	0.110	35.14	1.371s
BI-214	1218.97	609.56	106.	206.	0.103	34.29	1.319
CS-137	1323.66	661.88	95.	565.	0.282	16.66	1.560
BI-212	1453.84	726.94	92.	79.	0.039	79.12	1.448s
AC-228	1823.34	911.60	40.	155.	0.077	31.83	1.951
AC-228	1936.02	967.91	54.	120.	0.060	44.71	1.344
BI-214	2241.31	1120.46	76.	63.	0.032	95.95	1.453s
CO-60	2347.25	1173.39	66.	34.	0.017	113.12	1.854s
CO-60	2666.31	1332.81	23.	30.	0.015	87.26	1.959
K-40	2923.17	1461.13	7.	638.	0.319	12.12	1.685
BI-214	3532.16	1765.35	0.	45.	0.022	44.72	1.748

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		6.7225E-02					
			477.56	6.723E-02	&(	4.674E-01	1.37E-01 G
K-40		1.4602E+01					
			1460.75	1.460E+01	(P	3.348E-01	5.90E-01 G
MN-54		4.7912E-03					
			834.81	4.791E-03	%(P	5.727E-02	1.63E-02 G
CO-57		-5.1970E-04					
			122.07	-5.197E-04	&(	6.271E-02	1.87E-02 G K
			136.43	1.714E-02	&	4.638E-01	1.38E-01 G
CO-60		6.8532E-02					
			1332.51	6.739E-02	(P	5.654E-02	1.97E-02 G K
			1173.23	6.968E-02	(	8.269E-02	2.63E-02 G K
Sr-85		-2.0574E-02					
			514.00	-2.057E-02	&(	6.128E-02	1.83E-02 G

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Kr-85       -4.6894E+02
                513.99-4.689E+02 &(  1.397E+03 4.18E+02 G

Y-88         1.6753E-04
               1836.01 1.675E-04 %(P 5.761E-02 1.50E-02 G K
                898.02-9.926E-03 % P 6.418E-02 1.84E-02 G

NB-94        4.1892E-04
                871.10 4.189E-04 %(  5.309E-02 1.48E-02 G K
                702.50 1.304E-02 %   4.904E-02 1.44E-02 G K

Ag-108M      1.3476E-02
                722.95 1.348E-02 &(  6.681E-02 1.96E-02 G K
                614.37 3.903E-02 % P 5.584E-02 1.74E-02 G
                433.93 2.967E-02 %   5.535E-02 1.69E-02 G

CD-109      -1.4888E+00
                 88.04-1.489E+00 %(P 2.146E+00 6.55E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-1.1582E-02						
		391.71	-1.158E-02	%(	7.398E-02	2.18E-02	G K
		255.04	-4.782E-01	%	2.115E+00	6.31E-01	G
SB-125	-7.1900E-03						
		427.95	-7.190E-03	%(P	1.676E-01	4.86E-02	G K
		600.77	-4.771E-02	& P	2.937E-01	8.57E-02	G
		636.15	4.090E-02	% P	4.767E-01	1.38E-01	G
		463.51	3.670E-01	% P	5.291E-01	1.63E-01	G
		176.29	3.882E-02	% P	7.431E-01	2.21E-01	G
I-131	1.6056E-02						
		364.48	1.606E-02	%(	6.459E-02	1.92E-02	G K
		636.97	-1.695E-01	&	8.736E-01	2.56E-01	G
		284.29	1.699E-01	%	7.915E-01	2.36E-01	G
CS-134	-1.1336E-02						
		604.66	-1.134E-02	&(	6.078E-02	1.79E-02	G K
		795.76	3.638E-02	%	6.632E-02	2.03E-02	G
		569.29	-8.818E-03	%	3.053E-01	8.73E-02	G
		801.84	1.309E-01	& P	6.273E-01	1.83E-01	G
CS-137	8.1865E-01						
		661.62	8.187E-01	(	6.983E-02	4.55E-02	G
CE-139	8.2211E-03						
		165.85	8.221E-03	&(P	5.806E-02	1.73E-02	G
EU-152	-5.9352E-04						
		121.78	-5.935E-04	&(P	1.788E-01	5.32E-02	G K

344.30 4.950E-03 % 1.372E-01 3.98E-02 G
1408.08 7.407E-02 % 2.434E-01 7.08E-02 G
964.00-1.360E-02 & P 5.176E-01 1.48E-01 G
1112.07-6.325E-02 & 5.670E-01 1.63E-01 G
778.90-1.166E-02 % P 3.250E-01 9.02E-02 G

EU-154 4.7001E-03
123.10 4.700E-03 &(P 1.226E-01 3.65E-02 G K
1274.80 8.749E-02 % 1.452E-01 4.54E-02 G
723.30 5.250E-02 & P 3.122E-01 9.11E-02 G
1004.80 1.718E-01 % 2.656E-01 8.34E-02 G

EU-155 1.5408E-01
86.45 1.541E-01 %(P 2.659E-01 8.09E-02 G K
105.31 1.200E-01 & 2.575E-01 7.81E-02 G

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

HG-203       2.0137E-02
                    279.17 2.014E-02 &(P 4.809E-02 1.45E-02 G K
                     72.87-3.507E-01 %   1.883E+00 5.65E-01 G
                     70.83 7.834E-02 &   4.501E+00 1.35E+00 G
                     82.50-1.464E+00 %   4.461E+00 1.35E+00 G

TL-208       2.7804E-01
                    583.14 2.780E-01 *(P 6.571E-02 3.26E-02 G
                    510.72 5.271E-01 +   2.217E-01 9.36E-02 G

PB-212       7.3535E-01
                    238.63 7.629E-01  (  1.184E-01 4.53E-02 G K
                                         Energy duplication
                     77.11 6.675E-01 &(  6.237E-01 1.93E-01 G
                     74.81 1.143E+00 & P 1.246E+00 3.83E-01 G

PB-214       4.9768E-01
                    351.99 4.977E-01  (P 1.114E-01 4.40E-02 G K
                    295.22 3.675E-01 -   2.330E-01 7.58E-02 G
                                         Energy duplication
                     77.11 1.092E+00 &   1.020E+00 3.15E-01 G
                    241.92 3.065E-01 %   8.046E-01 2.43E-01 G

BI-212       8.9113E-01
                    727.17 8.911E-01 @(  5.386E-01 2.35E-01 G K
                   1620.56 5.091E-01 % P 1.364E+00 3.97E-01 G
                    785.42 9.036E-01 % P 2.461E+00 7.33E-01 G

BI-214       5.0792E-01
                    609.32 5.079E-01  (  1.247E-01 5.81E-02 G K
```

1764.51 8.131E-01 + P 1.334E-01 1.21E-01 G
1120.28 8.235E-01 + 5.615E-01 2.63E-01 G

RA-224 8.3640E-01
241.00 8.364E-01 %(P 1.495E+00 4.55E-01 G

RA-226 9.9999E-01
185.99 1.000E+00 %(P 1.408E+00 4.31E-01 G

AC-228 9.2290E-01
911.07 8.733E-01 (P 1.817E-01 9.28E-02 G K
968.90 1.185E+00 + P 3.652E-01 1.77E-01 G
338.40 1.043E+00 (4.130E-01 1.70E-01 G

TH-227 -3.3922E-01
236.00-3.392E-01 %(P 5.305E-01 1.62E-01 G K
256.25 8.237E-03 % 5.135E-01 1.50E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	5.5520E-02						
		98.44	5.552E-02	%(	2.488E-01	7.47E-02	G K
		946.00	7.414E-02	%	2.427E-01	7.12E-02	G
		131.28	-1.882E-02	%	2.433E-01	7.25E-02	G
		94.67	-1.407E-01	%	4.771E-01	1.44E-01	G
		883.24	-5.512E-02	%	4.506E-01	1.29E-01	G
		926.70	1.716E-01	%	4.276E-01	1.28E-01	G
		569.26	-1.355E-01	%	4.966E-01	1.47E-01	G
TH-234	1.9854E+00						
		63.29	9.437E-01	&(P	4.670E+00	1.40E+00	G K
		92.80	2.533E+00	(	2.487E+00	7.68E-01	G
		92.38	2.927E+00	(P	2.962E+00	9.14E-01	G
AM-241	-2.1827E-03						
		59.54	-2.183E-03	&(	6.595E-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	

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	6.6201E-02	6.7225E-02	4.1031E-01	4.1033E-01	4.603E-01
K-40	1.4602E+01	1.4602E+01	1.7700E+00	1.9505E+00	
MN-54 #A	4.7786E-03	4.7912E-03	4.9019E-02	4.9019E-02	5.712E-02
CO-57 #B	-5.1813E-04	-5.1970E-04	5.6012E-02	5.6012E-02	6.252E-02
CO-60 #	6.8503E-02	6.8532E-02	4.9003E-02	4.9153E-02	5.652E-02
Sr-85 #A	-2.0316E-02	-2.0574E-02	5.5041E-02	5.5053E-02	6.051E-02
Kr-85 #A	-4.6894E+02	-4.6894E+02	1.2547E+03	1.2550E+03	1.397E+03
Y-88 #B	1.6624E-04	1.6753E-04	4.5028E-02	4.5028E-02	5.717E-02
NB-94 #B	4.1892E-04	4.1892E-04	4.4526E-02	4.4526E-02	5.309E-02
Ag-108M#B	1.3476E-02	1.3476E-02	5.8736E-02	5.8741E-02	6.681E-02
CD-109 #A	-1.4861E+00	-1.4888E+00	2.0197E+00	2.0214E+00	2.142E+00
SN-113 #B	-1.1500E-02	-1.1582E-02	6.5425E-02	6.5428E-02	7.345E-02
SB-125 #B	-7.1842E-03	-7.1900E-03	3.2336E-01	3.2336E-01	1.675E-01
I-131 #B	1.4499E-02	1.6056E-02	5.7679E-02	5.7686E-02	5.832E-02
CS-134 #B	-1.1324E-02	-1.1336E-02	5.3597E-02	5.3601E-02	6.071E-02
CS-137	8.1859E-01	8.1865E-01	1.3638E-01	1.4391E-01	
CE-139 #A	8.1722E-03	8.2211E-03	5.2022E-02	5.2024E-02	5.772E-02
EU-152 #B	-5.9342E-04	-5.9352E-04	5.0307E-01	5.0307E-01	1.788E-01
EU-154 #B	4.6988E-03	4.7001E-03	1.0946E-01	1.0946E-01	1.225E-01
EU-155 #B	1.5401E-01	1.5408E-01	2.4255E-01	2.4270E-01	2.658E-01
HG-203 #B	1.9786E-02	2.0137E-02	4.3548E-02	4.3563E-02	4.725E-02
TL-208 #	2.7804E-01	2.7804E-01	9.7881E-02	9.9117E-02	
PB-212 #	7.3535E-01	7.3535E-01	1.3096E-01	1.3731E-01	1.184E-01
PB-214 #	4.9768E-01	4.9768E-01	1.3191E-01	1.3483E-01	1.114E-01
BI-212 #	8.9113E-01	8.9113E-01	7.0507E-01	7.0684E-01	
BI-214	5.0792E-01	5.0792E-01	1.7414E-01	1.7646E-01	

RA-224 #A	8.3640E-01	8.3640E-01	1.3649E+00	1.3657E+00	1.495E+00
RA-226 #A	9.9999E-01	9.9999E-01	1.2929E+00	1.2941E+00	1.408E+00
AC-228	9.2290E-01	9.2290E-01	2.6957E-01	2.7450E-01	
TH-227 #B	-3.3922E-01	-3.3922E-01	4.8919E-01	4.8956E-01	5.305E-01
PA-234 #B	5.5520E-02	5.5520E-02	2.2410E-01	2.2412E-01	2.488E-01
TH-234 #B	1.9854E+00	1.9854E+00	1.8071E+00	1.8105E+00	4.670E+00
AM-241 #A	-2.1827E-03	-2.1827E-03	5.8797E-01	5.8797E-01	6.595E-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) 1.8020811E+01 pCi/gm

Total Decayed Activity (270.7 to 1999.0 keV) 1.8020872E+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_30AUG2005_0935.An1

Sample description

FSS-NOL-06-01-016-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30AUG2005_0935.An1

Acquisition information

Start time:	30-Aug-2005 09:36:16
Live time:	2000
Real time:	2021
Dead time:	1.05 %
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: 2.0300E+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	27-Aug-2005 10:50:00
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. 11 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4101

***** 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
74.99	129.	36.01	1.50	8.847E-03				
74.99	129.	36.01	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.09	244.	18.97	1.50	9.541E-03	77.11	10.700	1.589E+00	PB214
					77.11	17.500	9.715E-01	PB212
77.09	244.	18.97	1.50	9.541E-03	77.11	10.700	1.589E+00	PB214
					77.11	17.500	9.715E-01	PB212
93.03	114.	38.03	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234

					92.80	3.000	1.895E+00 TH234
93.06	113.	38.38	1.50	1.325E-02	92.38	2.570	PBC<MDA TH234
					92.80	3.000	PBC<MDA TH234
128.37	74.	39.44	1.37	1.712E-02			
153.80	93.	33.04	2.32	1.731E-02			
186.10	90.	31.36	1.19	1.626E-02	185.99	3.280	PBC<MDA RA226
209.30	91.	32.36	1.43	1.519E-02			
238.86	699.	4.63	1.21	1.379E-02	238.63	43.100	7.819E-01 PB212
242.15	90.	22.86	1.22	1.364E-02	241.00	3.900	PBC<MDA RA224
					241.92	7.470	5.878E-01 PB214
277.81	85.	28.92	1.09	1.212E-02			
277.81	85.	28.92	1.09	1.212E-02	279.17	81.500	5.975E-02 HG203
295.47	155.	13.69	1.44	1.146E-02	295.22	19.200	4.675E-01 PB214
338.52	153.	15.39	1.08	1.006E-02	338.40	12.010	8.452E-01 AC228
352.12	260.	11.97	1.46	9.675E-03	351.99	37.100	4.820E-01 PB214
463.50	36.	38.00	1.50	7.365E-03	463.51	10.000	PBC<MDA SB125
510.63	127.	16.99	1.69	6.696E-03	510.72	22.500	5.621E-01 TL208
583.60	188.	11.43	1.35	5.886E-03	583.14	86.000	2.468E-01 TL208
609.58	202.	9.28	1.46	5.647E-03	609.32	46.090	5.157E-01 BI214
911.73	141.	10.33	1.92	3.919E-03	911.07	29.000	8.228E-01 AC228
969.81	64.	18.78	1.36	3.715E-03	968.90	17.460	6.508E-01 AC228
1121.01	58.	22.75	1.26	3.281E-03	1120.28	15.040	7.846E-01 BI214
1461.70	579.	4.20	1.80	2.619E-03	1460.75	10.700	1.374E+01 K40
1766.00	46.	14.74	1.69	2.225E-03	1764.51	15.920	8.627E-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
256.33	128.37	361.	102.	0.051	84.67	1.368	AC-228 s
307.19	153.80	385.	93.	0.046	99.13	2.316	XE-138 s
418.22	209.30	325.	91.	0.046	97.07	1.430	AC-228 s
477.36	238.90	174.	699.	0.349	13.89	1.215	PB-212 D
483.93	242.18	167.	90.	0.045	68.59	1.217	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	149.55	74.99	1068.	129.	0.065	108.03	1.500s
PB-214	153.80	77.11	947.	244.	0.122	56.92	1.500D
PB-212	153.80	77.11	947.	244.	0.122	56.92	1.500D
TH-234	185.70	93.06	905.	113.	0.057	115.14	1.500
TH-234	185.65	93.03	880.	114.	0.057	114.08	1.500
RA-226	371.73	186.06	454.	101.	0.050	90.30	1.500
PB-212	477.37	238.87	434.	613.	0.307	18.83	1.500

HG-203	555.14	277.75	187.	56.	0.028	110.80	1.500s
PB-214	590.73	295.54	183.	153.	0.076	44.75	1.500s
AC-228	676.71	338.52	150.	153.	0.077	46.17	1.081
PB-214	704.11	352.21	157.	220.	0.110	31.40	1.500
SB-125	926.75	463.50	86.	36.	0.018	114.01	1.500
TL-208	1021.03	510.63	92.	127.	0.064	50.96	1.692s
TL-208	1167.03	583.60	86.	188.	0.094	34.29	1.353
BI-214	1219.02	609.58	51.	202.	0.101	27.84	1.463s
AC-228	1823.60	911.73	27.	141.	0.070	30.99	1.919
AC-228	1939.83	969.81	32.	63.	0.032	56.35	1.356
BI-214	2242.41	1121.01	38.	58.	0.029	68.26	1.256s
K-40	2924.31	1461.70	4.	579.	0.289	12.60	1.799
BI-214	3533.46	1766.00	0.	46.	0.023	44.23	1.686

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.4521E-01					
			477.56	1.452E-01	&(	3.764E-01	1.13E-01 G
K-40		1.3741E+01					
			1460.75	1.374E+01	(P	2.897E-01	5.77E-01 G
MN-54		-1.8651E-03					
			834.81	-1.865E-03	%(P	5.027E-02	1.40E-02 G
CO-57		-3.3925E-03					
			122.07	-3.393E-03	&(	5.525E-02	1.64E-02 G K
			136.43	-4.386E-02	%	3.949E-01	1.18E-01 G
CO-60		-5.0838E-04					
			1332.51	-5.084E-04	&(P	6.377E-02	1.74E-02 G K
			1173.23	2.983E-02	%	7.030E-02	2.11E-02 G K
Sr-85		-1.7865E-02					
			514.00	-1.786E-02	%(	5.639E-02	1.68E-02 G
Kr-85		-4.0028E+02					
			513.99	-4.003E+02	%(	1.262E+03	3.76E+02 G
Y-88		-5.7592E-03					
			1836.01	-5.759E-03	%(P	4.987E-02	1.32E-02 G K

898.02-1.616E-02 % P 5.906E-02 1.71E-02 G

NB-94 1.7857E-02

871.10 1.786E-02 %(4.181E-02 1.26E-02 G K

702.50 1.468E-03 & 5.081E-02 1.44E-02 G K

Ag-108M -1.1204E-04

722.95-1.120E-04 %(3.652E-02 9.84E-03 G K

614.37-2.395E-02 & P 5.790E-02 1.74E-02 G

433.93-3.534E-03 % 4.983E-02 1.45E-02 G

CD-109 -1.6117E-01

88.04-1.612E-01 &(P 1.814E+00 5.40E-01 G

SN-113 -2.1865E-02

391.71-2.187E-02 %(7.283E-02 2.17E-02 G K

255.04-4.765E-01 % 1.921E+00 5.73E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0199E-01						
		427.95	2.539E-02	&(P	1.463E-01	4.28E-02	G K
		600.77	-1.508E-02	& P	2.528E-01	7.21E-02	G
		636.15	-6.255E-04	& P	3.965E-01	1.11E-01	G
		463.51	3.287E-01	(P	4.160E-01	1.30E-01	G
		176.29	8.490E-02	& P	6.965E-01	2.07E-01	G
I-131	-1.8716E-02						
		364.48	-1.872E-02	%(	6.519E-02	1.94E-02	G K
		636.97	-1.588E-01	%	8.604E-01	2.50E-01	G
		284.29	-7.187E-02	%	8.383E-01	2.46E-01	G
CS-134	-1.7566E-02						
		604.66	-1.757E-02	%(	5.945E-02	1.77E-02	G K
		795.76	3.896E-02	%	6.605E-02	2.04E-02	G
		569.29	-3.346E-02	%	3.251E-01	9.41E-02	G
		801.84	-1.148E-01	& P	7.665E-01	2.23E-01	G
CS-137	1.1419E-02						
		661.62	1.142E-02	%(	5.176E-02	1.51E-02	G
CE-139	1.2614E-02						
		165.85	1.261E-02	%(P	5.334E-02	1.60E-02	G
EU-152	-6.3672E-03						
		121.78	-6.367E-03	%(P	1.603E-01	4.76E-02	G K
		344.30	-1.827E-02	%	1.569E-01	4.60E-02	G
		1408.08	4.643E-02	%	2.182E-01	6.13E-02	G
		964.00	2.237E-01	% P	3.986E-01	1.22E-01	G
		1112.07	1.297E-01	%	4.576E-01	1.34E-01	G

778.90 3.416E-02 % P 4.143E-01 1.18E-01 G

EU-154 7.2521E-03

123.10 7.252E-03 &(P 1.226E-01 3.65E-02 G K

1274.80-6.239E-03 % 1.646E-01 4.52E-02 G

723.30-4.536E-02 & P 2.771E-01 8.01E-02 G

1004.80 6.628E-02 % 2.628E-01 7.58E-02 G

EU-155 8.6588E-02

86.45 8.659E-02 %(P 2.541E-01 7.66E-02 G K

105.31 1.004E-01 % 2.476E-01 7.48E-02 G

HG-203 3.9581E-02

279.17 3.958E-02 &(P 4.691E-02 1.46E-02 G K

72.87-3.403E-01 % 2.196E+00 6.59E-01 G

70.83-1.578E+00 % 4.011E+00 1.21E+00 G

82.50-7.952E-01 & 4.214E+00 1.26E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.4680E-01						
		583.14	2.468E-01	(P	6.042E-02	2.83E-02	G
		510.72	5.621E-01	+	2.093E-01	9.55E-02	G
PB-212	6.8589E-01						
		238.63	6.859E-01	(	1.116E-01	4.31E-02	G K
					Energy duplication		
		77.11	9.715E-01	+	5.825E-01	1.84E-01	G
		74.81	1.011E+00	& P	1.215E+00	3.73E-01	G
PB-214	4.2673E-01						
		351.99	4.086E-01	(P	1.133E-01	4.29E-02	G K
		295.22	4.617E-01	*(	1.988E-01	6.89E-02	G
					Energy duplication		
		77.11	1.589E+00	+	9.527E-01	3.01E-01	G
		241.92	1.769E-01	%	7.506E-01	2.25E-01	G
BI-212	2.6818E-01						
		727.17	2.682E-01	%(	3.752E-01	1.18E-01	G K
		1620.56	6.600E-02	% P	1.416E+00	3.51E-01	G
		785.42	1.277E+00	% P	2.493E+00	7.61E-01	G
BI-214	5.1568E-01						
		609.32	5.157E-01	@(	9.226E-02	4.79E-02	G K
		1764.51	8.627E-01	+ P	1.385E-01	1.28E-01	G
		1120.28	7.846E-01	+	4.228E-01	1.79E-01	G
RA-224	5.3905E-01						
		241.00	5.391E-01	%(P	1.420E+00	4.29E-01	G

```
RA-226       1.2580E+00
                 185.99 1.258E+00  (P 1.273E+00 3.95E-01 G

AC-228       8.2933E-01
                 911.07 8.228E-01  (P 1.587E-01 8.52E-02 G K
                 968.90 6.508E-01 - P 2.961E-01 1.22E-01 G
                 338.40 8.452E-01  (  3.290E-01 1.30E-01 G

TH-227      -2.6201E-01
                 236.00-2.620E-01 &(P 5.134E-01 1.56E-01 G K
                 256.25-1.373E-01 %   5.808E-01 1.73E-01 G

PA-234       1.0088E-01
                  98.44 1.009E-01 &(  2.319E-01 7.02E-02 G K
                 946.00 5.368E-02 &   2.145E-01 6.18E-02 G
                 131.28-7.685E-02 &   2.554E-01 7.69E-02 G
                  94.67-1.153E-01 %   4.615E-01 1.39E-01 G
                 883.24 1.181E-01 %   2.782E-01 8.35E-02 G
                 926.70 5.174E-02 %   4.765E-01 1.35E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	-5.051E-02	%	4.812E-01	1.39E-01	G
TH-234	1.9041E+00						
		63.29	1.710E+00	&(P	4.046E+00	1.22E+00	G K
		92.80	1.895E+00	(	2.346E+00	7.21E-01	G
		92.38	2.210E+00	(P	2.793E+00	8.57E-01	G
AM-241	-9.8219E-02						
		59.54	-9.822E-02	&(	7.022E-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

- -

***** 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	1.3976E-01	1.4521E-01	3.3815E-01	3.3825E-01	3.622E-01
K-40		1.3741E+01	1.3741E+01	1.7313E+00	1.8953E+00	
MN-54	#A	-1.8530E-03	-1.8651E-03	6.0574E-02	6.0574E-02	4.994E-02
CO-57	#B	-3.3669E-03	-3.3925E-03	4.9293E-02	4.9293E-02	5.483E-02
CO-60	#B	-5.0784E-04	-5.0838E-04	1.1098E-01	1.1098E-01	6.370E-02

Sr-85 #A	-1.7311E-02	-1.7865E-02	5.0460E-02	5.0470E-02	5.464E-02
Kr-85 #A	-4.0027E+02	-4.0028E+02	1.1289E+03	1.1291E+03	1.262E+03
Y-88 #B	-5.6498E-03	-5.7592E-03	3.9957E-02	3.9958E-02	4.892E-02
NB-94 #B	1.7857E-02	1.7857E-02	3.7695E-02	3.7708E-02	4.181E-02
Ag-108M#B	-1.1203E-04	-1.1204E-04	2.9512E-02	2.9512E-02	3.652E-02
CD-109 #A	-1.6044E-01	-1.6117E-01	2.1117E+00	2.1117E+00	1.806E+00
SN-113 #B	-2.1481E-02	-2.1865E-02	6.5173E-02	6.5184E-02	7.155E-02
SB-125 #B	1.0179E-01	1.0199E-01	1.2124E-01	1.2137E-01	1.460E-01
I-131 #B	-1.4515E-02	-1.8716E-02	5.8220E-02	5.8230E-02	5.055E-02
CS-134 #B	-1.7519E-02	-1.7566E-02	5.2982E-02	5.2991E-02	5.929E-02
CS-137 #A	1.1417E-02	1.1419E-02	4.5160E-02	4.5165E-02	5.175E-02
CE-139 #A	1.2427E-02	1.2614E-02	4.7916E-02	4.7921E-02	5.255E-02
EU-152 #B	-6.3644E-03	-6.3672E-03	2.0822E-01	2.0822E-01	1.602E-01
EU-154 #B	7.2473E-03	7.2521E-03	1.0945E-01	1.0946E-01	1.225E-01
EU-155 #B	8.6490E-02	8.6588E-02	2.2986E-01	2.2991E-01	2.538E-01
HG-203 #A	3.7882E-02	3.9581E-02	4.3929E-02	4.3985E-02	4.490E-02
TL-208	2.4680E-01	2.4680E-01	8.4812E-02	8.5936E-02	
PB-212 #	6.8589E-01	6.8589E-01	1.2915E-01	1.3476E-01	1.116E-01
PB-214 #	4.2673E-01	4.2673E-01	1.1672E-01	1.1915E-01	1.133E-01
BI-212 #B	2.6818E-01	2.6818E-01	3.5513E-01	3.5545E-01	3.752E-01
BI-214	5.1568E-01	5.1568E-01	1.4359E-01	1.4648E-01	
RA-224 #A	5.3905E-01	5.3905E-01	1.2856E+00	1.2859E+00	1.420E+00
RA-226 #A	1.2580E+00	1.2580E+00	1.1863E+00	1.1884E+00	1.273E+00
AC-228	8.2933E-01	8.2933E-01	2.3069E-01	2.3534E-01	
TH-227 #B	-2.6201E-01	-2.6201E-01	4.7197E-01	4.7220E-01	5.134E-01
PA-234 #B	1.0088E-01	1.0088E-01	2.1063E-01	2.1070E-01	2.319E-01
TH-234 #B	1.9041E+00	1.9041E+00	1.7106E+00	1.7139E+00	4.046E+00
AM-241 #A	-9.8218E-02	-9.8219E-02	6.3001E-01	6.3003E-01	7.022E-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) 1.5333078E+01 pCi/gm

Total Decayed Activity (277.7 to 1999.0 keV) 1.5333078E+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_30AUG2005_1019.An1

Sample description

FSS-NOL-06-01-006-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30AUG2005_1019.An1

Acquisition information

Start time:	30-Aug-2005 10:21:01
Live time:	2000
Real time:	2017
Dead time:	0.84 %
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: 1.5800E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5800E+03) =
6.3291E+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	27-Aug-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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4205

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.87	96.	41.58	1.50	8.847E-03				
74.87	96.	41.58	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.09	178.	22.42	1.50	9.541E-03	77.11	10.700	1.489E+00	PB214
					77.11	17.500	9.101E-01	PB212
77.09	178.	22.42	1.50	9.541E-03	77.11	10.700	1.489E+00	PB214
					77.11	17.500	9.101E-01	PB212
186.58	74.	35.12	1.27	1.624E-02	185.99	3.280	PBC<MDA	RA226

238.90	520.	5.25	1.21	1.379E-02	238.63	43.100	7.481E-01	PB212
241.47	101.	20.38	1.22	1.367E-02	241.00	3.900	1.604E+00	RA224
					241.92	7.470	8.498E-01	PB214
270.08	65.	35.94	1.11	1.243E-02				
295.55	125.	13.32	1.25	1.146E-02	295.22	19.200	4.870E-01	PB214
300.35	52.	25.30	1.26	1.129E-02				
328.68	36.	40.18	0.66	1.035E-02				
338.57	87.	16.30	1.09	1.005E-02	338.40	12.010	6.159E-01	AC228
352.26	203.	10.51	1.23	9.671E-03	351.99	37.100	4.826E-01	PB214
463.23	66.	26.71	1.03	7.369E-03				
463.23	66.	26.71	1.03	7.369E-03	463.51	10.000	7.500E-01	SB125
511.24	85.	17.42	1.41	6.688E-03	510.72	22.500	4.809E-01	TL208
583.49	158.	10.24	1.46	5.887E-03	583.14	86.000	2.661E-01	TL208
609.87	171.	9.36	1.65	5.644E-03	609.32	46.090	5.607E-01	BI214
661.62	82.	17.84	1.30	5.229E-03	661.62	84.620	1.585E-01	CS137
727.90	41.	25.29	1.55	4.794E-03	727.17	11.800	6.221E-01	BI212
912.03	104.	15.32	1.49	3.918E-03	911.07	29.000	7.789E-01	AC228
968.79	94.	14.44	1.69	3.718E-03	968.90	17.460	1.243E+00	AC228
1121.16	31.	33.18	1.82	3.283E-03	1120.28	15.040	PBC<MDA	BI214
1333.79	18.	39.09	1.96	2.834E-03	1332.51	99.980	PBC<MDA	CO60
1461.90	437.	4.90	1.98	2.619E-03	1460.75	10.700	1.334E+01	K40
1766.20	20.	27.08	2.24	2.225E-03	1764.51	15.920	4.738E-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
477.42	238.96	114.	520.	0.260	15.76	1.215	PB-212 D
482.56	241.52	163.	101.	0.051	61.15	1.217	PB-214 D
539.81	270.08	173.	65.	0.033	93.26	1.110	AC-228
600.12	300.23	113.	43.	0.021	124.94	0.892	PB-212
657.03	328.68	77.	36.	0.018	120.53	0.661	LA-140 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	704.	178.	0.089	67.25	1.500D
PB-212	153.80	77.11	704.	178.	0.089	67.25	1.500D
RA-226	372.26	186.33	322.	70.	0.035	106.69	1.500
PB-212	477.45	238.91	300.	452.	0.226	21.52	1.500s
RA-224	482.91	241.64	352.	67.	0.034	122.06	1.500
PB-214	590.67	295.51	160.	116.	0.058	53.84	1.500
AC-228	676.81	338.57	57.	87.	0.043	48.89	1.086

PB-214	704.14	352.23	88.	184.	0.092	30.84	1.500s
SB-125	926.45	463.35	58.	39.	0.020	91.28	1.500
TL-208	1022.27	511.24	49.	85.	0.042	52.27	1.413s
TL-208	1166.81	583.49	40.	158.	0.079	30.73	1.462s
BI-214	1219.59	609.87	27.	171.	0.085	28.08	1.654s
CS-137	1323.14	661.62	44.	82.	0.041	53.52	1.301s
BI-212	1455.75	727.90	34.	41.	0.021	75.86	1.554s
AC-228	1824.19	912.03	39.	104.	0.052	45.95	1.491
AC-228	1937.78	968.79	29.	94.	0.047	43.33	1.689s
BI-214	2242.71	1121.16	39.	31.	0.016	99.53	1.819s
CO-60	2668.28	1333.79	16.	18.	0.009	117.27	1.959s
K-40	2924.70	1461.90	6.	437.	0.219	14.69	1.983
BI-214	3533.87	1766.20	4.	20.	0.010	81.25	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 -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS
BE-7		4.3053E-03				
			477.56	4.305E-03	&(	4.187E-01 1.17E-01 G
K-40		1.3336E+01				
			1460.75	1.334E+01	(P	4.235E-01 6.54E-01 G
MN-54		-1.4344E-02				
			834.81	-1.434E-02	&(P	6.262E-02 1.81E-02 G
CO-57		-2.3742E-03				
			122.07	-2.374E-03	%(	5.929E-02 1.75E-02 G K
			136.43	7.703E-02	%	4.719E-01 1.41E-01 G
CO-60		5.4672E-02				
			1332.51	5.467E-02	(P	6.489E-02 2.15E-02 G K
			1173.23	3.549E-03	%	6.328E-02 1.73E-02 G K
Sr-85		-4.3057E-03				
			514.00	-4.306E-03	%(	5.674E-02 1.63E-02 G
Kr-85		-9.5368E+01				
			513.99	-9.537E+01	%(	1.269E+03 3.65E+02 G
Y-88		-4.5952E-03				
			1836.01	-4.595E-03	%(P	7.232E-02 1.91E-02 G K

898.02 1.596E-02 % P 6.567E-02 1.89E-02 G

NB-94 -1.2445E-04

871.10-1.244E-04 %(5.427E-02 1.48E-02 G K

702.50 3.987E-03 % 6.127E-02 1.74E-02 G K

Ag-108M -6.6432E-04

722.95-6.643E-04 %(5.429E-02 1.49E-02 G K

614.37-1.506E-02 % P 6.357E-02 1.86E-02 G

433.93 1.668E-02 & 4.168E-02 1.25E-02 G

CD-109 -7.8664E-02

88.04-7.866E-02 &(P 1.786E+00 5.27E-01 G

SN-113 -6.0798E-04

391.71-6.080E-04 &(6.801E-02 1.94E-02 G K

255.04 1.503E-02 & 1.894E+00 5.49E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.1153E-01						
		427.95	-4.389E-03	%(	P	1.427E-01	4.00E-02 G K
		600.77	-5.725E-02	&	P	2.757E-01	7.98E-02 G
		636.15	-6.675E-02	%	P	4.647E-01	1.33E-01 G
		463.51	4.547E-01	(	P	4.431E-01	1.44E-01 G
		176.29	-1.093E-02	%	P	6.357E-01	1.86E-01 G
I-131	1.5438E-02						
		364.48	1.544E-02	&(		5.958E-02	1.75E-02 G K
		636.97	-1.280E-01	&		8.881E-01	2.54E-01 G
		284.29	-2.159E-01	%		9.113E-01	2.70E-01 G
CS-134	-2.4589E-02						
		604.66	-2.459E-02	%(		6.463E-02	1.94E-02 G K
		795.76	3.642E-02	%		7.515E-02	2.28E-02 G
		569.29	-7.176E-03	%		3.021E-01	8.45E-02 G
		801.84	-9.049E-02	%	P	6.735E-01	1.91E-01 G
CS-137	1.5852E-01						
		661.62	1.585E-01	*(		6.499E-02	2.83E-02 G
CE-139	-8.4765E-03						
		165.85	-8.477E-03	%(	P	6.043E-02	1.80E-02 G
EU-152	-1.1109E-02						
		121.78	-1.111E-02	%(	P	1.836E-01	5.44E-02 G K
		344.30	3.296E-02	%		1.532E-01	4.51E-02 G
		1408.08	-5.284E-02	%		3.201E-01	8.94E-02 G
		964.00	-7.619E-02	%	P	5.026E-01	1.43E-01 G
		1112.07	-6.818E-02	%		4.647E-01	1.30E-01 G

778.90 1.553E-01 & P 3.616E-01 1.09E-01 G

EU-154 -8.4499E-04

123.10-8.450E-04 %(P 1.282E-01 3.79E-02 G K

1274.80-3.180E-02 % 2.547E-01 7.24E-02 G

723.30 8.858E-03 % P 3.562E-01 1.01E-01 G

1004.80 1.593E-01 & 3.326E-01 1.01E-01 G

EU-155 6.3265E-02

86.45 6.326E-02 %(P 2.988E-01 8.95E-02 G K

105.31 3.905E-02 % 2.593E-01 7.72E-02 G

HG-203 -1.0508E-03

279.17-1.051E-03 %(P 5.167E-02 1.50E-02 G K

72.87-9.846E-01 % 2.495E+00 7.55E-01 G

70.83-1.063E+00 & 4.502E+00 1.35E+00 G

82.50-3.003E-01 & 4.794E+00 1.43E+00 G

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

TL-208       2.6610E-01
                    583.14 2.661E-01 @(P 5.459E-02 2.73E-02 G
                    510.72 4.809E-01 +   2.012E-01 8.39E-02 G

PB-212       6.4983E-01
                    238.63 6.498E-01 @(  1.199E-01 4.66E-02 G K
                                         Energy duplication
                     77.11 9.101E-01 +   6.474E-01 2.04E-01 G
                     74.81 9.694E-01 & P 1.359E+00 4.16E-01 G

PB-214       4.4353E-01
                    351.99 4.390E-01 @(P 1.107E-01 4.52E-02 G K
                    295.22 4.524E-01  (  2.396E-01 8.12E-02 G
                                         Energy duplication
                     77.11 1.489E+00 +   1.059E+00 3.34E-01 G
                    241.92 3.398E-01 %   7.830E-01 2.37E-01 G

BI-212       6.2207E-01
                    727.17 6.221E-01 *(  4.490E-01 1.57E-01 G K
                   1620.56-8.072E-02 % P 1.883E+00 4.58E-01 G
                    785.42-3.401E-03 % P 3.590E+00 1.01E+00 G

BI-214       5.3958E-01
                    609.32 5.607E-01 *(  8.888E-02 5.25E-02 G K
                   1764.51 4.738E-01 ?(P 3.036E-01 1.29E-01 G
                   1120.28 5.445E-01 &(  5.488E-01 1.81E-01 G

RA-224       1.0731E+00
                    241.00 1.073E+00 ?(P 1.443E+00 4.44E-01 G
```

```
RA-226       1.1299E+00
                 185.99 1.130E+00  (P 1.384E+00 4.27E-01 G

AC-228       7.3112E-01
                 911.07 7.789E-01  (P 2.404E-01 1.20E-01 G K
                 968.90 1.243E+00 + P 3.643E-01 1.80E-01 G
                 338.40 6.159E-01  (  2.682E-01 1.00E-01 G

TH-227      -1.8222E-01
                 236.00-1.822E-01 %(P 5.310E-01 1.60E-01 G K
                 256.25 1.090E-02 %   6.157E-01 1.79E-01 G

PA-234       6.8531E-02
                  98.44 6.853E-02 %(  2.483E-01 7.45E-02 G K
                 946.00 4.074E-02 &   2.836E-01 7.97E-02 G
                 131.28-4.892E-02 %   2.579E-01 7.70E-02 G
                  94.67-1.713E-01 %   5.128E-01 1.55E-01 G
                 883.24-1.436E-02 &   4.520E-01 1.24E-01 G
                 926.70 3.324E-03 %   4.503E-01 1.20E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	-4.091E-04	%	4.843E-01	1.36E-01	G
TH-234	1.3332E+00						
		63.29	1.333E+00	%(P	5.061E+00	1.52E+00	G K
		92.80	1.338E+00	%	2.635E+00	8.00E-01	G
		92.38	1.546E+00	% P	3.148E+00	9.55E-01	G
AM-241	-2.1956E-01						
		59.54	-2.196E-01	%(	7.238E-01	2.18E-01	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes: 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	4.1446E-03	4.3053E-03	3.5213E-01	3.5213E-01	4.031E-01
K-40		1.3336E+01	1.3336E+01	1.9596E+00	2.0977E+00	
MN-54	#A	-1.4251E-02	-1.4344E-02	5.7628E-02	5.7633E-02	6.222E-02
CO-57	#B	-2.3564E-03	-2.3742E-03	5.2628E-02	5.2628E-02	5.885E-02
CO-60	#B	5.4615E-02	5.4672E-02	6.4389E-02	6.4462E-02	6.483E-02

Sr-85 #A	-4.1729E-03	-4.3057E-03	4.8890E-02	4.8891E-02	5.499E-02
Kr-85 #A	-9.5366E+01	-9.5368E+01	1.0936E+03	1.0936E+03	1.269E+03
Y-88 #B	-4.5084E-03	-4.5952E-03	5.7911E-02	5.7911E-02	7.096E-02
NB-94 #B	-1.2445E-04	-1.2445E-04	4.4264E-02	4.4264E-02	5.427E-02
Ag-108M#B	-6.6429E-04	-6.6432E-04	4.4722E-02	4.4722E-02	5.429E-02
CD-109 #A	-7.8312E-02	-7.8664E-02	3.2563E+00	3.2563E+00	1.778E+00
SN-113 #B	-5.9734E-04	-6.0798E-04	5.8145E-02	5.8145E-02	6.682E-02
SB-125 #B	1.1131E-01	1.1153E-01	1.0584E-01	1.0603E-01	1.424E-01
I-131 #B	1.1991E-02	1.5438E-02	5.2617E-02	5.2624E-02	4.628E-02
CS-134 #B	-2.4522E-02	-2.4589E-02	5.8053E-02	5.8069E-02	6.446E-02
CS-137 #	1.5849E-01	1.5852E-01	8.4838E-02	8.5303E-02	
CE-139 #A	-8.3522E-03	-8.4765E-03	5.7518E-02	5.7520E-02	5.955E-02
EU-152 #B	-1.1104E-02	-1.1109E-02	2.1521E-01	2.1521E-01	1.836E-01
EU-154 #B	-8.4444E-04	-8.4499E-04	2.1319E-01	2.1319E-01	1.281E-01
EU-155 #B	6.3194E-02	6.3265E-02	2.6863E-01	2.6865E-01	2.984E-01
HG-203 #B	-1.0060E-03	-1.0508E-03	5.2687E-02	5.2687E-02	4.947E-02
TL-208 #	2.6610E-01	2.6610E-01	8.1992E-02	8.3341E-02	
PB-212 #	6.4983E-01	6.4983E-01	1.3987E-01	1.4455E-01	1.199E-01
PB-214 #	4.4353E-01	4.4353E-01	1.3707E-01	1.3931E-01	1.107E-01
BI-212 #	6.2207E-01	6.2207E-01	4.7188E-01	4.7317E-01	4.490E-01
BI-214 #	5.3958E-01	5.3958E-01	1.5153E-01	1.5452E-01	
RA-224 #A	1.0731E+00	1.0731E+00	1.3325E+00	1.3339E+00	1.443E+00
RA-226 #A	1.1299E+00	1.1299E+00	1.2817E+00	1.2833E+00	1.384E+00
AC-228	7.3112E-01	7.3112E-01	2.4552E-01	2.4892E-01	
TH-227 #B	-1.8222E-01	-1.8222E-01	4.8742E-01	4.8752E-01	5.310E-01
PA-234 #B	6.8531E-02	6.8531E-02	2.2347E-01	2.2350E-01	2.483E-01
TH-234 #B	1.3332E+00	1.3332E+00	4.5554E+00	4.5560E+00	5.061E+00
AM-241 #A	-2.1956E-01	-2.1956E-01	6.5257E-01	6.5268E-01	7.238E-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) 1.5031403E+01 pCi/gm

Total Decayed Activity (269.7 to 1999.0 keV) 1.5031432E+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_30AUG2005_1108.An1

Sample description

FSS-NOL-06-01-014-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30AUG2005_1108.An1

Acquisition information

Start time:	30-Aug-2005 11:10:00
Live time:	2000
Real time:	2021
Dead time:	1.05 %
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: 1.7880E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7880E+03) =
5.5928E+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 27-Aug-2005 10:55:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4277

***** 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	126.	36.22	1.50	8.847E-03				
75.04	126.	36.22	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.10	201.	22.58	1.50	9.541E-03	77.11	17.500	9.113E-01	PB212
					77.11	10.700	1.490E+00	PB214
77.10	201.	22.58	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.490E+00	PB214
87.03	121.	24.07	1.11	1.216E-02	86.45	32.740	PBC<MDA	EU155

					88.04	3.790	PBC<MDA CD109	
89.72	83.	31.50	1.11	1.275E-02				
89.72	83.	31.50	1.11	1.275E-02	92.38	2.570	PBC<MDA TH234	
93.30	137.	19.47	1.11	1.346E-02	92.80	3.000	2.582E+00	TH234
186.42	124.	26.86	1.68	1.625E-02	185.99	3.280	1.700E+00	RA226
209.40	121.	25.94	1.15	1.519E-02				
238.90	766.	4.35	1.21	1.379E-02	238.63	43.100	9.725E-01	PB212
241.65	104.	22.20	1.22	1.367E-02				
241.65	104.	22.20	1.22	1.367E-02	241.92	7.470	7.699E-01	PB214
270.48	57.	36.13	1.21	1.242E-02				
277.85	63.	39.36	1.03	1.212E-02				
277.85	63.	39.36	1.03	1.212E-02	279.17	81.500	PBC<MDA HG203	
295.45	127.	13.26	1.25	1.146E-02	295.22	19.200	4.356E-01	PB214
300.23	52.	28.59	1.26	1.128E-02				
328.62	100.	26.38	1.42	1.035E-02				
338.77	173.	13.67	1.32	1.005E-02	338.40	12.010	1.085E+00	AC228
352.21	243.	9.10	1.52	9.673E-03	351.99	37.100	5.102E-01	PB214
511.19	129.	18.40	1.02	6.689E-03	510.72	22.500	6.482E-01	TL208
583.63	246.	8.85	1.48	5.885E-03	583.14	86.000	3.664E-01	TL208
609.73	163.	12.82	1.55	5.646E-03	609.32	46.090	4.737E-01	Bl214
719.15	18.	31.19	1.55	4.820E-03	722.95	90.499	3.196E-02	Ag108M
727.97	41.	28.70	1.21	4.789E-03	727.17	11.800	5.478E-01	Bl212
860.83	64.	23.18	1.45	4.122E-03				
911.86	173.	10.55	1.54	3.919E-03	911.07	29.000	1.147E+00	AC228
969.77	83.	13.96	1.56	3.715E-03	968.90	17.460	9.636E-01	AC228
1121.39	30.	38.64	1.82	3.283E-03	1120.28	15.040	PBC<MDA Bl214	
1461.91	575.	4.21	2.14	2.619E-03	1460.75	10.700	1.550E+01	K40
1765.54	19.	25.19	0.66	2.225E-03	1764.51	15.920	3.950E-01	Bl214

********** 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
173.64	87.21	367.	121.	0.061	72.21	1.107	PB-214 ID
179.03	89.91	296.	83.	0.041	94.51	1.109	PB-214 ID
418.42	209.40	331.	121.	0.060	77.82	1.150	AC-228 M
477.42	238.87	173.	766.	0.383	13.06	1.215	PB-212 D
482.93	241.63	214.	104.	0.052	66.60	1.217	PB-214 D
540.61	270.48	164.	57.	0.028	108.40	1.212	AC-228 s
555.34	277.85	197.	68.	0.034	94.81	1.031	NP-239 s
600.11	300.27	85.	52.	0.026	85.78	1.258	PB-212 ID
656.91	328.62	182.	100.	0.050	79.13	1.418	RH-106M s
1721.75	860.83	39.	64.	0.032	55.86	1.446	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	149.67	75.04	1025.	126.	0.063	108.67	1.500s

PB-212	153.80	77.11	932.	201.	0.101	67.74	1.500D
PB-214	153.80	77.11	932.	201.	0.101	67.74	1.500D
TH-234	185.86	93.14	760.	149.	0.074	82.44	1.500s
RA-226	371.78	186.09	477.	96.	0.048	96.76	1.500s
PB-212	477.30	238.83	359.	661.	0.330	16.86	1.500
RA-224	487.24	243.81	78.	35.	0.018	114.00	1.500
PB-214	590.49	295.42	184.	122.	0.061	54.43	1.500
AC-228	677.21	338.77	139.	173.	0.087	41.00	1.320
PB-214	704.11	352.21	124.	235.	0.118	28.00	1.500s
TL-208	1022.16	511.19	115.	129.	0.065	55.21	1.024s
TL-208	1167.09	583.63	69.	246.	0.123	26.54	1.478
BI-214	1219.32	609.73	86.	163.	0.082	38.46	1.547
Ag-108M	1438.24	719.15	7.	18.	0.009	93.56	1.551s
BI-212	1455.90	727.97	39.	41.	0.021	86.11	1.215
AC-228	1823.86	911.86	43.	173.	0.086	31.66	1.540
AC-228	1939.74	969.77	24.	83.	0.041	41.88	1.557
BI-214	2243.17	1121.39	51.	30.	0.015	115.92	1.819s
K-40	2924.72	1461.91	3.	575.	0.288	12.62	2.144

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bi-214	3532.55	1765.54	1.	19.	0.009	75.58	0.662s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.3592E-01					
			477.56	1.359E-01	&(	4.440E-01	1.32E-01 G
K-40		1.5499E+01					
			1460.75	1.550E+01	(P	2.888E-01	6.53E-01 G
MN-54		2.4677E-02					
			834.81	2.468E-02	&(P	5.674E-02	1.71E-02 G
CO-57		-4.6721E-03					
			122.07	-4.672E-03	%(	6.623E-02	1.97E-02 G K
			136.43	3.109E-02	%	3.990E-01	1.18E-01 G
CO-60		1.7591E-02					
			1332.51	1.759E-02	%(P	6.453E-02	1.87E-02 G K
			1173.23	-4.764E-04	&	8.310E-02	2.33E-02 G K
Sr-85		-2.3772E-02					

514.00-2.377E-02 %(6.927E-02 2.07E-02 G

Kr-85 -5.3212E+02

513.99-5.321E+02 %(1.549E+03 4.64E+02 G

Y-88 4.4128E-03

1836.01 4.413E-03 %(P 5.206E-02 1.34E-02 G K

898.02 1.282E-02 & P 6.156E-02 1.77E-02 G

NB-94 7.0649E-03

871.10 7.065E-03 %(5.257E-02 1.49E-02 G K

702.50 8.425E-03 % 5.406E-02 1.56E-02 G K

Ag-108M 3.1955E-02

722.95 3.196E-02 ?(2.654E-02 9.97E-03 G K

614.37 1.015E-03 % P 6.032E-02 1.71E-02 G

433.93 7.657E-03 % 4.642E-02 1.35E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.4317E+00						
		88.04	1.432E+00	%(P	2.237E+00	6.82E-01	G
SN-113	2.4906E-03						
		391.71	2.491E-03	%(	7.504E-02	2.17E-02	G K
		255.04	-3.186E-01	%	2.276E+00	6.74E-01	G
SB-125	2.2519E-02						
		427.95	2.252E-02	%(P	1.448E-01	4.20E-02	G K
		600.77	1.980E-02	% P	2.654E-01	7.55E-02	G
		636.15	-1.006E-01	& P	5.216E-01	1.52E-01	G
		463.51	2.448E-01	% P	4.789E-01	1.45E-01	G
		176.29	1.964E-01	% P	7.412E-01	2.22E-01	G
I-131	1.7995E-02						
		364.48	1.799E-02	%(	6.052E-02	1.80E-02	G K
		636.97	2.440E-01	&	7.505E-01	2.21E-01	G
		284.29	-4.636E-02	%	9.533E-01	2.79E-01	G
CS-134	-4.3665E-03						
		604.66	-4.366E-03	&(	5.709E-02	1.64E-02	G K
		795.76	3.843E-02	%	6.473E-02	2.00E-02	G
		569.29	-6.030E-03	%	3.345E-01	9.51E-02	G
		801.84	-1.296E-01	% P	6.447E-01	1.86E-01	G
CS-137	4.4938E-02						
		661.62	4.494E-02	%(	6.298E-02	1.98E-02	G
CE-139	-2.2558E-03						
		165.85	-2.256E-03	&(P	6.097E-02	1.81E-02	G

EU-152 2.6351E-04

121.78 2.635E-04 %(P 1.754E-01 5.19E-02 G K

344.30-1.661E-03 & 1.548E-01 4.47E-02 G

1408.08 3.312E-02 % 2.691E-01 7.38E-02 G

964.00 3.206E-01 % P 4.303E-01 1.36E-01 G

1112.07-2.505E-02 % 5.048E-01 1.41E-01 G

778.90-1.099E-01 % P 5.042E-01 1.47E-01 G

EU-154 -7.0114E-03

123.10-7.011E-03 &(P 1.095E-01 3.24E-02 G K

1274.80-1.355E-02 & 2.082E-01 5.81E-02 G

723.30-7.338E-02 % P 3.163E-01 9.24E-02 G

1004.80 2.165E-02 % 2.779E-01 7.62E-02 G

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

EU-155      -1.3514E-02
                    86.45-1.351E-02 %(P 2.847E-01 8.47E-02 G K
                   105.31 6.022E-02 %   2.829E-01 8.48E-02 G

HG-203      -4.3412E-03
                   279.17-4.341E-03 &(P 5.624E-02 1.65E-02 G K
                    72.87-3.834E-01 %   2.427E+00 7.28E-01 G
                    70.83-3.162E-02 %   5.008E+00 1.50E+00 G
                    82.50-4.499E-01 &   4.579E+00 1.37E+00 G

TL-208       3.6644E-01
                   583.14 3.664E-01  (P 6.197E-02 3.25E-02 G
                   510.72 6.482E-01 +   2.641E-01 1.19E-01 G

PB-212       8.5992E-01
                   238.63 8.391E-01  (  1.156E-01 4.72E-02 G K
                                        Energy duplication
                    77.11 9.113E-01 *(  6.564E-01 2.06E-01 G
                    74.81 1.118E+00 & P 1.352E+00 4.15E-01 G

PB-214       4.6901E-01
                   351.99 4.949E-01  (P 1.151E-01 4.63E-02 G K
                   295.22 4.189E-01  (  2.263E-01 7.60E-02 G
                                        Energy duplication
                    77.11 1.490E+00 +   1.074E+00 3.37E-01 G
                   241.92 1.750E-01 %   8.252E-01 2.47E-01 G

BI-212       5.4777E-01
                   727.17 5.478E-01  (  4.250E-01 1.57E-01 G K
                  1620.56 4.540E-01 & P 2.200E+00 6.14E-01 G
```

785.42 4.216E-01 % P 3.086E+00 8.87E-01 G

BI-214 4.5376E-01

609.32 4.737E-01 (1.332E-01 6.08E-02 G K

1764.51 3.950E-01 (P 1.790E-01 1.00E-01 G

1120.28 4.548E-01 &(5.511E-01 1.76E-01 G

RA-224 4.9631E-01

241.00 4.963E-01 (P 6.201E-01 1.95E-01 G

RA-226 1.3564E+00

185.99 1.356E+00 *(P 1.480E+00 4.58E-01 G

AC-228 1.0793E+00

911.07 1.147E+00 (P 2.221E-01 1.21E-01 G K

968.90 9.636E-01 (P 2.986E-01 1.35E-01 G

338.40 1.085E+00 (3.601E-01 1.48E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-6.3376E-02						
		236.00	-6.338E-02	&(P	4.771E-01	1.42E-01	G K
		256.25	-7.987E-02	%	6.846E-01	2.02E-01	G
PA-234	-1.1034E-01						
		98.44	-1.103E-01	%(	2.592E-01	7.84E-02	G K
		946.00	-5.023E-03	&	2.850E-01	7.86E-02	G
		131.28	1.187E-01	&	2.312E-01	7.02E-02	G
		94.67	-1.171E-03	&	3.947E-01	1.17E-01	G
		883.24	1.672E-01	&	3.980E-01	1.19E-01	G
		926.70	-7.857E-02	&	4.979E-01	1.42E-01	G
		569.26	-7.982E-03	%	4.946E-01	1.41E-01	G
TH-234	3.2578E-01						
		63.29	-1.585E+00	&(P	5.008E+00	1.51E+00	G K
		92.80	2.809E+00	*(	2.479E+00	7.72E-01	G
		92.38	1.381E-01	% P	2.691E+00	8.00E-01	G
AM-241	-3.6938E-02						
		59.54	-3.694E-02	%(	7.441E-01	2.21E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	1.3071E-01	1.3592E-01	3.9476E-01	3.9483E-01	4.269E-01
K-40	1.5499E+01	1.5499E+01	1.9570E+00	2.1416E+00	
MN-54 #A	2.4513E-02	2.4677E-02	5.1218E-02	5.1237E-02	5.636E-02
CO-57 #B	-4.6361E-03	-4.6721E-03	5.9183E-02	5.9183E-02	6.572E-02
CO-60 #B	1.7571E-02	1.7591E-02	5.6025E-02	5.6033E-02	6.446E-02
Sr-85 #A	-2.3020E-02	-2.3772E-02	6.2215E-02	6.2229E-02	6.707E-02
Kr-85 #A	-5.3210E+02	-5.3212E+02	1.3909E+03	1.3913E+03	1.549E+03
Y-88 #B	4.3272E-03	4.4128E-03	4.0302E-02	4.0303E-02	5.105E-02
NB-94 #B	7.0649E-03	7.0649E-03	4.4634E-02	4.4636E-02	5.257E-02
Ag-108M#	3.1954E-02	3.1955E-02	2.9899E-02	2.9952E-02	2.654E-02
CD-109 #A	1.4252E+00	1.4317E+00	2.0475E+00	2.0490E+00	2.227E+00
SN-113 #B	2.4458E-03	2.4906E-03	6.5158E-02	6.5158E-02	7.369E-02
SB-125 #B	2.2472E-02	2.2519E-02	1.2612E-01	1.2612E-01	1.445E-01
I-131 #B	1.3881E-02	1.7995E-02	5.3892E-02	5.3902E-02	4.669E-02
CS-134 #B	-4.3544E-03	-4.3665E-03	4.9161E-02	4.9162E-02	5.693E-02
CS-137 #A	4.4929E-02	4.4938E-02	5.9272E-02	5.9326E-02	6.297E-02
CE-139 #A	-2.2219E-03	-2.2558E-03	6.7477E-02	6.7477E-02	6.005E-02
EU-152 #B	2.6340E-04	2.6351E-04	1.5581E-01	1.5581E-01	1.753E-01
EU-154 #B	-7.0067E-03	-7.0114E-03	1.0377E-01	1.0377E-01	1.094E-01
EU-155 #B	-1.3499E-02	-1.3514E-02	8.6167E-01	8.6167E-01	2.844E-01
HG-203 #B	-4.1511E-03	-4.3412E-03	5.1248E-02	5.1248E-02	5.377E-02
TL-208	3.6644E-01	3.6644E-01	9.7423E-02	9.9570E-02	

PB-212 #	8.5992E-01	8.5992E-01	1.4500E-01	1.5282E-01	1.156E-01
PB-214 #	4.6901E-01	4.6901E-01	1.3156E-01	1.3416E-01	1.151E-01
BI-212	5.4777E-01	5.4777E-01	4.7170E-01	4.7270E-01	
BI-214	4.5376E-01	4.5376E-01	1.7452E-01	1.7637E-01	
RA-224 A	4.9631E-01	4.9631E-01	5.8452E-01	5.8519E-01	6.201E-01
RA-226 #A	1.3564E+00	1.3564E+00	1.3736E+00	1.3757E+00	1.480E+00
AC-228	1.0793E+00	1.0793E+00	2.3977E-01	2.4730E-01	
TH-227 #B	-6.3376E-02	-6.3376E-02	4.4448E-01	4.4449E-01	4.771E-01
PA-234 #B	-1.1034E-01	-1.1034E-01	2.3531E-01	2.3539E-01	2.592E-01
TH-234 #B	3.2578E-01	3.2578E-01	2.6858E-01	2.6919E-01	5.008E+00
AM-241 #A	-3.6937E-02	-3.6938E-02	6.6413E-01	6.6413E-01	7.441E-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_30AUG2005_1108.An1

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

Total Activity (270.2 to 1999.0 keV) 1.8442301E+01 pCi/gm

Total Decayed Activity (270.2 to 1999.0 keV) 1.8442301E+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_30AUG2005_1150.An1

Sample description

FSS-NOL-06-01-014-F-RC

Spectrum Filename: C:\GammaVision\Spectra\102F_30AUG2005_1150.An1

Acquisition information

Start time:	30-Aug-2005 11:51:20
Live time:	2000
Real time:	2021
Dead time:	1.02 %
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: 1.7880E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7880E+03) =
5.5928E+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	27-Aug-2005 10:55:00
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. 13 cutoff 20.00000 %

Energy Calibration

Normalized diff: 0.4242

***** 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	124.	25.49	1.10	8.817E-03				
74.38	124.	25.49	1.10	8.817E-03	74.81	9.600	PBC<MDA	PB212
77.37	256.	12.78	1.10	9.711E-03	77.11	10.700	1.896E+00	PB214
					77.11	17.500	1.159E+00	PB212
186.27	126.	29.77	1.10	1.625E-02	185.99	3.280	1.727E+00	RA226
209.63	122.	26.24	1.32	1.518E-02				
239.17	970.	4.92	1.24	1.378E-02	238.63	43.100	1.232E+00	PB212

270.69	66.	26.85	1.27	1.241E-02				
277.79	52.	40.71	1.03	1.212E-02				
295.35	114.	17.09	1.24	1.146E-02	295.22	19.200	3.900E-01	PB214
301.08	58.	35.88	1.34	1.126E-02				
328.82	43.	39.12	1.28	1.035E-02				
338.80	162.	14.77	0.99	1.005E-02	338.40	12.010	1.012E+00	AC228
352.19	237.	12.37	1.25	9.673E-03	351.99	37.100	4.972E-01	PB214
410.62	43.	36.37	1.36	8.307E-03				
463.36	71.	22.63	1.26	7.367E-03				
463.36	71.	22.63	1.26	7.367E-03	463.51	10.000	7.142E-01	SB125
511.09	98.	21.54	1.11	6.690E-03	510.72	22.500	4.927E-01	TL208
583.67	241.	8.81	1.52	5.885E-03	583.14	86.000	3.590E-01	TL208
609.83	170.	11.03	1.68	5.645E-03	609.32	46.090	4.940E-01	BI214
662.19	28.	40.88	1.51	5.229E-03				
662.19	28.	40.88	1.51	5.229E-03	661.62	84.620	PBC<MDA	CS137
727.90	88.	19.03	1.48	4.790E-03	727.17	11.800	1.176E+00	BI212
911.73	182.	10.95	1.76	3.919E-03	911.07	29.000	1.210E+00	AC228
968.53	140.	13.01	1.83	3.719E-03	968.90	17.460	1.630E+00	AC228
1461.80	615.	4.11	1.77	2.619E-03	1460.75	10.700	1.657E+01	K40
1765.50	29.	18.57	2.81	2.225E-03	1764.51	15.920	6.168E-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	
148.34	74.71	440.	124.	0.062	76.46	1.098	BI-207	D
154.31	77.69	408.	256.	0.128	38.34	1.100	PB-214	D

YAEC Chemistry Lab Spectrum name: 102F_30AUG2005_1150.An1

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected
418.88	209.63	333.	122.	0.061	78.72	1.316	NP-239
477.97	239.17	1191.	163.	0.082	92.62	1.243	PB-212 s
541.02	270.69	124.	66.	0.033	80.55	1.266	AC-228
555.23	277.79	160.	54.	0.027	108.47	1.033	NP-239
601.82	301.08	150.	58.	0.029	107.63	1.343	PB-212 s
657.32	328.82	117.	43.	0.022	117.36	1.278	LA-140
820.95	410.62	84.	43.	0.022	109.11	1.364	EU-152 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	149.22	74.82	1044.	120.	0.060	114.50	1.500s
PB-214	153.80	77.11	919.	260.	0.130	52.93	1.500D
PB-212	153.80	77.11	919.	260.	0.130	52.93	1.500D
RA-226	371.94	186.16	424.	88.	0.044	98.63	1.500s
PB-212	477.34	238.86	441.	740.	0.370	16.33	1.500s
PB-214	590.64	295.49	196.	122.	0.061	55.79	1.500
AC-228	677.28	338.80	151.	162.	0.081	44.30	0.988s
PB-214	704.12	352.22	135.	210.	0.105	31.15	1.500
SB-125	926.43	463.34	55.	66.	0.033	58.59	1.500
TL-208	1021.96	511.09	106.	98.	0.049	64.61	1.114s

TL-208	1167.18	583.67	70.	241.	0.120	26.44	1.521s
Bi-214	1219.52	609.83	59.	170.	0.085	33.09	1.680
CS-137	1324.27	662.19	50.	28.	0.014	122.64	1.509s
Bi-212	1455.76	727.90	55.	88.	0.044	57.10	1.483s
AC-228	1823.60	911.73	53.	182.	0.091	32.85	1.759
AC-228	1937.26	968.53	48.	140.	0.070	39.04	1.832s
K-40	2924.50	1461.80	8.	615.	0.307	12.33	1.771
Bi-214	3532.46	1765.50	0.	29.	0.014	55.71	2.810s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS
BE-7		1.0428E-01				
			477.56	1.043E-01	%(	3.673E-01 1.08E-01 G
K-40		1.6571E+01				
			1460.75	1.657E+01	(P	4.316E-01 6.82E-01 G
MN-54		7.1385E-03				
			834.81	7.138E-03	%(P	5.670E-02 1.61E-02 G
CO-57		1.0678E-02				
			122.07	1.068E-02	%(	5.943E-02 1.78E-02 G K
			136.43	-8.703E-03	%	4.834E-01 1.43E-01 G
CO-60		-2.3628E-03				
			1332.51	-2.363E-03	%(P	6.248E-02 1.69E-02 G K
			1173.23	0.000E+00	&	9.528E-02 2.69E-02 G K
Sr-85		-2.5172E-02				
			514.00	-2.517E-02	&(	7.160E-02 2.15E-02 G
Kr-85		-5.6264E+02				
			513.99	-5.626E+02	&(	1.600E+03 4.80E+02 G
Y-88		5.8059E-03				
			1836.01	5.806E-03	%(P	3.387E-02 8.62E-03 G K

898.02 1.898E-02 & P 4.949E-02 1.46E-02 G

NB-94 0.0000E+00

871.10 0.000E+00 &(6.926E-02 1.95E-02 G K

702.50 2.523E-02 % 6.372E-02 1.91E-02 G K

Ag-108M 3.8169E-03

722.95 3.817E-03 %(1.111E-01 3.24E-02 G K

614.37-3.503E-02 % P 7.031E-02 2.13E-02 G

433.93 1.127E-02 & 3.852E-02 1.14E-02 G

CD-109 1.5964E+00

88.04 1.596E+00 %(P 2.241E+00 6.86E-01 G

SN-113 1.1399E-03

391.71 1.140E-03 %(8.015E-02 2.32E-02 G K

255.04 2.102E-01 & 2.054E+00 6.05E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.8417E-01						
		427.95	1.643E-02	%(P	1.446E-01	4.17E-02	G K
		600.77	-1.004E-03	% P	3.053E-01	8.67E-02	G
		636.15	1.039E-01	& P	4.199E-01	1.23E-01	G
		463.51	6.807E-01	(P	3.839E-01	1.36E-01	G
		176.29	-3.206E-03	% P	7.267E-01	2.14E-01	G
I-131	-9.0796E-03						
		364.48	-9.080E-03	&(	7.483E-02	2.19E-02	G K
		636.97	1.948E-01	%	9.020E-01	2.63E-01	G
		284.29	2.664E-02	%	9.093E-01	2.65E-01	G
CS-134	-3.1175E-03						
		604.66	-3.117E-03	&(	5.470E-02	1.56E-02	G K
		795.76	4.920E-02	%	6.801E-02	2.14E-02	G
		569.29	-1.438E-02	%	2.762E-01	7.79E-02	G
		801.84	-1.246E-01	% P	7.048E-01	2.04E-01	G
CS-137	4.7322E-02						
		661.62	4.732E-02	(	6.107E-02	1.93E-02	G
CE-139	-9.6614E-03						
		165.85	-9.661E-03	%(P	6.229E-02	1.86E-02	G
EU-152	-3.5472E-03						
		121.78	-3.547E-03	%(P	1.743E-01	5.16E-02	G K
		344.30	-2.728E-02	%	1.865E-01	5.50E-02	G
		1408.08	1.651E-02	%	2.638E-01	7.08E-02	G
		964.00	-2.010E-02	% P	8.434E-01	2.45E-01	G
		1112.07	9.176E-02	%	5.161E-01	1.48E-01	G

778.90 1.213E-01 % P 4.306E-01 1.26E-01 G

EU-154 2.1230E-02

123.10 2.123E-02 %(P 1.287E-01 3.84E-02 G K

1274.80 6.216E-02 & 2.149E-01 6.30E-02 G

723.30-1.398E-01 % P 3.657E-01 1.09E-01 G

1004.80 7.590E-04 % 3.352E-01 9.20E-02 G

EU-155 1.7649E-01

86.45 1.765E-01 &(P 2.731E-01 8.33E-02 G K

105.31 2.413E-03 % 2.853E-01 8.48E-02 G

HG-203 -1.1441E-02

279.17-1.144E-02 %(P 6.085E-02 1.81E-02 G K

72.87 1.305E-01 & 1.703E+00 5.07E-01 G

70.83 4.289E-01 % 4.100E+00 1.23E+00 G

82.50-4.069E-01 % 4.413E+00 1.32E+00 G

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

TL-208       3.5898E-01
                   583.14 3.590E-01 @(P 6.239E-02 3.17E-02 G
                   510.72 4.927E-01 +   2.541E-01 1.06E-01 G

PB-212       9.6314E-01
                   238.63 9.398E-01 @(  1.278E-01 5.12E-02 G K
                                        Energy duplication
                    77.11 1.175E+00 +   6.516E-01 2.07E-01 G
                    74.81 1.068E+00 &(P 1.364E+00 4.18E-01 G

PB-214       4.3458E-01
                   351.99 4.430E-01  (P 1.195E-01 4.61E-02 G K
                   295.22 4.183E-01  (  2.331E-01 7.78E-02 G
                                        Energy duplication
                    77.11 1.922E+00 +   1.066E+00 3.39E-01 G
                   241.92 3.139E-01 %   8.453E-01 2.55E-01 G

BI-212       1.1757E+00
                   727.17 1.176E+00 @(  4.979E-01 2.24E-01 G K
                  1620.56 3.230E-01 % P 1.611E+00 4.34E-01 G
                   785.42-5.442E-03 & P 2.567E+00 7.09E-01 G

BI-214       5.2556E-01
                   609.32 4.940E-01  (  1.116E-01 5.45E-02 G K
                  1764.51 6.168E-01  (P 1.572E-01 1.15E-01 G
                  1120.28 3.187E-01 %   4.846E-01 1.52E-01 G

RA-224       9.2862E-01
                   241.00 9.286E-01 &(P 1.532E+00 4.67E-01 G
```

```
RA-226       1.2517E+00
                 185.99 1.252E+00 *(P 1.397E+00 4.32E-01 G

AC-228       1.1518E+00
                 911.07 1.210E+00  (P 2.433E-01 1.33E-01 G K
                 968.90 1.630E+00 + P 4.076E-01 2.12E-01 G
                 338.40 1.012E+00 @(  3.755E-01 1.50E-01 G

TH-227      -2.2644E-01
                 236.00-2.264E-01 %(P 5.579E-01 1.69E-01 G K
                 256.25 1.341E-01 %   6.630E-01 1.97E-01 G

PA-234      -6.3354E-02
                  98.44-6.335E-02 %(  2.827E-01 8.49E-02 G K
                 946.00 2.525E-02 %   3.138E-01 8.85E-02 G
                 131.28 3.994E-02 &   2.773E-01 8.29E-02 G
                  94.67-6.103E-02 %   5.045E-01 1.51E-01 G
                 883.24-1.626E-03 &   4.529E-01 1.25E-01 G
                 926.70 2.190E-01 %   4.657E-01 1.41E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26-7.297E-03 % 4.047E-01 1.13E-01 G

TH-234 1.4141E+00
63.29 1.414E+00 &(P 5.026E+00 1.51E+00 G K
92.80 1.472E+00 % 2.664E+00 8.10E-01 G
92.38 1.662E+00 % P 3.188E+00 9.68E-01 G

AM-241 -1.3417E-01
59.54-1.342E-01 &(7.687E-01 2.30E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.0025E-01	1.0428E-01	3.2392E-01	3.2397E-01	3.531E-01
K-40		1.6571E+01	1.6571E+01	2.0439E+00	2.2455E+00	
MN-54	#A	7.0905E-03	7.1385E-03	4.8331E-02	4.8333E-02	5.632E-02
CO-57	#B	1.0595E-02	1.0678E-02	5.3284E-02	5.3288E-02	5.897E-02
CO-60	#B	-2.3602E-03	-2.3628E-03	6.0481E-02	6.0481E-02	6.241E-02

Sr-85 #A	-2.4368E-02	-2.5172E-02	6.4386E-02	6.4401E-02	6.931E-02
Kr-85 #A	-5.6263E+02	-5.6264E+02	1.4389E+03	1.4392E+03	1.600E+03
Y-88 #B	5.6923E-03	5.8059E-03	2.5860E-02	2.5862E-02	3.321E-02
NB-94 #B	0.0000E+00	0.0000E+00	5.8488E-02	5.8488E-02	6.926E-02
Ag-108M#B	3.8167E-03	3.8169E-03	9.7212E-02	9.7213E-02	1.111E-01
CD-109 #A	1.5890E+00	1.5964E+00	2.0567E+00	2.0586E+00	2.230E+00
SN-113 #B	1.1193E-03	1.1399E-03	6.9671E-02	6.9671E-02	7.869E-02
SB-125 #F	1.8379E-01	1.8417E-01	1.1043E-01	1.1092E-01	1.443E-01
I-131 #B	-6.9868E-03	-9.0796E-03	6.5747E-02	6.5749E-02	5.758E-02
CS-134 #B	-3.1088E-03	-3.1175E-03	4.6845E-02	4.6845E-02	5.455E-02
CS-137 #A	4.7312E-02	4.7322E-02	5.8035E-02	5.8096E-02	6.106E-02
CE-139 #A	-9.5145E-03	-9.6614E-03	5.8648E-02	5.8651E-02	6.135E-02
EU-152 #B	-3.5455E-03	-3.5472E-03	3.4497E-01	3.4497E-01	1.742E-01
EU-154 #B	2.1216E-02	2.1230E-02	1.1534E-01	1.1535E-01	1.286E-01
EU-155 #B	1.7628E-01	1.7649E-01	2.4982E-01	2.5001E-01	2.728E-01
HG-203 #B	-1.0936E-02	-1.1441E-02	5.4879E-02	5.4883E-02	5.816E-02
TL-208 #	3.5898E-01	3.5898E-01	9.5060E-02	9.7171E-02	
PB-212 #	9.6314E-01	9.6314E-01	1.5728E-01	1.6631E-01	1.278E-01
PB-214 #	4.3458E-01	4.3458E-01	1.3563E-01	1.3781E-01	1.195E-01
BI-212 #	1.1757E+00	1.1757E+00	6.7128E-01	6.7451E-01	
BI-214	5.2556E-01	5.2556E-01	1.7065E-01	1.7318E-01	
RA-224 #A	9.2862E-01	9.2862E-01	1.4022E+00	1.4032E+00	1.532E+00
RA-226 #A	1.2517E+00	1.2517E+00	1.2969E+00	1.2988E+00	1.397E+00
AC-228	1.1518E+00	1.1518E+00	3.1775E-01	3.2426E-01	
TH-227 #B	-2.2644E-01	-2.2644E-01	5.1183E-01	5.1198E-01	5.579E-01
PA-234 #B	-6.3354E-02	-6.3354E-02	2.5457E-01	2.5459E-01	2.827E-01
TH-234 #B	1.4141E+00	1.4141E+00	4.5332E+00	4.5338E+00	5.026E+00
AM-241 #A	-1.3417E-01	-1.3417E-01	6.9029E-01	6.9033E-01	7.687E-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 (87.7 to 1999.0 keV) 1.9783421E+01 pCi/gm

Total Decayed Activity (87.7 to 1999.0 keV) 1.9783421E+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_30AUG2005_1228.An1

Sample description

FSS-NOL-06-01-013-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30AUG2005_1228.An1

Acquisition information

Start time:	30-Aug-2005 12:28:50
Live time:	2000
Real time:	2013
Dead time:	0.63 %
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: 1.8020E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8020E+03) =
5.5494E+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 27-Aug-2005 11:10:00
Decay during acquisition: NO
Decay during collection: NO
True coincidence correction: NO
Peaked background correction: YES 102_150K_28APR05.Pbc
01-May-2005 05:27:47
Absorption (Internal): NO
Geometry correction: NO
Random summing: NO

total peaks alloc. 10 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2345

***** 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
76.34	96.	40.01	1.34	9.313E-03	74.81	9.600	PBC<MDA	PB212
					77.11	10.700	7.081E-01	PB214
					77.11	17.500	4.330E-01	PB212
239.00	240.	12.89	1.22	1.379E-02	238.63	43.100	3.031E-01	PB212
295.07	58.	25.13	1.32	1.147E-02				
295.07	58.	25.13	1.32	1.147E-02	295.22	19.200	1.966E-01	PB214
338.55	44.	22.72	1.87	1.006E-02	338.40	12.010	2.762E-01	AC228

351.78	78.	19.41	0.89	9.684E-03				
351.78	78.	19.41	0.89	9.684E-03	351.99	37.100	1.621E-01	PB214
511.21	88.	14.39	2.51	6.695E-03	510.72	22.500	4.401E-01	TL208
583.54	94.	12.81	1.11	5.886E-03	583.14	86.000	1.378E-01	TL208
609.80	68.	15.16	1.24	5.645E-03	609.32	46.090	1.970E-01	BI214
911.48	51.	26.79	1.13	3.920E-03	911.07	29.000	3.328E-01	AC228
968.97	57.	14.88	1.98	3.718E-03	968.90	17.460	6.639E-01	AC228
1121.20	37.	22.63	1.72	3.283E-03	1120.28	15.040	5.665E-01	BI214
1461.84	155.	8.23	1.81	2.619E-03	1460.75	10.700	4.133E+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	
152.26	76.34	580.	96.	0.048	120.02	1.343	PB-214	I

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	477.41	238.89	200.	182.	0.091	39.71	1.500s
PB-214	589.89	295.12	81.	42.	0.021	101.95	1.500
AC-228	676.78	338.55	28.	44.	0.022	68.17	1.865s
PB-214	704.03	352.17	37.	61.	0.031	56.73	1.500
TL-208	1022.19	511.21	22.	88.	0.044	43.17	2.512s
TL-208	1166.92	583.54	14.	93.	0.047	38.43	1.107s
BI-214	1219.46	609.80	13.	68.	0.034	45.47	1.243s
AC-228	1823.09	911.48	28.	50.	0.025	80.37	1.131s
AC-228	1938.15	968.97	4.	57.	0.029	44.65	1.977
BI-214	2242.80	1121.20	9.	37.	0.019	67.88	1.723s
K-40	2924.59	1461.84	2.	155.	0.077	24.70	1.815

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 -7.3437E-02

477.56-7.344E-02 &(3.525E-01 1.02E-01 G

K-40 4.1330E+00

1460.75 4.133E+00 (P 2.676E-01 3.41E-01 G

MN-54 -8.9506E-04

834.81-8.951E-04 %(P 3.493E-02 9.11E-03 G

CO-57 6.3474E-03

122.07 6.347E-03 &(5.455E-02 1.62E-02 G K

136.43 2.066E-02 & 3.535E-01 1.04E-01 G

CO-60 5.7241E-05

1332.51 5.724E-05 %(P 4.590E-02 1.17E-02 G K

1173.23 4.602E-03 & 5.013E-02 1.37E-02 G K

Sr-85 -1.4094E-02

514.00-1.409E-02 %(5.036E-02 1.49E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Kr-85	-3.1485E+02						
		513.99	-3.149E+02	%(	1.125E+03	3.33E+02	G
Y-88	-2.3519E-05						
		1836.01	-2.352E-05	%(P	2.641E-02	3.58E-03	G K
		898.02	3.777E-03	% P	4.311E-02	1.16E-02	G
NB-94	-5.5078E-03						
		871.10	-5.508E-03	%(	3.469E-02	9.56E-03	G K
		702.50	-1.974E-04	%	3.753E-02	1.02E-02	G K
Ag-108M	6.1753E-03						
		722.95	6.175E-03	%(	3.708E-02	1.04E-02	G K
		614.37	-3.738E-03	% P	3.789E-02	1.05E-02	G
		433.93	1.014E-02	%	2.338E-02	7.03E-03	G
CD-109	-1.8633E-02						
		88.04	-1.863E-02	%(P	2.047E+00	6.08E-01	G
SN-113	0.0000E+00						
		391.71	0.000E+00	&(	4.417E-02	1.23E-02	G K
		255.04	-1.836E-02	%	1.164E+00	3.31E-01	G
SB-125	-2.3714E-03						
		427.95	-2.371E-03	%(P	8.387E-02	2.24E-02	G K
		600.77	-9.764E-03	& P	1.636E-01	4.43E-02	G
		636.15	-5.871E-02	% P	3.433E-01	9.76E-02	G
		463.51	3.219E-02	% P	2.800E-01	7.77E-02	G
		176.29	-2.212E-02	% P	5.539E-01	1.61E-01	G

```
I-131       9.3380E-03
                364.48 9.338E-03 %(  3.121E-02 9.10E-03 G K
                636.97-9.611E-02 %   6.333E-01 1.79E-01 G
                284.29-8.174E-02 %   7.122E-01 2.08E-01 G

CS-134      7.8996E-05
                604.66 7.900E-05 %(  2.869E-02 7.60E-03 G K
                795.76 1.417E-02 %   4.227E-02 1.24E-02 G
                569.29 3.426E-02 %   1.597E-01 4.50E-02 G
                801.84-7.387E-02 % P 4.387E-01 1.23E-01 G

CS-137      0.0000E+00
                661.62 0.000E+00 %(  4.463E-02 1.21E-02 G

CE-139      1.2724E-02
                165.85 1.272E-02 %(P 4.814E-02 1.44E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	-1.3711E-03						
		121.78	-1.371E-03	&(P	1.468E-01	4.32E-02	G K
		344.30	5.658E-02	%	8.529E-02	2.67E-02	G
		1408.08	5.544E-02	%	2.083E-01	5.90E-02	G
		964.00	-8.393E-03	% P	3.455E-01	9.34E-02	G
		1112.07	3.904E-02	%	3.232E-01	8.81E-02	G
		778.90	5.633E-03	% P	2.659E-01	7.06E-02	G
EU-154	1.0087E-02						
		123.10	1.009E-02	%(P	1.115E-01	3.31E-02	G K
		1274.80	-2.615E-02	%	1.491E-01	4.17E-02	G
		723.30	2.640E-02	% P	1.709E-01	4.75E-02	G
		1004.80	0.000E+00	&	1.991E-01	5.07E-02	G
EU-155	3.5383E-02						
		86.45	3.538E-02	&(P	2.515E-01	7.51E-02	G K
		105.31	9.609E-02	%	2.355E-01	7.12E-02	G
HG-203	-1.5183E-03						
		279.17	-1.518E-03	%(P	4.057E-02	1.17E-02	G K
		72.87	-3.158E-01	&	1.418E+00	4.24E-01	G
		70.83	4.400E-01	%	3.518E+00	1.05E+00	G
		82.50	-6.815E-01	%	4.065E+00	1.22E+00	G
TL-208	1.3782E-01						
		583.14	1.378E-01	@(P	2.974E-02	1.77E-02	G
		510.72	4.401E-01	+	1.213E-01	6.34E-02	G
PB-212	2.2985E-01						
		238.63	2.299E-01	@(	8.652E-02	3.04E-02	G K

Energy duplication

77.11 2.779E-01 % 5.685E-01 1.73E-01 G

74.81 2.482E-01 & P 1.189E+00 3.56E-01 G

PB-214 1.3295E-01

351.99 1.278E-01 (P 6.518E-02 2.43E-02 G K

295.22 1.429E-01 (1.518E-01 4.86E-02 G

Energy duplication

77.11 4.545E-01 % 9.299E-01 2.82E-01 G

241.92 0.000E+00 & 5.602E-01 1.64E-01 G

BI-212 -8.5466E-03

727.17-8.547E-03 %(2.983E-01 8.03E-02 G K

1620.56-3.817E-02 % P 1.867E+00 4.64E-01 G

785.42 5.445E-01 % P 1.673E+00 4.88E-01 G

BI-214 1.9700E-01

609.32 1.970E-01 *(5.545E-02 2.99E-02 G K

1764.51-1.835E-03 % P 3.550E-01 8.99E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1120.28	5.665E-01	+	2.499E-01	1.28E-01	G
RA-224	3.5874E-01						
		241.00	3.587E-01	&(P	9.810E-01	2.94E-01	G
RA-226	2.4595E-01						
		185.99	2.459E-01	%(P	1.159E+00	3.44E-01	G
AC-228	4.5720E-01						
		911.07	3.328E-01	(P	1.791E-01	8.96E-02	G K
		968.90	6.639E-01	(P	1.325E-01	9.89E-02	G
		338.40	2.762E-01	-	1.685E-01	6.28E-02	G
TH-227	-1.4159E-01						
		236.00	-1.416E-01	%(P	4.030E-01	1.21E-01	G K
		256.25	-7.028E-02	%	5.035E-01	1.48E-01	G
PA-234	3.5916E-02						
		98.44	3.592E-02	%(	2.418E-01	7.22E-02	G K
		946.00	-2.489E-03	&	1.613E-01	4.11E-02	G
		131.28	-1.624E-02	&	2.142E-01	6.35E-02	G
		94.67	-4.539E-05	%	3.885E-01	1.15E-01	G
		883.24	5.291E-02	%	1.725E-01	4.89E-02	G
		926.70	3.733E-02	%	3.470E-01	9.43E-02	G
		569.26	5.066E-02	%	2.362E-01	6.66E-02	G
TH-234	1.4542E+00						
		63.29	1.454E+00	&(P	4.392E+00	1.32E+00	G K
		92.80	-1.173E-01	%	2.439E+00	7.26E-01	G
		92.38	-4.154E-01	% P	2.744E+00	8.19E-01	G

AM-241 -1.3254E-01

59.54-1.325E-01 %(6.889E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	-7.0582E-02	-7.3437E-02	3.0646E-01	3.0649E-01	3.388E-01
K-40	4.1330E+00	4.1330E+00	1.0220E+00	1.0480E+00	
MN-54 #A	-8.8901E-04	-8.9506E-04	6.7724E-02	6.7724E-02	3.469E-02
CO-57 #B	6.2978E-03	6.3474E-03	4.8678E-02	4.8680E-02	5.412E-02
CO-60 #B	5.7178E-05	5.7241E-05	3.5197E-02	3.5197E-02	4.585E-02
Sr-85 #A	-1.3641E-02	-1.4094E-02	4.4655E-02	4.4662E-02	4.874E-02
Kr-85 #A	-3.1484E+02	-3.1485E+02	9.9776E+02	9.9791E+02	1.125E+03
Y-88 #B	-2.3057E-05	-2.3519E-05	1.4112E-04	1.4112E-04	2.589E-02
NB-94 #B	-5.5078E-03	-5.5078E-03	2.8681E-02	2.8683E-02	3.469E-02

Ag-108M#B	6.1750E-03	6.1753E-03	3.1091E-02	3.1093E-02	3.708E-02
CD-109 #A	-1.8546E-02	-1.8633E-02	1.4698E+01	1.4698E+01	2.038E+00
SN-113 #B	0.0000E+00	0.0000E+00	3.6840E-02	3.6840E-02	4.336E-02
SB-125 #B	-2.3665E-03	-2.3714E-03	4.5992E-01	4.5992E-01	8.369E-02
I-131 #B	7.1759E-03	9.3380E-03	2.7296E-02	2.7301E-02	2.398E-02
CS-134 #B	7.8774E-05	7.8996E-05	2.2805E-02	2.2805E-02	2.861E-02
CS-137 #A	0.0000E+00	0.0000E+00	3.6448E-02	3.6448E-02	4.462E-02
CE-139 #A	1.2529E-02	1.2724E-02	4.3181E-02	4.3187E-02	4.740E-02
EU-152 #B	-1.3705E-03	-1.3711E-03	1.0839E+01	1.0839E+01	1.467E-01
EU-154 #B	1.0080E-02	1.0087E-02	9.9329E-02	9.9331E-02	1.115E-01
EU-155 #B	3.5342E-02	3.5383E-02	2.2529E-01	2.2530E-01	2.512E-01
HG-203 #B	-1.4509E-03	-1.5183E-03	3.8690E-02	3.8690E-02	3.876E-02
TL-208 #	1.3782E-01	1.3782E-01	5.3195E-02	5.3755E-02	
PB-212 #	2.2985E-01	2.2985E-01	9.1280E-02	9.2187E-02	8.652E-02
PB-214 #	1.3295E-01	1.3295E-01	7.5895E-02	7.6260E-02	6.518E-02
BI-212 #B	-8.5466E-03	-8.5466E-03	2.4100E-01	2.4100E-01	2.983E-01
BI-214 #	1.9700E-01	1.9700E-01	8.9569E-02	9.0249E-02	
RA-224 #A	3.5874E-01	3.5874E-01	8.8337E-01	8.8360E-01	9.810E-01
RA-226 #A	2.4595E-01	2.4595E-01	1.0319E+00	1.0320E+00	1.159E+00
AC-228	4.5720E-01	4.5720E-01	2.0428E-01	2.0589E-01	
TH-227 #B	-1.4159E-01	-1.4159E-01	3.7046E-01	3.7055E-01	4.030E-01

PA-234 #B	3.5916E-02	3.5916E-02	2.1657E-01	2.1658E-01	2.418E-01
TH-234 #B	1.4542E+00	1.4542E+00	3.9659E+00	3.9668E+00	4.392E+00
AM-241 #A	-1.3254E-01	-1.3254E-01	6.1826E-01	6.1831E-01	6.889E-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) 4.9250612E+00 pCi/gm
Total Decayed Activity (50.2 to 1999.0 keV) 4.9250612E+00 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: 102F_30AUG2005_1314.An1

Sample description

FSS-NOL-06-01-019-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30AUG2005_1314.An1

Acquisition information

Start time:	30-Aug-2005 13:15:01
Live time:	2000
Real time:	2013
Dead time:	0.64 %
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: 8.5900E+02

Activity scaling factor: 1.0000E+06/(1.0000E+00* 8.5900E+02) =
1.1641E+03

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 27-Aug-2005 13:28:00
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. 9 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5177

***** 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
239.40	238.	10.24	1.04	1.377E-02	238.63	43.100	6.306E-01	PB212
295.52	79.	22.31	1.20	1.145E-02	295.22	19.200	5.674E-01	PB214
338.42	47.	31.00	1.54	1.006E-02	338.40	12.010	6.120E-01	AC228
352.39	110.	15.36	1.22	9.668E-03	351.99	37.100	4.811E-01	PB214
511.11	27.	37.60	1.50	6.695E-03	510.72	22.500	PBC<MDA	TL208
583.95	55.	18.62	1.51	5.882E-03	583.14	86.000	1.692E-01	TL208
609.91	62.	19.14	0.82	5.644E-03	609.32	46.090	3.734E-01	Bl214

662.28	108.	13.76	1.35	5.225E-03	661.62	84.620	3.833E-01	CS137
911.35	47.	18.67	1.21	3.921E-03	911.07	29.000	6.469E-01	AC228
969.03	50.	22.88	1.07	3.717E-03				
1119.97	36.	22.72	0.70	3.283E-03	1120.28	15.040	1.141E+00	Bl214
1461.78	301.	5.84	1.72	2.619E-03	1460.75	10.700	1.686E+01	K40
1765.96	16.	25.00	1.12	2.225E-03	1764.51	15.920	7.066E-01	Bl214

********** 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	
1938.26	969.03	13.	54.	0.027	49.38	1.067	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	477.14	238.75	131.	159.	0.079	38.69	1.500s
PB-214	590.73	295.54	68.	55.	0.028	74.97	1.500s
AC-228	676.84	338.58	39.	45.	0.022	74.15	1.500s
PB-214	704.36	352.34	56.	96.	0.048	45.07	1.500
TL-208	1021.99	511.11	39.	27.	0.014	112.81	1.499s
TL-208	1167.53	583.85	19.	49.	0.024	56.34	1.499
BI-214	1219.67	609.91	25.	62.	0.031	57.42	0.824s
CS-137	1324.46	662.28	31.	108.	0.054	41.29	1.346s
AC-228	1823.61	911.74	17.	34.	0.017	72.90	1.679s
BI-214	2240.33	1119.97	9.	36.	0.018	68.16	0.699s
K-40	2924.47	1461.78	2.	301.	0.150	17.52	1.718
BI-214	3533.38	1765.96	0.	16.	0.008	75.00	1.124s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.0890E-01					
			477.56	-1.089E-01	%(	6.233E-01	1.78E-01 G

K-40 1.6861E+01

1460.75 1.686E+01 (P 5.613E-01 9.86E-01 G

MN-54 -1.3516E-02

834.81-1.352E-02 %(P 9.256E-02 2.58E-02 G

CO-57 9.4716E-03

122.07 9.472E-03 %(6.859E-02 2.02E-02 G K

136.43 3.925E-02 % 5.586E-01 1.63E-01 G

CO-60 -1.3323E-02

1332.51-1.332E-02 &(P 1.238E-01 3.40E-02 G K

1173.23 5.595E-03 & 1.332E-01 3.67E-02 G K

Sr-85 -2.0431E-02

514.00-2.043E-02 &(9.258E-02 2.70E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Kr-85	-4.5684E+02						
		513.99	-4.568E+02	&(	2.070E+03	6.04E+02	G
Y-88	-4.9318E-05						
		1836.01	-4.932E-05	%(P	5.538E-02	7.51E-03	G K
		898.02	-2.041E-03	% P	8.765E-02	2.26E-02	G
NB-94	-5.8385E-03						
		871.10	-5.839E-03	&(	9.159E-02	2.51E-02	G K
		702.50	-2.743E-03	%	8.026E-02	2.19E-02	G K
Ag-108M	0.0000E+00						
		722.95	0.000E+00	%(	1.090E-01	3.01E-02	G K
		614.37	-1.156E-02	% P	8.804E-02	2.48E-02	G
		433.93	-5.544E-04	%	6.514E-02	1.80E-02	G
CD-109	8.2611E-01						
		88.04	8.261E-01	%(P	3.098E+00	9.27E-01	G
SN-113	-9.2759E-03						
		391.71	-9.276E-03	&(	9.286E-02	2.63E-02	G K
		255.04	6.162E-01	%	2.670E+00	7.85E-01	G
SB-125	6.0459E-02						
		427.95	6.046E-02	%(P	2.256E-01	6.58E-02	G K
		600.77	-4.442E-02	% P	3.781E-01	1.05E-01	G
		636.15	-4.253E-02	% P	5.104E-01	1.37E-01	G
		463.51	2.684E-01	% P	6.560E-01	1.95E-01	G
		176.29	6.284E-02	% P	8.467E-01	2.45E-01	G

I-131 -1.0523E-03

364.48-1.052E-03 &(9.583E-02 2.69E-02 G K

636.97 1.347E-02 % 9.100E-01 2.35E-01 G

284.29-2.687E-01 % 1.132E+00 3.32E-01 G

CS-134 3.0235E-03

604.66 3.023E-03 &(1.138E-01 3.23E-02 G K

795.76 1.936E-02 % 1.096E-01 3.12E-02 G

569.29-2.687E-02 % 3.995E-01 1.09E-01 G

801.84-1.071E-01 % P 1.110E+00 3.10E-01 G

CS-137 3.8331E-01

661.62 3.833E-01 @(1.022E-01 5.28E-02 G

CE-139 -1.0035E-02

165.85-1.003E-02 %(P 7.042E-02 2.06E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	2.3472E-02						
		121.78	2.347E-02	%(P	2.062E-01	6.05E-02	G K
		344.30	3.609E-02	&	2.082E-01	6.01E-02	G
		1408.08	5.819E-02	&	4.095E-01	1.09E-01	G
		964.00	1.561E-01	% P	6.640E-01	1.90E-01	G
		1112.07	4.326E-02	%	7.805E-01	2.12E-01	G
		778.90	2.309E-02	& P	6.208E-01	1.68E-01	G
EU-154	2.5531E-02						
		123.10	2.553E-02	%(P	1.370E-01	4.04E-02	G K
		1274.80	-9.228E-04	&	3.030E-01	7.96E-02	G
		723.30	7.903E-02	% P	3.689E-01	1.04E-01	G
		1004.80	-3.752E-02	&	5.818E-01	1.59E-01	G
EU-155	-2.2997E-02						
		86.45	-2.300E-02	&(P	2.945E-01	8.56E-02	G K
		105.31	7.934E-02	&	3.116E-01	9.27E-02	G
HG-203	-1.9279E-03						
		279.17	-1.928E-03	&(P	6.636E-02	1.88E-02	G K
		72.87	-4.343E-01	%	3.264E+00	9.72E-01	G
		70.83	-2.359E+00	&	6.339E+00	1.91E+00	G
		82.50	-7.130E-01	%	6.356E+00	1.89E+00	G
TL-208	1.5184E-01						
		583.14	1.518E-01	(P	7.086E-02	2.88E-02	G
		510.72	2.848E-01	+	3.320E-01	1.07E-01	G
PB-212	4.2018E-01						
		238.63	4.202E-01	@(	1.480E-01	5.42E-02	G K

Energy duplication

77.11 6.495E-01 % 9.277E-01 2.85E-01 G

74.81 7.385E-01 & P 1.851E+00 5.58E-01 G

PB-214 4.1089E-01

351.99 4.185E-01 (P 1.650E-01 6.31E-02 G K

295.22 3.961E-01 @(2.944E-01 9.90E-02 G

Energy duplication

77.11 1.062E+00 % 1.517E+00 4.66E-01 G

241.92 3.622E-01 & 1.004E+00 3.01E-01 G

BI-212 1.2357E-01

727.17 1.236E-01 %(6.538E-01 1.85E-01 G K

1620.56-8.008E-02 % P 3.917E+00 9.73E-01 G

785.42 1.431E+00 % P 3.888E+00 1.15E+00 G

BI-214 3.7339E-01

609.32 3.734E-01 (1.577E-01 7.15E-02 G K

1764.51 7.066E-01 + P 3.273E-01 1.78E-01 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      1120.28 1.141E+00 +   5.367E-01 2.59E-01 G

RA-224       1.0549E+00
                       241.00 1.055E+00 &(P 1.739E+00 5.33E-01 G

RA-226       9.9836E-01
                       185.99 9.984E-01 %(P 1.668E+00 5.08E-01 G

AC-228       4.9860E-01
                       911.07 4.641E-01 *(P 3.035E-01 1.14E-01 G K
                       968.90-1.161E-01 % P 7.425E-01 2.12E-01 G
                       338.40 5.819E-01  (  4.125E-01 1.44E-01 G

TH-227      -1.8405E-01
                       236.00-1.840E-01 %(P 6.427E-01 1.91E-01 G K
                       256.25 2.123E-01 %   8.536E-01 2.52E-01 G

PA-234      -8.4304E-02
                        98.44-8.430E-02 %(  3.212E-01 9.58E-02 G K
                       946.00-4.772E-02 %   4.796E-01 1.32E-01 G
                       131.28 3.973E-02 &   2.383E-01 6.99E-02 G
                        94.67 2.766E-01 %   5.522E-01 1.68E-01 G
                       883.24 0.000E+00 &   7.490E-01 2.01E-01 G
                       926.70 1.131E-01 %   7.037E-01 1.94E-01 G
                       569.26-3.836E-02 %   5.969E-01 1.63E-01 G

TH-234       8.9096E-01
                        63.29 8.910E-01 &(P 7.154E+00 2.12E+00 G K
                        92.80 1.360E+00 %   3.476E+00 1.05E+00 G
                        92.38 2.531E-01 % P 3.861E+00 1.14E+00 G
```

AM-241 1.0289E-01

59.54 1.029E-01 %(1.050E+00 3.10E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty 3 Sigma Counting pCi/gm	Total pCi/gm	MDA pCi/gm
BE-7 #A	-1.0476E-01	-1.0890E-01	5.3350E-01	5.3353E-01	5.996E-01
K-40	1.6861E+01	1.6861E+01	2.9551E+00	3.1028E+00	
MN-54 #A	-1.3427E-02	-1.3516E-02	8.7224E-02	8.7227E-02	9.195E-02
CO-57 #B	9.3992E-03	9.4716E-03	6.0507E-02	6.0509E-02	6.806E-02
CO-60 #B	-1.3309E-02	-1.3323E-02	1.0888E-01	1.0888E-01	1.237E-01
Sr-85 #A	-1.9788E-02	-2.0431E-02	8.1059E-02	8.1067E-02	8.967E-02
Kr-85 #A	-4.5683E+02	-4.5684E+02	1.8124E+03	1.8126E+03	2.070E+03
Y-88 #B	-4.8368E-05	-4.9318E-05	2.9591E-04	2.9592E-04	5.432E-02
NB-94 #B	-5.8385E-03	-5.8385E-03	7.5228E-02	7.5229E-02	9.159E-02

Ag-108M#B	0.0000E+00	0.0000E+00	9.0365E-02	9.0366E-02	1.090E-01
CD-109 #A	8.2234E-01	8.2611E-01	2.7800E+00	2.7804E+00	3.084E+00
SN-113 #B	-9.1103E-03	-9.2759E-03	7.9003E-02	7.9004E-02	9.121E-02
SB-125 #B	6.0335E-02	6.0459E-02	1.9725E-01	1.9728E-01	2.251E-01
I-131 #B	-8.1310E-04	-1.0523E-03	8.0793E-02	8.0793E-02	7.405E-02
CS-134 #B	3.0151E-03	3.0235E-03	9.7033E-02	9.7033E-02	1.135E-01
CS-137 #	3.8323E-01	3.8331E-01	1.5826E-01	1.5972E-01	
CE-139 #A	-9.8847E-03	-1.0035E-02	6.8617E-02	6.8620E-02	6.936E-02
EU-152 #B	2.3462E-02	2.3472E-02	1.8144E-01	1.8144E-01	2.061E-01
EU-154 #B	2.5514E-02	2.5531E-02	1.2120E-01	1.2121E-01	1.369E-01
EU-155 #B	-2.2971E-02	-2.2997E-02	1.2800E+00	1.2800E+00	2.942E-01
HG-203 #B	-1.8440E-03	-1.9279E-03	6.6360E-02	6.6360E-02	6.347E-02
TL-208 #	1.5184E-01	1.5184E-01	8.6261E-02	8.6681E-02	7.086E-02
PB-212 #	4.2018E-01	4.2018E-01	1.6257E-01	1.6427E-01	1.480E-01
PB-214 #	4.1089E-01	4.1089E-01	1.7991E-01	1.8138E-01	1.650E-01
BI-212 #B	1.2357E-01	1.2357E-01	5.5519E-01	5.5523E-01	6.538E-01
BI-214	3.7339E-01	3.7339E-01	2.1441E-01	2.1543E-01	
RA-224 #A	1.0549E+00	1.0549E+00	1.5977E+00	1.5988E+00	1.739E+00
RA-226 #A	9.9836E-01	9.9836E-01	1.5230E+00	1.5240E+00	1.668E+00
AC-228 #	4.9860E-01	4.9860E-01	2.6009E-01	2.6159E-01	3.035E-01
TH-227 #B	-1.8405E-01	-1.8405E-01	5.9250E-01	5.9259E-01	6.427E-01

PA-234 #B	-8.4304E-02	-8.4304E-02	2.8747E-01	2.8751E-01	3.212E-01
TH-234 #B	8.9096E-01	8.9096E-01	6.3597E+00	6.3599E+00	7.154E+00
AM-241 #A	1.0289E-01	1.0289E-01	9.3120E-01	9.3122E-01	1.050E+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 (50.2 to 1999.0 keV) 1.7617485E+01 pCi/gm
Total Decayed Activity (50.2 to 1999.0 keV) 1.7617558E+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_30AUG2005_1354.An1

Sample description

FSS-NOL-06-01-003-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30AUG2005_1354.An1

Acquisition information

Start time:	30-Aug-2005 13:54:40
Live time:	2000
Real time:	2019
Dead time:	0.92 %
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: 1.6490E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6490E+03) =
6.0643E+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 27-Aug-2005 12:10:00
Decay during acquisition: NO
Decay during collection: NO
True coincidence correction: NO
Peaked background correction: YES 102_150K_28APR05.Pbc
01-May-2005 05:27:47
Absorption (Internal): NO
Geometry correction: NO
Random summing: NO

total peaks alloc. 11 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3776

***** 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	111.	24.86	1.10	8.817E-03				
74.74	111.	24.86	1.10	8.817E-03	74.81	9.600	PBC<MDA	PB212
77.14	212.	14.21	1.10	9.543E-03	77.11	10.700	1.706E+00	PB214
					77.11	17.500	1.043E+00	PB212
186.01	63.	35.56	0.98	1.627E-02	185.99	3.280	PBC<MDA	RA226
209.39	68.	40.11	1.14	1.519E-02				
238.90	573.	6.60	1.21	1.379E-02	238.63	43.100	7.892E-01	PB212

270.74	66.	29.46	1.55	1.241E-02				
295.49	122.	12.68	1.25	1.145E-02	295.22	19.200	4.553E-01	PB214
300.29	34.	36.88	1.26	1.128E-02				
338.97	139.	14.98	1.18	1.004E-02	338.40	12.010	9.401E-01	AC228
352.22	251.	12.01	1.37	9.672E-03	351.99	37.100	5.715E-01	PB214
462.77	38.	40.85	1.16	7.376E-03				
462.77	38.	40.85	1.16	7.376E-03	463.51	10.000	PBC<MDA	SB125
510.86	41.	31.70	1.50	6.695E-03	510.72	22.500	2.245E-01	TL208
583.47	158.	10.47	1.12	5.887E-03	583.14	86.000	2.551E-01	TL208
609.90	134.	12.97	1.39	5.644E-03	609.32	46.090	4.224E-01	BI214
727.66	26.	39.07	1.55	4.794E-03	727.17	11.800	PBC<MDA	BI212
911.48	93.	13.78	1.76	3.920E-03	911.07	29.000	6.670E-01	AC228
968.42	79.	19.89	2.23	3.718E-03	964.00	14.580	1.189E+00	EU152
					968.90	17.460	9.969E-01	AC228
1121.09	36.	31.57	1.26	3.283E-03	1120.28	15.040	6.058E-01	BI214
1461.62	452.	4.76	2.01	2.619E-03	1460.75	10.700	1.321E+01	K40
1765.27	14.	32.43	2.24	2.225E-03	1764.51	15.920	3.292E-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	
149.05	74.71	329.	111.	0.056	74.59	1.098	BI-207	D

YAEC Chemistry Lab Spectrum name: 102F_30AUG2005_1354.An1

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
153.86	77.12	350.	212.	0.106	42.63	1.100	BI-207	D
418.39	209.39	246.	68.	0.034	120.33	1.137	AC-228	
477.42	238.90	761.	98.	0.049	123.59	1.208	PB-212	
541.12	270.74	118.	66.	0.033	88.37	1.551	AC-228	s
600.24	300.44	60.	34.	0.017	110.63	1.258	PB-212	ID
1457.85	728.95	30.	44.	0.022	78.98	1.179	J-132	I

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	729.	190.	0.095	64.18	1.500D
PB-212	153.80	77.11	729.	190.	0.095	64.18	1.500D
RA-226	371.82	186.11	331.	65.	0.032	116.26	1.500
PB-212	477.20	238.78	297.	436.	0.218	22.10	1.500
PB-214	590.71	295.53	147.	112.	0.056	54.17	1.500
AC-228	677.61	338.97	104.	139.	0.069	44.93	1.185s
PB-214	704.15	352.23	115.	205.	0.102	30.49	1.500
SB-125	926.27	463.26	58.	31.	0.016	110.21	1.500
TL-208	1021.50	510.86	65.	41.	0.021	95.10	1.499s
TL-208	1166.99	583.58	33.	147.	0.073	29.79	1.499
BI-214	1219.66	609.90	53.	134.	0.067	38.92	1.389

Bl-212	1455.27	727.66	38.	26.	0.013	117.21	1.554s
AC-228	1823.11	911.48	27.	93.	0.046	41.34	1.763
AC-228	1937.05	968.42	42.	79.	0.039	59.68	2.228s
Bl-214	2242.57	1121.09	28.	36.	0.018	94.70	1.258
K-40	2924.15	1461.62	3.	452.	0.226	14.27	2.006
Bl-214	3532.00	1765.27	4.	14.	0.007	97.28	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		8.5381E-02					
			477.56	8.538E-02	%(	3.818E-01	1.11E-01 G
K-40		1.3211E+01					
			1460.75	1.321E+01	(P	3.131E-01	6.29E-01 G
MN-54		1.2101E-02					
			834.81	1.210E-02	%(P	4.537E-02	1.31E-02 G
CO-57		1.3392E-02					
			122.07	1.339E-02	%(	5.828E-02	1.74E-02 G K
			136.43	-1.050E-01	&	4.691E-01	1.40E-01 G
CO-60		5.2606E-04					
			1332.51	5.261E-04	%(P	7.561E-02	2.06E-02 G K
			1173.23	2.347E-02	%	7.893E-02	2.32E-02 G K
Sr-85		-1.4647E-02					
			514.00	-1.465E-02	&(	6.473E-02	1.91E-02 G
Kr-85		-3.2721E+02					
			513.99	-3.272E+02	&(	1.446E+03	4.26E+02 G
Y-88		-2.2629E-03					
			1836.01	-2.263E-03	&(P	6.734E-02	1.75E-02 G K

898.02-1.114E-02 % P 7.195E-02 2.04E-02 G

NB-94 0.0000E+00

871.10 0.000E+00 &(6.466E-02 1.80E-02 G K

702.50-4.392E-03 & 4.971E-02 1.40E-02 G K

Ag-108M 0.0000E+00

722.95 0.000E+00 &(9.153E-02 2.62E-02 G K

614.37-2.086E-02 % P 6.938E-02 2.05E-02 G

433.93 0.000E+00 & 4.511E-02 1.27E-02 G

CD-109 8.9233E-01

88.04 8.923E-01 &(P 2.333E+00 7.04E-01 G

SN-113 -1.3787E-02

391.71-1.379E-02 &(6.293E-02 1.84E-02 G K

255.04-6.922E-01 & 1.967E+00 5.90E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.6120E-02						
		427.95	-3.132E-03	%(P	1.301E-01	3.63E-02	G K
		600.77	3.320E-02	% P	2.319E-01	6.59E-02	G
		636.15	1.617E-01	% P	3.408E-01	1.03E-01	G
		463.51	3.503E-01	(P	4.272E-01	1.35E-01	G
		176.29	-1.071E-01	% P	7.059E-01	2.09E-01	G
I-131	6.1081E-05						
		364.48	6.108E-05	%(	6.221E-02	1.77E-02	G K
		636.97	-9.882E-02	&	9.160E-01	2.61E-01	G
		284.29	-6.951E-02	&	8.533E-01	2.49E-01	G
CS-134	7.1357E-05						
		604.66	7.136E-05	%(	5.078E-02	1.42E-02	G K
		795.76	4.477E-02	%	6.436E-02	2.03E-02	G
		569.29	-1.293E-03	&	3.172E-01	8.91E-02	G
		801.84	1.517E-01	% P	5.984E-01	1.74E-01	G
CS-137	1.9967E-02						
		661.62	1.997E-02	%(	6.360E-02	1.88E-02	G
CE-139	-7.8130E-03						
		165.85	-7.813E-03	%(P	5.328E-02	1.58E-02	G
EU-152	-1.4629E-03						
		121.78	-1.463E-03	%(P	1.791E-01	5.29E-02	G K
		344.30	-3.899E-02	%	1.729E-01	5.11E-02	G
		1408.08	9.625E-02	%	2.768E-01	8.12E-02	G
		964.00	4.169E-02	% P	5.472E-01	1.56E-01	G
		1112.07	-7.072E-02	%	5.556E-01	1.58E-01	G

778.90-3.220E-03 % P 3.474E-01 9.39E-02 G

EU-154 2.7228E-02

123.10 2.723E-02 %(P 1.193E-01 3.57E-02 G K

1274.80-1.378E-02 % 2.088E-01 5.79E-02 G

723.30 6.899E-02 & P 2.348E-01 6.85E-02 G

1004.80-3.417E-02 % 3.603E-01 1.01E-01 G

EU-155 -1.4654E-02

86.45-1.465E-02 &(P 3.060E-01 9.10E-02 G K

105.31-2.790E-03 % 2.457E-01 7.26E-02 G

HG-203 1.7320E-02

279.17 1.732E-02 &(P 5.124E-02 1.53E-02 G K

72.87-1.164E+00 & 2.437E+00 7.39E-01 G

70.83-2.098E+00 % 4.136E+00 1.26E+00 G

82.50-4.203E-01 % 4.410E+00 1.32E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.3445E-01						
		583.14	2.371E-01	(P	4.795E-02	2.36E-02	G
		510.72	2.245E-01	*(	2.190E-01	7.12E-02	G
PB-212	6.0024E-01						
		238.63	6.002E-01	(	1.144E-01	4.42E-02	G K
					Energy duplication		
		77.11	9.310E-01	+	6.306E-01	1.99E-01	G
		74.81	8.076E-01	& P	1.342E+00	4.09E-01	G
PB-214	4.4912E-01						
		351.99	4.667E-01	(P	1.201E-01	4.75E-02	G K
		295.22	4.151E-01	(	2.204E-01	7.50E-02	G
					Energy duplication		
		77.11	1.523E+00	+	1.031E+00	3.26E-01	G
		241.92	2.147E-01	%	7.823E-01	2.35E-01	G
BI-212	3.7482E-01						
		727.17	3.748E-01	&(	4.563E-01	1.46E-01	G K
		1620.56	-2.310E-01	% P	2.151E+00	5.63E-01	G
		785.42	5.525E-01	% P	2.873E+00	8.27E-01	G
BI-214	4.2238E-01						
		609.32	4.224E-01	(	1.151E-01	5.48E-02	G K
		1764.51	3.292E-01	- P	2.702E-01	1.07E-01	G
		1120.28	6.058E-01	+	4.506E-01	1.91E-01	G
RA-224	5.8828E-01						
		241.00	5.883E-01	%(P	1.404E+00	4.24E-01	G

```
RA-226       9.9720E-01
                 185.99 9.972E-01  (P 1.344E+00 4.13E-01 G

AC-228       7.4698E-01
                 911.07 6.670E-01  (P 1.954E-01 9.22E-02 G K
                 968.90 9.969E-01 + P 4.156E-01 1.98E-01 G
                 338.40 9.401E-01 @(  3.413E-01 1.41E-01 G

TH-227      -1.7926E-01
                 236.00-1.793E-01 %(P 5.009E-01 1.51E-01 G K
                 256.25 2.436E-01 %   5.816E-01 1.75E-01 G

PA-234      -4.2742E-02
                  98.44-4.274E-02 %(  2.575E-01 7.69E-02 G K
                 946.00 7.244E-02 &   3.125E-01 9.04E-02 G
                 131.28 1.458E-03 &   2.376E-01 7.02E-02 G
                  94.67-1.502E-01 &   5.084E-01 1.53E-01 G
                 883.24 7.832E-02 %   3.522E-01 9.98E-02 G
                 926.70-1.439E-01 %   6.539E-01 1.90E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	-2.669E-03	&	3.544E-01	9.70E-02	G
TH-234	5.9601E-01						
		63.29	5.960E-01	&(P	5.060E+00	1.51E+00	G K
		92.80	1.522E+00	%	2.645E+00	8.05E-01	G
		92.38	1.733E+00	% P	3.169E+00	9.63E-01	G
AM-241	-4.2704E-03						
		59.54	-4.270E-03	&(	7.055E-01	2.09E-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
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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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	8.2043E-02	8.5381E-02	3.3265E-01	3.3269E-01	3.668E-01
K-40		1.3211E+01	1.3211E+01	1.8861E+00	2.0266E+00	
MN-54	#A	1.2019E-02	1.2101E-02	3.9205E-02	3.9211E-02	4.506E-02
CO-57	#B	1.3286E-02	1.3392E-02	5.2311E-02	5.2316E-02	5.782E-02
CO-60	#B	5.2548E-04	5.2606E-04	6.1754E-02	6.1754E-02	7.552E-02

Sr-85 #A	-1.4174E-02	-1.4647E-02	5.7266E-02	5.7272E-02	6.264E-02
Kr-85 #A	-3.2720E+02	-3.2721E+02	1.2792E+03	1.2794E+03	1.446E+03
Y-88 #B	-2.2181E-03	-2.2629E-03	5.3587E-02	5.3587E-02	6.600E-02
NB-94 #B	0.0000E+00	0.0000E+00	5.3909E-02	5.3909E-02	6.466E-02
Ag-108M#B	0.0000E+00	0.0000E+00	7.8699E-02	7.8699E-02	9.153E-02
CD-109 #A	8.8814E-01	8.9233E-01	2.1130E+00	2.1136E+00	2.322E+00
SN-113 #B	-1.3534E-02	-1.3787E-02	5.5308E-02	5.5314E-02	6.178E-02
SB-125 #B	8.5939E-02	8.6120E-02	9.9583E-02	9.9700E-02	1.298E-01
I-131 #B	4.6867E-05	6.1081E-05	5.3175E-02	5.3175E-02	4.773E-02
CS-134 #B	7.1156E-05	7.1357E-05	4.2596E-02	4.2596E-02	5.064E-02
CS-137 #A	1.9963E-02	1.9967E-02	5.6370E-02	5.6381E-02	6.359E-02
CE-139 #A	-7.6929E-03	-7.8130E-03	5.0762E-02	5.0764E-02	5.246E-02
EU-152 #B	-1.4622E-03	-1.4629E-03	2.7847E-01	2.7847E-01	1.790E-01
EU-154 #B	2.7209E-02	2.7228E-02	1.0705E-01	1.0706E-01	1.192E-01
EU-155 #B	-1.4637E-02	-1.4654E-02	9.2595E-01	9.2595E-01	3.056E-01
HG-203 #B	1.6546E-02	1.7320E-02	4.5990E-02	4.6001E-02	4.895E-02
TL-208 #	2.3445E-01	2.3445E-01	7.0040E-02	7.1265E-02	4.795E-02
PB-212 #	6.0024E-01	6.0024E-01	1.3265E-01	1.3686E-01	1.144E-01
PB-214 #	4.4912E-01	4.4912E-01	1.3720E-01	1.3950E-01	1.201E-01
BI-212 #A	3.7482E-01	3.7482E-01	4.3935E-01	4.3985E-01	4.563E-01
BI-214	4.2238E-01	4.2238E-01	1.6440E-01	1.6610E-01	
RA-224 #A	5.8828E-01	5.8828E-01	1.2714E+00	1.2719E+00	1.404E+00
RA-226 #A	9.9719E-01	9.9720E-01	1.2390E+00	1.2403E+00	1.344E+00
AC-228	7.4698E-01	7.4698E-01	2.2830E-01	2.3211E-01	
TH-227 #B	-1.7926E-01	-1.7926E-01	4.5994E-01	4.6005E-01	5.009E-01
PA-234 #B	-4.2742E-02	-4.2742E-02	2.3072E-01	2.3073E-01	2.575E-01
TH-234 #B	5.9601E-01	5.9601E-01	4.5256E+00	4.5258E+00	5.060E+00
AM-241 #A	-4.2704E-03	-4.2704E-03	6.2645E-01	6.2645E-01	7.055E-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 (89.2 to 1999.0 keV) 1.4754780E+01 pCi/gm

Total Decayed Activity (89.2 to 1999.0 keV) 1.4754780E+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_30AUG2005_1525.An1

Sample description

FSS-NOL-06-01-010-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30AUG2005_1525.An1

Acquisition information

Start time:	30-Aug-2005 15:25:30
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: 1.7950E+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 27-Aug-2005 11:30:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3316

***** 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	147.	27.43	1.50	9.541E-03	77.11	10.700	1.081E+00	PB214
					77.11	17.500	6.609E-01	PB212
77.17	147.	27.43	1.50	9.541E-03	77.11	10.700	1.081E+00	PB214
					77.11	17.500	6.609E-01	PB212
161.48	69.	34.85	0.83	1.715E-02				
185.51	88.	32.79	1.35	1.629E-02				
185.51	88.	32.79	1.35	1.629E-02	185.99	3.280		PBC<MDA RA226

208.89	64.	35.38	1.09	1.521E-02				
238.90	617.	5.76	1.15	1.379E-02	238.63	43.100	7.811E-01	PB212
270.22	88.	25.40	1.00	1.243E-02				
277.20	51.	32.51	1.06	1.215E-02				
295.45	146.	21.99	1.17	1.146E-02	295.22	19.200	4.979E-01	PB214
327.92	47.	34.35	0.81	1.037E-02				
338.24	124.	19.98	1.39	1.006E-02	338.40	12.010	7.727E-01	AC228
352.21	206.	10.09	1.04	9.673E-03	351.99	37.100	4.302E-01	PB214
510.96	90.	17.16	1.56	6.692E-03	510.72	22.500	4.478E-01	TL208
583.61	154.	13.22	1.31	5.885E-03	583.14	86.000	2.280E-01	TL208
609.58	143.	11.70	1.54	5.647E-03	609.32	46.090	4.132E-01	Bl214
727.47	45.	31.18	1.55	4.794E-03	727.17	11.800	6.042E-01	Bl212
795.61	21.	40.52	1.13	4.420E-03				
795.61	21.	40.52	1.13	4.420E-03	795.76	85.400	4.181E-02	CS134
911.53	122.	11.59	1.68	3.920E-03	911.07	29.000	8.047E-01	AC228
969.24	112.	14.27	1.29	3.717E-03	968.90	17.460	1.293E+00	AC228
1461.60	408.	5.06	2.22	2.619E-03	1460.75	10.700	1.095E+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 Centroid Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
370.64	185.51	302.	88.	0.044	98.38	1.346	U-235 I
417.40	208.89	204.	64.	0.032	106.15	1.090	AC-228
540.08	270.22	151.	88.	0.044	76.20	0.998	AC-228

YAEC Chemistry Lab Spectrum name: 102F_30AUG2005_1525.An1

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
655.52	327.92	88.	47.	0.023	103.06	0.813	AC-228	s
1591.25	795.61	22.	21.	0.010	121.57	1.126	CS-134	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-214	153.80	77.11	735.	147.	0.073	82.29	1.500D
PB-212	153.80	77.11	735.	147.	0.073	82.29	1.500D
PB-212	477.16	238.77	274.	484.	0.242	19.90	1.500
PB-214	590.48	295.41	165.	118.	0.059	53.71	1.500
AC-228	676.15	338.24	144.	124.	0.062	59.93	1.388s
PB-214	703.77	352.04	84.	188.	0.094	30.04	1.500s
TL-208	1021.70	510.96	54.	90.	0.045	51.49	1.563s
TL-208	1167.06	583.61	71.	153.	0.077	39.67	1.310
BI-214	1219.01	609.58	44.	143.	0.071	35.10	1.539
BI-212	1454.89	727.47	46.	45.	0.023	93.55	1.551
AC-228	1823.20	911.53	24.	122.	0.061	34.77	1.677s
AC-228	1938.68	969.24	32.	111.	0.056	42.82	1.294s
K-40	2924.11	1461.60	5.	408.	0.204	15.17	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 -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS
BE-7		-1.3987E-02				
			477.56	-1.399E-02	&(	4.345E-01 1.24E-01 G
K-40		1.0949E+01				
			1460.75	1.095E+01	(P	3.567E-01 5.54E-01 G
MN-54		-9.4344E-04				
			834.81	-9.434E-04	&(P	5.644E-02 1.56E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	5.6096E-04						
		122.07	5.610E-04	%(	5.455E-02	1.61E-02	G K
		136.43	7.976E-02	%	4.290E-01	1.28E-01	G
CO-60	-2.0691E-04						
		1332.51	-2.069E-04	%(P	6.676E-02	1.80E-02	G K
		1173.23	5.330E-02	%	7.130E-02	2.27E-02	G K
Sr-85	-1.4295E-02						
		514.00	-1.429E-02	%(	5.879E-02	1.74E-02	G
Kr-85	-3.0946E+02						
		513.99	-3.095E+02	%(	1.311E+03	3.87E+02	G
Y-88	-2.3628E-05						
		1836.01	-2.363E-05	%(P	2.653E-02	3.60E-03	G K
		898.02	-1.228E-03	% P	5.475E-02	1.48E-02	G
NB-94	2.9771E-04						
		871.10	2.977E-04	%(	5.158E-02	1.42E-02	G K
		702.50	5.338E-03	%	4.830E-02	1.37E-02	G K
Ag-108M	-1.5967E-02						
		722.95	-1.597E-02	%(	5.934E-02	1.74E-02	G K
		614.37	-2.180E-02	% P	6.096E-02	1.82E-02	G
		433.93	4.590E-03	&	4.503E-02	1.30E-02	G
CD-109	3.1530E-01						
		88.04	3.153E-01	%(P	2.105E+00	6.29E-01	G

```
SN-113       6.0245E-03
                 391.71 6.024E-03 %(  6.309E-02 1.82E-02 G K
                 255.04 1.845E-01 %   1.887E+00 5.54E-01 G

SB-125       4.4135E-02
                 427.95 4.413E-02 %(P 1.195E-01 3.55E-02 G K
                 600.77-1.000E-03 % P 2.954E-01 8.37E-02 G
                 636.15-5.553E-02 & P 4.097E-01 1.17E-01 G
                 463.51 2.829E-01 % P 4.203E-01 1.30E-01 G
                 176.29-2.548E-01 % P 7.119E-01 2.14E-01 G

I-131       -2.6524E-05
                 364.48-2.652E-05 %(  6.408E-02 1.84E-02 G K
                 636.97-1.990E-01 &   8.699E-01 2.53E-01 G
                 284.29 2.501E-01 %   5.944E-01 1.79E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	-1.9856E-02						
		604.66	-1.986E-02	%(	5.566E-02	1.66E-02	G K
		795.76	2.959E-02	%	5.829E-02	1.78E-02	G
		569.29	-4.489E-03	&	2.883E-01	8.10E-02	G
		801.84	1.222E-01	% P	5.750E-01	1.66E-01	G
CS-137	3.1410E-02						
		661.62	3.141E-02	%(	6.625E-02	2.01E-02	G
CE-139	-1.8523E-02						
		165.85	-1.852E-02	%(P	5.042E-02	1.52E-02	G
EU-152	1.8448E-03						
		121.78	1.845E-03	%(P	1.544E-01	4.56E-02	G K
		344.30	4.926E-03	%	1.358E-01	3.91E-02	G
		1408.08	3.527E-02	%	2.291E-01	6.25E-02	G
		964.00	-6.356E-02	% P	4.709E-01	1.34E-01	G
		1112.07	6.832E-02	%	5.232E-01	1.49E-01	G
		778.90	7.918E-04	& P	3.559E-01	9.74E-02	G
EU-154	1.6206E-02						
		123.10	1.621E-02	%(P	1.107E-01	3.30E-02	G K
		1274.80	4.378E-02	%	1.543E-01	4.46E-02	G
		723.30	6.963E-03	& P	4.232E-01	1.22E-01	G
		1004.80	0.000E+00	%	3.962E-01	1.10E-01	G
EU-155	7.7958E-02						
		86.45	7.796E-02	%(P	2.623E-01	7.89E-02	G K
		105.31	8.801E-02	%	2.427E-01	7.32E-02	G

```
HG-203      -1.2343E-02
                279.17-1.234E-02 &(P 5.203E-02 1.54E-02 G K
                 72.87 2.380E-02 %   1.440E+00 4.25E-01 G
                 70.83-1.810E+00 %   4.057E+00 1.23E+00 G
                 82.50-8.964E-01 %   4.353E+00 1.31E+00 G

TL-208      2.2798E-01
                583.14 2.280E-01  (P 6.222E-02 3.02E-02 G
                510.72 4.478E-01 +   1.853E-01 7.69E-02 G

PB-212      6.2682E-01
                238.63 6.130E-01  (  1.011E-01 4.07E-02 G K
                                     Energy duplication
                 77.11 6.609E-01 @(  5.819E-01 1.81E-01 G
                 74.81 6.238E-01 & P 1.163E+00 3.53E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.9762E-01						
		351.99	3.943E-01	*(P	9.531E-02	3.96E-02	G K
		295.22	4.041E-01	(	2.138E-01	7.23E-02	G
					Energy duplication		
		77.11	1.081E+00	+	9.516E-01	2.96E-01	G
		241.92	1.843E-01	%	7.358E-01	2.20E-01	G
BI-212	6.0419E-01						
		727.17	6.042E-01	(	4.548E-01	1.88E-01	G K
		1620.56	-1.684E-01	& P	1.865E+00	4.78E-01	G
		785.42	1.389E+00	% P	2.199E+00	6.89E-01	G
BI-214	4.1318E-01						
		609.32	4.132E-01	(	9.731E-02	4.84E-02	G K
		1764.51	1.372E-01	% P	2.650E-01	8.27E-02	G
		1120.28	2.804E-01	%	4.586E-01	1.43E-01	G
RA-224	7.7784E-01						
		241.00	7.778E-01	%(P	1.299E+00	3.96E-01	G
RA-226	7.6867E-01						
		185.99	7.687E-01	%(P	1.266E+00	3.86E-01	G
AC-228	7.9532E-01						
		911.07	8.047E-01	@(P	1.704E-01	9.35E-02	G K
		968.90	1.293E+00	+ P	3.349E-01	1.85E-01	G
		338.40	7.727E-01	@(	3.653E-01	1.54E-01	G
TH-227	-2.7636E-01						
		236.00	-2.764E-01	&(P	4.762E-01	1.45E-01	G K

256.25 5.638E-02 & 5.806E-01 1.71E-01 G

PA-234 -7.8799E-02

98.44-7.880E-02 %(2.218E-01 6.68E-02 G K

946.00-5.305E-02 % 3.297E-01 9.47E-02 G

131.28-2.780E-03 & 2.381E-01 7.05E-02 G

94.67 8.625E-03 % 4.390E-01 1.30E-01 G

883.24-3.017E-02 % 4.275E-01 1.19E-01 G

926.70 3.068E-02 & 4.208E-01 1.16E-01 G

569.26-7.582E-03 & 4.267E-01 1.20E-01 G

TH-234 1.1183E+00

63.29 1.118E+00 &(P 4.676E+00 1.40E+00 G K

92.80 1.422E+00 % 2.334E+00 7.12E-01 G

92.38-7.058E-02 % P 2.851E+00 8.47E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	3.1588E-02						
		59.54	3.159E-02	%(	7.140E-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

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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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	-1.3424E-02	-1.3987E-02	3.7114E-01	3.7115E-01	4.170E-01
K-40	1.0949E+01	1.0949E+01	1.6614E+00	1.7713E+00	
MN-54 #A	-9.3684E-04	-9.4344E-04	1.1079E-01	1.1079E-01	5.604E-02
CO-57 #B	5.5642E-04	5.6096E-04	4.8388E-02	4.8388E-02	5.410E-02
CO-60 #B	-2.0667E-04	-2.0691E-04	8.4198E-03	8.4198E-03	6.669E-02
Sr-85 #A	-1.3819E-02	-1.4295E-02	5.2094E-02	5.2101E-02	5.684E-02
Kr-85 #A	-3.0946E+02	-3.0946E+02	1.1606E+03	1.1607E+03	1.311E+03
Y-88 #B	-2.3147E-05	-2.3628E-05	1.4177E-04	1.4177E-04	2.599E-02
NB-94 #B	2.9771E-04	2.9771E-04	4.2467E-02	4.2467E-02	5.158E-02
Ag-108M#B	-1.5966E-02	-1.5967E-02	5.2201E-02	5.2209E-02	5.934E-02
CD-109 #A	3.1378E-01	3.1530E-01	1.8877E+00	1.8878E+00	2.095E+00

SN-113 #B	5.9108E-03	6.0245E-03	5.4737E-02	5.4738E-02	6.190E-02
SB-125 #B	4.4039E-02	4.4135E-02	1.0656E-01	1.0658E-01	1.192E-01
I-131 #B	-2.0193E-05	-2.6524E-05	5.5133E-02	5.5133E-02	4.878E-02
CS-134 #B	-1.9798E-02	-1.9856E-02	4.9823E-02	4.9836E-02	5.550E-02
CS-137 #A	3.1404E-02	3.1410E-02	6.0250E-02	6.0276E-02	6.623E-02
CE-139 #A	-1.8230E-02	-1.8523E-02	4.6744E-02	4.6756E-02	4.963E-02
EU-152 #B	1.8439E-03	1.8448E-03	1.3681E-01	1.3681E-01	1.543E-01
EU-154 #B	1.6195E-02	1.6206E-02	9.8912E-02	9.8916E-02	1.107E-01
EU-155 #B	7.7863E-02	7.7958E-02	2.3664E-01	2.3668E-01	2.620E-01
HG-203 #B	-1.1776E-02	-1.2343E-02	4.6910E-02	4.6915E-02	4.964E-02
TL-208	2.2798E-01	2.2798E-01	9.0672E-02	9.1570E-02	
PB-212 #	6.2682E-01	6.2682E-01	1.2475E-01	1.2961E-01	1.011E-01
PB-214 #	3.9762E-01	3.9762E-01	1.1968E-01	1.2174E-01	9.531E-02
BI-212	6.0419E-01	6.0419E-01	5.6524E-01	5.6625E-01	
BI-214	4.1318E-01	4.1318E-01	1.4504E-01	1.4689E-01	
RA-224 #A	7.7784E-01	7.7784E-01	1.1890E+00	1.1898E+00	1.299E+00
RA-226 #A	7.6866E-01	7.6867E-01	1.1576E+00	1.1584E+00	1.266E+00
AC-228 #	7.9532E-01	7.9532E-01	2.7565E-01	2.7924E-01	
TH-227 #B	-2.7636E-01	-2.7636E-01	4.3979E-01	4.4007E-01	4.762E-01
PA-234 #B	-7.8799E-02	-7.8799E-02	2.0050E-01	2.0055E-01	2.218E-01
TH-234 #B	1.1183E+00	1.1183E+00	4.2068E+00	4.2073E+00	4.676E+00
AM-241 #A	3.1588E-02	3.1588E-02	6.3660E-01	6.3660E-01	7.140E-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) 1.2990130E+01 pCi/gm

Total Decayed Activity (50.2 to 1999.0 keV) 1.2990130E+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_30AUG2005_1604.An1

Sample description

FSS-NOL-06-01-003-FRC

Spectrum Filename: C:\GammaVision\Spectra\102F_30AUG2005_1604.An1

Acquisition information

Start time:	30-Aug-2005 16:04:44
Live time:	2000
Real time:	2019
Dead time:	0.92 %
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: 1.6490E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6490E+03) =
6.0643E+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	27-Aug-2005 12:10:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4210

***** 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	96.	26.83	1.10	8.868E-03	74.81	9.600	PBC<MDA	PB212
76.98	157.	17.13	1.10	9.489E-03				
76.98	157.	17.13	1.10	9.489E-03	77.11	17.500	7.694E-01	PB212
					77.11	10.700	1.258E+00	PB214
128.87	86.	31.90	0.86	1.714E-02				
185.95	93.	30.76	1.56	1.627E-02				
185.95	93.	30.76	1.56	1.627E-02	185.99	3.280	1.366E+00	RA226

209.77	62.	41.03	1.24	1.517E-02				
239.20	631.	6.30	1.16	1.378E-02	238.63	43.100	8.697E-01	PB212
270.05	106.	25.49	1.92	1.244E-02				
295.39	100.	14.77	1.25	1.146E-02	295.22	19.200	3.708E-01	PB214
300.26	43.	29.55	1.26	1.129E-02				
328.51	60.	31.48	1.15	1.035E-02				
338.62	161.	15.24	1.11	1.005E-02	338.40	12.010	1.091E+00	AC228
352.13	219.	10.88	1.12	9.675E-03	351.99	37.100	4.994E-01	PB214
463.01	74.	24.32	0.77	7.373E-03				
463.01	74.	24.32	0.77	7.373E-03	463.51	10.000	8.135E-01	SB125
511.27	102.	18.26	1.29	6.688E-03	510.72	22.500	5.549E-01	TL208
583.52	151.	11.20	1.42	5.886E-03	583.14	86.000	2.443E-01	TL208
609.72	126.	12.60	1.19	5.646E-03	609.32	46.090	3.966E-01	BI214
728.19	43.	25.58	1.54	4.788E-03	727.17	11.800	6.229E-01	BI212
795.71	22.	35.98	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
911.66	118.	11.09	1.65	3.920E-03	911.07	29.000	8.479E-01	AC228
968.48	74.	17.01	2.12	3.718E-03	968.90	17.460	9.300E-01	AC228
1461.58	442.	4.81	2.03	2.619E-03	1460.75	10.700	1.292E+01	K40
1765.82	21.	21.82	1.50	2.225E-03	1764.51	15.920	4.838E-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	
149.43	74.88	280.	96.	0.048	80.48	1.098	BI-207	D
153.53	76.93	282.	157.	0.078	51.39	1.100	PB-214	D

YAEC Chemistry Lab Spectrum name: 102F_30AUG2005_1604.An1

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected
419.16	209.77	242.	62.	0.031	123.10	1.241	NP-239
539.74	270.05	196.	106.	0.053	76.47	1.920	AC-228 s
599.88	300.11	72.	34.	0.017	117.72	1.308	PB-212
656.68	328.51	104.	60.	0.030	94.43	1.154	RH-106M s
925.77	463.01	101.	46.	0.023	102.50	0.769	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	153.80	77.11	709.	130.	0.065	91.11	1.500D
PB-214	153.80	77.11	709.	130.	0.065	91.11	1.500D
RA-226	371.64	186.02	301.	85.	0.043	87.29	1.500s
PB-212	477.25	238.81	336.	498.	0.249	20.61	1.500s
PB-214	590.47	295.41	126.	95.	0.047	59.01	1.500s
AC-228	676.92	338.62	122.	161.	0.080	45.73	1.114s
PB-214	704.11	352.21	93.	176.	0.088	32.39	1.500
TL-208	1022.32	511.27	70.	102.	0.051	54.79	1.292s
TL-208	1166.87	583.52	49.	151.	0.075	33.60	1.418s
BI-214	1219.29	609.72	45.	126.	0.063	37.80	1.193
BI-212	1455.70	727.87	29.	29.	0.015	95.69	1.554
CS-134	1591.44	795.71	21.	22.	0.011	107.93	1.601

AC-228	1823.47	911.66	16.	118.	0.059	33.28	1.645s
AC-228	1937.17	968.48	25.	74.	0.037	51.03	2.124s
K-40	2924.07	1461.58	4.	442.	0.221	14.42	2.032
Bl-214	3533.10	1765.82	0.	21.	0.010	65.47	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 -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm	pCi/gm	COMMENTS

BE-7 -2.8450E-03

477.56-2.845E-03 %(4.496E-01 1.27E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	1.2924E+01						
		1460.75	1.292E+01	(P	3.430E-01	6.22E-01	G
MN-54	1.4825E-03						
		834.81	1.483E-03	%(P	5.308E-02	1.46E-02	G
CO-57	-1.0404E-03						
		122.07	-1.040E-03	&(	5.934E-02	1.76E-02	G K
		136.43	-8.518E-02	&	4.678E-01	1.40E-01	G
CO-60	-3.2934E-03						
		1332.51	-3.293E-03	%(P	6.085E-02	1.63E-02	G K
		1173.23	-2.049E-02	%	9.433E-02	2.75E-02	G K
Sr-85	-1.0326E-02						
		514.00	-1.033E-02	%(	6.144E-02	1.80E-02	G
Kr-85	-2.3164E+02						
		513.99	-2.316E+02	%(	1.371E+03	4.01E+02	G
Y-88	-4.2975E-03						
		1836.01	-4.297E-03	%(P	4.832E-02	1.21E-02	G K
		898.02	-7.703E-03	& P	6.346E-02	1.76E-02	G
NB-94	1.7395E-02						
		871.10	1.740E-02	%(	4.420E-02	1.32E-02	G K
		702.50	1.367E-02	&	5.247E-02	1.53E-02	G K
Ag-108M	1.9256E-02						
		722.95	1.926E-02	%(	4.786E-02	1.43E-02	G K

614.37-1.933E-02 % P 5.943E-02 1.76E-02 G
433.93 8.515E-03 % 4.313E-02 1.25E-02 G

CD-109 -1.7598E-01
88.04-1.760E-01 %(P 2.380E+00 7.09E-01 G

SN-113 -1.0141E-02
391.71-1.014E-02 %(6.748E-02 1.96E-02 G K
255.04 3.640E-01 & 1.925E+00 5.69E-01 G

SB-125 1.4884E-02
427.95 1.488E-02 %(P 1.426E-01 4.09E-02 G K
600.77 5.078E-02 & P 2.742E-01 7.93E-02 G
636.15-8.886E-03 % P 3.818E-01 1.05E-01 G
463.51 2.996E-01 % P 4.053E-01 1.27E-01 G
176.29-2.628E-01 % P 7.618E-01 2.28E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	4.2959E-03						
		364.48	4.296E-03	&(	5.454E-02	1.56E-02	G K
		636.97	3.456E-04	%	6.668E-01	1.80E-01	G
		284.29	2.294E-01	&	8.782E-01	2.61E-01	G
CS-134	1.8676E-02						
		604.66	-7.278E-03	%(	5.710E-02	1.64E-02	G K
		795.76	4.834E-02	(	5.217E-02	1.74E-02	G
		569.29	-3.013E-02	&	2.673E-01	7.56E-02	G
		801.84	-5.097E-02	% P	5.991E-01	1.67E-01	G
CS-137	-1.9846E-03						
		661.62	-1.985E-03	%(	5.558E-02	1.55E-02	G
CE-139	8.6889E-03						
		165.85	8.689E-03	&(P	5.574E-02	1.66E-02	G
EU-152	-2.0496E-03						
		121.78	-2.050E-03	&(P	1.662E-01	4.90E-02	G K
		344.30	-3.342E-02	%	1.517E-01	4.47E-02	G
		1408.08	-5.892E-02	%	3.465E-01	9.78E-02	G
		964.00	-4.217E-03	% P	5.681E-01	1.60E-01	G
		1112.07	-3.665E-02	%	4.753E-01	1.32E-01	G
		778.90	-2.394E-02	% P	4.264E-01	1.19E-01	G
EU-154	7.4320E-03						
		123.10	7.432E-03	%(P	1.273E-01	3.78E-02	G K
		1274.80	0.000E+00	%	1.741E-01	4.64E-02	G
		723.30	1.114E-01	& P	1.918E-01	5.96E-02	G
		1004.80	0.000E+00	&	3.800E-01	1.05E-01	G

```
EU-155       1.0576E-01
                  86.45 1.058E-01 &(P 2.734E-01 8.25E-02 G K
                 105.31 3.474E-02 &   2.443E-01 7.27E-02 G

HG-203       2.4886E-02
                 279.17 2.489E-02 &(P 4.992E-02 1.52E-02 G K
                  72.87-6.808E-01 &   2.344E+00 7.06E-01 G
                  70.83 2.171E-02 &   3.904E+00 1.16E+00 G
                  82.50-3.424E-01 &   4.414E+00 1.32E+00 G

TL-208       2.4428E-01
                 583.14 2.443E-01  (P 5.716E-02 2.74E-02 G
                 510.72 5.549E-01 +   2.269E-01 1.01E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	6.7141E-01						
		238.63	6.859E-01	@(	1.214E-01	4.71E-02	G K
					Energy duplication		
		77.11	6.358E-01	(	6.223E-01	1.93E-01	G
		74.81	8.398E-01	& P	1.246E+00	3.81E-01	G
PB-214	3.8460E-01						
		351.99	4.012E-01	(P	1.089E-01	4.34E-02	G K
		295.22	3.524E-01	(	2.049E-01	6.93E-02	G
					Energy duplication		
		77.11	1.040E+00	+	1.018E+00	3.16E-01	G
		241.92	1.242E-01	%	8.077E-01	2.41E-01	G
BI-212	4.2583E-01						
		727.17	4.258E-01	(	4.044E-01	1.36E-01	G K
		1620.56	3.693E-01	% P	1.824E+00	4.94E-01	G
		785.42	-1.857E-01	& P	3.365E+00	9.54E-01	G
BI-214	4.1895E-01						
		609.32	3.966E-01	(	1.069E-01	5.00E-02	G K
		1764.51	4.838E-01	(P	1.705E-01	1.06E-01	G
		1120.28	-1.296E-01	&	6.073E-01	1.77E-01	G
RA-224	5.4435E-01						
		241.00	5.443E-01	%(P	1.493E+00	4.50E-01	G
RA-226	1.3099E+00						
		185.99	1.310E+00	(P	1.282E+00	4.01E-01	G
AC-228	9.2225E-01						

```
                911.07 8.479E-01 @(P 1.552E-01 9.43E-02 G K
                968.90 9.300E-01 *(P 3.303E-01 1.58E-01 G
                338.40 1.091E+00 *(  3.678E-01 1.66E-01 G

TH-227      -3.1153E-01
                236.00-3.115E-01 %(P 5.759E-01 1.75E-01 G K
                256.25-1.373E-01 %   6.676E-01 1.98E-01 G

PA-234      -1.0266E-01
                 98.44-1.027E-01 %(  2.369E-01 7.17E-02 G K
                946.00 1.580E-02 %   2.942E-01 8.14E-02 G
                131.28-1.177E-01 %   2.716E-01 8.22E-02 G
                 94.67-1.701E-01 %   4.873E-01 1.47E-01 G
                883.24-6.349E-03 %   5.100E-01 1.41E-01 G
                926.70 7.183E-02 &   4.010E-01 1.12E-01 G
                569.26-4.456E-02 &   3.954E-01 1.12E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	1.5818E+00						
		63.29	1.582E+00	%(	P	4.913E+00	1.48E+00 G K
		92.80	1.492E+00	%		2.574E+00	7.84E-01 G
		92.38	1.745E+00	&	P	3.076E+00	9.36E-01 G
AM-241	2.5609E-02						
		59.54	2.561E-02	&(		7.393E-01	2.19E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-2.7306E-03	-2.8450E-03	3.8110E-01	3.8110E-01	4.315E-01
K-40		1.2924E+01	1.2924E+01	1.8649E+00	2.0010E+00	
MN-54	#A	1.4721E-03	1.4825E-03	4.3735E-02	4.3735E-02	5.271E-02
CO-57	#B	-1.0319E-03	-1.0404E-03	5.2665E-02	5.2665E-02	5.886E-02
CO-60	#B	-3.2897E-03	-3.2934E-03	5.6144E-02	5.6144E-02	6.078E-02
Sr-85	#A	-9.9831E-03	-1.0326E-02	5.3887E-02	5.3890E-02	5.940E-02

Kr-85	#A	-2.3164E+02	-2.3164E+02	1.2030E+03	1.2031E+03	1.371E+03
Y-88	#B	-4.2100E-03	-4.2975E-03	3.6867E-02	3.6867E-02	4.734E-02
NB-94	#B	1.7395E-02	1.7395E-02	3.9489E-02	3.9502E-02	4.420E-02
Ag-108M	#B	1.9255E-02	1.9256E-02	4.2912E-02	4.2925E-02	4.785E-02
CD-109	#A	-1.7513E-01	-1.7598E-01	2.8691E+00	2.8691E+00	2.369E+00
SN-113	#B	-9.9493E-03	-1.0141E-02	5.8916E-02	5.8919E-02	6.621E-02
SB-125	#B	1.4852E-02	1.4884E-02	1.2271E-01	1.2272E-01	1.423E-01
I-131	#B	3.2706E-03	4.2959E-03	4.6750E-02	4.6751E-02	4.152E-02
CS-134	#B	1.8622E-02	1.8676E-02	2.0158E-02	2.0185E-02	5.693E-02
CS-137	#A	-1.9842E-03	-1.9846E-03	4.6390E-02	4.6390E-02	5.557E-02
CE-139	#A	8.5515E-03	8.6889E-03	4.9707E-02	4.9709E-02	5.486E-02
EU-152	#B	-2.0486E-03	-2.0496E-03	8.8077E-01	8.8077E-01	1.662E-01
EU-154	#B	7.4267E-03	7.4320E-03	1.1327E-01	1.1327E-01	1.272E-01
EU-155	#B	1.0563E-01	1.0576E-01	2.4753E-01	2.4760E-01	2.731E-01
HG-203	#B	2.3742E-02	2.4886E-02	4.5488E-02	4.5509E-02	4.762E-02
TL-208	#	2.4428E-01	2.4428E-01	8.2293E-02	8.3427E-02	
PB-212	#	6.7141E-01	6.7141E-01	1.3839E-01	1.4343E-01	1.214E-01
PB-214	#	3.8460E-01	3.8460E-01	1.2484E-01	1.2669E-01	1.089E-01
BI-212	#	4.2583E-01	4.2583E-01	4.0746E-01	4.0816E-01	4.044E-01
BI-214		4.1895E-01	4.1895E-01	1.5835E-01	1.6009E-01	
RA-224	#A	5.4435E-01	5.4435E-01	1.3490E+00	1.3493E+00	1.493E+00
RA-226	#	1.3099E+00	1.3099E+00	1.2033E+00	1.2055E+00	1.282E+00
AC-228	#	9.2225E-01	9.2225E-01	2.3432E-01	2.3996E-01	
TH-227	#B	-3.1153E-01	-3.1153E-01	5.3041E-01	5.3070E-01	5.759E-01
PA-234	#B	-1.0266E-01	-1.0266E-01	2.1500E-01	2.1508E-01	2.369E-01
TH-234	#B	1.5818E+00	1.5818E+00	4.4354E+00	4.4363E+00	4.913E+00
AM-241	#A	2.5608E-02	2.5609E-02	6.5819E-01	6.5819E-01	7.393E-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 (87.2 to 1999.0 keV) 1.4509697E+01 pCi/gm

Total Decayed Activity (87.2 to 1999.0 keV) 1.4509697E+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_30AUG2005_1641.An1

Sample description

FSS-NOL-06-01-008-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30AUG2005_1641.An1

Acquisition information

Start time:	30-Aug-2005 16:41:51
Live time:	2000
Real time:	2017
Dead time:	0.83 %
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: 1.7030E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7030E+03) =
5.8720E+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	27-Aug-2005 11:50:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2616

***** 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
76.19	218.	18.19	0.95	9.268E-03				
76.19	218.	18.19	0.95	9.268E-03	77.11	10.700	1.698E+00	PB214
					77.11	17.500	1.038E+00	PB212
93.14	86.	41.02	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.712E+00	TH234
185.31	68.	33.18	1.58	1.630E-02				
185.31	68.	33.18	1.58	1.630E-02	185.99	3.280	PBC<MDA	RA226

209.16	53.	33.91	0.90	1.520E-02				
239.24	611.	6.83	1.13	1.378E-02	238.63	43.100	8.154E-01	PB212
295.08	131.	16.49	1.10	1.147E-02				
295.08	131.	16.49	1.10	1.147E-02	295.22	19.200	4.726E-01	PB214
338.78	116.	17.96	1.18	1.005E-02	338.40	12.010	7.619E-01	AC228
352.24	199.	10.95	1.49	9.672E-03	351.99	37.100	4.389E-01	PB214
463.23	48.	36.71	1.02	7.369E-03				
463.23	48.	36.71	1.02	7.369E-03	463.51	10.000	5.016E-01	SB125
511.01	87.	18.61	2.03	6.695E-03	510.72	22.500	4.583E-01	TL208
583.42	171.	10.44	1.50	5.887E-03	583.14	86.000	2.669E-01	TL208
609.54	145.	11.71	1.49	5.647E-03	609.32	46.090	4.428E-01	BI214
661.89	54.	29.21	0.82	5.229E-03	661.62	84.620	9.595E-02	CS137
911.93	78.	14.19	1.28	3.919E-03	911.07	29.000	5.412E-01	AC228
968.73	81.	15.34	1.31	3.718E-03	968.90	17.460	9.946E-01	AC228
1120.32	40.	24.17	0.73	3.283E-03	1120.28	15.040	6.412E-01	BI214
1461.51	367.	5.22	2.22	2.620E-03	1460.75	10.700	1.038E+01	K40
1764.99	28.	18.90	1.12	2.225E-03	1764.51	15.920	6.252E-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
417.93	209.16	135.	53.	0.026	101.73	0.897	AC-228

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected
478.11	239.24	800.	126.	0.063	99.20	1.130	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-214	153.80	77.11	650.	137.	0.068	83.04	1.500D
PB-212	153.80	77.11	650.	137.	0.068	83.04	1.500D
TH-234	185.87	93.14	583.	86.	0.043	123.07	1.500s
RA-226	371.47	185.93	246.	62.	0.031	106.27	1.500s
PB-212	477.28	238.83	304.	424.	0.212	22.72	1.500
PB-214	590.59	295.47	116.	99.	0.050	55.05	1.500
AC-228	677.23	338.78	106.	116.	0.058	53.88	1.183
PB-214	703.90	352.11	91.	174.	0.087	32.39	1.500s
SB-125	926.05	463.15	48.	27.	0.013	118.08	1.500
TL-208	1021.81	511.01	50.	87.	0.043	55.82	2.034s
TL-208	1166.67	583.42	44.	170.	0.085	31.31	1.498
BI-214	1218.93	609.54	44.	145.	0.073	35.13	1.492
CS-137	1323.68	661.89	46.	54.	0.027	87.62	0.822s
AC-228	1824.00	911.93	15.	78.	0.039	42.57	1.281
AC-228	1937.66	968.73	20.	81.	0.041	46.01	1.309
BI-214	2241.03	1120.32	16.	40.	0.020	72.52	0.734s

K-40	2923.92	1461.51	0.	367.	0.183	15.66	2.217
Bl-214	3531.44	1764.99	0.	28.	0.014	56.69	1.124s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

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

BE-7 -5.9613E-02

477.56-5.961E-02 &(4.176E-01 1.20E-01 G

K-40 1.0381E+01

1460.75 1.038E+01 (P 2.086E-01 5.42E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	-4.0266E-04						
		834.81	-4.027E-04	&(P	5.823E-02	1.61E-02	G
CO-57	-4.5366E-03						
		122.07	-4.537E-03	%(	5.159E-02	1.53E-02	G K
		136.43	2.114E-01	&	3.703E-01	1.13E-01	G
CO-60	6.4351E-03						
		1332.51	6.435E-03	&(P	5.352E-02	1.45E-02	G K
		1173.23	5.647E-03	&	6.360E-02	1.76E-02	G K
Sr-85	-1.0754E-02						
		514.00	-1.075E-02	%(	5.706E-02	1.67E-02	G
Kr-85	-2.4071E+02						
		513.99	-2.407E+02	%(	1.273E+03	3.73E+02	G
Y-88	3.7071E-04						
		1836.01	3.707E-04	%(P	4.839E-02	1.16E-02	G K
		898.02	-1.315E-02	& P	6.918E-02	1.97E-02	G
NB-94	-3.7587E-03						
		871.10	-3.759E-03	%(	5.325E-02	1.48E-02	G K
		702.50	-8.854E-03	%	5.981E-02	1.72E-02	G K
Ag-108M	1.3960E-02						
		722.95	1.396E-02	&(	5.183E-02	1.51E-02	G K
		614.37	-1.778E-02	& P	5.715E-02	1.69E-02	G
		433.93	1.483E-02	%	3.225E-02	9.76E-03	G

CD-109 -1.7041E-01

88.04-1.704E-01 %(P 2.208E+00 6.57E-01 G

SN-113 1.1741E-02

391.71 1.174E-02 &(5.864E-02 1.71E-02 G K

255.04-3.086E-01 % 1.925E+00 5.68E-01 G

SB-125 4.2461E-02

427.95-3.991E-02 %(P 1.352E-01 3.95E-02 G K

600.77-1.054E-03 % P 3.403E-01 9.70E-02 G

636.15 9.942E-02 & P 3.070E-01 8.99E-02 G

463.51 2.863E-01 (P 3.797E-01 1.19E-01 G

176.29-1.872E-01 % P 6.334E-01 1.89E-01 G

I-131 9.3680E-04

364.48 9.368E-04 %(6.228E-02 1.78E-02 G K

636.97 6.212E-02 & 7.482E-01 2.09E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		284.29	-1.548E-02	%		7.779E-01	2.25E-01 G
CS-134	-7.9981E-05						
		604.66	-7.998E-05	%(		3.633E-02	9.85E-03 G K
		795.76	1.941E-02	%		5.945E-02	1.75E-02 G
		569.29	-2.807E-02	%		2.533E-01	7.15E-02 G
		801.84	-8.299E-02	%	P	5.495E-01	1.55E-01 G
CS-137	9.5954E-02						
		661.62	9.595E-02	@(		6.185E-02	2.80E-02 G
CE-139	-9.9257E-04						
		165.85	-9.926E-04	&(P		5.581E-02	1.65E-02 G
EU-152	-3.5527E-02						
		121.78	-3.553E-02	%(P		1.592E-01	4.75E-02 G K
		344.30	3.164E-03	%		1.541E-01	4.44E-02 G
		1408.08	5.323E-03	%		2.106E-01	5.32E-02 G
		964.00	2.046E-02	%	P	2.640E-01	6.99E-02 G
		1112.07	-4.692E-02	%		4.222E-01	1.17E-01 G
		778.90	-3.457E-02	%	P	3.117E-01	8.60E-02 G
EU-154	-3.0219E-02						
		123.10	-3.022E-02	%(P		1.173E-01	3.51E-02 G K
		1274.80	-2.441E-02	&		1.940E-01	5.44E-02 G
		723.30	6.368E-02	&	P	2.365E-01	6.87E-02 G
		1004.80	-3.530E-04	%		3.035E-01	8.18E-02 G
EU-155	9.5903E-02						
		86.45	9.590E-02	%(P		2.528E-01	7.62E-02 G K
		105.31	6.481E-03	%		2.428E-01	7.18E-02 G

```
HG-203       1.8484E-02
                 279.17 1.848E-02 &(P 4.742E-02 1.43E-02 G K
                  72.87-4.934E-01 &   2.191E+00 6.58E-01 G
                  70.83 4.858E-01 %   3.610E+00 1.08E+00 G
                  82.50-6.733E-01 %   3.997E+00 1.19E+00 G

TL-208       2.6693E-01
                 583.14 2.669E-01  (P 5.245E-02 2.79E-02 G
                 510.72 4.583E-01 +   1.879E-01 8.53E-02 G

PB-212       5.9011E-01
                 238.63 5.655E-01  (  1.119E-01 4.28E-02 G K
                                     Energy duplication
                  77.11 6.508E-01 @(  5.775E-01 1.80E-01 G
                  74.81 6.144E-01 & P 1.210E+00 3.67E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.7586E-01						
		351.99	3.853E-01	*(	P 1.042E-01	4.17E-02	G K
		295.22	3.577E-01	(	1.908E-01	6.56E-02	G
					Energy duplication		
		77.11	1.064E+00	+	9.445E-01	2.95E-01	G
		241.92	4.252E-01	%	6.896E-01	2.11E-01	G
BI-212	2.8710E-01						
		727.17	2.871E-01	%(	3.835E-01	1.23E-01	G K
		1620.56	5.629E-01	%	P 1.680E+00	4.81E-01	G
		785.42	3.139E-03	&	P 2.424E+00	6.63E-01	G
BI-214	4.4281E-01						
		609.32	4.428E-01	(	1.021E-01	5.19E-02	G K
		1764.51	6.252E-01	+	P 1.651E-01	1.19E-01	G
		1120.28	6.412E-01	+	3.440E-01	1.55E-01	G
RA-224	9.0031E-01						
		241.00	9.003E-01	%(	P 1.282E+00	3.94E-01	G
RA-226	9.1856E-01						
		185.99	9.186E-01	(	P 1.128E+00	3.49E-01	G
AC-228	6.0582E-01						
		911.07	5.412E-01	(	P 1.466E-01	7.71E-02	G K
		968.90	9.946E-01	+	P 2.855E-01	1.53E-01	G
		338.40	7.619E-01	(	3.329E-01	1.37E-01	G
TH-227	-2.6974E-01						
		236.00	-2.697E-01	%(	P 5.197E-01	1.58E-01	G K

256.25 1.365E-01 % 5.644E-01 1.68E-01 G

PA-234 -1.6353E-02

98.44-1.635E-02 %(2.389E-01 7.10E-02 G K

946.00-1.833E-02 & 2.837E-01 7.87E-02 G

131.28-4.905E-03 & 2.506E-01 7.42E-02 G

94.67-4.948E-02 % 4.396E-01 1.31E-01 G

883.24-2.897E-04 % 3.219E-01 8.42E-02 G

926.70-7.629E-03 % 4.487E-01 1.21E-01 G

569.26-4.683E-02 % 3.690E-01 1.04E-01 G

TH-234 1.2770E+00

63.29 9.425E-01 &(P 4.196E+00 1.25E+00 G K

92.80 1.712E+00 (2.287E+00 7.02E-01 G

92.38 1.873E+00 & P 2.766E+00 8.46E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	6.7119E-03						
		59.54	6.712E-03	&(	6.899E-01	2.04E-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	-5.7185E-02	-5.9613E-02	3.6091E-01	3.6093E-01	4.006E-01
K-40	1.0381E+01	1.0381E+01	1.6263E+00	1.7275E+00	
MN-54 #A	-3.9980E-04	-4.0266E-04	2.0574E-02	2.0574E-02	5.782E-02
CO-57 #B	-4.4994E-03	-4.5366E-03	4.5848E-02	4.5848E-02	5.117E-02
CO-60 #B	6.4277E-03	6.4351E-03	4.3643E-02	4.3644E-02	5.346E-02
Sr-85 #A	-1.0392E-02	-1.0754E-02	5.0095E-02	5.0099E-02	5.514E-02
Kr-85 #A	-2.4070E+02	-2.4071E+02	1.1176E+03	1.1177E+03	1.273E+03
Y-88 #B	3.6307E-04	3.7071E-04	3.4861E-02	3.4861E-02	4.739E-02
NB-94 #B	-3.7587E-03	-3.7587E-03	4.4431E-02	4.4432E-02	5.325E-02
Ag-108M#B	1.3960E-02	1.3960E-02	4.5298E-02	4.5305E-02	5.183E-02
CD-109 #A	-1.6958E-01	-1.7041E-01	2.6595E+00	2.6595E+00	2.197E+00

SN-113 #B	1.1517E-02	1.1741E-02	5.1326E-02	5.1330E-02	5.752E-02
SB-125 #B	4.2368E-02	4.2461E-02	5.3061E-02	5.3115E-02	1.349E-01
I-131 #B	7.1077E-04	9.3680E-04	5.3414E-02	5.3414E-02	4.725E-02
CS-134 #B	-7.9746E-05	-7.9981E-05	2.9556E-02	2.9556E-02	3.622E-02
CS-137 #	9.5935E-02	9.5954E-02	8.4074E-02	8.4246E-02	
CE-139 #A	-9.7668E-04	-9.9257E-04	8.4207E-02	8.4207E-02	5.492E-02
EU-152 #B	-3.5510E-02	-3.5527E-02	1.5437E-01	1.5438E-01	1.591E-01
EU-154 #B	-3.0197E-02	-3.0219E-02	1.0707E-01	1.0708E-01	1.172E-01
EU-155 #B	9.5786E-02	9.5903E-02	2.2871E-01	2.2877E-01	2.525E-01
HG-203 #B	1.7624E-02	1.8484E-02	4.2757E-02	4.2770E-02	4.521E-02
TL-208	2.6693E-01	2.6693E-01	8.3764E-02	8.5093E-02	
PB-212 #	5.9011E-01	5.9011E-01	1.3409E-01	1.3812E-01	1.119E-01
PB-214 #	3.7586E-01	3.7586E-01	1.2011E-01	1.2195E-01	1.042E-01
BI-212 #B	2.8710E-01	2.8710E-01	3.6766E-01	3.6801E-01	3.835E-01
BI-214	4.4281E-01	4.4281E-01	1.5556E-01	1.5754E-01	
RA-224 #A	9.0031E-01	9.0031E-01	1.1819E+00	1.1830E+00	1.282E+00
RA-226 #A	9.1856E-01	9.1856E-01	1.0466E+00	1.0479E+00	1.128E+00
AC-228	6.0582E-01	6.0582E-01	2.0823E-01	2.1099E-01	
TH-227 #B	-2.6974E-01	-2.6974E-01	4.7873E-01	4.7897E-01	5.197E-01
PA-234 #B	-1.6353E-02	-1.6353E-02	2.1286E-01	2.1286E-01	2.389E-01
TH-234 #B	1.2770E+00	1.2770E+00	1.5716E+00	1.5732E+00	4.196E+00
AM-241 #A	6.7118E-03	6.7119E-03	6.1287E-01	6.1287E-01	6.899E-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) 1.1792284E+01 pCi/gm

Total Decayed Activity (50.2 to 1999.0 keV) 1.1792303E+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_30AUG2005_1718.An1

Sample description

FSS-NOL-06-01-002-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30AUG2005_1718.An1

Acquisition information

Start time:	30-Aug-2005 17:18:50
Live time:	2000
Real time:	2020
Dead time:	0.98 %
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: 1.6660E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6660E+03) =
6.0024E+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	27-Aug-2005 12:15:00
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: 0.2721

***** 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	109.	38.11	1.50	8.847E-03				
74.75	109.	38.11	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.07	191.	21.39	1.50	9.541E-03	77.11	10.700	1.516E+00	PB214
					77.11	17.500	9.267E-01	PB212
77.07	191.	21.39	1.50	9.541E-03	77.11	10.700	1.516E+00	PB214
					77.11	17.500	9.267E-01	PB212
93.05	100.	39.53	0.66	1.338E-02	92.38	2.570	PBC<MDA	TH234

					92.80	3.000	2.032E+00	TH234
109.34	71.	37.05	0.85	1.579E-02				
185.67	105.	29.79	1.66	1.628E-02				
185.67	105.	29.79	1.66	1.628E-02	185.99	3.280	1.529E+00	RA226
209.54	91.	26.57	1.26	1.518E-02				
238.82	643.	4.58	1.21	1.380E-02	238.63	43.100	8.772E-01	PB212
238.86	470.	6.76	1.50	1.365E-02	238.63	43.100	6.402E-01	PB212
241.68	80.	24.92	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
269.91	102.	24.13	1.50	1.244E-02				
277.15	46.	36.00	0.77	1.215E-02				
295.37	103.	16.22	1.23	1.146E-02	295.22	19.200	3.795E-01	PB214
328.36	40.	37.48	1.60	1.036E-02				
338.67	162.	18.42	1.12	1.005E-02	338.40	12.010	1.089E+00	AC228
352.06	228.	11.01	1.39	9.677E-03	351.99	37.100	5.142E-01	PB214
511.41	129.	15.02	1.37	6.686E-03	510.72	22.500	6.925E-01	TL208
583.61	199.	8.53	1.53	5.885E-03	583.14	86.000	3.174E-01	TL208
609.42	145.	12.66	1.66	5.648E-03	609.32	46.090	4.517E-01	BI214
662.04	69.	22.64	1.47	5.226E-03	661.62	84.620	1.265E-01	CS137
728.12	50.	31.14	1.62	4.794E-03	727.17	11.800	7.169E-01	BI212
911.85	147.	10.80	1.41	3.919E-03	911.07	29.000	1.047E+00	AC228
968.97	89.	19.52	1.49	3.718E-03	968.90	17.460	1.112E+00	AC228
1120.78	43.	28.78	1.45	3.283E-03	1120.28	15.040	7.064E-01	BI214
1173.76	81.	21.70	1.08	3.156E-03	1173.23	99.860	2.087E-01	CO60
1333.07	48.	21.72	1.07	2.833E-03	1332.51	99.980	1.368E-01	CO60
1461.56	490.	4.60	2.06	2.620E-03	1460.75	10.700	1.416E+01	K40
1765.61	28.	18.90	1.33	2.224E-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	
185.69	93.05	612.	100.	0.050	118.58	0.661	TH-234	l
418.70	209.54	223.	91.	0.045	79.70	1.259	AC-228	s
477.27	238.83	112.	643.	0.322	13.74	1.215	PB-212	D
482.99	241.68	160.	80.	0.040	74.77	1.217	PB-214	D
539.46	269.91	180.	102.	0.051	72.40	1.497	AC-228	s
656.38	328.36	88.	40.	0.020	112.45	1.600	RH-106M	s
677.02	338.67	295.	70.	0.035	109.94	1.121	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	74.75	862.	109.	0.055	114.33	1.500s
PB-214	153.80	77.11	737.	191.	0.095	64.18	1.500D
PB-212	153.80	77.11	737.	191.	0.095	64.18	1.500D
RA-226	371.94	186.17	348.	95.	0.047	84.84	1.500s
PB-212	477.27	238.82	287.	558.	0.279	18.10	1.500s

PB-214	477.35	238.86	270.	470.	0.235	20.29	1.500s
PB-214	590.49	295.42	146.	111.	0.056	54.28	1.500
AC-228	677.12	338.72	169.	92.	0.046	67.60	1.500s
PB-214	704.12	352.22	118.	198.	0.099	31.52	1.500s
TL-208	1022.60	511.41	64.	129.	0.064	45.07	1.369s
TL-208	1167.05	583.61	31.	198.	0.099	25.58	1.533
BI-214	1218.69	609.42	64.	145.	0.072	37.98	1.659
CS-137	1323.97	662.04	50.	69.	0.034	67.92	1.470s
BI-212	1456.19	728.12	55.	50.	0.025	93.43	1.623s
AC-228	1823.80	911.83	25.	127.	0.063	31.42	1.679
AC-228	1938.96	969.38	44.	64.	0.032	57.65	1.718s
BI-214	2241.96	1120.78	38.	43.	0.022	86.35	1.451
CO-60	2347.98	1173.76	57.	81.	0.041	65.11	1.075s
CO-60	2666.84	1333.07	16.	48.	0.024	65.15	1.074s
K-40	2924.04	1461.56	5.	490.	0.245	13.81	2.063
BI-214	3532.16	1765.35	6.	12.	0.006	121.25	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		7.6122E-02					
			477.56	7.612E-02	%(	3.620E-01	1.05E-01 G
K-40		1.4163E+01					
			1460.75	1.416E+01	(P	3.902E-01	6.53E-01 G
MN-54		1.2705E-03					
			834.81	1.270E-03	%(P	6.233E-02	1.74E-02 G
CO-57		-1.8648E-04					
			122.07	-1.865E-04	&(	6.102E-02	1.81E-02 G K
			136.43	-1.486E-02	&	4.975E-01	1.48E-01 G
CO-60		1.7270E-01					
			1332.51	1.368E-01	(P	6.166E-02	2.98E-02 G K
			1173.23	2.087E-01	(	9.761E-02	4.53E-02 G K
Sr-85		9.9791E-05					
			514.00	9.979E-05	&(	5.710E-02	1.63E-02 G
Kr-85		4.5542E+00					
			513.99	4.554E+00	&(	1.274E+03	3.63E+02 G
Y-88		8.6334E-03					
			1836.01	8.633E-03	&(P	5.246E-02	1.40E-02 G K

898.02-1.060E-02 % P 6.835E-02 1.93E-02 G

NB-94 1.6562E-02

871.10 1.656E-02 %(5.109E-02 1.50E-02 G K

702.50 1.708E-02 % 4.988E-02 1.48E-02 G K

Ag-108M 1.0500E-02

722.95 1.050E-02 &(5.889E-02 1.69E-02 G K

614.37-6.870E-04 % P 5.272E-02 1.47E-02 G

433.93 6.239E-03 % 4.986E-02 1.44E-02 G

CD-109 -6.0711E-01

88.04-6.071E-01 &(P 2.311E+00 6.94E-01 G

SN-113 -1.0926E-02

391.71-1.093E-02 %(7.874E-02 2.30E-02 G K

255.04 3.254E-02 & 2.176E+00 6.36E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	3.7609E-02						
		427.95	3.761E-02	&(P	1.595E-01	4.68E-02	G K
		600.77	-6.165E-03	& P	2.938E-01	8.29E-02	G
		636.15	-7.831E-02	% P	4.868E-01	1.40E-01	G
		463.51	3.479E-01	% P	5.132E-01	1.59E-01	G
		176.29	5.086E-02	& P	7.142E-01	2.11E-01	G
I-131	1.9134E-02						
		364.48	1.913E-02	&(	7.204E-02	2.13E-02	G K
		636.97	-9.768E-02	%	9.389E-01	2.68E-01	G
		284.29	-2.388E-01	%	9.549E-01	2.84E-01	G
CS-134	-6.6194E-03						
		604.66	-6.619E-03	%(	6.777E-02	1.96E-02	G K
		795.76	3.106E-02	%	6.530E-02	1.98E-02	G
		569.29	2.860E-03	&	3.471E-01	9.83E-02	G
		801.84	-6.815E-02	& P	6.895E-01	1.95E-01	G
CS-137	1.2650E-01						
		661.62	1.265E-01	(	6.538E-02	2.87E-02	G
CE-139	-9.0422E-03						
		165.85	-9.042E-03	&(P	5.947E-02	1.77E-02	G
EU-152	-5.4336E-02						
		121.78	-5.434E-02	&(P	1.739E-01	5.22E-02	G K
		344.30	-5.576E-03	%	1.433E-01	4.12E-02	G
		1408.08	4.824E-02	&	2.310E-01	6.40E-02	G
		964.00	-4.419E-02	& P	5.228E-01	1.48E-01	G
		1112.07	1.220E-01	%	5.626E-01	1.63E-01	G

778.90-4.968E-02 % P 4.701E-01 1.34E-01 G

EU-154 -8.5649E-03

123.10-8.565E-03 %(P 1.267E-01 3.76E-02 G K

1274.80-1.767E-02 % 2.105E-01 5.87E-02 G

723.30-3.463E-03 & P 3.473E-01 9.83E-02 G

1004.80-2.832E-02 & 3.872E-01 1.09E-01 G

EU-155 1.7640E-01

86.45 1.764E-01 %(P 2.835E-01 8.64E-02 G K

105.31-5.917E-02 % 2.755E-01 8.25E-02 G

HG-203 -1.2965E-02

279.17-1.297E-02 %(P 5.787E-02 1.72E-02 G K

72.87-1.147E+00 % 2.480E+00 7.52E-01 G

70.83-2.510E+00 & 4.335E+00 1.32E+00 G

82.50-1.467E-01 % 4.990E+00 1.49E+00 G

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

TL-208       3.1737E-01
                   583.14 3.174E-01  (P 4.576E-02 2.71E-02 G
                   510.72 6.925E-01 +   2.160E-01 1.04E-01 G

PB-212       7.6043E-01
                   238.63 7.604E-01 @(  1.114E-01 4.59E-02 G K
                                        Energy duplication
                    77.11 9.267E-01 +   6.279E-01 1.98E-01 G
                    74.81 1.043E+00 & P 1.332E+00 4.09E-01 G

PB-214       4.3415E-01
                   351.99 4.471E-01  (P 1.206E-01 4.71E-02 G K
                   295.22 4.092E-01  (  2.177E-01 7.40E-02 G
                                        Energy duplication
                    77.11 1.516E+00 +   1.027E+00 3.24E-01 G
                   241.92 3.735E+00 +   6.302E-01 2.53E-01 G

BI-212       7.1693E-01
                   727.17 7.169E-01  (  5.344E-01 2.24E-01 G K
                  1620.56 4.859E-01 % P 1.608E+00 4.52E-01 G
                   785.42 1.360E+00 % P 2.642E+00 8.08E-01 G

BI-214       4.5171E-01
                   609.32 4.517E-01  (  1.246E-01 5.72E-02 G K
                  1764.51 2.727E-01 - P 3.199E-01 1.11E-01 G
                  1120.28 7.064E-01 +   5.164E-01 2.03E-01 G

RA-224       8.2314E-01
                   241.00 8.231E-01 %(P 1.405E+00 4.28E-01 G
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RA-226       1.4393E+00
                 185.99 1.439E+00  (P 1.363E+00 4.26E-01 G

AC-228       8.6629E-01
                 911.07 9.038E-01  (P 1.861E-01 9.48E-02 G K
                 968.90 8.040E-01 @(P 4.217E-01 1.55E-01 G
                 338.40 6.183E-01 -   4.253E-01 1.39E-01 G

TH-227      -2.6040E-01
                 236.00-2.604E-01 %(P 5.782E-01 1.75E-01 G K
                 256.25 1.640E-01 %   6.404E-01 1.91E-01 G

PA-234       2.3751E-02
                  98.44 2.375E-02 %(  2.676E-01 7.97E-02 G K
                 946.00 1.402E-01 %   3.111E-01 9.40E-02 G
                 131.28-5.528E-02 %   2.833E-01 8.48E-02 G
                  94.67-1.073E-02 %   5.097E-01 1.52E-01 G
                 883.24 4.851E-02 %   5.018E-01 1.41E-01 G
                 926.70-5.148E-02 %   4.960E-01 1.38E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	2.463E-03	&	5.139E-01	1.45E-01	G
TH-234	1.5209E-01						
		63.29	1.521E-01	&(P	4.895E+00	1.45E+00	G K
		92.80	1.482E+00	%	2.619E+00	7.97E-01	G
		92.38	1.725E+00	% P	3.180E+00	9.67E-01	G
AM-241	-2.1272E-02						
		59.54	-2.127E-02	%(	7.468E-01	2.22E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	7.3014E-02	7.6122E-02	3.1402E-01	3.1405E-01	3.472E-01
K-40		1.4163E+01	1.4163E+01	1.9569E+00	2.1121E+00	
MN-54	#A	1.2614E-03	1.2705E-03	5.2128E-02	5.2128E-02	6.188E-02
CO-57	#B	-1.8495E-04	-1.8648E-04	5.4164E-02	5.4164E-02	6.052E-02
CO-60		1.7250E-01	1.7270E-01	7.9595E-02	8.0183E-02	

Sr-85	#A	9.6424E-05	9.9791E-05	4.8866E-02	4.8866E-02	5.518E-02
Kr-85	#A	4.5541E+00	4.5542E+00	1.0901E+03	1.0901E+03	1.274E+03
Y-88	#B	8.4550E-03	8.6334E-03	4.1943E-02	4.1946E-02	5.138E-02
NB-94	#B	1.6562E-02	1.6562E-02	4.5031E-02	4.5041E-02	5.109E-02
Ag-108M	#B	1.0499E-02	1.0500E-02	5.0790E-02	5.0793E-02	5.889E-02
CD-109	#A	-6.0413E-01	-6.0711E-01	2.2668E+00	2.2670E+00	2.300E+00
SN-113	#B	-1.0717E-02	-1.0926E-02	6.9098E-02	6.9101E-02	7.723E-02
SB-125	#B	3.7527E-02	3.7609E-02	1.4050E-01	1.4052E-01	1.591E-01
I-131	#B	1.4507E-02	1.9134E-02	6.4035E-02	6.4044E-02	5.462E-02
CS-134	#B	-6.5998E-03	-6.6194E-03	5.8836E-02	5.8837E-02	6.757E-02
CS-137	#	1.2648E-01	1.2650E-01	8.5915E-02	8.6207E-02	
CE-139	#A	-8.8970E-03	-9.0422E-03	5.6278E-02	5.6281E-02	5.852E-02
EU-152	#B	-5.4310E-02	-5.4336E-02	1.6525E-01	1.6527E-01	1.738E-01
EU-154	#B	-8.5588E-03	-8.5649E-03	1.1942E-01	1.1942E-01	1.266E-01
EU-155	#B	1.7618E-01	1.7640E-01	2.5914E-01	2.5932E-01	2.832E-01
HG-203	#B	-1.2360E-02	-1.2965E-02	5.2166E-02	5.2171E-02	5.517E-02
TL-208		3.1737E-01	3.1737E-01	8.1351E-02	8.3278E-02	
PB-212	#	7.6043E-01	7.6043E-01	1.3762E-01	1.4408E-01	1.114E-01
PB-214	#	4.3415E-01	4.3415E-01	1.3632E-01	1.3848E-01	1.206E-01
BI-212	#	7.1693E-01	7.1693E-01	6.6986E-01	6.7107E-01	
BI-214		4.5171E-01	4.5171E-01	1.7157E-01	1.7343E-01	
RA-224	#A	8.2314E-01	8.2314E-01	1.2852E+00	1.2860E+00	1.405E+00
RA-226	#	1.4393E+00	1.4393E+00	1.2786E+00	1.2812E+00	1.363E+00
AC-228	#	8.6629E-01	8.6629E-01	2.7271E-01	2.7701E-01	1.861E-01
TH-227	#B	-2.6040E-01	-2.6040E-01	5.3112E-01	5.3132E-01	5.782E-01
PA-234	#B	2.3751E-02	2.3751E-02	2.3908E-01	2.3909E-01	2.676E-01
TH-234	#B	1.5209E-01	1.5209E-01	4.3570E+00	4.3570E+00	4.895E+00
AM-241	#A	-2.1272E-02	-2.1272E-02	6.6498E-01	6.6498E-01	7.468E-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) 1.5948397E+01 pCi/gm

Total Decayed Activity (269.7 to 1999.0 keV) 1.5948623E+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_31AUG2005_0946.An1

Sample description

FSS-NOL-06-01-040-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_31AUG2005_0946.An1

Acquisition information

Start time:	31-Aug-2005 09:46:35
Live time:	2000
Real time:	2026
Dead time:	1.27 %
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: 1.7190E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7190E+03) =
5.8173E+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	30-Aug-2005 11:05:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2287

***** 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
76.99	168.	26.35	1.50	9.541E-03	77.11	17.500	7.932E-01	PB212
					77.11	10.700	1.297E+00	PB214
76.99	168.	26.35	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.297E+00	PB214
185.98	91.	26.99	1.08	1.627E-02				
185.98	91.	26.99	1.08	1.627E-02	185.99	3.280	PBC<MDA	RA226
238.76	642.	4.85	1.21	1.380E-02	238.63	43.100	8.489E-01	PB212

295.47	128.	15.22	1.25	1.146E-02	295.22	19.200	4.574E-01	PB214
300.31	57.	36.08	1.29	1.128E-02				
338.59	145.	20.50	1.31	1.005E-02	338.40	12.010	9.415E-01	AC228
352.00	182.	13.49	1.13	9.678E-03	351.99	37.100	3.987E-01	PB214
510.98	76.	25.31	1.18	6.692E-03	510.72	22.500	3.987E-01	TL208
583.41	182.	11.15	1.56	5.887E-03	583.14	86.000	2.818E-01	TL208
609.61	184.	10.08	1.48	5.647E-03	609.32	46.090	5.570E-01	BI214
661.94	355.	8.37	1.64	5.227E-03	661.62	84.620	6.307E-01	CS137
727.42	61.	31.73	1.61	4.793E-03	727.17	11.800	8.532E-01	BI212
911.71	118.	18.45	1.47	3.920E-03	911.07	29.000	8.168E-01	AC228
965.16	36.	25.52	1.72	3.730E-03				
969.32	92.	14.90	1.72	3.716E-03	968.90	17.460	1.114E+00	AC228
1118.88	65.	26.10	0.91	3.283E-03	1120.28	15.040	1.028E+00	BI214
1173.44	333.	6.56	1.59	3.156E-03	1173.23	99.860	8.315E-01	CO60
1332.86	289.	6.46	2.02	2.833E-03	1332.51	99.980	8.030E-01	CO60
1461.21	536.	4.49	2.19	2.620E-03	1460.75	10.700	1.501E+01	K40
1765.27	27.	19.25	1.25	2.225E-03	1764.51	15.920	5.972E-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
477.15	238.70	163.	642.	0.321	14.54	1.215	PB-212 D
600.27	300.31	157.	57.	0.028	108.24	1.286	PB-212 s
1931.20	965.18	21.	39.	0.019	69.85	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	153.80	77.11	901.	168.	0.084	79.05	1.500D
PB-214	153.80	77.11	901.	168.	0.084	79.05	1.500D
RA-226	371.59	185.99	518.	86.	0.043	110.79	1.500D
PB-212	477.14	238.75	413.	579.	0.289	19.43	1.500
PB-214	590.57	295.46	226.	136.	0.068	53.59	1.500s
AC-228	676.86	338.59	237.	145.	0.072	61.51	1.313s
PB-214	703.66	351.99	177.	174.	0.087	39.46	1.500D
TL-208	1021.98	511.10	84.	59.	0.030	76.24	1.499s
TL-208	1166.68	583.42	81.	183.	0.091	30.37	1.499

Bl-214	1219.08	609.61	64.	184.	0.092	30.23	1.482s
CS-137	1323.77	661.94	132.	355.	0.177	25.11	1.639
Bl-212	1454.79	727.42	94.	61.	0.031	95.20	1.612
AC-228	1823.55	911.71	106.	118.	0.059	55.36	1.467
AC-228	1938.01	968.90	53.	96.	0.048	44.48	1.718D
Bl-214	2238.15	1118.88	59.	65.	0.032	78.31	0.907s
CO-60	2347.34	1173.44	44.	333.	0.167	19.67	1.595
CO-60	2666.41	1332.86	14.	289.	0.145	19.37	2.017
K-40	2923.32	1461.21	13.	535.	0.268	13.48	2.187
Bl-214	3532.00	1765.27	0.	27.	0.013	57.74	1.249s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS
BE-7		8.0272E-02				
			477.56	8.027E-02	%(	5.587E-01 1.63E-01 G
K-40		1.5008E+01				
			1460.75	1.501E+01	(P	5.406E-01 6.75E-01 G
MN-54		-3.9691E-04				
			834.81	-3.969E-04	%(P	9.500E-02 2.73E-02 G
CO-57		-2.0977E-03				
			122.07	-2.098E-03	&(	6.479E-02 1.92E-02 G K
			136.43	2.603E-03	%	5.165E-01 1.53E-01 G
CO-60		8.1725E-01				
			1332.51	8.030E-01	(P	5.536E-02 5.19E-02 G K
			1173.23	8.315E-01	(	8.361E-02 5.45E-02 G K
Sr-85		-2.5947E-02				
			514.00	-2.595E-02	%(	7.081E-02 2.12E-02 G
Kr-85		-5.9207E+02				
			513.99	-5.921E+02	%(	1.618E+03 4.86E+02 G
Y-88		7.7040E-03				
			1836.01	7.704E-03	%(P	3.192E-02 8.52E-03 G K

898.02-1.612E-02 % P 9.832E-02 2.86E-02 G

NB-94 1.6268E-04

871.10 1.627E-04 &(6.345E-02 1.77E-02 G K

702.50-9.355E-03 % 7.534E-02 2.19E-02 G K

Ag-108M -1.7482E-02

722.95-1.748E-02 %(8.538E-02 2.51E-02 G K

614.37-3.109E-02 % P 8.252E-02 2.47E-02 G

433.93 1.165E-02 & 5.667E-02 1.67E-02 G

CD-109 -6.8103E-01

88.04-6.810E-01 %(P 2.712E+00 8.16E-01 G

SN-113 5.6485E-04

391.71 5.649E-04 &(8.243E-02 2.39E-02 G K

255.04-4.091E-01 % 2.514E+00 7.47E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-3.6268E-02						
		427.95	-3.627E-02	%(P	1.827E-01	5.35E-02	G K
		600.77	5.287E-02	% P	3.174E-01	9.23E-02	G
		636.15	1.241E-01	% P	4.234E-01	1.24E-01	G
		463.51	2.762E-01	% P	6.246E-01	1.88E-01	G
		176.29	-4.325E-03	% P	7.020E-01	2.06E-01	G
I-131	-4.8407E-04						
		364.48	-4.841E-04	%(	6.893E-02	2.00E-02	G K
		636.97	3.323E-01	%	5.630E-01	1.75E-01	G
		284.29	-1.392E-01	%	8.483E-01	2.51E-01	G
CS-134	2.1562E-02						
		604.66	2.156E-02	&(	4.532E-02	1.37E-02	G K
		795.76	5.408E-02	%	8.763E-02	2.70E-02	G
		569.29	1.158E-01	&	3.850E-01	1.14E-01	G
		801.84	1.586E-01	% P	8.650E-01	2.52E-01	G
CS-137	6.3069E-01						
		661.62	6.307E-01	(	9.993E-02	5.28E-02	G
CE-139	3.6371E-04						
		165.85	3.637E-04	&(P	6.627E-02	1.96E-02	G
EU-152	-2.7533E-02						
		121.78	-2.753E-02	&(P	1.972E-01	5.88E-02	G K
		344.30	1.805E-02	%	1.930E-01	5.66E-02	G
		1408.08	7.324E-02	%	2.356E-01	6.80E-02	G
		964.00	-2.864E-01	% P	7.452E-01	2.23E-01	G
		1112.07	-2.175E-01	%	8.178E-01	2.42E-01	G

778.90-1.014E-03 % P 5.825E-01 1.66E-01 G

EU-154 -1.4349E-02

123.10-1.435E-02 %(P 1.493E-01 4.46E-02 G K

1274.80-3.346E-02 % 2.377E-01 6.78E-02 G

723.30-1.858E-03 & P 5.581E-01 1.62E-01 G

1004.80-1.534E-02 % 5.322E-01 1.52E-01 G

EU-155 8.9076E-02

86.45 8.908E-02 %(P 3.083E-01 9.28E-02 G K

105.31 2.232E-03 % 2.915E-01 8.66E-02 G

HG-203 1.0519E-02

279.17 1.052E-02 %(P 5.577E-02 1.65E-02 G K

72.87-2.732E-01 % 2.422E+00 7.25E-01 G

70.83-1.780E+00 % 4.165E+00 1.26E+00 G

82.50-3.793E-03 % 4.756E+00 1.42E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8896E-01						
		583.14	2.834E-01	(P	6.912E-02	2.88E-02	G
		510.72	3.102E-01	*(	2.375E-01	7.88E-02	G
PB-212	7.7292E-01						
		238.63	7.647E-01	(	1.287E-01	4.95E-02	G K
					Energy duplication		
		77.11	7.932E-01	(	6.714E-01	2.09E-01	G
		74.81	7.919E-01	& P	1.398E+00	4.25E-01	G
PB-214	4.1643E-01						
					Energy duplication		
		351.99	3.812E-01	(P	1.415E-01	5.02E-02	G K
		295.22	4.845E-01	*(	2.598E-01	8.66E-02	G
					Energy duplication		
		77.11	1.297E+00	+	1.098E+00	3.42E-01	G
		241.92	3.242E-01	%	8.813E-01	2.66E-01	G
BI-212	8.5325E-01						
		727.17	8.532E-01	(	6.642E-01	2.71E-01	G K
		1620.56	-2.636E-02	& P	1.945E+00	4.84E-01	G
		785.42	5.949E-01	% P	3.200E+00	9.27E-01	G
BI-214	5.6735E-01						
		609.32	5.570E-01	@(	1.212E-01	5.62E-02	G K
		1764.51	5.972E-01	(P	1.635E-01	1.15E-01	G
		1120.28	1.028E+00	+	6.149E-01	2.68E-01	G
RA-224	9.2713E-01						
		241.00	9.271E-01	%(P	1.571E+00	4.79E-01	G

```
RA-226      1.2680E+00
                                    Energy duplication
                185.99 1.268E+00  (P 1.603E+00 4.93E-01 G

AC-228      9.4511E-01
                911.07 8.168E-01  (P 3.501E-01 1.51E-01 G K
                968.90 1.161E+00  (P 4.443E-01 1.72E-01 G
                338.40 9.415E-01 *(  4.847E-01 1.93E-01 G

TH-227      2.7661E-02
                236.00 2.766E-02 %(P 3.931E-01 1.16E-01 G K
                256.25 0.000E+00 %   8.217E-01 2.42E-01 G

PA-234     -9.2009E-02
                 98.44-9.201E-02 &(  2.949E-01 8.88E-02 G K
                946.00-9.992E-02 %   4.429E-01 1.30E-01 G
                131.28-1.775E-02 &   2.296E-01 6.81E-02 G
                 94.67-5.385E-02 %   5.323E-01 1.59E-01 G
                883.24 2.946E-01 %   5.792E-01 1.77E-01 G
                926.70 2.199E-01 &   7.086E-01 2.10E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	1.717E-01	&	5.707E-01	1.69E-01	G
TH-234	1.9626E+00						
		63.29	1.963E+00	%(P	5.321E+00	1.61E+00	G K
		92.80	1.760E+00	%	2.874E+00	8.76E-01	G
		92.38	2.009E+00	% P	3.402E+00	1.04E+00	G
AM-241	1.4266E-01						
		59.54	1.427E-01	%(	7.808E-01	2.34E-01	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes: 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	7.9293E-02	8.0272E-02	4.9004E-01	4.9006E-01	5.519E-01
K-40		1.5008E+01	1.5008E+01	2.0241E+00	2.1923E+00	
MN-54	#A	-3.9608E-04	-3.9691E-04	3.4910E-02	3.4910E-02	9.480E-02
CO-57	#B	-2.0926E-03	-2.0977E-03	5.7725E-02	5.7725E-02	6.463E-02
CO-60		8.1697E-01	8.1725E-01	1.1282E-01	1.2179E-01	

Sr-85 #A	-2.5686E-02	-2.5947E-02	6.3744E-02	6.3761E-02	7.010E-02
Kr-85 #A	-5.9207E+02	-5.9207E+02	1.4566E+03	1.4570E+03	1.618E+03
Y-88 #B	7.6568E-03	7.7040E-03	2.5555E-02	2.5558E-02	3.173E-02
NB-94 #B	1.6268E-04	1.6268E-04	5.3041E-02	5.3041E-02	6.345E-02
Ag-108M#B	-1.7482E-02	-1.7482E-02	7.5200E-02	7.5207E-02	8.538E-02
CD-109 #A	-6.8004E-01	-6.8103E-01	2.6330E+00	2.6333E+00	2.708E+00
SN-113 #B	5.6164E-04	5.6485E-04	7.1603E-02	7.1603E-02	8.196E-02
SB-125 #B	-3.6245E-02	-3.6268E-02	1.9308E-01	1.9309E-01	1.826E-01
I-131 #B	-4.4618E-04	-4.8407E-04	6.0032E-02	6.0032E-02	6.354E-02
CS-134 #B	2.1543E-02	2.1562E-02	4.1246E-02	4.1264E-02	4.528E-02
CS-137	6.3065E-01	6.3069E-01	1.5838E-01	1.6228E-01	
CE-139 #A	3.6198E-04	3.6371E-04	5.8909E-02	5.8909E-02	6.596E-02
EU-152 #B	-2.7529E-02	-2.7533E-02	1.9547E-01	1.9548E-01	1.971E-01
EU-154 #B	-1.4346E-02	-1.4349E-02	1.3813E-01	1.3814E-01	1.493E-01
EU-155 #B	8.9044E-02	8.9076E-02	2.7838E-01	2.7843E-01	3.082E-01
HG-203 #B	1.0372E-02	1.0519E-02	4.9548E-02	4.9551E-02	5.499E-02
TL-208 #	2.8896E-01	2.8896E-01	8.7962E-02	8.9444E-02	6.912E-02
PB-212 #	7.7292E-01	7.7292E-01	1.5017E-01	1.5631E-01	1.287E-01
PB-214 #	4.1643E-01	4.1643E-01	1.3867E-01	1.4063E-01	1.415E-01
BI-212	8.5325E-01	8.5325E-01	8.1230E-01	8.1371E-01	
BI-214	5.6735E-01	5.6735E-01	1.7154E-01	1.7447E-01	
RA-224 #A	9.2713E-01	9.2713E-01	1.4362E+00	1.4371E+00	1.571E+00
RA-226 #A	1.2680E+00	1.2680E+00	1.4777E+00	1.4794E+00	1.603E+00
AC-228	9.4511E-01	9.4511E-01	2.9622E-01	3.0093E-01	
TH-227 #B	2.7661E-02	2.7661E-02	3.4714E-01	3.4714E-01	3.931E-01
PA-234 #B	-9.2009E-02	-9.2009E-02	2.6652E-01	2.6657E-01	2.949E-01
TH-234 #B	1.9626E+00	1.9626E+00	4.8185E+00	4.8197E+00	5.321E+00
AM-241 #A	1.4266E-01	1.4266E-01	7.0118E-01	7.0123E-01	7.808E-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) 1.8821196E+01 pCi/gm

Total Decayed Activity (1119.8 to 1999.0 keV) 1.8821510E+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_31AUG2005_1023.An1

Sample description

FSS-NOL-06-01-035-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_31AUG2005_1023.An1

Acquisition information

Start time:	31-Aug-2005 10:23:38
Live time:	2000
Real time:	2022
Dead time:	1.10 %
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: 2.0230E+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	30-Aug-2005 10:45:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1955

***** 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	210.	22.03	1.50	9.541E-03	77.11	10.700	1.371E+00	PB214
					77.11	17.500	8.383E-01	PB212
77.17	210.	22.03	1.50	9.541E-03	77.11	10.700	1.371E+00	PB214
					77.11	17.500	8.383E-01	PB212
93.24	123.	35.68	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.046E+00	TH234
					94.67	15.500	3.859E-01	PA234

129.55	98.	36.23	1.40	1.717E-02				
129.55	98.	36.23	1.40	1.717E-02	131.28	20.000	1.908E-01	PA234
186.98	188.	19.32	1.49	1.622E-02	185.99	3.280	2.295E+00	RA226
209.52	96.	31.18	1.01	1.518E-02				
238.75	691.	4.69	1.21	1.380E-02	238.63	43.100	7.758E-01	PB212
241.59	103.	22.82	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
277.25	61.	34.43	0.92	1.215E-02				
295.23	191.	12.02	1.18	1.147E-02	295.22	19.200	5.796E-01	PB214
300.58	55.	32.28	1.02	1.127E-02				
328.25	37.	38.98	1.43	1.036E-02				
338.47	171.	16.24	1.29	1.006E-02	338.40	12.010	9.476E-01	AC228
352.08	224.	11.94	1.20	9.676E-03	351.99	37.100	4.151E-01	PB214
409.83	45.	31.71	0.90	8.322E-03				
462.91	83.	28.45	1.15	7.374E-03				
462.91	83.	28.45	1.15	7.374E-03	463.51	10.000	7.429E-01	SB125
511.09	129.	15.37	1.44	6.690E-03	510.72	22.500	5.721E-01	TL208
583.28	206.	8.70	1.55	5.889E-03	583.14	86.000	2.718E-01	TL208
609.49	179.	10.71	1.68	5.648E-03	609.32	46.090	4.595E-01	BI214
727.58	52.	21.82	1.87	4.792E-03	727.17	11.800	6.081E-01	BI212
795.19	36.	27.80	1.60	4.420E-03	795.76	85.400	6.422E-02	CS134
911.54	121.	11.21	1.17	3.920E-03	911.07	29.000	7.117E-01	AC228
968.20	90.	16.30	1.51	3.720E-03	968.90	17.460	9.299E-01	AC228
1120.32	63.	24.19	1.39	3.283E-03	1120.28	15.040	8.536E-01	BI214
1461.21	579.	4.20	1.84	2.620E-03	1460.75	10.700	1.379E+01	K40
1621.44	20.	22.36	0.62	2.397E-03	1620.56	2.750	1.993E+00	BI212
1764.63	21.	21.82	0.79	2.225E-03	1764.51	15.920	3.943E-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	
373.56	186.98	508.	83.	0.041	120.16	1.491	PA-234	s
418.65	209.52	316.	96.	0.048	93.54	1.011	AC-228	s
477.14	238.79	180.	691.	0.346	14.07	1.215	PB-212	D
482.81	241.62	227.	103.	0.052	68.46	1.217	PB-214	D
600.82	300.58	116.	55.	0.027	96.85	1.017	PB-212	
656.16	328.25	90.	37.	0.019	116.94	1.425	AC-228	
819.37	409.83	76.	45.	0.023	95.12	0.901	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	961.	210.	0.105	66.10	1.500	D
PB-212	153.80	77.11	961.	210.	0.105	66.10	1.500	D
TH-234	186.05	93.24	894.	123.	0.061	107.05	1.500	s
PA-234	258.30	129.36	473.	88.	0.044	109.45	1.500	s
RA-226	371.96	186.18	442.	101.	0.050	89.42	1.500	s

PB-212	477.13	238.75	446.	662.	0.331	17.87	1.500
PB-214	590.09	295.22	181.	172.	0.086	40.25	1.500D
AC-228	676.62	338.47	178.	171.	0.086	48.73	1.293s
PB-214	703.85	352.08	127.	206.	0.103	31.18	1.500
SB-125	926.85	463.55	99.	49.	0.024	93.24	1.500
TL-208	1021.97	511.09	88.	129.	0.064	46.10	1.437s
TL-208	1166.39	583.28	47.	206.	0.103	26.10	1.549
Bi-214	1218.83	609.49	61.	179.	0.090	32.13	1.676
Bi-212	1455.11	727.58	32.	52.	0.026	65.45	1.869s
CS-134	1590.39	795.19	33.	36.	0.018	83.40	1.601s
AC-228	1823.22	911.54	27.	121.	0.061	33.63	1.167
AC-228	1936.44	968.12	35.	96.	0.048	45.09	1.528s
Bi-214	2241.04	1120.32	46.	63.	0.032	72.56	1.387s
K-40	2923.32	1461.21	3.	579.	0.289	12.60	1.841
Bi-212	3244.07	1621.44	0.	20.	0.010	67.08	0.624s
Bi-214	3530.71	1764.63	0.	21.	0.010	65.47	0.787s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS
BE-7		-3.4327E-03				
			477.56	-3.433E-03	%(	3.709E-01 1.05E-01 G
K-40		1.3789E+01				
			1460.75	1.379E+01	(P	2.616E-01 5.79E-01 G
MN-54		1.7864E-02				
			834.81	1.786E-02	%(P	3.376E-02 1.04E-02 G
CO-57		4.9496E-04				
			122.07	4.950E-04	%(	5.621E-02 1.67E-02 G K
			136.43	-1.195E-03	%	4.126E-01 1.22E-01 G
CO-60		-1.8344E-04				
			1332.51	-1.834E-04	&(P	6.997E-02 1.93E-02 G K
			1173.23	-1.452E-02	%	9.161E-02 2.66E-02 G K
Sr-85		-1.4985E-02				
			514.00	-1.499E-02	%(	6.036E-02 1.79E-02 G
Kr-85		-3.4239E+02				
			513.99	-3.424E+02	%(	1.379E+03 4.09E+02 G
Y-88		-2.0670E-05				
			1836.01	-2.067E-05	%(P	5.300E-02 1.35E-02 G K

898.02-1.143E-02 % P 6.200E-02 1.78E-02 G

NB-94 -6.7762E-03

871.10-6.776E-03 %(4.548E-02 1.29E-02 G K

702.50 9.466E-03 % 4.442E-02 1.29E-02 G K

Ag-108M 2.3924E-05

722.95 2.392E-05 &(4.527E-02 1.25E-02 G K

614.37 2.212E-03 % P 3.927E-02 1.10E-02 G

433.93-8.275E-03 % 4.817E-02 1.41E-02 G

CD-109 -5.1664E-02

88.04-5.166E-02 %(P 2.191E+00 6.53E-01 G

SN-113 -4.1598E-03

391.71-4.160E-03 %(6.701E-02 1.95E-02 G K

255.04 4.373E-01 % 1.851E+00 5.51E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3195E-01						
		427.95	2.674E-02	%(P	1.315E-01	3.85E-02	G K
		600.77	-5.768E-03	% P	2.373E-01	6.69E-02	G
		636.15	-7.528E-04	& P	4.680E-01	1.33E-01	G
		463.51	4.434E-01	(P	4.455E-01	1.42E-01	G
		176.29	1.905E-02	% P	6.837E-01	2.02E-01	G
I-131	-6.6426E-03						
		364.48	-6.643E-03	%(	5.073E-02	1.48E-02	G K
		636.97	1.966E-02	&	7.476E-01	2.13E-01	G
		284.29	0.000E+00	%	8.224E-01	2.41E-01	G
CS-134	2.0987E-02						
		604.66	-1.684E-02	%(	5.929E-02	1.76E-02	G K
		795.76	6.422E-02	*(	5.198E-02	1.79E-02	G
		569.29	1.015E-01	&	2.052E-01	6.25E-02	G
		801.84	-7.208E-03	% P	5.220E-01	1.44E-01	G
CS-137	1.3284E-02						
		661.62	1.328E-02	%(	4.488E-02	1.32E-02	G
CE-139	1.3322E-02						
		165.85	1.332E-02	&(P	5.187E-02	1.55E-02	G
EU-152	-6.6621E-02						
		121.78	-6.662E-02	%(P	1.711E-01	5.16E-02	G K
		344.30	-4.129E-02	%	1.514E-01	4.50E-02	G
		1408.08	3.566E-02	%	2.154E-01	5.94E-02	G
		964.00	8.757E-02	% P	5.005E-01	1.45E-01	G
		1112.07	-1.200E-01	%	5.611E-01	1.64E-01	G

778.90-7.580E-02 % P 3.921E-01 1.13E-01 G

EU-154 3.7560E-02

123.10 3.756E-02 &(P 1.167E-01 3.51E-02 G K

1274.80-2.136E-02 & 2.045E-01 5.80E-02 G

723.30 6.844E-02 & P 1.567E-01 4.71E-02 G

1004.80-4.663E-02 % 3.265E-01 9.31E-02 G

EU-155 1.3094E-01

86.45 1.309E-01 %(P 2.589E-01 7.85E-02 G K

105.31 6.890E-02 % 2.514E-01 7.56E-02 G

HG-203 -3.3043E-03

279.17-3.304E-03 &(P 5.197E-02 1.53E-02 G K

72.87-3.557E-01 % 1.701E+00 5.10E-01 G

70.83-1.639E+00 & 4.071E+00 1.23E+00 G

82.50-5.128E-01 % 3.261E+00 9.74E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7178E-01						
		583.14	2.718E-01	(P	4.566E-02	2.37E-02	G
		510.72	5.721E-01	+	2.059E-01	8.80E-02	G
PB-212	7.7043E-01						
		238.63	7.429E-01	(	1.135E-01	4.43E-02	G K
					Energy duplication		
		77.11	8.383E-01	(	5.888E-01	1.85E-01	G
		74.81	7.185E-01	% P	1.202E+00	3.66E-01	G
PB-214	3.8310E-01						
		351.99	3.831E-01	(P	1.028E-01	3.99E-02	G K
					Energy duplication		
		295.22	5.224E-01	+	1.983E-01	7.01E-02	G
					Energy duplication		
		77.11	1.371E+00	+	9.630E-01	3.02E-01	G
		241.92	2.472E-03	%	6.698E-01	1.98E-01	G
BI-212	6.0813E-01						
		727.17	6.081E-01	(	3.457E-01	1.33E-01	G K
		1620.56	1.993E+00	+ P	7.468E-01	4.53E-01	G
		785.42	8.433E-01	% P	2.487E+00	7.37E-01	G
BI-214	4.4275E-01						
		609.32	4.595E-01	(	1.002E-01	4.92E-02	G K
		1764.51	3.943E-01	(P	1.390E-01	8.64E-02	G
		1120.28	8.536E-01	+	4.638E-01	2.06E-01	G
RA-224	6.8879E-01						
		241.00	6.888E-01	%(P	1.408E+00	4.27E-01	G

```
RA-226       1.2591E+00
                 185.99 1.259E+00 *(P 1.260E+00 3.92E-01 G

AC-228       7.1167E-01
                 911.07 7.117E-01  (P 1.577E-01 8.00E-02 G K
                 968.90 9.927E-01 + P 3.097E-01 1.49E-01 G
                 338.40 9.476E-01 +   3.583E-01 1.54E-01 G

TH-227      -1.8028E-01
                 236.00-1.803E-01 %(P 5.145E-01 1.55E-01 G K
                 256.25 1.391E-01 &   5.141E-01 1.53E-01 G

PA-234       7.6181E-02
                  98.44 6.371E-04 %(  2.516E-01 7.48E-02 G K
                 946.00-3.750E-02 &   3.051E-01 8.73E-02 G
                 131.28 1.710E-01 &(  2.019E-01 6.24E-02 G
                  94.67 1.341E-02 %   4.392E-01 1.31E-01 G
                 883.24 1.067E-01 &   4.490E-01 1.31E-01 G
                 926.70-1.600E-03 %   4.281E-01 1.17E-01 G
```

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                     569.26 1.506E-01 &   3.041E-01 9.26E-02 G

TH-234       1.4363E+00
                     63.29 9.673E-01 &(P 4.548E+00 1.36E+00 G K
                     92.80 2.046E+00 *(  2.373E+00 7.30E-01 G
                     92.38-1.692E-01 & P 2.931E+00 8.75E-01 G

AM-241      -3.4105E-02
                     59.54-3.411E-02 &(  6.836E-01 2.04E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-3.3890E-03	-3.4327E-03	3.1549E-01	3.1549E-01	3.662E-01
K-40		1.3789E+01	1.3789E+01	1.7373E+00	1.9018E+00	
MN-54	#A	1.7825E-02	1.7864E-02	3.1137E-02	3.1153E-02	3.369E-02
CO-57	#B	4.9371E-04	4.9496E-04	5.0052E-02	5.0052E-02	5.607E-02
CO-60	#B	-1.8338E-04	-1.8344E-04	8.9930E-03	8.9930E-03	6.994E-02

Sr-85	#A	-1.4828E-02	-1.4985E-02	5.3731E-02	5.3737E-02	5.973E-02
Kr-85	#A	-3.4239E+02	-3.4239E+02	1.2274E+03	1.2275E+03	1.379E+03
Y-88	#B	-2.0538E-05	-2.0670E-05	5.3119E-04	5.3119E-04	5.266E-02
NB-94	#B	-6.7762E-03	-6.7762E-03	3.8678E-02	3.8680E-02	4.548E-02
Ag-108M	#B	2.3923E-05	2.3924E-05	3.7437E-02	3.7437E-02	4.526E-02
CD-109	#A	-5.1586E-02	-5.1664E-02	4.6928E+00	4.6928E+00	2.188E+00
SN-113	#B	-4.1352E-03	-4.1598E-03	5.8423E-02	5.8424E-02	6.661E-02
SB-125	#F	1.3187E-01	1.3195E-01	1.2693E-01	1.2714E-01	1.314E-01
I-131	#B	-6.1017E-03	-6.6426E-03	4.4471E-02	4.4473E-02	4.660E-02
CS-134	#B	2.0968E-02	2.0987E-02	1.7503E-02	1.7542E-02	5.923E-02
CS-137	#A	1.3283E-02	1.3284E-02	3.9491E-02	3.9498E-02	4.488E-02
CE-139	#A	1.3256E-02	1.3322E-02	4.6637E-02	4.6643E-02	5.161E-02
EU-152	#B	-6.6612E-02	-6.6621E-02	1.6056E-01	1.6060E-01	1.711E-01
EU-154	#B	3.7552E-02	3.7560E-02	1.0537E-01	1.0539E-01	1.166E-01
EU-155	#B	1.3089E-01	1.3094E-01	2.3561E-01	2.3572E-01	2.588E-01
HG-203	#B	-3.2562E-03	-3.3043E-03	4.7631E-02	4.7632E-02	5.121E-02
TL-208		2.7178E-01	2.7178E-01	7.1075E-02	7.2693E-02	
PB-212	#	7.7043E-01	7.7043E-01	1.3767E-01	1.4430E-01	1.135E-01
PB-214	#	3.8310E-01	3.8310E-01	1.1969E-01	1.2160E-01	1.028E-01
BI-212		6.0813E-01	6.0813E-01	3.9804E-01	3.9950E-01	
BI-214		4.4275E-01	4.4275E-01	1.4225E-01	1.4440E-01	
RA-224	#A	6.8879E-01	6.8879E-01	1.2806E+00	1.2812E+00	1.408E+00
RA-226	#A	1.2591E+00	1.2591E+00	1.1758E+00	1.1779E+00	1.260E+00
AC-228		7.1167E-01	7.1167E-01	2.3981E-01	2.4311E-01	
TH-227	#B	-1.8028E-01	-1.8028E-01	4.7158E-01	4.7168E-01	5.145E-01
PA-234	#B	7.6181E-02	7.6181E-02	8.3379E-02	8.3486E-02	2.516E-01
TH-234	#B	1.4363E+00	1.4363E+00	1.5376E+00	1.5397E+00	4.548E+00
AM-241	#A	-3.4105E-02	-3.4105E-02	6.1061E-01	6.1061E-01	6.836E-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) 1.5823151E+01 pCi/gm

Total Decayed Activity (277.2 to 1999.0 keV) 1.5823151E+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_31AUG2005_1103.An1

Sample description

FSS-NOL-06-01-034-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_31AUG2005_1103.An1

Acquisition information

Start time:	31-Aug-2005 11:03:58
Live time:	2000
Real time:	2022
Dead time:	1.10 %
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: 1.7620E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7620E+03) =
5.6754E+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 30-Aug-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: 0.1608

***** 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
77.15	209.	21.61	1.50	9.541E-03	77.11	10.700	1.569E+00	PB214
					77.11	17.500	9.591E-01	PB212
77.15	209.	21.61	1.50	9.541E-03	77.11	10.700	1.569E+00	PB214
					77.11	17.500	9.591E-01	PB212
86.93	88.	31.40	1.11	1.209E-02	86.45	32.740	PBC<MDA	EU155
89.72	90.	33.89	1.11	1.271E-02	88.04	3.790	PBC<MDA	CD109
93.25	97.	31.18	1.11	1.341E-02	92.38	2.570	PBC<MDA	TH234

					92.80	3.000	1.851E+00	TH234
186.26	108.	25.26	1.95	1.625E-02	185.99	3.280	1.494E+00	RA226
238.71	727.	4.40	1.21	1.380E-02	238.63	43.100	9.370E-01	PB212
242.00	97.	24.43	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.291E-01	PB214
270.18	76.	35.58	0.91	1.243E-02				
295.36	138.	12.23	1.25	1.147E-02				
295.36	138.	12.23	1.25	1.147E-02	295.22	19.200	4.824E-01	PB214
300.58	53.	28.76	1.26	1.128E-02				
338.39	148.	15.89	1.28	1.006E-02	338.40	12.010	9.382E-01	AC228
352.05	244.	12.20	1.40	9.677E-03	351.99	37.100	5.193E-01	PB214
511.15	106.	21.57	1.56	6.689E-03	510.72	22.500	5.387E-01	TL208
583.28	220.	9.49	1.33	5.889E-03	583.14	86.000	3.320E-01	TL208
609.31	151.	13.33	1.44	5.649E-03	609.32	46.090	4.442E-01	BI214
727.67	60.	18.46	0.94	4.791E-03	727.17	11.800	8.162E-01	BI212
911.56	160.	10.46	1.61	3.920E-03	911.07	29.000	1.077E+00	AC228
965.06	35.	22.12	1.72	3.730E-03				
969.41	73.	15.40	1.72	3.716E-03	968.90	17.460	8.582E-01	AC228
1120.75	65.	28.21	2.02	3.283E-03	1120.28	15.040	1.006E+00	BI214
1461.25	617.	4.18	2.15	2.620E-03	1460.75	10.700	1.687E+01	K40
1765.22	36.	16.67	1.72	2.225E-03	1764.51	15.920	7.775E-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	
173.43	86.91	341.	88.	0.044	94.19	1.107	BI-207	ID
179.03	89.71	416.	90.	0.045	101.66	1.109	PB-214	ID
186.08	93.24	404.	97.	0.048	93.55	1.112	U-235	ID
477.04	238.67	147.	727.	0.363	13.19	1.215	PB-212	D
483.63	241.96	232.	97.	0.048	73.29	1.217	PB-214	D
540.00	270.18	234.	76.	0.038	106.74	0.906	AC-228	s
600.50	300.42	146.	67.	0.034	84.16	1.026	PB-212	
1931.27	965.16	15.	30.	0.015	77.85	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	914.	209.	0.104	64.83	1.500D
PB-212	153.80	77.11	914.	209.	0.104	64.83	1.500D
RA-226	372.12	186.26	296.	104.	0.052	75.79	1.946s
PB-212	477.09	238.73	400.	660.	0.330	17.36	1.500

PB-214	590.54	295.44	185.	122.	0.061	54.45	1.500
AC-228	676.45	338.39	155.	148.	0.074	47.66	1.285
PB-214	703.82	352.07	156.	186.	0.093	35.84	1.500s
TL-208	1022.08	511.15	109.	106.	0.053	64.71	1.556s
TL-208	1166.38	583.28	70.	219.	0.110	28.46	1.326
BI-214	1218.48	609.31	79.	151.	0.075	40.00	1.436
BI-212	1455.30	727.67	29.	60.	0.030	55.39	0.938s
AC-228	1823.26	911.56	40.	160.	0.080	31.37	1.607
AC-228	1938.01	968.90	32.	72.	0.036	48.67	1.718D
BI-214	2241.90	1120.75	61.	65.	0.032	84.62	2.019s
K-40	2923.40	1461.25	12.	617.	0.308	12.54	2.146
BI-214	3531.91	1765.22	0.	36.	0.018	50.00	1.723s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		7.8724E-02					
			477.56	7.872E-02	%(	4.448E-01	1.30E-01 G
K-40		1.6871E+01					
			1460.75	1.687E+01	(P	5.184E-01	7.05E-01 G
MN-54		-6.6621E-03					
			834.81	-6.662E-03	%(P	5.861E-02	1.66E-02 G
CO-57		9.8730E-03					
			122.07	9.873E-03	&(	6.451E-02	1.93E-02 G K
			136.43	-4.345E-02	&	5.243E-01	1.56E-01 G
CO-60		2.1671E-03					
			1332.51	2.167E-03	%(P	7.886E-02	2.18E-02 G K
			1173.23	2.054E-02	%	7.305E-02	2.14E-02 G K
Sr-85		-1.5426E-02					
			514.00	-1.543E-02	&(	6.632E-02	1.96E-02 G
Kr-85		-3.5212E+02					
			513.99	-3.521E+02	&(	1.514E+03	4.48E+02 G
Y-88		-6.5077E-03					
			1836.01	-6.508E-03	%(P	5.588E-02	1.48E-02 G K

898.02-1.431E-02 % P 7.628E-02 2.20E-02 G

NB-94 -1.2505E-04

871.10-1.251E-04 %(3.919E-02 1.04E-02 G K

702.50 0.000E+00 % 6.706E-02 1.91E-02 G K

Ag-108M 2.3515E-02

722.95 2.351E-02 &(3.313E-02 1.07E-02 G K

614.37-5.484E-04 % P 7.059E-02 2.02E-02 G

433.93 2.041E-03 % 4.962E-02 1.42E-02 G

CD-109 1.5321E-01

88.04 1.532E-01 %(P 2.319E+00 6.92E-01 G

SN-113 4.4924E-05

391.71 4.492E-05 &(7.078E-02 2.03E-02 G K

255.04 3.252E-01 & 2.124E+00 6.29E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	4.0869E-02						
		427.95	4.087E-02	%(P	1.382E-01	4.08E-02	G K
		600.77	-4.780E-02	% P	2.835E-01	8.21E-02	G
		636.15	-8.979E-02	% P	4.328E-01	1.25E-01	G
		463.51	2.934E-01	% P	4.924E-01	1.51E-01	G
		176.29	-1.056E-02	& P	7.681E-01	2.27E-01	G
I-131	9.2579E-03						
		364.48	9.258E-03	%(	4.915E-02	1.44E-02	G K
		636.97	-1.752E-01	%	7.897E-01	2.30E-01	G
		284.29	2.404E-01	%	6.481E-01	1.94E-01	G
CS-134	-2.0543E-03						
		604.66	-2.054E-03	&(	6.424E-02	1.84E-02	G K
		795.76	4.571E-02	%	6.185E-02	1.96E-02	G
		569.29	8.782E-03	&	3.253E-01	9.23E-02	G
		801.84	-1.590E-01	% P	7.096E-01	2.07E-01	G
CS-137	1.8571E-03						
		661.62	1.857E-03	%(	7.756E-02	2.22E-02	G
CE-139	-6.2361E-04						
		165.85	-6.236E-04	%(P	4.860E-02	1.43E-02	G
EU-152	-8.3849E-04						
		121.78	-8.385E-04	%(P	1.815E-01	5.38E-02	G K
		344.30	1.079E-02	%	1.664E-01	4.85E-02	G
		1408.08	0.000E+00	%	2.314E-01	5.92E-02	G
		964.00	-4.382E-02	% P	2.992E-01	8.22E-02	G
		1112.07	4.901E-02	%	4.749E-01	1.33E-01	G

778.90-1.002E-02 % P 3.689E-01 1.02E-01 G

EU-154 3.5863E-02

123.10 3.586E-02 %(P 1.352E-01 4.06E-02 G K

1274.80 3.629E-02 & 1.997E-01 5.70E-02 G

723.30-1.549E-01 & P 3.774E-01 1.13E-01 G

1004.80 2.399E-02 & 3.456E-01 9.65E-02 G

EU-155 -2.6188E-02

86.45-2.619E-02 %(P 2.993E-01 8.93E-02 G K

105.31 1.230E-01 % 2.853E-01 8.64E-02 G

HG-203 1.6951E-03

279.17 1.695E-03 &(P 4.483E-02 1.30E-02 G K

72.87-3.475E-01 % 2.369E+00 7.11E-01 G

70.83-1.075E+00 & 4.346E+00 1.31E+00 G

82.50-8.216E-02 & 4.483E+00 1.34E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.3203E-01						
		583.14	3.320E-01	(P	6.301E-02	3.16E-02	G
		510.72	5.387E-01	+	2.617E-01	1.16E-01	G
PB-212	8.8241E-01						
		238.63	8.513E-01	(	1.236E-01	4.93E-02	G K
					Energy duplication		
		77.11	9.591E-01	(	6.595E-01	2.07E-01	G
		74.81	7.734E-01	& P	1.380E+00	4.19E-01	G
PB-214	4.0725E-01						
		351.99	3.977E-01	@(P	1.299E-01	4.76E-02	G K
		295.22	4.257E-01	(	2.302E-01	7.73E-02	G
					Energy duplication		
		77.11	1.569E+00	+	1.079E+00	3.39E-01	G
		241.92	1.558E-01	%	8.931E-01	2.67E-01	G
BI-212	8.1616E-01						
		727.17	8.162E-01	(	3.758E-01	1.51E-01	G K
		1620.56	2.341E-01	% P	1.938E+00	5.15E-01	G
		785.42	1.300E+00	% P	3.047E+00	9.17E-01	G
BI-214	4.4418E-01						
		609.32	4.442E-01	(	1.301E-01	5.92E-02	G K
		1764.51	7.775E-01	+ P	1.595E-01	1.30E-01	G
		1120.28	1.006E+00	+	6.083E-01	2.84E-01	G
RA-224	7.3152E-01						
		241.00	7.315E-01	%(P	1.546E+00	4.69E-01	G

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RA-226       1.4941E+00
                 185.99 1.494E+00 *(P 1.192E+00 3.94E-01 G

AC-228       1.0366E+00
                 911.07 1.077E+00  (P 2.176E-01 1.13E-01 G K
                 968.90 8.491E-01 - P 3.441E-01 1.38E-01 G
                 338.40 9.382E-01  (  3.857E-01 1.49E-01 G

TH-227      -3.1583E-01
                 236.00-3.158E-01 %(P 5.574E-01 1.70E-01 G K
                 256.25 8.871E-02 &   6.349E-01 1.88E-01 G

PA-234       2.4650E-02
                  98.44 2.465E-02 %(  2.843E-01 8.48E-02 G K
                 946.00-1.764E-03 %   3.167E-01 8.79E-02 G
                 131.28 1.338E-01 &   2.419E-01 7.36E-02 G
                  94.67-1.499E-01 %   5.215E-01 1.57E-01 G
                 883.24 1.101E-02 &   4.608E-01 1.27E-01 G
                 926.70 8.235E-02 %   4.369E-01 1.24E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	1.238E-02	&	4.680E-01	1.33E-01	G
TH-234	1.2071E+00						
		63.29	1.207E+00	%(P	5.071E+00	1.52E+00	G K
		92.80	1.855E+00	%	2.739E+00	8.37E-01	G
		92.38	-2.182E-01	% P	3.281E+00	9.79E-01	G
AM-241	0.0000E+00						
		59.54	0.000E+00	%(	7.785E-01	2.31E-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	7.7685E-02	7.8724E-02	3.8870E-01	3.8873E-01	4.390E-01
K-40		1.6871E+01	1.6871E+01	2.1158E+00	2.3180E+00	
MN-54	#A	-6.6469E-03	-6.6621E-03	5.5943E-02	5.5944E-02	5.848E-02
CO-57	#B	9.8471E-03	9.8730E-03	5.7829E-02	5.7832E-02	6.434E-02
CO-60	#B	2.1663E-03	2.1671E-03	6.5477E-02	6.5477E-02	7.883E-02

Sr-85 #A	-1.5258E-02	-1.5426E-02	5.8883E-02	5.8890E-02	6.560E-02
Kr-85 #A	-3.5212E+02	-3.5212E+02	1.3445E+03	1.3447E+03	1.514E+03
Y-88 #B	-6.4645E-03	-6.5077E-03	4.4700E-02	4.4702E-02	5.551E-02
NB-94 #B	-1.2505E-04	-1.2505E-04	3.1074E-02	3.1074E-02	3.919E-02
Ag-108M#B	2.3514E-02	2.3515E-02	3.2234E-02	3.2261E-02	3.313E-02
CD-109 #A	1.5297E-01	1.5321E-01	2.0752E+00	2.0752E+00	2.315E+00
SN-113 #B	4.4648E-05	4.4924E-05	6.1034E-02	6.1034E-02	7.034E-02
SB-125 #B	4.0840E-02	4.0869E-02	1.2240E-01	1.2242E-01	1.381E-01
I-131 #B	8.4759E-03	9.2579E-03	4.3110E-02	4.3113E-02	4.500E-02
CS-134 #B	-2.0524E-03	-2.0543E-03	5.5307E-02	5.5307E-02	6.418E-02
CS-137 #A	1.8570E-03	1.8571E-03	6.6554E-02	6.6554E-02	7.755E-02
CE-139 #A	-6.2040E-04	-6.2361E-04	9.9225E-02	9.9225E-02	4.835E-02
EU-152 #B	-8.3836E-04	-8.3849E-04	6.7155E-01	6.7155E-01	1.815E-01
EU-154 #B	3.5855E-02	3.5863E-02	1.2176E-01	1.2178E-01	1.351E-01
EU-155 #B	-2.6178E-02	-2.6188E-02	4.8119E-01	4.8119E-01	2.992E-01
HG-203 #B	1.6695E-03	1.6951E-03	3.9012E-02	3.9012E-02	4.415E-02
TL-208	3.3203E-01	3.3203E-01	9.4685E-02	9.6501E-02	
PB-212 #	8.8241E-01	8.8241E-01	1.5317E-01	1.6097E-01	1.236E-01
PB-214 #	4.0725E-01	4.0725E-01	1.3282E-01	1.3477E-01	1.299E-01
BI-212	8.1616E-01	8.1616E-01	4.5210E-01	4.5442E-01	
BI-214	4.4418E-01	4.4418E-01	1.7767E-01	1.7941E-01	
RA-224 #A	7.3152E-01	7.3152E-01	1.4056E+00	1.4062E+00	1.546E+00
RA-226 #	1.4941E+00	1.4941E+00	1.1809E+00	1.1839E+00	
AC-228	1.0366E+00	1.0366E+00	2.9587E-01	3.0154E-01	
TH-227 #B	-3.1583E-01	-3.1583E-01	5.1360E-01	5.1390E-01	5.574E-01
PA-234 #B	2.4650E-02	2.4650E-02	2.5448E-01	2.5448E-01	2.843E-01
TH-234 #B	1.2071E+00	1.2071E+00	4.5648E+00	4.5653E+00	5.071E+00
AM-241 #A	0.0000E+00	0.0000E+00	6.9370E-01	6.9370E-01	7.785E-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) 2.0993694E+01 pCi/gm

Total Decayed Activity (1119.8 to 1999.0 keV) 2.0993696E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____

DAT

Reviewed by: _____

Supervisor

Laboratory: YAEC Chemistry Lab

Sample description

FSS-NOL-06-01-024-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_31AUG2005_1219.An1

Acquisition information

Start time:	31-Aug-2005 12:19:56
Live time:	2000
Real time:	2021
Dead time:	1.01 %
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: 1.7590E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7590E+03) =
5.6850E+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 30-Aug-2005 08:40:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1921

***** 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
74.63	130.	22.12	1.10	8.855E-03	74.81	9.600		PBC<MDA PB212
77.20	172.	16.13	1.10	9.627E-03	77.11	10.700	1.293E+00	PB214
					77.11	17.500	7.905E-01	PB212
186.01	96.	32.00	0.74	1.627E-02	185.99	3.280		PBC<MDA RA226
238.75	579.	5.06	1.21	1.380E-02	238.63	43.100	7.472E-01	PB212
241.25	88.	31.09	1.22	1.369E-02	241.00	3.900		PBC<MDA RA224
					241.92	7.470	6.642E-01	PB214

295.35	133.	12.54	1.25	1.146E-02	295.22	19.200	4.651E-01	PB214
300.41	39.	37.80	1.26	1.128E-02				
327.74	38.	40.10	1.13	1.038E-02				
338.61	143.	15.53	1.32	1.005E-02	338.40	12.010	9.080E-01	AC228
352.06	209.	12.07	1.32	9.677E-03	351.99	37.100	4.472E-01	PB214
463.03	35.	35.97	1.02	7.372E-03				
463.03	35.	35.97	1.02	7.372E-03	463.51	10.000		PBC<MDA SB125
510.99	94.	22.53	1.07	6.691E-03	510.72	22.500	4.820E-01	TL208
583.61	177.	10.07	1.19	5.885E-03	583.14	86.000	2.678E-01	TL208
609.58	134.	14.19	1.52	5.647E-03	609.32	46.090	3.954E-01	BI214
661.91	123.	13.68	1.54	5.227E-03	661.62	84.620	2.134E-01	CS137
727.28	50.	26.41	2.10	4.794E-03	727.17	11.800	6.845E-01	BI212
794.86	29.	33.75	1.60	4.420E-03	795.76	85.400		PBC<MDA CS134
911.28	116.	11.93	1.26	3.921E-03	911.07	29.000	7.820E-01	AC228
968.51	78.	18.50	1.55	3.719E-03	968.90	17.460	9.215E-01	AC228
1120.68	40.	40.01	0.70	3.283E-03	1120.28	15.040	6.208E-01	BI214
1173.13	70.	21.33	1.69	3.157E-03	1173.23	99.860	1.716E-01	CO60
1331.85	42.	21.48	1.61	2.834E-03	1332.51	99.980	1.143E-01	CO60
1461.18	521.	4.43	1.61	2.620E-03	1460.75	10.700	1.427E+01	K40
1765.62	13.	36.41	2.24	2.225E-03	1764.51	15.920	2.771E-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	
148.84	74.84	351.	130.	0.065	66.37	1.098	BI-207	D
153.97	77.40	298.	172.	0.086	48.40	1.100	PB-214	D
477.13	238.69	140.	579.	0.289	15.18	1.215	PB-212	D
482.13	241.20	332.	88.	0.044	93.28	1.217	RA-224	D
600.48	300.34	91.	39.	0.020	113.41	1.258	PB-212	ID
655.16	327.74	95.	38.	0.019	120.29	1.126	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	149.11	74.77	833.	114.	0.057	107.78	1.500	s
PB-214	153.80	77.11	801.	148.	0.074	84.72	1.500	D
PB-212	153.80	77.11	801.	148.	0.074	84.72	1.500	D
RA-226	371.65	186.02	383.	78.	0.039	105.37	1.500	s
PB-212	477.05	238.71	374.	499.	0.250	21.22	1.500	
RA-224	483.12	241.75	416.	75.	0.038	117.88	1.500	

PB-214	590.31	295.33	183.	120.	0.060	55.00	1.500
AC-228	676.90	338.61	129.	143.	0.071	46.58	1.322s
PB-214	703.70	352.01	118.	178.	0.089	34.16	1.500s
TL-208	1021.75	510.99	102.	94.	0.047	67.59	1.069s
TL-208	1167.05	583.61	44.	177.	0.088	30.22	1.186
BI-214	1219.01	609.58	69.	134.	0.067	42.58	1.516
CS-137	1323.71	661.91	55.	123.	0.061	41.04	1.538
BI-212	1454.51	727.28	40.	50.	0.025	79.22	2.099s
CS-134	1589.74	794.86	32.	29.	0.014	101.26	1.601s
AC-228	1822.71	911.28	27.	116.	0.058	35.80	1.262
AC-228	1937.23	968.51	35.	78.	0.039	55.51	1.553
BI-214	2241.76	1120.68	55.	40.	0.020	120.02	0.704s
CO-60	2346.73	1173.13	46.	70.	0.035	63.98	1.687s
CO-60	2664.40	1331.85	11.	42.	0.021	64.44	1.612s
K-40	2923.26	1461.18	3.	521.	0.260	13.29	1.605
BI-214	3532.70	1765.62	5.	13.	0.006	109.22	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	%(	5.422E-01	1.56E-01 G
K-40		1.4269E+01					
			1460.75	1.427E+01	(P	3.009E-01	6.33E-01 G
MN-54		4.1810E-03					
			834.81	4.181E-03	%(P	5.228E-02	1.46E-02 G
CO-57		7.2646E-03					
			122.07	7.265E-03	&(	5.668E-02	1.69E-02 G K
			136.43	9.637E-02	&	4.469E-01	1.34E-01 G
CO-60		1.4294E-01					
			1332.51	1.143E-01	*(P	4.904E-02	2.46E-02 G K
			1173.23	1.716E-01	@(	8.333E-02	3.66E-02 G K
Sr-85		-2.0453E-02					
			514.00	-2.045E-02	&(	6.863E-02	2.05E-02 G
Kr-85		-4.6635E+02					
			513.99	-4.663E+02	&(	1.565E+03	4.66E+02 G
Y-88		-2.3798E-05					
			1836.01	-2.380E-05	&(P	2.672E-02	3.63E-03 G K

898.02-7.212E-03 % P 6.278E-02 1.76E-02 G

NB-94 -1.1620E-03

871.10-1.162E-03 %(5.700E-02 1.58E-02 G K

702.50 1.108E-02 % 4.897E-02 1.42E-02 G K

Ag-108M -1.9739E-02

722.95-1.974E-02 %(7.078E-02 2.09E-02 G K

614.37-2.711E-03 % P 5.528E-02 1.56E-02 G

433.93-7.127E-03 % 4.679E-02 1.36E-02 G

CD-109 -1.3117E-02

88.04-1.312E-02 &(P 2.298E+00 6.83E-01 G

SN-113 7.8206E-03

391.71 7.821E-03 %(6.772E-02 1.97E-02 G K

255.04-4.362E-01 & 2.151E+00 6.39E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-3.2584E-03						
		427.95	-3.258E-03	%(P	1.675E-01	4.79E-02	G K
		600.77	-6.074E-02	% P	3.070E-01	8.95E-02	G
		636.15	8.217E-02	% P	4.150E-01	1.20E-01	G
		463.51	3.353E-01	% P	4.604E-01	1.43E-01	G
		176.29	1.139E-01	% P	6.974E-01	2.07E-01	G
I-131	1.7350E-02						
		364.48	1.735E-02	%(	5.360E-02	1.60E-02	G K
		636.97	1.537E-01	%	6.348E-01	1.84E-01	G
		284.29	-8.788E-02	%	7.848E-01	2.31E-01	G
CS-134	3.1384E-02						
		604.66	8.012E-03	&(	5.138E-02	1.48E-02	G K
		795.76	5.810E-02	*(	5.928E-02	1.96E-02	G
		569.29	2.052E-02	&	3.149E-01	8.97E-02	G
		801.84	-4.205E-02	% P	6.362E-01	1.79E-01	G
CS-137	2.1338E-01						
		661.62	2.134E-01	(	6.476E-02	2.92E-02	G
CE-139	8.6651E-03						
		165.85	8.665E-03	&(P	5.422E-02	1.61E-02	G
EU-152	2.3027E-02						
		121.78	2.303E-02	%(P	1.696E-01	5.05E-02	G K
		344.30	1.492E-04	%	1.515E-01	4.36E-02	G
		1408.08	6.273E-02	%	2.897E-01	8.22E-02	G
		964.00	-3.331E-03	& P	4.575E-01	1.27E-01	G
		1112.07	8.336E-02	&	5.034E-01	1.44E-01	G

778.90-8.161E-02 % P 3.717E-01 1.07E-01 G

EU-154 -1.3910E-02

123.10-1.391E-02 &(P 1.198E-01 3.56E-02 G K

1274.80-2.931E-02 % 2.331E-01 6.63E-02 G

723.30-5.762E-02 % P 3.389E-01 9.84E-02 G

1004.80 1.385E-02 % 3.259E-01 8.99E-02 G

EU-155 5.2816E-02

86.45 5.282E-02 %(P 2.740E-01 8.21E-02 G K

105.31 2.971E-02 & 2.483E-01 7.39E-02 G

HG-203 2.5490E-04

279.17 2.549E-04 &(P 5.665E-02 1.65E-02 G K

72.87-5.208E-01 % 1.939E+00 5.83E-01 G

70.83 3.127E-02 & 4.506E+00 1.34E+00 G

82.50 3.369E-02 % 4.408E+00 1.31E+00 G

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

TL-208      2.6783E-01
                 583.14 2.678E-01  (P 5.121E-02 2.71E-02 G
                 510.72 4.820E-01 +   2.544E-01 1.09E-01 G

PB-212      6.5536E-01
                 238.63 6.447E-01  (  1.199E-01 4.56E-02 G K
                                      Energy duplication
                  77.11 6.816E-01 *(  6.192E-01 1.92E-01 G
                  74.81 1.034E+00 + P 1.241E+00 3.81E-01 G

PB-214      3.9436E-01
                 351.99 3.812E-01 @(P 1.140E-01 4.35E-02 G K
                 295.22 4.198E-01  (  2.294E-01 7.70E-02 G
                                      Energy duplication
                  77.11 1.115E+00 +   1.013E+00 3.15E-01 G
                 241.92 4.119E-01 %   7.834E-01 2.38E-01 G

BI-212      6.8446E-01
                 727.17 6.845E-01  (  4.350E-01 1.81E-01 G K
                1620.56 5.332E-02 % P 1.904E+00 4.84E-01 G
                 785.42 7.021E-01 % P 2.610E+00 7.62E-01 G

BI-214      3.9537E-01
                 609.32 3.954E-01  (  1.222E-01 5.61E-02 G K
                1764.51 2.771E-01 - P 2.760E-01 1.02E-01 G
                1120.28 6.208E-01 +   5.804E-01 2.48E-01 G

RA-224      1.0855E+00
                 241.00 1.086E+00  (P 1.406E+00 4.33E-01 G
```

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RA-226       1.1238E+00
                 185.99 1.124E+00 *(P 1.352E+00 4.17E-01 G

AC-228       8.4955E-01
                 911.07 7.820E-01  (P 1.826E-01 9.35E-02 G K
                 968.90 9.215E-01  (P 3.590E-01 1.71E-01 G
                 338.40 9.080E-01 *(  3.540E-01 1.41E-01 G

TH-227      -3.1552E-01
                 236.00-3.155E-01 %(P 5.711E-01 1.74E-01 G K
                 256.25-1.135E-01 %   6.244E-01 1.85E-01 G

PA-234       8.8110E-03
                  98.44 8.811E-03 %(  2.347E-01 6.96E-02 G K
                 946.00 1.190E-01 &   2.425E-01 7.39E-02 G
                 131.28-4.748E-03 %   2.610E-01 7.74E-02 G
                  94.67-1.449E-01 %   4.423E-01 1.33E-01 G
                 883.24 2.379E-01 &   3.108E-01 1.02E-01 G
                 926.70-9.299E-02 &   5.841E-01 1.67E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	2.628E-02	&	4.592E-01	1.31E-01	G
TH-234	1.5803E+00						
		63.29	1.580E+00	%(P	4.648E+00	1.40E+00	G K
		92.80	1.742E+00	%	2.536E+00	7.76E-01	G
		92.38	1.944E+00	% P	3.048E+00	9.30E-01	G
AM-241	-1.0665E-01						
		59.54	-1.066E-01	%(	7.237E-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

- -

***** 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	0.0000E+00	0.0000E+00	4.6750E-01	4.6750E-01	5.341E-01
K-40		1.4269E+01	1.4269E+01	1.8975E+00	2.0595E+00	
MN-54	#A	4.1703E-03	4.1810E-03	4.3826E-02	4.3827E-02	5.215E-02
CO-57	#B	7.2432E-03	7.2646E-03	5.0630E-02	5.0631E-02	5.651E-02
CO-60	#	1.4288E-01	1.4294E-01	6.4959E-02	6.5452E-02	

Sr-85	#A	-2.0202E-02	-2.0453E-02	6.1374E-02	6.1384E-02	6.779E-02
Kr-85	#A	-4.6634E+02	-4.6635E+02	1.3995E+03	1.3997E+03	1.565E+03
Y-88	#B	-2.3621E-05	-2.3798E-05	1.4279E-04	1.4280E-04	2.652E-02
NB-94	#B	-1.1620E-03	-1.1620E-03	4.7458E-02	4.7458E-02	5.700E-02
Ag-108M	#B	-1.9739E-02	-1.9739E-02	6.2643E-02	6.2652E-02	7.078E-02
CD-109	#A	-1.3094E-02	-1.3117E-02	6.8070E+00	6.8070E+00	2.294E+00
SN-113	#B	7.7665E-03	7.8206E-03	5.9073E-02	5.9074E-02	6.726E-02
SB-125	#B	-3.2558E-03	-3.2584E-03	2.8755E-01	2.8755E-01	1.673E-01
I-131	#B	1.5709E-02	1.7350E-02	4.7904E-02	4.7914E-02	4.853E-02
CS-134	#B	3.1351E-02	3.1384E-02	3.1781E-02	3.1830E-02	5.132E-02
CS-137		2.1337E-01	2.1338E-01	8.7575E-02	8.8390E-02	
CE-139	#A	8.6149E-03	8.6651E-03	4.8409E-02	4.8412E-02	5.390E-02
EU-152	#B	2.3023E-02	2.3027E-02	1.5155E-01	1.5155E-01	1.696E-01
EU-154	#B	-1.3907E-02	-1.3910E-02	1.1050E-01	1.1050E-01	1.197E-01
EU-155	#B	5.2792E-02	5.2816E-02	2.4623E-01	2.4624E-01	2.738E-01
HG-203	#B	2.5057E-04	2.5490E-04	4.9627E-02	4.9627E-02	5.568E-02
TL-208		2.6783E-01	2.6783E-01	8.1113E-02	8.2493E-02	
PB-212	#	6.5536E-01	6.5536E-01	1.3908E-01	1.4386E-01	1.199E-01
PB-214	#	3.9436E-01	3.9436E-01	1.2774E-01	1.2964E-01	1.140E-01
BI-212		6.8446E-01	6.8446E-01	5.4222E-01	5.4357E-01	
BI-214		3.9537E-01	3.9537E-01	1.6834E-01	1.6980E-01	
RA-224	#A	1.0855E+00	1.0855E+00	1.2992E+00	1.3007E+00	1.406E+00
RA-226	#A	1.1238E+00	1.1238E+00	1.2518E+00	1.2534E+00	1.352E+00
AC-228		8.4955E-01	8.4955E-01	2.2902E-01	2.3393E-01	
TH-227	#B	-3.1552E-01	-3.1552E-01	5.2583E-01	5.2613E-01	5.711E-01
PA-234	#B	8.8110E-03	8.8110E-03	2.0878E-01	2.0878E-01	2.347E-01
TH-234	#B	1.5803E+00	1.5803E+00	4.1999E+00	4.2008E+00	4.648E+00
AM-241	#A	-1.0665E-01	-1.0665E-01	6.4837E-01	6.4840E-01	7.237E-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) 1.6822788E+01 pCi/gm

Total Decayed Activity (295.2 to 1999.0 keV) 1.6822863E+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_31AUG2005_1256.An1

Sample description

FSS-NOL-06-01-030-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_31AUG2005_1256.An1

Acquisition information

Start time:	31-Aug-2005 12:56:38
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: 1.6340E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6340E+03) =
6.1200E+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 30-Aug-2005 10:15:00
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: 0.1348

***** 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	133.	29.00	1.50	9.541E-03	77.11	10.700	1.081E+00	PB214
					77.11	17.500	6.608E-01	PB212
77.08	133.	29.00	1.50	9.541E-03	77.11	10.700	1.081E+00	PB214
					77.11	17.500	6.608E-01	PB212
85.80	102.	36.59	0.94	1.184E-02				
128.28	70.	35.38	0.92	1.712E-02				
185.94	83.	30.02	1.47	1.627E-02				

185.94	83.	30.02	1.47	1.627E-02	185.99	3.280	PBC<MDA	RA226
209.31	68.	35.51	1.00	1.519E-02				
238.76	522.	5.26	1.21	1.380E-02	238.63	43.100	7.250E-01	PB212
242.30	66.	27.84	1.22	1.364E-02	241.92	7.470	5.383E-01	PB214
270.13	77.	30.75	1.22	1.243E-02				
295.37	122.	12.80	1.25	1.147E-02				
295.37	122.	12.80	1.25	1.147E-02	295.22	19.200	4.569E-01	PB214
300.27	44.	30.70	1.26	1.129E-02				
338.06	120.	16.42	0.94	1.007E-02	338.40	12.010	8.187E-01	AC228
352.05	172.	13.33	0.92	9.677E-03	351.99	37.100	3.953E-01	PB214
510.42	97.	18.34	0.73	6.699E-03	510.72	22.500	5.315E-01	TL208
583.05	152.	12.28	1.75	5.891E-03	583.14	86.000	2.478E-01	TL208
609.55	139.	12.27	1.39	5.647E-03	609.32	46.090	4.415E-01	BI214
661.87	138.	13.31	1.45	5.228E-03	661.62	84.620	2.589E-01	CS137
795.45	21.	40.68	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
911.25	111.	11.44	1.63	3.921E-03	911.07	29.000	8.040E-01	AC228
968.32	80.	19.69	2.03	3.718E-03	968.90	17.460	1.019E+00	AC228
1119.92	47.	32.16	0.79	3.283E-03	1120.28	15.040	7.805E-01	BI214
1172.82	72.	23.57	1.80	3.158E-03	1173.23	99.860	1.890E-01	CO60
1332.41	62.	19.26	1.74	2.834E-03	1332.51	99.980	1.794E-01	CO60
1461.07	414.	4.91	2.10	2.620E-03	1460.75	10.700	1.221E+01	K40
1765.61	13.	30.21	2.24	2.225E-03	1764.51	15.920	2.998E-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	
171.18	85.80	533.	102.	0.051	109.76	0.945	BI-207	I
418.23	209.31	228.	68.	0.034	106.54	1.004	AC-228	
477.14	238.73	115.	522.	0.261	15.77	1.215	PB-212	D
484.22	242.27	138.	66.	0.033	83.51	1.217	XE-138	D
539.89	270.13	175.	77.	0.039	92.24	1.217	AC-228	
600.21	299.99	71.	44.	0.022	92.09	1.258	TH-227	ID

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	682.	133.	0.067	87.00	1.500D
PB-212	153.80	77.11	682.	133.	0.067	87.00	1.500D
RA-226	371.44	185.92	308.	78.	0.039	95.73	1.500s
PB-212	477.04	238.71	302.	463.	0.232	21.16	1.500
PB-214	590.37	295.36	164.	112.	0.056	56.22	1.500
AC-228	675.79	338.06	102.	120.	0.060	49.27	0.940s

PB-214	703.72	352.02	100.	145.	0.073	38.29	1.500
TL-208	1020.63	510.42	68.	97.	0.048	55.01	0.726s
TL-208	1165.93	583.05	60.	152.	0.076	36.85	1.751s
BI-214	1218.95	609.55	46.	139.	0.069	36.80	1.389
CS-137	1323.63	661.87	58.	138.	0.069	39.93	1.453
CS-134	1590.93	795.45	26.	21.	0.011	122.03	1.601s
AC-228	1822.65	911.25	19.	111.	0.055	34.33	1.635s
AC-228	1936.84	968.32	42.	80.	0.040	59.06	2.033s
BI-214	2240.24	1119.92	43.	47.	0.023	96.47	0.789s
CO-60	2346.11	1172.82	54.	72.	0.036	70.71	1.800s
CO-60	2665.51	1332.41	18.	61.	0.031	57.77	1.742s
K-40	2923.05	1461.07	0.	414.	0.207	14.74	2.103
BI-214	3532.69	1765.61	1.	13.	0.006	90.62	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.0158E-01					
			477.56	1.016E-01	%(	4.067E-01	1.19E-01 G
K-40		1.2205E+01					
			1460.75	1.221E+01	(P	2.174E-01	6.00E-01 G
MN-54		-4.1772E-04					
			834.81	-4.177E-04	%(P	5.856E-02	1.61E-02 G
CO-57		-7.3129E-04					
			122.07	-7.313E-04	&(	5.950E-02	1.76E-02 G K
			136.43	8.147E-02	&	4.546E-01	1.36E-01 G
CO-60		1.8416E-01					
			1332.51	1.794E-01	@(P	6.497E-02	3.46E-02 G K
			1173.23	1.890E-01	@(	9.699E-02	4.45E-02 G K
Sr-85		-2.7310E-02					
			514.00	-2.731E-02	%(	7.397E-02	2.22E-02 G
Kr-85		-6.2300E+02					
			513.99	-6.230E+02	%(	1.687E+03	5.06E+02 G
Y-88		-2.5612E-05					
			1836.01	-2.561E-05	%(P	2.876E-02	3.90E-03 G K

898.02-3.492E-03 & P 6.590E-02 1.81E-02 G

NB-94 1.9332E-02

871.10 1.933E-02 %(5.300E-02 1.57E-02 G K

702.50-1.292E-02 % 5.200E-02 1.51E-02 G K

Ag-108M -1.1127E-02

722.95-1.113E-02 &(7.451E-02 2.15E-02 G K

614.37-8.948E-03 % P 5.133E-02 1.47E-02 G

433.93-1.044E-02 % 5.479E-02 1.60E-02 G

CD-109 -3.0172E-01

88.04-3.017E-01 &(P 2.447E+00 7.31E-01 G

SN-113 -6.5709E-04

391.71-6.571E-04 &(6.102E-02 1.73E-02 G K

255.04 2.367E-01 % 2.186E+00 6.44E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-3.5076E-03						
		427.95	-3.508E-03	&(P	1.803E-01	5.16E-02	G K
		600.77	-1.097E-03	% P	2.982E-01	8.39E-02	G
		636.15	-6.560E-02	% P	4.780E-01	1.37E-01	G
		463.51	1.987E-01	% P	4.240E-01	1.28E-01	G
		176.29	-2.167E-01	% P	7.373E-01	2.20E-01	G
I-131	5.3017E-03						
		364.48	5.302E-03	%(	5.711E-02	1.65E-02	G K
		636.97	-8.515E-02	&	7.722E-01	2.20E-01	G
		284.29	2.211E-01	&	6.375E-01	1.91E-01	G
CS-134	1.3264E-02						
		604.66	-1.561E-02	%(	6.113E-02	1.80E-02	G K
		795.76	4.626E-02	(	5.831E-02	1.88E-02	G
		569.29	2.083E-02	%	2.776E-01	7.81E-02	G
		801.84	2.526E-02	& P	7.456E-01	2.10E-01	G
CS-137	2.5886E-01						
		661.62	2.589E-01	(	7.111E-02	3.45E-02	G
CE-139	-9.5233E-03						
		165.85	-9.523E-03	%(P	5.398E-02	1.60E-02	G
EU-152	-2.2894E-02						
		121.78	-2.289E-02	&(P	1.754E-01	5.21E-02	G K
		344.30	1.112E-02	&	1.756E-01	5.11E-02	G
		1408.08	9.062E-04	%	2.618E-01	6.77E-02	G
		964.00	1.953E-01	% P	4.650E-01	1.39E-01	G
		1112.07	9.247E-03	&	4.047E-01	1.08E-01	G

778.90-1.993E-02 % P 4.208E-01 1.17E-01 G

EU-154 1.1256E-03

123.10 1.126E-03 %(P 1.193E-01 3.52E-02 G K

1274.80-1.442E-02 % 2.397E-01 6.71E-02 G

723.30-6.193E-02 & P 3.489E-01 1.01E-01 G

1004.80-3.161E-03 % 3.711E-01 1.02E-01 G

EU-155 7.4310E-02

86.45 7.431E-02 %(P 2.763E-01 8.30E-02 G K

105.31 7.787E-02 % 2.389E-01 7.18E-02 G

HG-203 9.4001E-04

279.17 9.400E-04 &(P 5.163E-02 1.50E-02 G K

72.87-7.423E-01 & 2.228E+00 6.72E-01 G

70.83 6.992E-01 % 4.112E+00 1.23E+00 G

82.50 2.558E-02 % 4.290E+00 1.27E+00 G

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

TL-208       2.4783E-01
                   583.14 2.478E-01  (P 6.346E-02 3.05E-02 G
                   510.72 5.315E-01 +   2.262E-01 9.74E-02 G

PB-212       6.4889E-01
                   238.63 6.440E-01  (  1.164E-01 4.54E-02 G K
                                        Energy duplication
                    77.11 6.608E-01  (  6.161E-01 1.92E-01 G
                    74.81 7.717E-01 & P 1.295E+00 3.94E-01 G

PB-214       3.6389E-01
                   351.99 3.346E-01  (P 1.138E-01 4.28E-02 G K
                   295.22 4.206E-01  (  2.344E-01 7.88E-02 G
                                        Energy duplication
                    77.11 1.081E+00 +   1.008E+00 3.13E-01 G
                   241.92 3.398E-01 %   7.818E-01 2.36E-01 G

BI-212       3.0228E-01
                   727.17 3.023E-01 %(  4.722E-01 1.47E-01 G K
                  1620.56 3.437E-01 % P 2.002E+00 5.40E-01 G
                   785.42 1.127E+00 & P 2.629E+00 7.91E-01 G

BI-214       4.4150E-01
                   609.32 4.415E-01  (  1.090E-01 5.42E-02 G K
                  1764.51 2.998E-01 - P 1.849E-01 9.12E-02 G
                  1120.28 7.805E-01 +   5.596E-01 2.51E-01 G

RA-224      -3.2128E-01
                   241.00-3.213E-01 &(P 1.161E+00 3.46E-01 G
```

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RA-226       1.2067E+00
                 185.99 1.207E+00  (P 1.310E+00 4.07E-01 G

AC-228       8.7115E-01
                 911.07 8.040E-01 *(P 1.691E-01 9.22E-02 G K
                 968.90 1.019E+00 *(P 4.194E-01 2.01E-01 G
                 338.40 8.187E-01 @(  3.413E-01 1.34E-01 G

TH-227      -1.3198E-01
                 236.00-1.320E-01 &(P 5.003E-01 1.50E-01 G K
                 256.25 3.912E-02 %   6.789E-01 1.99E-01 G

PA-234      -3.6744E-02
                  98.44-3.674E-02 &(  2.586E-01 7.71E-02 G K
                 946.00-3.334E-02 %   2.996E-01 8.42E-02 G
                 131.28-8.422E-02 %   2.597E-01 7.81E-02 G
                  94.67-1.132E-02 %   4.024E-01 1.19E-01 G
                 883.24-1.180E-03 %   4.469E-01 1.22E-01 G
                 926.70-1.033E-01 &   6.195E-01 1.78E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26-3.540E-03 % 4.743E-01 1.33E-01 G

TH-234 1.5873E-02
63.29 1.587E-02 %(P 4.835E+00 1.43E+00 G K
92.80 1.361E+00 % 2.594E+00 7.88E-01 G
92.38 1.559E+00 % P 3.076E+00 9.34E-01 G

AM-241 1.2812E-01
59.54 1.281E-01 %(7.144E-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

- -

***** 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	1.0012E-01	1.0158E-01	3.5703E-01	3.5707E-01	4.008E-01
K-40		1.2205E+01	1.2205E+01	1.8002E+00	1.9261E+00	
MN-54	#A	-4.1669E-04	-4.1772E-04	2.0622E-02	2.0622E-02	5.842E-02
CO-57	#B	-7.2920E-04	-7.3129E-04	5.2786E-02	5.2786E-02	5.933E-02
CO-60	#	1.8409E-01	1.8416E-01	8.4121E-02	8.4754E-02	

Sr-85	#A	-2.6987E-02	-2.7310E-02	6.6599E-02	6.6617E-02	7.310E-02
Kr-85	#A	-6.2300E+02	-6.2300E+02	1.5193E+03	1.5197E+03	1.687E+03
Y-88	#B	-2.5427E-05	-2.5612E-05	1.5367E-04	1.5368E-04	2.855E-02
NB-94	#B	1.9332E-02	1.9332E-02	4.7152E-02	4.7165E-02	5.300E-02
Ag-108M	#B	-1.1127E-02	-1.1127E-02	6.4642E-02	6.4645E-02	7.451E-02
CD-109	#A	-3.0120E-01	-3.0172E-01	2.6110E+00	2.6110E+00	2.443E+00
SN-113	#B	-6.5270E-04	-6.5709E-04	5.1961E-02	5.1961E-02	6.061E-02
SB-125	#B	-3.5049E-03	-3.5076E-03	3.0957E-01	3.0957E-01	1.802E-01
I-131	#B	4.8170E-03	5.3017E-03	4.9621E-02	4.9621E-02	5.189E-02
CS-134	#B	1.3251E-02	1.3264E-02	1.6186E-02	1.6203E-02	6.107E-02
CS-137		2.5884E-01	2.5886E-01	1.0335E-01	1.0437E-01	
CE-139	#A	-9.4700E-03	-9.5233E-03	5.0919E-02	5.0921E-02	5.368E-02
EU-152	#B	-2.2891E-02	-2.2894E-02	1.7800E-01	1.7800E-01	1.754E-01
EU-154	#B	1.1253E-03	1.1256E-03	1.0571E-01	1.0571E-01	1.193E-01
EU-155	#B	7.4278E-02	7.4310E-02	2.4886E-01	2.4890E-01	2.762E-01
HG-203	#B	9.2458E-04	9.4001E-04	4.4972E-02	4.4972E-02	5.078E-02
TL-208		2.4783E-01	2.4783E-01	9.1574E-02	9.2625E-02	
PB-212	#	6.4889E-01	6.4889E-01	1.3729E-01	1.4203E-01	1.164E-01
PB-214	#	3.6389E-01	3.6389E-01	1.2387E-01	1.2554E-01	1.138E-01
BI-212	#B	3.0228E-01	3.0228E-01	4.4147E-01	4.4179E-01	4.722E-01
BI-214		4.4150E-01	4.4150E-01	1.6249E-01	1.6437E-01	
RA-224	#A	-3.2128E-01	-3.2128E-01	1.1599E+00	1.1600E+00	1.161E+00
RA-226	#A	1.2067E+00	1.2067E+00	1.2213E+00	1.2232E+00	1.310E+00
AC-228	#	8.7115E-01	8.7115E-01	2.4470E-01	2.4954E-01	
TH-227	#B	-1.3198E-01	-1.3198E-01	4.5965E-01	4.5971E-01	5.003E-01
PA-234	#B	-3.6744E-02	-3.6744E-02	2.3137E-01	2.3138E-01	2.586E-01
TH-234	#B	1.5873E-02	1.5873E-02	4.2942E+00	4.2942E+00	4.835E+00
AM-241	#A	1.2812E-01	1.2812E-01	6.4018E-01	6.4022E-01	7.144E-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) 1.4208691E+01 pCi/gm

Total Decayed Activity (269.7 to 1999.0 keV) 1.4208782E+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_31AUG2005_1333.An1

Sample description

FSS-NOL-06-01-025-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_31AUG2005_1333.An1

Acquisition information

Start time:	31-Aug-2005 13:33:36
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: 1.8580E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8580E+03) =
5.3821E+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 30-Aug-2005 08:37:00
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: 0.1663

***** 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
74.12	84.	34.44	1.10	8.660E-03				
74.12	84.	34.44	1.10	8.660E-03	74.81	9.600		PBC<MDA PB212
77.27	221.	14.33	1.10	9.615E-03	77.11	10.700	1.576E+00	PB214
					77.11	17.500	9.636E-01	PB212
185.98	68.	34.92	1.26	1.627E-02				
185.98	68.	34.92	1.26	1.627E-02	185.99	3.280		PBC<MDA RA226
238.70	616.	4.84	1.21	1.380E-02				

238.70	616.	4.84	1.21	1.380E-02	238.63	43.100	7.534E-01	PB212
242.04	71.	30.16	1.22	1.365E-02				
277.04	62.	35.05	1.15	1.215E-02				
295.30	118.	14.56	1.25	1.147E-02				
295.30	118.	14.56	1.25	1.147E-02	295.22	19.200	3.913E-01	PB214
300.30	36.	40.58	1.26	1.129E-02				
338.87	127.	16.50	1.23	1.005E-02	338.40	12.010	7.645E-01	AC228
351.95	213.	12.22	1.39	9.680E-03				
351.95	213.	12.22	1.39	9.680E-03	351.99	37.100	4.300E-01	PB214
459.34	25.	37.68	1.37	7.431E-03				
463.33	54.	20.93	1.37	7.367E-03				
463.33	54.	20.93	1.37	7.367E-03	463.51	10.000	5.189E-01	SB125
510.34	135.	15.87	1.52	6.700E-03	510.72	22.500	6.518E-01	TL208
583.24	178.	12.17	1.35	5.889E-03	583.14	86.000	2.546E-01	TL208
609.66	181.	12.00	1.77	5.646E-03	609.32	46.090	5.048E-01	BI214
661.88	33.	36.35	1.51	5.229E-03	661.62	84.620	PBC<MDA	CS137
727.64	41.	32.58	0.90	4.791E-03	727.17	11.800	5.258E-01	BI212
794.47	52.	31.48	1.47	4.426E-03				
794.47	52.	31.48	1.47	4.426E-03	795.76	85.400	1.003E-01	CS134
911.29	136.	11.25	1.88	3.921E-03	911.07	29.000	8.695E-01	AC228
968.95	77.	16.91	1.53	3.718E-03	968.90	17.460	8.579E-01	AC228
1120.54	42.	22.48	1.61	3.283E-03	1120.28	15.040	6.260E-01	BI214
1461.02	539.	4.43	2.19	2.620E-03	1460.75	10.700	1.397E+01	K40
1764.90	15.	30.71	2.24	2.225E-03	1764.51	15.920	3.061E-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	
147.82	74.21	372.	84.	0.042	103.33	1.098	Bl-207	D
154.12	77.36	392.	221.	0.111	42.99	1.100	PB-214	D
477.03	238.63	137.	616.	0.308	14.52	1.215	PB-212	D
483.70	241.97	194.	71.	0.036	90.49	1.217	PB-214	D
599.67	300.01	100.	40.	0.020	116.61	1.383	PB-212	
918.42	459.36	30.	25.	0.012	113.03	1.370	J-134	D
926.41	463.35	37.	54.	0.027	62.79	1.372	SB-125	D
1588.95	794.47	54.	52.	0.026	94.45	1.474	AC-228	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-214	153.80	77.11	789.	208.	0.104	60.88	1.500	D
PB-212	153.80	77.11	789.	208.	0.104	60.88	1.500	D
RA-226	371.62	186.01	409.	76.	0.038	110.61	1.500	
PB-212	476.89	238.63	391.	545.	0.272	20.06	1.500	D

PB-214	590.21	295.28	160.	120.	0.060	52.27	1.500
AC-228	677.41	338.87	120.	127.	0.064	49.49	1.230
PB-214	703.45	351.88	95.	160.	0.080	34.98	1.500
SB-125	926.60	463.43	77.	44.	0.022	92.31	1.500
TL-208	1020.47	510.34	81.	135.	0.068	47.61	1.517s
TL-208	1166.31	583.24	79.	177.	0.089	36.50	1.350
BI-214	1219.17	609.66	78.	181.	0.090	36.01	1.771s
CS-137	1323.66	661.88	56.	33.	0.017	109.06	1.509s
BI-212	1455.24	727.64	44.	41.	0.020	97.75	0.899s
AC-228	1822.71	911.29	31.	136.	0.068	33.75	1.882
AC-228	1938.10	968.95	29.	77.	0.038	50.72	1.530
BI-214	2241.47	1120.54	20.	42.	0.021	67.43	1.606
K-40	2922.94	1461.02	9.	538.	0.269	13.30	2.189
BI-214	3531.27	1764.90	3.	15.	0.007	92.13	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	&(	5.081E-01	1.46E-01 G
K-40		1.3966E+01					
			1460.75	1.397E+01	(P	4.237E-01	6.20E-01 G
MN-54		-1.3521E-03					
			834.81	-1.352E-03	%(P	4.566E-02	1.25E-02 G
CO-57		-7.0387E-03					
			122.07	-7.039E-03	%(	5.715E-02	1.70E-02 G K
			136.43	-1.546E-02	%	4.329E-01	1.28E-01 G
CO-60		2.8757E-02					
			1332.51	2.876E-02	%(P	5.852E-02	1.78E-02 G K
			1173.23	3.110E-02	%	7.468E-02	2.24E-02 G K
Sr-85		-1.5348E-02					
			514.00	-1.535E-02	%(	5.556E-02	1.65E-02 G
Kr-85		-3.4977E+02					
			513.99	-3.498E+02	%(	1.266E+03	3.75E+02 G
Y-88		-2.2538E-05					
			1836.01	-2.254E-05	%(P	2.531E-02	3.43E-03 G K

898.02-4.696E-03 % P 6.395E-02 1.79E-02 G

NB-94 7.9053E-03

871.10 7.905E-03 %(5.488E-02 1.56E-02 G K

702.50 2.079E-02 % 4.280E-02 1.30E-02 G K

Ag-108M -7.8531E-03

722.95-7.853E-03 &(5.690E-02 1.63E-02 G K

614.37-1.525E-02 % P 6.440E-02 1.89E-02 G

433.93 1.074E-02 % 4.401E-02 1.29E-02 G

CD-109 8.4208E-01

88.04 8.421E-01 %(P 2.147E+00 6.49E-01 G

SN-113 -1.5269E-02

391.71-1.527E-02 %(6.421E-02 1.89E-02 G K

255.04 6.736E-02 & 1.683E+00 4.90E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3890E-01						
		427.95	3.878E-02	%(	P	1.187E-01	3.51E-02 G K
		600.77	5.632E-02	%	P	2.187E-01	6.38E-02 G
		636.15	9.087E-02	%	P	3.398E-01	9.89E-02 G
		463.51	4.352E-01	(	P	4.313E-01	1.39E-01 G
		176.29	-1.356E-01	%	P	6.165E-01	1.83E-01 G
I-131	1.4608E-02						
		364.48	1.461E-02	&(		5.591E-02	1.66E-02 G K
		636.97	1.696E-01	&		5.432E-01	1.59E-01 G
		284.29	-2.132E-01	%		8.316E-01	2.48E-01 G
CS-134	-1.6539E-02						
		604.66	-1.654E-02	&(		5.804E-02	1.72E-02 G K
		795.76	3.925E-02	%		5.905E-02	1.85E-02 G
		569.29	1.066E-01	%		2.784E-01	8.32E-02 G
		801.84	-1.304E-01	%	P	6.363E-01	1.84E-01 G
CS-137	5.4287E-02						
		661.62	5.429E-02	*(		6.155E-02	1.97E-02 G
CE-139	1.0253E-02						
		165.85	1.025E-02	%(	P	5.288E-02	1.58E-02 G
EU-152	2.2009E-04						
		121.78	2.201E-04	%(	P	1.608E-01	4.76E-02 G K
		344.30	-5.697E-02	&		1.629E-01	4.88E-02 G
		1408.08	0.000E+00	%		2.737E-01	7.26E-02 G
		964.00	-7.637E-02	%	P	4.777E-01	1.37E-01 G
		1112.07	0.000E+00	&		5.021E-01	1.39E-01 G

778.90 8.018E-02 % P 4.436E-01 1.28E-01 G

EU-154 -1.4665E-02

123.10-1.467E-02 %(P 1.128E-01 3.36E-02 G K

1274.80-2.407E-02 % 2.193E-01 6.22E-02 G

723.30-4.875E-02 & P 2.855E-01 8.24E-02 G

1004.80 1.156E-01 % 3.527E-01 1.04E-01 G

EU-155 -8.1401E-03

86.45-8.140E-03 &(P 2.602E-01 7.73E-02 G K

105.31 1.200E-01 % 2.378E-01 7.22E-02 G

HG-203 -1.5262E-03

279.17-1.526E-03 &(P 5.259E-02 1.54E-02 G K

72.87-8.767E-01 & 2.137E+00 6.47E-01 G

70.83-3.737E-02 % 3.687E+00 1.10E+00 G

82.50-2.706E-01 % 4.260E+00 1.27E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5457E-01						
		583.14	2.546E-01	(P	6.325E-02	3.10E-02	G
		510.72	6.518E-01	+	2.156E-01	1.03E-01	G
PB-212	6.6590E-01						
					Energy duplication		
		238.63	6.659E-01	(	1.160E-01	4.45E-02	G K
					Energy duplication		
		77.11	9.071E-01	+	5.819E-01	1.84E-01	G
		74.81	6.790E-01	& P	1.234E+00	3.75E-01	G
PB-214	3.4897E-01						
		351.99	3.238E-01	(P	9.740E-02	3.78E-02	G K
		295.22	3.975E-01	(	2.035E-01	6.93E-02	G
					Energy duplication		
		77.11	1.484E+00	+	9.516E-01	3.01E-01	G
		241.92	1.599E-01	%	5.433E-01	1.63E-01	G
BI-212	5.2585E-01						
		727.17	5.258E-01	(	4.327E-01	1.71E-01	G K
		1620.56	5.472E-01	% P	1.364E+00	4.01E-01	G
		785.42	6.406E-01	% P	2.794E+00	8.13E-01	G
BI-214	5.3459E-01						
		609.32	5.048E-01	@(	1.228E-01	6.06E-02	G K
		1764.51	3.061E-01	- P	2.266E-01	9.45E-02	G
		1120.28	6.260E-01	(	3.430E-01	1.41E-01	G
RA-224	3.5303E-01						
		241.00	3.530E-01	%(P	1.370E+00	4.10E-01	G

```
RA-226       1.0422E+00
                185.99 1.042E+00  (P 1.322E+00 4.07E-01 G

AC-228       8.4446E-01
                911.07 8.695E-01  (P 1.833E-01 9.80E-02 G K
                968.90 8.579E-01  (P 3.136E-01 1.45E-01 G
                338.40 7.645E-01  (  3.236E-01 1.26E-01 G

TH-227      -1.4560E-01
                236.00-1.456E-01 %(P 5.198E-01 1.56E-01 G K
                256.25 3.443E-02 &   5.872E-01 1.72E-01 G

PA-234      -8.3245E-02
                 98.44-8.325E-02 &(  2.404E-01 7.24E-02 G K
                946.00-2.096E-02 %   2.649E-01 7.39E-02 G
                131.28-1.803E-02 &   2.450E-01 7.29E-02 G
                 94.67-1.657E-02 %   4.143E-01 1.23E-01 G
                883.24 2.351E-02 %   4.410E-01 1.23E-01 G
                926.70 1.499E-01 %   4.449E-01 1.31E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	1.580E-01	%	4.126E-01	1.23E-01	G
TH-234	9.3299E-01						
		63.29	9.330E-01	%(P	4.795E+00	1.44E+00	G K
		92.80	0.000E+00	%	2.413E+00	7.17E-01	G
		92.38	1.655E-01	& P	2.701E+00	8.04E-01	G
AM-241	3.4285E-02						
		59.54	3.428E-02	&(	5.870E-01	1.74E-01	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes: 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	0.0000E+00	0.0000E+00	4.3789E-01	4.3789E-01	5.003E-01
K-40		1.3966E+01	1.3966E+01	1.8585E+00	2.0170E+00	
MN-54	#A	-1.3485E-03	-1.3521E-03	6.5262E-02	6.5262E-02	4.554E-02
CO-57	#B	-7.0170E-03	-7.0387E-03	5.1099E-02	5.1100E-02	5.698E-02
CO-60	#B	2.8745E-02	2.8757E-02	5.3511E-02	5.3536E-02	5.849E-02

Sr-85 #A	-1.5151E-02	-1.5348E-02	4.9420E-02	4.9428E-02	5.485E-02
Kr-85 #A	-3.4977E+02	-3.4977E+02	1.1263E+03	1.1265E+03	1.266E+03
Y-88 #B	-2.2362E-05	-2.2538E-05	1.3523E-04	1.3523E-04	2.511E-02
NB-94 #B	7.9053E-03	7.9053E-03	4.6941E-02	4.6943E-02	5.488E-02
Ag-108M#B	-7.8529E-03	-7.8531E-03	4.8912E-02	4.8914E-02	5.690E-02
CD-109 #A	8.4053E-01	8.4208E-01	1.9459E+00	1.9465E+00	2.143E+00
SN-113 #B	-1.5159E-02	-1.5269E-02	5.6833E-02	5.6839E-02	6.375E-02
SB-125 #F	1.3879E-01	1.3890E-01	1.3273E-01	1.3296E-01	1.186E-01
I-131 #B	1.3165E-02	1.4608E-02	4.9705E-02	4.9712E-02	5.039E-02
CS-134 #B	-1.6520E-02	-1.6539E-02	5.1541E-02	5.1549E-02	5.798E-02
CS-137 #A	5.4283E-02	5.4287E-02	5.9205E-02	5.9284E-02	6.155E-02
CE-139 #A	1.0190E-02	1.0253E-02	4.7337E-02	4.7341E-02	5.256E-02
EU-152 #B	2.2005E-04	2.2009E-04	1.4266E-01	1.4266E-01	1.607E-01
EU-154 #B	-1.4661E-02	-1.4665E-02	1.0378E-01	1.0379E-01	1.128E-01
EU-155 #B	-8.1363E-03	-8.1401E-03	3.3150E+00	3.3150E+00	2.601E-01
HG-203 #B	-1.4990E-03	-1.5262E-03	5.0534E-02	5.0535E-02	5.165E-02
TL-208	2.5457E-01	2.5457E-01	9.3128E-02	9.4218E-02	
PB-212 #	6.6590E-01	6.6590E-01	1.3359E-01	1.3872E-01	1.160E-01
PB-214 #	3.4897E-01	3.4897E-01	1.0982E-01	1.1155E-01	9.740E-02
BI-212	5.2585E-01	5.2585E-01	5.1403E-01	5.1488E-01	
BI-214	5.3459E-01	5.3459E-01	1.9250E-01	1.9482E-01	
RA-224 #A	3.5303E-01	3.5303E-01	1.2303E+00	1.2305E+00	1.370E+00
RA-226 #A	1.0422E+00	1.0422E+00	1.2200E+00	1.2214E+00	1.322E+00
AC-228	8.4446E-01	8.4446E-01	2.2106E-01	2.2609E-01	
TH-227 #B	-1.4560E-01	-1.4560E-01	4.7679E-01	4.7686E-01	5.198E-01
PA-234 #B	-8.3245E-02	-8.3245E-02	2.1735E-01	2.1740E-01	2.404E-01
TH-234 #B	9.3299E-01	9.3299E-01	4.3076E+00	4.3079E+00	4.795E+00
AM-241 #A	3.4285E-02	3.4285E-02	5.2191E-01	5.2192E-01	5.870E-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 (510.6 to 1999.0 keV) 1.6124969E+01 pCi/gm

Total Decayed Activity (510.6 to 1999.0 keV) 1.6124969E+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_31AUG2005_1410.An1

Sample description

FSS-NOL-06-01-029-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_31AUG2005_1410.An1

Acquisition information

Start time:	31-Aug-2005 14:10:45
Live time:	2000
Real time:	2022
Dead time:	1.10 %
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: 1.9480E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9480E+03) =
5.1335E+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 30-Aug-2005 10:15:00
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: 0.1081

***** 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	126.	35.42	1.50	8.847E-03				
74.84	126.	35.42	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.12	152.	29.05	1.50	9.541E-03	77.11	10.700	1.036E+00	PB214
					77.11	17.500	6.332E-01	PB212
77.12	152.	29.05	1.50	9.541E-03	77.11	10.700	1.036E+00	PB214
					77.11	17.500	6.332E-01	PB212
86.77	103.	28.86	1.11	1.205E-02	86.45	32.740	PBC<MDA	EU155

90.11	71.	39.34	1.11	1.278E-02				
93.62	106.	28.90	1.11	1.348E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.834E+00	TH234
					94.67	15.500	3.460E-01	PA234
129.20	77.	38.09	1.05	1.716E-02				
186.05	119.	25.46	1.66	1.626E-02	185.99	3.280	1.484E+00	RA226
238.83	792.	6.46	1.21	1.380E-02	238.63	43.100	9.233E-01	PB212
294.68	130.	18.49	1.08	1.148E-02				
294.68	130.	18.49	1.08	1.148E-02	295.22	19.200	4.103E-01	PB214
338.46	139.	13.99	1.43	1.006E-02	338.40	12.010	7.981E-01	AC228
351.97	250.	10.02	1.58	9.679E-03				
351.97	250.	10.02	1.58	9.679E-03	351.99	37.100	4.822E-01	PB214
463.12	39.	35.75	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
510.91	100.	23.03	0.77	6.692E-03	510.72	22.500	4.601E-01	TL208
583.31	216.	12.11	1.41	5.888E-03	583.14	86.000	2.954E-01	TL208
609.53	159.	14.03	1.18	5.647E-03	609.32	46.090	4.242E-01	BI214
661.61	106.	18.68	1.49	5.230E-03	661.62	84.620	1.654E-01	CS137
727.33	40.	30.99	1.27	4.793E-03	727.17	11.800	4.881E-01	BI212
911.28	137.	13.57	1.73	3.921E-03	911.07	29.000	8.360E-01	AC228
968.78	115.	16.06	1.34	3.718E-03	968.90	17.460	1.231E+00	AC228
1120.74	54.	33.23	1.89	3.283E-03	1120.28	15.040	7.572E-01	BI214
1332.44	48.	26.77	0.88	2.834E-03				
1332.44	48.	26.77	0.88	2.834E-03	1332.51	99.980	1.169E-01	CO60
1461.01	562.	4.27	1.85	2.620E-03	1460.75	10.700	1.389E+01	K40
1764.91	28.	18.90	1.00	2.225E-03	1764.51	15.920	5.466E-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
179.79	90.06	357.	71.	0.036	118.01	1.109	PB-214 ID
477.29	238.83	1124.	162.	0.081	91.14	1.209	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	149.25	74.84	982.	126.	0.063	106.26	1.500s
PB-214	153.80	77.11	904.	152.	0.076	87.14	1.500D
PB-212	153.80	77.11	904.	152.	0.076	87.14	1.500D
TH-234	185.54	92.98	903.	110.	0.055	118.43	1.500s
TH-234	185.51	92.97	855.	131.	0.066	98.21	1.500s
RA-226	371.70	186.05	419.	97.	0.048	90.26	1.500s
PB-212	477.05	238.71	397.	586.	0.293	19.00	1.500
PB-214	590.08	295.21	220.	91.	0.045	76.30	1.500s
AC-228	676.60	338.46	104.	139.	0.069	41.97	1.431s
PB-214	703.84	352.08	120.	229.	0.115	28.30	1.500s

SB-125	926.00	463.12	86.	39.	0.019	107.26	1.500s
TL-208	1021.59	510.91	116.	100.	0.050	69.10	0.769s
TL-208	1166.45	583.31	109.	216.	0.108	36.32	1.413
BI-214	1218.91	609.53	92.	159.	0.080	42.09	1.175s
CS-137	1323.12	661.61	72.	106.	0.053	56.03	1.489
BI-212	1454.62	727.33	43.	40.	0.020	92.97	1.273
AC-228	1822.70	911.28	57.	137.	0.069	40.71	1.729
AC-228	1937.76	968.78	53.	115.	0.058	48.18	1.343
BI-214	2241.88	1120.74	65.	54.	0.027	99.69	1.891s
CO-60	2666.10	1332.70	27.	25.	0.012	106.50	1.959s
K-40	2922.92	1461.01	4.	562.	0.281	12.80	1.854
BI-214	3531.29	1764.91	0.	28.	0.014	56.69	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 -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS
BE-7		1.8680E-01				
			477.56	1.868E-01	%(	3.981E-01 1.21E-01 G
K-40		1.3894E+01				
			1460.75	1.389E+01	(P	3.075E-01 5.93E-01 G
MN-54		3.9896E-03				
			834.81	3.990E-03	&(P	6.560E-02 1.87E-02 G
CO-57		2.4174E-03				
			122.07	2.417E-03	%(	5.090E-02 1.51E-02 G K
			136.43	-9.973E-02	&	4.374E-01 1.31E-01 G
CO-60		6.1133E-02				
			1332.51	6.113E-02	(P	6.601E-02 2.18E-02 G K
			1173.23	3.506E-02	%	8.582E-02 2.58E-02 G K
Sr-85		-1.5851E-02				
			514.00	-1.585E-02	&(	6.072E-02 1.80E-02 G
Kr-85		-3.6140E+02				
			513.99	-3.614E+02	&(	1.384E+03 4.11E+02 G
Y-88		-3.0479E-03				
			1836.01	-3.048E-03	%(P	3.807E-02 9.40E-03 G K

898.02 7.520E-03 % P 5.785E-02 1.64E-02 G

NB-94 -1.0904E-02

871.10-1.090E-02 &(4.950E-02 1.43E-02 G K

702.50 3.804E-03 & 6.018E-02 1.73E-02 G K

Ag-108M 1.1273E-03

722.95 1.127E-03 &(6.539E-02 1.86E-02 G K

614.37-1.292E-02 % P 5.864E-02 1.72E-02 G

433.93-6.795E-03 % 4.625E-02 1.35E-02 G

CD-109 -9.1225E-01

88.04-9.122E-01 &(P 2.341E+00 7.07E-01 G

SN-113 -1.1437E-02

391.71-1.144E-02 %(6.996E-02 2.06E-02 G K

255.04-2.461E-01 % 1.982E+00 5.86E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.9725E-02						
		427.95	-3.702E-03	&(P	1.384E-01	3.94E-02	G K
		600.77	-1.437E-02	% P	2.640E-01	7.52E-02	G
		636.15	-2.926E-02	% P	3.876E-01	1.10E-01	G
		463.51	3.663E-01	*(P	4.322E-01	1.36E-01	G
		176.29	-2.429E-02	% P	6.697E-01	1.97E-01	G
I-131	-1.1165E-02						
		364.48	-1.117E-02	&(	5.617E-02	1.66E-02	G K
		636.97	6.150E-02	&	6.020E-01	1.70E-01	G
		284.29	-1.125E-01	%	7.833E-01	2.32E-01	G
CS-134	1.7765E-02						
		604.66	1.777E-02	%(	5.333E-02	1.59E-02	G K
		795.76	-1.310E-02	%	6.444E-02	1.87E-02	G
		569.29	1.353E-01	%	2.380E-01	7.33E-02	G
		801.84	-4.701E-02	& P	5.392E-01	1.51E-01	G
CS-137	1.6540E-01						
		661.62	1.654E-01	(	6.646E-02	3.09E-02	G
CE-139	-1.2737E-02						
		165.85	-1.274E-02	%(P	5.715E-02	1.71E-02	G
EU-152	1.2873E-02						
		121.78	1.287E-02	%(P	1.620E-01	4.82E-02	G K
		344.30	2.799E-02	&	1.469E-01	4.33E-02	G
		1408.08	7.039E-02	%	2.143E-01	6.23E-02	G
		964.00	2.158E-01	& P	4.876E-01	1.47E-01	G
		1112.07	-6.444E-02	%	5.554E-01	1.59E-01	G

778.90 8.123E-02 % P 3.355E-01 9.71E-02 G

EU-154 4.0693E-04

123.10 4.069E-04 &(P 1.149E-01 3.41E-02 G K

1274.80-2.893E-02 % 2.209E-01 6.31E-02 G

723.30-1.089E-01 & P 3.243E-01 9.64E-02 G

1004.80-8.311E-02 % 3.659E-01 1.06E-01 G

EU-155 5.1409E-06

86.45 5.141E-06 %(P 2.657E-01 7.91E-02 G K

105.31 1.080E-01 % 2.261E-01 6.86E-02 G

HG-203 2.4928E-02

279.17 2.493E-02 &(P 4.561E-02 1.39E-02 G K

72.87-5.926E-01 % 2.069E+00 6.23E-01 G

70.83-1.449E+00 % 4.023E+00 1.21E+00 G

82.50-5.825E-01 % 4.224E+00 1.27E+00 G

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

TL-208       2.9540E-01
                   583.14 2.954E-01  (P 7.043E-02 3.58E-02 G
                   510.72 4.601E-01 +   2.437E-01 1.06E-01 G

PB-212       6.6910E-01
                   238.63 6.837E-01  (  1.114E-01 4.33E-02 G K
                                        Energy duplication
                    77.11 6.332E-01 *(  5.933E-01 1.84E-01 G
                    74.81 1.029E+00 & P 1.215E+00 3.73E-01 G

PB-214       4.4281E-01
                   351.99 4.428E-01  (P 1.039E-01 4.18E-02 G K
                   295.22 2.857E-01 -   2.266E-01 7.27E-02 G
                                        Energy duplication
                    77.11 1.036E+00 +   9.703E-01 3.01E-01 G
                   241.92-2.290E-02 %   8.133E-01 2.42E-01 G

BI-212       4.8806E-01
                   727.17 4.881E-01  (  4.088E-01 1.51E-01 G K
                  1620.56-3.531E-02 % P 7.756E-01 1.05E-01 G
                   785.42 1.055E-01 & P 2.318E+00 6.46E-01 G

BI-214       4.5558E-01
                   609.32 4.242E-01 @(  1.262E-01 5.95E-02 G K
                  1764.51 5.466E-01  (P 1.443E-01 1.04E-01 G
                  1120.28 7.572E-01 +   5.663E-01 2.52E-01 G

RA-224       5.5544E-01
                   241.00 5.554E-01 %(P 1.400E+00 4.22E-01 G
```

```
RA-226       1.2603E+00
                 185.99 1.260E+00 *(P 1.276E+00 3.97E-01 G

AC-228       8.2493E-01
                 911.07 8.360E-01  (P 2.310E-01 1.14E-01 G K
                 968.90 1.231E+00 + P 3.909E-01 1.98E-01 G
                 338.40 7.981E-01 @(  2.884E-01 1.12E-01 G

TH-227      -2.4354E-01
                 236.00-2.435E-01 &(P 5.157E-01 1.56E-01 G K
                 256.25 6.729E-02 %   5.941E-01 1.75E-01 G

PA-234      -7.4459E-03
                  98.44-7.446E-03 &(  2.303E-01 6.84E-02 G K
                 946.00 0.000E+00 %   3.924E-01 1.12E-01 G
                 131.28-2.569E-02 %   2.484E-01 7.41E-02 G
                  94.67-1.194E-02 %   4.565E-01 1.36E-01 G
                 883.24-1.932E-04 %   4.454E-01 1.23E-01 G
                 926.70-8.413E-02 %   5.872E-01 1.69E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26 2.006E-01 % 3.527E-01 1.09E-01 G

TH-234 1.8136E+00
63.29 1.183E+00 %(P 4.837E+00 1.45E+00 G K
92.80 2.274E+00 *(2.411E+00 7.44E-01 G
92.38 2.234E+00 *(P 2.908E+00 8.91E-01 G

AM-241 -8.6188E-02
59.54-8.619E-02 &(6.672E-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

- -

***** 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	1.8400E-01	1.8680E-01	3.6183E-01	3.6198E-01	3.922E-01
K-40		1.3894E+01	1.3894E+01	1.7793E+00	1.9427E+00	
MN-54	#A	3.9793E-03	3.9896E-03	5.6157E-02	5.6157E-02	6.543E-02
CO-57	#B	2.4102E-03	2.4174E-03	4.5262E-02	4.5262E-02	5.074E-02
CO-60	#B	6.1108E-02	6.1133E-02	6.5312E-02	6.5402E-02	6.598E-02

Sr-85 #A	-1.5655E-02	-1.5851E-02	5.4075E-02	5.4082E-02	5.996E-02
Kr-85 #A	-3.6140E+02	-3.6140E+02	1.2329E+03	1.2331E+03	1.384E+03
Y-88 #B	-3.0249E-03	-3.0479E-03	2.8590E-02	2.8590E-02	3.779E-02
NB-94 #B	-1.0904E-02	-1.0904E-02	4.2862E-02	4.2866E-02	4.950E-02
Ag-108M#B	1.1272E-03	1.1273E-03	5.5756E-02	5.5756E-02	6.539E-02
CD-109 #A	-9.1063E-01	-9.1225E-01	2.2268E+00	2.2274E+00	2.337E+00
SN-113 #B	-1.1358E-02	-1.1437E-02	6.1661E-02	6.1664E-02	6.947E-02
SB-125 #B	8.9654E-02	8.9725E-02	1.0007E-01	1.0020E-01	1.383E-01
I-131 #B	-1.0099E-02	-1.1165E-02	4.9682E-02	4.9686E-02	5.081E-02
CS-134 #B	1.7746E-02	1.7765E-02	4.7614E-02	4.7625E-02	5.327E-02
CS-137	1.6539E-01	1.6540E-01	9.2674E-02	9.3138E-02	
CE-139 #A	-1.2662E-02	-1.2737E-02	5.3146E-02	5.3151E-02	5.681E-02
EU-152 #B	1.2871E-02	1.2873E-02	1.4449E-01	1.4449E-01	1.619E-01
EU-154 #B	4.0682E-04	4.0693E-04	1.0216E-01	1.0216E-01	1.149E-01
EU-155 #B	5.1386E-06	5.1409E-06	2.3733E-01	2.3733E-01	2.656E-01
HG-203 #B	2.4500E-02	2.4928E-02	4.1728E-02	4.1751E-02	4.483E-02
TL-208	2.9540E-01	2.9540E-01	1.0748E-01	1.0875E-01	
PB-212 #	6.6910E-01	6.6910E-01	1.2714E-01	1.3257E-01	1.114E-01
PB-214 #	4.4281E-01	4.4281E-01	1.2552E-01	1.2796E-01	1.039E-01
BI-212	4.8806E-01	4.8806E-01	4.5374E-01	4.5457E-01	
BI-214	4.5558E-01	4.5558E-01	1.6117E-01	1.6318E-01	
RA-224 #A	5.5544E-01	5.5544E-01	1.2674E+00	1.2678E+00	1.400E+00
RA-226 #A	1.2603E+00	1.2603E+00	1.1899E+00	1.1920E+00	1.276E+00
AC-228	8.2493E-01	8.2493E-01	2.4137E-01	2.4577E-01	
TH-227 #B	-2.4354E-01	-2.4354E-01	4.7383E-01	4.7403E-01	5.157E-01
PA-234 #B	-7.4459E-03	-7.4459E-03	2.0527E-01	2.0527E-01	2.303E-01
TH-234 #B	1.8136E+00	1.8136E+00	1.7812E+00	1.7840E+00	4.837E+00
AM-241 #A	-8.6187E-02	-8.6188E-02	5.9740E-01	5.9742E-01	6.672E-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) 1.6123568E+01 pCi/gm

Total Decayed Activity (50.2 to 1999.0 keV) 1.6123579E+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_31AUG2005_1447.An1

Sample description

FSS-NOL-06-01-022-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_31AUG2005_1447.An1

Acquisition information

Start time:	31-Aug-2005 14:47:31
Live time:	2000
Real time:	3354
Dead time:	40.36 %
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: 1.5850E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5850E+03) =
6.3091E+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 29-Aug-2005 15:40:00
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. 3 cutoff 20.00000 %
Energy Calibration
Normalized diff: 1.0000

***** 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
310.59	1460.	19.42	1.32	1.093E-02				
510.53	665.	35.17	1.34	6.697E-03				
510.53	665.	35.17	1.34	6.697E-03	510.72	22.500	3.766E+00	TL208
821.23	1157.	29.00	2.68	4.297E-03				
1113.10	2080.	15.52	0.99	3.301E-03				
1173.46	244527.	0.23	2.07	3.156E-03	1173.23	99.860	6.618E+02	CO60
1332.77	217494.	0.23	2.22	2.833E-03	1332.51	99.980	6.550E+02	CO60

1461.71	494.	16.00	2.44	2.619E-03	1460.75	10.700	1.501E+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	
620.84	310.59	29248.	1460.	0.730	58.25	1.324	-	s
1020.85	510.53	20040.	665.	0.333	105.52	1.343	J-133	l
1642.50	821.23	32794.	1157.	0.579	87.00	2.678	PA-234	s
2226.58	1113.10	29340.	1902.	0.951	38.82	0.987	EU-152	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
CO-60	2347.39	1173.46	18949.	244527.	122.264	0.70	2.067s
CO-60	2666.23	1332.77	4717.	217494.	108.747	0.68	2.217s
K-40	2924.32	1461.71	1473.	494.	0.247	47.99	2.445s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.4566E-01					
			477.56	-1.457E-01	&(	7.960E+00	2.41E+00 G
K-40		1.5009E+01					
			1460.75	1.501E+01	*(P	5.521E+00	2.40E+00 G
MN-54		-1.4275E-01					
			834.81	-1.427E-01	&(P	1.510E+00	4.57E-01 G
CO-57		1.2667E-02					
			122.07	1.267E-02	%(	6.636E-01	2.01E-01 G K

136.43-8.299E-01 % 5.351E+00 1.62E+00 G

CO-60 6.5839E+02

1332.51 6.550E+02 *(P 9.720E-01 1.48E+00 G K

1173.23 6.618E+02 *(1.743E+00 1.55E+00 G K

Sr-85 -4.1447E-01

514.00-4.145E-01 %(8.117E-01 2.46E-01 G

Kr-85 -9.3249E+03

513.99-9.325E+03 %(1.835E+04 5.57E+03 G

Y-88 3.1155E-02

1836.01 3.115E-02 %(P 5.403E-01 1.61E-01 G K

898.02 4.208E-02 % P 1.970E+00 5.96E-01 G

NB-94 3.4559E-01

871.10 3.456E-01 &(1.668E+00 5.05E-01 G K

702.50-1.860E-01 % 1.179E+00 3.57E-01 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-2.6571E-01						
		722.95	-2.657E-01	%(	1.320E+00	4.00E-01	G K
		614.37	-2.361E-02	% P	9.956E-01	3.01E-01	G
		433.93	-3.138E-01	%	7.978E-01	2.42E-01	G
CD-109	-3.9252E+00						
		88.04	-3.925E+00	&(P	1.943E+01	5.89E+00	G
SN-113	-1.6976E-01						
		391.71	-1.698E-01	&(	1.131E+00	3.42E-01	G K
		255.04	-3.137E+00	&	3.163E+01	9.58E+00	G
SB-125	-5.1252E-01						
		427.95	-5.125E-01	&(P	1.996E+00	6.04E-01	G K
		600.77	1.078E+00	% P	5.283E+00	1.60E+00	G
		636.15	3.338E-01	% P	7.105E+00	2.15E+00	G
		463.51	3.125E-03	& P	8.046E+00	2.43E+00	G
		176.29	2.033E+00	& P	8.579E+00	2.60E+00	G
I-131	-2.5338E-01						
		364.48	-2.534E-01	&(	9.366E-01	2.84E-01	G K
		636.97	2.204E+00	%	1.680E+01	5.08E+00	G
		284.29	-8.961E-02	%	1.255E+01	3.80E+00	G
CS-134	-8.4377E-02						
		604.66	-8.438E-02	%(	9.156E-01	2.77E-01	G K
		795.76	2.209E-01	%	1.714E+00	5.19E-01	G
		569.29	-1.787E+00	%	5.689E+00	1.72E+00	G
		801.84	5.462E+00	% P	1.559E+01	4.72E+00	G

```
CS-137       4.1711E-01
                 661.62 4.171E-01 %(  1.238E+00 3.75E-01 G

CE-139       1.0554E-01
                 165.85 1.055E-01 %(P 6.807E-01 2.06E-01 G

EU-152      -9.1360E-01
                 121.78-9.136E-01 %(P 1.933E+00 5.86E-01 G K
                 344.30-4.276E-02 &   2.259E+00 6.83E-01 G
                1408.08 6.023E-01 &   2.209E+00 6.65E-01 G
                 964.00 3.657E-01 % P 1.339E+01 4.05E+00 G
                1112.07 3.953E+00 %   1.449E+01 4.39E+00 G
                 778.90 1.621E+00 % P 1.089E+01 3.30E+00 G

EU-154       3.3184E-01
                 123.10 3.318E-01 &(P 1.426E+00 4.32E-01 G K
                1274.80-2.776E-01 &   1.991E+00 5.99E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-1.092E+00 %	P	5.886E+00	1.78E+00	G
		1004.80	9.627E-02 %		9.273E+00	2.80E+00	G
EU-155	7.4926E-01						
		86.45	7.493E-01 %(	P	2.356E+00	7.14E-01	G K
		105.31	2.701E-01 %		2.841E+00	8.61E-01	G
HG-203	1.5766E-03						
		279.17	1.577E-03 %(	P	6.328E-01	1.91E-01	G K
		72.87	-1.719E+00 &		1.698E+01	5.14E+00	G
		70.83	3.862E+00 %		3.326E+01	1.01E+01	G
		82.50	-3.906E+00 %		3.606E+01	1.09E+01	G
TL-208	2.6755E-01						
		583.14	2.676E-01 %(	P	1.069E+00	3.24E-01	G
		510.72	2.577E+00 %		3.877E+00	1.18E+00	G
PB-212	6.7384E-01						
		238.63	6.738E-01 %(		1.554E+00	4.71E-01	G K
					Energy duplication		
		77.11	1.260E+00 %		5.251E+00	1.59E+00	G
		74.81	2.011E-01 %	P	1.028E+01	3.11E+00	G
PB-214	3.6353E-01						
		351.99	3.635E-01 %(	P	1.813E+00	5.49E-01	G K
		295.22	2.575E-01 %		3.341E+00	1.01E+00	G
					Energy duplication		
		77.11	2.060E+00 %		8.588E+00	2.60E+00	G
		241.92	-1.861E+00 &		8.964E+00	2.72E+00	G
BI-212	2.7754E+00						

727.17 2.775E+00 %(1.040E+01 3.15E+00 G K
1620.56-3.612E+00 % P 1.849E+01 5.55E+00 G
785.42 1.015E+01 & P 6.978E+01 2.11E+01 G

BI-214 4.7894E-01
609.32 4.789E-01 %(2.145E+00 6.49E-01 G K
1764.51 1.441E-01 % P 3.195E+00 9.52E-01 G
1120.28-7.161E+00 % 1.212E+01 3.68E+00 G

RA-224 -3.4999E+00
241.00-3.500E+00 &(P 1.717E+01 5.20E+00 G

RA-226 1.1318E+00
185.99 1.132E+00 %(P 1.405E+01 4.25E+00 G

AC-228 6.3224E-01
911.07 6.322E-01 %(P 6.501E+00 1.97E+00 G K
968.90-4.665E+00 % P 1.025E+01 3.11E+00 G
338.40 7.832E-01 % 5.496E+00 1.66E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.6273E-02						
		236.00	-3.627E-02	&(P	5.852E+00	1.77E+00	G K
		256.25	1.932E-02	%	8.659E+00	2.62E+00	G
PA-234	2.9698E-01						
		98.44	2.970E-01	%(	2.323E+00	7.04E-01	G K
		946.00	7.606E-03	%	1.046E+01	3.17E+00	G
		131.28	7.010E-01	%	2.511E+00	7.61E-01	G
		94.67	1.095E+00	%	4.193E+00	1.27E+00	G
		883.24	2.332E-02	&	1.322E+01	4.00E+00	G
		926.70	-1.479E+00	%	1.812E+01	5.49E+00	G
		569.26	-2.810E+00	%	8.429E+00	2.55E+00	G
TH-234	1.2660E+00						
		63.29	1.266E+00	&(P	3.911E+01	1.18E+01	G K
		92.80	6.496E+00	%	2.215E+01	6.72E+00	G
		92.38	7.447E+00	% P	2.598E+01	7.88E+00	G
AM-241	-4.3269E-02						
		59.54	-4.327E-02	&(	6.735E+00	2.04E+00	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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	-1.4199E-01	-1.4566E-01	7.2190E+00	7.2190E+00	7.760E+00
K-40 #	1.5009E+01	1.5009E+01	7.2047E+00	7.2538E+00	
MN-54 #A	-1.4213E-01	-1.4275E-01	1.3793E+00	1.3794E+00	1.504E+00
CO-57 #B	1.2603E-02	1.2667E-02	6.0279E-01	6.0279E-01	6.603E-01
CO-60 #	6.5792E+02	6.5839E+02	3.2121E+00	3.7086E+01	
Sr-85 #A	-4.0586E-01	-4.1447E-01	7.3905E-01	7.3942E-01	7.948E-01
Kr-85 #A	-9.3247E+03	-9.3249E+03	1.6707E+04	1.6715E+04	1.835E+04
Y-88 #B	3.0759E-02	3.1155E-02	4.8309E-01	4.8309E-01	5.334E-01
NB-94 #B	3.4559E-01	3.4559E-01	1.5157E+00	1.5158E+00	1.668E+00
Ag-108M#B	-2.6570E-01	-2.6571E-01	1.1993E+00	1.1994E+00	1.320E+00
CD-109 #A	-3.9135E+00	-3.9252E+00	1.7906E+01	1.7907E+01	1.937E+01
SN-113 #B	-1.6776E-01	-1.6976E-01	1.0269E+00	1.0270E+00	1.118E+00
SB-125 #B	-5.1184E-01	-5.1252E-01	1.8383E+00	1.8385E+00	1.993E+00
I-131 #B	-2.1393E-01	-2.5338E-01	8.5126E-01	8.5138E-01	7.908E-01
CS-134 #B	-8.4224E-02	-8.4377E-02	8.3054E-01	8.3055E-01	9.140E-01
CS-137 #A	4.1706E-01	4.1711E-01	1.1253E+00	1.1256E+00	1.238E+00
CE-139 #A	1.0450E-01	1.0554E-01	6.1865E-01	6.1868E-01	6.740E-01
EU-152 #B	-9.1333E-01	-9.1360E-01	1.7653E+00	1.7660E+00	1.932E+00
EU-154 #B	3.3169E-01	3.3184E-01	1.2963E+00	1.2964E+00	1.425E+00
EU-155 #B	7.4869E-01	7.4926E-01	2.1434E+00	2.1438E+00	2.355E+00
HG-203 #B	1.5312E-03	1.5766E-03	5.7389E-01	5.7389E-01	6.145E-01
TL-208 #A	2.6755E-01	2.6755E-01	9.7158E-01	9.7170E-01	1.069E+00

PB-212 #B	6.7384E-01	6.7384E-01	1.4145E+00	1.4150E+00	1.554E+00
PB-214 #B	3.6353E-01	3.6353E-01	1.6469E+00	1.6471E+00	1.813E+00
BI-212 #B	2.7754E+00	2.7754E+00	9.4538E+00	9.4551E+00	1.040E+01
BI-214 #B	4.7894E-01	4.7894E-01	1.9482E+00	1.9483E+00	2.145E+00
RA-224 #A	-3.4999E+00	-3.4999E+00	1.5775E+01	1.5776E+01	1.717E+01
RA-226 #A	1.1318E+00	1.1318E+00	1.2762E+01	1.2762E+01	1.405E+01
AC-228 #B	6.3224E-01	6.3224E-01	5.9036E+00	5.9037E+00	6.501E+00
TH-227 #B	-3.6273E-02	-3.6273E-02	5.7926E+00	5.7926E+00	5.852E+00
PA-234 #B	2.9698E-01	2.9698E-01	2.1106E+00	2.1107E+00	2.323E+00
TH-234 #B	1.2660E+00	1.2660E+00	3.5499E+01	3.5499E+01	3.911E+01
AM-241 #A	-4.3269E-02	-4.3269E-02	6.1154E+00	6.1154E+00	6.735E+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 (50.2 to 1999.0 keV) 6.7292993E+02 pCi/gm

Total Decayed Activity (50.2 to 1999.0 keV) 6.7339508E+02 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_20OCT2005_1259.An1

Sample description

NOL-06-01-003-R WET

Spectrum Filename: C:\GammaVision\Spectra\103_20OCT2005_1259.An1

Acquisition information

Start time:	20-Oct-2005 13:00:07
Live time:	1000
Real time:	1001
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: 2.4810E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.4810E+03) =
4.0306E+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	20-Oct-2005 12:05:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1086

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.86	71.	32.49	0.99	9.052E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.16	96.	20.47	0.99	1.011E-02	77.11	17.500	7.392E-01	PB212
					77.11	10.700	1.209E+00	PB214
186.08	131.	28.39	1.07	2.566E-02	185.99	3.280	1.606E+00	RA226
238.85	632.	4.82	1.09	2.319E-02	238.63	43.100	6.820E-01	PB212
242.02	88.	25.48	1.10	2.302E-02	241.00	3.900	1.069E+00	RA224

					241.92	7.470	5.591E-01	PB214
270.32	103.	28.61	1.77	2.151E-02				
295.15	144.	15.70	1.14	2.025E-02	295.22	19.200	3.981E-01	PB214
338.11	204.	14.55	0.85	1.831E-02	338.40	12.010	1.007E+00	AC228
351.84	238.	10.48	1.22	1.776E-02	351.99	37.100	3.887E-01	PB214
463.12	60.	36.68	1.44	1.426E-02				
463.12	60.	36.68	1.44	1.426E-02	463.51	10.000	4.509E-01	SB125
510.69	111.	19.14	1.57	1.317E-02	510.72	22.500	3.597E-01	TL208
583.11	208.	9.47	1.29	1.185E-02	583.14	86.000	2.198E-01	TL208
609.20	202.	8.67	1.32	1.144E-02	609.32	46.090	4.103E-01	BI214
661.58	590.	5.08	1.22	1.072E-02	661.62	84.620	7.078E-01	CS137
727.57	54.	28.69	1.46	9.961E-03	727.17	11.800	4.980E-01	BI212
795.08	28.	37.83	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
859.56	30.	34.27	1.03	8.775E-03				
911.01	164.	10.81	1.20	8.402E-03	911.07	29.000	7.235E-01	AC228
968.94	126.	14.05	1.51	8.026E-03	968.90	17.460	9.789E-01	AC228
1120.04	66.	21.37	2.40	7.212E-03	1120.28	15.040	6.634E-01	BI214
1172.78	68.	19.06	1.65	6.974E-03	1173.23	99.860	1.046E-01	CO60
1332.14	54.	20.57	1.56	6.349E-03	1332.51	99.980	9.280E-02	CO60
1460.64	772.	3.63	1.71	5.932E-03	1460.75	10.700	1.310E+01	K40
1764.41	46.	14.43	2.11	5.142E-03	1764.51	15.920	6.170E-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
539.79	270.32	282.	103.	0.103	85.82	1.769	AC-228 s
1718.16	859.56	32.	30.	0.031	102.81	1.030	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	242.	71.	0.071	97.46	0.993D
PB-212	153.39	77.11	240.	96.	0.096	61.40	0.995A
RA-226	371.28	186.06	565.	85.	0.085	113.47	1.500s
PB-212	476.98	238.91	430.	626.	0.626	19.77	0.881
RA-224	482.38	241.61	529.	83.	0.083	122.52	1.500s
PB-214	589.45	295.15	162.	142.	0.142	47.10	1.142
AC-228	675.36	338.11	212.	203.	0.203	43.66	0.852s
PB-214	702.83	351.84	150.	235.	0.235	31.43	1.224
SB-125	925.48	463.18	130.	58.	0.058	91.60	1.500s
TL-208	1020.49	510.69	131.	98.	0.098	57.41	1.568s

TL-208	1165.33	583.11	68.	206.	0.206	28.40	1.290
Bl-214	1217.25	609.08	89.	225.	0.225	29.28	1.515s
CS-137	1322.24	661.58	86.	590.	0.590	15.24	1.219
Bl-212	1454.20	727.57	62.	54.	0.054	86.07	1.462s
CS-134	1589.22	795.08	44.	28.	0.028	113.49	1.500
AC-228	1821.04	911.01	44.	162.	0.162	32.42	1.201
AC-228	1936.90	968.94	52.	126.	0.126	42.14	1.509
Bl-214	2239.06	1120.04	47.	66.	0.066	64.11	2.405s
CO-60	2344.52	1172.78	35.	67.	0.067	57.18	1.648
CO-60	2663.19	1332.14	21.	54.	0.054	61.71	1.563
K-40	2920.15	1460.64	13.	763.	0.763	10.90	1.711
Bl-214	3527.58	1764.41	2.	46.	0.046	43.30	2.112

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		9.2592E-02					
			477.56	9.259E-02	&(	4.140E-01	1.22E-01 G
K-40		1.3098E+01					
			1460.75	1.310E+01	(P	3.333E-01	4.82E-01 G
MN-54		-1.3483E-02					
			834.81	-1.348E-02	%(P	4.275E-02	1.26E-02 G
CO-57		1.6721E-02					
			122.07	1.672E-02	%(P	6.677E-02	2.00E-02 G K
			136.43	2.351E-02	&	4.762E-01	1.41E-01 G
CO-60		9.8681E-02					
			1332.51	9.280E-02	(P	4.123E-02	1.96E-02 G K
			1173.23	1.046E-01	(P	4.749E-02	2.02E-02 G K
Sr-85		-2.1938E-02					
			514.00	-2.194E-02	%(	5.520E-02	1.66E-02 G
Kr-85		-5.0632E+02					
			513.99	-5.063E+02	%(	1.274E+03	3.84E+02 G
Y-88		-6.9261E-05					
			1836.01	-6.926E-05	%(P	3.595E-02	9.09E-03 G K

898.02-4.109E-03 % P 4.195E-02 1.18E-02 G

NB-94 1.0812E-02

871.10 1.081E-02 %(3.224E-02 9.50E-03 G K

702.50 7.035E-05 & 4.050E-02 1.14E-02 G K

Ag-108M 1.9531E-02

722.95 1.953E-02 %(5.011E-02 1.50E-02 G K

614.37 2.411E-02 % P 4.136E-02 1.27E-02 G

433.93 1.567E-02 % 4.656E-02 1.39E-02 G

CD-109 6.4870E-02

88.04 6.487E-02 &(2.228E+00 6.61E-01 G

SN-113 -1.1381E-02

391.71-1.138E-02 &(6.308E-02 1.86E-02 G K

255.04 1.705E-01 % 2.027E+00 5.99E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.5168E-01						
		427.95	5.410E-02	%(P	1.290E-01	3.89E-02	G K
		600.77	3.091E-02	% P	1.915E-01	5.54E-02	G
		636.15	-5.401E-03	& P	3.488E-01	9.85E-02	G
		463.51	4.405E-01	(P	4.264E-01	1.36E-01	G
		176.29	1.447E-01	&	5.498E-01	1.64E-01	G
I-131	4.1930E-03						
		364.48	4.193E-03	&(P	4.442E-02	1.30E-02	G K
		636.97	-4.994E-03	&	4.846E-01	1.36E-01	G
		284.29	-9.485E-02	% P	6.552E-01	1.94E-01	G
CS-134	1.0516E-02						
		604.66	-1.441E-02	%(	5.336E-02	1.58E-02	G K
		795.76	3.901E-02	(P	4.605E-02	1.48E-02	G
		569.29	-7.745E-03	% P	2.075E-01	5.78E-02	G
		801.84	-9.785E-02	& P	4.996E-01	1.44E-01	G
CS-137	7.0779E-01						
		661.62	7.078E-01	(P	5.529E-02	3.60E-02	G
CE-139	1.0996E-02						
		165.85	1.100E-02	%(	5.577E-02	1.67E-02	G
EU-152	4.3190E-03						
		121.78	4.319E-03	%(P	2.016E-01	5.99E-02	G K
		344.30	-4.259E-02	% P	1.559E-01	4.65E-02	G
		1408.08	3.312E-02	%	1.937E-01	5.45E-02	G
		964.00	2.016E-01	% P	2.774E-01	8.78E-02	G
		1112.07	5.179E-02	&	3.393E-01	9.69E-02	G

778.90 0.000E+00 % 3.192E-01 8.96E-02 G

EU-154 3.0365E-02

123.10 3.036E-02 &(1.283E-01 3.85E-02 G K

1274.80 3.315E-02 & 1.189E-01 3.46E-02 G

723.30 0.000E+00 % 3.786E-01 1.10E-01 G

1004.80 7.579E-02 % 1.936E-01 5.77E-02 G

EU-155 6.5404E-02

86.45 6.540E-02 %(2.813E-01 8.43E-02 G K

105.31 2.161E-02 & 2.948E-01 8.77E-02 G

HG-203 7.0319E-03

279.17 7.032E-03 %(P 4.298E-02 1.27E-02 G K

72.87 8.977E-01 & P 2.520E+00 7.60E-01 G

70.83-7.345E-02 % 5.009E+00 1.49E+00 G

82.50 1.828E-02 & 3.708E+00 1.09E+00 G

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

TL-208       2.1982E-01
                   583.14 2.198E-01  (P 4.413E-02 2.10E-02 G
                   510.72 3.597E-01 + P 2.061E-01 7.82E-02 G

PB-212       6.9856E-01
                   238.63 6.821E-01  (P 1.082E-01 4.54E-02 G K
                                        Energy duplication
                    77.11 5.921E-01 } P 4.609E-01 1.21E-01 G
                    74.81 8.880E-01 + P 9.424E-01 2.95E-01 G

PB-214       3.9187E-01
                   351.99 3.887E-01  (P 9.889E-02 4.12E-02 G K
                   295.22 3.981E-01  (P 1.738E-01 6.34E-02 G
                                        Energy duplication
                    77.11 0.000E+00 } P 1.097E+00 0.00E+00 G
                   241.92 2.058E-01 %   7.309E-01 2.20E-01 G

BI-212       4.9799E-01
                   727.17 4.980E-01  (P 3.657E-01 1.44E-01 G K
                  1620.56 1.871E-02 & P 1.336E+00 3.48E-01 G
                   785.42 0.000E+00 %   2.127E+00 5.98E-01 G

BI-214       4.6420E-01
                   609.32 4.642E-01 *(P 9.660E-02 4.59E-02 G K
                  1764.51 6.170E-01 + P 1.154E-01 9.22E-02 G
                  1120.28 6.634E-01 + P 3.479E-01 1.44E-01 G

RA-224       1.0011E+00
                   241.00 1.001E+00  (  1.330E+00 4.09E-01 G
```

```
RA-226      1.1061E+00
                185.99 1.106E+00 *(P 1.469E+00 4.50E-01 G

AC-228      7.2352E-01
                911.07 7.235E-01  (P 1.506E-01 7.90E-02 G K
                968.90 9.789E-01 + P 2.825E-01 1.38E-01 G
                338.40 1.007E+00 + P 3.495E-01 1.47E-01 G

TH-227     -2.7133E-01
                236.00-2.713E-01 %(  4.931E-01 1.50E-01 G K
                256.25 7.327E-02 % P 5.796E-01 1.72E-01 G

PA-234     -4.0557E-03
                 98.44-4.056E-03 &(P 2.059E-01 6.06E-02 G K
                946.00 5.795E-03 & P 1.942E-01 5.38E-02 G
                131.28-6.618E-03 % P 2.806E-01 8.34E-02 G
                 94.67-2.533E-02 % P 4.846E-01 1.44E-01 G
                883.24-7.014E-02 &   3.246E-01 9.39E-02 G
                926.70 4.938E-04 %   3.246E-01 8.87E-02 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments

569.26-6.416E-02 % P 2.950E-01 8.46E-02 G

TH-234 1.4055E+00

63.29 1.405E+00 %(P 7.702E+00 2.30E+00 G K

92.80 1.185E+00 % P 2.664E+00 8.04E-01 G

92.38 1.429E+00 % P 3.147E+00 9.50E-01 G

AM-241 1.9797E-01

59.54 1.980E-01 %(P 1.343E+00 4.00E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	9.2546E-02	9.2592E-02	3.6689E-01	3.6693E-01	4.138E-01
K-40		1.3098E+01	1.3098E+01	1.4456E+00	1.6334E+00	
MN-54	#A	-1.3482E-02	-1.3483E-02	3.9065E-02	3.9073E-02	4.275E-02
CO-57	#B	1.6719E-02	1.6721E-02	6.0133E-02	6.0141E-02	6.677E-02
CO-60		9.8680E-02	9.8681E-02	4.2337E-02	4.2722E-02	

Sr-85 #A	-2.1929E-02	-2.1938E-02	4.9875E-02	4.9891E-02	5.518E-02
Kr-85 #A	-5.0632E+02	-5.0632E+02	1.1509E+03	1.1513E+03	1.274E+03
Y-88 #B	-6.9244E-05	-6.9261E-05	1.7164E-03	1.7164E-03	3.595E-02
NB-94 #B	1.0812E-02	1.0812E-02	2.8491E-02	2.8498E-02	3.224E-02
Ag-108M#B	1.9531E-02	1.9531E-02	4.5068E-02	4.5083E-02	5.011E-02
CD-109 #A	6.4866E-02	6.4870E-02	1.9831E+00	1.9831E+00	2.228E+00
SN-113 #B	-1.1378E-02	-1.1381E-02	5.5830E-02	5.5834E-02	6.307E-02
SB-125 #F	1.5167E-01	1.5168E-01	1.4047E-01	1.4074E-01	1.290E-01
I-131 #B	4.1792E-03	4.1930E-03	3.8872E-02	3.8873E-02	4.427E-02
CS-134 #B	1.0516E-02	1.0516E-02	1.1953E-02	1.1969E-02	5.336E-02
CS-137	7.0779E-01	7.0779E-01	1.0800E-01	1.1556E-01	
CE-139 #A	1.0994E-02	1.0996E-02	5.0005E-02	5.0009E-02	5.576E-02
EU-152 #B	4.3190E-03	4.3190E-03	1.7977E-01	1.7977E-01	2.016E-01
EU-154 #B	3.0365E-02	3.0365E-02	1.1538E-01	1.1539E-01	1.283E-01
EU-155 #B	6.5403E-02	6.5404E-02	2.5303E-01	2.5306E-01	2.813E-01
HG-203 #B	7.0279E-03	7.0319E-03	3.8090E-02	3.8092E-02	4.295E-02
TL-208	2.1982E-01	2.1982E-01	6.3090E-02	6.4368E-02	
PB-212	6.9856E-01	6.9856E-01	1.3942E-01	1.4520E-01	
PB-214	3.9187E-01	3.9187E-01	1.1245E-01	1.1473E-01	
BI-212 #	4.9799E-01	4.9799E-01	4.3058E-01	4.3155E-01	
BI-214	4.6420E-01	4.6420E-01	1.3788E-01	1.4049E-01	
RA-224 #A	1.0011E+00	1.0011E+00	1.2266E+00	1.2279E+00	1.330E+00
RA-226 #A	1.1061E+00	1.1061E+00	1.3502E+00	1.3517E+00	1.469E+00
AC-228	7.2352E-01	7.2352E-01	2.3703E-01	2.4072E-01	
TH-227 #B	-2.7133E-01	-2.7133E-01	4.5012E-01	4.5040E-01	4.931E-01
PA-234 #B	-4.0557E-03	-4.0557E-03	3.3007E-01	3.3007E-01	2.059E-01
TH-234 #B	1.4055E+00	1.4055E+00	6.8866E+00	6.8870E+00	7.702E+00
AM-241 #A	1.9797E-01	1.9797E-01	1.1998E+00	1.1998E+00	1.343E+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 (92.4 to 2000.7 keV) 1.6899981E+01 pCi/gm

Total Decayed Activity (92.4 to 2000.7 keV) 1.6899984E+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_20OCT2005_1322.An1

Sample description

NOL-06-01-002-R WET

Spectrum Filename: C:\GammaVision\Spectra\103_20OCT2005_1322.An1

Acquisition information

Start time:	20-Oct-2005 13:24:09
Live time:	1000
Real time:	1001
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: 2.5100E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.5100E+03) =
3.9841E+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	20-Oct-2005 11:52:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1144

***** 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	91.	25.34	0.99	9.052E-03	74.81	9.600	1.123E+00	PB212
77.15	114.	19.31	0.99	1.011E-02	77.11	17.500	8.377E-01	PB212
93.04	96.	33.08	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
93.08	78.	41.66	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
128.65	70.	41.40	1.18	2.432E-02				
186.19	78.	35.76	1.18	2.566E-02	185.99	3.280		PBC<MDA RA226
238.88	677.	4.64	1.09	2.319E-02	238.63	43.100	7.225E-01	PB212
241.41	76.	35.50	1.09	2.305E-02	241.00	3.900	9.142E-01	RA224
					241.92	7.470	4.783E-01	PB214
269.78	75.	34.72	1.01	2.153E-02				
295.28	171.	10.98	1.13	2.025E-02	295.22	19.200	4.692E-01	PB214
299.80	40.	35.80	1.13	2.004E-02				
328.17	45.	39.38	1.18	1.873E-02				
338.22	154.	12.74	1.16	1.831E-02	338.40	12.010	7.537E-01	AC228
351.85	240.	9.04	1.10	1.776E-02	351.99	37.100	3.871E-01	PB214
462.00	67.	25.80	1.03	1.428E-02				
511.11	106.	19.20	1.15	1.316E-02	510.72	22.500	3.374E-01	TL208
583.07	241.	10.29	1.30	1.185E-02	583.14	86.000	2.525E-01	TL208
609.29	266.	9.22	1.25	1.144E-02	609.32	46.090	5.375E-01	BI214
720.75	23.	37.38	1.50	1.001E-02	722.95	90.499		PBC<MDA Ag108M
					723.30	19.700	1.243E-01	EU154
727.07	53.	20.06	1.65	9.966E-03	727.17	11.800	4.831E-01	BI212
793.95	39.	29.42	1.10	9.317E-03				
910.96	153.	9.42	1.03	8.402E-03	911.07	29.000	6.670E-01	AC228
964.46	28.	29.14	1.54	8.053E-03				
968.93	69.	15.91	1.54	8.025E-03	968.90	17.460	5.306E-01	AC228
1119.94	39.	41.34	1.05	7.213E-03	1120.28	15.040		PBC<MDA BI214
1460.57	806.	3.56	1.92	5.933E-03	1460.75	10.700	1.352E+01	K40
1764.26	32.	18.09	1.02	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
481.98	241.36	330.	76.	0.076	106.51	1.095	RA-224 lD
538.72	269.78	232.	75.	0.075	104.17	1.006	AC-228 s
598.38	299.62	101.	44.	0.044	109.66	1.577	TH-227 sM
655.49	328.17	117.	45.	0.045	118.15	1.180	AC-228 s
923.11	462.00	92.	62.	0.062	75.52	1.027	CS-138 s
1586.96	793.95	33.	41.	0.041	75.85	1.100	PA-234 s
1928.04	964.49	19.	29.	0.029	84.76	1.538	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	148.79	74.81	228.	91.	0.091	76.01	0.993D
PB-212	153.39	77.11	243.	114.	0.114	57.94	0.995A
PA-234	185.26	93.04	454.	96.	0.096	99.23	1.500s
PB-212	476.86	238.85	484.	642.	0.642	20.37	0.899

PB-214	589.34	295.10	215.	182.	0.182	44.77	1.090
AC-228	675.57	338.22	106.	154.	0.154	38.21	1.159s
PB-214	702.85	351.85	107.	237.	0.237	27.12	1.097
TL-208	1021.33	511.11	110.	93.	0.093	57.61	1.154s
TL-208	1165.25	583.07	106.	239.	0.239	30.88	1.295s
BI-214	1217.67	609.29	97.	263.	0.263	27.66	1.249
EU-154	1440.57	720.75	25.	23.	0.023	112.14	1.500s
BI-212	1453.21	727.07	30.	53.	0.053	60.17	1.645
AC-228	1820.95	910.96	25.	151.	0.151	28.25	1.030
AC-228	1936.81	968.90	26.	69.	0.069	47.66	1.541D
K-40	2920.01	1460.57	13.	797.	0.797	10.67	1.920
BI-214	3527.27	1764.26	3.	32.	0.032	54.28	1.015s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-4.0679E-02					
			477.56	-4.068E-02	&(	3.814E-01	1.11E-01 G
K-40		1.3523E+01					
			1460.75	1.352E+01	(P	3.295E-01	4.86E-01 G
MN-54		1.5760E-02					
			834.81	1.576E-02	%(P	3.651E-02	1.10E-02 G
CO-57		-1.0082E-02					
			122.07	-1.008E-02	%(P	6.763E-02	2.02E-02 G K
			136.43	5.047E-02	&	4.687E-01	1.40E-01 G
CO-60		8.9748E-04					
			1332.51	8.975E-04	%(P	4.188E-02	1.12E-02 G K
			1173.23	-4.507E-03	& P	6.775E-02	1.93E-02 G K
Sr-85		-7.1562E-03					
			514.00	-7.156E-03	%(	4.671E-02	1.37E-02 G
Kr-85		-1.6556E+02					
			513.99	-1.656E+02	%(	1.078E+03	3.16E+02 G
Y-88		-5.7129E-03					
			1836.01	-5.713E-03	%(P	3.832E-02	1.04E-02 G K

898.02 9.354E-03 % P 2.930E-02 8.52E-03 G

NB-94 5.1723E-03

871.10 5.172E-03 %(3.619E-02 1.03E-02 G K

702.50 1.405E-03 & 4.270E-02 1.22E-02 G K

Ag-108M 2.1192E-02

722.95 2.119E-02 %(3.417E-02 1.06E-02 G K

614.37-9.789E-03 % P 4.778E-02 1.40E-02 G

433.93 2.610E-03 & 4.441E-02 1.29E-02 G

CD-109 7.4740E-01

88.04 7.474E-01 %(2.235E+00 6.73E-01 G

SN-113 1.5064E-05

391.71 1.506E-05 &(5.541E-02 1.60E-02 G K

255.04 1.449E-02 & 1.820E+00 5.34E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.6747E-02						
		427.95	1.675E-02	&(P	1.212E-01	3.54E-02	G K
		600.77	2.763E-02	& P	1.758E-01	5.06E-02	G
		636.15	-6.619E-02	% P	3.294E-01	9.55E-02	G
		463.51	3.570E-02	% P	3.167E-01	9.12E-02	G
		176.29	-1.800E-01	%	6.885E-01	2.06E-01	G
I-131	-2.3586E-04						
		364.48	-2.359E-04	%(P	4.534E-02	1.31E-02	G K
		636.97	6.775E-03	%	4.761E-01	1.34E-01	G
		284.29	-1.652E-02	% P	6.365E-01	1.86E-01	G
CS-134	-5.1023E-03						
		604.66	-5.102E-03	%(	1.027E-01	3.05E-02	G K
		795.76	-2.945E-03	& P	5.584E-02	1.59E-02	G
		569.29	2.092E-02	& P	2.190E-01	6.24E-02	G
		801.84	1.883E-02	& P	4.584E-01	1.29E-01	G
CS-137	3.2645E-02						
		661.62	3.264E-02	%(P	4.616E-02	1.44E-02	G
CE-139	-5.5016E-04						
		165.85	-5.502E-04	%(	5.928E-02	1.76E-02	G
EU-152	-3.0394E-02						
		121.78	-3.039E-02	%(P	1.984E-01	5.93E-02	G K
		344.30	1.649E-02	& P	1.375E-01	4.04E-02	G
		1408.08	2.735E-02	%	1.627E-01	4.51E-02	G
		964.00	1.809E-02	& P	2.818E-01	7.89E-02	G
		1112.07	-4.013E-02	%	3.172E-01	8.97E-02	G

778.90-5.270E-02 % 3.136E-01 9.05E-02 G

EU-154 2.3322E-02

123.10-2.585E-02 %(1.353E-01 4.05E-02 G K

1274.80 2.256E-02 % 1.365E-01 3.90E-02 G

723.30 1.243E-01 ?(1.416E-01 4.65E-02 G

1004.80-3.204E-02 % 2.492E-01 7.10E-02 G

EU-155 9.6531E-02

86.45 9.653E-02 %(2.738E-01 8.25E-02 G K

105.31 7.430E-02 & 2.970E-01 8.91E-02 G

HG-203 1.3254E-03

279.17 1.325E-03 &(P 5.037E-02 1.48E-02 G K

72.87-8.719E-01 % P 2.704E+00 8.15E-01 G

70.83 4.543E-02 % 5.506E+00 1.64E+00 G

82.50-6.658E-01 & 4.572E+00 1.37E+00 G

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

TL-208       2.5248E-01
                   583.14 2.525E-01 @(P 5.362E-02 2.62E-02 G
                   510.72 3.374E-01 + P 1.875E-01 7.41E-02 G

PB-212       6.9172E-01
                   238.63 6.917E-01  (P 1.133E-01 4.74E-02 G K
                                      Energy duplication
                    77.11 6.917E-01 } P 4.587E-01 1.34E-01 G
                    74.81 1.123E+00 + P 9.061E-01 2.89E-01 G

PB-214       3.8710E-01
                   351.99 3.871E-01  (P 8.332E-02 3.54E-02 G K
                   295.22 5.054E-01 + P 1.965E-01 7.63E-02 G
                                      Energy duplication
                    77.11 3.097E-02 } P 1.034E+00 2.94E-01 G
                   241.92 1.805E-01 %   7.186E-01 2.16E-01 G

BI-212       4.8308E-01
                   727.17 4.831E-01  (P 2.595E-01 9.73E-02 G K
                  1620.56 3.535E-01 % P 1.094E+00 3.16E-01 G
                   785.42 1.179E+00 %   1.628E+00 5.17E-01 G

BI-214       5.3746E-01
                   609.32 5.375E-01  (P 9.919E-02 5.02E-02 G K
                  1764.51 4.205E-01 - P 1.425E-01 8.00E-02 G
                  1120.28 3.798E-01 % P 3.845E-01 1.61E-01 G

RA-224       7.5295E-01
                   241.00 7.530E-01 %(  1.266E+00 3.86E-01 G
```

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RA-226      9.2182E-01
                185.99 9.218E-01 %(P 1.351E+00 4.13E-01 G

AC-228      6.9239E-01
                911.07 6.670E-01  (P 1.151E-01 6.35E-02 G K
                968.90 5.311E-01 - P 2.030E-01 8.45E-02 G
                338.40 7.537E-01  (P 2.485E-01 9.63E-02 G

TH-227     -1.1978E-01
                236.00-1.198E-01 %(  4.282E-01 1.29E-01 G K
                256.25 1.900E-02 % P 4.538E-01 1.32E-01 G

PA-234      1.3547E-01
                 98.44-2.098E-02 %(P 2.834E-01 8.43E-02 G K
                946.00-1.107E-02 & P 2.064E-01 5.78E-02 G
                131.28-4.607E-02 & P 2.731E-01 8.17E-02 G
                 94.67 3.888E-01 ?(P 4.149E-01 1.29E-01 G
                883.24 8.954E-02 &   3.068E-01 8.99E-02 G
                926.70 1.223E-02 &   3.046E-01 8.36E-02 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26 2.649E-02 & P 3.259E-01 9.28E-02 G

TH-234 -1.1458E-01
63.29-1.146E-01 &(P 7.694E+00 2.27E+00 G K
92.80 1.704E+00 & P 2.593E+00 7.90E-01 G
92.38 1.951E+00 & P 3.092E+00 9.41E-01 G

AM-241 -2.0469E-01
59.54-2.047E-01 &(P 1.327E+00 3.95E-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

- -

***** 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-4.0645E-02	-4.0679E-02	3.3282E-01	3.3282E-01	3.811E-01
K-40		1.3523E+01	1.3523E+01	1.4594E+00	1.6571E+00	
MN-54	#A	1.5758E-02	1.5760E-02	3.2937E-02	3.2950E-02	3.651E-02
CO-57	#B	-1.0081E-02	-1.0082E-02	6.2044E-02	6.2046E-02	6.762E-02
CO-60	#B	8.9746E-04	8.9748E-04	3.3644E-02	3.3644E-02	4.188E-02

Sr-85	#A	-7.1513E-03	-7.1562E-03	4.1140E-02	4.1142E-02	4.668E-02
Kr-85	#A	-1.6556E+02	-1.6556E+02	9.4922E+02	9.4927E+02	1.078E+03
Y-88	#B	-5.7105E-03	-5.7129E-03	3.2054E-02	3.2056E-02	3.830E-02
NB-94	#B	5.1723E-03	5.1723E-03	3.0842E-02	3.0843E-02	3.619E-02
Ag-108M	#B	2.1192E-02	2.1192E-02	3.1948E-02	3.1972E-02	3.417E-02
CD-109	#A	7.4732E-01	7.4740E-01	2.0194E+00	2.0199E+00	2.235E+00
SN-113	#B	1.5058E-05	1.5064E-05	4.7909E-02	4.7909E-02	5.539E-02
SB-125	#B	1.6746E-02	1.6747E-02	1.0615E-01	1.0616E-01	1.212E-01
I-131	#B	-2.3456E-04	-2.3586E-04	7.0031E-01	7.0031E-01	4.509E-02
CS-134	#B	-5.1020E-03	-5.1023E-03	9.1400E-02	9.1401E-02	1.027E-01
CS-137	#A	3.2644E-02	3.2645E-02	4.3224E-02	4.3266E-02	4.616E-02
CE-139	#A	-5.4999E-04	-5.5016E-04	5.2718E-02	5.2718E-02	5.926E-02
EU-152	#B	-3.0393E-02	-3.0394E-02	1.8685E-01	1.8686E-01	1.984E-01
EU-154	#B	2.3321E-02	2.3322E-02	2.6153E-02	2.6185E-02	1.353E-01
EU-155	#B	9.6528E-02	9.6531E-02	2.4762E-01	2.4768E-01	2.738E-01
HG-203	#B	1.3241E-03	1.3254E-03	4.4395E-02	4.4395E-02	5.033E-02
TL-208	#	2.5248E-01	2.5248E-01	7.8668E-02	8.0022E-02	
PB-212		6.9172E-01	6.9172E-01	1.4223E-01	1.4779E-01	
PB-214		3.8710E-01	3.8710E-01	1.0625E-01	1.0860E-01	
BI-212		4.8308E-01	4.8308E-01	2.9204E-01	2.9338E-01	
BI-214		5.3746E-01	5.3746E-01	1.5050E-01	1.5370E-01	
RA-224	#A	7.5295E-01	7.5295E-01	1.1590E+00	1.1599E+00	1.266E+00
RA-226	#A	9.2182E-01	9.2182E-01	1.2379E+00	1.2391E+00	1.351E+00
AC-228		6.9239E-01	6.9239E-01	1.6553E-01	1.7034E-01	
TH-227	#B	-1.1978E-01	-1.1978E-01	3.8551E-01	3.8558E-01	4.282E-01
PA-234	#B	1.3547E-01	1.3547E-01	1.3467E-01	1.3488E-01	2.834E-01
TH-234	#B	-1.1458E-01	-1.1458E-01	2.8517E+01	2.8517E+01	7.694E+00
AM-241	#A	-2.0469E-01	-2.0469E-01	1.2010E+00	1.2010E+00	1.327E+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) 1.6567251E+01 pCi/gm

Total Decayed Activity (1120.0 to 2000.7 keV) 1.6567251E+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_2SEPT2005_0944.An1

Sample description

FSS-NOL-06-01-062-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_2SEPT2005_0944.An1

Acquisition information

Start time:	02-Sep-2005 09:45:31
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: 1.9840E+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.

YAEC Chemistry Lab Spectrum name: 103F_2SEPT2005_0944.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	01-Sep-2005 09:48:00
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: 0.1632

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.86	161.	17.63	0.99	9.052E-03	74.81	9.600	1.261E+00	PB212
77.16	190.	13.75	0.99	1.011E-02	77.11	17.500	8.160E-01	PB212
93.42	112.	26.63	1.00	1.679E-02	92.38	2.570		PBC<MDA TH234
					92.80	3.000		PBC<MDA TH234
					94.67	15.500		PBC<MDA PA234
129.02	109.	33.03	1.07	2.437E-02				
186.32	154.	23.66	1.05	2.566E-02	185.99	3.280	1.142E+00	RA226

209.35	87.	32.49	1.15	2.471E-02				
238.84	1134.	3.52	1.09	2.319E-02	238.63	43.100	7.647E-01	PB212
241.74	135.	19.03	1.09	2.304E-02	241.00	3.900	1.025E+00	RA224
					241.92	7.470	5.365E-01	PB214
270.61	91.	31.09	1.85	2.149E-02				
295.07	224.	11.74	1.09	2.026E-02	295.22	19.200	3.860E-01	PB214
300.12	73.	35.10	1.13	2.001E-02				
327.83	76.	26.45	0.83	1.875E-02				
338.26	238.	10.26	0.93	1.831E-02	338.40	12.010	7.354E-01	AC228
351.82	446.	6.95	1.15	1.776E-02	351.99	37.100	4.549E-01	PB214
462.63	98.	24.28	1.58	1.427E-02				
462.63	98.	24.28	1.58	1.427E-02	463.51	10.000	4.628E-01	SB125
510.90	194.	11.93	1.45	1.317E-02	510.72	22.500	3.841E-01	TL208
583.04	431.	7.34	1.25	1.185E-02	583.14	86.000	2.856E-01	TL208
609.09	285.	8.10	1.30	1.144E-02	609.32	46.090	3.598E-01	BI214
727.38	131.	15.35	1.40	9.963E-03	727.17	11.800	7.571E-01	BI212
794.15	88.	22.10	1.30	9.316E-03				
794.15	88.	22.10	1.30	9.316E-03	795.76	85.400	7.528E-02	CS134
860.33	71.	25.43	1.06	8.769E-03				
910.86	298.	8.70	1.45	8.403E-03	911.07	29.000	8.237E-01	AC228
964.36	71.	17.97	1.54	8.054E-03	964.00	14.580	4.068E-01	EU152
968.71	159.	10.24	1.54	8.027E-03	968.90	17.460	7.719E-01	AC228
1120.79	124.	18.82	1.58	7.209E-03	1120.28	15.040	7.649E-01	BI214
1460.36	1248.	2.88	2.02	5.933E-03	1460.75	10.700	1.319E+01	K40
1763.96	55.	15.65	1.57	5.143E-03	1764.51	15.920	4.288E-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
417.86	209.35	356.	87.	0.043	97.47	1.150	AC-228
540.37	270.61	311.	91.	0.046	93.28	1.848	AC-228 s
599.39	300.12	252.	73.	0.036	105.29	1.126	PB-212
654.80	327.83	164.	76.	0.038	79.34	0.826	AC-228
1719.70	860.33	79.	71.	0.035	76.30	1.064	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	339.	161.	0.080	52.89	0.993D
PB-212	153.39	77.11	366.	190.	0.095	41.24	0.995A
TH-234	185.82	93.32	960.	117.	0.059	99.86	1.500s
TH-234	185.80	93.31	941.	119.	0.059	98.07	1.500s
PA-234	185.72	93.27	712.	136.	0.068	86.60	1.500s
RA-226	371.51	186.18	707.	141.	0.071	76.50	1.500
PB-212	476.83	238.84	719.	1120.	0.560	14.62	1.005

RA-224	482.69	241.77	804.	113.	0.056	110.50	1.500
PB-214	589.29	295.07	218.	220.	0.110	35.23	1.095
AC-228	675.66	338.26	173.	237.	0.119	30.79	0.929
PB-214	702.77	351.82	211.	440.	0.220	20.86	1.148
SB-125	924.84	462.86	135.	70.	0.035	77.08	1.500s
TL-208	1020.92	510.90	158.	167.	0.084	35.80	1.451s
TL-208	1165.19	583.04	163.	427.	0.214	22.02	1.247
BI-214	1217.28	609.09	105.	279.	0.139	24.29	1.304
BI-212	1453.83	727.38	86.	131.	0.065	46.06	1.402s
CS-134	1588.15	794.54	75.	50.	0.025	85.46	1.500s
AC-228	1820.74	910.86	107.	295.	0.147	26.10	1.451
EU-152	1927.64	964.31	125.	43.	0.022	117.82	1.538s
AC-228	1934.72	967.85	119.	260.	0.130	31.69	1.861s
BI-214	2240.56	1120.79	109.	122.	0.061	56.47	1.581s
K-40	2919.59	1460.36	33.	1230.	0.615	8.64	2.025
BI-214	3526.68	1763.96	8.	52.	0.026	46.94	1.568

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		3.1577E-02					
			477.56	3.158E-02	&(	2.827E-01	8.27E-02 G
K-40		1.3195E+01					
			1460.75	1.319E+01	(P	3.182E-01	3.86E-01 G
MN-54		9.1094E-03					
			834.81	9.109E-03	%(P	3.631E-02	1.07E-02 G
CO-57		-8.6805E-03					
			122.07	-8.681E-03	%(P	4.983E-02	1.49E-02 G K
			136.43	6.915E-02	%	3.768E-01	1.13E-01 G
CO-60		5.7930E-03					
			1332.51	5.793E-03	%(P	3.069E-02	8.62E-03 G K
			1173.23	-1.905E-03	& P	5.887E-02	1.70E-02 G K
Sr-85		-1.2223E-02					
			514.00	-1.222E-02	%(	4.211E-02	1.26E-02 G
Kr-85		-2.7915E+02					
			513.99	-2.792E+02	%(	9.619E+02	2.88E+02 G
Y-88		-4.3432E-03					
			1836.01	-4.343E-03	%(P	2.628E-02	7.24E-03 G K

898.02-8.436E-03 % P 3.466E-02 1.01E-02 G

NB-94 7.5755E-03

871.10 7.576E-03 &(3.016E-02 8.85E-03 G K

702.50 1.008E-04 & 3.523E-02 1.01E-02 G K

Ag-108M -2.4740E-02

722.95-2.474E-02 %(4.878E-02 1.48E-02 G K

614.37-6.701E-03 & P 3.613E-02 1.06E-02 G

433.93 1.224E-02 & 2.817E-02 8.50E-03 G

CD-109 -3.9043E-02

88.04-3.904E-02 %(1.933E+00 5.77E-01 G

SN-113 1.6075E-02

391.71 1.608E-02 %(4.361E-02 1.31E-02 G K

255.04 3.169E-01 % 1.482E+00 4.43E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.4894E-02						
		427.95	1.318E-02	&(P	9.936E-02	2.93E-02	G K
		600.77	2.247E-02	& P	1.541E-01	4.49E-02	G
		636.15	4.118E-02	% P	2.921E-01	8.54E-02	G
		463.51	3.368E-01	(P	2.720E-01	8.81E-02	G
		176.29	7.651E-02	&	4.089E-01	1.22E-01	G
I-131	-1.8012E-03						
		364.48	-1.801E-03	%(P	3.895E-02	1.14E-02	G K
		636.97	9.843E-03	%	5.171E-01	1.50E-01	G
		284.29	1.068E-02	& P	5.398E-01	1.59E-01	G
CS-134	1.9154E-02						
		604.66	-1.292E-03	%(	7.638E-02	2.27E-02	G K
		795.76	4.252E-02	*(P	3.701E-02	1.21E-02	G
		569.29	2.466E-02	% P	1.974E-01	5.75E-02	G
		801.84	1.060E-01	% P	3.245E-01	9.57E-02	G
CS-137	1.2181E-02						
		661.62	1.218E-02	%(P	3.622E-02	1.08E-02	G
CE-139	9.8363E-03						
		165.85	9.836E-03	%(	4.516E-02	1.36E-02	G
EU-152	6.5660E-02						
		121.78	-2.603E-02	%(P	1.418E-01	4.25E-02	G K
		344.30	1.977E-02	& P	1.087E-01	3.23E-02	G
		1408.08	5.295E-02	%	1.252E-01	3.76E-02	G
		964.00	2.495E-01	&(P	3.181E-01	9.92E-02	G
		1112.07	3.838E-02	%	3.105E-01	9.00E-02	G

778.90 5.225E-02 % 2.331E-01 6.83E-02 G

EU-154 -6.1165E-03

123.10-6.117E-03 %(1.064E-01 3.18E-02 G K

1274.80 0.000E+00 % 1.501E-01 4.31E-02 G

723.30-1.054E-01 % 2.282E-01 6.91E-02 G

1004.80 5.553E-03 & 2.151E-01 6.14E-02 G

EU-155 9.2149E-02

86.45 9.215E-02 %(2.207E-01 6.68E-02 G K

105.31 4.600E-02 & 2.160E-01 6.48E-02 G

HG-203 -7.0863E-04

279.17-7.086E-04 &(P 3.992E-02 1.18E-02 G K

72.87-9.567E-03 & P 2.292E+00 6.84E-01 G

70.83 1.814E-02 % 3.616E+00 1.08E+00 G

82.50 5.917E-01 % 3.598E+00 1.08E+00 G

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

TL-208       2.8558E-01
                   583.14 2.856E-01  (P 4.158E-02 2.12E-02 G
                   510.72 3.841E-01 + P 1.408E-01 5.32E-02 G

PB-212       7.7819E-01
                   238.63 7.628E-01  (P 8.698E-02 3.76E-02 G K
                                        Energy duplication
                    77.11 7.329E-01 } P 3.535E-01 1.01E-01 G
                    74.81 1.261E+00 + P 6.939E-01 2.27E-01 G

PB-214       4.5488E-01
                   351.99 4.549E-01  (P 7.283E-02 3.20E-02 G K
                   295.22 3.860E-01 - P 1.252E-01 4.61E-02 G
                                        Energy duplication
                    77.11 0.000E+00 } P 8.314E-01 0.00E+00 G
                   241.92 3.364E-01 %   5.287E-01 1.61E-01 G

BI-212       7.5713E-01
                   727.17 7.571E-01 *(P 2.665E-01 1.17E-01 G K
                  1620.56 2.178E-01 % P 8.012E-01 2.28E-01 G
                   785.42 4.708E-01 %   1.694E+00 5.02E-01 G

BI-214       3.7752E-01
                   609.32 3.598E-01  (P 6.533E-02 2.98E-02 G K
                  1764.51 4.288E-01  (P 1.354E-01 7.13E-02 G
                  1120.28 7.649E-01 + P 3.228E-01 1.46E-01 G

RA-224       8.5249E-01
                   241.00 8.525E-01  (  1.021E+00 3.14E-01 G
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RA-226       1.1409E+00
                 185.99 1.141E+00  (P 1.024E+00 3.18E-01 G

AC-228       7.9783E-01
                 911.07 8.237E-01  (P 1.426E-01 7.25E-02 G K
                 968.90 1.266E+00 + P 2.598E-01 1.34E-01 G
                 338.40 7.354E-01  (P 1.982E-01 7.58E-02 G

TH-227      -1.0181E-01
                 236.00-1.018E-01 %(  3.312E-01 9.97E-02 G K
                 256.25 9.530E-02 % P 4.245E-01 1.27E-01 G

PA-234       1.3585E-01
                  98.44 2.914E-03 %(P 2.076E-01 6.18E-02 G K
                 946.00 1.015E-01 % P 1.496E-01 4.67E-02 G
                 131.28-6.511E-02 % P 2.104E-01 6.34E-02 G
                  94.67 3.511E-01 ?(P 3.268E-01 1.02E-01 G
                 883.24 0.000E+00 &   3.036E-01 8.67E-02 G
                 926.70 2.409E-03 &   2.874E-01 8.12E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	3.442E-02	%	P	3.020E-01	8.80E-02 G
TH-234	1.2680E+00						
		63.29	5.631E-01	&(P	5.519E+00	1.64E+00	G K
		92.80	1.637E+00	*(P	2.011E+00	6.15E-01	G
		92.38	1.907E+00	&(P	2.390E+00	7.30E-01	G
AM-241	-2.7434E-01						
		59.54	-2.743E-01	%(P	1.015E+00	3.05E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	3.1170E-02	3.1577E-02	2.4823E-01	2.4823E-01	2.790E-01
K-40		1.3195E+01	1.3195E+01	1.1580E+00	1.3885E+00	
MN-54	#A	9.0892E-03	9.1094E-03	3.2133E-02	3.2137E-02	3.623E-02
CO-57	#B	-8.6583E-03	-8.6805E-03	4.6351E-02	4.6353E-02	4.970E-02
CO-60	#B	5.7909E-03	5.7930E-03	2.5852E-02	2.5855E-02	3.068E-02

Sr-85	#A	-1.2093E-02	-1.2223E-02	3.7812E-02	3.7819E-02	4.166E-02
Kr-85	#A	-2.7915E+02	-2.7915E+02	8.6366E+02	8.6381E+02	9.619E+02
Y-88	#B	-4.3151E-03	-4.3432E-03	2.2606E-02	2.2608E-02	2.611E-02
NB-94	#B	7.5755E-03	7.5755E-03	2.6555E-02	2.6559E-02	3.016E-02
Ag-108M	#B	-2.4740E-02	-2.4740E-02	4.4480E-02	4.4503E-02	4.878E-02
CD-109	#A	-3.8984E-02	-3.9043E-02	1.7310E+00	1.7310E+00	1.930E+00
SN-113	#B	1.5979E-02	1.6075E-02	3.9315E-02	3.9326E-02	4.335E-02
SB-125	#B	9.4830E-02	9.4894E-02	7.4473E-02	7.4676E-02	9.930E-02
I-131	#B	-1.6527E-03	-1.8012E-03	5.1402E-02	5.1403E-02	3.573E-02
CS-134	#B	1.9136E-02	1.9154E-02	1.6397E-02	1.6435E-02	7.631E-02
CS-137	#A	1.2181E-02	1.2181E-02	3.2314E-02	3.2322E-02	3.622E-02
CE-139	#A	9.7869E-03	9.8363E-03	4.0664E-02	4.0668E-02	4.493E-02
EU-152	#B	6.5650E-02	6.5660E-02	7.8337E-02	7.8422E-02	1.417E-01
EU-154	#B	-6.1151E-03	-6.1165E-03	9.5338E-02	9.5338E-02	1.064E-01
EU-155	#B	9.2113E-02	9.2149E-02	2.0037E-01	2.0043E-01	2.206E-01
HG-203	#B	-6.9819E-04	-7.0863E-04	3.6973E-02	3.6973E-02	3.933E-02
TL-208		2.8558E-01	2.8558E-01	6.3509E-02	6.5638E-02	
PB-212		7.7819E-01	7.7819E-01	1.1497E-01	1.2353E-01	
PB-214		4.5488E-01	4.5488E-01	9.6088E-02	9.9652E-02	
BI-212	#	7.5713E-01	7.5713E-01	3.5005E-01	3.5280E-01	
BI-214		3.7752E-01	3.7752E-01	9.3833E-02	9.6359E-02	
RA-224	A	8.5249E-01	8.5249E-01	9.4198E-01	9.4328E-01	1.021E+00
RA-226	#	1.1409E+00	1.1409E+00	9.5292E-01	9.5522E-01	1.024E+00
AC-228		7.9783E-01	7.9783E-01	1.6224E-01	1.6872E-01	
TH-227	#B	-1.0181E-01	-1.0181E-01	2.9914E-01	2.9920E-01	3.312E-01
PA-234	#B	1.3585E-01	1.3585E-01	1.1793E-01	1.1818E-01	2.076E-01
TH-234	#B	1.2680E+00	1.2680E+00	1.4286E+00	1.4303E+00	5.519E+00
AM-241	#A	-2.7434E-01	-2.7434E-01	9.2576E-01	9.2588E-01	1.015E+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) 1.7498280E+01 pCi/gm

Total Decayed Activity (86.9 to 2000.7 keV) 1.7498280E+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_2SEPT2005_1044.An1

Sample description

FSS-NOL-06-01-058-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_2SEPT2005_1044.An1

Acquisition information

Start time:	02-Sep-2005 10:45:55
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: 2.1680E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1680E+03) =
4.6125E+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-Aug-2005 15:13:00
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: 0.2466

***** 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	162.	18.72	0.99	9.052E-03	74.81	9.600	1.161E+00	PB212
77.26	207.	12.21	0.99	1.011E-02	77.11	17.500	7.831E-01	PB212
128.72	124.	37.16	0.98	2.433E-02				
186.43	154.	22.43	1.08	2.565E-02	185.99	3.280	1.044E+00	RA226
209.36	108.	26.50	1.08	2.471E-02				
238.81	1291.	3.29	1.09	2.319E-02	238.63	43.100	7.975E-01	PB212
241.67	166.	16.28	1.09	2.304E-02	241.00	3.900	1.147E+00	RA224

					241.92	7.470	6.001E-01	PB214
270.17	103.	26.11	1.29	2.151E-02				
295.12	256.	11.33	1.12	2.025E-02	295.22	19.200	4.043E-01	PB214
300.88	83.	35.86	1.03	1.998E-02				
327.88	94.	32.01	0.83	1.875E-02				
338.23	296.	12.14	1.03	1.831E-02	338.40	12.010	8.363E-01	AC228
351.81	443.	7.15	1.02	1.776E-02	351.99	37.100	4.135E-01	PB214
410.04	97.	24.95	1.10	1.573E-02				
462.86	92.	24.85	1.15	1.426E-02				
462.86	92.	24.85	1.15	1.426E-02	463.51	10.000	3.996E-01	SB125
510.49	236.	15.19	1.86	1.318E-02	510.72	22.500	4.409E-01	TL208
582.99	423.	6.39	1.00	1.185E-02	583.14	86.000	2.562E-01	TL208
609.15	410.	5.98	1.48	1.144E-02	609.32	46.090	4.773E-01	BI214
726.84	172.	13.65	1.06	9.968E-03	727.17	11.800	9.065E-01	BI212
784.93	46.	35.20	1.37	9.399E-03	785.42	2.000	1.539E+00	BI212
794.96	37.	32.55	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
910.85	353.	7.29	1.72	8.403E-03	911.07	29.000	8.950E-01	AC228
964.43	80.	16.19	1.54	8.053E-03	964.00	14.580	4.240E-01	EU152
968.70	185.	8.71	1.54	8.027E-03	968.90	17.460	8.210E-01	AC228
1000.22	51.	27.95	0.63	7.839E-03				
1119.76	89.	19.97	1.39	7.214E-03	1120.28	15.040	4.989E-01	BI214
1460.43	1479.	2.65	1.90	5.933E-03	1460.75	10.700	1.434E+01	K40
1619.67	28.	26.24	0.65	5.488E-03	1620.56	2.750	1.146E+00	BI212
1763.73	61.	14.26	1.74	5.143E-03	1764.51	15.920	4.365E-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	
256.61	128.72	832.	125.	0.062	101.85	0.982	AC-228	s
417.86	209.35	566.	114.	0.057	99.40	1.077	AC-228	
539.49	270.17	296.	103.	0.052	78.32	1.286	AC-228	s
600.91	300.88	307.	83.	0.041	107.57	1.035	PB-212	s
654.91	327.88	299.	94.	0.047	96.04	0.833	AC-228	s
819.20	410.04	180.	97.	0.048	74.85	1.103	AC-228	s
1568.93	784.93	82.	46.	0.023	105.59	1.367	BI-212	l
1927.62	964.47	46.	79.	0.039	49.93	1.538	AC-228	D
1999.45	1000.22	49.	58.	0.029	65.11	0.634	-	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	397.	162.	0.081	56.15	0.993	D
PB-212	153.39	77.11	454.	207.	0.104	36.62	0.995	A
RA-226	372.03	186.43	508.	141.	0.071	67.30	1.082	

PB-212	476.81	238.83	816.	1243.	0.621	13.99	1.015
RA-224	482.83	241.84	897.	129.	0.064	102.25	1.500
PB-214	482.32	241.58	397.	67.	0.034	124.80	1.572s
PB-214	589.40	295.12	259.	252.	0.126	33.98	1.119
AC-228	675.61	338.23	333.	295.	0.147	36.43	1.030
PB-214	702.76	351.81	238.	437.	0.218	21.44	1.017
SB-125	925.07	462.97	153.	73.	0.037	78.29	1.500
TL-208	1020.09	510.49	296.	210.	0.105	45.57	1.862s
TL-208	1165.08	582.99	127.	419.	0.209	19.17	0.998
BI-214	1217.40	609.15	86.	404.	0.202	17.94	1.484
BI-212	1452.75	726.84	108.	171.	0.086	40.94	1.065s
CS-134	1588.98	794.96	54.	37.	0.018	97.65	1.500s
AC-228	1820.73	910.85	89.	350.	0.175	21.86	1.719
EU-152	1928.12	964.55	111.	63.	0.031	80.10	1.538
AC-228	1936.81	968.90	34.	184.	0.092	25.78	1.541D
BI-214	2238.49	1119.76	85.	87.	0.043	59.90	1.390s
K-40	2919.74	1460.43	35.	1460.	0.730	7.94	1.904
BI-212	3238.15	1619.67	6.	28.	0.014	78.73	0.651s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bi-214	3526.22	1763.73	8.	57.	0.029	42.78	1.740

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		4.2931E-02					
			477.56	4.293E-02	&(	3.088E-01	9.11E-02 G
K-40		1.4339E+01					
			1460.75	1.434E+01	(P	2.967E-01	3.84E-01 G
MN-54		1.4213E-02					
			834.81	1.421E-02	%(P	3.818E-02	1.14E-02 G
CO-57		-5.5230E-03					
			122.07	-5.523E-03	&(P	4.026E-02	1.20E-02 G K
			136.43	4.895E-03	%	3.698E-01	1.10E-01 G
CO-60		5.4603E-03					
			1332.51	5.460E-03	&(P	3.253E-02	9.22E-03 G K
			1173.23	7.074E-03	& P	4.498E-02	1.31E-02 G K
Sr-85		-2.3423E-02					

514.00-2.342E-02 %(4.296E-02 1.31E-02 G

Kr-85 -5.3049E+02

513.99-5.305E+02 %(9.727E+02 2.96E+02 G

Y-88 -2.9959E-03

1836.01-2.996E-03 %(P 1.829E-02 4.88E-03 G K

898.02 1.368E-02 % P 2.432E-02 7.46E-03 G

NB-94 -3.1096E-03

871.10-3.110E-03 %(3.226E-02 9.32E-03 G K

702.50-1.395E-05 % 3.141E-02 9.03E-03 G K

Ag-108M -1.4269E-02

722.95-1.427E-02 %(4.414E-02 1.32E-02 G K

614.37-7.921E-03 % P 3.297E-02 9.75E-03 G

433.93-2.396E-03 % 3.230E-02 9.48E-03 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.2625E+00						
		88.04	1.263E+00	&(	1.729E+00	5.29E-01	G
SN-113	1.2834E-03						
		391.71	1.283E-03	&(	3.858E-02	1.12E-02	G K
		255.04	1.590E-01	&	1.502E+00	4.47E-01	G
SB-125	9.7589E-02						
		427.95	2.221E-02	&(P	8.697E-02	2.59E-02	G K
		600.77	2.366E-02	& P	1.721E-01	5.05E-02	G
		636.15	1.595E-02	% P	2.558E-01	7.39E-02	G
		463.51	3.207E-01	(P	2.643E-01	8.52E-02	G
		176.29	1.203E-02	&	4.579E-01	1.36E-01	G
I-131	4.6114E-03						
		364.48	4.611E-03	&(P	3.768E-02	1.11E-02	G K
		636.97	4.420E-02	%	4.513E-01	1.31E-01	G
		284.29	-1.519E-01	& P	5.324E-01	1.59E-01	G
CS-134	1.4106E-02						
		604.66	1.183E-03	&(	7.919E-02	2.36E-02	G K
		795.76	2.888E-02	(P	2.892E-02	9.42E-03	G
		569.29	2.076E-02	% P	1.804E-01	5.25E-02	G
		801.84	2.738E-02	& P	3.489E-01	1.00E-01	G
CS-137	1.6085E-02						
		661.62	1.609E-02	&(P	3.551E-02	1.07E-02	G
CE-139	-3.9923E-03						
		165.85	-3.992E-03	%(	3.963E-02	1.18E-02	G

EU-152 9.6399E-02

121.78-2.138E-02 &(P 1.136E-01 3.40E-02 G K

344.30-6.711E-04 % P 1.101E-01 3.24E-02 G

1408.08 4.614E-02 % 1.226E-01 3.64E-02 G

964.00 3.326E-01 &(P 2.754E-01 8.96E-02 G

1112.07 0.000E+00 & 3.063E-01 8.78E-02 G

778.90 0.000E+00 % 2.678E-01 7.71E-02 G

EU-154 2.0708E-03

123.10 2.071E-03 &(9.653E-02 2.88E-02 G K

1274.80 4.231E-02 % 8.757E-02 2.66E-02 G

723.30-5.956E-02 % 2.129E-01 6.35E-02 G

1004.80-5.603E-02 % 2.022E-01 5.98E-02 G

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Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

EU-155       1.4378E-02
                    86.45 1.438E-02 &(  2.285E-01 6.84E-02 G K
                   105.31-7.197E-03 %   2.170E-01 6.48E-02 G

HG-203       6.6093E-03
                   279.17 6.609E-03 %(P 3.844E-02 1.15E-02 G K
                    72.87-4.326E-01 % P 2.105E+00 6.33E-01 G
                    70.83-2.155E+00 %   3.813E+00 1.16E+00 G
                    82.50-6.899E-01 %   3.687E+00 1.11E+00 G

TL-208       2.5620E-01
                   583.14 2.562E-01  (P 3.383E-02 1.65E-02 G
                   510.72 4.409E-01 + P 1.744E-01 7.55E-02 G

PB-212       7.7723E-01
                   238.63 7.748E-01  (P 8.468E-02 3.65E-02 G K
                                      Energy duplication
                    77.11 7.292E-01 } P 3.591E-01 8.90E-02 G
                    74.81 1.161E+00 + P 6.856E-01 2.21E-01 G

PB-214       4.1037E-01
                   351.99 4.135E-01  (P 7.061E-02 2.99E-02 G K
                   295.22 4.043E-01  (P 1.246E-01 4.65E-02 G
                                      Energy duplication
                    77.11 1.417E-01 } P 7.693E-01 1.97E-01 G
                   241.92 2.436E-01 -   3.463E-01 1.01E-01 G

BI-212       9.5185E-01
                   727.17 9.065E-01 @(P 2.711E-01 1.24E-01 G K
                  1620.56 1.146E+00  (P 5.929E-01 3.01E-01 G
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785.42 9.720E-01 % 1.369E+00 4.28E-01 G

BI-214 4.7309E-01

609.32 4.773E-01 (P 5.438E-02 2.90E-02 G K

1764.51 4.365E-01 (P 1.189E-01 6.58E-02 G

1120.28 4.989E-01 @(P 2.627E-01 1.02E-01 G

RA-224 8.9138E-01

241.00 8.914E-01 (9.858E-01 3.04E-01 G

RA-226 1.0443E+00

185.99 1.044E+00 (P 7.977E-01 2.56E-01 G

AC-228 8.6067E-01

911.07 8.950E-01 (P 1.195E-01 6.58E-02 G K

968.90 8.204E-01 (P 1.324E-01 7.06E-02 G

338.40 8.363E-01 (P 2.489E-01 1.02E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	1.0153E-02						
		236.00	1.015E-02	&(	4.105E-01	1.23E-01	G K
		256.25	1.119E-02	% P	4.196E-01	1.24E-01	G
PA-234	4.2360E-02						
		98.44	4.236E-02	%(P	2.126E-01	6.38E-02	G K
		946.00	-2.601E-03	& P	1.696E-01	4.84E-02	G
		131.28	-1.658E-03	% P	2.054E-01	6.13E-02	G
		94.67	-1.305E-01	% P	3.950E-01	1.19E-01	G
		883.24	-4.693E-02	%	2.696E-01	7.87E-02	G
		926.70	1.071E-02	%	2.446E-01	6.91E-02	G
		569.26	3.074E-02	% P	2.672E-01	7.77E-02	G
TH-234	4.5609E-01						
		63.29	4.561E-01	%(P	4.626E+00	1.37E+00	G K
		92.80	1.222E+00	% P	2.033E+00	6.17E-01	G
		92.38	1.473E+00	% P	2.406E+00	7.30E-01	G
AM-241	1.4959E-01						
		59.54	1.496E-01	&(P	1.015E+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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	4.1931E-02	4.2931E-02	2.7331E-01	2.7332E-01	3.016E-01
K-40	1.4339E+01	1.4339E+01	1.1531E+00	1.4222E+00	
MN-54 #A	1.4155E-02	1.4213E-02	3.4336E-02	3.4346E-02	3.802E-02
CO-57 #B	-5.4974E-03	-5.5230E-03	3.7887E-02	3.7889E-02	4.007E-02
CO-60 #B	5.4567E-03	5.4603E-03	2.7653E-02	2.7655E-02	3.251E-02
Sr-85 #A	-2.2973E-02	-2.3423E-02	3.9239E-02	3.9263E-02	4.213E-02
Kr-85 #A	-5.3048E+02	-5.3049E+02	8.8850E+02	8.8903E+02	9.727E+02
Y-88 #B	-2.9607E-03	-2.9959E-03	1.5439E-02	1.5440E-02	1.808E-02
NB-94 #B	-3.1096E-03	-3.1096E-03	2.7964E-02	2.7964E-02	3.226E-02
Ag-108M#B	-1.4268E-02	-1.4269E-02	3.9618E-02	3.9627E-02	4.414E-02
CD-109 #A	1.2590E+00	1.2625E+00	1.5871E+00	1.5886E+00	1.724E+00
SN-113 #B	1.2695E-03	1.2834E-03	3.3746E-02	3.3746E-02	3.816E-02
SB-125 #F	9.7468E-02	9.7589E-02	7.7730E-02	7.7937E-02	8.686E-02
I-131 #B	3.9436E-03	4.6114E-03	3.3326E-02	3.3327E-02	3.223E-02
CS-134 #B	1.4083E-02	1.4106E-02	1.3808E-02	1.3832E-02	7.906E-02
CS-137 #A	1.6083E-02	1.6085E-02	3.2122E-02	3.2136E-02	3.550E-02
CE-139 #A	-3.9559E-03	-3.9923E-03	3.5489E-02	3.5490E-02	3.927E-02
EU-152 #B	9.6373E-02	9.6399E-02	7.7886E-02	7.8069E-02	1.136E-01
EU-154 #B	2.0700E-03	2.0708E-03	8.6349E-02	8.6349E-02	9.650E-02
EU-155 #B	1.4368E-02	1.4378E-02	2.0512E-01	2.0512E-01	2.283E-01
HG-203 #B	6.4332E-03	6.6093E-03	3.4397E-02	3.4399E-02	3.741E-02
TL-208	2.5620E-01	2.5620E-01	4.9615E-02	5.1797E-02	

PB-212		7.7723E-01	7.7723E-01	1.0980E-01	1.1871E-01	
PB-214		4.1037E-01	4.1037E-01	8.3695E-02	8.7020E-02	
BI-212		9.5185E-01	9.5185E-01	3.9081E-01	3.9470E-01	
BI-214		4.7309E-01	4.7309E-01	8.6232E-02	9.0501E-02	
RA-224	A	8.9138E-01	8.9138E-01	9.1142E-01	9.1288E-01	9.858E-01
RA-226		1.0443E+00	1.0443E+00	7.6737E-01	7.6976E-01	
AC-228		8.6067E-01	8.6067E-01	1.4315E-01	1.5162E-01	
TH-227	#B	1.0153E-02	1.0153E-02	3.6817E-01	3.6817E-01	4.105E-01
PA-234	#B	4.2360E-02	4.2360E-02	1.9149E-01	1.9150E-01	2.126E-01
TH-234	#B	4.5609E-01	4.5609E-01	4.1173E+00	4.1173E+00	4.626E+00
AM-241	#A	1.4958E-01	1.4959E-01	9.1041E-01	9.1045E-01	1.014E+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_2SEPT2005_1044.An1

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

Total Activity (1000.0 to 2000.7 keV) 2.0004467E+01 pCi/gm

Total Decayed Activity (1000.0 to 2000.7 keV) 2.0004469E+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_2SEPT2005_1317.An1

Sample description

FSS-NOL-06-01-076-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_2SEPT2005_1317.An1

Acquisition information

Start time:	02-Sep-2005 13:18:07
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: 1.8730E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8730E+03) =
5.3390E+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	01-Sep-2005 13:07:00
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: 0.1320

***** 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	121.	22.37	0.99	9.052E-03	74.81	9.600	1.003E+00	PB212
77.20	184.	13.91	0.99	1.011E-02	77.11	17.500	8.130E-01	PB212
93.00	120.	31.01	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.01	117.	32.17	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.64	87.	41.56	1.61	2.443E-02				

129.64	87.	41.56	1.61	2.443E-02	131.28	20.000	PBC<MDA	PA234
186.51	154.	23.86	1.18	2.565E-02	185.99	3.280	1.211E+00	RA226
209.49	75.	36.20	0.77	2.470E-02				
238.86	1017.	3.81	1.09	2.319E-02	236.00	11.200	2.807E+00	TH227
					238.63	43.100	7.253E-01	PB212
241.80	117.	21.41	1.09	2.303E-02	241.00	3.900	9.379E-01	RA224
					241.92	7.470	4.907E-01	PB214
270.66	83.	33.42	1.19	2.149E-02				
277.77	92.	34.50	1.20	2.112E-02				
277.77	92.	34.50	1.20	2.112E-02	279.17	81.500	3.926E-02	HG203
295.15	227.	15.00	1.14	2.025E-02	295.22	19.200	4.136E-01	PB214
327.35	64.	40.91	0.93	1.877E-02				
338.19	207.	15.02	1.11	1.831E-02	338.40	12.010	6.765E-01	AC228
351.84	377.	8.43	0.97	1.776E-02	351.99	37.100	4.066E-01	PB214
463.45	106.	19.51	1.61	1.425E-02				
463.45	106.	19.51	1.61	1.425E-02	463.51	10.000	5.297E-01	SB125
510.62	146.	16.08	0.96	1.317E-02	510.72	22.500	2.915E-01	TL208
583.03	331.	8.99	1.04	1.185E-02	583.14	86.000	2.315E-01	TL208
609.28	328.	8.65	1.34	1.144E-02	609.32	46.090	4.401E-01	BI214
661.52	203.	11.54	1.06	1.072E-02	661.62	84.620	1.606E-01	CS137
727.20	50.	25.51	1.27	9.964E-03	727.17	11.800	3.044E-01	BI212
860.25	48.	33.12	1.37	8.770E-03				
910.95	285.	8.68	1.50	8.402E-03	911.07	29.000	8.340E-01	AC228
968.16	242.	9.99	1.61	8.030E-03	968.90	17.460	1.247E+00	AC228
1120.06	62.	29.91	1.89	7.213E-03	1120.28	15.040	3.998E-01	BI214
1172.87	117.	19.15	1.65	6.973E-03	1173.23	99.860	1.193E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.24	108.	18.02	1.89	6.350E-03	1332.51	99.980	1.192E-01	CO60
1460.56	1357.	2.80	1.89	5.933E-03	1460.75	10.700	1.521E+01	K40
1620.15	12.	41.61	1.94	5.488E-03	1620.56	2.750	PBC<MDA	Bi212
1764.49	60.	13.81	0.97	5.142E-03	1764.51	15.920	4.965E-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	331.	75.	0.038	108.59	0.772	AC-228
540.47	270.66	302.	83.	0.042	100.27	1.192	AC-228
653.85	327.35	244.	64.	0.032	122.72	0.930	AC-228 s
1719.54	860.25	74.	48.	0.024	99.36	1.369	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	325.	121.	0.060	67.12	0.993D
PB-212	153.39	77.11	352.	184.	0.092	41.73	0.995A
TH-234	185.19	93.01	891.	117.	0.059	96.52	1.500s

TH-234	185.18	93.00	865.	120.	0.060	93.04	1.500s
RA-226	372.18	186.51	513.	141.	0.071	71.58	1.179s
PB-212	476.96	238.90	558.	1001.	0.501	14.44	0.963
RA-224	482.84	241.84	721.	96.	0.048	122.55	1.500s
HG-203	554.13	277.49	320.	75.	0.037	107.44	1.500s
PB-214	589.45	295.15	349.	223.	0.111	45.01	1.144
AC-228	675.52	338.19	273.	206.	0.103	45.05	1.111
PB-214	702.83	351.85	257.	384.	0.192	25.19	0.970
SB-125	925.05	462.96	134.	72.	0.036	75.45	1.500s
TL-208	1020.36	510.62	167.	120.	0.060	48.24	0.961s
TL-208	1165.16	583.03	172.	327.	0.163	26.96	1.044
BI-214	1217.66	609.28	151.	322.	0.161	25.96	1.342
CS-137	1322.13	661.52	121.	202.	0.101	34.62	1.062
BI-212	1453.48	727.20	54.	50.	0.025	76.52	1.265
AC-228	1820.93	910.95	94.	282.	0.141	26.05	1.501
AC-228	1935.34	968.16	84.	242.	0.121	29.96	1.606
BI-214	2239.09	1120.06	96.	60.	0.030	89.74	1.886
CO-60	2344.69	1172.87	112.	115.	0.058	57.45	1.647

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2663.38	1332.24	62.	105.	0.052	54.06	1.894s
K-40	2919.99	1460.56	39.	1338.	0.669	8.39	1.886
Bl-214	3527.73	1764.49	6.	56.	0.028	41.43	0.968s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-3.6615E-02					
			477.56	-3.661E-02	&(	3.255E-01	9.56E-02 G
K-40		1.5214E+01					
			1460.75	1.521E+01	(P	3.596E-01	4.32E-01 G
MN-54		7.4944E-03					
			834.81	7.494E-03	%(P	3.481E-02	1.02E-02 G
CO-57		-7.8552E-03					
			122.07	-7.855E-03	&(P	4.551E-02	1.36E-02 G K
			136.43	9.599E-02	%	3.689E-01	1.11E-01 G
CO-60		1.1925E-01					
			1332.51	1.192E-01	@(P	4.485E-02	2.20E-02 G K
			1173.23	1.193E-01	(P	5.393E-02	2.32E-02 G K

Sr-85 -2.1523E-02

514.00-2.152E-02 %(4.493E-02 1.36E-02 G

Kr-85 -4.9189E+02

513.99-4.919E+02 %(1.026E+03 3.11E+02 G

Y-88 -4.8773E-03

1836.01-4.877E-03 %(P 2.794E-02 7.72E-03 G K

898.02-1.973E-03 & P 3.953E-02 1.13E-02 G

NB-94 -1.4404E-04

871.10-1.440E-04 %(3.639E-02 1.04E-02 G K

702.50-1.342E-03 % 3.657E-02 1.06E-02 G K

Ag-108M 1.9393E-02

722.95 1.939E-02 %(3.298E-02 1.01E-02 G K

614.37-5.417E-03 % P 3.862E-02 1.13E-02 G

433.93 1.737E-03 & 3.371E-02 9.84E-03 G

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

CD-109       7.8235E-01
                    88.04 7.823E-01 %(  1.772E+00 5.37E-01 G

SN-113      -1.3948E-02
                   391.71-1.395E-02 %(  5.341E-02 1.59E-02 G K
                   255.04-2.868E-02 %   1.606E+00 4.75E-01 G

SB-125       9.0815E-02
                   427.95-1.402E-03 &(P 9.817E-02 2.85E-02 G K
                   600.77 5.773E-02 & P 1.577E-01 4.72E-02 G
                   636.15 2.380E-02 % P 2.681E-01 7.73E-02 G
                   463.51 3.638E-01 *(P 2.867E-01 9.31E-02 G
                   176.29-4.104E-02 %   5.560E-01 1.66E-01 G

I-131       -1.1940E-02
                   364.48-1.194E-02 %(P 3.468E-02 1.04E-02 G K
                   636.97-1.347E-01 %   4.522E-01 1.34E-01 G
                   284.29-7.893E-02 % P 5.479E-01 1.63E-01 G

CS-134      -1.1763E-02
                   604.66-1.176E-02 %(  4.257E-02 1.27E-02 G K
                   795.76 2.816E-02 % P 4.136E-02 1.28E-02 G
                   569.29-1.133E-02 & P 2.419E-01 7.00E-02 G
                   801.84-1.972E-02 & P 3.230E-01 8.95E-02 G

CS-137       1.6057E-01
                   661.62 1.606E-01  (P 4.293E-02 1.87E-02 G

CE-139       6.7293E-03
                   165.85 6.729E-03 &(  4.000E-02 1.20E-02 G
```

EU-152 -4.4467E-02

121.78-4.447E-02 &(P 1.272E-01 3.83E-02 G K

344.30 2.855E-02 & P 1.153E-01 3.44E-02 G

1408.08 5.295E-02 % 1.281E-01 3.84E-02 G

964.00 1.927E-01 % P 3.038E-01 9.36E-02 G

1112.07 8.092E-02 % 2.871E-01 8.47E-02 G

778.90 1.421E-02 & 2.264E-01 6.45E-02 G

EU-154 1.2356E-02

123.10 1.236E-02 %(9.986E-02 2.98E-02 G K

1274.80 1.373E-02 % 1.079E-01 3.09E-02 G

723.30-1.559E-02 % 2.857E-01 8.40E-02 G

1004.80-5.356E-02 % 2.270E-01 6.67E-02 G

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

EU-155       9.4997E-02
                    86.45 9.500E-02 %(  2.232E-01 6.76E-02 G K
                   105.31 2.318E-02 %   1.896E-01 5.65E-02 G

HG-203       3.1830E-02
                   279.17 3.183E-02 &(P 3.672E-02 1.14E-02 G K
                    72.87-4.316E-01 % P 2.185E+00 6.56E-01 G
                    70.83-2.114E+00 &   2.942E+00 9.03E-01 G
                    82.50-1.020E-01 &   2.996E+00 8.89E-01 G

TL-208       2.4390E-01
                   583.14 2.315E-01  (P 4.523E-02 2.11E-02 G
                   510.72 2.915E-01 *(P 1.533E-01 5.73E-02 G

PB-212       7.4852E-01
                   238.63 7.223E-01  (P 8.138E-02 3.52E-02 G K
                                      Energy duplication
                    77.11 7.485E-01 } P 3.672E-01 1.04E-01 G
                    74.81 1.003E+00 + P 7.203E-01 2.30E-01 G

PB-214       4.1806E-01
                   351.99 4.204E-01  (P 8.484E-02 3.58E-02 G K
                   295.22 4.136E-01  (P 1.666E-01 6.32E-02 G
                                      Energy duplication
                    77.11 0.000E+00 } P 8.394E-01 0.00E+00 G
                   241.92 1.718E-01 %   5.483E-01 1.65E-01 G

BI-212       3.0438E-01
                   727.17 3.044E-01  (P 2.275E-01 7.84E-02 G K
                  1620.56 5.633E-01 % P 6.861E-01 2.35E-01 G
```

785.42 7.396E-01 % 1.735E+00 5.23E-01 G

BI-214 4.4390E-01

609.32 4.401E-01 (P 8.217E-02 3.89E-02 G K

1764.51 4.965E-01 (P 1.217E-01 7.26E-02 G

1120.28 3.998E-01 (P 3.216E-01 1.23E-01 G

RA-224 7.6988E-01

241.00 7.699E-01 &(1.025E+00 3.14E-01 G

RA-226 1.2105E+00

185.99 1.211E+00 *(P 9.276E-01 3.16E-01 G

AC-228 8.3401E-01

911.07 8.340E-01 (P 1.421E-01 7.33E-02 G K

968.90 1.247E+00 + P 2.337E-01 1.25E-01 G

338.40 6.765E-01 - P 2.616E-01 1.02E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.4367E-01						
		236.00	-1.437E-01	%(	3.569E-01	1.08E-01	G K
		256.25	1.208E-01	%	P 4.692E-01	1.41E-01	G
PA-234	-2.2755E-02						
		98.44	-2.275E-02	&(P	1.990E-01	5.93E-02	G K
		946.00	2.152E-02	&	P 1.793E-01	5.17E-02	G
		131.28	-3.202E-03	&	P 2.029E-01	6.04E-02	G
		94.67	-9.360E-02	&	P 3.944E-01	1.18E-01	G
		883.24	8.617E-02	%	2.809E-01	8.32E-02	G
		926.70	-9.051E-02	%	3.236E-01	9.55E-02	G
		569.26	-1.660E-02	&	P 3.585E-01	1.04E-01	G
TH-234	5.4581E-01						
		63.29	-1.358E+00	&(P	6.301E+00	1.88E+00	G K
		92.80	1.760E+00	(P	2.043E+00	6.26E-01	G
		92.38	2.017E+00	&(P	2.441E+00	7.47E-01	G
AM-241	2.6056E-01						
		59.54	2.606E-01	%(P	9.962E-01	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:	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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	-3.6139E-02	-3.6615E-02	2.8670E-01	2.8670E-01	3.213E-01
K-40	1.5214E+01	1.5214E+01	1.2951E+00	1.5676E+00	
MN-54 #A	7.4777E-03	7.4944E-03	3.0570E-02	3.0573E-02	3.473E-02
CO-57 #B	-7.8349E-03	-7.8552E-03	4.2485E-02	4.2488E-02	4.539E-02
CO-60	1.1920E-01	1.1925E-01	4.8014E-02	4.8511E-02	
Sr-85 #A	-2.1292E-02	-2.1523E-02	4.0873E-02	4.0892E-02	4.445E-02
Kr-85 #A	-4.9188E+02	-4.9189E+02	9.3352E+02	9.3396E+02	1.026E+03
Y-88 #B	-4.8454E-03	-4.8773E-03	2.4064E-02	2.4065E-02	2.776E-02
NB-94 #B	-1.4404E-04	-1.4404E-04	3.1103E-02	3.1103E-02	3.639E-02
Ag-108M#B	1.9392E-02	1.9393E-02	3.0435E-02	3.0456E-02	3.298E-02
CD-109 #A	7.8114E-01	7.8235E-01	1.6102E+00	1.6108E+00	1.770E+00
SN-113 #B	-1.3864E-02	-1.3948E-02	4.7833E-02	4.7840E-02	5.309E-02
SB-125 #B	9.0752E-02	9.0815E-02	6.9738E-02	6.9938E-02	9.811E-02
I-131 #B	-1.0946E-02	-1.1940E-02	3.3146E-02	3.3154E-02	3.180E-02
CS-134 #B	-1.1752E-02	-1.1763E-02	3.8073E-02	3.8080E-02	4.253E-02
CS-137	1.6056E-01	1.6057E-01	5.5972E-02	5.6743E-02	
CE-139 #A	6.6952E-03	6.7293E-03	3.5859E-02	3.5861E-02	3.980E-02
EU-152 #B	-4.4460E-02	-4.4467E-02	1.2030E-01	1.2032E-01	1.272E-01
EU-154 #B	1.2353E-02	1.2356E-02	8.9526E-02	8.9529E-02	9.984E-02
EU-155 #B	9.4961E-02	9.4997E-02	2.0269E-01	2.0276E-01	2.231E-01
HG-203 #A	3.1356E-02	3.1830E-02	3.4217E-02	3.4267E-02	3.618E-02
TL-208	2.4390E-01	2.4390E-01	6.6616E-02	6.8104E-02	

PB-212	7.4852E-01	7.4852E-01	1.0939E-01	1.1771E-01	
PB-214	4.1806E-01	4.1806E-01	1.0684E-01	1.0956E-01	
BI-212	3.0438E-01	3.0438E-01	2.3522E-01	2.3589E-01	
BI-214	4.4390E-01	4.4390E-01	1.1757E-01	1.2036E-01	
RA-224 #A	7.6988E-01	7.6988E-01	9.4345E-01	9.4451E-01	1.025E+00
RA-226 #	1.2105E+00	1.2105E+00	9.4597E-01	9.4858E-01	
AC-228	8.3401E-01	8.3401E-01	2.1989E-01	2.2515E-01	
TH-227 #B	-1.4367E-01	-1.4367E-01	3.2367E-01	3.2378E-01	3.569E-01
PA-234 #B	-2.2755E-02	-2.2755E-02	2.0420E-01	2.0420E-01	1.990E-01
TH-234 #B	5.4581E-01	5.4581E-01	5.8229E-01	5.8307E-01	6.301E+00
AM-241 #A	2.6056E-01	2.6056E-01	8.9675E-01	8.9687E-01	9.962E-01

- All peaks for activity calculation had bad shape.

* - Activity omitted from total

& - Activity omitted from total and all peaks had bad shape.

< - MDA value printed.

A - Activity printed, but activity < MDA.

B - Activity < MDA and failed test.

C - Area < Critical level.

F - Failed fraction or key line test.

H - Halflife limit exceeded

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

Total Activity (86.9 to 2000.7 keV) 1.9697514E+01 pCi/gm

Total Decayed Activity (86.9 to 2000.7 keV) 1.9697565E+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_2sept2005_1403.An1

Sample description

FSS-NOL-06-01-042-F-I

Spectrum Filename: C:\GammaVision\Spectra\103f_2sept2005_1403.An1

Acquisition information

Start time:	02-Sep-2005 14:04:11
Live time:	2000
Real time:	2003
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: 2.0630E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0630E+03) =
4.8473E+02

Detection limit method: Nureg 4.16

Random error: 1.0000000E+00

Systematic error: 1.0000000E+00

Fraction Limit: 0.000%

Background width: average of five points.

YAEC Chemistry Lab Spectrum name: 103f_2sept2005_1403.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	31-Aug-2005 13:08:00
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. 20 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
74.69	133.	21.30	0.99	9.100E-03	74.81	9.600	9.796E-01	PB212
77.30	224.	14.09	0.99	1.030E-02	77.11	17.500	8.196E-01	PB212
93.23	102.	40.02	1.50	1.645E-02	92.38	2.570		PBC<MDA TH234
					92.80	3.000		PBC<MDA TH234
99.40	111.	38.50	0.66	1.856E-02				
185.96	126.	31.89	1.59	2.567E-02				
185.96	126.	31.89	1.59	2.567E-02	185.99	3.280		PBC<MDA RA226

209.67	119.	26.93	0.97	2.470E-02				
238.87	1315.	3.32	1.09	2.319E-02	238.63	43.100	8.536E-01	PB212
241.72	164.	17.12	1.09	2.304E-02	241.00	3.900	1.195E+00	RA224
					241.92	7.470	6.254E-01	PB214
270.02	177.	19.96	1.32	2.152E-02				
277.30	96.	34.92	0.90	2.115E-02				
295.35	240.	12.65	1.00	2.024E-02	295.22	19.200	3.979E-01	PB214
300.17	77.	28.62	1.06	2.001E-02				
327.56	105.	22.41	1.07	1.876E-02				
338.60	339.	9.95	1.11	1.829E-02	338.40	12.010	1.006E+00	AC228
351.83	444.	8.67	1.03	1.776E-02	351.99	37.100	4.356E-01	PB214
462.62	99.	24.21	1.47	1.427E-02				
462.62	99.	24.21	1.47	1.427E-02	463.51	10.000	4.509E-01	SB125
510.85	197.	12.69	1.12	1.317E-02	510.72	22.500	3.764E-01	TL208
583.10	488.	6.72	1.30	1.185E-02	583.14	86.000	3.112E-01	TL208
609.18	332.	8.29	1.18	1.144E-02	609.32	46.090	4.044E-01	BI214
661.56	245.	10.42	1.47	1.072E-02	661.62	84.620	1.762E-01	CS137
727.36	131.	17.48	1.25	9.963E-03	727.17	11.800	7.259E-01	BI212
794.77	103.	23.09	0.86	9.310E-03				
794.77	103.	23.09	0.86	9.310E-03	795.76	85.400	8.470E-02	CS134
860.38	50.	30.15	1.33	8.769E-03				
911.05	323.	7.65	1.71	8.401E-03	911.07	29.000	8.594E-01	AC228
964.23	60.	19.56	1.54	8.054E-03	964.00	14.580	3.340E-01	EU152
968.89	184.	8.83	1.54	8.025E-03	968.90	17.460	8.572E-01	AC228
1120.26	97.	23.47	1.42	7.212E-03	1120.28	15.040	5.726E-01	BI214
1172.93	69.	31.11	1.14	6.972E-03	1173.23	99.860	6.464E-02	CO60
1238.13	46.	36.05	0.82	6.702E-03				
1332.59	82.	21.28	2.27	6.349E-03	1332.51	99.980	8.463E-02	CO60
1460.63	1527.	2.65	1.83	5.932E-03	1460.75	10.700	1.557E+01	K40
1588.59	55.	18.01	1.23	5.571E-03				
1764.36	57.	13.90	2.30	5.142E-03	1764.51	15.920	4.564E-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
418.50	209.67	454.	119.	0.060	80.79	0.966	NP-239
539.19	270.02	398.	177.	0.089	59.89	1.323	AC-228 s
553.76	277.30	381.	92.	0.046	94.86	0.897	TL-208 s
599.49	300.17	213.	77.	0.038	85.87	1.060	PB-212
654.27	327.56	212.	105.	0.052	67.23	1.067	AC-228 s
1588.61	794.77	180.	50.	0.025	120.95	0.862	AC-228 s
1719.81	860.38	69.	50.	0.025	90.45	1.331	TL-208 s
1927.73	964.38	38.	62.	0.031	56.30	1.538	AC-228 D
2475.19	1238.13	86.	46.	0.023	108.15	0.817	BI-214 s
3176.00	1588.59	11.	55.	0.027	54.02	1.229	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	400.	132.	0.066	67.47	0.993	D
PB-212	153.39	77.11	399.	195.	0.098	39.14	0.995	A

RA-226	371.41	186.13	879.	117.	0.058	99.84	1.500s
PB-212	476.42	238.63	288.	1301.	0.650	9.87	1.093D
PB-214	483.00	241.92	423.	109.	0.054	64.75	1.095A
PB-214	589.85	295.35	315.	236.	0.118	37.96	1.002
AC-228	676.34	338.60	285.	338.	0.169	29.85	1.114s
PB-214	702.80	351.83	329.	438.	0.219	26.00	1.032
SB-125	924.78	462.83	169.	82.	0.041	73.90	1.500s
TL-208	1020.81	510.85	180.	170.	0.085	38.08	1.116s
TL-208	1165.30	583.10	168.	484.	0.242	20.17	1.299s
BI-214	1217.46	609.18	148.	326.	0.163	24.88	1.183
CS-137	1322.21	661.56	129.	244.	0.122	31.26	1.473
BI-212	1453.80	727.36	116.	130.	0.065	52.43	1.252s
CS-134	1588.80	794.87	77.	52.	0.026	82.47	1.500s
AC-228	1821.09	911.03	115.	341.	0.170	23.82	1.714
EU-152	1927.84	964.41	91.	50.	0.025	90.29	1.538
AC-228	1936.81	968.90	40.	183.	0.092	26.47	1.541D
BI-214	2239.50	1120.26	109.	95.	0.047	70.42	1.422
CO-60	2344.82	1172.93	116.	69.	0.034	93.33	1.136

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2664.08	1332.59	57.	82.	0.041	63.83	2.273s
K-40	2920.14	1460.63	47.	1508.	0.754	7.94	1.835
Bl-214	3527.48	1764.36	6.	57.	0.029	41.71	2.304

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		4.9985E-03					
			477.56	4.998E-03	%(	3.187E-01	9.30E-02 G
K-40		1.5566E+01					
			1460.75	1.557E+01	(P	3.567E-01	4.17E-01 G
MN-54		9.2017E-03					
			834.81	9.202E-03	%(P	3.411E-02	1.01E-02 G
CO-57		-2.0564E-03					
			122.07	-2.056E-03	%(P	4.344E-02	1.29E-02 G K
			136.43	-5.183E-02	%	3.902E-01	1.17E-01 G
CO-60		7.4642E-02					
			1332.51	8.463E-02	(P	3.914E-02	1.86E-02 G K
			1173.23	6.464E-02	(P	4.988E-02	2.07E-02 G K

```
Sr-85      -1.5722E-02
                514.00-1.572E-02 %(  4.055E-02 1.22E-02 G

Kr-85      -3.5535E+02
                513.99-3.553E+02 %(  9.159E+02 2.76E+02 G

Y-88       -2.6406E-03
               1836.01-2.641E-03 %(P 2.612E-02 7.06E-03 G K
                898.02 1.223E-02 % P 3.090E-02 9.24E-03 G

NB-94       1.4875E-03
                871.10 1.487E-03 %(  3.192E-02 9.13E-03 G K
                702.50-6.133E-03 %   3.729E-02 1.10E-02 G K

Ag-108M    -1.2643E-02
                722.95-1.264E-02 %(  4.371E-02 1.30E-02 G K
                614.37 6.224E-03 & P 2.734E-02 8.02E-03 G
                433.93 1.194E-02 &   3.178E-02 9.55E-03 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	6.5983E-01						
		88.04	6.598E-01	&(	1.761E+00	5.32E-01	G
SN-113	1.7894E-02						
		391.71	1.789E-02	&(	4.164E-02	1.26E-02	G K
		255.04	-4.584E-02	%	1.628E+00	4.83E-01	G
SB-125	1.1379E-01						
		427.95	2.512E-02	%(P	9.704E-02	2.89E-02	G K
		600.77	-4.611E-02	% P	1.726E-01	5.12E-02	G
		636.15	-3.062E-03	% P	3.417E-01	9.92E-02	G
		463.51	3.763E-01	*(P	2.912E-01	9.41E-02	G
		176.29	-9.980E-03	&	4.632E-01	1.37E-01	G
I-131	7.7298E-03						
		364.48	7.730E-03	%(P	4.535E-02	1.35E-02	G K
		636.97	2.222E-03	&	4.615E-01	1.32E-01	G
		284.29	-8.569E-03	% P	6.167E-01	1.82E-01	G
CS-134	1.9135E-02						
		604.66	-1.894E-03	&(	3.517E-02	1.02E-02	G K
		795.76	4.317E-02	(P	3.611E-02	1.19E-02	G
		569.29	1.878E-02	% P	1.962E-01	5.71E-02	G
		801.84	3.671E-02	% P	3.619E-01	1.04E-01	G
CS-137	1.7619E-01						
		661.62	1.762E-01	(P	4.017E-02	1.85E-02	G
CE-139	-1.1604E-03						
		165.85	-1.160E-03	%(	4.415E-02	1.32E-02	G

EU-152 7.7788E-02

121.78-2.232E-02 %(P 1.421E-01 4.26E-02 G K

344.30-3.287E-02 % P 1.165E-01 3.49E-02 G

1408.08 5.922E-02 % 1.192E-01 3.64E-02 G

964.00 2.785E-01 (P 2.627E-01 8.48E-02 G

1112.07-4.708E-02 % 3.087E-01 9.00E-02 G

778.90-3.803E-02 % 2.465E-01 7.19E-02 G

EU-154 3.2315E-03

123.10 3.232E-03 &(9.461E-02 2.82E-02 G K

1274.80 2.985E-03 % 1.099E-01 3.12E-02 G

723.30-6.011E-02 % 1.984E-01 5.92E-02 G

1004.80-3.502E-02 % 1.795E-01 5.22E-02 G

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

EU-155       1.4087E-01
                  86.45 1.409E-01 %(  2.258E-01 6.88E-02 G K
                 105.31-6.348E-03 %   2.253E-01 6.72E-02 G

HG-203       1.2462E-03
                 279.17 1.246E-03 &(P 3.890E-02 1.15E-02 G K
                  72.87-1.200E-01 % P 2.152E+00 6.43E-01 G
                  70.83-1.261E+00 &   3.995E+00 1.20E+00 G
                  82.50-1.610E+00 %   3.849E+00 1.17E+00 G

TL-208       3.1117E-01
                 583.14 3.112E-01 @(P 4.060E-02 2.11E-02 G
                 510.72 3.764E-01 + P 1.440E-01 5.53E-02 G

PB-212       8.4367E-01
                 238.63 8.522E-01  (P 5.356E-02 2.83E-02 G K
                                    Energy duplication
                  77.11 7.225E-01 } P 3.544E-01 9.43E-02 G
                  74.81 9.980E-01 + P 7.226E-01 2.30E-01 G

PB-214       4.1433E-01
                 351.99 4.356E-01  (P 8.676E-02 3.82E-02 G K
                 295.22 3.979E-01  (P 1.439E-01 5.12E-02 G
                                    Energy duplication
                  77.11 0.000E+00 } P 8.378E-01 0.00E+00 G
                 241.92 4.143E-01 }   3.753E-01 8.94E-02 G

BI-212       7.2591E-01
                 727.17 7.259E-01  (P 2.943E-01 1.27E-01 G K
                1620.56 3.148E-01 % P 7.946E-01 2.36E-01 G
```

785.42 6.118E-01 % 1.726E+00 5.16E-01 G

BI-214 4.1777E-01

609.32 4.044E-01 (P 7.391E-02 3.42E-02 G K

1764.51 4.564E-01 (P 1.128E-01 6.71E-02 G

1120.28 5.726E-01 + P 3.104E-01 1.37E-01 G

RA-224 8.2436E-01

Derived Ave Activity

241.00 8.244E-01 }(1.206E+00 3.80E-01 G

RA-226 9.0778E-01

185.99 9.078E-01 (P 1.096E+00 3.36E-01 G

AC-228 9.1715E-01

911.07 9.164E-01 (P 1.417E-01 7.35E-02 G K

968.90 8.574E-01 (P 1.497E-01 7.57E-02 G

338.40 1.006E+00 @(P 2.427E-01 1.00E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-5.3348E-03						
		236.00	-5.335E-03	&(	4.684E-01	1.40E-01	G K
		256.25	-4.968E-02	% P	4.859E-01	1.45E-01	G
PA-234	-3.1922E-03						
		98.44	-3.192E-03	%(P	1.999E-01	5.95E-02	G K
		946.00	2.632E-02	& P	1.289E-01	3.73E-02	G
		131.28	4.635E-03	% P	2.146E-01	6.41E-02	G
		94.67	-1.481E-01	% P	4.121E-01	1.24E-01	G
		883.24	-4.720E-02	&	2.695E-01	7.85E-02	G
		926.70	2.534E-02	&	2.528E-01	7.21E-02	G
		569.26	2.766E-02	% P	2.906E-01	8.45E-02	G
TH-234	-5.8783E-01						
		63.29	-5.878E-01	%(P	6.226E+00	1.85E+00	G K
		92.80	1.356E+00	% P	2.095E+00	6.37E-01	G
		92.38	1.457E+00	& P	2.480E+00	7.52E-01	G
AM-241	3.1790E-03						
		59.54	3.179E-03	%(P	7.906E-01	2.33E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	4.8679E-03	4.9985E-03	2.7896E-01	2.7896E-01	3.104E-01
K-40	1.5566E+01	1.5566E+01	1.2513E+00	1.5435E+00	
MN-54 #A	9.1601E-03	9.2017E-03	3.0234E-02	3.0239E-02	3.395E-02
CO-57 #B	-2.0456E-03	-2.0564E-03	4.4536E-02	4.4536E-02	4.322E-02
CO-60	7.4587E-02	7.4642E-02	4.3449E-02	4.3664E-02	
Sr-85 #A	-1.5383E-02	-1.5722E-02	3.6652E-02	3.6663E-02	3.967E-02
Kr-85 #A	-3.5534E+02	-3.5535E+02	8.2794E+02	8.2820E+02	9.159E+02
Y-88 #B	-2.6058E-03	-2.6406E-03	2.2564E-02	2.2564E-02	2.578E-02
NB-94 #B	1.4875E-03	1.4875E-03	2.7389E-02	2.7389E-02	3.192E-02
Ag-108M#B	-1.2643E-02	-1.2643E-02	3.9078E-02	3.9085E-02	4.371E-02
CD-109 #A	6.5778E-01	6.5983E-01	1.5966E+00	1.5970E+00	1.756E+00
SN-113 #B	1.7676E-02	1.7894E-02	3.7721E-02	3.7736E-02	4.113E-02
SB-125 #F	1.1363E-01	1.1379E-01	8.5402E-02	8.5657E-02	9.690E-02
I-131 #B	6.4838E-03	7.7298E-03	4.0374E-02	4.0377E-02	3.804E-02
CS-134 #B	1.9099E-02	1.9135E-02	1.5806E-02	1.5845E-02	3.510E-02
CS-137	1.7617E-01	1.7619E-01	5.5384E-02	5.6321E-02	
CE-139 #A	-1.1485E-03	-1.1604E-03	3.9457E-02	3.9457E-02	4.370E-02
EU-152 #B	7.7765E-02	7.7788E-02	7.1004E-02	7.1135E-02	1.421E-01
EU-154 #B	3.2300E-03	3.2315E-03	8.4559E-02	8.4560E-02	9.456E-02
EU-155 #B	1.4076E-01	1.4087E-01	2.0647E-01	2.0662E-01	2.256E-01
HG-203 #B	1.2090E-03	1.2462E-03	3.4505E-02	3.4505E-02	3.773E-02
TL-208 #	3.1117E-01	3.1117E-01	6.3336E-02	6.5862E-02	

PB-212	8.4367E-01	8.4367E-01	8.4013E-02	9.7249E-02
PB-214	4.1433E-01	4.1433E-01	1.0913E-01	1.1175E-01
BI-212 #	7.2591E-01	7.2591E-01	3.8201E-01	3.8433E-01
BI-214	4.1777E-01	4.1777E-01	1.0600E-01	1.0874E-01
RA-224 A	8.2436E-01	8.2436E-01	1.1156E+00	1.1166E+00
RA-226 #A	9.0778E-01	9.0778E-01	1.0069E+00	1.0083E+00 1.096E+00
AC-228	9.1715E-01	9.1715E-01	1.4265E-01	1.5226E-01
TH-227 #B	-5.3348E-03	-5.3348E-03	4.2043E-01	4.2043E-01 4.684E-01
PA-234 #B	-3.1922E-03	-3.1922E-03	4.6243E-01	4.6243E-01 1.999E-01
TH-234 #B	-5.8783E-01	-5.8783E-01	1.2532E+01	1.2532E+01 6.226E+00
AM-241 #A	3.1790E-03	3.1790E-03	7.0012E-01	7.0012E-01 7.906E-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_2sept2005_1403.An1

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

Total Activity (1120.0 to 2000.7 keV) 2.0270695E+01 pCi/gm

Total Decayed Activity (1120.0 to 2000.7 keV) 2.0270773E+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_2SEPT2005_1444.An1

Sample description

FSS-NOL-06-01-066-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_2SEPT2005_1444.An1

Acquisition information

Start time:	02-Sep-2005 14:44:56
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: 1.8180E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8180E+03) =
5.5005E+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-Aug-2005 10:44:00
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: 0.1028

***** 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	88.	28.97	0.99	9.052E-03	74.81	9.600	7.539E-01	PB212
77.20	128.	22.18	0.99	1.011E-02	77.11	17.500	7.642E-01	PB212
					77.11	10.700	1.250E+00	PB214
87.24	104.	38.38	0.70	1.441E-02	86.45	32.740	1.682E-01	EU155
					88.04	3.790	1.395E+00	CD109
93.22	142.	26.25	1.00	1.660E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234

186.19	167.	22.43	1.18	2.566E-02	185.99	3.280	1.357E+00	RA226
208.69	116.	29.12	0.88	2.474E-02				
238.90	940.	3.99	1.09	2.319E-02	238.63	43.100	6.900E-01	PB212
242.04	138.	19.05	1.10	2.302E-02	241.00	3.900	1.136E+00	RA224
					241.92	7.470	5.945E-01	PB214
270.36	59.	37.79	0.75	2.150E-02				
276.42	63.	38.90	1.01	2.119E-02				
295.30	207.	13.05	0.95	2.024E-02	295.22	19.200	3.873E-01	PB214
328.22	61.	35.46	1.14	1.873E-02				
338.51	218.	13.44	1.14	1.830E-02	338.40	12.010	7.325E-01	AC228
351.77	416.	7.84	1.04	1.776E-02	351.99	37.100	4.627E-01	PB214
408.92	51.	41.53	1.29	1.576E-02				
463.26	72.	30.93	1.09	1.425E-02				
463.26	72.	30.93	1.09	1.425E-02	463.51	10.000	3.675E-01	SB125
510.68	146.	17.54	1.60	1.317E-02	510.72	22.500	2.983E-01	TL208
583.09	328.	8.06	1.27	1.185E-02	583.14	86.000	2.364E-01	TL208
609.23	317.	8.51	1.47	1.144E-02	609.32	46.090	4.374E-01	BI214
661.53	188.	14.17	1.35	1.072E-02	661.62	84.620	1.532E-01	CS137
727.24	105.	21.94	1.19	9.964E-03	727.17	11.800	6.606E-01	BI212
829.62	44.	29.95	1.45	9.013E-03				
860.68	48.	32.49	1.56	8.767E-03				
911.27	240.	8.66	1.82	8.400E-03	911.07	29.000	7.220E-01	AC228
968.50	194.	11.14	1.41	8.028E-03	968.90	17.460	1.026E+00	AC228
1120.22	91.	24.84	1.71	7.212E-03	1120.28	15.040	6.107E-01	BI214
1173.48	99.	20.19	2.10	6.971E-03	1173.23	99.860	1.039E-01	CO60
1332.42	70.	15.26	1.74	6.350E-03	1332.51	99.980	7.869E-02	CO60
1460.65	1297.	2.79	1.71	5.932E-03	1460.75	10.700	1.497E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.20	59.	12.70	2.25	5.142E-03	1764.51	15.920	5.333E-01	Bl214
1839.05	6.	41.06	2.08	4.985E-03	1836.01	99.360	PBC<MDA	Y88

********** 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
416.54	208.69	427.	116.	0.058	87.35	0.880	LU-177 s
539.87	270.36	219.	59.	0.030	113.36	0.751	AC-228
655.59	328.22	182.	61.	0.030	106.39	1.137	AC-228
816.98	408.92	159.	51.	0.025	124.58	1.291	CS-138 s
1658.28	829.62	47.	44.	0.022	79.74	1.445	PA-234 s
1720.41	860.68	68.	48.	0.024	97.46	1.556	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	307.	88.	0.044	86.92	0.993D
PB-212	153.39	77.11	351.	128.	0.064	66.53	0.995A
CD-109	173.97	87.40	787.	101.	0.050	121.92	1.500s

TH-234	185.55	93.19	860.	136.	0.068	83.50	1.500s
TH-234	185.53	93.18	848.	136.	0.068	83.27	1.500s
RA-226	371.45	186.14	666.	148.	0.074	71.42	1.500
PB-212	476.88	238.86	687.	877.	0.439	17.57	1.010
RA-224	483.11	241.98	606.	133.	0.066	82.97	1.500
PB-214	483.22	242.03	705.	105.	0.053	110.68	1.500
PB-214	589.75	295.30	240.	203.	0.101	39.14	0.946
AC-228	676.15	338.51	237.	217.	0.108	40.31	1.141
PB-214	702.68	351.77	236.	410.	0.205	23.51	1.039s
SB-125	925.26	463.07	138.	47.	0.024	111.21	1.500
TL-208	1020.47	510.68	185.	119.	0.059	52.63	1.600s
TL-208	1165.28	583.09	124.	324.	0.162	24.17	1.268
BI-214	1217.56	609.23	139.	310.	0.155	25.54	1.470s
CS-137	1322.15	661.53	147.	187.	0.094	42.51	1.353
BI-212	1453.51	727.22	101.	96.	0.048	65.33	1.183
AC-228	1821.56	911.27	67.	237.	0.118	25.98	1.820s
AC-228	1936.02	968.50	78.	193.	0.097	33.42	1.409
BI-214	2239.71	1120.37	104.	102.	0.051	67.45	1.740s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2345.91	1173.48	91.	97.	0.049	60.57	2.097s
CO-60	2663.74	1332.42	21.	67.	0.034	45.79	1.743
K-40	2920.16	1460.65	22.	1279.	0.639	8.38	1.714
Bl-214	3527.15	1764.20	3.	59.	0.029	38.10	2.250
Y-88	3676.82	1839.05	0.	6.	0.003	123.17	2.078s

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

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

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

BE-7 -5.6816E-03
477.56-5.682E-03 %(3.126E-01 9.06E-02 G

K-40 1.4973E+01
1460.75 1.497E+01 (P 2.901E-01 4.25E-01 G

MN-54 2.0399E-02
834.81 2.040E-02 %(P 2.781E-02 8.77E-03 G

CO-57 -2.7735E-03
122.07-2.773E-03 &(P 5.029E-02 1.50E-02 G K
136.43-5.471E-02 % 3.693E-01 1.10E-01 G

CO-60 9.1299E-02

1332.51 7.869E-02 (P 2.811E-02 1.25E-02 G K
1173.23 1.039E-01 *(P 5.033E-02 2.14E-02 G K

Sr-85 -2.1126E-02
514.00-2.113E-02 %(4.356E-02 1.32E-02 G

Kr-85 -4.7654E+02
513.99-4.765E+02 %(9.826E+02 2.98E+02 G

Y-88 8.5512E-03
1836.01 8.551E-03 ?(P 1.122E-02 3.55E-03 G K
898.02 1.120E-03 % P 3.399E-02 9.57E-03 G

NB-94 3.2721E-03
871.10 3.272E-03 %(3.589E-02 1.03E-02 G K
702.50 1.206E-02 % 3.581E-02 1.07E-02 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-4.9710E-03						
		722.95	-4.971E-03	%(	3.918E-02	1.14E-02	G K
		614.37	-1.179E-02	% P	3.899E-02	1.16E-02	G
		433.93	-8.344E-04	&	2.755E-02	7.94E-03	G
CD-109	1.3456E+00						
		88.04	1.346E+00	(	1.783E+00	5.47E-01	G
SN-113	-3.8042E-04						
		391.71	-3.804E-04	%(	4.093E-02	1.18E-02	G K
		255.04	-3.299E-01	%	1.660E+00	4.96E-01	G
SB-125	9.2440E-02						
		427.95	4.038E-02	%(P	1.032E-01	3.11E-02	G K
		600.77	-1.813E-02	& P	1.819E-01	5.29E-02	G
		636.15	8.302E-02	% P	2.046E-01	6.12E-02	G
		463.51	2.465E-01	(P	3.006E-01	9.39E-02	G
		176.29	-1.011E-01	%	5.582E-01	1.67E-01	G
I-131	7.7089E-03						
		364.48	7.709E-03	%(P	4.375E-02	1.29E-02	G K
		636.97	-1.235E-01	%	5.737E-01	1.69E-01	G
		284.29	7.022E-03	& P	5.911E-01	1.74E-01	G
CS-134	4.2349E-03						
		604.66	4.235E-03	%(	7.608E-02	2.26E-02	G K
		795.76	-2.078E-03	& P	4.752E-02	1.37E-02	G
		569.29	6.814E-02	% P	1.947E-01	5.79E-02	G
		801.84	-2.066E-02	& P	3.978E-01	1.12E-01	G

CS-137 1.5323E-01

661.62 1.532E-01 (P 4.851E-02 2.19E-02 G

CE-139 -5.1812E-03

165.85-5.181E-03 &(4.597E-02 1.37E-02 G

EU-152 2.6153E-02

121.78 2.615E-02 &(P 1.365E-01 4.09E-02 G K

344.30-1.799E-02 % P 1.127E-01 3.33E-02 G

1408.08 4.890E-02 % 1.287E-01 3.82E-02 G

964.00 2.082E-01 & P 2.861E-01 8.92E-02 G

1112.07-1.318E-02 & 3.062E-01 8.73E-02 G

778.90-7.156E-02 & 2.915E-01 8.61E-02 G

EU-154 2.0061E-02

123.10 2.006E-02 %(1.037E-01 3.11E-02 G K

1274.80 3.339E-02 & 1.057E-01 3.12E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30-1.667E-02 %   1.665E-01 4.81E-02 G
                      1004.80-3.126E-03 &   2.036E-01 5.75E-02 G

EU-155       1.2825E-01
                       86.45 1.283E-01 %(  2.286E-01 6.96E-02 G K
                      105.31 6.227E-02 %   2.258E-01 6.79E-02 G

HG-203      -9.5401E-03
                      279.17-9.540E-03 &(P 4.180E-02 1.25E-02 G K
                       72.87-4.944E-01 & P 2.136E+00 6.41E-01 G
                       70.83-1.940E+00 %   4.186E+00 1.27E+00 G
                       82.50-8.794E-01 %   3.950E+00 1.19E+00 G

TL-208       2.3642E-01
                      583.14 2.364E-01  (P 3.984E-02 1.93E-02 G
                      510.72 2.983E-01 + P 1.658E-01 6.40E-02 G

PB-212       6.9396E-01
                      238.63 6.521E-01  (P 9.281E-02 3.87E-02 G K
                                          Energy duplication
                       77.11 5.364E-01 } P 3.780E-01 1.19E-01 G
                       74.81 7.539E-01  (P 7.215E-01 2.26E-01 G

PB-214       4.6155E-01
                      351.99 4.627E-01 @(P 8.386E-02 3.67E-02 G K
                      295.22 3.873E-01 - P 1.433E-01 5.16E-02 G
                                          Energy duplication
                       77.11 3.587E-01 } P 9.022E-01 2.19E-01 G
                      241.92 4.560E-01  (  5.464E-01 1.68E-01 G

BI-212       6.0501E-01
```

727.17 6.050E-01 (P 3.136E-01 1.32E-01 G K
1620.56 1.182E-01 & P 1.027E+00 2.81E-01 G
785.42 2.553E-01 % 1.415E+00 4.09E-01 G

BI-214 4.6200E-01
609.32 4.374E-01 @(P 8.121E-02 3.80E-02 G K
1764.51 5.333E-01 (P 1.012E-01 7.15E-02 G
1120.28 6.977E-01 + P 3.446E-01 1.60E-01 G

RA-224 1.0950E+00
241.00 1.095E+00 (9.698E-01 3.03E-01 G

RA-226 1.3062E+00
185.99 1.306E+00 (P 1.086E+00 3.38E-01 G

AC-228 7.2505E-01
911.07 7.220E-01 @(P 1.250E-01 6.34E-02 G K
968.90 1.026E+00 + P 2.322E-01 1.14E-01 G
338.40 7.325E-01 (P 2.520E-01 9.89E-02 G

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

TH-227      -1.7700E-01
                    236.00-1.770E-01 %(  3.846E-01 1.17E-01 G K
                    256.25-1.115E-02 % P 4.010E-01 1.18E-01 G

PA-234      -2.2918E-02
                     98.44-2.292E-02 %(P 2.153E-01 6.42E-02 G K
                    946.00-8.219E-04 & P 2.040E-01 5.82E-02 G
                    131.28 8.313E-02 % P 2.031E-01 6.14E-02 G
                     94.67-3.134E-03 % P 3.893E-01 1.16E-01 G
                    883.24 7.937E-02 %   2.781E-01 8.20E-02 G
                    926.70-8.309E-02 %   3.304E-01 9.71E-02 G
                    569.26 1.011E-01 % P 2.882E-01 8.58E-02 G

TH-234       1.5813E+00
                     63.29 6.723E-01 %(P 5.980E+00 1.78E+00 G K
                     92.80 2.045E+00 *(P 2.084E+00 6.41E-01 G
                     92.38 2.420E+00 *(P 2.472E+00 7.61E-01 G

AM-241      -1.4857E-01
                     59.54-1.486E-01 %(P 1.027E+00 3.06E-01 G
  ( - This peak used in the nuclide activity average.

  * - Peak is too wide, but only one peak in library.
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
```

+ - Peak activity higher than counting uncertainty range.

- - Peak activity lower than counting uncertainty range.

= - Peak outside analysis energy range.

& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.

P - Peakbackground subtraction

} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	-5.5240E-03	-5.6816E-03	2.7191E-01	2.7191E-01	3.039E-01
K-40	1.4973E+01	1.4973E+01	1.2739E+00	1.5422E+00	
MN-54 #A	2.0301E-02	2.0399E-02	2.6303E-02	2.6330E-02	2.768E-02
CO-57 #B	-2.7581E-03	-2.7735E-03	5.0472E-02	5.0472E-02	5.001E-02
CO-60	9.1228E-02	9.1299E-02	3.5600E-02	3.5992E-02	
Sr-85 #A	-2.0642E-02	-2.1126E-02	3.9644E-02	3.9663E-02	4.256E-02
Kr-85 #A	-4.7653E+02	-4.7654E+02	8.9427E+02	8.9470E+02	9.826E+02
Y-88 #A	8.4315E-03	8.5512E-03	1.0650E-02	1.0662E-02	1.106E-02
NB-94 #B	3.2721E-03	3.2721E-03	3.0973E-02	3.0973E-02	3.589E-02
Ag-108M#B	-4.9708E-03	-4.9710E-03	3.4185E-02	3.4186E-02	3.918E-02
CD-109 #A	1.3411E+00	1.3456E+00	1.6405E+00	1.6422E+00	1.777E+00
SN-113 #B	-3.7549E-04	-3.8042E-04	3.5520E-02	3.5520E-02	4.039E-02
SB-125 #B	9.2303E-02	9.2440E-02	1.0558E-01	1.0572E-01	1.031E-01
I-131 #B	6.3950E-03	7.7089E-03	3.8801E-02	3.8804E-02	3.630E-02
CS-134 #B	4.2264E-03	4.2349E-03	6.7817E-02	6.7817E-02	7.593E-02
CS-137	1.5321E-01	1.5323E-01	6.5616E-02	6.6216E-02	
CE-139 #A	-5.1249E-03	-5.1812E-03	4.1164E-02	4.1165E-02	4.547E-02
EU-152 #B	2.6145E-02	2.6153E-02	1.2258E-01	1.2259E-01	1.364E-01
EU-154 #B	2.0052E-02	2.0061E-02	9.3211E-02	9.3218E-02	1.036E-01
EU-155 #B	1.2815E-01	1.2825E-01	2.0869E-01	2.0881E-01	2.285E-01
HG-203 #B	-9.2374E-03	-9.5401E-03	3.7602E-02	3.7607E-02	4.047E-02
TL-208	2.3642E-01	2.3642E-01	5.7893E-02	5.9498E-02	

PB-212	6.9396E-01	6.9396E-01	1.2359E-01	1.2999E-01	
PB-214	4.6155E-01	4.6155E-01	1.1000E-01	1.1322E-01	
BI-212	6.0501E-01	6.0501E-01	3.9732E-01	3.9887E-01	
BI-214	4.6200E-01	4.6200E-01	1.1072E-01	1.1393E-01	
RA-224	1.0950E+00	1.0950E+00	9.0851E-01	9.1073E-01	9.698E-01
RA-226 #	1.3062E+00	1.3062E+00	1.0146E+00	1.0175E+00	1.086E+00
AC-228	7.2505E-01	7.2505E-01	1.7521E-01	1.8019E-01	
TH-227 #B	-1.7700E-01	-1.7700E-01	3.4969E-01	3.4984E-01	3.846E-01
PA-234 #B	-2.2918E-02	-2.2918E-02	2.2170E-01	2.2170E-01	2.153E-01
TH-234 #B	1.5813E+00	1.5813E+00	1.4879E+00	1.4905E+00	5.980E+00
AM-241 #A	-1.4856E-01	-1.4857E-01	9.4147E-01	9.4150E-01	1.027E+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) 1.9496744E+01 pCi/gm

Total Decayed Activity (86.9 to 2000.7 keV) 1.9496836E+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_2SEPT2005_1526.An1

Sample description

FSS-NOL-06-01-044-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_2SEPT2005_1526.An1

Acquisition information

Start time:	02-Sep-2005 15:29:42
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: 2.1080E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1080E+03) =
4.7438E+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-Aug-2005 13:21:00
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: 0.0846

***** 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	118.	24.18	0.99	9.100E-03	74.81	9.600	8.446E-01	PB212
77.23	232.	13.73	0.99	1.018E-02	77.11	17.500	8.282E-01	PB212
					77.11	10.700	1.355E+00	PB214
93.21	129.	24.27	1.00	1.663E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.13	185.	20.37	1.31	2.566E-02	185.99	3.280	1.312E+00	RA226
209.53	80.	35.30	0.65	2.470E-02				

238.91	1265.	3.39	1.09	2.319E-02	238.63	43.100	8.036E-01	PB212
241.55	176.	20.20	1.09	2.305E-02	241.00	3.900	1.253E+00	RA224
					241.92	7.470	6.556E-01	PB214
270.02	121.	22.04	1.49	2.152E-02				
295.35	217.	12.94	1.06	2.024E-02	295.22	19.200	3.515E-01	PB214
300.27	74.	33.14	1.40	2.000E-02				
328.04	80.	34.81	1.27	1.874E-02				
338.31	232.	13.90	1.22	1.830E-02	338.40	12.010	6.720E-01	AC228
351.83	449.	9.05	1.00	1.776E-02	351.99	37.100	4.311E-01	PB214
409.43	69.	28.32	1.85	1.575E-02				
463.29	95.	26.42	1.21	1.425E-02				
463.29	95.	26.42	1.21	1.425E-02	463.51	10.000	4.214E-01	SB125
510.70	239.	13.06	1.43	1.317E-02	510.72	22.500	4.592E-01	TL208
583.19	416.	6.74	1.29	1.184E-02	583.14	86.000	2.593E-01	TL208
609.34	296.	7.83	1.33	1.144E-02	604.66	97.600	1.694E-01	CS134
					609.32	46.090	3.523E-01	BI214
661.51	412.	7.04	1.26	1.072E-02	661.62	84.620	2.904E-01	CS137
726.57	113.	19.09	1.28	9.971E-03	727.17	11.800	6.123E-01	BI212
795.08	55.	32.15	1.16	9.307E-03				
795.08	55.	32.15	1.16	9.307E-03	795.76	85.400	4.408E-02	CS134
860.57	60.	23.57	1.57	8.767E-03				
911.21	281.	7.63	1.54	8.400E-03	911.07	29.000	7.310E-01	AC228
964.21	49.	22.20	1.54	8.053E-03	964.00	14.580	2.671E-01	EU152
968.98	188.	8.59	1.54	8.024E-03	968.90	17.460	8.611E-01	AC228
1120.37	133.	18.43	1.94	7.211E-03	1120.28	15.040	7.749E-01	BI214
1173.04	86.	25.64	1.68	6.972E-03	1173.23	99.860	7.930E-02	CO60
1332.72	78.	20.15	1.87	6.349E-03	1332.51	99.980	7.565E-02	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.75	1470.	2.68	1.94	5.932E-03	1460.75	10.700	1.466E+01	K40
1590.34	43.	19.54	0.61	5.566E-03				
1764.84	71.	11.62	2.40	5.142E-03	1764.51	15.920	5.539E-01	Bl214

********** 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	209.53	382.	80.	0.040	105.90	0.651	AC-228	s
539.20	270.02	283.	121.	0.061	66.13	1.493	AC-228	s
599.69	300.27	248.	74.	0.037	99.42	1.398	PB-212	s
655.23	328.04	274.	80.	0.040	104.42	1.273	AC-228	
818.00	409.43	140.	69.	0.034	84.97	1.850	AC-228	s
1589.22	795.08	87.	55.	0.027	83.22	1.163	AC-228	
1720.17	860.57	57.	60.	0.030	70.71	1.567	TL-208	
1927.95	964.41	35.	54.	0.027	61.50	1.538	AC-228	D
3179.50	1590.34	8.	43.	0.022	58.63	0.609	-	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	411.	115.	0.057	77.73	0.993D
PB-212	153.39	77.11	393.	172.	0.086	43.77	0.995A
TH-234	185.51	93.17	1046.	149.	0.074	84.99	1.500s
TH-234	185.49	93.16	1043.	146.	0.073	86.46	1.500s
RA-226	371.43	186.13	576.	172.	0.086	61.11	1.311s
PB-212	476.90	238.87	825.	1176.	0.588	14.68	0.852
RA-224	482.16	241.50	889.	117.	0.058	111.99	1.500s
PB-214	589.84	295.35	277.	213.	0.107	38.82	1.062
AC-228	675.76	338.31	299.	230.	0.115	41.69	1.224
PB-214	702.81	351.83	369.	443.	0.221	27.15	0.995s
SB-125	925.14	463.01	193.	90.	0.045	71.39	1.500
TL-208	1020.51	510.70	237.	212.	0.106	39.17	1.431s
TL-208	1165.47	583.19	142.	412.	0.206	20.23	1.285
BI-214	1217.77	609.34	107.	290.	0.145	23.50	1.327
CS-137	1322.11	661.51	140.	411.	0.206	21.11	1.263
BI-212	1452.21	726.57	104.	112.	0.056	57.27	1.277s
AC-228	1821.44	911.21	72.	278.	0.139	22.88	1.543
EU-152	1928.25	964.62	79.	43.	0.022	96.44	1.538s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1936.81	968.90	37.	188.	0.094	25.74	1.541D
Bl-214	2239.72	1120.37	119.	131.	0.066	55.30	1.941s
CO-60	2345.03	1173.04	119.	86.	0.043	76.93	1.685s
CO-60	2664.35	1332.72	50.	75.	0.037	60.44	1.873s
K-40	2920.36	1460.75	41.	1452.	0.726	8.03	1.936
Bl-214	3528.44	1764.84	3.	71.	0.035	34.87	2.398s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		4.7831E-02					
			477.56	4.783E-02	&(	2.872E-01	8.47E-02 G
K-40		1.4663E+01					
			1460.75	1.466E+01	(P	3.295E-01	3.98E-01 G
MN-54		-4.2465E-03					
			834.81	-4.246E-03	%(P	2.829E-02	8.15E-03 G
CO-57		-8.6945E-04					
			122.07	-8.694E-04	%(P	4.344E-02	1.29E-02 G K
			136.43	-7.236E-02	%	3.690E-01	1.11E-01 G

```
CO-60        7.7472E-02
                  1332.51 7.565E-02 *(P 3.609E-02 1.58E-02 G K
                  1173.23 7.930E-02 *(P 4.933E-02 2.08E-02 G K

Sr-85       -1.3338E-02
                   514.00-1.334E-02 %(  4.061E-02 1.22E-02 G

Kr-85       -3.0406E+02
                   513.99-3.041E+02 %(  9.171E+02 2.75E+02 G

Y-88         2.0489E-03
                  1836.01 2.049E-03 &(P 2.317E-02 6.17E-03 G K
                   898.02-1.381E-03 % P 3.966E-02 1.14E-02 G

NB-94       -1.8387E-03
                   871.10-1.839E-03 %(  2.685E-02 7.63E-03 G K
                   702.50-4.472E-03 %   3.404E-02 9.96E-03 G K
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.5878E-03						
		722.95	-1.588E-03	%(	3.217E-02	9.24E-03	G K
		614.37	-1.723E-05	%	P 3.952E-02	1.15E-02	G
		433.93	-5.360E-03	%	3.453E-02	1.02E-02	G
CD-109	1.1042E-01						
		88.04	1.104E-01	&(	1.885E+00	5.64E-01	G
SN-113	-5.8123E-03						
		391.71	-5.812E-03	%(	4.969E-02	1.47E-02	G K
		255.04	-3.905E-02	%	1.504E+00	4.46E-01	G
SB-125	9.4308E-02						
		427.95	-1.144E-02	&(P	9.677E-02	2.85E-02	G K
		600.77	1.207E-02	%	P 1.727E-01	5.03E-02	G
		636.15	-5.846E-02	%	P 2.976E-01	8.75E-02	G
		463.51	4.073E-01	(P	3.042E-01	9.83E-02	G
		176.29	1.093E-01	%	5.379E-01	1.61E-01	G
I-131	-1.0035E-02						
		364.48	-1.004E-02	%(P	4.601E-02	1.37E-02	G K
		636.97	-1.043E-01	&	5.255E-01	1.55E-01	G
		284.29	1.505E-01	&	P 4.940E-01	1.48E-01	G
CS-134	-1.0398E-02						
		604.66	-1.040E-02	%(	4.128E-02	1.23E-02	G K
		795.76	-7.052E-05	%	P 3.885E-02	1.11E-02	G
		569.29	-3.752E-02	%	P 2.004E-01	5.86E-02	G
		801.84	2.920E-02	&	P 3.926E-01	1.13E-01	G

```
CS-137       2.9044E-01
                 661.62 2.904E-01  (P 4.088E-02 2.05E-02 G

CE-139      -3.0490E-03
                 165.85-3.049E-03 &(  4.524E-02 1.35E-02 G

EU-152       7.8510E-02
                 121.78-6.978E-04 %(P 1.436E-01 4.28E-02 G K
                 344.30 1.265E-03 % P 1.100E-01 3.23E-02 G
                1408.08 7.327E-02 %   1.258E-01 3.91E-02 G
                 964.00 2.374E-01  (P 2.404E-01 7.73E-02 G
                1112.07-3.685E-02 &   3.185E-01 9.26E-02 G
                 778.90 5.558E-03 %   2.723E-01 7.85E-02 G

EU-154       1.1821E-02
                 123.10 1.182E-02 %(  1.030E-01 3.08E-02 G K
                1274.80-9.645E-04 %   1.004E-01 2.83E-02 G
```

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30-2.179E-02 %   1.588E-01 4.63E-02 G
                      1004.80 2.908E-02 %   2.032E-01 5.90E-02 G

EU-155       1.1658E-01
                       86.45 1.166E-01 %(  2.137E-01 6.50E-02 G K
                      105.31 4.125E-02 %   2.093E-01 6.28E-02 G

HG-203      -1.5517E-02
                      279.17-1.552E-02 %(P 4.113E-02 1.24E-02 G K
                       72.87-2.370E-01 % P 1.913E+00 5.72E-01 G
                       70.83 2.044E-03 %   3.946E+00 1.18E+00 G
                       82.50-3.023E-01 %   3.475E+00 1.04E+00 G

TL-208       2.5928E-01
                      583.14 2.593E-01  (P 3.665E-02 1.77E-02 G
                      510.72 4.592E-01 + P 1.609E-01 6.75E-02 G

PB-212       7.8546E-01
                      238.63 7.543E-01  (P 8.753E-02 3.73E-02 G K
                                          Energy duplication
                       77.11 6.240E-01 } P 3.445E-01 9.10E-02 G
                       74.81 8.474E-01  (P 7.171E-01 2.25E-01 G

PB-214       4.3114E-01
                      351.99 4.311E-01 @(P 8.977E-02 3.95E-02 G K
                      295.22 3.515E-01 - P 1.323E-01 4.64E-02 G
                                          Energy duplication
                       77.11 2.542E-01 } P 8.421E-01 2.01E-01 G
                      241.92 3.440E-01 %   5.279E-01 1.61E-01 G

BI-212       6.1228E-01
```

727.17 6.123E-01 *(P 2.735E-01 1.17E-01 G K
1620.56 1.291E-01 & P 8.324E-01 2.30E-01 G
785.42 5.659E-01 % 1.350E+00 4.06E-01 G

BI-214 3.5228E-01
609.32 3.523E-01 (P 6.198E-02 2.82E-02 G K
1764.51 5.539E-01 + P 8.724E-02 6.74E-02 G
1120.28 7.749E-01 + P 3.163E-01 1.45E-01 G

RA-224 8.3055E-01
241.00 8.306E-01 ?(1.009E+00 3.10E-01 G

RA-226 1.3116E+00
185.99 1.312E+00 (P 8.721E-01 2.87E-01 G

AC-228 7.5792E-01
911.07 7.310E-01 (P 1.113E-01 5.64E-02 G K
968.90 8.617E-01 (P 1.415E-01 7.40E-02 G
338.40 6.720E-01 (P 2.428E-01 9.38E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-8.1465E-02						
		236.00	-8.147E-02	%(	3.392E-01	1.02E-01	G K
		256.25	-6.999E-02	%	P 4.655E-01	1.39E-01	G
PA-234	4.1058E-02						
		98.44	4.106E-02	&(P	2.076E-01	6.23E-02	G K
		946.00	-2.940E-02	&	P 1.808E-01	5.27E-02	G
		131.28	-1.847E-02	&	P 2.007E-01	6.00E-02	G
		94.67	-7.782E-02	%	P 3.825E-01	1.15E-01	G
		883.24	-3.906E-02	%	2.648E-01	7.68E-02	G
		926.70	-5.299E-04	&	2.620E-01	7.38E-02	G
		569.26	-5.556E-02	%	P 2.968E-01	8.67E-02	G
TH-234	1.1670E+00						
		63.29	-1.211E-01	%(P	5.662E+00	1.68E+00	G K
		92.80	1.892E+00	(P	1.990E+00	6.11E-01	G
		92.38	2.276E+00	(P	2.347E+00	7.21E-01	G
AM-241	-2.5176E-01						
		59.54	-2.518E-01	%(P	9.367E-01	2.81E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	4.6552E-02	4.7831E-02	2.5407E-01	2.5408E-01	2.795E-01
K-40	1.4663E+01	1.4663E+01	1.1926E+00	1.4653E+00	
MN-54 #A	-4.2268E-03	-4.2465E-03	2.7594E-02	2.7595E-02	2.816E-02
CO-57 #B	-8.6479E-04	-8.6945E-04	5.3456E-02	5.3456E-02	4.321E-02
CO-60 #	7.7414E-02	7.7472E-02	3.8937E-02	3.9196E-02	
Sr-85 #A	-1.3044E-02	-1.3338E-02	3.6567E-02	3.6575E-02	3.971E-02
Kr-85 #A	-3.0406E+02	-3.0406E+02	8.2597E+02	8.2616E+02	9.171E+02
Y-88 #B	2.0213E-03	2.0489E-03	1.8497E-02	1.8497E-02	2.286E-02
NB-94 #B	-1.8387E-03	-1.8387E-03	2.2893E-02	2.2894E-02	2.685E-02
Ag-108M#B	-1.5878E-03	-1.5878E-03	2.7722E-02	2.7723E-02	3.217E-02
CD-109 #A	1.1007E-01	1.1042E-01	1.6912E+00	1.6912E+00	1.879E+00
SN-113 #B	-5.7396E-03	-5.8123E-03	4.4076E-02	4.4077E-02	4.906E-02
SB-125 #B	9.4173E-02	9.4308E-02	6.8273E-02	6.8492E-02	9.663E-02
I-131 #B	-8.3809E-03	-1.0035E-02	4.4264E-02	4.4268E-02	3.843E-02
CS-134 #B	-1.0378E-02	-1.0398E-02	3.6903E-02	3.6908E-02	4.120E-02
CS-137	2.9040E-01	2.9044E-01	6.1516E-02	6.3785E-02	
CE-139 #A	-3.0171E-03	-3.0490E-03	4.0528E-02	4.0528E-02	4.477E-02
EU-152 #B	7.8485E-02	7.8510E-02	7.6663E-02	7.6787E-02	1.436E-01
EU-154 #B	1.1816E-02	1.1821E-02	9.2511E-02	9.2514E-02	1.030E-01
EU-155 #B	1.1649E-01	1.1658E-01	1.9489E-01	1.9500E-01	2.135E-01
HG-203 #B	-1.5042E-02	-1.5517E-02	3.7295E-02	3.7306E-02	3.987E-02
TL-208	2.5928E-01	2.5928E-01	5.3001E-02	5.5097E-02	

PB-212	7.8546E-01	7.8546E-01	1.1649E-01	1.2510E-01	
PB-214	4.3114E-01	4.3114E-01	1.1853E-01	1.2115E-01	
BI-212 #	6.1228E-01	6.1228E-01	3.5219E-01	3.5398E-01	
BI-214	3.5228E-01	3.5228E-01	8.4616E-02	8.7053E-02	
RA-224 #A	8.3055E-01	8.3055E-01	9.3015E-01	9.3140E-01	1.009E+00
RA-226	1.3116E+00	1.3116E+00	8.6186E-01	8.6522E-01	
AC-228	7.5792E-01	7.5792E-01	1.3731E-01	1.4419E-01	
TH-227 #B	-8.1465E-02	-8.1465E-02	3.0573E-01	3.0576E-01	3.392E-01
PA-234 #B	4.1058E-02	4.1058E-02	1.8692E-01	1.8693E-01	2.076E-01
TH-234 #B	1.1670E+00	1.1670E+00	1.1094E+00	1.1113E+00	5.662E+00
AM-241 #A	-2.5176E-01	-2.5176E-01	8.5439E-01	8.5450E-01	9.367E-01

- All peaks for activity calculation had bad shape.

* - Activity omitted from total

& - Activity omitted from total and all peaks had bad shape.

< - MDA value printed.

A - Activity printed, but activity < MDA.

B - Activity < MDA and failed test.

C - Area < Critical level.

F - Failed fraction or key line test.

H - Halflife limit exceeded

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

Total Activity (1120.0 to 2000.7 keV) 1.9540445E+01 pCi/gm

Total Decayed Activity (1120.0 to 2000.7 keV) 1.9540545E+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_6SEP2005_1516.An1

Sample description

FSS-NOL-06-01-079-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_6SEP2005_1516.An1

Acquisition information

Start time:	06-Sep-2005 15:16:51
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: 1.9150E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9150E+03) =
5.2219E+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	02-Sep-2005 07:25:00
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: 0.1494

***** 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	126.	23.05	0.99	9.052E-03	74.81	9.600	1.023E+00	PB212
77.14	169.	14.89	0.99	1.011E-02	77.11	17.500	9.056E-01	PB212
					77.11	10.700	1.481E+00	PB214
93.02	111.	35.50	1.74	1.653E-02	88.04	3.790	1.408E+00	CD109
					92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					98.44	25.100	PBC<MDA	PA234

186.40	216.	21.05	1.21	2.565E-02	185.99	3.280	1.704E+00	RA226
209.70	93.	28.62	0.77	2.469E-02				
238.87	1196.	3.35	1.09	2.319E-02	236.00	11.200	3.229E+00	TH227
					238.63	43.100	8.357E-01	PB212
241.57	191.	17.73	1.09	2.305E-02	241.00	3.900	1.497E+00	RA224
					241.92	7.470	7.832E-01	PB214
269.84	104.	28.04	1.57	2.153E-02				
277.96	74.	37.90	1.64	2.111E-02				
277.96	74.	37.90	1.64	2.111E-02	279.17	81.500	PBC<MDA	HG203
295.18	217.	10.27	1.13	2.025E-02	295.22	19.200	3.859E-01	PB214
299.69	82.	23.91	1.13	2.003E-02				
328.17	62.	35.26	1.05	1.873E-02				
338.24	286.	11.69	1.25	1.831E-02	338.40	12.010	9.150E-01	AC228
351.74	456.	8.65	1.22	1.776E-02	351.99	37.100	4.825E-01	PB214
409.40	70.	32.10	0.67	1.575E-02				
462.65	93.	24.62	1.34	1.427E-02				
462.65	93.	24.62	1.34	1.427E-02	463.51	10.000	4.567E-01	SB125
511.04	176.	15.97	1.62	1.317E-02	510.72	22.500	3.567E-01	TL208
583.03	408.	7.42	1.45	1.185E-02	583.14	86.000	2.796E-01	TL208
609.28	323.	8.12	1.27	1.144E-02	609.32	46.090	4.231E-01	BI214
661.42	150.	10.85	1.35	1.073E-02	661.62	84.620	1.155E-01	CS137
664.78	27.	41.39	1.35	1.068E-02				
727.04	111.	20.75	1.81	9.966E-03	727.17	11.800	6.608E-01	BI212
794.68	85.	23.53	1.11	9.311E-03				
794.68	85.	23.53	1.11	9.311E-03	795.76	85.400	7.574E-02	CS134
859.78	62.	26.41	1.28	8.774E-03				
910.89	301.	7.64	1.72	8.403E-03	911.07	29.000	8.621E-01	AC228
967.97	218.	10.87	1.64	8.031E-03	968.90	17.460	1.095E+00	AC228
1120.04	93.	20.29	1.61	7.213E-03	1120.28	15.040	5.901E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1173.03	190.	12.96	1.81	6.972E-03	1173.23	99.860	1.907E-01	CO60
1332.05	132.	12.34	2.09	6.351E-03	1332.51	99.980	1.442E-01	CO60
1460.42	1324.	2.79	1.81	5.933E-03	1460.75	10.700	1.451E+01	K40
1620.28	20.	34.43	1.29	5.488E-03	1620.56	2.750	9.425E-01	Bi212
1764.12	63.	12.60	1.93	5.143E-03	1764.51	15.920	5.149E-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	209.70	323.	93.	0.046	85.85	0.769	NP-239	
538.83	269.84	314.	104.	0.052	84.12	1.569	AC-228	s
555.07	277.96	306.	74.	0.037	113.71	1.640	NP-239	l
598.61	299.73	241.	78.	0.039	95.12	0.940	TH-227	M
655.47	328.17	198.	62.	0.031	105.77	1.051	AC-228	
817.94	409.40	174.	70.	0.035	96.31	0.672	AC-228	s
1328.65	664.68	51.	27.	0.014	124.18	1.354	PA-234	lD
1588.41	794.68	123.	52.	0.026	99.86	1.108	AC-228	
1718.59	859.78	70.	62.	0.031	79.24	1.276	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	148.79	74.81	381.	126.	0.063	69.15	0.993D
PB-212	153.39	77.11	363.	169.	0.084	44.67	0.995A
TH-234	185.09	92.96	961.	112.	0.056	103.85	1.500s
RA-226	371.55	186.19	786.	145.	0.073	78.35	1.500s
TH-227	476.83	238.84	270.	1064.	0.532	11.29	1.500s
PB-212	476.42	238.63	233.	1180.	0.590	10.17	1.093D
RA-224	481.16	241.00	1090.	124.	0.062	117.40	1.095D
PB-214	483.00	241.92	365.	116.	0.058	58.53	1.095A
PB-214	589.59	295.22	261.	203.	0.102	40.23	1.036
AC-228	675.62	338.24	288.	285.	0.143	35.06	1.249
PB-214	702.62	351.74	330.	450.	0.225	25.96	1.222s
SB-125	924.43	462.65	136.	73.	0.037	74.44	1.500s
TL-208	1021.20	511.04	226.	150.	0.075	47.92	1.622s
TL-208	1165.16	583.03	158.	404.	0.202	22.26	1.455

YAEC Chemistry Lab Spectrum name: 103F_6SEP2005_1516.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bl-214	1217.66	609.28	132.	316.	0.158	24.36	1.271s
CS-137	1322.33	661.62	60.	148.	0.074	32.67	1.352D
Bl-212	1453.14	727.04	123.	110.	0.055	62.25	1.808s
AC-228	1820.81	910.89	79.	298.	0.149	22.92	1.722s
AC-228	1934.96	967.97	104.	217.	0.109	32.61	1.641s
Bl-214	2239.06	1120.04	83.	91.	0.045	60.88	1.607s
CO-60	2345.02	1173.03	111.	188.	0.094	38.87	1.806s
CO-60	2663.02	1332.05	44.	130.	0.065	37.01	2.091
K-40	2919.71	1460.42	29.	1305.	0.653	8.38	1.813
Bl-212	3239.37	1620.28	9.	20.	0.010	103.28	1.295s
Bl-214	3527.00	1764.12	3.	60.	0.030	37.80	1.925s

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

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

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

BE-7 4.7025E-02
477.56 4.703E-02 %(3.111E-01 9.15E-02 G

K-40 1.4509E+01
1460.75 1.451E+01 (P 3.087E-01 4.11E-01 G

MN-54 1.9059E-02
834.81 1.906E-02 %(P 3.540E-02 1.08E-02 G

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CO-57       -1.2051E-02
                122.07-1.205E-02 %(P 5.099E-02 1.53E-02 G K
                136.43 3.990E-03 %   3.787E-01 1.13E-01 G

CO-60        1.6746E-01
               1332.51 1.442E-01  (P 3.761E-02 1.82E-02 G K
               1173.23 1.907E-01  (P 5.263E-02 2.50E-02 G K

Sr-85       -1.3610E-02
                514.00-1.361E-02 &(  4.532E-02 1.36E-02 G

Kr-85       -3.0002E+02
                513.99-3.000E+02 &(  9.989E+02 2.99E+02 G

Y-88         5.7418E-03
               1836.01 5.742E-03 %(P 2.125E-02 5.98E-03 G K
                898.02 1.311E-02 % P 2.623E-02 7.96E-03 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-7.2089E-04						
		871.10	-7.209E-04	%(	2.969E-02	8.38E-03	G K
		702.50	0.000E+00	&	3.904E-02	1.13E-02	G K
Ag-108M	-9.8787E-03						
		722.95	-9.879E-03	%(	4.858E-02	1.44E-02	G K
		614.37	-1.956E-02	% P	3.951E-02	1.20E-02	G
		433.93	7.175E-03	&	3.186E-02	9.44E-03	G
CD-109	5.0905E-02						
		88.04	5.091E-02	%(	1.628E+00	4.84E-01	G
SN-113	7.3638E-04						
		391.71	7.364E-04	%(	5.233E-02	1.53E-02	G K
		255.04	-2.682E-01	%	1.685E+00	5.03E-01	G
SB-125	9.9703E-02						
		427.95	1.011E-02	&(P	8.051E-02	2.35E-02	G K
		600.77	2.326E-02	& P	1.561E-01	4.55E-02	G
		636.15	3.688E-02	& P	3.051E-01	8.90E-02	G
		463.51	3.649E-01	*(P	2.833E-01	9.21E-02	G
		176.29	-1.331E-01	&	4.653E-01	1.40E-01	G
I-131	1.0954E-02						
		364.48	1.095E-02	%(P	5.281E-02	1.57E-02	G K
		636.97	5.091E-02	&	7.192E-01	2.09E-01	G
		284.29	-4.231E-02	% P	7.462E-01	2.20E-01	G
CS-134	-2.5847E-04						
		604.66	-2.585E-04	%(	3.649E-02	1.06E-02	G K

795.76 2.947E-02 % P 3.961E-02 1.24E-02 G
569.29 5.018E-02 % P 2.152E-01 6.35E-02 G
801.84-6.895E-02 & P 3.930E-01 1.13E-01 G

CS-137 1.1547E-01
661.62 1.155E-01 (P 3.009E-02 1.27E-02 G

CE-139 -9.9487E-03
165.85-9.949E-03 %(4.875E-02 1.46E-02 G

EU-152 -3.2491E-02
121.78-3.249E-02 %(P 1.477E-01 4.43E-02 G K
344.30 7.918E-03 % P 1.073E-01 3.15E-02 G
1408.08 5.470E-02 % 9.404E-02 2.96E-02 G
964.00 8.634E-02 % P 3.701E-01 1.10E-01 G
1112.07 3.918E-04 & 3.513E-01 1.01E-01 G
778.90 2.225E-02 & 2.589E-01 7.47E-02 G

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

EU-154      -2.2238E-02
                 123.10-2.224E-02 %(  1.093E-01 3.28E-02 G K
                1274.80-6.328E-03 %   1.034E-01 2.92E-02 G
                 723.30-4.761E-02 %   2.226E-01 6.59E-02 G
                1004.80 2.656E-02 %   1.846E-01 5.31E-02 G

EU-155       1.0237E-01
                  86.45 1.024E-01 %(  2.270E-01 6.88E-02 G K
                 105.31 3.197E-02 %   2.279E-01 6.82E-02 G

HG-203       2.8599E-02
                 279.17 2.860E-02 &(P 3.937E-02 1.21E-02 G K
                  72.87-4.331E-01 % P 2.271E+00 6.82E-01 G
                  70.83-5.248E-01 %   3.977E+00 1.19E+00 G
                  82.50-9.081E-01 &   4.016E+00 1.21E+00 G

TL-208       2.7959E-01
                 583.14 2.796E-01  (P 4.251E-02 2.10E-02 G
                 510.72 3.567E-01 + P 1.733E-01 6.71E-02 G

PB-212       8.5404E-01
                 238.63 8.331E-01  (P 5.208E-02 2.85E-02 G K
                                    Energy duplication
                  77.11 6.718E-01 } P 3.647E-01 1.00E-01 G
                  74.81 1.023E+00 + P 7.607E-01 2.42E-01 G

PB-214       4.7593E-01
                 351.99 4.825E-01 @(P 9.355E-02 4.23E-02 G K
                 295.22 3.687E-01 - P 1.415E-01 5.04E-02 G
                                    Energy duplication
```

77.11 3.240E-01 } P 9.391E-01 2.19E-01 G

241.92 4.759E-01 } 3.764E-01 9.29E-02 G

BI-212 7.1403E-01

727.17 6.608E-01 (P 3.263E-01 1.38E-01 G K

1620.56 9.425E-01 (P 7.748E-01 3.25E-01 G

785.42 7.665E-01 % 1.749E+00 5.28E-01 G

BI-214 4.4668E-01

609.32 4.231E-01 @(P 7.525E-02 3.51E-02 G K

1764.51 5.149E-01 @(P 9.603E-02 6.84E-02 G

1120.28 5.901E-01 + P 2.943E-01 1.22E-01 G

RA-224 9.7189E-01

Derived Ave Activity

241.00 9.719E-01 }(1.228E+00 3.89E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RA-226	1.2164E+00						
		185.99	1.216E+00	*(P	1.118E+00	3.46E-01	G
AC-228	8.7757E-01						
		911.07	8.621E-01	@(P	1.281E-01	6.66E-02	G K
		968.90	1.095E+00	+ P	2.526E-01	1.19E-01	G
		338.40	9.150E-01	(P	2.626E-01	1.07E-01	G
TH-227	2.8724E+00						
		236.00	2.872E+00	?(	2.141E-01	1.08E-01	G K
		256.25	-9.569E-02	% P	4.811E-01	1.44E-01	G
PA-234	-3.6316E-03						
		98.44	-3.632E-03	&(P	1.695E-01	5.02E-02	G K
		946.00	9.679E-02	% P	1.453E-01	4.54E-02	G
		131.28	-8.018E-03	% P	2.195E-01	6.55E-02	G
		94.67	-1.165E-01	% P	3.662E-01	1.10E-01	G
		883.24	1.758E-02	%	3.162E-01	9.10E-02	G
		926.70	6.957E-03	&	2.280E-01	6.33E-02	G
		569.26	7.388E-02	% P	3.181E-01	9.39E-02	G
TH-234	1.0820E-01						
		63.29	-1.041E+00	&(P	6.682E+00	1.99E+00	G K
		92.80	1.602E+00	*(P	2.104E+00	6.42E-01	G
		92.38	1.830E+00	% P	2.502E+00	7.63E-01	G
AM-241	2.5883E-02						
		59.54	2.588E-02	&(P	1.099E+00	3.27E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	4.4456E-02	4.7025E-02	2.7441E-01	2.7443E-01	2.941E-01
K-40	1.4509E+01	1.4509E+01	1.2339E+00	1.4940E+00	
MN-54 #A	1.8877E-02	1.9059E-02	3.2414E-02	3.2433E-02	3.507E-02
CO-57 #B	-1.1918E-02	-1.2051E-02	4.7136E-02	4.7141E-02	5.043E-02
CO-60	1.6720E-01	1.6746E-01	4.5620E-02	4.6644E-02	
Sr-85 #A	-1.2995E-02	-1.3610E-02	4.0721E-02	4.0729E-02	4.327E-02
Kr-85 #A	-3.0001E+02	-3.0002E+02	8.9760E+02	8.9777E+02	9.989E+02
Y-88 #B	5.5825E-03	5.7418E-03	1.7941E-02	1.7944E-02	2.066E-02
NB-94 #B	-7.2089E-04	-7.2089E-04	2.5128E-02	2.5128E-02	2.969E-02
Ag-108M#B	-9.8780E-03	-9.8787E-03	4.3118E-02	4.3122E-02	4.858E-02
CD-109 #A	5.0569E-02	5.0905E-02	1.4532E+00	1.4532E+00	1.618E+00
SN-113 #B	7.1744E-04	7.3638E-04	4.5988E-02	4.5988E-02	5.099E-02

SB-125 #F	9.9407E-02	9.9703E-02	7.5507E-02	7.5729E-02	8.027E-02
I-131 #B	7.5427E-03	1.0954E-02	4.7014E-02	4.7018E-02	3.636E-02
CS-134 #B	-2.5745E-04	-2.5847E-04	3.1685E-02	3.1685E-02	3.634E-02
CS-137	1.1544E-01	1.1547E-01	3.8078E-02	3.8664E-02	
CE-139 #A	-9.7340E-03	-9.9487E-03	4.3882E-02	4.3886E-02	4.769E-02
EU-152 #B	-3.2470E-02	-3.2491E-02	1.4125E-01	1.4126E-01	1.476E-01
EU-154 #B	-2.2217E-02	-2.2238E-02	9.8422E-02	9.8430E-02	1.092E-01
EU-155 #B	1.0220E-01	1.0237E-01	2.0637E-01	2.0644E-01	2.267E-01
HG-203 #B	2.6816E-02	2.8599E-02	3.6345E-02	3.6383E-02	3.691E-02
TL-208	2.7959E-01	2.7959E-01	6.2914E-02	6.4974E-02	
PB-212	8.5404E-01	8.5404E-01	8.7732E-02	1.0077E-01	
PB-214	4.7593E-01	4.7593E-01	1.2512E-01	1.2814E-01	
BI-212 #	7.1403E-01	7.1403E-01	4.3174E-01	4.3373E-01	
BI-214 #	4.4668E-01	4.4668E-01	1.0493E-01	1.0809E-01	
RA-224 A	9.7189E-01	9.7189E-01	1.1410E+00	1.1424E+00	
RA-226 #	1.2164E+00	1.2164E+00	1.0382E+00	1.0406E+00	1.118E+00
AC-228	8.7757E-01	8.7757E-01	1.8493E-01	1.9182E-01	
TH-227 #	2.8724E+00	2.8724E+00	3.2441E-01	3.6476E-01	2.141E-01
PA-234 #B	-3.6316E-03	-3.6316E-03	3.6806E-01	3.6806E-01	1.695E-01
TH-234 #B	1.0820E-01	1.0820E-01	1.3007E-01	1.3021E-01	6.682E+00
AM-241 #A	2.5883E-02	2.5883E-02	9.8026E-01	9.8026E-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

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

Total Activity (727.0 to 2000.7 keV) 1.9411821E+01 pCi/gm
Total Decayed Activity (727.0 to 2000.7 keV) 1.9412113E+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_6SEP2005_1554.An1

Sample description

FSS-NOL-06-01-080-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_6SEP2005_1554.An1

Acquisition information

Start time:	06-Sep-2005 15:54:50
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: 1.9860E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9860E+03) =
5.0352E+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	02-Sep-2005 07:23:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff 20.00000 %

Energy Calibration

Normalized diff: 0.1464

***** 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	141.	21.17	0.99	9.052E-03	74.81	9.600	1.105E+00	PB212
77.10	149.	16.58	0.99	1.011E-02	77.11	17.500	7.971E-01	PB212
					77.11	10.700	1.304E+00	PB214
92.94	116.	37.50	1.86	1.650E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
128.80	104.	36.10	0.96	2.434E-02				

186.02	143.	28.24	1.03	2.567E-02	185.99	3.280	PBC<MDA	RA226
209.27	114.	32.03	1.17	2.471E-02				
238.85	1165.	3.56	1.09	2.319E-02	238.63	43.100	7.847E-01	PB212
241.73	176.	15.79	1.09	2.304E-02	241.00	3.900	1.334E+00	RA224
					241.92	7.470	6.979E-01	PB214
270.18	112.	25.93	1.21	2.151E-02				
295.17	262.	10.82	1.06	2.025E-02	295.22	19.200	4.515E-01	PB214
300.19	111.	22.77	1.01	2.001E-02				
327.91	92.	30.92	1.37	1.875E-02				
338.30	287.	11.40	1.03	1.831E-02	338.40	12.010	8.860E-01	AC228
351.83	413.	8.55	1.14	1.776E-02	351.99	37.100	4.208E-01	PB214
463.05	58.	36.19	1.50	1.425E-02	463.51	10.000	PBC<MDA	SB125
510.92	232.	13.68	1.64	1.317E-02	510.72	22.500	4.714E-01	TL208
582.97	397.	7.20	1.12	1.185E-02	583.14	86.000	2.620E-01	TL208
609.10	288.	9.43	1.26	1.144E-02	609.32	46.090	3.633E-01	BI214
661.48	288.	9.70	1.23	1.072E-02	661.62	84.620	2.150E-01	CS137
727.68	122.	18.56	1.44	9.959E-03	727.17	11.800	7.031E-01	BI212
911.04	277.	7.46	1.20	8.401E-03	911.07	29.000	7.642E-01	AC228
964.43	55.	21.90	1.54	8.053E-03	964.00	14.580	3.174E-01	EU152
968.76	160.	10.50	1.54	8.027E-03	968.90	17.460	7.738E-01	AC228
1120.04	106.	24.59	1.74	7.213E-03	1120.28	15.040	6.556E-01	BI214
1172.90	438.	8.04	1.66	6.973E-03	1173.23	99.860	4.267E-01	CO60
1228.18	34.	40.02	0.58	6.741E-03				
1332.19	335.	6.49	1.63	6.350E-03	1332.51	99.980	3.568E-01	CO60
1460.49	1222.	2.89	1.64	5.933E-03	1460.75	10.700	1.290E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.07	67.	11.95	2.21	5.142E-03	1764.51	15.920	5.547E-01	Bl214

********** 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
417.70	209.27	529.	114.	0.057	96.09	1.171	AC-228 s
539.51	270.18	331.	112.	0.056	77.79	1.205	AC-228 s
599.52	300.19	240.	111.	0.056	68.32	1.013	PB-212
654.97	327.91	284.	92.	0.046	92.75	1.367	AC-228 s
1927.66	964.45	47.	54.	0.027	68.20	1.538	AC-228 D
2455.29	1228.18	58.	34.	0.017	120.06	0.584	AS-76 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	397.	141.	0.071	63.51	0.993D
PB-212	153.39	77.11	382.	149.	0.075	49.73	0.995A
TH-234	185.32	93.07	1071.	126.	0.063	99.14	1.500s
TH-234	185.35	93.09	1065.	124.	0.062	100.05	1.500s

RA-226	371.26	186.05	856.	154.	0.077	77.23	1.500
PB-212	476.96	238.90	759.	1107.	0.554	14.65	0.969
RA-224	482.77	241.81	858.	157.	0.078	82.85	1.500
PB-214	589.48	295.17	250.	258.	0.129	32.45	1.059
AC-228	675.73	338.30	292.	286.	0.143	34.19	1.032
PB-214	702.81	351.83	284.	407.	0.204	25.65	1.145s
SB-125	925.21	463.05	203.	58.	0.029	108.58	1.500s
TL-208	1020.96	510.92	255.	205.	0.103	41.04	1.643s
TL-208	1165.05	582.97	154.	392.	0.196	21.59	1.120
BI-214	1217.30	609.10	156.	282.	0.141	28.30	1.262
CS-137	1322.04	661.48	155.	287.	0.143	29.11	1.229
BI-212	1454.42	727.68	126.	122.	0.061	55.67	1.438s
AC-228	1821.11	911.04	63.	274.	0.137	22.38	1.202
EU-152	1928.19	964.59	112.	44.	0.022	109.43	1.538s
AC-228	1936.81	968.90	54.	159.	0.080	30.72	1.541D
BI-214	2239.04	1120.04	139.	105.	0.052	73.76	1.740s
CO-60	2344.76	1172.90	172.	436.	0.218	24.11	1.665
CO-60	2663.30	1332.19	49.	332.	0.166	19.48	1.627

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2919.85	1460.49	28.	1203.	0.602	8.68	1.639
Bl-214	3526.89	1764.07	3.	67.	0.033	35.86	2.215

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.2062E-01					
			477.56	1.206E-01	&(	3.056E-01	9.20E-02 G
K-40		1.2902E+01					
			1460.75	1.290E+01	(P	2.911E-01	3.79E-01 G
MN-54		-1.2338E-03					
			834.81	-1.234E-03	%(P	4.335E-02	1.25E-02 G
CO-57		-3.2006E-03					
			122.07	-3.201E-03	%(P	5.199E-02	1.55E-02 G K
			136.43	-5.605E-02	%	4.069E-01	1.22E-01 G
CO-60		3.9171E-01					
			1332.51	3.568E-01	(P	3.780E-02	2.33E-02 G K
			1173.23	4.267E-01	(P	6.251E-02	3.44E-02 G K

```
Sr-85       -1.8155E-02
                514.00-1.815E-02 %(  4.678E-02 1.41E-02 G

Kr-85       -4.0008E+02
                513.99-4.001E+02 %(  1.031E+03 3.11E+02 G

Y-88         1.1273E-03
               1836.01 1.127E-03 %(P 2.265E-02 5.84E-03 G K
                898.02 3.227E-04 & P 3.771E-02 1.07E-02 G

NB-94        1.1313E-02
                871.10 1.131E-02 %(  3.759E-02 1.12E-02 G K
                702.50-5.759E-03 %   3.825E-02 1.12E-02 G K

Ag-108M     -2.1794E-02
                722.95-2.179E-02 %(  4.715E-02 1.43E-02 G K
                614.37 1.027E-04 % P 3.649E-02 1.05E-02 G
                433.93 2.832E-03 &   3.518E-02 1.03E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-5.2273E-02						
		88.04	-5.227E-02	&(	1.976E+00	5.90E-01	G
SN-113	1.2136E-03						
		391.71	1.214E-03	%(	5.023E-02	1.47E-02	G K
		255.04	8.288E-03	&	1.418E+00	4.18E-01	G
SB-125	7.8541E-02						
		427.95	1.095E-02	%(P	1.129E-01	3.33E-02	G K
		600.77	1.423E-02	% P	1.809E-01	5.27E-02	G
		636.15	5.149E-03	% P	3.035E-01	8.76E-02	G
		463.51	2.786E-01	*(P	3.310E-01	1.03E-01	G
		176.29	-1.310E-03	&	5.189E-01	1.54E-01	G
I-131	1.2550E-02						
		364.48	1.255E-02	%(P	4.927E-02	1.47E-02	G K
		636.97	-3.719E-03	&	6.465E-01	1.86E-01	G
		284.29	-2.659E-02	% P	6.092E-01	1.79E-01	G
CS-134	-1.3505E-02						
		604.66	-1.350E-02	%(	4.250E-02	1.27E-02	G K
		795.76	3.037E-02	% P	4.157E-02	1.30E-02	G
		569.29	-5.303E-02	% P	2.059E-01	6.05E-02	G
		801.84	5.301E-02	% P	4.109E-01	1.19E-01	G
CS-137	2.1500E-01						
		661.62	2.150E-01	(P	4.561E-02	2.10E-02	G
CE-139	-7.6751E-03						
		165.85	-7.675E-03	%(	4.467E-02	1.34E-02	G

EU-152 1.0468E-01

121.78 2.891E-02 %(P 1.441E-01 4.32E-02 G K

344.30 4.172E-03 % P 1.155E-01 3.40E-02 G

1408.08 5.223E-02 % 1.209E-01 3.64E-02 G

964.00 2.566E-01 (P 3.013E-01 9.48E-02 G

1112.07-6.526E-02 % 3.406E-01 1.00E-01 G

778.90 9.458E-03 & 2.710E-01 7.80E-02 G

EU-154 -1.7835E-02

123.10-1.783E-02 &(1.095E-01 3.29E-02 G K

1274.80-1.449E-02 & 9.960E-02 2.86E-02 G

723.30-1.011E-01 % 2.262E-01 6.84E-02 G

1004.80-1.958E-02 % 2.041E-01 5.87E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	8.1234E-02						
		86.45	8.123E-02	%(	2.327E-01	7.03E-02	G K
		105.31	4.153E-02	&	2.079E-01	6.23E-02	G
HG-203	-5.4115E-03						
		279.17	-5.411E-03	&(P	4.545E-02	1.35E-02	G K
		72.87	-3.434E-01	% P	2.255E+00	6.76E-01	G
		70.83	2.448E-01	%	4.740E+00	1.42E+00	G
		82.50	-7.008E-02	%	3.894E+00	1.16E+00	G
TL-208	2.6205E-01						
		583.14	2.620E-01	(P	4.040E-02	1.91E-02	G
		510.72	4.714E-01	+ P	1.770E-01	7.29E-02	G
PB-212	7.6600E-01						
		238.63	7.534E-01	(P	8.921E-02	3.72E-02	G K
					Energy duplication		
		77.11	5.732E-01	} P	3.604E-01	9.50E-02	G
		74.81	1.105E+00	+ P	7.482E-01	2.39E-01	G
PB-214	4.3129E-01						
		351.99	4.208E-01	@(P	8.388E-02	3.65E-02	G K
		295.22	4.515E-01	(P	1.337E-01	4.96E-02	G
					Energy duplication		
		77.11	3.533E-01	} P	9.345E-01	2.11E-01	G
		241.92	4.077E-01	%	5.797E-01	1.77E-01	G
BI-212	7.0313E-01						
		727.17	7.031E-01	@(P	3.190E-01	1.31E-01	G K
		1620.56	1.025E-01	% P	9.122E-01	2.49E-01	G

785.42 7.322E-01 % 1.776E+00 5.35E-01 G

BI-214 3.6333E-01

609.32 3.633E-01 (P 7.873E-02 3.51E-02 G K

1764.51 5.547E-01 + P 9.260E-02 6.95E-02 G

1120.28 6.556E-01 + P 3.623E-01 1.64E-01 G

RA-224 1.1849E+00

241.00 1.185E+00 (1.053E+00 3.27E-01 G

RA-226 1.2472E+00

185.99 1.247E+00 (P 1.124E+00 3.48E-01 G

AC-228 7.9198E-01

911.07 7.642E-01 (P 1.112E-01 5.77E-02 G K

968.90 7.734E-01 (P 1.790E-01 7.93E-02 G

338.40 8.860E-01 (P 2.548E-01 1.01E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	5.5416E-03						
		236.00	5.542E-03	&(	4.646E-01	1.39E-01	G K
		256.25	-8.840E-04	%	P 4.233E-01	1.25E-01	G
PA-234	-6.7985E-02						
		98.44	-6.799E-02	%(P	2.209E-01	6.65E-02	G K
		946.00	-6.751E-02	&	P 2.151E-01	6.41E-02	G
		131.28	-5.724E-02	%	P 2.118E-01	6.37E-02	G
		94.67	-2.550E-02	&	P 3.814E-01	1.14E-01	G
		883.24	-1.913E-02	%	3.160E-01	9.12E-02	G
		926.70	6.123E-03	%	2.995E-01	8.50E-02	G
		569.26	-7.646E-02	%	P 3.036E-01	8.92E-02	G
TH-234	1.2475E+00						
		63.29	3.654E-01	%(P	6.520E+00	1.94E+00	G K
		92.80	1.712E+00	*(P	2.134E+00	6.52E-01	G
		92.38	2.044E+00	*(P	2.520E+00	7.70E-01	G
AM-241	-6.5789E-02						
		59.54	-6.579E-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	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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	1.1399E-01	1.2062E-01	2.7586E-01	2.7595E-01	2.888E-01
K-40	1.2902E+01	1.2902E+01	1.1372E+00	1.3617E+00	
MN-54 #A	-1.2219E-03	-1.2338E-03	5.9103E-02	5.9103E-02	4.294E-02
CO-57 #B	-3.1650E-03	-3.2006E-03	5.1088E-02	5.1088E-02	5.141E-02
CO-60	3.9110E-01	3.9171E-01	6.1055E-02	6.5153E-02	
Sr-85 #A	-1.7329E-02	-1.8155E-02	4.2306E-02	4.2319E-02	4.465E-02
Kr-85 #A	-4.0006E+02	-4.0008E+02	9.3226E+02	9.3255E+02	1.031E+03
Y-88 #B	1.0958E-03	1.1273E-03	1.7514E-02	1.7514E-02	2.202E-02
NB-94 #B	1.1313E-02	1.1313E-02	3.3505E-02	3.3512E-02	3.759E-02
Ag-108M#B	-2.1793E-02	-2.1794E-02	4.2828E-02	4.2846E-02	4.714E-02
CD-109 #A	-5.1926E-02	-5.2273E-02	1.7707E+00	1.7707E+00	1.963E+00
SN-113 #B	1.1822E-03	1.2136E-03	4.4164E-02	4.4164E-02	4.893E-02
SB-125 #B	7.8307E-02	7.8541E-02	8.7153E-02	8.7272E-02	1.126E-01
I-131 #B	8.6213E-03	1.2550E-02	4.3997E-02	4.4003E-02	3.385E-02
CS-134 #B	-1.3451E-02	-1.3505E-02	3.8175E-02	3.8183E-02	4.233E-02
CS-137	2.1494E-01	2.1500E-01	6.2884E-02	6.4111E-02	
CE-139 #A	-7.5084E-03	-7.6751E-03	4.0130E-02	4.0133E-02	4.370E-02
EU-152 #B	1.0461E-01	1.0468E-01	1.1597E-01	1.1611E-01	1.440E-01
EU-154 #B	-1.7818E-02	-1.7835E-02	9.8551E-02	9.8556E-02	1.094E-01
EU-155 #B	8.1099E-02	8.1234E-02	2.1081E-01	2.1086E-01	2.323E-01
HG-203 #B	-5.0720E-03	-5.4115E-03	4.0836E-02	4.0837E-02	4.260E-02
TL-208	2.6205E-01	2.6205E-01	5.7206E-02	5.9195E-02	

PB-212	7.6600E-01	7.6600E-01	1.1344E-01	1.2185E-01	
PB-214	4.3129E-01	4.3129E-01	9.0539E-02	9.3938E-02	
BI-212 #	7.0313E-01	7.0313E-01	3.9305E-01	3.9517E-01	
BI-214	3.6333E-01	3.6333E-01	1.0518E-01	1.0727E-01	
RA-224	1.1849E+00	1.1849E+00	9.8170E-01	9.8411E-01	1.053E+00
RA-226 #	1.2472E+00	1.2472E+00	1.0441E+00	1.0466E+00	1.124E+00
AC-228	7.9198E-01	7.9198E-01	1.3557E-01	1.4315E-01	
TH-227 #B	5.5416E-03	5.5416E-03	4.1671E-01	4.1671E-01	4.646E-01
PA-234 #B	-6.7985E-02	-6.7985E-02	2.0845E-01	2.0848E-01	2.209E-01
TH-234 #B	1.2475E+00	1.2475E+00	1.4100E+00	1.4117E+00	6.520E+00
AM-241 #A	-6.5788E-02	-6.5789E-02	1.0847E+00	1.0847E+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

YAEC Chemistry Lab Spectrum name: 103F_6SEP2005_1554.An1

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

Total Activity (1120.0 to 2000.7 keV) 1.8010330E+01 pCi/gm

Total Decayed Activity (1120.0 to 2000.7 keV) 1.8011002E+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_6SEPT2005_1105.An1

Sample description

FSS-NOL-06-01-048-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_6SEPT2005_1105.An1

Acquisition information

Start time:	06-Sep-2005 11:06:55
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: 2.0610E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0610E+03) =
4.8520E+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-Aug-2005 13:53:00
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: 0.2467

***** 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	155.	20.41	0.99	9.052E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	1.171E+00	PB212
77.13	190.	13.89	0.99	1.011E-02	77.11	17.500	9.040E-01	PB212
					77.11	10.700	1.479E+00	PB214
86.69	91.	36.21	1.00	1.410E-02				
86.69	91.	36.21	1.00	1.410E-02	86.45	32.740	1.293E-01	EU155
90.16	79.	41.62	1.00	1.542E-02				

93.17	105.	40.40	1.50	1.645E-02	92.38	2.570	PBC<MDA TH234	
					92.80	3.000	PBC<MDA TH234	
93.19	106.	40.22	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	
186.18	207.	20.24	1.17	2.566E-02	185.99	3.280	1.513E+00	RA226
209.18	144.	28.67	1.15	2.472E-02				
238.64	1360.	3.19	1.09	2.320E-02	238.63	43.100	8.839E-01	PB212
241.52	207.	16.57	1.09	2.305E-02	241.00	3.900	1.506E+00	RA224
					241.92	7.470	7.881E-01	PB214
270.04	131.	26.38	1.13	2.152E-02				
277.54	114.	30.42	1.04	2.113E-02				
277.54	114.	30.42	1.04	2.113E-02	279.17	81.500	4.733E-02	HG203
295.10	268.	10.51	1.14	2.025E-02	295.22	19.200	4.455E-01	PB214
299.96	119.	23.95	0.91	2.002E-02				
327.53	82.	28.35	1.26	1.876E-02				
338.03	294.	10.04	1.09	1.832E-02	338.40	12.010	8.726E-01	AC228
351.77	500.	6.73	1.25	1.776E-02	351.99	37.100	4.926E-01	PB214
462.80	60.	28.96	1.00	1.426E-02				
462.80	60.	28.96	1.00	1.426E-02	463.51	10.000	PBC<MDA SB125	
510.34	220.	14.21	1.68	1.318E-02	510.72	22.500	4.288E-01	TL208
582.81	481.	6.60	1.43	1.185E-02	583.14	86.000	3.068E-01	TL208
608.93	432.	6.99	1.32	1.144E-02	609.32	46.090	5.292E-01	BI214
726.86	107.	24.08	0.82	9.968E-03	727.17	11.800	5.917E-01	BI212
768.53	43.	33.27	0.96	9.551E-03				
794.84	82.	24.62	1.55	9.309E-03				
794.84	82.	24.62	1.55	9.309E-03	795.76	85.400	6.782E-02	CS134
859.19	106.	17.67	0.91	8.778E-03				
910.79	311.	7.03	1.51	8.403E-03	911.07	29.000	8.268E-01	AC228
963.95	64.	19.21	1.54	8.056E-03	964.00	14.580	3.534E-01	EU152

YAEC Chemistry Lab Spectrum name: 103F_6SEPT2005_1105.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
968.45	186.	8.76	1.54	8.028E-03	968.90	17.460	8.674E-01	AC228
1119.94	128.	16.55	2.06	7.213E-03	1120.28	15.040	7.653E-01	BI214
1460.00	1514.	2.62	1.91	5.934E-03	1460.75	10.700	1.545E+01	K40
1620.67	29.	26.49	1.11	5.488E-03	1620.56	2.750	1.258E+00	BI212
1763.21	73.	11.70	1.76	5.145E-03	1764.51	15.920	5.585E-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	
172.56	86.44	496.	91.	0.045	108.63	1.000	BI-207	ID
179.50	89.91	495.	79.	0.039	124.85	1.003	PB-214	ID
417.53	209.18	628.	144.	0.072	86.00	1.154	AC-228	
539.24	270.04	406.	131.	0.065	79.15	1.127	AC-228	s
599.07	299.96	290.	119.	0.060	71.84	0.907	TH-227	
654.20	327.53	219.	82.	0.041	85.05	1.257	AC-228	s
924.72	462.80	124.	57.	0.028	92.26	1.003	CS-138	
1536.12	768.53	77.	43.	0.022	99.82	0.956	BI-214	M
1717.42	859.19	70.	106.	0.053	53.02	0.911	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	148.79	74.81	446.	155.	0.078	61.22	0.993D
PB-212	153.39	77.11	441.	190.	0.095	41.67	0.995A
RA-226	371.53	186.18	660.	194.	0.097	60.73	1.172s
PB-212	476.42	238.63	273.	1348.	0.674	9.57	1.093D
RA-224	481.16	241.00	1016.	131.	0.065	108.64	1.094D
PB-214	483.00	241.92	420.	128.	0.064	65.36	1.095A
HG-203	553.54	277.20	351.	74.	0.037	113.16	1.500s
PB-214	589.36	295.10	255.	264.	0.132	31.54	1.141
AC-228	675.19	338.03	240.	293.	0.146	30.11	1.087s
PB-214	702.70	351.78	301.	502.	0.251	21.58	1.255
TL-208	1019.80	510.34	245.	183.	0.091	44.17	1.670s
TL-208	1164.73	582.81	169.	477.	0.238	19.81	1.432
BI-214	1216.96	608.93	166.	426.	0.213	20.97	1.319
BI-212	1452.79	726.86	154.	106.	0.053	72.24	0.820s

YAEC Chemistry Lab Spectrum name: 103F_6SEPT2005_1105.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	1588.27	794.60	69.	66.	0.033	64.94	1.500
AC-228	1820.61	910.79	63.	307.	0.154	21.09	1.511
EU-152	1927.07	964.03	101.	50.	0.025	94.15	1.538
AC-228	1935.92	968.45	80.	250.	0.125	26.75	1.508
Bl-214	2238.85	1119.94	94.	127.	0.063	49.65	2.059s
K-40	2918.87	1460.00	34.	1495.	0.748	7.86	1.909
Bl-212	3240.15	1620.67	10.	29.	0.014	79.46	1.114s
Bl-214	3525.06	1763.15	9.	64.	0.032	43.13	1.745

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-7.8142E-02					
			477.56	-7.814E-02	&(	2.958E-01	8.79E-02 G
K-40		1.5446E+01					
			1460.75	1.545E+01	(P	3.075E-01	4.10E-01 G
MN-54		1.5538E-02					
			834.81	1.554E-02	%(P	3.004E-02	9.15E-03 G
CO-57		-9.7771E-04					
			122.07	-9.777E-04	&(P	4.563E-02	1.36E-02 G K

136.43-1.171E-01 % 3.865E-01 1.17E-01 G

CO-60 -3.0046E-03

1332.51-3.005E-03 %(P 3.414E-02 9.22E-03 G K

1173.23 1.341E-02 % P 4.378E-02 1.29E-02 G K

Sr-85 -2.4457E-02

514.00-2.446E-02 %(4.591E-02 1.40E-02 G

Kr-85 -5.3019E+02

513.99-5.302E+02 %(9.952E+02 3.03E+02 G

Y-88 -8.6606E-05

1836.01-8.661E-05 &(P 1.014E-02 1.38E-03 G K

898.02-3.991E-03 & P 4.222E-02 1.22E-02 G

NB-94 -2.2425E-04

871.10-2.242E-04 &(3.266E-02 9.30E-03 G K

702.50-1.428E-03 & 3.259E-02 9.41E-03 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-9.9475E-03						
		722.95	-9.948E-03	%(	4.145E-02	1.23E-02	G K
		614.37	7.856E-03	% P	3.517E-02	1.04E-02	G
		433.93	5.698E-03	&	3.042E-02	8.99E-03	G
CD-109	5.1167E-01						
		88.04	5.117E-01	&(	1.972E+00	5.94E-01	G
SN-113	-9.3762E-03						
		391.71	-9.376E-03	%(	5.153E-02	1.53E-02	G K
		255.04	1.904E-01	%	1.694E+00	5.05E-01	G
SB-125	3.3776E-02						
		427.95	3.378E-02	&(P	9.608E-02	2.88E-02	G K
		600.77	-6.910E-03	% P	1.674E-01	4.85E-02	G
		636.15	-3.865E-02	% P	2.898E-01	8.45E-02	G
		463.51	8.865E-03	% P	3.582E-01	1.05E-01	G
		176.29	-5.581E-02	&	5.540E-01	1.65E-01	G
I-131	-5.3090E-04						
		364.48	-5.309E-04	%(P	6.636E-02	1.95E-02	G K
		636.97	3.448E-02	&	6.937E-01	2.01E-01	G
		284.29	6.458E-03	% P	9.091E-01	2.69E-01	G
CS-134	2.6151E-02						
		604.66	1.249E-03	&(	9.584E-02	2.86E-02	G K
		795.76	5.461E-02	(P	3.434E-02	1.18E-02	G
		569.29	-1.888E-02	& P	2.165E-01	6.28E-02	G
		801.84	-1.336E-02	& P	4.095E-01	1.17E-01	G

```
CS-137       1.6971E-02
                 661.62 1.697E-02 %(P 3.826E-02 1.15E-02 G

CE-139      -1.0350E-03
                 165.85-1.035E-03 %(  4.885E-02 1.46E-02 G

EU-152       1.1971E-01
                 121.78 4.025E-02 %(P 1.379E-01 4.15E-02 G K
                 344.30 1.295E-03 % P 1.085E-01 3.18E-02 G
                1408.08 7.814E-02 %   1.171E-01 3.71E-02 G
                 964.00 2.791E-01 &(P 2.766E-01 8.85E-02 G
                1112.07 1.430E-01 &   2.431E-01 7.49E-02 G
                 778.90 5.688E-03 %   2.848E-01 8.22E-02 G

EU-154      -9.4179E-03
                 123.10-9.418E-03 &(  1.075E-01 3.22E-02 G K
                1274.80-3.953E-02 %   1.295E-01 3.85E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-7.091E-03	%	2.912E-01	8.58E-02	G
		1004.80	9.386E-02	&	1.444E-01	4.52E-02	G
EU-155	1.4912E-01						
					Energy duplication		
		86.45	1.491E-01	%(	2.358E-01	7.19E-02	G K
		105.31	5.778E-02	%	2.382E-01	7.17E-02	G
HG-203	3.0778E-02						
		279.17	3.078E-02	&(P	3.754E-02	1.16E-02	G K
		72.87	3.901E-02	% P	2.372E+00	7.09E-01	G
		70.83	-2.516E-01	%	4.247E+00	1.27E+00	G
		82.50	-1.509E+00	&	4.334E+00	1.31E+00	G
TL-208	3.0684E-01						
		583.14	3.068E-01	(P	4.077E-02	2.04E-02	G
		510.72	4.047E-01	+ P	1.674E-01	6.82E-02	G
PB-212	8.8965E-01						
		238.63	8.838E-01	(P	5.222E-02	2.84E-02	G K
					Energy duplication		
		77.11	7.045E-01	} P	3.724E-01	9.79E-02	G
		74.81	1.171E+00	+ P	7.628E-01	2.44E-01	G
PB-214	4.8872E-01						
		351.99	4.999E-01	(P	8.316E-02	3.63E-02	G K
		295.22	4.455E-01	(P	1.300E-01	4.75E-02	G
					Energy duplication		
		77.11	8.156E-02	} P	9.539E-01	2.18E-01	G
		241.92	4.887E-01	}	3.746E-01	1.06E-01	G

```
BI-212      5.9167E-01
                727.17 5.917E-01  (P 3.375E-01 1.43E-01 G K
               1620.56 1.258E+00 + P 7.594E-01 3.34E-01 G
                785.42 8.699E-01 %   1.751E+00 5.32E-01 G

BI-214      5.2397E-01
                609.32 5.292E-01  (P 7.814E-02 3.75E-02 G K
               1764.51 5.089E-01  (P 1.366E-01 7.69E-02 G
               1120.28 7.653E-01 + P 2.901E-01 1.29E-01 G

RA-224      9.5116E-01
                                      Derived Ave Activity
                241.00 9.512E-01 }(  1.102E+00 3.56E-01 G

RA-226      1.5129E+00
                185.99 1.513E+00 *(P 9.534E-01 3.27E-01 G

AC-228      8.4023E-01
                911.07 8.268E-01  (P 1.066E-01 5.88E-02 G K
                968.90 1.170E+00 + P 2.076E-01 1.04E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		338.40	8.726E-01	@(P	2.237E-01	8.78E-02	G
TH-227	-1.3350E-02						
		236.00	-1.335E-02	&(	4.190E-01	1.25E-01	G K
		256.25	6.650E-02	% P	4.666E-01	1.39E-01	G
PA-234	-7.2061E-02						
		98.44	-7.206E-02	&(P	2.168E-01	6.54E-02	G K
		946.00	-3.916E-02	% P	1.954E-01	5.74E-02	G
		131.28	2.144E-02	& P	2.110E-01	6.31E-02	G
		94.67	-1.139E-02	% P	3.918E-01	1.17E-01	G
		883.24	-4.835E-02	%	2.554E-01	7.44E-02	G
		926.70	5.586E-02	%	2.619E-01	7.62E-02	G
		569.26	-2.721E-02	& P	3.193E-01	9.26E-02	G
TH-234	-1.7857E-01						
		63.29	-1.786E-01	%(P	6.020E+00	1.78E+00	G K
		92.80	1.393E+00	% P	2.164E+00	6.58E-01	G
		92.38	1.657E+00	& P	2.558E+00	7.77E-01	G
AM-241	1.8474E-01						
		59.54	1.847E-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

- -

***** 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-7.2396E-02	-7.8142E-02	2.6380E-01	2.6384E-01	2.741E-01
K-40		1.5446E+01	1.5446E+01	1.2295E+00	1.5218E+00	
MN-54	#A	1.5337E-02	1.5538E-02	2.7447E-02	2.7462E-02	2.965E-02
CO-57	#B	-9.6305E-04	-9.7771E-04	5.4705E-02	5.4705E-02	4.495E-02
CO-60	#B	-2.9983E-03	-3.0046E-03	5.9924E-01	5.9924E-01	3.406E-02
Sr-85	#A	-2.2965E-02	-2.4457E-02	4.1905E-02	4.1930E-02	4.311E-02
Kr-85	#A	-5.3016E+02	-5.3019E+02	9.0847E+02	9.0899E+02	9.952E+02
Y-88	#B	-8.3355E-05	-8.6606E-05	5.1964E-04	5.1966E-04	9.755E-03
NB-94	#B	-2.2425E-04	-2.2425E-04	2.7901E-02	2.7901E-02	3.266E-02
Ag-108M	#B	-9.9467E-03	-9.9475E-03	3.6846E-02	3.6851E-02	4.145E-02
CD-109	#A	5.0709E-01	5.1167E-01	1.7814E+00	1.7816E+00	1.954E+00
SN-113	#B	-9.0498E-03	-9.3762E-03	4.5914E-02	4.5917E-02	4.974E-02
SB-125	#B	3.3640E-02	3.3776E-02	8.6472E-02	8.6495E-02	9.569E-02
I-131	#B	-3.1966E-04	-5.3090E-04	7.9965E-02	7.9965E-02	3.995E-02
CS-134	#B	2.6010E-02	2.6151E-02	1.7004E-02	1.7072E-02	9.533E-02
CS-137	#A	1.6964E-02	1.6971E-02	3.4586E-02	3.4600E-02	3.825E-02
CE-139	#A	-1.0047E-03	-1.0350E-03	4.3706E-02	4.3706E-02	4.742E-02
EU-152	#B	1.1961E-01	1.1971E-01	1.1394E-01	1.1413E-01	1.377E-01
EU-154	#B	-9.4055E-03	-9.4179E-03	9.6523E-02	9.6524E-02	1.074E-01
EU-155	#B	1.4879E-01	1.4912E-01	2.1567E-01	2.1583E-01	2.353E-01
HG-203	#A	2.8198E-02	3.0778E-02	3.4847E-02	3.4893E-02	3.439E-02

TL-208		3.0684E-01	3.0684E-01	6.1339E-02	6.3873E-02
PB-212		8.8965E-01	8.8965E-01	8.5882E-02	1.0022E-01
PB-214		4.8872E-01	4.8872E-01	1.0665E-01	1.1036E-01
BI-212		5.9167E-01	5.9167E-01	4.2939E-01	4.3076E-01
BI-214		5.2397E-01	5.2397E-01	1.1156E-01	1.1563E-01
RA-224	A	9.5116E-01	9.5116E-01	1.0333E+00	1.0348E+00
RA-226	#	1.5129E+00	1.5129E+00	9.8010E-01	9.8403E-01
AC-228		8.4023E-01	8.4023E-01	1.5538E-01	1.6286E-01
TH-227	#B	-1.3350E-02	-1.3350E-02	3.7573E-01	3.7573E-01 4.190E-01
PA-234	#B	-7.2061E-02	-7.2061E-02	2.0393E-01	2.0397E-01 2.168E-01
TH-234	#B	-1.7857E-01	-1.7857E-01	4.4790E+01	4.4790E+01 6.020E+00
AM-241	#A	1.8473E-01	1.8474E-01	9.7040E-01	9.7046E-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 (269.9 to 2000.7 keV) 2.1551504E+01 pCi/gm
Total Decayed Activity (269.9 to 2000.7 keV) 2.1551514E+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_6SEPT2005_1349.An1

Sample description

FSS-NOL-06-01-064-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_6SEPT2005_1349.An1

Acquisition information

Start time:	06-Sep-2005 13:50:04
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: 1.9390E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9390E+03) =
5.1573E+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	01-Sep-2005 09:53:00
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: 0.2706

***** 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	145.	19.56	0.99	9.052E-03	74.81	9.600	1.162E+00	PB212
77.14	161.	14.50	0.99	1.011E-02	77.11	17.500	7.838E-01	PB212
					77.11	10.700	1.282E+00	PB214
185.98	166.	22.41	0.99	2.567E-02				
185.98	166.	22.41	0.99	2.567E-02	185.99	3.280	1.269E+00	RA226
209.91	132.	25.17	1.34	2.468E-02				
238.83	1163.	3.38	1.09	2.319E-02	236.00	11.200	3.099E+00	TH227

					238.63	43.100	8.020E-01	PB212
241.99	170.	15.49	1.10	2.302E-02	241.00	3.900	1.319E+00	RA224
					241.92	7.470	6.900E-01	PB214
270.59	71.	35.06	1.10	2.149E-02				
295.07	239.	13.96	1.09	2.026E-02	295.22	19.200	4.217E-01	PB214
300.23	80.	29.76	1.11	2.001E-02				
328.05	87.	29.11	1.20	1.874E-02				
338.31	217.	13.89	1.16	1.830E-02	338.40	12.010	6.855E-01	AC228
351.77	420.	6.70	1.17	1.776E-02	351.99	37.100	4.390E-01	PB214
409.24	43.	34.21	1.38	1.575E-02				
463.15	87.	21.26	1.31	1.426E-02				
463.15	87.	21.26	1.31	1.426E-02	463.51	10.000	4.208E-01	SB125
510.62	208.	14.05	1.00	1.317E-02	510.72	22.500	4.276E-01	TL208
583.02	363.	7.28	1.28	1.185E-02	583.14	86.000	2.455E-01	TL208
609.08	371.	7.67	1.33	1.144E-02	609.32	46.090	4.813E-01	BI214
727.28	96.	17.35	1.14	9.964E-03	727.17	11.800	5.690E-01	BI212
795.20	63.	26.69	1.04	9.306E-03				
795.20	63.	26.69	1.04	9.306E-03	795.76	85.400	5.529E-02	CS134
860.14	108.	16.36	1.62	8.771E-03				
910.97	250.	7.62	1.62	8.402E-03	911.07	29.000	7.055E-01	AC228
964.01	64.	19.32	1.54	8.056E-03	964.00	14.580	3.758E-01	EU152
968.70	141.	10.31	1.54	8.027E-03	968.90	17.460	7.026E-01	AC228
1120.13	102.	16.50	1.80	7.213E-03	1120.28	15.040	6.445E-01	BI214
1236.18	61.	29.94	1.14	6.709E-03				
1302.78	30.	38.80	0.95	6.456E-03				
1460.26	1223.	2.92	1.92	5.933E-03	1460.75	10.700	1.322E+01	K40
1620.91	18.	28.71	1.43	5.488E-03	1620.56	2.750	8.200E-01	BI212
1764.08	57.	13.42	1.99	5.142E-03	1764.51	15.920	4.847E-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	
418.98	209.91	424.	132.	0.066	75.50	1.345	NP-239	s
540.34	270.59	251.	71.	0.036	105.17	1.101	AC-228	s
599.60	300.23	214.	80.	0.040	89.27	1.108	PB-212	
655.24	328.05	231.	87.	0.043	87.33	1.200	AC-228	
817.61	409.24	93.	43.	0.022	102.63	1.379	AC-228	
1719.31	860.14	60.	108.	0.054	49.07	1.623	TL-208	s
2471.30	1236.18	86.	61.	0.031	89.82	1.136	CS-136	s
2604.48	1302.78	36.	30.	0.015	116.40	0.947	-	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	348.	145.	0.072	58.67	0.993D
PB-212	153.39	77.11	341.	161.	0.080	43.49	0.995A
RA-226	371.14	185.99	723.	128.	0.064	83.82	1.500D
PB-212	476.88	238.86	529.	1161.	0.581	12.56	0.959

RA-224	482.64	241.74	594.	185.	0.093	60.00	1.500
PB-214	482.90	241.87	330.	78.	0.039	100.24	1.587s
PB-214	589.28	295.07	329.	235.	0.118	41.88	1.094s
AC-228	675.77	338.31	258.	216.	0.108	41.66	1.158s
PB-214	702.68	351.77	168.	415.	0.207	20.11	1.170
SB-125	925.24	463.06	98.	83.	0.042	59.17	1.500s
TL-208	1020.11	510.50	224.	145.	0.072	51.38	0.964
TL-208	1165.14	583.02	120.	359.	0.179	21.85	1.277
BI-214	1217.26	609.08	143.	364.	0.182	23.00	1.330
BI-212	1453.64	727.28	74.	96.	0.048	52.04	1.139s
CS-134	1588.52	794.73	49.	42.	0.021	84.97	1.500s
AC-228	1820.97	910.97	48.	247.	0.123	22.85	1.618
EU-152	1927.69	964.34	109.	47.	0.024	102.56	1.538
AC-228	1934.49	967.74	60.	225.	0.112	27.62	1.503
BI-214	2239.23	1120.13	61.	100.	0.050	49.51	1.804s
K-40	2919.40	1460.26	34.	1204.	0.602	8.75	1.915
BI-212	3240.64	1620.91	3.	18.	0.009	86.14	1.425
BI-214	3526.92	1764.08	5.	57.	0.028	40.25	1.995

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.4720E-01					
			477.56	1.472E-01	%(	2.924E-01	8.89E-02 G
K-40		1.3219E+01					
			1460.75	1.322E+01	(P	3.286E-01	3.91E-01 G
MN-54		-2.8122E-04					
			834.81	-2.812E-04	&(P	3.778E-02	1.08E-02 G
CO-57		-1.1814E-02					
			122.07	-1.181E-02	&(P	5.131E-02	1.54E-02 G K
			136.43	4.556E-02	&	3.706E-01	1.11E-01 G
CO-60		7.5568E-03					
			1332.51	7.557E-03	%(P	3.565E-02	1.02E-02 G K
			1173.23	3.783E-03	& P	4.290E-02	1.23E-02 G K
Sr-85		-1.3362E-02					
			514.00	-1.336E-02	%(	3.993E-02	1.20E-02 G

Kr-85 -2.9279E+02

513.99-2.928E+02 %(8.723E+02 2.62E+02 G

Y-88 1.9208E-03

1836.01 1.921E-03 &(P 2.394E-02 6.28E-03 G K

898.02-7.925E-03 % P 3.799E-02 1.10E-02 G

NB-94 1.1391E-03

871.10 1.139E-03 %(3.022E-02 8.56E-03 G K

702.50 9.721E-03 % 3.207E-02 9.53E-03 G K

Ag-108M -1.7494E-02

722.95-1.749E-02 %(4.451E-02 1.34E-02 G K

614.37 8.103E-04 % P 3.825E-02 1.11E-02 G

433.93 1.575E-02 & 2.513E-02 7.75E-03 G

CD-109 3.9775E-01

88.04 3.977E-01 %(1.924E+00 5.78E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	0.0000E+00						
		391.71	0.000E+00	%(	4.976E-02	1.45E-02	G K
		255.04	2.952E-01	%	1.533E+00	4.57E-01	G
SB-125	1.4023E-01						
		427.95	4.933E-02	%(P	7.927E-02	2.44E-02	G K
		600.77	3.202E-02	& P	1.394E-01	4.09E-02	G
		636.15	9.194E-02	& P	2.531E-01	7.55E-02	G
		463.51	4.093E-01	(P	2.402E-01	8.20E-02	G
		176.29	9.588E-02	&	5.466E-01	1.64E-01	G
I-131	4.5010E-03						
		364.48	4.501E-03	%(P	5.397E-02	1.58E-02	G K
		636.97	-1.952E-02	&	5.602E-01	1.60E-01	G
		284.29	9.775E-03	% P	7.521E-01	2.21E-01	G
CS-134	1.7128E-02						
		604.66	0.000E+00	&(	8.601E-02	2.56E-02	G K
		795.76	3.670E-02	@(P	3.116E-02	1.04E-02	G
		569.29	-3.662E-02	% P	2.010E-01	5.85E-02	G
		801.84	-7.442E-02	% P	3.858E-01	1.11E-01	G
CS-137	1.3881E-02						
		661.62	1.388E-02	%(P	3.997E-02	1.19E-02	G
CE-139	-4.5347E-03						
		165.85	-4.535E-03	&(	4.331E-02	1.29E-02	G
EU-152	6.9837E-02						
		121.78	-3.461E-02	&(P	1.487E-01	4.46E-02	G K

344.30-1.998E-02 % P 1.023E-01 3.03E-02 G
1408.08 1.865E-02 % 1.331E-01 3.73E-02 G
964.00 2.793E-01 &(P 3.051E-01 9.66E-02 G
1112.07 1.379E-01 % 2.739E-01 8.34E-02 G
778.90 9.803E-02 % 2.081E-01 6.31E-02 G

EU-154 -1.5599E-02
123.10-1.560E-02 %(9.856E-02 2.95E-02 G K
1274.80 3.448E-02 % 9.859E-02 2.93E-02 G
723.30-8.395E-02 % 2.155E-01 6.48E-02 G
1004.80-2.395E-02 & 2.035E-01 5.86E-02 G

EU-155 6.4386E-03
86.45 6.439E-03 %(2.378E-01 7.10E-02 G K
105.31 2.102E-03 % 2.194E-01 6.53E-02 G

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

HG-203      -5.0423E-03
                    279.17-5.042E-03 &(P 4.308E-02 1.28E-02 G K
                     72.87-4.832E-01 % P 2.214E+00 6.65E-01 G
                     70.83-4.756E-01 %   4.274E+00 1.28E+00 G
                     82.50-6.292E-01 &   3.716E+00 1.11E+00 G

TL-208       2.4548E-01
                    583.14 2.455E-01  (P 3.681E-02 1.81E-02 G
                    510.72 3.406E-01 + P 1.704E-01 6.90E-02 G

PB-212       8.0212E-01
                    238.63 8.095E-01  (P 7.657E-02 3.42E-02 G K
                                      Energy duplication
                     77.11 6.330E-01 } P 3.495E-01 9.18E-02 G
                     74.81 1.162E+00 + P 7.189E-01 2.32E-01 G

PB-214       4.3310E-01
                    351.99 4.390E-01  (P 6.681E-02 2.98E-02 G K
                    295.22 4.217E-01 @(P 1.563E-01 5.99E-02 G
                                      Energy duplication
                     77.11 4.212E-02 } P 8.651E-01 2.07E-01 G
                    241.92 3.145E-01 -   3.543E-01 1.05E-01 G

BI-212       6.1647E-01
                    727.17 5.690E-01 @(P 2.537E-01 9.92E-02 G K
                   1620.56 8.200E-01  (P 5.128E-01 2.36E-01 G
                    785.42 8.269E-01 %   1.623E+00 4.94E-01 G

BI-214       4.8219E-01
                    609.32 4.813E-01  (P 7.721E-02 3.75E-02 G K
```

1764.51 4.847E-01 (P 1.124E-01 6.88E-02 G

1120.28 6.445E-01 + P 2.507E-01 1.08E-01 G

RA-224 1.4348E+00

241.00 1.435E+00 (9.005E-01 2.87E-01 G

RA-226 1.0634E+00

Energy duplication

185.99 1.063E+00 *(P 1.060E+00 3.27E-01 G

AC-228 6.9966E-01

911.07 7.055E-01 (P 1.005E-01 5.45E-02 G K

968.90 1.118E+00 + P 1.932E-01 1.03E-01 G

338.40 6.855E-01 @(P 2.458E-01 9.57E-02 G

TH-227 -1.3342E-01

236.00-1.334E-01 &(3.643E-01 1.10E-01 G K

256.25 1.507E-03 % P 4.530E-01 1.34E-01 G

Nuclide Ave activity Energy Activity Code Peak MDA Comments

PA-234 -4.7399E-03

98.44-4.740E-03 %(P 2.113E-01 6.29E-02 G K
946.00 1.166E-02 & P 1.593E-01 4.54E-02 G
131.28-5.121E-02 % P 1.520E-01 4.57E-02 G
94.67-1.166E-01 % P 3.997E-01 1.20E-01 G
883.24 5.222E-02 % 1.968E-01 5.73E-02 G
926.70 5.353E-02 % 2.730E-01 7.92E-02 G
569.26-5.409E-02 % P 2.969E-01 8.64E-02 G

TH-234 7.1856E-01

63.29 7.186E-01 %(P 5.856E+00 1.74E+00 G K
92.80 9.917E-01 & P 1.998E+00 6.03E-01 G
92.38 1.132E+00 & P 2.439E+00 7.36E-01 G

AM-241 1.0275E-01

59.54 1.027E-01 %(P 9.280E-01 2.76E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	1.3765E-01	1.4720E-01	2.6661E-01	2.6675E-01	2.734E-01
K-40	1.3219E+01	1.3219E+01	1.1748E+00	1.4032E+00	
MN-54 #A	-2.7801E-04	-2.8122E-04	2.3180E-02	2.3180E-02	3.735E-02
CO-57 #B	-1.1658E-02	-1.1814E-02	4.7442E-02	4.7447E-02	5.064E-02
CO-60 #B	7.5428E-03	7.5568E-03	3.0503E-02	3.0506E-02	3.558E-02
Sr-85 #A	-1.2645E-02	-1.3362E-02	3.5915E-02	3.5923E-02	3.778E-02
Kr-85 #A	-2.9278E+02	-2.9279E+02	7.8475E+02	7.8493E+02	8.723E+02
Y-88 #B	1.8573E-03	1.9208E-03	1.8854E-02	1.8855E-02	2.315E-02
NB-94 #B	1.1391E-03	1.1391E-03	2.5691E-02	2.5691E-02	3.022E-02
Ag-108M#B	-1.7493E-02	-1.7494E-02	4.0166E-02	4.0179E-02	4.451E-02
CD-109 #A	3.9462E-01	3.9775E-01	1.7337E+00	1.7339E+00	1.909E+00
SN-113 #B	0.0000E+00	0.0000E+00	4.3607E-02	4.3607E-02	4.823E-02
SB-125 #F	1.3974E-01	1.4023E-01	8.4251E-02	8.4644E-02	7.899E-02
I-131 #B	2.8836E-03	4.5010E-03	4.7512E-02	4.7513E-02	3.457E-02
CS-134 #B	1.7047E-02	1.7128E-02	1.4585E-02	1.4619E-02	8.560E-02
CS-137 #A	1.3877E-02	1.3881E-02	3.5753E-02	3.5762E-02	3.995E-02
CE-139 #A	-4.4181E-03	-4.5347E-03	3.8764E-02	3.8765E-02	4.220E-02
EU-152 #B	6.9783E-02	6.9837E-02	7.2451E-02	7.2555E-02	1.485E-01
EU-154 #B	-1.5581E-02	-1.5599E-02	8.8509E-02	8.8514E-02	9.844E-02
EU-155 #B	6.4259E-03	6.4386E-03	2.1294E-01	2.1294E-01	2.373E-01
HG-203 #B	-4.6694E-03	-5.0423E-03	3.8660E-02	3.8661E-02	3.990E-02
TL-208	2.4548E-01	2.4548E-01	5.4274E-02	5.6114E-02	
PB-212	8.0212E-01	8.0212E-01	1.0178E-01	1.1193E-01	
PB-214	4.3310E-01	4.3310E-01	8.8264E-02	9.1776E-02	
BI-212	6.1647E-01	6.1647E-01	3.1120E-01	3.1325E-01	
BI-214	4.8219E-01	4.8219E-01	1.1286E-01	1.1628E-01	

RA-224	1.4348E+00	1.4348E+00	8.6097E-01	8.6499E-01	9.005E-01
RA-226 #	1.0634E+00	1.0634E+00	9.8124E-01	9.8318E-01	1.060E+00
AC-228	6.9966E-01	6.9966E-01	1.6203E-01	1.6705E-01	
TH-227 #B	-1.3342E-01	-1.3342E-01	3.3000E-01	3.3009E-01	3.643E-01
PA-234 #B	-4.7399E-03	-4.7399E-03	3.6408E-01	3.6408E-01	2.113E-01
TH-234 #B	7.1856E-01	7.1856E-01	5.2329E+00	5.2331E+00	5.856E+00
AM-241 #A	1.0275E-01	1.0275E-01	8.2854E-01	8.2856E-01	9.280E-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 (83.9 to 2000.7 keV) 1.7932518E+01 pCi/gm

Total Decayed Activity (83.9 to 2000.7 keV) 1.7932518E+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_6sept2005_1431.An1

Sample description

FSS-NOL-06-01-075-F-I

Spectrum Filename: C:\GammaVision\Spectra\103f_6sept2005_1431.An1

Acquisition information

Start time:	06-Sep-2005 14:33:11
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: 2.0420E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0420E+03) =
4.8972E+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	01-Sep-2005 13:01:00
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: 0.1847

***** 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	125.	25.29	0.99	9.052E-03	74.81	9.600	9.515E-01	PB212
77.13	136.	20.84	0.99	1.011E-02	77.11	17.500	6.698E-01	PB212
					77.11	10.700	1.095E+00	PB214
185.67	118.	32.57	1.59	2.568E-02				
185.67	118.	32.57	1.59	2.568E-02	185.99	3.280	PBC<MDA	RA226
209.49	111.	36.84	0.87	2.470E-02				
238.81	1091.	3.81	1.09	2.319E-02	238.63	43.100	7.143E-01	PB212

241.47	167.	21.33	1.09	2.305E-02	241.00	3.900	1.229E+00	RA224
					241.92	7.470	6.432E-01	PB214
270.16	108.	37.06	1.52	2.151E-02				
295.16	292.	9.48	1.13	2.026E-02	295.22	19.200	4.898E-01	PB214
299.73	84.	26.61	1.13	2.003E-02				
328.03	76.	40.77	0.74	1.874E-02				
338.25	252.	16.67	1.10	1.831E-02	338.40	12.010	7.554E-01	AC228
351.79	467.	7.89	1.09	1.776E-02	351.99	37.100	4.632E-01	PB214
462.69	125.	19.16	1.92	1.427E-02				
462.69	125.	19.16	1.92	1.427E-02	463.51	10.000	5.767E-01	SB125
510.25	174.	19.30	1.74	1.318E-02	510.72	22.500	3.296E-01	TL208
583.16	426.	8.16	1.37	1.184E-02	583.14	86.000	2.738E-01	TL208
609.11	390.	6.99	1.37	1.144E-02	609.32	46.090	4.809E-01	BI214
661.42	510.	8.27	1.63	1.072E-02	661.62	84.620	3.709E-01	CS137
727.19	84.	22.89	1.75	9.965E-03	727.17	11.800	4.677E-01	BI212
794.51	44.	41.19	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
911.01	265.	9.25	1.32	8.402E-03	911.07	29.000	7.107E-01	AC228
964.12	50.	36.85	1.54	8.055E-03	964.00	14.580	PBC<MDA	EU152
968.86	165.	12.35	1.54	8.026E-03	968.90	17.460	7.797E-01	AC228
1119.98	80.	22.42	2.11	7.213E-03	1120.28	15.040	4.753E-01	BI214
1172.84	1564.	3.36	1.74	6.973E-03	1173.23	99.860	1.487E+00	CO60
1332.10	1495.	2.87	1.71	6.351E-03	1332.51	99.980	1.558E+00	CO60
1460.32	1356.	2.83	1.88	5.933E-03	1460.75	10.700	1.394E+01	K40
1619.95	27.	28.76	1.91	5.488E-03	1620.56	2.750	1.165E+00	BI212
1763.83	72.	12.32	1.93	5.143E-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
418.14	209.49	680.	111.	0.056	110.51	0.872	AC-228
482.10	241.40	552.	167.	0.084	63.99	1.095	RA-224 ID
539.48	270.16	558.	108.	0.054	111.18	1.524	AC-228 s
598.45	299.65	302.	75.	0.038	104.23	0.831	TH-227 M
655.21	328.03	358.	76.	0.038	122.31	0.741	AC-228 s
1927.26	964.19	148.	50.	0.025	110.55	1.538	EU-152 ID

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	464.	125.	0.062	75.88	0.993D
PB-212	153.39	77.11	469.	136.	0.068	62.52	0.995A
RA-226	371.04	185.94	1066.	126.	0.063	102.34	1.500s
PB-212	476.83	238.84	1017.	1025.	0.513	17.71	0.985
PB-214	589.30	295.08	398.	279.	0.140	36.54	1.137

AC-228	675.63	338.25	505.	251.	0.125	50.00	1.100
PB-214	702.71	351.79	348.	461.	0.230	23.68	1.093s
SB-125	924.90	462.89	247.	105.	0.053	68.74	1.500s
TL-208	1019.62	510.25	335.	148.	0.074	57.89	1.742s
TL-208	1165.41	583.16	249.	421.	0.211	24.48	1.374s
BI-214	1217.32	609.11	160.	383.	0.192	20.98	1.374s
CS-137	1321.93	661.42	335.	508.	0.254	24.80	1.630s
BI-212	1453.45	727.19	129.	83.	0.042	68.66	1.747s
CS-134	1588.07	794.51	145.	44.	0.022	123.57	1.500s
AC-228	1821.05	911.01	143.	262.	0.131	27.75	1.322s
AC-228	1936.58	968.78	323.	231.	0.116	48.33	1.681
BI-214	2238.94	1119.98	111.	78.	0.039	67.25	2.112s
CO-60	2344.64	1172.84	261.	1562.	0.781	10.07	1.739
CO-60	2663.10	1332.10	81.	1492.	0.746	8.61	1.711
K-40	2919.51	1460.32	44.	1337.	0.669	8.49	1.884
BI-212	3238.70	1619.95	8.	27.	0.013	86.28	1.910
BI-214	3526.42	1763.83	5.	69.	0.034	36.95	1.927

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-3.8230E-02					
			477.56	-3.823E-02	&(	4.030E-01	1.19E-01 G
K-40		1.3941E+01					
			1460.75	1.394E+01	(P	3.502E-01	4.00E-01 G
MN-54		1.5806E-03					
			834.81	1.581E-03	%(P	4.229E-02	1.23E-02 G
CO-57		-1.1456E-02					
			122.07	-1.146E-02	%(P	5.519E-02	1.66E-02 G K
			136.43	-1.296E-02	&	4.211E-01	1.26E-01 G
CO-60		1.5229E+00					
			1332.51	1.558E+00	(P	4.659E-02	4.48E-02 G K
			1173.23	1.487E+00	(P	7.430E-02	5.00E-02 G K
Sr-85		-1.2041E-02					
			514.00	-1.204E-02	%(	4.806E-02	1.44E-02 G
Kr-85		-2.6362E+02					
			513.99	-2.636E+02	%(	1.051E+03	3.14E+02 G
Y-88		-2.5897E-03					
			1836.01	-2.590E-03	%(P	2.933E-02	7.97E-03 G K

898.02 1.499E-02 % P 5.706E-02 1.70E-02 G

NB-94 1.0158E-02

871.10 1.016E-02 &(5.090E-02 1.51E-02 G K

702.50-8.150E-03 % 4.625E-02 1.37E-02 G K

Ag-108M -2.1094E-02

722.95-2.109E-02 &(5.825E-02 1.75E-02 G K

614.37 1.207E-02 & P 4.627E-02 1.38E-02 G

433.93 6.254E-03 % 4.132E-02 1.23E-02 G

CD-109 6.3618E-02

88.04 6.362E-02 %(2.182E+00 6.53E-01 G

SN-113 -1.0551E-03

391.71-1.055E-03 %(5.896E-02 1.74E-02 G K

255.04 1.172E-01 % 1.757E+00 5.23E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.4146E-01						
		427.95	2.317E-02	%(P	1.269E-01	3.78E-02	G K
		600.77	3.480E-02	% P	2.071E-01	6.12E-02	G
		636.15	-2.276E-02	% P	3.604E-01	1.05E-01	G
		463.51	4.916E-01	*(P	3.540E-01	1.14E-01	G
		176.29	1.265E-01	&	5.734E-01	1.72E-01	G
I-131	1.6152E-03						
		364.48	1.615E-03	&(P	6.395E-02	1.88E-02	G K
		636.97	-1.588E-01	%	9.242E-01	2.74E-01	G
		284.29	-2.208E-01	% P	9.730E-01	2.92E-01	G
CS-134	1.6282E-02						
		604.66	-1.890E-03	&(	8.865E-02	2.64E-02	G K
		795.76	3.705E-02	*(P	4.920E-02	1.53E-02	G
		569.29	-4.729E-02	& P	2.755E-01	8.13E-02	G
		801.84	-8.315E-02	& P	5.434E-01	1.59E-01	G
CS-137	3.7095E-01						
		661.62	3.709E-01	(P	6.417E-02	3.07E-02	G
CE-139	3.6844E-03						
		165.85	3.684E-03	%(	5.170E-02	1.55E-02	G
EU-152	-3.3984E-02						
		121.78	-3.398E-02	%(P	1.649E-01	4.96E-02	G K
		344.30	-3.009E-03	% P	1.341E-01	3.96E-02	G
		1408.08	8.777E-02	%	1.232E-01	3.94E-02	G
		964.00	1.709E-01	% P	4.532E-01	1.36E-01	G
		1112.07	-5.953E-02	%	4.737E-01	1.40E-01	G

778.90 3.085E-02 % 2.902E-01 8.46E-02 G

EU-154 2.8636E-02

123.10 2.864E-02 %(1.120E-01 3.37E-02 G K

1274.80 0.000E+00 % 1.388E-01 3.98E-02 G

723.30 7.477E-02 & 1.770E-01 5.34E-02 G

1004.80 9.997E-02 % 3.171E-01 9.48E-02 G

EU-155 9.9656E-02

86.45 9.966E-02 %(2.443E-01 7.39E-02 G K

105.31 7.732E-02 % 2.330E-01 7.03E-02 G

HG-203 -8.4559E-03

279.17-8.456E-03 &(P 5.123E-02 1.53E-02 G K

72.87-1.378E-01 % P 2.409E+00 7.21E-01 G

70.83-1.513E+00 & 4.474E+00 1.35E+00 G

82.50-1.879E-01 % 4.206E+00 1.26E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8540E-01						
		583.14	2.738E-01	@(P	4.949E-02	2.26E-02	G
		510.72	3.296E-01	*(P	1.966E-01	7.51E-02	G
PB-212	6.7607E-01						
		238.63	6.786E-01	(P	1.001E-01	4.05E-02	G K
					Energy duplication		
		77.11	5.092E-01	} P	3.875E-01	1.06E-01	G
		74.81	9.515E-01	+ P	7.847E-01	2.47E-01	G
PB-214	4.6720E-01						
		351.99	4.632E-01	@(P	9.007E-02	3.70E-02	G K
		295.22	4.750E-01	(P	1.629E-01	5.87E-02	G
					Energy duplication		
		77.11	6.539E-02	} P	9.729E-01	2.13E-01	G
		241.92	1.369E-01	%	6.284E-01	1.89E-01	G
BI-212	4.6773E-01						
		727.17	4.677E-01	(P	3.130E-01	1.08E-01	G K
		1620.56	1.165E+00	+ P	7.127E-01	3.35E-01	G
		785.42	9.010E-01	%	2.186E+00	6.59E-01	G
BI-214	4.9509E-01						
		609.32	4.809E-01	@(P	7.736E-02	3.42E-02	G K
		1764.51	5.548E-01	(P	1.092E-01	7.16E-02	G
		1120.28	4.753E-01	(P	3.162E-01	1.09E-01	G
RA-224	8.3740E-01						
		241.00	8.374E-01	%(	1.173E+00	3.59E-01	G

```
RA-226       9.8984E-01
                185.99 9.898E-01  (P 1.217E+00 3.72E-01 G

AC-228       7.2378E-01
                911.07 7.107E-01 @(P 1.589E-01 6.66E-02 G K
                968.90 1.093E+00 + P 4.080E-01 1.76E-01 G
                338.40 7.554E-01  (P 3.235E-01 1.26E-01 G

TH-227      -1.3694E-01
                236.00-1.369E-01 %(  3.939E-01 1.19E-01 G K
                256.25 6.779E-02 % P 5.374E-01 1.60E-01 G

PA-234       6.6842E-02
                 98.44 6.684E-02 %(P 2.327E-01 7.01E-02 G K
                946.00 5.336E-06 % P 2.409E-01 6.98E-02 G
                131.28-2.457E-02 & P 2.250E-01 6.74E-02 G
                 94.67-1.078E-01 & P 4.383E-01 1.32E-01 G
                883.24 6.503E-02 &   3.993E-01 1.18E-01 G
                926.70 8.277E-02 %   5.386E-01 1.59E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments

569.26-7.049E-02 & P 4.069E-01 1.20E-01 G

TH-234 -1.6704E+00

63.29-1.670E+00 %(P 6.548E+00 1.96E+00 G K

92.80 1.159E+00 & P 2.189E+00 6.63E-01 G

92.38 1.335E+00 & P 2.661E+00 8.05E-01 G

AM-241 1.3065E-01

59.54 1.306E-01 &(P 1.194E+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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-3.5797E-02	-3.8230E-02	3.5715E-01	3.5716E-01	3.774E-01
K-40		1.3941E+01	1.3941E+01	1.1999E+00	1.4474E+00	
MN-54	#A	1.5629E-03	1.5806E-03	3.6778E-02	3.6778E-02	4.181E-02
CO-57	#B	-1.1308E-02	-1.1456E-02	5.1027E-02	5.1031E-02	5.448E-02
CO-60		1.5201E+00	1.5229E+00	1.0102E-01	1.3425E-01	

Sr-85 #A	-1.1406E-02	-1.2041E-02	4.3109E-02	4.3115E-02	4.553E-02
Kr-85 #A	-2.6361E+02	-2.6362E+02	9.4285E+02	9.4298E+02	1.051E+03
Y-88 #B	-2.5059E-03	-2.5897E-03	2.5573E-02	2.5574E-02	2.838E-02
NB-94 #B	1.0158E-02	1.0158E-02	4.5239E-02	4.5243E-02	5.090E-02
Ag-108M#B	-2.1093E-02	-2.1094E-02	5.2569E-02	5.2583E-02	5.825E-02
CD-109 #A	6.3127E-02	6.3618E-02	1.9590E+00	1.9590E+00	2.165E+00
SN-113 #B	-1.0234E-03	-1.0551E-03	5.2135E-02	5.2135E-02	5.719E-02
SB-125 #F	1.4097E-01	1.4146E-01	9.8420E-02	9.8762E-02	1.265E-01
I-131 #B	1.0438E-03	1.6152E-03	5.6489E-02	5.6489E-02	4.133E-02
CS-134 #B	1.6207E-02	1.6282E-02	2.0159E-02	2.0182E-02	8.824E-02
CS-137	3.7083E-01	3.7095E-01	9.2243E-02	9.4723E-02	
CE-139 #A	3.5916E-03	3.6844E-03	4.6380E-02	4.6381E-02	5.039E-02
EU-152 #B	-3.3958E-02	-3.3984E-02	1.5697E-01	1.5698E-01	1.648E-01
EU-154 #B	2.8604E-02	2.8636E-02	1.0111E-01	1.0112E-01	1.118E-01
EU-155 #B	9.9464E-02	9.9656E-02	2.2184E-01	2.2191E-01	2.439E-01
HG-203 #B	-7.8423E-03	-8.4559E-03	4.6138E-02	4.6140E-02	4.752E-02
TL-208 #	2.8540E-01	2.8540E-01	7.0580E-02	7.2499E-02	
PB-212	6.7607E-01	6.7607E-01	1.2113E-01	1.2733E-01	
PB-214	4.6720E-01	4.6720E-01	1.0313E-01	1.0664E-01	
BI-212	4.6773E-01	4.6773E-01	3.2305E-01	3.2419E-01	
BI-214	4.9509E-01	4.9509E-01	1.0563E-01	1.0947E-01	
RA-224 #A	8.3740E-01	8.3740E-01	1.0762E+00	1.0773E+00	1.173E+00
RA-226 #A	9.8983E-01	9.8984E-01	1.1172E+00	1.1187E+00	1.217E+00
AC-228	7.2378E-01	7.2378E-01	2.0346E-01	2.0775E-01	
TH-227 #B	-1.3694E-01	-1.3694E-01	3.5682E-01	3.5691E-01	3.939E-01
PA-234 #B	6.6842E-02	6.6842E-02	2.1033E-01	2.1036E-01	2.327E-01
TH-234 #B	-1.6704E+00	-1.6704E+00	7.7540E+00	7.7545E+00	6.548E+00
AM-241 #A	1.3064E-01	1.3065E-01	1.0719E+00	1.0719E+00	1.194E+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) 1.8946918E+01 pCi/gm

Total Decayed Activity (86.9 to 2000.7 keV) 1.8949810E+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_9SEP2005_1258.An1

Sample description

FSS NOL-06-01-086-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_9SEP2005_1258.An1

Acquisition information

Start time:	09-Sep-2005 12:58:39
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: 1.6750E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6750E+03) =
5.9701E+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	07-Sep-2005 11:30:00
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: 0.1488

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.88	137.	20.83	0.99	9.052E-03	74.81	9.600	1.277E+00	PB212
77.18	174.	14.16	0.99	1.011E-02	77.11	17.500	9.685E-01	PB212
					77.11	10.700	1.584E+00	PB214
93.30	117.	26.34	1.00	1.673E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
99.44	94.	35.09	0.88	1.857E-02				

186.15	184.	23.13	1.20	2.566E-02	185.99	3.280	1.639E+00	RA226
209.24	105.	27.34	1.32	2.472E-02				
238.78	1131.	3.56	1.09	2.319E-02	236.00	11.200	3.491E+00	TH227
					238.63	43.100	9.030E-01	PB212
					241.92	7.470	5.306E+00	PB214
269.86	83.	34.00	1.54	2.153E-02				
278.22	100.	29.77	1.23	2.110E-02				
278.22	100.	29.77	1.23	2.110E-02	279.17	81.500	4.838E-02	HG203
295.18	249.	11.78	1.14	2.025E-02	295.22	19.200	5.079E-01	PB214
300.09	76.	34.06	1.02	2.001E-02				
328.17	72.	34.96	1.13	1.873E-02				
338.17	230.	15.34	1.12	1.831E-02	338.40	12.010	8.417E-01	AC228
351.87	407.	9.12	1.13	1.776E-02	351.99	37.100	4.916E-01	PB214
463.41	78.	28.25	1.34	1.425E-02				
463.41	78.	28.25	1.34	1.425E-02	463.51	10.000	4.362E-01	SB125
511.21	213.	12.09	1.22	1.316E-02	510.72	22.500	5.072E-01	TL208
583.00	373.	6.79	1.15	1.185E-02	583.14	86.000	2.920E-01	TL208
609.14	336.	9.33	1.50	1.144E-02	609.32	46.090	5.036E-01	BI214
661.46	829.	4.27	1.32	1.072E-02	661.62	84.620	7.360E-01	CS137
727.10	102.	18.45	1.57	9.966E-03	727.17	11.800	6.965E-01	BI212
794.40	71.	31.25	1.37	9.313E-03				
794.40	71.	31.25	1.37	9.313E-03	795.76	85.400	7.216E-02	CS134
859.97	70.	28.02	1.10	8.772E-03				
910.86	303.	8.97	1.23	8.403E-03	911.07	29.000	9.929E-01	AC228
964.57	43.	28.98	1.54	8.052E-03	964.00	14.580	PBC<MDA	EU152
968.82	141.	11.22	1.54	8.026E-03	968.90	17.460	8.120E-01	AC228
1119.86	99.	22.20	1.42	7.214E-03	1120.28	15.040	7.223E-01	BI214
1172.75	224.	11.17	1.60	6.974E-03	1173.23	99.860	2.578E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.12	191.	9.49	1.98	6.351E-03	1332.51	99.980	2.390E-01	CO60
1460.38	1241.	2.90	1.96	5.933E-03	1460.75	10.700	1.553E+01	K40
1764.54	43.	17.43	1.39	5.142E-03	1764.51	15.920	4.280E-01	Bl214

********** 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
417.64	209.24	382.	105.	0.053	82.02	1.320	AC-228 s
482.77	241.73	314.	132.	0.066	62.53	1.095	PB-214 lD
538.87	269.86	328.	83.	0.042	102.00	1.537	AC-228 s
599.32	300.09	270.	76.	0.038	102.18	1.022	PB-212
655.48	328.17	257.	72.	0.036	104.88	1.135	AC-228
1718.97	859.97	97.	70.	0.035	84.07	1.105	TL-208 s
1928.22	964.67	55.	43.	0.021	87.08	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	362.	137.	0.069	62.48	0.993D

PB-212	153.39	77.11	374.	174.	0.087	42.47	0.995A
TH-234	185.03	92.93	983.	136.	0.068	88.88	1.500s
TH-234	185.03	92.93	957.	138.	0.069	87.00	1.500s
PA-234	184.91	92.87	656.	172.	0.086	66.94	1.500s
RA-226	371.53	186.18	788.	170.	0.085	68.10	1.500s
PB-212	476.86	238.85	765.	1100.	0.550	15.13	1.056
RA-224	482.38	241.61	899.	108.	0.054	121.31	1.500s
HG-203	554.04	277.44	364.	69.	0.034	123.44	1.500s
PB-214	589.51	295.18	281.	245.	0.122	35.33	1.138
AC-228	675.47	338.17	365.	229.	0.115	46.01	1.123
PB-214	702.88	351.87	330.	401.	0.201	27.37	1.125s
SB-125	925.13	463.00	207.	75.	0.037	87.22	1.500
TL-208	1021.53	511.21	177.	186.	0.093	36.27	1.222s
TL-208	1165.10	583.00	121.	369.	0.184	20.38	1.147
BI-214	1217.38	609.14	186.	329.	0.165	28.00	1.496
CS-137	1322.00	661.46	143.	828.	0.414	12.82	1.322
BI-212	1453.26	727.10	90.	102.	0.051	55.34	1.568
CS-134	1588.87	794.91	82.	40.	0.020	107.61	1.500

YAEC Chemistry Lab Spectrum name: 103F_9SEP2005_1258.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1820.74	910.86	118.	300.	0.150	26.91	1.229
AC-228	1936.81	968.90	54.	142.	0.071	33.29	1.541D
Bl-214	2238.69	1119.86	98.	97.	0.049	66.60	1.419s
CO-60	2344.46	1172.75	114.	222.	0.111	33.50	1.598
CO-60	2663.16	1332.12	44.	188.	0.094	28.47	1.984
K-40	2919.62	1460.38	31.	1222.	0.611	8.69	1.960
Bl-214	3527.83	1764.54	10.	43.	0.022	52.28	1.393s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		8.2484E-02					
			477.56	8.248E-02	%(	4.085E-01	1.21E-01 G
K-40		1.5531E+01					
			1460.75	1.553E+01	(P	3.649E-01	4.57E-01 G
MN-54		1.3762E-02					
			834.81	1.376E-02	%(P	4.668E-02	1.39E-02 G
CO-57		-6.0414E-03					
			122.07	-6.041E-03	%(P	5.929E-02	1.77E-02 G K
			136.43	-1.149E-01	%	4.558E-01	1.37E-01 G

```
CO-60        2.4839E-01
                  1332.51 2.390E-01  (P 4.278E-02 2.30E-02 G K
                  1173.23 2.578E-01  (P 6.078E-02 2.90E-02 G K

Sr-85       -1.7359E-02
                  514.00-1.736E-02 %(  4.666E-02 1.40E-02 G

Kr-85       -3.9195E+02
                  513.99-3.920E+02 %(  1.054E+03 3.17E+02 G

Y-88         2.2877E-03
                  1836.01 2.288E-03 &(P 3.053E-02 8.13E-03 G K
                  898.02 9.577E-04 % P 3.368E-02 9.40E-03 G

NB-94        1.5808E-02
                  871.10 1.581E-02 %(  3.352E-02 1.02E-02 G K
                  702.50-5.207E-03 %   4.582E-02 1.34E-02 G K
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	1.1579E-02						
		722.95	1.158E-02	%(	3.614E-02	1.07E-02	G K
		614.37	1.345E-04	% P	3.171E-02	8.98E-03	G
		433.93	7.261E-03	%	4.424E-02	1.31E-02	G
CD-109	1.3792E-01						
		88.04	1.379E-01	&(	2.138E+00	6.38E-01	G
SN-113	7.3276E-05						
		391.71	7.328E-05	%(	6.214E-02	1.82E-02	G K
		255.04	-1.032E-02	&	1.870E+00	5.53E-01	G
SB-125	1.1720E-01						
		427.95	1.379E-02	%(P	1.315E-01	3.88E-02	G K
		600.77	-5.387E-05	% P	2.287E-01	6.63E-02	G
		636.15	-2.092E-02	& P	3.767E-01	1.09E-01	G
		463.51	4.233E-01	(P	3.955E-01	1.25E-01	G
		176.29	-1.162E-01	%	6.878E-01	2.06E-01	G
I-131	-5.8400E-04						
		364.48	-5.840E-04	&(P	5.715E-02	1.68E-02	G K
		636.97	-5.574E-02	&	6.661E-01	1.94E-01	G
		284.29	6.922E-02	& P	7.113E-01	2.11E-01	G
CS-134	1.2076E-02						
		604.66	-1.278E-02	&(	4.687E-02	1.40E-02	G K
		795.76	4.048E-02	(P	4.580E-02	1.46E-02	G
		569.29	4.497E-02	% P	2.744E-01	8.07E-02	G
		801.84	-3.707E-02	% P	4.525E-01	1.29E-01	G

```
CS-137      7.3600E-01
                661.62 7.360E-01  (P 5.203E-02 3.15E-02 G

CE-139      4.1638E-04
                165.85 4.164E-04 %(  4.976E-02 1.48E-02 G

EU-152     -1.8075E-02
                121.78-1.808E-02 %(P 1.682E-01 5.03E-02 G K
                344.30 2.766E-02 % P 1.421E-01 4.23E-02 G
                1408.08 2.350E-02 %   1.504E-01 4.23E-02 G
                964.00 1.651E-01 % P 3.914E-01 1.18E-01 G
                1112.07-2.833E-02 %   3.178E-01 9.10E-02 G
                778.90 5.277E-02 %   3.020E-01 8.82E-02 G

EU-154      2.6976E-03
                123.10 2.698E-03 &(  1.285E-01 3.83E-02 G K
                1274.80-2.534E-02 %   1.424E-01 4.14E-02 G
```

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30 1.308E-02 &   3.595E-01 1.06E-01 G
                     1004.80-6.921E-02 %   2.495E-01 7.37E-02 G

EU-155       1.2400E-01
                       86.45 1.240E-01 &(  2.602E-01 7.89E-02 G K
                      105.31 6.130E-02 &   2.616E-01 7.86E-02 G

HG-203       3.3227E-02
                      279.17 3.323E-02 *(P 4.441E-02 1.37E-02 G K
                       72.87-2.097E-01 % P 2.462E+00 7.36E-01 G
                       70.83 9.803E-01 %   4.645E+00 1.39E+00 G
                       82.50-7.558E-01 &   4.382E+00 1.31E+00 G

TL-208       2.9201E-01
                      583.14 2.920E-01  (P 4.280E-02 2.01E-02 G
                      510.72 5.072E-01 + P 1.760E-01 7.01E-02 G

PB-212       9.1091E-01
                      238.63 8.875E-01  (P 1.062E-01 4.53E-02 G K
                                         Energy duplication
                       77.11 7.927E-01 } P 4.229E-01 1.12E-01 G
                       74.81 1.277E+00 + P 8.478E-01 2.72E-01 G

PB-214       4.9718E-01
                      351.99 4.916E-01 @(P 1.070E-01 4.55E-02 G K
                      295.22 5.079E-01  (P 1.678E-01 6.08E-02 G
                                         Energy duplication
                       77.11 1.150E-01 } P 1.056E+00 2.49E-01 G
                      241.92 7.188E-02 %   6.430E-01 1.92E-01 G

BI-212       6.9646E-01
```

727.17 6.965E-01 (P 3.228E-01 1.29E-01 G K
1620.56 3.337E-01 % P 1.004E+00 2.93E-01 G
785.42 8.602E-01 % 1.917E+00 5.79E-01 G

BI-214 4.8422E-01
609.32 5.036E-01 (P 1.014E-01 4.79E-02 G K
1764.51 4.280E-01 @(P 1.688E-01 8.02E-02 G
1120.28 7.223E-01 + P 3.631E-01 1.63E-01 G

RA-224 9.6828E-01
241.00 9.683E-01 (1.277E+00 3.92E-01 G

RA-226 1.6334E+00
185.99 1.633E+00 @(P 1.279E+00 3.99E-01 G

AC-228 9.4859E-01
911.07 9.929E-01 (P 1.767E-01 9.00E-02 G K
968.90 8.189E-01 - P 2.123E-01 9.10E-02 G
338.40 8.417E-01 (P 3.366E-01 1.30E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.1120E-01						
		236.00	-3.112E-01	%(	4.393E-01	1.34E-01	G K
		256.25	-1.953E-02	% P	4.759E-01	1.40E-01	G
PA-234	1.4896E-01						
		98.44	-8.329E-02	%(P	2.364E-01	7.13E-02	G K
		946.00	1.512E-03	& P	1.832E-01	5.16E-02	G
		131.28	1.179E-01	% P	2.128E-01	6.47E-02	G
		94.67	5.250E-01	&(P	3.720E-01	1.17E-01	G
		883.24	6.565E-02	%	3.323E-01	9.71E-02	G
		926.70	-3.099E-02	&	3.050E-01	8.69E-02	G
		569.26	-8.718E-03	% P	4.148E-01	1.20E-01	G
TH-234	1.9960E+00						
		63.29	1.382E+00	&(P	7.093E+00	2.12E+00	G K
		92.80	2.253E+00	*(P	2.400E+00	7.37E-01	G
		92.38	2.627E+00	&(P	2.865E+00	8.79E-01	G
AM-241	-1.0819E-01						
		59.54	-1.082E-01	%(P	1.327E+00	3.96E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	8.0306E-02	8.2484E-02	3.6363E-01	3.6366E-01	3.978E-01
K-40	1.5531E+01	1.5531E+01	1.3703E+00	1.6404E+00	
MN-54 #A	1.3700E-02	1.3762E-02	4.1603E-02	4.1611E-02	4.647E-02
CO-57 #B	-6.0095E-03	-6.0414E-03	5.6326E-02	5.6327E-02	5.897E-02
CO-60	2.4821E-01	2.4839E-01	5.5201E-02	5.7053E-02	
Sr-85 #A	-1.6980E-02	-1.7359E-02	4.2108E-02	4.2120E-02	4.564E-02
Kr-85 #A	-3.9195E+02	-3.9195E+02	9.5090E+02	9.5117E+02	1.054E+03
Y-88 #B	2.2573E-03	2.2877E-03	2.4393E-02	2.4394E-02	3.012E-02
NB-94 #B	1.5808E-02	1.5808E-02	3.0476E-02	3.0490E-02	3.352E-02
Ag-108M#B	1.1578E-02	1.1579E-02	3.2185E-02	3.2192E-02	3.614E-02
CD-109 #A	1.3749E-01	1.3792E-01	1.9153E+00	1.9153E+00	2.131E+00
SN-113 #B	7.2371E-05	7.3276E-05	5.4657E-02	5.4657E-02	6.138E-02
SB-125 #B	1.1704E-01	1.1720E-01	1.0397E-01	1.0419E-01	1.314E-01
I-131 #B	-4.8891E-04	-5.8400E-04	4.6413E-01	4.6413E-01	4.785E-02
CS-134 #B	1.2053E-02	1.2076E-02	1.3023E-02	1.3042E-02	4.678E-02
CS-137	7.3591E-01	7.3600E-01	9.4514E-02	1.0372E-01	
CE-139 #A	4.1208E-04	4.1638E-04	4.4357E-02	4.4357E-02	4.925E-02
EU-152 #B	-1.8069E-02	-1.8075E-02	1.7081E-01	1.7081E-01	1.682E-01
EU-154 #B	2.6963E-03	2.6976E-03	1.1499E-01	1.1499E-01	1.284E-01
EU-155 #B	1.2390E-01	1.2400E-01	2.3671E-01	2.3681E-01	2.600E-01
HG-203 #A	3.2224E-02	3.3227E-02	4.1039E-02	4.1084E-02	4.307E-02
TL-208	2.9201E-01	2.9201E-01	6.0208E-02	6.2549E-02	

PB-212	9.1091E-01	9.1091E-01	1.3933E-01	1.4903E-01	
PB-214	4.9718E-01	4.9718E-01	1.1284E-01	1.1648E-01	
BI-212	6.9646E-01	6.9646E-01	3.8728E-01	3.8939E-01	
BI-214	4.8422E-01	4.8422E-01	1.3827E-01	1.4110E-01	
RA-224 #A	9.6828E-01	9.6828E-01	1.1746E+00	1.1760E+00	1.277E+00
RA-226 #	1.6334E+00	1.6334E+00	1.1968E+00	1.2006E+00	1.279E+00
AC-228	9.4859E-01	9.4859E-01	2.5441E-01	2.6030E-01	
TH-227 #B	-3.1120E-01	-3.1120E-01	4.0321E-01	4.0362E-01	4.393E-01
PA-234 #B	1.4896E-01	1.4896E-01	9.9910E-02	1.0025E-01	2.364E-01
TH-234 #B	1.9960E+00	1.9960E+00	1.9588E+00	1.9620E+00	7.093E+00
AM-241 #A	-1.0818E-01	-1.0819E-01	1.2317E+00	1.2317E+00	1.327E+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) 2.0344381E+01 pCi/gm

Total Decayed Activity (1120.0 to 2000.7 keV) 2.0344662E+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: 103F_9SEP2005_1336.An1

Sample description

FSS NOL-06-01-088-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_9SEP2005_1336.An1

Acquisition information

Start time:	09-Sep-2005 13:36:55
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: 1.8270E+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	07-Sep-2005 11:10:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 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
74.87	98.	26.73	0.99	9.052E-03	74.81	9.600	8.324E-01	PB212
77.17	177.	12.96	0.99	1.011E-02	77.11	17.500	8.887E-01	PB212
					77.11	10.700	1.453E+00	PB214
87.11	91.	28.71	1.00	1.437E-02	86.45	32.740	1.463E-01	EU155
89.90	79.	34.99	1.00	1.542E-02				
93.36	124.	22.77	1.00	1.665E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234

185.71	155.	23.18	0.79	2.568E-02				
185.71	155.	23.18	0.79	2.568E-02	185.99	3.280	1.248E+00	RA226
209.66	100.	24.46	1.08	2.470E-02				
238.82	991.	3.71	1.09	2.319E-02	238.63	43.100	7.241E-01	PB212
242.07	144.	18.46	1.10	2.302E-02	241.00	3.900	1.180E+00	RA224
					241.92	7.470	6.176E-01	PB214
270.38	95.	24.09	1.38	2.150E-02				
277.47	96.	28.15	1.07	2.114E-02				
277.47	96.	28.15	1.07	2.114E-02	279.17	81.500	4.291E-02	HG203
295.14	184.	14.23	1.22	2.025E-02	295.22	19.200	3.424E-01	PB214
300.25	60.	35.90	1.29	2.001E-02				
327.68	63.	32.62	1.00	1.876E-02				
338.39	197.	13.38	0.93	1.830E-02	338.40	12.010	6.606E-01	AC228
351.78	372.	9.13	1.08	1.776E-02	351.99	37.100	4.117E-01	PB214
462.78	43.	36.59	1.23	1.426E-02				
462.78	43.	36.59	1.23	1.426E-02	463.51	10.000	PBC<MDA	SB125
510.59	155.	15.94	1.20	1.318E-02	510.72	22.500	3.210E-01	TL208
582.90	327.	8.95	1.15	1.185E-02	583.14	86.000	2.343E-01	TL208
609.13	279.	8.24	1.63	1.144E-02	609.32	46.090	3.823E-01	BI214
661.37	255.	10.88	1.06	1.073E-02	661.62	84.620	2.068E-01	CS137
727.00	72.	21.42	1.55	9.967E-03	727.17	11.800	4.529E-01	BI212
795.05	34.	38.09	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
859.96	62.	28.47	1.89	8.772E-03				
911.02	271.	8.30	1.60	8.402E-03	911.07	29.000	8.137E-01	AC228
967.91	169.	13.79	1.37	8.032E-03	968.90	17.460	8.913E-01	AC228
1119.59	78.	24.93	1.00	7.215E-03	1120.28	15.040	5.204E-01	BI214
1173.13	115.	20.33	1.69	6.972E-03	1173.23	99.860	1.200E-01	CO60
1332.45	64.	25.02	1.29	6.350E-03	1332.51	99.980	7.154E-02	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.43	1204.	2.94	1.64	5.933E-03	1460.75	10.700	1.381E+01	K40
1620.56	19.	22.94	0.83	5.488E-03	1620.56	2.750	9.291E-01	Bi212
1764.02	68.	12.76	1.81	5.143E-03	1764.51	15.920	5.831E-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
173.39	87.12	298.	91.	0.046	86.12	1.001	PB-214 ID
178.98	89.91	339.	79.	0.039	104.97	1.002	PB-214 ID
418.50	209.67	412.	99.	0.050	95.68	1.107	NP-239
539.92	270.38	206.	95.	0.048	72.28	1.383	AC-228 s
554.08	277.47	256.	96.	0.048	84.44	1.071	TL-208 l
599.65	300.25	190.	60.	0.030	107.70	1.288	PB-212 s
654.50	327.68	166.	63.	0.032	97.86	1.001	AC-228 s
1718.97	859.96	76.	62.	0.031	85.41	1.889	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	316.	98.	0.049	80.18	0.993D
PB-212	153.39	77.11	318.	177.	0.089	38.87	0.995A
TH-234	185.36	93.10	822.	142.	0.071	79.22	1.500s
TH-234	185.35	93.09	813.	141.	0.070	79.15	1.500s
RA-226	371.13	185.99	712.	107.	0.053	97.56	1.500s
PB-212	476.81	238.83	634.	975.	0.487	15.70	1.009
RA-224	482.77	241.81	730.	126.	0.063	94.73	1.500
PB-214	482.98	241.91	736.	95.	0.048	124.54	1.500
PB-214	589.42	295.14	232.	180.	0.090	42.69	1.216s
AC-228	675.92	338.39	210.	196.	0.098	40.15	0.927
PB-214	702.70	351.78	275.	367.	0.183	27.39	1.080
SB-125	924.83	462.85	127.	51.	0.025	100.57	1.500
TL-208	1020.29	510.59	184.	129.	0.064	47.81	1.199s
TL-208	1164.90	582.90	160.	323.	0.161	26.86	1.146
BI-214	1217.36	609.13	102.	273.	0.136	24.72	1.625s
CS-137	1321.83	661.37	144.	254.	0.127	32.64	1.062
BI-212	1453.07	727.00	68.	72.	0.036	64.27	1.545
CS-134	1589.16	795.05	67.	34.	0.017	114.28	1.500s

YAEC Chemistry Lab Spectrum name: 103F_9SEP2005_1336.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1821.08	911.02	73.	268.	0.134	24.91	1.602s
AC-228	1934.83	967.91	85.	169.	0.084	41.37	1.371
BI-214	2238.15	1119.59	91.	76.	0.038	74.80	1.005s
CO-60	2345.22	1173.13	112.	113.	0.056	60.98	1.689s
CO-60	2663.82	1332.45	58.	61.	0.031	75.07	1.290
K-40	2919.72	1460.43	35.	1185.	0.593	8.81	1.641
BI-212	3239.92	1620.56	0.	19.	0.009	68.82	0.833s
BI-214	3526.79	1764.02	5.	65.	0.032	38.28	1.812

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

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

- Nuclide -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS
BE-7		1.1207E-01				
			477.56	1.121E-01	%(	2.677E-01 8.06E-02 G
K-40		1.3810E+01				
			1460.75	1.381E+01	(P	3.525E-01 4.12E-01 G
MN-54		1.1317E-02				
			834.81	1.132E-02	&(P	3.442E-02 1.02E-02 G
CO-57		-2.5260E-04				
			122.07	-2.526E-04	%(P	4.717E-02 1.40E-02 G K

136.43-5.928E-02 & 3.761E-01 1.13E-01 G

CO-60 9.5752E-02

1332.51 7.154E-02 (P 4.442E-02 1.87E-02 G K

1173.23 1.200E-01 *(P 5.535E-02 2.48E-02 G K

Sr-85 -1.0139E-02

514.00-1.014E-02 %(4.309E-02 1.28E-02 G

Kr-85 -2.2906E+02

513.99-2.291E+02 %(9.728E+02 2.90E+02 G

Y-88 -2.5730E-03

1836.01-2.573E-03 %(P 2.747E-02 7.33E-03 G K

898.02 8.026E-03 % P 3.306E-02 9.63E-03 G

NB-94 -2.7457E-03

871.10-2.746E-03 &(3.172E-02 9.06E-03 G K

702.50 5.090E-03 & 3.495E-02 1.02E-02 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.0825E-02						
		722.95	-1.083E-02	%(	4.411E-02	1.31E-02	G K
		614.37	-6.583E-04	& P	3.883E-02	1.12E-02	G
		433.93	1.517E-02	%	3.408E-02	1.03E-02	G
CD-109	-7.0094E-01						
		88.04	-7.009E-01	&(	1.609E+00	4.87E-01	G
SN-113	1.1591E-02						
		391.71	1.159E-02	&(	4.535E-02	1.35E-02	G K
		255.04	4.945E-02	&	1.567E+00	4.63E-01	G
SB-125	5.0018E-02						
		427.95	-2.224E-02	%(P	1.041E-01	3.08E-02	G K
		600.77	-1.751E-02	% P	1.691E-01	4.91E-02	G
		636.15	-2.074E-03	% P	2.571E-01	7.29E-02	G
		463.51	2.639E-01	(P	2.876E-01	9.07E-02	G
		176.29	-1.034E-03	&	5.291E-01	1.57E-01	G
I-131	-6.4485E-03						
		364.48	-6.449E-03	%(P	4.253E-02	1.25E-02	G K
		636.97	7.583E-02	%	4.437E-01	1.29E-01	G
		284.29	1.499E-01	% P	5.700E-01	1.70E-01	G
CS-134	-1.7173E-02						
		604.66	-1.717E-02	%(	3.855E-02	1.17E-02	G K
		795.76	3.163E-02	+ P	3.809E-02	1.21E-02	G
		569.29	3.712E-02	% P	1.673E-01	4.87E-02	G
		801.84	-2.739E-02	% P	3.924E-01	1.11E-01	G

CS-137 2.0678E-01

661.62 2.068E-01 (P 4.786E-02 2.26E-02 G

CE-139 3.9989E-03

165.85 3.999E-03 %(4.432E-02 1.32E-02 G

EU-152 2.2885E-02

121.78 2.288E-02 &(P 1.434E-01 4.29E-02 G K

344.30-1.704E-02 & P 1.055E-01 3.12E-02 G

1408.08 3.500E-02 % 1.225E-01 3.54E-02 G

964.00-6.190E-02 & P 2.843E-01 8.31E-02 G

1112.07 2.454E-02 & 2.844E-01 8.13E-02 G

778.90 5.844E-02 % 2.527E-01 7.41E-02 G

EU-154 1.5723E-02

123.10 1.572E-02 %(1.037E-01 3.10E-02 G K

1274.80 0.000E+00 % 1.531E-01 4.38E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30-5.682E-02 %   2.131E-01 6.33E-02 G
                      1004.80 0.000E+00 &   2.215E-01 6.28E-02 G

EU-155       1.4266E-01
                       86.45 1.427E-01 &(  2.171E-01 6.63E-02 G K
                      105.31 3.462E-02 %   2.299E-01 6.88E-02 G

HG-203       2.3964E-02
                      279.17 2.396E-02 &(P 3.466E-02 1.07E-02 G K
                       72.87-7.235E-01 % P 2.149E+00 6.48E-01 G
                       70.83-8.900E-01 %   4.173E+00 1.25E+00 G
                       82.50-2.218E-01 &   3.586E+00 1.07E+00 G

TL-208       2.3431E-01
                      583.14 2.343E-01  (P 4.481E-02 2.13E-02 G
                      510.72 3.210E-01 + P 1.647E-01 6.18E-02 G

PB-212       7.4141E-01
                      238.63 7.211E-01  (P 8.882E-02 3.82E-02 G K
                                         Energy duplication
                       77.11 7.414E-01 } P 3.588E-01 9.61E-02 G
                       74.81 8.324E-01  (P 7.284E-01 2.30E-01 G

PB-214       3.9060E-01
                      351.99 4.117E-01  (P 8.990E-02 3.81E-02 G K
                      295.22 3.424E-01 @(P 1.402E-01 4.98E-02 G
                                         Energy duplication
                       77.11 0.000E+00 } P 8.586E-01 0.00E+00 G
                      241.92 4.101E-01  (  5.552E-01 1.70E-01 G

BI-212       4.5295E-01
```

727.17 4.529E-01 (P 2.588E-01 9.77E-02 G K
1620.56 9.291E-01 + P 3.612E-01 2.14E-01 G
785.42-4.041E-02 % 1.570E+00 4.46E-01 G

BI-214 3.8233E-01
609.32 3.823E-01 (P 6.998E-02 3.22E-02 G K
1764.51 5.831E-01 + P 1.230E-01 7.82E-02 G
1120.28 5.204E-01 + P 3.211E-01 1.33E-01 G

RA-224 1.0368E+00
241.00 1.037E+00 (1.057E+00 3.27E-01 G

RA-226 9.3896E-01
185.99 9.390E-01 *(P 1.117E+00 3.42E-01 G

AC-228 8.4287E-01
911.07 8.137E-01 @(P 1.291E-01 6.84E-02 G K
968.90 8.913E-01 (P 2.413E-01 1.23E-01 G
338.40 6.606E-01 - P 2.362E-01 8.89E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.6735E-01						
		236.00	-1.673E-01	%(	3.922E-01	1.19E-01	G K
		256.25	-3.529E-03	& P	4.446E-01	1.31E-01	G
PA-234	1.1631E-02						
		98.44	1.163E-02	%(P	2.133E-01	6.35E-02	G K
		946.00	4.321E-02	& P	1.886E-01	5.53E-02	G
		131.28	2.478E-02	& P	2.132E-01	6.37E-02	G
		94.67	-6.899E-03	% P	3.697E-01	1.10E-01	G
		883.24	-7.934E-02	%	3.001E-01	8.85E-02	G
		926.70	9.174E-02	%	2.087E-01	6.29E-02	G
		569.26	5.494E-02	% P	2.477E-01	7.22E-02	G
TH-234	7.9763E-01						
		63.29	-1.334E+00	%(P	5.938E+00	1.77E+00	G K
		92.80	2.111E+00	(P	2.032E+00	6.27E-01	G
		92.38	2.499E+00	(P	2.406E+00	7.42E-01	G
AM-241	1.3768E-02						
		59.54	1.377E-02	%(P	1.018E+00	3.02E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Counting pCi/gm	Total pCi/gm	MDA pCi/gm
BE-7 #A	1.0905E-01	1.1207E-01	2.4192E-01	2.4201E-01	2.605E-01	
K-40	1.3810E+01	1.3810E+01	1.2356E+00	1.4729E+00		
MN-54 #A	1.1264E-02	1.1317E-02	3.0660E-02	3.0667E-02	3.426E-02	
CO-57 #B	-2.5124E-04	-2.5260E-04	1.8648E-01	1.8648E-01	4.692E-02	
CO-60	9.5679E-02	9.5752E-02	4.7831E-02	4.8153E-02		
Sr-85 #A	-9.9140E-03	-1.0139E-02	3.8495E-02	3.8500E-02	4.214E-02	
Kr-85 #A	-2.2905E+02	-2.2906E+02	8.6898E+02	8.6908E+02	9.728E+02	
Y-88 #B	-2.5381E-03	-2.5730E-03	2.3692E-02	2.3692E-02	2.710E-02	
NB-94 #B	-2.7457E-03	-2.7457E-03	2.7173E-02	2.7173E-02	3.172E-02	
Ag-108M#B	-1.0825E-02	-1.0825E-02	3.9173E-02	3.9178E-02	4.411E-02	
CD-109 #A	-6.9869E-01	-7.0094E-01	1.4614E+00	1.4619E+00	1.604E+00	
SN-113 #B	1.1445E-02	1.1591E-02	4.0456E-02	4.0461E-02	4.478E-02	
SB-125 #B	4.9946E-02	5.0018E-02	5.1566E-02	5.1648E-02	1.040E-01	
I-131 #B	-5.3797E-03	-6.4485E-03	4.2949E-02	4.2951E-02	3.548E-02	
CS-134 #B	-1.7140E-02	-1.7173E-02	3.4961E-02	3.4975E-02	3.848E-02	
CS-137	2.0675E-01	2.0678E-01	6.7864E-02	6.8918E-02		
CE-139 #A	3.9568E-03	3.9989E-03	3.9625E-02	3.9625E-02	4.385E-02	
EU-152 #B	2.2878E-02	2.2885E-02	1.2868E-01	1.2868E-01	1.433E-01	
EU-154 #B	1.5716E-02	1.5723E-02	9.3128E-02	9.3132E-02	1.037E-01	
EU-155 #B	1.4255E-01	1.4266E-01	1.9892E-01	1.9908E-01	2.169E-01	
HG-203 #B	2.3226E-02	2.3964E-02	3.1991E-02	3.2021E-02	3.359E-02	
TL-208	2.3431E-01	2.3431E-01	6.3785E-02	6.5220E-02		

PB-212	7.4141E-01	7.4141E-01	1.1783E-01	1.2544E-01	
PB-214	3.9060E-01	3.9060E-01	1.0863E-01	1.1097E-01	
BI-212	4.5295E-01	4.5295E-01	2.9311E-01	2.9429E-01	
BI-214	3.8233E-01	3.8233E-01	9.6763E-02	9.9277E-02	
RA-224 #A	1.0368E+00	1.0368E+00	9.8216E-01	9.8400E-01	1.057E+00
RA-226 #A	9.3896E-01	9.3896E-01	1.0271E+00	1.0286E+00	1.117E+00
AC-228	8.4287E-01	8.4287E-01	2.0432E-01	2.1010E-01	
TH-227 #B	-1.6735E-01	-1.6735E-01	3.5609E-01	3.5622E-01	3.922E-01
PA-234 #B	1.1631E-02	1.1631E-02	1.9063E-01	1.9063E-01	2.133E-01
TH-234 #B	7.9763E-01	7.9763E-01	7.1045E-01	7.1182E-01	5.938E+00
AM-241 #A	1.3768E-02	1.3768E-02	9.0546E-01	9.0546E-01	1.018E+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) 1.7156845E+01 pCi/gm

Total Decayed Activity (86.9 to 2000.7 keV) 1.7156944E+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: 103F_9SEP2005_1433.An1

Sample description

FSS NOL-06-01-083-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_9SEP2005_1433.An1

Acquisition information

Start time:	09-Sep-2005 14:33:29
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: 1.8610E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8610E+03) =
5.3735E+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	07-Sep-2005 11:16:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1681

***** 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	90.	30.73	0.99	9.052E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.19	155.	16.54	0.99	1.011E-02	77.11	17.500	8.074E-01	PB212
					77.11	10.700	1.320E+00	PB214
129.35	116.	36.54	1.04	2.440E-02				
153.83	97.	36.92	1.03	2.594E-02				
185.99	162.	23.06	0.89	2.567E-02				

185.99	162.	23.06	0.89	2.567E-02	185.99	3.280	1.289E+00	RA226
209.26	90.	35.50	1.20	2.471E-02				
238.84	1034.	3.68	1.09	2.319E-02	238.63	43.100	7.422E-01	PB212
242.12	147.	17.50	1.10	2.302E-02	241.00	3.900	1.186E+00	RA224
					241.92	7.470	6.204E-01	PB214
270.49	84.	30.40	1.31	2.150E-02				
277.51	76.	37.84	0.78	2.113E-02				
294.91	257.	13.03	1.13	2.026E-02	295.22	19.200	4.732E-01	PB214
300.12	56.	34.72	1.14	2.001E-02				
327.90	86.	26.31	1.04	1.875E-02				
338.33	230.	11.87	0.97	1.830E-02	338.40	12.010	7.576E-01	AC228
351.86	405.	6.51	0.99	1.776E-02	351.99	37.100	4.403E-01	PB214
463.31	93.	23.11	1.45	1.425E-02				
463.31	93.	23.11	1.45	1.425E-02	463.51	10.000	4.697E-01	SB125
510.82	165.	17.46	1.92	1.317E-02	510.72	22.500	3.389E-01	TL208
583.13	308.	7.79	1.09	1.184E-02	583.14	86.000	2.162E-01	TL208
609.10	319.	9.39	1.45	1.144E-02	609.32	46.090	4.310E-01	BI214
640.56	27.	35.36	1.50	1.105E-02	636.97	7.268	PBC<MDA	I131
661.55	231.	9.18	1.10	1.072E-02	661.62	84.620	1.838E-01	CS137
722.50	36.	36.50	0.54	1.001E-02				
727.21	65.	19.19	1.39	9.965E-03	727.17	11.800	3.977E-01	BI212
859.95	81.	24.32	1.28	8.772E-03				
910.97	244.	8.12	1.68	8.402E-03	911.07	29.000	7.184E-01	AC228
964.16	36.	28.05	1.54	8.055E-03	964.00	14.580	PBC<MDA	EU152
968.73	150.	10.39	1.54	8.027E-03	968.90	17.460	7.778E-01	AC228
1119.92	89.	27.91	1.24	7.214E-03	1120.28	15.040	5.832E-01	BI214
1172.87	73.	24.56	1.68	6.973E-03	1173.23	99.860	7.396E-02	CO60
1332.02	64.	21.33	2.01	6.351E-03	1332.51	99.980	7.023E-02	CO60
1460.45	1318.	2.78	1.78	5.933E-03	1460.75	10.700	1.486E+01	K40
1763.94	59.	14.52	1.64	5.142E-03	1764.51	15.920	5.263E-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
257.87	129.35	692.	127.	0.064	91.66	1.040	AC-228 s
306.82	153.83	519.	97.	0.049	110.75	1.025	XE-138 s
417.67	209.26	421.	90.	0.045	106.51	1.196	AC-228
540.14	270.49	247.	84.	0.042	91.20	1.309	AC-228 s
554.17	277.51	304.	76.	0.038	113.51	0.784	NP-239 l
599.40	300.12	161.	56.	0.028	104.15	1.138	PB-212 s
654.95	327.90	196.	86.	0.043	78.93	1.039	AC-228 s
1444.08	722.50	67.	36.	0.018	109.50	0.535	SB-124 sM
1718.94	859.95	84.	81.	0.041	72.96	1.278	TL-208 s
1927.34	964.15	34.	36.	0.018	84.14	1.538	EU-152 lD

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	368.	90.	0.045	92.20	0.993D

PB-212	153.39	77.11	342.	155.	0.078	49.63	0.995A
RA-226	371.14	185.99	673.	110.	0.055	92.83	1.500D
PB-212	476.81	238.83	673.	945.	0.472	16.42	0.827
RA-224	481.76	241.30	687.	134.	0.067	87.04	1.500
PB-214	482.96	241.90	691.	119.	0.060	97.34	1.500s
PB-214	588.97	294.91	314.	253.	0.127	39.08	1.127s
AC-228	675.80	338.33	217.	229.	0.115	35.61	0.973s
PB-214	702.85	351.86	138.	399.	0.200	19.53	0.994
SB-125	924.99	462.93	138.	72.	0.036	76.25	1.500s
TL-208	1020.75	510.82	217.	138.	0.069	52.38	1.919s
TL-208	1165.36	583.13	107.	303.	0.152	23.36	1.088
BI-214	1217.29	609.10	163.	313.	0.156	28.16	1.454s
I-131	1280.20	640.56	32.	27.	0.013	106.09	1.500
CS-137	1322.19	661.55	92.	230.	0.115	27.53	1.103
BI-212	1453.41	727.17	43.	77.	0.038	50.31	1.947s
AC-228	1820.97	910.97	61.	241.	0.121	24.37	1.684s
AC-228	1935.46	968.22	79.	198.	0.099	32.78	1.456
BI-214	2238.81	1119.92	134.	87.	0.044	83.73	1.237

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2344.70	1172.87	90.	71.	0.035	73.69	1.679
CO-60	2662.94	1332.02	39.	61.	0.031	64.00	2.015
K-40	2919.76	1460.45	28.	1299.	0.650	8.34	1.777
Bl-214	3526.63	1763.94	9.	59.	0.030	43.55	1.639s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		8.1590E-02					
			477.56	8.159E-02	%(	3.284E-01	9.76E-02 G
K-40		1.4864E+01					
			1460.75	1.486E+01	(P	3.117E-01	4.19E-01 G
MN-54		-8.1151E-03					
			834.81	-8.115E-03	%(P	3.512E-02	1.03E-02 G
CO-57		1.6562E-04					
			122.07	1.656E-04	%(P	4.065E-02	1.20E-02 G K
			136.43	-6.535E-02	&	3.135E-01	9.38E-02 G
CO-60		7.2096E-02					
			1332.51	7.023E-02	(P	3.627E-02	1.56E-02 G K

1173.23 7.396E-02 (P 4.901E-02 1.87E-02 G K

Sr-85 -1.4820E-02

514.00-1.482E-02 %(4.389E-02 1.32E-02 G

Kr-85 -3.3455E+02

513.99-3.345E+02 %(9.903E+02 2.97E+02 G

Y-88 5.9908E-04

1836.01 5.991E-04 &(P 2.664E-02 6.92E-03 G K

898.02-5.590E-03 % P 3.748E-02 1.08E-02 G

NB-94 2.0031E-03

871.10 2.003E-03 &(3.345E-02 9.55E-03 G K

702.50-4.006E-03 & 3.519E-02 1.02E-02 G K

Ag-108M 2.2285E-03

722.95 2.229E-03 %(4.269E-02 1.24E-02 G K

614.37-1.303E-02 & P 4.265E-02 1.27E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                    433.93-9.499E-05 %   3.266E-02 9.47E-03 G

CD-109       9.0119E-01
                     88.04 9.012E-01 %(  1.793E+00 5.44E-01 G

SN-113      -9.1072E-04
                    391.71-9.107E-04 %(  3.973E-02 1.15E-02 G K
                    255.04 3.230E-01 %   1.551E+00 4.63E-01 G

SB-125       8.6321E-02
                    427.95-8.504E-03 &(P 1.098E-01 3.22E-02 G K
                    600.77-2.745E-02 & P 1.669E-01 4.88E-02 G
                    636.15-7.147E-03 & P 2.259E-01 6.36E-02 G
                    463.51 3.670E-01 *(P 2.929E-01 9.49E-02 G
                    176.29-9.480E-03 &   5.444E-01 1.62E-01 G

I-131        2.9934E-02
                    364.48 6.419E-03 &(P 4.382E-02 1.29E-02 G K
                    636.97 2.928E-01 &(  3.155E-01 1.04E-01 G
                    284.29 1.357E-01 % P 6.125E-01 1.83E-01 G

CS-134       0.0000E+00
                    604.66 0.000E+00 &(  8.000E-02 2.37E-02 G K
                    795.76-3.654E-03 % P 4.269E-02 1.23E-02 G
                    569.29 2.671E-02 % P 2.206E-01 6.43E-02 G
                    801.84 4.172E-03 % P 3.507E-01 9.85E-02 G

CS-137       1.8379E-01
                    661.62 1.838E-01  (P 3.802E-02 1.70E-02 G

CE-139      -6.7637E-03
```

165.85-6.764E-03 &(4.557E-02 1.36E-02 G

EU-152 -1.6820E-03

121.78-1.682E-03 %(P 1.188E-01 3.52E-02 G K

344.30-9.624E-03 % P 1.110E-01 3.27E-02 G

1408.08 8.508E-03 & 1.395E-01 3.83E-02 G

964.00-1.047E-02 % P 3.879E-01 1.13E-01 G

1112.07-2.831E-02 & 3.363E-01 9.71E-02 G

778.90-2.786E-03 & 2.613E-01 7.46E-02 G

EU-154 -2.5269E-02

123.10-2.527E-02 %(1.039E-01 3.12E-02 G K

1274.80 1.124E-02 % 7.888E-02 2.22E-02 G

723.30-1.230E-01 % 2.377E-01 7.23E-02 G

1004.80-2.493E-03 % 2.233E-01 6.35E-02 G

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

EU-155       0.0000E+00
                    86.45 0.000E+00 %(  2.473E-01 7.38E-02 G K
                   105.31-8.115E-02 %   2.156E-01 6.51E-02 G

HG-203       9.4895E-03
                   279.17 9.489E-03 &(P 4.085E-02 1.22E-02 G K
                    72.87 1.513E-01 % P 2.148E+00 6.42E-01 G
                    70.83 4.239E-02 %   4.130E+00 1.23E+00 G
                    82.50-3.340E-02 &   3.427E+00 1.02E+00 G

TL-208       2.1620E-01
                   583.14 2.162E-01  (P 3.625E-02 1.71E-02 G
                   510.72 3.389E-01 + P 1.747E-01 7.06E-02 G

PB-212       7.2562E-01
                   238.63 6.861E-01  (P 8.978E-02 3.80E-02 G K
                                      Energy duplication
                    77.11 6.365E-01 } P 3.648E-01 1.05E-01 G
                    74.81 7.540E-01  (P 7.694E-01 2.40E-01 G

PB-214       4.5768E-01
                   351.99 4.403E-01  (P 6.326E-02 2.91E-02 G K
                   295.22 4.732E-01 @(P 1.592E-01 6.26E-02 G
                                      Energy duplication
                    77.11 7.985E-04 } P 8.842E-01 2.51E-02 G
                   241.92 5.041E-01  (  5.286E-01 1.64E-01 G

BI-212       4.7308E-01
                   727.17 4.731E-01  (P 2.063E-01 7.99E-02 G K
                  1620.56 3.616E-01 % P 8.008E-01 2.42E-01 G
```

785.42 8.533E-01 % 1.733E+00 5.26E-01 G

BI-214 4.5545E-01

609.32 4.310E-01 @(P 8.569E-02 4.13E-02 G K

1764.51 5.263E-01 *(P 1.458E-01 8.06E-02 G

1120.28 5.832E-01 + P 3.791E-01 1.66E-01 G

RA-224 1.0805E+00

241.00 1.081E+00 (1.008E+00 3.13E-01 G

RA-226 9.4736E-01

Energy duplication

185.99 9.474E-01 (P 1.066E+00 3.28E-01 G

AC-228 7.2986E-01

911.07 7.184E-01 *(P 1.165E-01 5.92E-02 G K

968.90 1.024E+00 + P 2.291E-01 1.12E-01 G

338.40 7.576E-01 *(P 2.356E-01 9.03E-02 G

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

TH-227      -1.7108E-01
                    236.00-1.711E-01 %(  3.754E-01 1.14E-01 G K
                    256.25 1.283E-01 & P 4.168E-01 1.25E-01 G

PA-234      -1.6762E-02
                     98.44-1.676E-02 &(P 2.248E-01 6.71E-02 G K
                    946.00 2.992E-02 % P 1.988E-01 5.78E-02 G
                    131.28-1.721E-02 % P 2.159E-01 6.45E-02 G
                     94.67-1.509E-01 % P 4.087E-01 1.23E-01 G
                    883.24 1.401E-02 %   2.325E-01 6.55E-02 G
                    926.70-2.087E-03 %   3.330E-01 9.46E-02 G
                    569.26 2.394E-03 % P 2.909E-01 8.33E-02 G

TH-234      -3.3417E-01
                     63.29-3.342E-01 &(P 5.598E+00 1.65E+00 G K
                     92.80 1.068E+00 % P 2.112E+00 6.38E-01 G
                     92.38-1.028E-01 % P 2.394E+00 7.07E-01 G

AM-241       8.2671E-02
                     59.54 8.267E-02 &(P 1.114E+00 3.32E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	7.9357E-02	8.1590E-02	2.9270E-01	2.9274E-01	3.194E-01
K-40	1.4864E+01	1.4864E+01	1.2578E+00	1.5254E+00	
MN-54 #A	-8.0767E-03	-8.1151E-03	3.3138E-02	3.3141E-02	3.496E-02
CO-57 #B	1.6471E-04	1.6562E-04	3.6116E-02	3.6116E-02	4.043E-02
CO-60	7.2041E-02	7.2096E-02	3.6387E-02	3.6627E-02	
Sr-85 #A	-1.4485E-02	-1.4820E-02	3.9523E-02	3.9533E-02	4.290E-02
Kr-85 #A	-3.3454E+02	-3.3455E+02	8.9186E+02	8.9207E+02	9.903E+02
Y-88 #B	5.9081E-04	5.9908E-04	2.0746E-02	2.0746E-02	2.627E-02
NB-94 #B	2.0031E-03	2.0031E-03	2.8657E-02	2.8657E-02	3.345E-02
Ag-108M#B	2.2284E-03	2.2285E-03	3.7107E-02	3.7107E-02	4.269E-02
CD-109 #A	8.9825E-01	9.0119E-01	1.6329E+00	1.6337E+00	1.787E+00
SN-113 #B	-8.9907E-04	-9.1072E-04	3.4520E-02	3.4520E-02	3.922E-02
SB-125 #B	8.6195E-02	8.6321E-02	6.6985E-02	6.7172E-02	1.096E-01
I-131 #B	2.4897E-02	2.9934E-02	3.1758E-02	3.1806E-02	3.645E-02
CS-134 #B	0.0000E+00	0.0000E+00	7.1239E-02	7.1239E-02	7.984E-02
CS-137	1.8376E-01	1.8379E-01	5.0905E-02	5.2011E-02	
CE-139 #A	-6.6912E-03	-6.7637E-03	4.0884E-02	4.0886E-02	4.508E-02
EU-152 #B	-1.6814E-03	-1.6820E-03	4.2531E-01	4.2531E-01	1.187E-01
EU-154 #B	-2.5257E-02	-2.5269E-02	9.3686E-02	9.3696E-02	1.039E-01
EU-155 #B	0.0000E+00	0.0000E+00	2.2127E-01	2.2127E-01	2.471E-01
HG-203 #B	9.1925E-03	9.4895E-03	3.6628E-02	3.6632E-02	3.957E-02
TL-208	2.1620E-01	2.1620E-01	5.1229E-02	5.2744E-02	

PB-212	7.2562E-01	7.2562E-01	1.2066E-01	1.2781E-01	
PB-214	4.5768E-01	4.5768E-01	9.0664E-02	9.4478E-02	
BI-212	4.7308E-01	4.7308E-01	2.3955E-01	2.4112E-01	
BI-214	4.5545E-01	4.5545E-01	1.2343E-01	1.2623E-01	
RA-224	1.0805E+00	1.0805E+00	9.4044E-01	9.4253E-01	1.008E+00
RA-226 #A	9.4736E-01	9.4736E-01	9.8321E-01	9.8475E-01	1.066E+00
AC-228	7.2986E-01	7.2986E-01	1.5868E-01	1.6424E-01	
TH-227 #B	-1.7108E-01	-1.7108E-01	3.4121E-01	3.4136E-01	3.754E-01
PA-234 #B	-1.6762E-02	-1.6762E-02	2.4269E-01	2.4269E-01	2.248E-01
TH-234 #B	-3.3417E-01	-3.3417E-01	3.5069E+01	3.5069E+01	5.598E+00
AM-241 #A	8.2670E-02	8.2671E-02	9.9510E-01	9.9511E-01	1.114E+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_9SEP2005_1433.An1

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

Total Activity (86.4 to 2000.7 keV) 1.9258331E+01 pCi/gm

Total Decayed Activity (86.4 to 2000.7 keV) 1.9258411E+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: 103F_14SEP2005_1549.An1

Sample description

FSS-NOL-06-01-090-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_14SEP2005_1549.An1

Acquisition information

Start time:	14-Sep-2005 15:49:43
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: 1.7670E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7670E+03) =
5.6593E+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-Sep-2005 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: 0.1065

***** 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	123.	23.20	0.99	9.052E-03	74.81	9.600	1.080E+00	PB212
77.21	175.	16.92	0.99	1.011E-02	77.11	17.500	9.953E-01	PB212
93.43	89.	32.57	1.00	1.670E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.32	120.	36.47	1.02	2.440E-02				
185.99	160.	20.36	1.11	2.567E-02	185.99	3.280	1.336E+00	RA226
209.59	101.	27.46	0.89	2.470E-02				

238.87	1037.	3.78	1.09	2.319E-02	238.63	43.100	7.844E-01	PB212
					241.92	7.470	4.614E+00	PB214
270.31	84.	31.26	1.36	2.151E-02				
295.23	250.	13.22	1.16	2.025E-02	295.22	19.200	4.834E-01	PB214
300.38	74.	34.77	0.98	2.000E-02				
338.22	242.	10.99	1.07	1.831E-02	338.40	12.010	8.365E-01	AC228
351.80	445.	7.16	1.14	1.776E-02	351.99	37.100	5.099E-01	PB214
462.88	97.	24.89	1.00	1.426E-02				
462.88	97.	24.89	1.00	1.426E-02	463.51	10.000	5.146E-01	SB125
510.38	210.	13.74	1.74	1.318E-02	510.72	22.500	4.720E-01	TL208
583.08	412.	7.06	1.20	1.185E-02	583.14	86.000	3.060E-01	TL208
609.26	306.	7.48	1.36	1.144E-02	609.32	46.090	4.345E-01	BI214
726.71	107.	21.45	1.69	9.970E-03	727.17	11.800	6.901E-01	BI212
785.85	28.	39.95	1.18	9.394E-03	785.42	2.000	PBC<MDA	BI212
794.61	77.	26.95	1.21	9.311E-03				
794.61	77.	26.95	1.21	9.311E-03	795.76	85.400	7.440E-02	CS134
911.07	282.	9.20	1.58	8.401E-03	911.07	29.000	8.737E-01	AC228
964.29	54.	23.37	1.54	8.054E-03	964.00	14.580	PBC<MDA	EU152
968.83	169.	9.56	1.54	8.026E-03	968.90	17.460	9.190E-01	AC228
1120.97	105.	17.85	1.94	7.209E-03	1120.28	15.040	7.284E-01	BI214
1408.04	22.	34.65	1.81	6.096E-03	1408.08	21.210	PBC<MDA	EU152
1460.60	1641.	2.51	1.74	5.932E-03	1460.75	10.700	1.955E+01	K40
1620.25	22.	24.34	0.72	5.488E-03	1620.56	2.750	1.108E+00	BI212
1764.13	77.	11.40	1.63	5.143E-03	1764.51	15.920	6.888E-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
257.80	129.32	727.	118.	0.059	100.47	1.021	AC-228 s
418.34	209.59	334.	101.	0.051	82.37	0.892	NP-239
483.29	242.01	292.	119.	0.060	66.75	1.095	PB-214 ID
539.78	270.31	261.	84.	0.042	93.79	1.365	AC-228 s
599.90	300.38	245.	74.	0.037	104.31	0.980	PB-212
1927.50	964.31	54.	53.	0.027	71.75	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	366.	123.	0.061	69.60	0.993D
PB-212	153.39	77.11	372.	175.	0.087	50.75	0.995A
RA-226	371.15	185.99	442.	147.	0.074	61.07	1.107s
PB-212	476.85	238.85	590.	986.	0.493	14.68	0.981
RA-224	483.08	241.96	672.	98.	0.049	116.71	1.500s
PB-214	589.60	295.23	327.	246.	0.123	39.65	1.159

AC-228	675.58	338.22	203.	240.	0.120	32.98	1.072s
PB-214	702.74	351.80	225.	439.	0.220	21.48	1.144
SB-125	924.98	462.93	121.	74.	0.037	70.57	1.500
TL-208	1019.88	510.38	209.	183.	0.091	41.23	1.742s
TL-208	1165.26	583.08	135.	408.	0.204	21.17	1.199s
BI-214	1217.61	609.26	97.	300.	0.150	22.45	1.360
BI-212	1452.50	726.71	123.	106.	0.053	64.35	1.687s
BI-212	1570.76	785.85	46.	28.	0.014	119.85	1.184s
CS-134	1588.33	794.64	51.	59.	0.029	64.70	1.500s
AC-228	1821.16	911.07	109.	278.	0.139	27.59	1.581
EU-152	1928.23	964.61	129.	42.	0.021	122.55	1.538
AC-228	1936.81	968.90	46.	168.	0.084	28.68	1.541D
BI-214	2240.91	1120.97	82.	103.	0.052	53.55	1.942s
EU-152	2814.96	1408.04	19.	22.	0.011	103.95	1.812
K-40	2920.08	1460.60	33.	1622.	0.811	7.52	1.739
BI-212	3239.30	1620.25	2.	22.	0.011	73.02	0.718s
BI-214	3527.01	1764.13	3.	74.	0.037	34.19	1.632

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-6.6501E-02					
			477.56	-6.650E-02	&(	3.354E-01	9.91E-02 G
K-40		1.9547E+01					
			1460.75	1.955E+01	(P	3.538E-01	4.96E-01 G
MN-54		1.1272E-02					
			834.81	1.127E-02	%(P	4.253E-02	1.26E-02 G
CO-57		-1.3588E-02					
			122.07	-1.359E-02	%(P	5.457E-02	1.64E-02 G K
			136.43	1.206E-01	%	3.814E-01	1.15E-01 G
CO-60		-1.4951E-02					
			1332.51	-1.495E-02	%(P	4.851E-02	1.40E-02 G K
			1173.23	-1.264E-02	% P	6.020E-02	1.76E-02 G K
Sr-85		-1.0622E-02					
			514.00	-1.062E-02	%(	4.327E-02	1.29E-02 G
Kr-85		-2.3942E+02					
			513.99	-2.394E+02	%(	9.754E+02	2.90E+02 G
Y-88		5.2227E-03					
			1836.01	5.223E-03	%(P	2.091E-02	5.80E-03 G K

898.02-5.900E-04 & P 4.026E-02 1.14E-02 G

NB-94 1.0327E-02

871.10 1.033E-02 %(3.439E-02 1.02E-02 G K

702.50-2.279E-03 % 3.702E-02 1.07E-02 G K

Ag-108M -1.5453E-02

722.95-1.545E-02 %(5.214E-02 1.56E-02 G K

614.37-2.393E-02 % P 4.189E-02 1.28E-02 G

433.93 2.383E-03 % 3.641E-02 1.06E-02 G

CD-109 1.1545E+00

88.04 1.154E+00 &(1.966E+00 5.99E-01 G

SN-113 -7.3073E-03

391.71-7.307E-03 %(5.407E-02 1.60E-02 G K

255.04-6.194E-01 % 1.731E+00 5.22E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.8942E-02						
		427.95	-1.554E-02	&(P	1.149E-01	3.39E-02	G K
		600.77	5.113E-02	& P	1.700E-01	5.05E-02	G
		636.15	6.683E-04	% P	2.895E-01	8.27E-02	G
		463.51	3.982E-01	(P	2.898E-01	9.53E-02	G
		176.29	9.449E-02	%	5.784E-01	1.73E-01	G
I-131	-1.1164E-02						
		364.48	-1.116E-02	&(P	4.856E-02	1.44E-02	G K
		636.97	5.387E-02	&	4.753E-01	1.37E-01	G
		284.29	1.159E-01	% P	6.844E-01	2.04E-01	G
CS-134	-2.4047E-02						
		604.66	-2.405E-02	%(	4.621E-02	1.41E-02	G K
		795.76	5.645E-02	+ P	3.461E-02	1.22E-02	G
		569.29	-6.949E-03	% P	2.525E-01	7.29E-02	G
		801.84	-5.177E-02	% P	3.970E-01	1.13E-01	G
CS-137	6.2470E-04						
		661.62	6.247E-04	%(P	5.258E-02	1.52E-02	G
CE-139	-5.7716E-03						
		165.85	-5.772E-03	&(	4.901E-02	1.46E-02	G
EU-152	8.5921E-02						
		121.78	-4.018E-02	%(P	1.592E-01	4.78E-02	G K
		344.30	1.763E-02	& P	1.042E-01	3.08E-02	G
		1408.08	1.316E-01	(	1.349E-01	4.56E-02	G
		964.00	2.724E-01	?(P	3.625E-01	1.13E-01	G
		1112.07	1.019E-01	%	3.284E-01	9.74E-02	G

778.90-1.370E-02 & 2.752E-01 7.89E-02 G

EU-154 -2.6003E-02

123.10-2.600E-02 %(1.071E-01 3.22E-02 G K

1274.80 0.000E+00 % 1.377E-01 3.91E-02 G

723.30-6.588E-02 % 2.332E-01 6.94E-02 G

1004.80 0.000E+00 & 2.823E-01 8.11E-02 G

EU-155 1.0273E-01

86.45 1.027E-01 &(2.512E-01 7.60E-02 G K

105.31 3.133E-02 % 2.393E-01 7.16E-02 G

HG-203 2.7029E-02

279.17 2.703E-02 &(P 3.831E-02 1.18E-02 G K

72.87-5.580E-01 % P 2.477E+00 7.44E-01 G

70.83-1.446E+00 % 4.400E+00 1.33E+00 G

82.50-1.218E+00 & 4.156E+00 1.25E+00 G

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

TL-208       3.0601E-01
                    583.14 3.060E-01 @(P 4.275E-02 2.18E-02 G
                    510.72 4.720E-01 + P 1.809E-01 7.43E-02 G

PB-212       7.5404E-01
                    238.63 7.540E-01  (P 8.866E-02 3.74E-02 G K
                                          Energy duplication
                     77.11 7.540E-01 } P 3.999E-01 1.28E-01 G
                     74.81 1.080E+00 + P 8.088E-01 2.57E-01 G

PB-214       5.0089E-01
                    351.99 5.099E-01  (P 8.428E-02 3.70E-02 G K
                    295.22 4.834E-01  (P 1.712E-01 6.50E-02 G
                                          Energy duplication
                     77.11 0.000E+00 } P 9.225E-01 0.00E+00 G
                    241.92 2.406E-01 %   5.099E-01 1.55E-01 G

BI-212       8.1579E-01
                    727.17 6.901E-01 *(P 3.536E-01 1.49E-01 G K
                   1620.56 1.108E+00  (P 4.832E-01 2.70E-01 G
                    785.42 1.156E+00 *(  1.391E+00 4.62E-01 G

BI-214       4.3447E-01
                    609.32 4.345E-01  (P 7.067E-02 3.32E-02 G K
                   1764.51 6.888E-01 + P 1.041E-01 8.20E-02 G
                   1120.28 7.284E-01 + P 3.161E-01 1.32E-01 G

RA-224       8.2985E-01
                    241.00 8.299E-01 &(  1.050E+00 3.23E-01 G
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RA-226       1.3358E+00
                 185.99 1.336E+00  (P 9.146E-01 2.96E-01 G

AC-228       8.7952E-01
                 911.07 8.737E-01  (P 1.610E-01 8.13E-02 G K
                 968.90 9.188E-01  (P 1.866E-01 8.79E-02 G
                 338.40 8.365E-01 @(P 2.402E-01 9.23E-02 G

TH-227      -2.5487E-01
                 236.00-2.549E-01 %(  4.311E-01 1.31E-01 G K
                 256.25 1.587E-01 % P 4.438E-01 1.34E-01 G

PA-234       7.8253E-02
                  98.44 7.825E-02 %(P 2.205E-01 6.65E-02 G K
                 946.00 9.585E-02 & P 1.519E-01 4.73E-02 G
                 131.28 2.329E-03 % P 2.307E-01 6.88E-02 G
                  94.67-5.913E-02 % P 3.146E-01 9.40E-02 G
                 883.24 4.152E-02 &   3.022E-01 8.74E-02 G
                 926.70-1.687E-02 &   2.751E-01 7.75E-02 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26-1.029E-02 % P 3.738E-01 1.08E-01 G

TH-234 1.5077E+00
63.29 1.508E+00 %(P 6.822E+00 2.04E+00 G K
92.80 1.398E+00 % P 2.273E+00 6.90E-01 G
92.38 1.720E+00 & P 2.689E+00 8.17E-01 G

AM-241 -1.6937E-01
59.54-1.694E-01 &(P 1.157E+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	-6.4611E-02	-6.6501E-02	2.9735E-01	2.9738E-01	3.258E-01
K-40		1.9547E+01	1.9547E+01	1.4878E+00	1.8712E+00	
MN-54	#A	1.1217E-02	1.1272E-02	3.7741E-02	3.7747E-02	4.232E-02
CO-57	#B	-1.3510E-02	-1.3588E-02	5.0408E-02	5.0414E-02	5.426E-02
CO-60	#B	-1.4939E-02	-1.4951E-02	6.4628E-02	6.4634E-02	4.847E-02

Sr-85	#A	-1.0373E-02	-1.0622E-02	3.8658E-02	3.8663E-02	4.225E-02
Kr-85	#A	-2.3941E+02	-2.3942E+02	8.7148E+02	8.7159E+02	9.754E+02
Y-88	#B	5.1478E-03	5.2227E-03	1.7393E-02	1.7396E-02	2.061E-02
NB-94	#B	1.0327E-02	1.0327E-02	3.0511E-02	3.0516E-02	3.439E-02
Ag-108M	#B	-1.5452E-02	-1.5453E-02	4.6665E-02	4.6674E-02	5.214E-02
CD-109	#A	1.1505E+00	1.1545E+00	1.7959E+00	1.7971E+00	1.959E+00
SN-113	#B	-7.2101E-03	-7.3073E-03	4.7908E-02	4.7910E-02	5.335E-02
SB-125	#B	8.8807E-02	8.8942E-02	6.3844E-02	6.4052E-02	1.148E-01
I-131	#B	-9.2178E-03	-1.1164E-02	4.6910E-02	4.6915E-02	4.010E-02
CS-134	#B	-2.3998E-02	-2.4047E-02	4.2180E-02	4.2203E-02	4.612E-02
CS-137	#A	6.2462E-04	6.2470E-04	4.5750E-02	4.5750E-02	5.258E-02
CE-139	#A	-5.7074E-03	-5.7716E-03	4.3927E-02	4.3928E-02	4.847E-02
EU-152	#B	8.5892E-02	8.5921E-02	8.9317E-02	8.9444E-02	1.592E-01
EU-154	#B	-2.5990E-02	-2.6003E-02	9.6522E-02	9.6533E-02	1.071E-01
EU-155	#B	1.0265E-01	1.0273E-01	2.2796E-01	2.2803E-01	2.509E-01
HG-203	#B	2.6150E-02	2.7029E-02	3.5364E-02	3.5399E-02	3.707E-02
TL-208	#	3.0601E-01	3.0601E-01	6.5454E-02	6.7822E-02	
PB-212		7.5404E-01	7.5404E-01	1.1207E-01	1.2032E-01	
PB-214		5.0089E-01	5.0089E-01	1.0900E-01	1.1281E-01	
BI-212		8.1579E-01	8.1579E-01	4.2035E-01	4.2301E-01	
BI-214		4.3447E-01	4.3447E-01	9.9651E-02	1.0279E-01	
RA-224	#A	8.2985E-01	8.2985E-01	9.6848E-01	9.6968E-01	1.050E+00
RA-226	#	1.3358E+00	1.3358E+00	8.8767E-01	8.9105E-01	
AC-228		8.7952E-01	8.7952E-01	1.5238E-01	1.6071E-01	
TH-227	#B	-2.5487E-01	-2.5487E-01	3.9384E-01	3.9412E-01	4.311E-01
PA-234	#B	7.8253E-02	7.8253E-02	1.9951E-01	1.9956E-01	2.205E-01
TH-234	#B	1.5077E+00	1.5077E+00	6.1289E+00	6.1295E+00	6.822E+00
AM-241	#A	-1.6937E-01	-1.6937E-01	1.0596E+00	1.0596E+00	1.157E+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 (987.5 to 2000.7 keV) 2.4573156E+01 pCi/gm

Total Decayed Activity (987.5 to 2000.7 keV) 2.4573158E+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_14SEP2005_1629.An1

Sample description

FSS-NOL-06-01-093-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_14SEP2005_1629.An1

Acquisition information

Start time:	14-Sep-2005 16:29:09
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: 1.9020E+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	12-Sep-2005 14:49:00
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: 0.0877

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.88	142.	19.84	0.99	9.100E-03	74.81	9.600	1.136E+00	PB212
77.20	219.	14.68	0.99	1.017E-02	77.11	17.500	8.682E-01	PB212
					77.11	10.700	1.420E+00	PB214
87.25	119.	25.97	1.00	1.447E-02				
87.25	119.	25.97	1.00	1.447E-02	88.04	3.790	1.525E+00	CD109
89.90	116.	25.94	1.00	1.547E-02				
93.11	146.	21.10	1.00	1.660E-02	92.38	2.570	PBC<MDA	TH234

						92.80	3.000	PBC<MDA TH234
128.31	104.	38.62	0.77	2.428E-02				
185.87	164.	24.04	1.15	2.567E-02				
185.87	164.	24.04	1.15	2.567E-02	185.99	3.280	1.276E+00	RA226
209.52	114.	27.24	0.85	2.470E-02				
238.90	1434.	3.13	1.09	2.319E-02	238.63	43.100	1.010E+00	PB212
241.73	126.	34.34	1.50	2.307E-02	241.00	3.900		PBC<MDA RA224
					241.92	7.470	5.199E-01	PB214
270.03	109.	30.65	1.09	2.152E-02				
295.19	270.	13.33	1.24	2.025E-02	295.22	19.200	4.858E-01	PB214
300.00	120.	23.82	1.27	2.002E-02				
328.48	65.	40.39	1.18	1.872E-02				
338.26	320.	11.02	1.11	1.831E-02	338.40	12.010	1.031E+00	AC228
351.86	422.	7.73	0.94	1.776E-02	351.99	37.100	4.487E-01	PB214
409.91	90.	30.77	1.39	1.573E-02				
462.92	81.	25.26	1.15	1.426E-02				
462.92	81.	25.26	1.15	1.426E-02	463.51	10.000	3.982E-01	SB125
510.80	220.	14.27	1.39	1.317E-02	510.72	22.500	4.622E-01	TL208
583.09	466.	6.44	1.19	1.185E-02	583.14	86.000	3.220E-01	TL208
609.03	301.	8.81	1.37	1.144E-02	609.32	46.090	3.969E-01	BI214
727.14	117.	14.61	1.44	9.965E-03	727.17	11.800	7.028E-01	BI212
794.91	52.	31.63	1.14	9.309E-03				
794.91	52.	31.63	1.14	9.309E-03	795.76	85.400	4.670E-02	CS134
859.67	99.	18.02	1.63	8.774E-03				
911.05	326.	8.12	1.03	8.401E-03	911.07	29.000	9.409E-01	AC228
964.36	48.	22.04	1.54	8.054E-03	964.00	14.580	2.851E-01	EU152
968.91	192.	8.39	1.54	8.026E-03	968.90	17.460	9.716E-01	AC228
1120.32	98.	20.42	0.72	7.212E-03	1120.28	15.040	6.328E-01	BI214
1173.29	28.	40.84	1.67	6.972E-03	1173.23	99.860		PBC<MDA CO60
1460.61	1412.	2.76	1.76	5.932E-03	1460.75	10.700	1.560E+01	K40
1764.38	67.	15.14	2.37	5.142E-03	1764.51	15.920	5.800E-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
178.98	90.04	396.	116.	0.058	77.82	1.002	PB-214 ID
418.20	209.52	425.	114.	0.057	81.71	0.850	AC-228
539.22	270.03	389.	109.	0.055	91.94	1.086	AC-228 s
599.15	300.00	293.	120.	0.060	71.47	1.269	PB-212
656.11	328.48	262.	65.	0.033	121.17	1.183	RH-106M
818.95	409.91	236.	90.	0.045	92.30	1.387	AC-228 s
1718.38	859.67	68.	99.	0.049	54.07	1.626	TL-208 s
1927.74	964.35	31.	48.	0.024	66.17	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	410.	139.	0.070	65.19	0.993D
PB-212	153.39	77.11	412.	161.	0.081	46.43	0.995A
CD-109	173.80	87.31	1022.	119.	0.059	117.52	1.500s
TH-234	186.58	93.70	1039.	112.	0.056	107.80	1.500s

TH-234	185.44	93.13	1068.	131.	0.066	95.53	1.500s
RA-226	371.57	186.20	839.	149.	0.075	78.76	1.500s
PB-212	476.97	238.91	784.	1368.	0.684	12.79	0.886
RA-224	482.62	241.73	871.	126.	0.063	103.03	1.500
PB-214	589.53	295.19	383.	266.	0.133	39.98	1.243
AC-228	675.67	338.26	309.	319.	0.159	33.07	1.111
PB-214	702.81	351.83	308.	436.	0.218	24.92	0.946
SB-125	924.89	462.88	136.	73.	0.037	74.90	1.500
TL-208	1020.72	510.80	244.	193.	0.096	42.80	1.394s
TL-208	1165.29	583.09	154.	462.	0.231	19.33	1.194
BI-214	1217.15	609.03	140.	295.	0.147	26.43	1.370s
BI-212	1453.34	727.14	80.	116.	0.058	43.82	1.441
CS-134	1588.52	794.73	76.	49.	0.024	87.39	1.500s
AC-228	1821.14	911.05	107.	323.	0.161	24.35	1.032
EU-152	1927.97	964.48	67.	43.	0.022	90.88	1.538s
AC-228	1936.81	968.90	34.	192.	0.096	25.18	1.541D
BI-214	2239.62	1120.32	89.	97.	0.048	61.27	0.724s
K-40	2920.09	1460.61	47.	1393.	0.697	8.28	1.761

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bi-214	3527.52	1764.38	13.	67.	0.033	45.43	2.371

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		4.5525E-02					
			477.56	4.552E-02	%(	2.802E-01	8.23E-02 G
K-40		1.5596E+01					
			1460.75	1.560E+01	(P	3.869E-01	4.36E-01 G
MN-54		1.1653E-02					
			834.81	1.165E-02	%(P	3.226E-02	9.62E-03 G
CO-57		-4.0229E-03					
			122.07	-4.023E-03	%(P	4.949E-02	1.48E-02 G K
			136.43	-6.750E-02	%	4.121E-01	1.24E-01 G
CO-60		-7.3343E-03					
			1332.51	-7.334E-03	&(P	3.709E-02	1.03E-02 G K
			1173.23	2.849E-02	% P	4.003E-02	1.24E-02 G K
Sr-85		-2.0255E-02					

514.00-2.025E-02 %(4.410E-02 1.34E-02 G

Kr-85 -4.5793E+02

513.99-4.579E+02 %(9.959E+02 3.02E+02 G

Y-88 -5.3950E-03

1836.01-5.395E-03 %(P 3.110E-02 8.68E-03 G K

898.02-9.543E-04 & P 4.083E-02 1.16E-02 G

NB-94 -8.0053E-03

871.10-8.005E-03 %(3.691E-02 1.08E-02 G K

702.50 3.687E-04 % 3.976E-02 1.15E-02 G K

Ag-108M -2.6577E-02

722.95-2.658E-02 &(5.728E-02 1.74E-02 G K

614.37-1.030E-02 % P 3.964E-02 1.18E-02 G

433.93-7.237E-03 % 3.366E-02 9.97E-03 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.5163E+00						
		88.04	1.516E+00	&(	1.937E+00	5.94E-01	G
SN-113	-1.2284E-02						
		391.71	-1.228E-02	&(	5.273E-02	1.57E-02	G K
		255.04	6.114E-04	%	1.511E+00	4.46E-01	G
SB-125	6.8704E-02						
		427.95	-3.132E-02	%(P	1.061E-01	3.17E-02	G K
		600.77	5.004E-02	% P	1.656E-01	4.92E-02	G
		636.15	-2.379E-03	& P	2.892E-01	8.29E-02	G
		463.51	3.648E-01	(P	2.852E-01	9.27E-02	G
		176.29	-1.559E-01	%	5.901E-01	1.77E-01	G
I-131	-8.2606E-03						
		364.48	-8.261E-03	%(P	4.524E-02	1.34E-02	G K
		636.97	-2.420E-05	&	5.944E-01	1.72E-01	G
		284.29	7.965E-02	% P	6.493E-01	1.93E-01	G
CS-134	2.1037E-02						
		604.66	1.349E-03	%(	7.725E-02	2.29E-02	G K
		795.76	4.354E-02	@(P	3.890E-02	1.27E-02	G
		569.29	9.220E-02	& P	2.001E-01	6.04E-02	G
		801.84	-9.584E-02	% P	4.503E-01	1.31E-01	G
CS-137	1.9074E-02						
		661.62	1.907E-02	%(P	4.137E-02	1.25E-02	G
CE-139	-1.0035E-02						
		165.85	-1.004E-02	%(	4.850E-02	1.46E-02	G

EU-152 7.1959E-02

121.78-2.284E-02 %(P 1.498E-01 4.48E-02 G K

344.30-3.153E-02 % P 1.237E-01 3.70E-02 G

1408.08 3.747E-02 % 1.279E-01 3.72E-02 G

964.00 2.621E-01 (P 2.470E-01 8.04E-02 G

1112.07 1.465E-01 % 2.773E-01 8.47E-02 G

778.90 3.400E-03 % 2.052E-01 5.77E-02 G

EU-154 -2.6624E-03

123.10-2.662E-03 &(1.082E-01 3.23E-02 G K

1274.80 1.427E-02 % 1.192E-01 3.43E-02 G

723.30-7.677E-03 & 3.660E-01 1.08E-01 G

1004.80-4.002E-02 % 2.474E-01 7.23E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	3.2786E-02						
		86.45	3.279E-02	&(	2.129E-01	6.38E-02	G K
		105.31	9.112E-02	%	2.375E-01	7.18E-02	G
HG-203	1.7545E-03						
		279.17	1.754E-03	&(P	4.213E-02	1.25E-02	G K
		72.87	-9.862E-02	% P	2.161E+00	6.45E-01	G
		70.83	-3.089E-02	%	4.924E+00	1.47E+00	G
		82.50	7.798E-02	%	3.649E+00	1.09E+00	G
TL-208	3.2195E-01						
		583.14	3.220E-01	(P	4.228E-02	2.09E-02	G
		510.72	4.622E-01	+ P	1.811E-01	7.51E-02	G
PB-212	9.4227E-01						
		238.63	9.722E-01	(P	9.463E-02	4.19E-02	G K
					Energy duplication		
		77.11	6.472E-01	} P	3.904E-01	1.00E-01	G
		74.81	1.138E+00	+ P	7.935E-01	2.53E-01	G
PB-214	4.7588E-01						
		351.99	4.707E-01	(P	9.109E-02	3.96E-02	G K
		295.22	4.858E-01	(P	1.717E-01	6.57E-02	G
					Energy duplication		
		77.11	2.510E-01	} P	9.580E-01	2.23E-01	G
		241.92	2.002E-01	%	6.213E-01	1.87E-01	G
BI-212	7.0277E-01						
		727.17	7.028E-01	(P	2.677E-01	1.03E-01	G K
		1620.56	3.670E-01	& P	9.781E-01	2.89E-01	G

785.42 7.675E-01 % 1.606E+00 4.87E-01 G

BI-214 3.9690E-01

609.32 3.969E-01 @(P 7.808E-02 3.57E-02 G K

1764.51 5.800E-01 + P 1.703E-01 9.21E-02 G

1120.28 6.328E-01 + P 3.064E-01 1.32E-01 G

RA-224 9.9373E-01

241.00 9.937E-01 (1.107E+00 3.41E-01 G

RA-226 1.2597E+00

185.99 1.260E+00 *(P 1.162E+00 3.59E-01 G

AC-228 9.6852E-01

911.07 9.409E-01 (P 1.487E-01 7.72E-02 G K

968.90 9.716E-01 (P 1.511E-01 8.16E-02 G

338.40 1.031E+00 (P 2.736E-01 1.14E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.7063E-02						
		236.00	-3.706E-02	&(	2.842E-01	8.46E-02	G K
		256.25	1.427E-02	% P	4.849E-01	1.44E-01	G
PA-234	-3.3091E-03						
		98.44	-3.309E-03	%(P	2.310E-01	6.88E-02	G K
		946.00	-3.654E-02	% P	1.823E-01	5.33E-02	G
		131.28	-1.311E-02	% P	2.127E-01	6.35E-02	G
		94.67	7.861E-03	% P	3.789E-01	1.13E-01	G
		883.24	2.631E-02	&	2.984E-01	8.60E-02	G
		926.70	6.615E-02	%	2.985E-01	8.72E-02	G
		569.26	1.364E-01	& P	2.963E-01	8.94E-02	G
TH-234	4.8595E-01						
		63.29	-1.527E+00	%(P	6.689E+00	2.00E+00	G K
		92.80	1.891E+00	*(P	2.232E+00	6.83E-01	G
		92.38	1.901E+00	*(P	2.593E+00	7.90E-01	G
AM-241	-3.3327E-01						
		59.54	-3.333E-01	%(P	1.170E+00	3.52E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	4.4318E-02	4.5525E-02	2.4676E-01	2.4678E-01	2.727E-01
K-40	1.5596E+01	1.5596E+01	1.3085E+00	1.5913E+00	
MN-54 #A	1.1600E-02	1.1653E-02	2.8853E-02	2.8861E-02	3.211E-02
CO-57 #B	-4.0016E-03	-4.0229E-03	4.7822E-02	4.7822E-02	4.923E-02
CO-60 #B	-7.3288E-03	-7.3343E-03	7.2473E-02	7.2474E-02	3.706E-02
Sr-85 #A	-1.9812E-02	-2.0255E-02	4.0062E-02	4.0080E-02	4.313E-02
Kr-85 #A	-4.5792E+02	-4.5793E+02	9.0476E+02	9.0515E+02	9.959E+02
Y-88 #B	-5.3229E-03	-5.3950E-03	2.6946E-02	2.6948E-02	3.068E-02
NB-94 #B	-8.0053E-03	-8.0053E-03	3.2506E-02	3.2510E-02	3.691E-02
Ag-108M#B	-2.6576E-02	-2.6577E-02	5.2054E-02	5.2076E-02	5.728E-02
CD-109 #A	1.5115E+00	1.5163E+00	1.7819E+00	1.7839E+00	1.931E+00
SN-113 #B	-1.2132E-02	-1.2284E-02	4.7128E-02	4.7133E-02	5.208E-02
SB-125 #B	6.8607E-02	6.8704E-02	5.2357E-02	5.2509E-02	1.059E-01
I-131 #B	-6.9107E-03	-8.2606E-03	4.4415E-02	4.4418E-02	3.785E-02
CS-134 #B	2.0997E-02	2.1037E-02	1.8418E-02	1.8459E-02	7.711E-02
CS-137 #A	1.9072E-02	1.9074E-02	3.7460E-02	3.7477E-02	4.136E-02
CE-139 #A	-9.9310E-03	-1.0035E-02	4.3661E-02	4.3665E-02	4.799E-02
EU-152 #B	7.1937E-02	7.1959E-02	6.6223E-02	6.6343E-02	1.497E-01
EU-154 #B	-2.6612E-03	-2.6624E-03	9.6752E-02	9.6752E-02	1.081E-01
EU-155 #B	3.2760E-02	3.2786E-02	1.9126E-01	1.9127E-01	2.128E-01
HG-203 #B	1.7013E-03	1.7545E-03	3.7389E-02	3.7390E-02	4.085E-02
TL-208	3.2195E-01	3.2195E-01	6.2815E-02	6.5537E-02	

PB-212		9.4227E-01	9.4227E-01	1.2160E-01	1.3334E-01
PB-214		4.7588E-01	4.7588E-01	1.1372E-01	1.1703E-01
BI-212		7.0277E-01	7.0277E-01	3.0925E-01	3.1193E-01
BI-214		3.9690E-01	3.9690E-01	1.0719E-01	1.0964E-01
RA-224	A	9.9373E-01	9.9373E-01	1.0238E+00	1.0255E+00	1.107E+00
RA-226	#	1.2597E+00	1.2597E+00	1.0782E+00	1.0807E+00	1.162E+00
AC-228		9.6852E-01	9.6852E-01	1.5622E-01	1.6603E-01
TH-227	#B	-3.7063E-02	-3.7063E-02	2.5381E-01	2.5382E-01	2.842E-01
PA-234	#B	-3.3091E-03	-3.3091E-03	5.6342E-01	5.6342E-01	2.310E-01
TH-234	#B	4.8595E-01	4.8595E-01	5.2662E-01	5.2731E-01	6.689E+00
AM-241	#A	-3.3327E-01	-3.3327E-01	1.0670E+00	1.0671E+00	1.170E+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) 2.0397921E+01 pCi/gm

Total Decayed Activity (1120.0 to 2000.7 keV) 2.0397921E+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_14SEP2005_1705.An1

Sample description

FSS-NOL-06-01-095-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_14SEP2005_1705.An1

Acquisition information

Start time:	14-Sep-2005 17:05:42
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: 1.6940E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6940E+03) =
5.9032E+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-Sep-2005 14:55:00
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: 0.2349

***** 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	106.	23.97	0.99	9.100E-03	74.81	9.600	9.437E-01	PB212
77.27	217.	12.12	0.99	1.025E-02	77.11	17.500	9.664E-01	PB212
92.85	152.	26.66	1.86	1.647E-02	92.38	2.570		PBC<MDA TH234
					92.80	3.000		PBC<MDA TH234
186.36	158.	24.28	1.04	2.565E-02	185.99	3.280	1.371E+00	RA226
209.49	116.	23.64	1.29	2.470E-02				
238.89	973.	3.87	1.09	2.319E-02	238.63	43.100	7.671E-01	PB212

242.11	127.	19.60	1.10	2.302E-02	241.00	3.900	1.125E+00	RA224
					241.92	7.470	5.887E-01	PB214
270.06	85.	30.23	0.98	2.152E-02				
295.16	223.	11.95	1.12	2.025E-02	295.22	19.200	4.495E-01	PB214
300.43	66.	38.88	1.15	2.000E-02				
327.43	64.	36.80	0.88	1.877E-02				
338.31	204.	12.95	1.20	1.830E-02	338.40	12.010	7.346E-01	AC228
351.75	432.	7.52	1.16	1.776E-02	351.99	37.100	5.169E-01	PB214
462.79	78.	25.32	1.16	1.426E-02				
462.79	78.	25.32	1.16	1.426E-02	463.51	10.000	4.302E-01	SB125
510.81	196.	14.03	1.37	1.317E-02	510.72	22.500	4.568E-01	TL208
583.04	370.	6.99	1.16	1.185E-02	583.14	86.000	2.867E-01	TL208
609.14	272.	8.88	1.43	1.144E-02	609.32	46.090	4.018E-01	BI214
662.05	115.	19.14	1.52	1.072E-02	661.62	84.620	1.002E-01	CS137
689.36	27.	38.67	0.99	1.038E-02				
726.67	73.	28.43	1.09	9.970E-03	727.17	11.800	4.912E-01	BI212
794.62	59.	31.29	1.17	9.311E-03				
794.62	59.	31.29	1.17	9.311E-03	795.76	85.400	5.918E-02	CS134
860.59	56.	20.67	1.81	8.767E-03				
911.15	266.	8.45	1.30	8.401E-03	911.07	29.000	8.606E-01	AC228
964.20	43.	28.00	1.54	8.055E-03	964.00	14.580	PBC<MDA	EU152
968.82	139.	10.74	1.54	8.026E-03	968.90	17.460	7.907E-01	AC228
1120.87	73.	24.39	1.52	7.212E-03	1120.28	15.040	5.391E-01	BI214
1173.23	106.	20.56	1.55	6.972E-03	1173.23	99.860	1.194E-01	CO60
1332.25	72.	18.83	1.31	6.350E-03	1332.51	99.980	8.785E-02	CO60
1460.57	1040.	3.22	1.93	5.933E-03	1460.75	10.700	1.284E+01	K40
1588.17	35.	20.80	1.28	5.572E-03				
1763.89	57.	13.68	2.48	5.142E-03	1764.51	15.920	5.587E-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	305.	116.	0.058	70.93	1.292	AC-228 s
539.28	270.06	248.	85.	0.042	90.70	0.985	AC-228
600.00	300.43	237.	66.	0.033	116.64	1.150	PB-212 s
654.01	327.43	200.	64.	0.032	110.39	0.880	AC-228 s
1377.80	689.36	41.	27.	0.014	116.00	0.991	-
1720.22	860.59	32.	56.	0.028	62.02	1.807	TL-208 s
3175.15	1588.17	6.	35.	0.018	62.40	1.282	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	318.	103.	0.052	76.67	0.993D
PB-212	153.39	77.11	282.	171.	0.085	47.07	0.995A
TH-234	185.07	92.95	803.	109.	0.054	97.95	1.500s
TH-234	185.04	92.93	798.	108.	0.054	97.96	1.500s
RA-226	371.43	186.13	577.	130.	0.065	74.63	1.500s

PB-212	476.42	238.63	209.	965.	0.483	11.36	1.093D
PB-214	483.00	241.92	296.	106.	0.053	54.89	1.095A
PB-214	589.48	295.16	216.	219.	0.110	35.84	1.119
AC-228	675.77	338.31	198.	202.	0.101	38.86	1.196
PB-214	702.64	351.75	207.	427.	0.213	22.56	1.156
SB-125	924.97	462.92	101.	95.	0.047	53.67	1.500
TL-208	1020.73	510.81	192.	170.	0.085	42.09	1.368s
TL-208	1165.19	583.04	101.	366.	0.183	20.96	1.159s
BI-214	1217.38	609.14	110.	266.	0.133	26.65	1.426s
CS-137	1323.18	662.05	114.	114.	0.057	57.43	1.516s
BI-212	1452.41	726.67	109.	72.	0.036	85.30	1.095
CS-134	1588.75	794.84	56.	43.	0.021	87.45	1.500
AC-228	1821.33	911.15	78.	263.	0.131	25.34	1.297s
EU-152	1928.23	964.61	84.	56.	0.028	79.67	1.538
AC-228	1935.60	968.29	95.	197.	0.098	36.03	1.834
BI-214	2240.71	1120.87	79.	73.	0.037	73.16	1.521s
CO-60	2345.42	1173.23	102.	104.	0.052	61.67	1.553s
CO-60	2663.42	1332.25	37.	70.	0.035	56.49	1.309

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2920.01	1460.57	37.	1021.	0.511	9.67	1.933
Bl-214	3526.53	1763.89	6.	57.	0.029	41.05	2.477s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.5255E-01					
			477.56	1.526E-01	%(	3.203E-01	9.71E-02 G
K-40		1.2836E+01					
			1460.75	1.284E+01	(P	3.890E-01	4.21E-01 G
MN-54		1.4721E-02					
			834.81	1.472E-02	%(P	3.583E-02	1.08E-02 G
CO-57		-1.3108E-02					
			122.07	-1.311E-02	%(P	5.224E-02	1.57E-02 G K
			136.43	-1.354E-01	%	4.087E-01	1.23E-01 G
CO-60		1.0363E-01					
			1332.51	8.785E-02	(P	3.913E-02	1.72E-02 G K
			1173.23	1.194E-01	@(P	5.704E-02	2.50E-02 G K

```
Sr-85      -1.2261E-02
                514.00-1.226E-02 &(  4.317E-02 1.29E-02 G

Kr-85      -2.7685E+02
                513.99-2.769E+02 &(  9.745E+02 2.91E+02 G

Y-88       -2.3270E-03
               1836.01-2.327E-03 %(P 2.803E-02 7.39E-03 G K
                898.02-4.831E-03 % P 3.732E-02 1.06E-02 G

NB-94       1.2951E-02
                871.10 1.295E-02 %(  2.929E-02 8.83E-03 G K
                702.50-7.645E-03 %   3.907E-02 1.15E-02 G K

Ag-108M    -1.1189E-02
                722.95-1.119E-02 %(  4.300E-02 1.27E-02 G K
                614.37-4.352E-03 % P 3.627E-02 1.05E-02 G
                433.93-2.984E-03 %   3.158E-02 9.19E-03 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.2214E-01						
		88.04	1.221E-01	%(	2.131E+00	6.36E-01	G
SN-113	4.3489E-03						
		391.71	4.349E-03	%(	5.111E-02	1.50E-02	G K
		255.04	-1.332E-01	%	1.639E+00	4.85E-01	G
SB-125	1.3422E-01						
		427.95	1.038E-04	&(P	1.013E-01	2.93E-02	G K
		600.77	9.353E-04	% P	1.740E-01	4.98E-02	G
		636.15	-5.189E-05	& P	3.156E-01	9.03E-02	G
		463.51	5.312E-01	(P	2.775E-01	9.63E-02	G
		176.29	-6.412E-02	%	5.822E-01	1.74E-01	G
I-131	-1.1670E-02						
		364.48	-1.167E-02	&(P	4.592E-02	1.36E-02	G K
		636.97	5.104E-02	&	5.547E-01	1.60E-01	G
		284.29	-1.065E-01	% P	6.605E-01	1.96E-01	G
CS-134	2.0690E-02						
		604.66	1.277E-03	%(	2.760E-02	7.85E-03	G K
		795.76	4.288E-02	(P	3.788E-02	1.25E-02	G
		569.29	7.321E-02	% P	2.166E-01	6.44E-02	G
		801.84	-6.915E-03	% P	3.419E-01	9.44E-02	G
CS-137	1.0017E-01						
		661.62	1.002E-01	*(P	4.615E-02	1.94E-02	G
CE-139	-5.3491E-03						
		165.85	-5.349E-03	%(	4.662E-02	1.39E-02	G

EU-152 9.9872E-02

121.78-3.885E-02 %(P 1.525E-01 4.58E-02 G K

344.30 1.671E-02 & P 1.089E-01 3.21E-02 G

1408.08 5.347E-02 % 1.528E-01 4.51E-02 G

964.00 3.781E-01 &(P 3.082E-01 1.01E-01 G

1112.07 6.306E-02 & 2.900E-01 8.44E-02 G

778.90-6.681E-02 % 2.984E-01 8.77E-02 G

EU-154 -5.9603E-04

123.10-5.960E-04 %(8.993E-02 2.66E-02 G K

1274.80 2.647E-05 & 9.196E-02 2.51E-02 G

723.30-7.770E-02 % 2.391E-01 7.15E-02 G

1004.80 6.436E-03 % 2.500E-01 7.14E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	5.9755E-02						
		86.45	5.975E-02	%(	2.365E-01	7.11E-02	G K
		105.31	6.340E-02	%	2.353E-01	7.07E-02	G
HG-203	-5.8341E-03						
		279.17	-5.834E-03	&(P	4.537E-02	1.35E-02	G K
		72.87	-4.810E-01	% P	2.123E+00	6.37E-01	G
		70.83	-3.016E-01	%	4.581E+00	1.37E+00	G
		82.50	-7.825E-01	&	4.009E+00	1.20E+00	G
TL-208	2.8670E-01						
		583.14	2.867E-01	@(P	3.878E-02	2.03E-02	G
		510.72	4.568E-01	+ P	1.812E-01	7.42E-02	G
PB-212	7.7030E-01						
		238.63	7.703E-01	(P	5.589E-02	2.95E-02	G K
					Energy duplication		
		77.11	7.703E-01	} P	3.651E-01	1.21E-01	G
		74.81	9.460E-01	+ P	7.877E-01	2.49E-01	G
PB-214	4.9389E-01						
		351.99	5.169E-01	(P	8.453E-02	3.94E-02	G K
		295.22	4.495E-01	(P	1.461E-01	5.47E-02	G
					Energy duplication		
		77.11	0.000E+00	} P	8.356E-01	0.00E+00	G
		241.92	4.939E-01	}	3.846E-01	9.04E-02	G
BI-212	4.9122E-01						
		727.17	4.912E-01	(P	3.478E-01	1.41E-01	G K
		1620.56	1.686E-01	% P	9.427E-01	2.60E-01	G

785.42 7.272E-01 % 1.742E+00 5.24E-01 G

BI-214 4.0175E-01

609.32 4.018E-01 @(P 7.821E-02 3.66E-02 G K

1764.51 5.587E-01 + P 1.346E-01 8.08E-02 G

1120.28 5.391E-01 + P 3.240E-01 1.35E-01 G

RA-224 7.9973E-01

Derived Ave Activity

241.00 7.997E-01 }(1.266E+00 3.98E-01 G

RA-226 1.2357E+00

185.99 1.236E+00 *(P 1.087E+00 3.38E-01 G

AC-228 8.2369E-01

911.07 8.606E-01 *(P 1.438E-01 7.36E-02 G K

968.90 1.120E+00 + P 2.745E-01 1.35E-01 G

338.40 7.346E-01 (P 2.476E-01 9.56E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	6.4968E-03						
		236.00	6.497E-03	&(	4.999E-01	1.49E-01	G K
		256.25	-1.106E-01	&	P 5.056E-01	1.51E-01	G
PA-234	-8.4005E-03						
		98.44	-8.400E-03	%(	P 2.289E-01	6.81E-02	G K
		946.00	2.954E-02	&	P 1.790E-01	5.17E-02	G
		131.28	-1.042E-02	%	P 2.055E-01	6.11E-02	G
		94.67	-8.090E-02	%	P 4.259E-01	1.28E-01	G
		883.24	-6.250E-02	%	3.160E-01	9.22E-02	G
		926.70	2.545E-02	&	3.522E-01	1.01E-01	G
		569.26	1.084E-01	%	P 3.207E-01	9.54E-02	G
TH-234	1.2260E+00						
		63.29	2.709E-01	%(	P 6.832E+00	2.03E+00	G K
		92.80	1.748E+00	*(	P 2.172E+00	6.64E-01	G
		92.38	2.066E+00	*(	P 2.566E+00	7.84E-01	G
AM-241	1.0287E-01						
		59.54	1.029E-01	&(	P 1.128E+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

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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	1.4847E-01	1.5255E-01	2.9134E-01	2.9147E-01	3.118E-01
K-40	1.2836E+01	1.2836E+01	1.2634E+00	1.4668E+00	
MN-54 #A	1.4653E-02	1.4721E-02	3.2265E-02	3.2277E-02	3.567E-02
CO-57 #B	-1.3038E-02	-1.3108E-02	4.8316E-02	4.8321E-02	5.196E-02
CO-60	1.0355E-01	1.0363E-01	4.4526E-02	4.4930E-02	
Sr-85 #A	-1.1990E-02	-1.2261E-02	3.8659E-02	3.8666E-02	4.221E-02
Kr-85 #A	-2.7685E+02	-2.7685E+02	8.7277E+02	8.7292E+02	9.745E+02
Y-88 #B	-2.2956E-03	-2.3270E-03	2.4223E-02	2.4223E-02	2.765E-02
NB-94 #B	1.2951E-02	1.2951E-02	2.6504E-02	2.6514E-02	2.929E-02
Ag-108M#B	-1.1189E-02	-1.1189E-02	3.8155E-02	3.8161E-02	4.300E-02
CD-109 #A	1.2175E-01	1.2214E-01	1.9087E+00	1.9087E+00	2.124E+00
SN-113 #B	4.2945E-03	4.3489E-03	4.4964E-02	4.4964E-02	5.047E-02
SB-125 #F	1.3403E-01	1.3422E-01	7.3006E-02	7.3420E-02	1.012E-01
I-131 #B	-9.7451E-03	-1.1670E-02	4.4307E-02	4.4312E-02	3.835E-02
CS-134 #B	2.0651E-02	2.0690E-02	1.8132E-02	1.8172E-02	2.755E-02
CS-137 #	1.0015E-01	1.0017E-01	5.8228E-02	5.8518E-02	
CE-139 #A	-5.2930E-03	-5.3491E-03	4.1717E-02	4.1718E-02	4.613E-02
EU-152 #B	9.9840E-02	9.9872E-02	8.0352E-02	8.0542E-02	1.525E-01
EU-154 #B	-5.9575E-04	-5.9603E-04	7.9839E-02	7.9839E-02	8.988E-02
EU-155 #B	5.9707E-02	5.9755E-02	2.1328E-01	2.1331E-01	2.364E-01
HG-203 #B	-5.6554E-03	-5.8341E-03	4.0686E-02	4.0687E-02	4.398E-02
TL-208 #	2.8670E-01	2.8670E-01	6.0806E-02	6.3043E-02	

PB-212	7.7030E-01	7.7030E-01	8.8629E-02	9.9273E-02	
PB-214	4.9389E-01	4.9389E-01	1.0636E-01	1.1016E-01	
BI-212	4.9122E-01	4.9122E-01	4.2187E-01	4.2283E-01	
BI-214 #	4.0175E-01	4.0175E-01	1.0969E-01	1.1215E-01	
RA-224 A	7.9973E-01	7.9973E-01	1.1690E+00	1.1699E+00	
RA-226 #	1.2357E+00	1.2357E+00	1.0139E+00	1.0164E+00	1.087E+00
AC-228	8.2369E-01	8.2369E-01	1.9251E-01	1.9836E-01	
TH-227 #B	6.4968E-03	6.4968E-03	4.4782E-01	4.4782E-01	4.999E-01
PA-234 #B	-8.4005E-03	-8.4005E-03	3.0961E-01	3.0961E-01	2.289E-01
TH-234 #B	1.2260E+00	1.2260E+00	1.3960E+00	1.3977E+00	6.832E+00
AM-241 #A	1.0287E-01	1.0287E-01	1.0076E+00	1.0076E+00	1.128E+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) 1.7106535E+01 pCi/gm

Total Decayed Activity (269.9 to 2000.7 keV) 1.7106627E+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_14SEPT2005_1115.An1

Sample description

FSS-NOL-06-01-092-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_14SEPT2005_1115.An1

Acquisition information

Start time:	14-Sep-2005 11:16:25
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: 1.6620E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6620E+03) =
6.0168E+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-Sep-2005 14:44:00
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: 0.1336

***** 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	133.	21.62	0.99	9.194E-03	74.81	9.600	1.213E+00	PB212
77.12	248.	11.68	0.99	1.027E-02	77.11	17.500	1.125E+00	PB212
					77.11	10.700	1.839E+00	PB214
84.43	62.	41.44	1.00	1.332E-02				
87.78	101.	27.44	1.00	1.464E-02				
87.78	101.	27.44	1.00	1.464E-02	88.04	3.790	1.473E+00	CD109
89.85	123.	23.70	1.00	1.542E-02				

93.24	100.	27.16	1.00	1.662E-02	92.38	2.570	PBC<MDA TH234	
					92.80	3.000	PBC<MDA TH234	
186.03	166.	23.13	1.13	2.567E-02	185.99	3.280	1.483E+00	RA226
209.59	117.	25.88	1.07	2.470E-02				
238.91	1042.	3.72	1.09	2.319E-02	238.63	43.100	8.379E-01	PB212
241.75	162.	15.82	1.09	2.303E-02	241.00	3.900	1.465E+00	RA224
					241.92	7.470	7.667E-01	PB214
270.68	107.	23.88	1.36	2.149E-02				
277.72	65.	39.14	1.86	2.112E-02				
277.72	65.	39.14	1.86	2.112E-02	279.17	81.500	PBC<MDA HG203	
295.20	214.	12.56	0.98	2.025E-02	295.22	19.200	4.391E-01	PB214
300.33	91.	25.73	0.93	2.000E-02				
327.63	91.	29.13	0.92	1.876E-02				
338.28	238.	14.70	1.16	1.831E-02	338.40	12.010	8.764E-01	AC228
351.82	403.	8.25	1.15	1.776E-02	351.99	37.100	4.902E-01	PB214
463.46	82.	24.07	0.99	1.425E-02				
463.46	82.	24.07	0.99	1.425E-02	463.51	10.000	4.613E-01	SB125
510.44	178.	15.68	1.11	1.318E-02	510.72	22.500	4.162E-01	TL208
583.02	358.	7.98	1.27	1.185E-02	583.14	86.000	2.823E-01	TL208
609.09	318.	9.85	1.32	1.144E-02	609.32	46.090	4.810E-01	BI214
661.86	82.	24.39	1.20	1.072E-02	661.62	84.620	7.234E-02	CS137
727.33	96.	19.67	1.36	9.963E-03	723.30	19.700	3.962E-01	EU154
					727.17	11.800	6.604E-01	BI212
794.72	44.	27.01	1.50	9.301E-03	795.76	85.400	4.536E-02	CS134
860.68	78.	20.79	1.26	8.767E-03				
910.97	276.	7.28	1.06	8.402E-03	911.07	29.000	9.112E-01	AC228
964.50	59.	19.03	1.54	8.052E-03	964.00	14.580	4.040E-01	EU152
968.82	176.	8.92	1.54	8.026E-03	968.90	17.460	1.023E+00	AC228
1120.27	109.	20.13	1.50	7.212E-03	1120.28	15.040	8.029E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1172.56	108.	25.31	1.12	6.974E-03	1173.23	99.860	1.245E-01	CO60
1332.33	100.	13.85	1.73	6.350E-03	1332.51	99.980	1.243E-01	CO60
1460.57	1274.	2.91	1.90	5.933E-03	1460.75	10.700	1.608E+01	K40
1619.76	25.	28.87	1.05	5.488E-03	1620.56	2.750	1.366E+00	Bi212
1764.15	57.	14.21	2.13	5.143E-03	1764.51	15.920	5.317E-01	Bi214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
168.03	84.49	296.	62.	0.031	124.32	0.999	TA-182	ID
174.73	87.84	332.	101.	0.050	82.31	1.001	PB-214	ID
178.88	89.91	366.	123.	0.062	71.09	1.002	PB-214	ID
185.64	93.30	322.	100.	0.050	81.47	1.004	U-235	ID
418.33	209.59	365.	117.	0.059	77.63	1.071	NP-239	
540.51	270.68	247.	107.	0.053	71.65	1.358	AC-228	s
599.80	300.33	209.	91.	0.046	77.18	0.931	PB-212	
654.40	327.63	226.	91.	0.045	87.40	0.916	AC-228	s
1720.40	860.68	65.	78.	0.039	62.38	1.256	TL-208	
1928.08	964.62	33.	59.	0.030	56.96	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	323.	130.	0.065	62.68	0.993D
PB-212	153.39	77.11	319.	173.	0.086	42.08	0.995A
RA-226	371.69	186.26	642.	129.	0.065	78.86	1.500
PB-212	477.01	238.92	646.	975.	0.487	15.42	0.972
RA-224	482.95	241.90	705.	141.	0.071	83.70	1.500
PB-214	483.74	242.29	771.	106.	0.053	114.67	1.500
PB-214	589.56	295.20	225.	210.	0.105	37.68	0.980
AC-228	675.71	338.28	309.	237.	0.118	44.09	1.158
PB-214	702.79	351.82	247.	397.	0.199	24.74	1.154
SB-125	925.63	463.25	139.	69.	0.035	78.97	1.500
TL-208	1019.98	510.44	204.	152.	0.076	47.03	1.112s
TL-208	1165.14	583.02	147.	354.	0.177	23.93	1.267
BI-214	1217.28	609.09	191.	312.	0.156	29.54	1.319
CS-137	1322.81	661.86	104.	81.	0.040	73.18	1.201

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bl-212	1453.74	727.33	84.	96.	0.048	59.00	1.355
CS-134	1588.51	794.72	50.	44.	0.022	81.02	1.500s
AC-228	1820.96	910.97	53.	273.	0.137	21.85	1.055
EU-152	1928.12	964.55	88.	44.	0.022	99.38	1.538
AC-228	1936.81	968.90	36.	176.	0.088	26.74	1.541D
Bl-214	2239.52	1120.27	100.	107.	0.054	60.39	1.505
CO-60	2344.08	1172.56	145.	107.	0.053	75.94	1.122s
CO-60	2663.56	1332.33	35.	97.	0.048	41.55	1.728s
K-40	2920.01	1460.57	45.	1255.	0.628	8.73	1.900
Bl-212	3238.33	1619.76	7.	25.	0.013	86.62	1.050s
Bl-214	3527.06	1764.15	6.	54.	0.027	42.62	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 -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS

BE-7 -5.2151E-02
477.56-5.215E-02 &(3.422E-01 1.01E-01 G

K-40 1.6079E+01
1460.75 1.608E+01 (P 4.344E-01 4.75E-01 G

MN-54 -6.8089E-03
834.81-6.809E-03 &(P 4.591E-02 1.34E-02 G

```
CO-57        9.7027E-03
                 122.07 9.703E-03 &(P 5.151E-02 1.54E-02 G K
                 136.43-9.319E-02 %   4.291E-01 1.29E-01 G

CO-60        1.2440E-01
                1332.51 1.243E-01 *(P 3.883E-02 1.77E-02 G K
                1173.23 1.245E-01 @(P 6.885E-02 3.21E-02 G K

Sr-85       -1.6596E-02
                 514.00-1.660E-02 %(  4.446E-02 1.34E-02 G

Kr-85       -3.7609E+02
                 513.99-3.761E+02 %(  1.006E+03 3.03E+02 G

Y-88        -2.1669E-04
                1836.01-2.167E-04 &(P 2.947E-02 7.57E-03 G K
                 898.02-4.585E-03 % P 4.150E-02 1.19E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	1.0611E-03						
		871.10	1.061E-03	%(	3.793E-02	1.08E-02	G K
		702.50	7.537E-03	&	3.801E-02	1.12E-02	G K
Ag-108M	-3.8782E-02						
		722.95	-3.878E-02	%(	5.737E-02	1.77E-02	G K
		614.37	-3.405E-03	% P	4.543E-02	1.32E-02	G
		433.93	-1.404E-04	&	3.596E-02	1.04E-02	G
CD-109	1.2648E+00						
		88.04	1.265E+00	%(	2.037E+00	6.21E-01	G
SN-113	2.8541E-03						
		391.71	2.854E-03	&(	4.020E-02	1.17E-02	G K
		255.04	-1.895E-02	%	1.775E+00	5.24E-01	G
SB-125	9.0062E-02						
		427.95	-1.365E-02	%(P	1.165E-01	3.42E-02	G K
		600.77	4.344E-02	% P	1.896E-01	5.59E-02	G
		636.15	-1.081E-02	% P	2.949E-01	8.41E-02	G
		463.51	3.971E-01	(P	3.298E-01	1.06E-01	G
		176.29	-7.693E-03	&	5.665E-01	1.68E-01	G
I-131	3.5383E-03						
		364.48	3.538E-03	%(P	4.617E-02	1.35E-02	G K
		636.97	-6.612E-02	&	5.883E-01	1.71E-01	G
		284.29	-1.298E-01	& P	6.720E-01	2.00E-01	G
CS-134	2.2816E-02						
		604.66	3.087E-03	%(	9.357E-02	2.78E-02	G K

795.76 4.536E-02 *(P 3.643E-02 1.23E-02 G
569.29-8.276E-03 % P 2.001E-01 5.66E-02 G
801.84-6.706E-02 % P 4.258E-01 1.22E-01 G

CS-137 7.2338E-02
661.62 7.234E-02 (P 4.508E-02 1.80E-02 G

CE-139 5.8811E-04
165.85 5.881E-04 %(5.138E-02 1.53E-02 G

EU-152 1.1860E-01
121.78 2.527E-02 &(P 1.551E-01 4.64E-02 G K
344.30 6.554E-05 % P 1.050E-01 3.05E-02 G
1408.08 2.361E-02 % 1.403E-01 3.93E-02 G
964.00 3.058E-01 &(P 3.212E-01 1.03E-01 G
1112.07 1.567E-02 % 3.412E-01 9.74E-02 G
778.90 4.895E-02 % 2.637E-01 7.67E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	2.6630E-02						
		123.10	2.663E-02	&(	1.124E-01	3.37E-02	G K
		1274.80	-1.673E-02	%	1.358E-01	3.91E-02	G
		723.30	-1.703E-02	%	2.332E-01	6.79E-02	G
		1004.80	1.418E-02	%	2.351E-01	6.71E-02	G
EU-155	2.0631E-02						
		86.45	2.063E-02	%(	2.761E-01	8.26E-02	G K
		105.31	6.279E-02	&	2.512E-01	7.55E-02	G
HG-203	8.5719E-04						
		279.17	8.572E-04	&(P	4.438E-02	1.31E-02	G K
		72.87	7.407E-01	% P	2.078E+00	6.27E-01	G
		70.83	-1.761E+00	%	4.554E+00	1.38E+00	G
		82.50	-6.176E-01	%	4.171E+00	1.25E+00	G
TL-208	2.8232E-01						
		583.14	2.823E-01	(P	4.731E-02	2.28E-02	G
		510.72	4.162E-01	+ P	1.901E-01	7.67E-02	G
PB-212	7.9249E-01						
		238.63	7.925E-01	(P	9.855E-02	4.13E-02	G K
					Energy duplication		
		77.11	7.925E-01	} P	3.949E-01	1.11E-01	G
		74.81	1.216E+00	+ P	8.090E-01	2.60E-01	G
PB-214	4.7619E-01						
		351.99	4.902E-01	(P	9.375E-02	4.10E-02	G K
		295.22	4.391E-01	(P	1.519E-01	5.62E-02	G
					Energy duplication		

77.11 3.106E-01 } P 9.591E-01 2.43E-01 G
241.92 5.021E-01 (6.245E-01 1.92E-01 G

BI-212 6.6042E-01
727.17 6.604E-01 (P 3.149E-01 1.31E-01 G K
1620.56 1.366E+00 + P 7.932E-01 3.95E-01 G
785.42 9.004E-01 % 1.788E+00 5.44E-01 G

BI-214 4.9405E-01
609.32 4.810E-01 (P 1.035E-01 4.83E-02 G K
1764.51 5.317E-01 (P 1.447E-01 8.01E-02 G
1120.28 8.029E-01 + P 3.695E-01 1.64E-01 G

RA-224 1.2752E+00
241.00 1.275E+00 (1.142E+00 3.56E-01 G

RA-226 1.2494E+00
185.99 1.249E+00 (P 1.166E+00 3.61E-01 G

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

AC-228       9.3747E-01
                    911.07 9.112E-01  (P 1.222E-01 6.72E-02 G K
                    968.90 1.023E+00  (P 1.772E-01 9.13E-02 G
                    338.40 8.764E-01  (P 3.131E-01 1.29E-01 G

TH-227      -3.3110E-03
                    236.00-3.311E-03 %(  5.398E-01 1.61E-01 G K
                    256.25 1.125E-02 % P 5.100E-01 1.51E-01 G

PA-234       9.1826E-02
                     98.44 9.183E-02 %(P 2.149E-01 6.50E-02 G K
                    946.00-4.728E-02 % P 2.218E-01 6.50E-02 G
                    131.28-1.241E-02 & P 2.242E-01 6.68E-02 G
                     94.67-2.208E-01 % P 4.339E-01 1.32E-01 G
                    883.24-4.556E-02 &   3.218E-01 9.31E-02 G
                    926.70 2.630E-02 %   3.097E-01 8.80E-02 G
                    569.26-1.253E-02 % P 3.090E-01 8.77E-02 G

TH-234      -7.6325E-01
                     63.29-7.633E-01 %(P 7.145E+00 2.12E+00 G K
                     92.80 1.107E+00 % P 2.284E+00 6.89E-01 G
                     92.38 1.351E+00 % P 2.717E+00 8.21E-01 G

AM-241       1.0252E-01
                     59.54 1.025E-01 %(P 1.200E+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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	-5.0910E-02	-5.2151E-02	3.0180E-01	3.0182E-01	3.341E-01
K-40	1.6079E+01	1.6079E+01	1.4254E+00	1.7039E+00	
MN-54 #A	-6.7809E-03	-6.8089E-03	4.4187E-02	4.4189E-02	4.572E-02
CO-57 #B	9.6566E-03	9.7027E-03	4.6269E-02	4.6272E-02	5.126E-02
CO-60 #	1.2431E-01	1.2440E-01	5.3102E-02	5.3591E-02	
Sr-85 #A	-1.6270E-02	-1.6596E-02	4.0107E-02	4.0118E-02	4.358E-02
Kr-85 #A	-3.7609E+02	-3.7609E+02	9.0785E+02	9.0811E+02	1.006E+03
Y-88 #B	-2.1409E-04	-2.1669E-04	6.5074E-02	6.5074E-02	2.911E-02
NB-94 #B	1.0611E-03	1.0611E-03	3.2363E-02	3.2363E-02	3.793E-02
Ag-108M#B	-3.8781E-02	-3.8782E-02	5.3055E-02	5.3103E-02	5.737E-02
CD-109 #A	1.2612E+00	1.2648E+00	1.8638E+00	1.8651E+00	2.031E+00
SN-113 #B	2.8224E-03	2.8541E-03	3.4950E-02	3.4950E-02	3.975E-02
SB-125 #B	8.9948E-02	9.0062E-02	7.2426E-02	7.2615E-02	1.163E-01
I-131 #B	3.0151E-03	3.5383E-03	4.0590E-02	4.0590E-02	3.934E-02
CS-134 #B	2.2778E-02	2.2816E-02	1.8523E-02	1.8570E-02	9.341E-02
CS-137	7.2330E-02	7.2338E-02	5.3848E-02	5.4012E-02	
CE-139 #A	5.8264E-04	5.8811E-04	4.5826E-02	4.5826E-02	5.090E-02

EU-152 #B	1.1857E-01	1.1860E-01	1.1932E-01	1.1950E-01	1.551E-01
EU-154 #B	2.6619E-02	2.6630E-02	1.0121E-01	1.0122E-01	1.123E-01
EU-155 #B	2.0616E-02	2.0631E-02	2.4772E-01	2.4772E-01	2.759E-01
HG-203 #B	8.3385E-04	8.5719E-04	3.9247E-02	3.9247E-02	4.317E-02
TL-208	2.8232E-01	2.8232E-01	6.8387E-02	7.0324E-02	
PB-212	7.9249E-01	7.9249E-01	1.2374E-01	1.3202E-01	
PB-214	4.7619E-01	4.7619E-01	1.1946E-01	1.2262E-01	
BI-212	6.6042E-01	6.6042E-01	3.9163E-01	3.9351E-01	
BI-214	4.9405E-01	4.9405E-01	1.3428E-01	1.3731E-01	
RA-224	1.2752E+00	1.2752E+00	1.0674E+00	1.0700E+00	1.142E+00
RA-226 #	1.2494E+00	1.2494E+00	1.0840E+00	1.0864E+00	1.166E+00
AC-228	9.3747E-01	9.3747E-01	1.7589E-01	1.8411E-01	
TH-227 #B	-3.3110E-03	-3.3110E-03	4.8391E-01	4.8391E-01	5.398E-01
PA-234 #B	9.1826E-02	9.1826E-02	1.9503E-01	1.9510E-01	2.149E-01
TH-234 #B	-7.6325E-01	-7.6325E-01	1.3803E+01	1.3803E+01	7.145E+00
AM-241 #A	1.0252E-01	1.0252E-01	1.0718E+00	1.0718E+00	1.200E+00

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

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

Total Activity (1120.0 to 2000.7 keV) 2.1193777E+01 pCi/gm

Total Decayed Activity (1120.0 to 2000.7 keV) 2.1193869E+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_29AUG2005_1024.An1

Sample description

FSS NOL-06-01-008-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\103F_29AUG2005_1024.An1

Acquisition information

Start time:	29-Aug-2005 10:24:59
Live time:	2000
Real time:	2002
Dead time:	0.08 %
Detector ID:	4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb

Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created:	08-Aug-2005 11:09:41
Zero offset:	0.409 keV
Gain:	0.500 keV/channel
Quadratic:	1.092E-08 keV/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: 1.9760E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9760E+03) =
5.0607E+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 27-Aug-2005 11:50:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2229

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.87	111.	22.40	0.99	9.052E-03	74.81	9.600	8.703E-01	PB212
77.17	101.	19.32	0.99	1.011E-02	77.11	17.500	5.000E-01	PB212
					77.11	10.700	8.178E-01	PB214
185.90	160.	23.38	1.11	2.567E-02				
185.90	160.	23.38	1.11	2.567E-02	185.99	3.280	1.193E+00	RA226
210.19	103.	28.44	1.54	2.467E-02				
238.66	807.	4.11	1.09	2.320E-02	238.63	43.100	5.436E-01	PB212

					241.92	7.470	3.208E+00	PB214
270.19	74.	29.80	1.12	2.151E-02				
295.17	203.	9.98	1.13	2.025E-02	295.22	19.200	3.506E-01	PB214
299.92	52.	31.85	1.13	2.002E-02				
327.89	49.	35.99	0.88	1.875E-02				
338.16	152.	17.40	1.16	1.831E-02	338.40	12.010	4.683E-01	AC228
351.80	363.	8.17	1.15	1.776E-02	351.99	37.100	3.711E-01	PB214
462.50	49.	32.28	0.91	1.427E-02				
462.50	49.	32.28	0.91	1.427E-02	463.51	10.000	PBC<MDA	SB125
510.48	152.	14.37	1.63	1.318E-02	510.72	22.500	2.887E-01	TL208
582.88	271.	9.03	1.05	1.185E-02	583.14	86.000	1.790E-01	TL208
608.99	278.	7.49	1.24	1.144E-02	609.32	46.090	3.517E-01	BI214
661.21	94.	23.16	1.15	1.073E-02	661.62	84.620	7.012E-02	CS137
720.99	25.	36.38	1.50	1.001E-02	722.95	90.499	PBC<MDA	Ag108M
					723.30	19.700	8.541E-02	EU154
726.99	65.	19.41	1.55	9.967E-03	727.17	11.800	3.775E-01	BI212
910.95	190.	9.02	1.65	8.402E-03	911.07	29.000	5.239E-01	AC228
964.03	36.	26.54	1.54	8.055E-03	964.00	14.580	2.072E-01	EU152
968.65	105.	12.21	1.54	8.026E-03	968.90	17.460	5.102E-01	AC228
1119.92	88.	18.82	1.97	7.214E-03	1120.28	15.040	5.398E-01	BI214
1237.15	54.	28.37	1.00	6.706E-03				
1460.18	821.	3.55	1.72	5.934E-03	1460.75	10.700	8.642E+00	K40
1763.65	51.	15.19	0.79	5.142E-03	1764.51	15.920	4.221E-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
419.53	210.19	329.	103.	0.052	85.31	1.540	NP-239 s
482.45	241.67	181.	136.	0.068	49.05	1.095	PB-214 lD
539.54	270.19	190.	74.	0.037	89.40	1.116	AC-228
598.97	299.91	127.	48.	0.024	106.07	1.000	TH-227 s
654.93	327.89	131.	49.	0.024	107.97	0.879	AC-228 s
2473.24	1237.15	59.	54.	0.027	85.12	1.001	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	148.79	74.81	270.	111.	0.055	67.19	0.993D
PB-212	153.39	77.11	282.	101.	0.051	57.96	0.995A
RA-226	371.61	186.22	543.	133.	0.067	71.20	1.500s
PB-212	476.51	238.68	578.	771.	0.385	18.42	1.158
PB-214	476.36	238.60	190.	906.	0.453	11.88	1.500
PB-214	589.46	295.15	152.	183.	0.091	35.26	1.175

AC-228	675.45	338.16	195.	151.	0.075	52.20	1.163
PB-214	702.73	351.80	178.	357.	0.179	24.50	1.154
SB-125	924.66	462.77	105.	43.	0.021	108.29	1.500s
TL-208	1020.08	510.48	128.	125.	0.063	43.10	1.628s
TL-208	1164.86	582.88	95.	267.	0.133	27.08	1.054
BI-214	1217.08	608.99	71.	271.	0.136	22.47	1.237
CS-137	1321.51	661.21	108.	93.	0.047	69.49	1.152
EU-154	1441.05	720.99	28.	25.	0.012	109.15	1.500
BI-212	1453.06	726.99	42.	65.	0.032	58.22	1.549
AC-228	1820.93	910.95	43.	187.	0.093	27.07	1.649s
EU-152	1927.67	964.33	48.	34.	0.017	97.61	1.538
AC-228	1935.94	968.46	53.	153.	0.076	35.47	1.650
BI-214	2238.81	1119.92	54.	86.	0.043	56.47	1.973s
K-40	2919.24	1460.18	29.	802.	0.401	10.65	1.722
BI-214	3526.05	1763.65	7.	51.	0.025	45.58	0.794s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	&(	2.504E-01	7.20E-02 G
K-40		8.6420E+00					
			1460.75	8.642E+00	(P	2.992E-01	3.14E-01 G
MN-54		5.5671E-03					
			834.81	5.567E-03	%(P	2.208E-02	6.39E-03 G
CO-57		2.8065E-03					
			122.07	2.807E-03	%(P	4.226E-02	1.26E-02 G K
			136.43	8.877E-04	%	3.129E-01	9.28E-02 G
CO-60		1.5920E-02					
			1332.51	1.592E-02	&(P	3.231E-02	9.68E-03 G K
			1173.23	-7.315E-03	& P	4.259E-02	1.22E-02 G K
Sr-85		-1.1046E-02					
			514.00	-1.105E-02	%(	3.476E-02	1.04E-02 G
Kr-85		-2.4979E+02					
			513.99	-2.498E+02	%(	7.859E+02	2.35E+02 G
Y-88		2.6752E-03					
			1836.01	2.675E-03	%(P	2.203E-02	5.85E-03 G K

898.02 3.663E-03 % P 2.431E-02 6.87E-03 G

NB-94 -1.8406E-03

871.10-1.841E-03 %(2.498E-02 7.04E-03 G K

702.50 5.451E-03 & 2.626E-02 7.66E-03 G K

Ag-108M 3.5622E-03

722.95 3.562E-03 &(3.067E-02 8.84E-03 G K

614.37-4.566E-04 % P 3.174E-02 9.09E-03 G

433.93-3.710E-03 % 2.785E-02 8.15E-03 G

CD-109 3.9258E-02

88.04 3.926E-02 &(1.756E+00 5.23E-01 G

SN-113 2.7182E-03

391.71 2.718E-03 %(3.758E-02 1.09E-02 G K

255.04 2.856E-03 & 1.129E+00 3.30E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.7353E-02						
		427.95	7.541E-03	%(P	7.910E-02	2.30E-02	G K
		600.77	6.697E-02	% P	1.243E-01	3.80E-02	G
		636.15	-1.863E-02	& P	2.246E-01	6.40E-02	G
		463.51	2.048E-01	*(P	2.423E-01	7.61E-02	G
		176.29	9.360E-02	%	4.285E-01	1.28E-01	G
I-131	-1.0338E-02						
		364.48	-1.034E-02	%(P	3.535E-02	1.05E-02	G K
		636.97	5.384E-02	%	3.721E-01	1.07E-01	G
		284.29	-1.164E-01	% P	5.133E-01	1.53E-01	G
CS-134	-1.9200E-02						
		604.66	-1.920E-02	%(	3.944E-02	1.20E-02	G K
		795.76	-1.911E-03	% P	3.213E-02	9.12E-03	G
		569.29	-4.012E-02	& P	1.658E-01	4.81E-02	G
		801.84	-7.847E-02	% P	3.198E-01	9.18E-02	G
CS-137	7.0116E-02						
		661.62	7.012E-02	(P	3.855E-02	1.65E-02	G
CE-139	5.4337E-03						
		165.85	5.434E-03	%(	3.723E-02	1.11E-02	G
EU-152	6.2439E-02						
		121.78	-6.460E-03	&(P	1.247E-01	3.71E-02	G K
		344.30	-5.405E-04	& P	8.330E-02	2.41E-02	G
		1408.08	4.252E-02	%	1.051E-01	3.14E-02	G
		964.00	2.006E-01	&(P	2.035E-01	6.63E-02	G
		1112.07	-1.597E-02	&	2.361E-01	6.68E-02	G

778.90 4.228E-02 % 1.993E-01 5.80E-02 G

EU-154 2.4425E-02

123.10-5.269E-03 %(8.109E-02 2.41E-02 G K

1274.80-1.679E-02 % 8.698E-02 2.50E-02 G

723.30 8.541E-02 &(9.464E-02 3.11E-02 G

1004.80-3.634E-02 & 1.883E-01 5.47E-02 G

EU-155 -9.4654E-03

86.45-9.465E-03 &(2.026E-01 6.04E-02 G K

105.31-1.657E-03 & 1.981E-01 5.89E-02 G

HG-203 -6.4146E-03

279.17-6.415E-03 &(P 3.456E-02 1.03E-02 G K

72.87-5.109E-01 % P 1.937E+00 5.82E-01 G

70.83-1.321E+00 % 3.771E+00 1.14E+00 G

82.50 1.671E+00 & 2.973E+00 9.05E-01 G

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

TL-208       1.7905E-01
                   583.14 1.790E-01  (P 3.236E-02 1.64E-02 G
                   510.72 2.887E-01 + P 1.278E-01 5.03E-02 G

PB-212       5.1943E-01
                   238.63 5.273E-01  (P 7.849E-02 3.29E-02 G K
                                      Energy duplication
                    77.11 3.912E-01 } P 3.126E-01 7.56E-02 G
                    74.81 8.703E-01 + P 6.244E-01 2.00E-01 G

PB-214       3.5427E-01
                   351.99 3.711E-01  (P 6.730E-02 3.08E-02 G K
                   295.22 3.218E-01  (P 1.058E-01 3.87E-02 G
                                      Energy duplication
                    77.11 0.000E+00 } P 7.263E-01 0.00E+00 G
                   241.92 3.601E+00 +   2.660E-01 1.43E-01 G

BI-212       3.7750E-01
                   727.17 3.775E-01  (P 1.916E-01 7.38E-02 G K
                  1620.56 2.220E-01 % P 7.138E-01 2.05E-01 G
                   785.42 4.758E-01 %   1.382E+00 4.11E-01 G

BI-214       3.6977E-01
                   609.32 3.517E-01  (P 5.440E-02 2.70E-02 G K
                  1764.51 4.221E-01  (P 1.291E-01 6.83E-02 G
                  1120.28 5.398E-01 + P 2.338E-01 1.04E-01 G

RA-224       5.9790E-01
                   241.00 5.979E-01 &(  8.603E-01 2.64E-01 G
```

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RA-226       1.0840E+00
                 185.99 1.084E+00 *(P 9.044E-01 2.82E-01 G

AC-228       5.0760E-01
                 911.07 5.239E-01 @(P 9.375E-02 4.81E-02 G K
                 968.90 7.465E-01 + P 1.789E-01 8.83E-02 G
                 338.40 4.683E-01  (P 2.112E-01 8.20E-02 G

TH-227       2.7848E-03
                 236.00 2.785E-03 %(  3.471E-01 1.03E-01 G K
                 256.25-2.284E-02 % P 3.772E-01 1.11E-01 G

PA-234       4.8369E-02
                  98.44 4.837E-02 %(P 1.823E-01 5.47E-02 G K
                 946.00 4.242E-02 & P 1.295E-01 3.82E-02 G
                 131.28 4.630E-02 % P 1.607E-01 4.83E-02 G
                  94.67-1.295E-02 % P 3.191E-01 9.49E-02 G
                 883.24 1.481E-03 %   1.642E-01 4.45E-02 G
                 926.70-1.883E-02 %   2.456E-01 6.94E-02 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26-5.945E-02 & P 2.455E-01 7.13E-02 G

TH-234 2.7066E-01
63.29 2.707E-01 %(P 5.686E+00 1.69E+00 G K
92.80 7.714E-01 % P 1.757E+00 5.29E-01 G
92.38 6.700E-01 & P 2.055E+00 6.15E-01 G

AM-241 -3.0659E-01
59.54-3.066E-01 %(P 9.644E-01 2.90E-01 G

(- This peak used in the nuclide activity average.

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

Nuclide Codes: 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	0.0000E+00	0.0000E+00	2.1588E-01	2.1588E-01	2.442E-01
K-40		8.6420E+00	8.6420E+00	9.4146E-01	1.0668E+00	
MN-54	#A	5.5432E-03	5.5671E-03	1.9184E-02	1.9187E-02	2.198E-02
CO-57	#B	2.7926E-03	2.8065E-03	3.7742E-02	3.7742E-02	4.205E-02
CO-60	#B	1.5909E-02	1.5920E-02	2.9027E-02	2.9042E-02	3.229E-02

Sr-85	#A	-1.0819E-02	-1.1046E-02	3.1187E-02	3.1194E-02	3.404E-02
Kr-85	#A	-2.4978E+02	-2.4979E+02	7.0521E+02	7.0536E+02	7.859E+02
Y-88	#B	2.6416E-03	2.6752E-03	1.7560E-02	1.7561E-02	2.175E-02
NB-94	#B	-1.8406E-03	-1.8406E-03	2.1109E-02	2.1109E-02	2.498E-02
Ag-108M	#B	3.5621E-03	3.5622E-03	2.6524E-02	2.6524E-02	3.067E-02
CD-109	#A	3.9141E-02	3.9258E-02	1.5699E+00	1.5699E+00	1.751E+00
SN-113	#B	2.6866E-03	2.7182E-03	3.2829E-02	3.2830E-02	3.714E-02
SB-125	#B	5.7277E-02	5.7353E-02	6.3966E-02	6.4053E-02	7.899E-02
I-131	#B	-8.7449E-03	-1.0338E-02	3.4024E-02	3.4030E-02	2.990E-02
CS-134	#B	-1.9166E-02	-1.9200E-02	3.5905E-02	3.5922E-02	3.937E-02
CS-137		7.0107E-02	7.0116E-02	4.9452E-02	4.9619E-02	
CE-139	#A	5.3808E-03	5.4337E-03	3.3320E-02	3.3321E-02	3.687E-02
EU-152	#B	6.2421E-02	6.2439E-02	6.1912E-02	6.2009E-02	1.247E-01
EU-154	#B	2.4414E-02	2.4425E-02	2.6658E-02	2.6693E-02	8.106E-02
EU-155	#B	-9.4584E-03	-9.4654E-03	1.8114E-01	1.8114E-01	2.024E-01
HG-203	#B	-6.2321E-03	-6.4146E-03	3.0986E-02	3.0988E-02	3.357E-02
TL-208		1.7905E-01	1.7905E-01	4.9277E-02	5.0362E-02	
PB-212		5.1943E-01	5.1943E-01	9.7178E-02	1.0175E-01	
PB-214		3.5427E-01	3.5427E-01	7.7581E-02	8.0262E-02	
BI-212		3.7750E-01	3.7750E-01	2.2145E-01	2.2253E-01	
BI-214		3.6977E-01	3.6977E-01	8.5056E-02	8.7723E-02	
RA-224	#A	5.9790E-01	5.9790E-01	7.9078E-01	7.9154E-01	8.603E-01
RA-226	#	1.0840E+00	1.0840E+00	8.4675E-01	8.4909E-01	9.044E-01
AC-228		5.0760E-01	5.0760E-01	1.3990E-01	1.4297E-01	
TH-227	#B	2.7848E-03	2.7848E-03	3.0963E-01	3.0963E-01	3.471E-01
PA-234	#B	4.8369E-02	4.8369E-02	1.6419E-01	1.6421E-01	1.823E-01
TH-234	#B	2.7066E-01	2.7066E-01	5.0614E+00	5.0614E+00	5.686E+00
AM-241	#A	-3.0658E-01	-3.0659E-01	8.8001E-01	8.8018E-01	9.644E-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 (82.9 to 2000.7 keV) 1.1019705E+01 pCi/gm

Total Decayed Activity (82.9 to 2000.7 keV) 1.1019713E+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: 103F_29AUG2005_1109.An1

Sample description

FSS NOL-06-01-005-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\103F_29AUG2005_1109.An1

Acquisition information

Start time:	29-Aug-2005 11:10:19
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: 1.7390E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7390E+03) =
5.7504E+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	27-Aug-2005 12:05:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2773

***** 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	81.	29.67	0.99	9.100E-03	74.81	9.600	PBC<MDA	PB212
77.16	185.	15.01	0.99	1.023E-02	77.11	17.500	7.972E-01	PB212
					77.11	10.700	1.304E+00	PB214
92.99	95.	38.74	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
186.08	117.	29.68	1.42	2.566E-02	185.99	3.280	PBC<MDA	RA226

238.69	849.	4.28	1.09	2.320E-02	238.63	43.100	6.508E-01	PB212
241.58	116.	24.97	1.09	2.305E-02	241.00	3.900	1.006E+00	RA224
					241.92	7.470	5.263E-01	PB214
270.15	80.	41.45	0.71	2.152E-02				
294.69	231.	13.77	1.09	2.027E-02	295.22	19.200	4.540E-01	PB214
338.04	170.	17.42	1.15	1.832E-02	338.40	12.010	5.989E-01	AC228
351.74	389.	8.47	1.14	1.776E-02	351.99	37.100	4.518E-01	PB214
510.71	142.	18.81	1.60	1.317E-02	510.72	22.500	3.029E-01	TL208
582.80	273.	8.35	1.24	1.185E-02	583.14	86.000	2.047E-01	TL208
609.12	249.	10.27	1.37	1.144E-02	609.32	46.090	3.572E-01	BI214
661.35	517.	6.07	1.32	1.073E-02	661.62	84.620	4.415E-01	CS137
726.59	77.	28.26	1.75	9.971E-03				
726.59	77.	28.26	1.75	9.971E-03	727.17	11.800	5.043E-01	BI212
794.72	56.	37.91	1.20	9.311E-03				
794.72	56.	37.91	1.20	9.311E-03	795.76	85.400	5.460E-02	CS134
860.75	50.	24.65	1.02	8.766E-03				
910.91	226.	12.89	1.25	8.402E-03	911.07	29.000	7.104E-01	AC228
964.03	47.	24.79	1.54	8.055E-03	964.00	14.580	PBC<MDA	EU152
968.79	115.	12.31	1.54	8.026E-03	968.90	17.460	6.376E-01	AC228
1119.18	94.	24.68	1.47	7.217E-03	1120.28	15.040	6.635E-01	BI214
1172.75	406.	5.80	1.84	6.974E-03	1173.23	99.860	4.509E-01	CO60
1331.94	393.	5.69	1.68	6.351E-03	1332.51	99.980	4.779E-01	CO60
1460.18	980.	3.24	1.91	5.934E-03	1460.75	10.700	1.177E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1763.51	55.	13.48	1.96	5.144E-03	1764.51	15.920	4.911E-01	Bl214

********** 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
539.45	270.15	382.	80.	0.040	124.34	0.710	AC-228
1588.49	794.72	114.	57.	0.028	89.10	1.195	AC-228
1720.54	860.75	47.	50.	0.025	73.96	1.019	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	305.	79.	0.039	95.84	0.993D
PB-212	153.39	77.11	299.	135.	0.068	59.03	0.995A
PA-234	185.16	92.99	639.	95.	0.048	116.23	1.500s
RA-226	371.44	186.14	759.	111.	0.056	97.17	1.500s
PB-212	476.82	238.83	686.	916.	0.458	17.76	1.130
RA-224	482.33	241.59	704.	101.	0.051	114.98	1.500
PB-214	588.52	294.69	305.	227.	0.114	41.30	1.091s

AC-228	675.23	338.04	265.	169.	0.085	52.25	1.146
PB-214	702.62	351.74	254.	383.	0.191	25.42	1.142s
TL-208	1020.52	510.71	211.	116.	0.058	56.42	1.597s
TL-208	1164.69	582.80	99.	268.	0.134	25.05	1.239
BI-214	1217.33	609.12	137.	242.	0.121	30.80	1.368
CS-137	1321.78	661.35	125.	515.	0.258	18.22	1.317
BI-212	1453.11	727.02	110.	47.	0.023	103.70	1.500s
AC-228	1820.84	910.91	155.	223.	0.111	38.66	1.245s
EU-152	1927.33	964.16	93.	38.	0.019	115.62	1.538
AC-228	1934.59	967.79	96.	166.	0.083	40.10	1.497s
BI-214	2237.33	1119.18	123.	93.	0.046	74.05	1.466s
CO-60	2344.45	1172.75	56.	404.	0.202	17.39	1.843
CO-60	2662.80	1331.94	35.	390.	0.195	17.06	1.685
K-40	2919.24	1460.18	30.	961.	0.481	9.73	1.908
BI-214	3525.78	1763.51	3.	52.	0.026	40.45	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 -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS
BE-7		6.7220E-02				
			477.56	6.722E-02	&(	3.611E-01 1.07E-01 G
K-40		1.1771E+01				
			1460.75	1.177E+01	(P	3.432E-01 3.89E-01 G
MN-54		6.4386E-03				
			834.81	6.439E-03	%(P	4.042E-02 1.18E-02 G
CO-57		-9.2296E-03				
			122.07	-9.230E-03	%(P	5.233E-02 1.57E-02 G K
			136.43	-2.255E-02	%	3.813E-01 1.14E-01 G
CO-60		4.6442E-01				
			1332.51	4.779E-01	(P	3.702E-02 2.74E-02 G K
			1173.23	4.509E-01	(P	4.210E-02 2.62E-02 G K
Sr-85		-1.5686E-02				
			514.00	-1.569E-02	&(	4.728E-02 1.42E-02 G
Kr-85		-3.5462E+02				
			513.99	-3.546E+02	&(	1.069E+03 3.21E+02 G
Y-88		1.1966E-04				
			1836.01	1.197E-04	%(P	2.289E-02 5.64E-03 G K

898.02 5.331E-04 & P 4.381E-02 1.25E-02 G

NB-94 7.3158E-03

871.10 7.316E-03 &(4.089E-02 1.20E-02 G K

702.50 1.617E-03 & 4.246E-02 1.23E-02 G K

Ag-108M -9.1318E-04

722.95-9.132E-04 %(6.459E-02 1.89E-02 G K

614.37-1.197E-03 & P 3.244E-02 9.26E-03 G

433.93-5.316E-03 % 3.675E-02 1.08E-02 G

CD-109 -1.8582E-01

88.04-1.858E-01 %(2.009E+00 6.00E-01 G

SN-113 -2.2905E-03

391.71-2.290E-03 &(4.921E-02 1.44E-02 G K

255.04-3.627E-01 % 1.622E+00 4.85E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	2.0649E-02						
		427.95	2.065E-02	%(P	1.238E-01	3.66E-02	G K
		600.77	-3.617E-02	% P	1.939E-01	5.70E-02	G
		636.15	3.056E-03	% P	3.335E-01	9.60E-02	G
		463.51	1.939E-01	% P	3.319E-01	1.01E-01	G
		176.29	-1.464E-01	%	5.653E-01	1.70E-01	G
I-131	-9.0842E-03						
		364.48	-9.084E-03	%(P	4.178E-02	1.23E-02	G K
		636.97	-4.087E-02	%	5.912E-01	1.71E-01	G
		284.29	3.170E-04	& P	6.186E-01	1.82E-01	G
CS-134	-2.2132E-03						
		604.66	-2.213E-03	&(	8.170E-02	2.43E-02	G K
		795.76	-1.129E-03	% P	4.243E-02	1.21E-02	G
		569.29	5.746E-02	% P	1.903E-01	5.62E-02	G
		801.84	-6.623E-02	% P	4.082E-01	1.17E-01	G
CS-137	4.4149E-01						
		661.62	4.415E-01	(P	4.688E-02	2.69E-02	G
CE-139	-6.6705E-04						
		165.85	-6.670E-04	%(	4.624E-02	1.37E-02	G
EU-152	6.6015E-02						
		121.78	-2.761E-02	%(P	1.528E-01	4.57E-02	G K
		344.30	-1.404E-02	% P	1.288E-01	3.81E-02	G
		1408.08	3.404E-02	%	1.554E-01	4.46E-02	G
		964.00	2.538E-01	&(P	3.160E-01	9.92E-02	G
		1112.07	-9.124E-03	&	4.354E-01	1.26E-01	G

778.90-5.074E-02 & 3.060E-01 8.95E-02 G

EU-154 7.3195E-04

123.10 7.319E-04 %(1.087E-01 3.23E-02 G K

1274.80 3.333E-02 & 9.041E-02 2.69E-02 G

723.30-4.572E-02 & 1.582E-01 4.67E-02 G

1004.80 3.983E-02 % 2.555E-01 7.44E-02 G

EU-155 5.8222E-02

86.45 5.822E-02 %(2.332E-01 7.01E-02 G K

105.31 6.011E-02 % 2.316E-01 6.96E-02 G

HG-203 1.4714E-03

279.17 1.471E-03 &(P 4.671E-02 1.38E-02 G K

72.87-9.516E-02 % P 2.269E+00 6.77E-01 G

70.83-9.264E-02 & 3.913E+00 1.16E+00 G

82.50 7.457E-01 & 3.117E+00 9.34E-01 G

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

TL-208       2.0467E-01
                   583.14 2.047E-01  (P 3.739E-02 1.74E-02 G
                   510.72 3.029E-01 + P 1.848E-01 7.01E-02 G

PB-212       7.2746E-01
                   238.63 7.119E-01  (P 9.697E-02 4.27E-02 G K
                                        Energy duplication
                    77.11 5.940E-01 } P 3.655E-01 1.17E-01 G
                    74.81 7.055E-01  (P 7.521E-01 2.34E-01 G

PB-214       4.5258E-01
                   351.99 4.518E-01 @(P 9.083E-02 3.88E-02 G K
                   295.22 4.540E-01 @(P 1.681E-01 6.36E-02 G
                                        Energy duplication
                    77.11 1.256E-01 } P 9.066E-01 2.17E-01 G
                   241.92 2.905E-01 %   5.733E-01 1.74E-01 G

BI-212       3.0857E-01
                   727.17 3.086E-01 @(P 3.408E-01 1.08E-01 G K
                  1620.56 3.890E-01 % P 7.875E-01 2.42E-01 G
                   785.42 3.048E-01 &   2.043E+00 5.97E-01 G

BI-214       3.5716E-01
                   609.32 3.572E-01  (P 8.429E-02 3.76E-02 G K
                  1764.51 4.911E-01 + P 1.057E-01 7.04E-02 G
                  1120.28 6.635E-01 + P 3.903E-01 1.67E-01 G

RA-224       8.7518E-01
                   241.00 8.752E-01  (  1.091E+00 3.35E-01 G
```

```
RA-226       1.0262E+00
                 185.99 1.026E+00 *(P 1.210E+00 3.71E-01 G

AC-228       7.8908E-01
                 911.07 7.104E-01 @(P 1.938E-01 9.29E-02 G K
                 968.90 9.197E-01 *(P 2.684E-01 1.23E-01 G
                 338.40 5.989E-01 - P 2.776E-01 1.05E-01 G

TH-227      -2.3192E-01
                 236.00-2.319E-01 %(  4.107E-01 1.25E-01 G K
                 256.25-1.250E-01 % P 5.435E-01 1.63E-01 G

PA-234       7.6242E-02
                  98.44-4.938E-02 %(P 2.260E-01 6.77E-02 G K
                 946.00-4.824E-02 % P 2.272E-01 6.68E-02 G
                 131.28-2.167E-02 % P 2.201E-01 6.57E-02 G
                  94.67 2.797E-01 ?(P 3.537E-01 1.09E-01 G
                 883.24-3.634E-02 %   3.043E-01 8.77E-02 G
                 926.70-1.095E-01 %   3.653E-01 1.08E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26-1.934E-02 % P 3.052E-01 8.71E-02 G

TH-234 4.8273E-01
63.29 4.827E-01 &(P 6.275E+00 1.86E+00 G K
92.80 1.189E+00 % P 2.195E+00 6.64E-01 G
92.38 1.368E+00 % P 2.599E+00 7.86E-01 G

AM-241 -1.2345E-01
59.54-1.235E-01 &(P 1.167E+00 3.48E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	6.5529E-02	6.7220E-02	3.2034E-01	3.2036E-01	3.520E-01
K-40		1.1771E+01	1.1771E+01	1.1675E+00	1.3528E+00	
MN-54	#A	6.4106E-03	6.4386E-03	3.5340E-02	3.5342E-02	4.025E-02
CO-57	#B	-9.1833E-03	-9.2296E-03	4.8746E-02	4.8749E-02	5.206E-02
CO-60		4.6409E-01	4.6442E-01	5.6891E-02	6.2957E-02	

Sr-85	#A	-1.5360E-02	-1.5686E-02	4.2567E-02	4.2577E-02	4.630E-02
Kr-85	#A	-3.5461E+02	-3.5462E+02	9.6231E+02	9.6253E+02	1.069E+03
Y-88	#B	1.1815E-04	1.1966E-04	1.6929E-02	1.6929E-02	2.260E-02
NB-94	#B	7.3158E-03	7.3158E-03	3.5851E-02	3.5853E-02	4.089E-02
Ag-108M	#B	-9.1315E-04	-9.1318E-04	5.6749E-02	5.6749E-02	6.459E-02
CD-109	#A	-1.8527E-01	-1.8582E-01	1.8014E+00	1.8014E+00	2.003E+00
SN-113	#B	-2.2635E-03	-2.2905E-03	4.3131E-02	4.3132E-02	4.863E-02
SB-125	#B	2.0621E-02	2.0649E-02	1.0990E-01	1.0991E-01	1.236E-01
I-131	#B	-7.6706E-03	-9.0842E-03	4.0895E-02	4.0898E-02	3.528E-02
CS-134	#B	-2.2092E-03	-2.2132E-03	7.2770E-02	7.2771E-02	8.156E-02
CS-137		4.4143E-01	4.4149E-01	8.0648E-02	8.4624E-02	
CE-139	#A	-6.6048E-04	-6.6705E-04	4.1200E-02	4.1200E-02	4.579E-02
EU-152	#B	6.5996E-02	6.6015E-02	7.7410E-02	7.7496E-02	1.527E-01
EU-154	#B	7.3163E-04	7.3195E-04	9.6950E-02	9.6950E-02	1.086E-01
EU-155	#B	5.8178E-02	5.8222E-02	2.1024E-01	2.1026E-01	2.330E-01
HG-203	#B	1.4290E-03	1.4714E-03	4.1446E-02	4.1446E-02	4.536E-02
TL-208		2.0467E-01	2.0467E-01	5.2089E-02	5.3427E-02	
PB-212		7.2746E-01	7.2746E-01	1.3089E-01	1.3753E-01	
PB-214	#	4.5258E-01	4.5258E-01	1.1161E-01	1.1467E-01	
BI-212	#A	3.0857E-01	3.0857E-01	3.2337E-01	3.2386E-01	3.408E-01
BI-214		3.5716E-01	3.5716E-01	1.1294E-01	1.1483E-01	
RA-224	A	8.7518E-01	8.7518E-01	1.0063E+00	1.0076E+00	1.091E+00
RA-226	#A	1.0262E+00	1.0262E+00	1.1134E+00	1.1150E+00	1.210E+00
AC-228		7.8908E-01	7.8908E-01	2.2147E-01	2.2616E-01	
TH-227	#B	-2.3192E-01	-2.3192E-01	3.7497E-01	3.7521E-01	4.107E-01
PA-234	#B	7.6242E-02	7.6242E-02	8.8935E-02	8.9036E-02	2.260E-01
TH-234	#B	4.8273E-01	4.8273E-01	5.5900E+00	5.5901E+00	6.275E+00
AM-241	#A	-1.2345E-01	-1.2345E-01	1.0759E+00	1.0759E+00	1.166E+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 (87.4 to 2000.7 keV) 1.6082924E+01 pCi/gm

Total Decayed Activity (87.4 to 2000.7 keV) 1.6083307E+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: 103F_30AUG2005_0927.An1

Sample description

FSS-NOL-06-01-001-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30AUG2005_0927.An1

Acquisition information

Start time:	30-Aug-2005 09:29:06
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: 1.6660E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6660E+03) =
6.0024E+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	27-Aug-2005 12:14:00
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: 0.1855

***** 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	85.	29.94	0.99	9.052E-03	74.81	9.600	7.935E-01	PB212
77.21	188.	11.45	0.99	1.011E-02	77.11	10.700	1.524E+00	PB214
					77.11	17.500	9.316E-01	PB212
93.04	112.	32.75	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.05	111.	33.09	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234

185.92	174.	22.69	1.28	2.567E-02	185.99	3.280	1.547E+00	RA226
209.48	170.	22.79	1.10	2.470E-02				
238.87	1096.	3.46	1.09	2.319E-02	238.63	43.100	8.793E-01	PB212
241.91	168.	15.51	1.10	2.303E-02	241.00	3.900	1.511E+00	RA224
					241.92	7.470	7.908E-01	PB214
269.92	88.	31.60	1.13	2.153E-02				
277.73	82.	37.67	1.36	2.112E-02				
277.73	82.	37.67	1.36	2.112E-02	279.17	81.500	PBC<MDA	HG203
295.26	248.	10.28	0.96	2.025E-02	295.22	19.200	5.100E-01	PB214
300.39	80.	34.47	1.15	2.000E-02				
327.95	49.	39.73	0.93	1.874E-02				
338.33	210.	12.71	1.08	1.830E-02	338.40	12.010	7.709E-01	AC228
351.90	436.	8.38	1.18	1.776E-02	351.99	37.100	5.300E-01	PB214
463.17	72.	28.63	0.76	1.425E-02				
463.17	72.	28.63	0.76	1.425E-02	463.51	10.000	4.035E-01	SB125
510.72	141.	20.09	1.51	1.317E-02	510.72	22.500	3.126E-01	TL208
582.98	382.	6.80	1.24	1.185E-02	583.14	86.000	3.004E-01	TL208
609.30	314.	7.71	1.24	1.144E-02	609.32	46.090	4.727E-01	BI214
661.19	47.	32.04	1.24	1.073E-02				
661.19	47.	32.04	1.24	1.073E-02	661.62	84.620	PBC<MDA	CS137
727.43	96.	19.23	1.54	9.962E-03	727.17	11.800	6.623E-01	BI212
795.01	70.	20.74	2.31	9.308E-03				
795.01	70.	20.74	2.31	9.308E-03	795.76	85.400	7.189E-02	CS134
859.15	69.	22.87	1.90	8.778E-03				
911.17	279.	7.55	1.61	8.401E-03	911.07	29.000	9.177E-01	AC228
968.32	192.	11.83	1.41	8.029E-03	968.90	17.460	1.111E+00	AC228
1120.37	92.	23.81	1.02	7.211E-03	1120.28	15.040	6.753E-01	BI214
1237.75	87.	26.49	1.53	6.703E-03				
1460.69	1106.	3.04	1.90	5.932E-03	1460.75	10.700	1.389E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.46	44.	15.78	1.69	5.142E-03	1764.51	15.920	4.066E-01	Bl214

********** 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
418.12	209.48	495.	170.	0.085	68.36	1.100	AC-228
539.00	269.92	278.	88.	0.044	94.81	1.127	AC-228 s
554.61	277.73	323.	82.	0.041	99.26	1.358	NP-239 s
599.93	300.39	268.	80.	0.040	103.40	1.153	PB-212
655.03	327.95	165.	49.	0.024	119.19	0.926	AC-228
1717.34	859.15	60.	69.	0.034	68.61	1.899	TL-208 s
2474.44	1237.75	111.	87.	0.043	79.46	1.532	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	148.79	74.81	307.	85.	0.043	89.82	0.993D
PB-212	153.39	77.11	293.	188.	0.094	34.34	0.995A
TH-234	185.27	93.05	866.	111.	0.056	99.28	1.500s

TH-234	185.26	93.04	851.	112.	0.056	98.26	1.500s
RA-226	371.01	185.92	563.	161.	0.080	68.07	1.285s
PB-212	476.86	238.85	646.	1047.	0.523	14.91	0.888
RA-224	482.87	241.86	641.	151.	0.075	75.40	1.500
PB-214	482.79	241.82	311.	89.	0.044	86.06	1.515s
PB-214	589.66	295.26	197.	244.	0.122	30.84	0.960
AC-228	675.81	338.33	202.	209.	0.104	38.13	1.083
PB-214	702.94	351.90	270.	430.	0.215	25.13	1.185
SB-125	925.25	463.06	124.	57.	0.029	89.51	1.500s
TL-208	1020.56	510.72	227.	114.	0.057	60.27	1.514s
TL-208	1165.06	582.98	109.	377.	0.189	20.41	1.240
BI-214	1217.70	609.30	107.	307.	0.154	23.12	1.238
CS-137	1321.97	661.44	98.	40.	0.020	111.62	1.500
BI-212	1453.94	727.43	86.	96.	0.048	57.70	1.539
CS-134	1588.65	794.80	39.	63.	0.032	56.15	1.500s
AC-228	1821.38	911.17	60.	276.	0.138	22.66	1.605
AC-228	1935.65	968.32	81.	192.	0.096	35.49	1.408
BI-214	2239.72	1120.37	95.	90.	0.045	71.43	1.020s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2920.24	1460.69	27.	1087.	0.544	9.11	1.902
Bl-214	3527.68	1764.46	5.	41.	0.021	47.35	1.690

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.5342E-02					
			477.56	1.534E-02	%(	3.254E-01	9.44E-02 G
K-40		1.3895E+01					
			1460.75	1.389E+01	(P	3.425E-01	4.29E-01 G
MN-54		1.9791E-02					
			834.81	1.979E-02	%(P	3.873E-02	1.18E-02 G
CO-57		-3.9865E-03					
			122.07	-3.986E-03	&(P	5.520E-02	1.65E-02 G K
			136.43	5.917E-02	&	4.169E-01	1.25E-01 G
CO-60		1.5101E-02					
			1332.51	1.510E-02	%(P	3.744E-02	1.10E-02 G K
			1173.23	2.763E-02	% P	4.683E-02	1.43E-02 G K

```
Sr-85       -1.0045E-02
                514.00-1.004E-02 &(  4.837E-02 1.44E-02 G

Kr-85       -2.2451E+02
                513.99-2.245E+02 &(  1.083E+03 3.22E+02 G

Y-88        -3.1695E-03
               1836.01-3.169E-03 %(P 2.825E-02 7.52E-03 G K
                898.02-2.249E-03 % P 2.612E-02 7.10E-03 G

NB-94        -4.1165E-03
                871.10-4.117E-03 %(  3.209E-02 9.18E-03 G K
                702.50 1.313E-02 &   3.497E-02 1.05E-02 G K

Ag-108M      2.0984E-03
                722.95 2.098E-03 %(  4.208E-02 1.21E-02 G K
                614.37-1.778E-02 % P 4.534E-02 1.36E-02 G
                433.93-9.279E-03 &   3.674E-02 1.09E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.2435E-01						
		88.04	1.243E-01	&(	2.189E+00	6.54E-01	G
SN-113	-2.8995E-03						
		391.71	-2.899E-03	%(	5.433E-02	1.59E-02	G K
		255.04	5.160E-01	%	1.469E+00	4.42E-01	G
SB-125	9.3521E-02						
		427.95	1.515E-02	%(P	1.025E-01	3.01E-02	G K
		600.77	4.010E-03	& P	1.853E-01	5.32E-02	G
		636.15	-2.115E-02	& P	3.244E-01	9.34E-02	G
		463.51	3.255E-01	*(P	3.110E-01	9.93E-02	G
		176.29	9.771E-02	&	5.819E-01	1.74E-01	G
I-131	-5.4730E-03						
		364.48	-5.473E-03	&(P	4.947E-02	1.45E-02	G K
		636.97	1.434E-01	&	5.358E-01	1.58E-01	G
		284.29	3.618E-02	% P	6.840E-01	2.01E-01	G
CS-134	3.6415E-02						
		604.66	1.150E-02	&(	2.393E-02	7.26E-03	G K
		795.76	6.489E-02	*(P	3.253E-02	1.22E-02	G
		569.29	2.682E-03	% P	2.011E-01	5.73E-02	G
		801.84	-6.186E-02	% P	4.232E-01	1.21E-01	G
CS-137	3.5541E-02						
		661.62	3.554E-02	(P	4.366E-02	1.37E-02	G
CE-139	1.1199E-03						
		165.85	1.120E-03	&(	4.286E-02	1.27E-02	G

```
EU-152      -1.2637E-02
                 121.78-1.264E-02 &(P 1.561E-01 4.65E-02 G K
                 344.30 9.760E-03 % P 1.175E-01 3.45E-02 G
                1408.08 6.572E-02 &   1.708E-01 5.09E-02 G
                 964.00 9.786E-02 % P 3.790E-01 1.12E-01 G
                1112.07 0.000E+00 %   3.420E-01 9.70E-02 G
                 778.90 7.034E-03 &   2.653E-01 7.54E-02 G

EU-154      -1.6358E-02
                 123.10-1.636E-02 %(  1.170E-01 3.50E-02 G K
                1274.80 1.588E-02 %   1.122E-01 3.21E-02 G
                 723.30 0.000E+00 %   3.587E-01 1.05E-01 G
                1004.80-3.226E-02 &   2.481E-01 7.18E-02 G
```

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

EU-155       1.3103E-02
                    86.45 1.310E-02 %(  2.681E-01 8.01E-02 G K
                   105.31 1.104E-01 %   2.431E-01 7.36E-02 G

HG-203       1.9136E-04
                   279.17 1.914E-04 &(P 4.384E-02 1.29E-02 G K
                    72.87-2.050E-01 & P 1.922E+00 5.72E-01 G
                    70.83 1.891E+00 %   3.298E+00 1.01E+00 G
                    82.50-8.179E-01 &   3.692E+00 1.11E+00 G

TL-208       3.0296E-01
                   583.14 3.004E-01  (P 4.085E-02 2.07E-02 G
                   510.72 3.126E-01 *(P 1.995E-01 7.75E-02 G

PB-212       8.6219E-01
                   238.63 8.493E-01  (P 9.829E-02 4.27E-02 G K
                                      Energy duplication
                    77.11 8.622E-01 } P 3.778E-01 9.87E-02 G
                    74.81 7.935E-01  (P 7.874E-01 2.46E-01 G

PB-214       5.2319E-01
                   351.99 5.300E-01  (P 9.758E-02 4.50E-02 G K
                   295.22 5.100E-01  (P 1.420E-01 5.33E-02 G
                                      Energy duplication
                    77.11 0.000E+00 } P 9.271E-01 0.00E+00 G
                   241.92 4.188E-01 -   4.005E-01 1.20E-01 G

BI-212       6.6228E-01
                   727.17 6.623E-01  (P 3.168E-01 1.28E-01 G K
                  1620.56 2.726E-01 & P 8.815E-01 2.54E-01 G
```

785.42 7.322E-01 % 1.782E+00 5.36E-01 G

BI-214 4.5569E-01

609.32 4.727E-01 (P 7.825E-02 3.72E-02 G K

1764.51 4.066E-01 (P 1.298E-01 6.93E-02 G

1120.28 6.753E-01 + P 3.594E-01 1.64E-01 G

RA-224 1.3576E+00

241.00 1.358E+00 (1.088E+00 3.41E-01 G

RA-226 1.5469E+00

185.99 1.547E+00 *(P 1.092E+00 3.79E-01 G

AC-228 9.9015E-01

911.07 9.177E-01 (P 1.296E-01 7.02E-02 G K

968.90 1.111E+00 (P 2.587E-01 1.31E-01 G

338.40 7.709E-01 - P 2.545E-01 9.85E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.0754E-01						
		236.00	-1.075E-01	%(	3.254E-01	9.79E-02	G K
		256.25	-3.534E-02	% P	5.068E-01	1.50E-01	G
PA-234	-7.3992E-03						
		98.44	-7.399E-03	%(P	2.411E-01	7.17E-02	G K
		946.00	-5.005E-02	% P	1.902E-01	5.59E-02	G
		131.28	1.725E-02	& P	2.223E-01	6.63E-02	G
		94.67	-2.275E-01	& P	4.579E-01	1.39E-01	G
		883.24	1.096E-01	%	2.592E-01	7.79E-02	G
		926.70	-5.967E-02	%	3.588E-01	1.04E-01	G
		569.26	3.640E-03	% P	2.977E-01	8.47E-02	G
TH-234	1.0661E+00						
		63.29	-2.452E-01	&(P	6.224E+00	1.83E+00	G K
		92.80	1.836E+00	(P	2.279E+00	6.96E-01	G
		92.38	2.157E+00	&(P	2.706E+00	8.27E-01	G
AM-241	-3.8698E-02						
		59.54	-3.870E-02	&(P	9.314E-01	2.75E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	1.4778E-02	1.5342E-02	2.8319E-01	2.8319E-01	3.134E-01
K-40	1.3895E+01	1.3895E+01	1.2869E+00	1.5189E+00	
MN-54 #A	1.9665E-02	1.9791E-02	3.5348E-02	3.5367E-02	3.848E-02
CO-57 #B	-3.9571E-03	-3.9865E-03	5.3931E-02	5.3931E-02	5.479E-02
CO-60 #B	1.5085E-02	1.5101E-02	3.3036E-02	3.3048E-02	3.740E-02
Sr-85 #A	-9.7398E-03	-1.0045E-02	4.3131E-02	4.3134E-02	4.690E-02
Kr-85 #A	-2.2451E+02	-2.2451E+02	9.6538E+02	9.6547E+02	1.083E+03
Y-88 #B	-3.1105E-03	-3.1695E-03	2.4123E-02	2.4123E-02	2.773E-02
NB-94 #B	-4.1165E-03	-4.1165E-03	2.7546E-02	2.7547E-02	3.209E-02
Ag-108M#B	2.0983E-03	2.0984E-03	3.6338E-02	3.6338E-02	4.208E-02
CD-109 #A	1.2380E-01	1.2435E-01	1.9609E+00	1.9609E+00	2.179E+00
SN-113 #B	-2.8495E-03	-2.8995E-03	4.7732E-02	4.7732E-02	5.339E-02
SB-125 #B	9.3337E-02	9.3521E-02	8.5586E-02	8.5758E-02	1.023E-01
I-131 #B	-4.2676E-03	-5.4730E-03	5.2400E-02	5.2401E-02	3.857E-02
CS-134 #F	3.6319E-02	3.6415E-02	2.0475E-02	2.0584E-02	2.386E-02
CS-137 #A	3.5534E-02	3.5541E-02	4.1055E-02	4.1107E-02	4.365E-02
CE-139 #A	1.1038E-03	1.1199E-03	3.8096E-02	3.8096E-02	4.224E-02
EU-152 #B	-1.2632E-02	-1.2637E-02	1.6698E-01	1.6698E-01	1.560E-01
EU-154 #B	-1.6347E-02	-1.6358E-02	1.0498E-01	1.0498E-01	1.169E-01
EU-155 #B	1.3088E-02	1.3103E-02	2.4022E-01	2.4022E-01	2.678E-01
HG-203 #B	1.8332E-04	1.9136E-04	3.8709E-02	3.8709E-02	4.200E-02
TL-208	3.0296E-01	3.0296E-01	6.2536E-02	6.4963E-02	

PB-212	8.6219E-01	8.6219E-01	1.3005E-01	1.3935E-01	
PB-214	5.2319E-01	5.2319E-01	1.0565E-01	1.0993E-01	
BI-212	6.6228E-01	6.6228E-01	3.8409E-01	3.8601E-01	
BI-214	4.5569E-01	4.5569E-01	1.0758E-01	1.1078E-01	
RA-224	1.3576E+00	1.3576E+00	1.0236E+00	1.0266E+00	1.088E+00
RA-226 #	1.5469E+00	1.5469E+00	1.1379E+00	1.1414E+00	
AC-228	9.9015E-01	9.9015E-01	2.0934E-01	2.1709E-01	
TH-227 #B	-1.0754E-01	-1.0754E-01	2.9373E-01	2.9379E-01	3.254E-01
PA-234 #B	-7.3992E-03	-7.3992E-03	3.4872E-01	3.4872E-01	2.411E-01
TH-234 #B	1.0661E+00	1.0661E+00	1.2131E+00	1.2146E+00	6.224E+00
AM-241 #A	-3.8697E-02	-3.8698E-02	9.1402E-01	9.1402E-01	9.314E-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 (81.4 to 2000.7 keV) 2.0595583E+01 pCi/gm

Total Decayed Activity (81.4 to 2000.7 keV) 2.0595589E+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_30AUG2005_1012.An1

Sample description

FSS-NOL-06-01-004-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30AUG2005_1012.An1

Acquisition information

Start time:	30-Aug-2005 10:13:35
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: 1.7270E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7270E+03) =
5.7904E+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	27-Aug-2005 12:12:00
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: 0.1178

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.86	93.	28.78	0.99	9.052E-03	74.81	9.600	8.370E-01	PB212
77.16	208.	10.84	0.99	1.011E-02	77.11	10.700	1.514E+00	PB214
					77.11	17.500	9.257E-01	PB212
93.20	114.	32.40	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.22	118.	31.71	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234

186.18	158.	22.24	1.17	2.566E-02	185.99	3.280	1.344E+00	RA226
209.80	130.	26.78	0.68	2.469E-02				
238.95	1230.	3.33	1.09	2.318E-02	238.63	43.100	9.536E-01	PB212
241.66	152.	16.66	1.09	2.304E-02	241.00	3.900	1.324E+00	RA224
					241.92	7.470	6.930E-01	PB214
270.62	98.	23.04	1.21	2.149E-02				
278.11	98.	32.00	1.07	2.110E-02				
278.11	98.	32.00	1.07	2.110E-02	279.17	81.500	4.690E-02	HG203
295.22	239.	12.35	0.90	2.025E-02	295.22	19.200	4.737E-01	PB214
300.23	53.	36.70	0.95	2.001E-02				
327.79	92.	28.28	1.86	1.875E-02				
338.45	256.	10.86	1.10	1.830E-02	338.40	12.010	9.057E-01	AC228
351.92	415.	8.92	1.09	1.776E-02	351.99	37.100	4.866E-01	PB214
463.37	87.	27.66	1.32	1.425E-02				
463.37	87.	27.66	1.32	1.425E-02	463.51	10.000	4.718E-01	SB125
510.80	176.	14.68	1.48	1.317E-02	510.72	22.500	3.929E-01	TL208
583.19	418.	7.01	1.19	1.184E-02	583.14	86.000	3.181E-01	TL208
609.34	239.	10.03	1.31	1.144E-02	609.32	46.090	3.457E-01	BI214
727.07	123.	18.26	1.32	9.966E-03	727.17	11.800	8.166E-01	BI212
794.72	62.	32.84	1.61	9.310E-03				
794.72	62.	32.84	1.61	9.310E-03	795.76	85.400	6.165E-02	CS134
860.83	70.	24.74	0.92	8.765E-03				
911.18	295.	8.76	1.35	8.401E-03	911.07	29.000	9.366E-01	AC228
964.87	53.	20.81	1.54	8.051E-03	964.00	14.580	3.512E-01	EU152
969.14	153.	9.44	1.54	8.025E-03	968.90	17.460	8.554E-01	AC228
1120.49	82.	28.92	1.09	7.211E-03	1120.28	15.040	5.793E-01	BI214
1238.48	46.	39.01	1.30	6.700E-03				
1460.82	1208.	2.90	1.72	5.932E-03	1460.75	10.700	1.467E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1621.01	18.	36.68	1.04	5.486E-03	1620.56	2.750	9.569E-01	Bl212
1764.52	62.	12.40	2.25	5.142E-03	1764.51	15.920	5.901E-01	Bl214

********** 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
418.75	209.80	454.	130.	0.065	80.33	0.676	NP-239
540.40	270.62	206.	98.	0.049	69.13	1.207	AC-228
555.36	278.11	332.	98.	0.049	96.00	1.070	SB-126 l
599.61	300.23	172.	53.	0.027	110.09	0.951	PB-212
654.72	327.79	234.	92.	0.046	84.85	1.859	AC-228 s
1720.69	860.83	65.	72.	0.036	59.19	0.917	TL-208 s
1929.13	964.84	35.	53.	0.026	62.97	1.538	AC-228 D
2475.89	1238.48	92.	46.	0.023	117.03	1.299	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	337.	93.	0.046	86.33	0.993D

PB-212	153.39	77.11	317.	208.	0.104	32.52	0.995A
TH-234	185.62	93.22	879.	118.	0.059	95.13	1.500
TH-234	185.58	93.20	863.	114.	0.057	97.21	1.500
RA-226	371.59	186.21	645.	151.	0.075	69.26	1.500
PB-212	476.42	238.63	207.	1220.	0.610	9.81	1.093D
PB-214	483.00	241.92	348.	106.	0.053	61.24	1.095A
PB-214	589.59	295.22	269.	235.	0.118	37.06	0.896s
AC-228	676.05	338.45	207.	254.	0.127	32.57	1.100
PB-214	702.98	351.92	295.	410.	0.205	26.76	1.088
SB-125	925.75	463.31	156.	49.	0.025	112.61	1.500
TL-208	1020.72	510.80	184.	149.	0.074	44.04	1.479s
TL-208	1165.47	583.19	134.	414.	0.207	21.02	1.192
BI-214	1217.77	609.34	127.	233.	0.116	30.10	1.306
BI-212	1453.21	727.07	101.	123.	0.061	54.79	1.323s
CS-134	1588.82	794.88	69.	37.	0.019	107.08	1.500
AC-228	1821.38	911.18	101.	292.	0.146	26.27	1.355
EU-152	1928.95	964.97	64.	44.	0.022	88.42	1.538
AC-228	1936.81	968.90	28.	153.	0.077	28.32	1.541D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bi-214	2239.95	1120.49	120.	80.	0.040	86.76	1.086s
K-40	2920.51	1460.82	26.	1190.	0.595	8.71	1.724
Bi-212	3240.82	1621.01	10.	18.	0.009	110.04	1.045s
Bi-214	3527.80	1764.52	3.	62.	0.031	37.21	2.250

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		8.5886E-02					
			477.56	8.589E-02	%(	3.056E-01	9.08E-02 G
K-40		1.4666E+01					
			1460.75	1.467E+01	(P	3.281E-01	4.32E-01 G
MN-54		6.2062E-04					
			834.81	6.206E-04	%(P	4.262E-02	1.22E-02 G
CO-57		-2.6388E-04					
			122.07	-2.639E-04	%(P	4.847E-02	1.44E-02 G K
			136.43	1.415E-01	&	3.618E-01	1.09E-01 G
CO-60		-2.9080E-03					
			1332.51	-2.908E-03	&(P	3.823E-02	1.02E-02 G K

1173.23 1.230E-02 & P 4.607E-02 1.35E-02 G K

Sr-85 -1.3973E-02

514.00-1.397E-02 %(4.259E-02 1.28E-02 G

Kr-85 -3.1315E+02

513.99-3.131E+02 %(9.531E+02 2.86E+02 G

Y-88 -7.9305E-05

1836.01-7.931E-05 %(P 2.532E-02 6.34E-03 G K

898.02-5.736E-03 & P 3.794E-02 1.09E-02 G

NB-94 -5.1337E-03

871.10-5.134E-03 &(3.226E-02 9.30E-03 G K

702.50 1.074E-02 & 3.293E-02 9.79E-03 G K

Ag-108M 2.3631E-03

722.95 2.363E-03 %(4.256E-02 1.23E-02 G K

614.37-1.787E-02 & P 4.149E-02 1.25E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                    433.93 1.064E-02 %   3.669E-02 1.09E-02 G

CD-109      -1.1996E-01
                     88.04-1.200E-01 &(  2.219E+00 6.63E-01 G

SN-113       3.4256E-03
                    391.71 3.426E-03 %(  5.055E-02 1.48E-02 G K
                    255.04 3.743E-02 %   1.542E+00 4.54E-01 G

SB-125       9.3803E-02
                    427.95 3.390E-02 &(P 1.007E-01 3.01E-02 G K
                    600.77-1.117E-03 & P 1.925E-01 5.54E-02 G
                    636.15-4.236E-02 % P 2.799E-01 8.10E-02 G
                    463.51 2.711E-01  (P 3.352E-01 1.04E-01 G
                    176.29-6.288E-02 %   6.307E-01 1.88E-01 G

I-131        1.0359E-03
                    364.48 1.036E-03 &(P 4.689E-02 1.37E-02 G K
                    636.97-1.276E-01 %   5.661E-01 1.66E-01 G
                    284.29-2.537E-03 % P 7.350E-01 2.16E-01 G

CS-134      -1.9863E-02
                    604.66-1.986E-02 %(  4.477E-02 1.35E-02 G K
                    795.76 3.662E-02 + P 4.104E-02 1.31E-02 G
                    569.29-1.544E-02 % P 2.333E-01 6.72E-02 G
                    801.84-1.262E-01 % P 4.492E-01 1.31E-01 G

CS-137       7.9782E-03
                    661.62 7.978E-03 %(P 4.230E-02 1.24E-02 G

CE-139      -6.2909E-03
```

165.85-6.291E-03 &(4.914E-02 1.47E-02 G

EU-152 1.1021E-01

121.78 1.967E-02 %(P 1.490E-01 4.45E-02 G K

344.30 1.696E-02 % P 1.195E-01 3.53E-02 G

1408.08 2.644E-02 % 1.332E-01 3.76E-02 G

964.00 2.918E-01 &(P 2.660E-01 8.71E-02 G

1112.07 4.526E-02 & 3.158E-01 9.13E-02 G

778.90-2.550E-02 & 2.538E-01 7.29E-02 G

EU-154 6.5720E-03

123.10 6.572E-03 %(1.091E-01 3.25E-02 G K

1274.80 5.042E-02 % 1.319E-01 3.95E-02 G

723.30-8.457E-03 % 3.390E-01 9.98E-02 G

1004.80 3.931E-02 % 2.318E-01 6.74E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.1616E-01						
		86.45	1.162E-01	%(	2.495E-01	7.56E-02	G K
		105.31	4.556E-02	%	2.348E-01	7.04E-02	G
HG-203	2.7625E-02						
		279.17	2.762E-02	%(P	4.051E-02	1.24E-02	G K
		72.87	-3.303E-01	& P	2.212E+00	6.62E-01	G
		70.83	-7.247E-04	&	4.321E+00	1.28E+00	G
		82.50	-1.091E+00	&	4.218E+00	1.27E+00	G
TL-208	3.1809E-01						
		583.14	3.181E-01	(P	4.350E-02	2.25E-02	G
		510.72	3.929E-01	+ P	1.741E-01	6.80E-02	G
PB-212	9.4624E-01						
		238.63	9.546E-01	(P	5.457E-02	3.15E-02	G K
							Energy duplication
		77.11	9.206E-01	} P	3.785E-01	9.98E-02	G
		74.81	8.370E-01	- P	7.948E-01	2.49E-01	G
PB-214	4.8218E-01						
		351.99	4.866E-01	(P	9.838E-02	4.40E-02	G K
		295.22	4.737E-01	@(P	1.592E-01	5.95E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.515E-01	0.00E+00	G
		241.92	4.822E-01	}	4.080E-01	9.84E-02	G
BI-212	8.4310E-01						
		727.17	8.166E-01	*(P	3.301E-01	1.50E-01	G K
		1620.56	9.569E-01	(P	8.870E-01	3.52E-01	G

785.42-1.695E-02 % 2.068E+00 5.94E-01 G

BI-214 3.4570E-01

609.32 3.457E-01 (P 8.198E-02 3.57E-02 G K

1764.51 5.901E-01 + P 1.065E-01 7.71E-02 G

1120.28 5.793E-01 + P 3.873E-01 1.72E-01 G

RA-224 7.7453E-01

Derived Ave Activity

241.00 7.745E-01 }(1.396E+00 4.37E-01 G

RA-226 1.4011E+00

185.99 1.401E+00 (P 1.125E+00 3.51E-01 G

AC-228 9.0598E-01

911.07 9.366E-01 (P 1.594E-01 8.30E-02 G K

968.90 8.553E-01 (P 1.534E-01 8.08E-02 G

338.40 9.057E-01 (P 2.481E-01 9.88E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.5542E-01						
		236.00	-1.554E-01	%(	3.765E-01	1.14E-01	G K
		256.25	5.963E-02	&	P 4.319E-01	1.28E-01	G
PA-234	1.0896E-02						
		98.44	1.090E-02	%(P	2.217E-01	6.60E-02	G K
		946.00	6.287E-02	&	P 1.712E-01	5.10E-02	G
		131.28	2.419E-02	&	P 2.122E-01	6.34E-02	G
		94.67	-7.633E-02	%	P 4.238E-01	1.27E-01	G
		883.24	4.712E-02	%	2.565E-01	7.41E-02	G
		926.70	0.000E+00	%	3.408E-01	9.64E-02	G
		569.26	-2.267E-02	%	P 3.357E-01	9.65E-02	G
TH-234	1.7875E+00						
		63.29	1.493E+00	&(P	6.837E+00	2.05E+00	G K
		92.80	1.809E+00	(P	2.214E+00	6.77E-01	G
		92.38	2.209E+00	&(P	2.630E+00	8.05E-01	G
AM-241	2.8151E-02						
		59.54	2.815E-02	&(P	1.113E+00	3.30E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	8.2694E-02	8.5886E-02	2.7240E-01	2.7244E-01	2.942E-01
K-40	1.4666E+01	1.4666E+01	1.2973E+00	1.5518E+00	
MN-54 #A	6.1662E-04	6.2062E-04	3.6669E-02	3.6669E-02	4.235E-02
CO-57 #B	-2.6191E-04	-2.6388E-04	1.9762E-01	1.9762E-01	4.811E-02
CO-60 #B	-2.9050E-03	-2.9080E-03	5.2913E-01	5.2913E-01	3.819E-02
Sr-85 #A	-1.3544E-02	-1.3973E-02	3.8277E-02	3.8286E-02	4.128E-02
Kr-85 #A	-3.1314E+02	-3.1315E+02	8.5663E+02	8.5683E+02	9.531E+02
Y-88 #B	-7.7815E-05	-7.9305E-05	1.5559E-01	1.5559E-01	2.484E-02
NB-94 #B	-5.1337E-03	-5.1337E-03	2.7907E-02	2.7909E-02	3.226E-02
Ag-108M#B	2.3630E-03	2.3631E-03	3.6865E-02	3.6865E-02	4.256E-02
CD-109 #A	-1.1943E-01	-1.1996E-01	1.9889E+00	1.9889E+00	2.209E+00
SN-113 #B	3.3660E-03	3.4256E-03	4.4411E-02	4.4411E-02	4.967E-02
SB-125 #B	9.3616E-02	9.3803E-02	1.0837E-01	1.0850E-01	1.005E-01
I-131 #B	8.0550E-04	1.0359E-03	4.0967E-02	4.0967E-02	3.646E-02
CS-134 #B	-1.9810E-02	-1.9863E-02	4.0602E-02	4.0618E-02	4.465E-02
CS-137 #A	7.9767E-03	7.9782E-03	3.7103E-02	3.7106E-02	4.230E-02
CE-139 #A	-6.1990E-03	-6.2909E-03	4.4048E-02	4.4050E-02	4.843E-02
EU-152 #B	1.1016E-01	1.1021E-01	9.8657E-02	9.8846E-02	1.489E-01
EU-154 #B	6.5678E-03	6.5720E-03	9.7560E-02	9.7561E-02	1.090E-01
EU-155 #B	1.1603E-01	1.1616E-01	2.2692E-01	2.2701E-01	2.492E-01
HG-203 #B	2.6451E-02	2.7625E-02	3.7330E-02	3.7364E-02	3.879E-02
TL-208	3.1809E-01	3.1809E-01	6.7543E-02	7.0022E-02	

PB-212		9.4624E-01	9.4624E-01	9.3713E-02	1.0863E-01
PB-214		4.8218E-01	4.8218E-01	1.1197E-01	1.1541E-01
BI-212		8.4310E-01	8.4310E-01	4.6378E-01	4.6636E-01
BI-214		3.4570E-01	3.4570E-01	1.0696E-01	1.0882E-01
RA-224	A	7.7453E-01	7.7453E-01	1.2847E+00	1.2855E+00
RA-226	#	1.4011E+00	1.4011E+00	1.0537E+00	1.0569E+00 1.125E+00
AC-228		9.0598E-01	9.0598E-01	1.5338E-01	1.6215E-01
TH-227	#B	-1.5542E-01	-1.5542E-01	3.4156E-01	3.4168E-01 3.765E-01
PA-234	#B	1.0896E-02	1.0896E-02	1.9803E-01	1.9803E-01 2.217E-01
TH-234	#B	1.7875E+00	1.7875E+00	1.9541E+00	1.9566E+00 6.837E+00
AM-241	#A	2.8151E-02	2.8151E-02	9.9055E-01	9.9055E-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 (1103.5 to 2000.7 keV) 1.9282112E+01 pCi/gm

Total Decayed Activity (1103.5 to 2000.7 keV) 1.9282112E+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_30AUG2005_1100.An1

Sample description

FSS-NOL-06-01-017-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30AUG2005_1100.An1

Acquisition information

Start time:	30-Aug-2005 11:02:25
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: 1.9200E+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	27-Aug-2005 10:25:00
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: 0.0722

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.86	111.	24.42	0.99	9.100E-03	74.81	9.600	8.705E-01	PB212
77.26	208.	14.89	0.99	1.020E-02	77.11	17.500	8.168E-01	PB212
93.10	105.	37.26	1.50	1.631E-02	88.04	3.790		PBC<MDA CD109
					92.38	2.570		PBC<MDA TH234
					92.80	3.000		PBC<MDA TH234
93.11	108.	36.03	1.50	1.645E-02	92.38	2.570		PBC<MDA TH234
					92.80	3.000		PBC<MDA TH234

185.99	140.	30.03	1.26	2.567E-02				
185.99	140.	30.03	1.26	2.567E-02	185.99	3.280	PBC<MDA	RA226
209.46	121.	24.64	0.74	2.471E-02				
238.92	1186.	3.47	1.09	2.319E-02	238.63	43.100	8.263E-01	PB212
241.55	178.	20.68	1.09	2.305E-02	241.00	3.900	1.394E+00	RA224
					241.92	7.470	7.294E-01	PB214
270.45	118.	25.45	1.13	2.150E-02				
277.31	63.	32.00	0.62	2.114E-02				
295.26	232.	15.09	1.18	2.025E-02	295.22	19.200	4.123E-01	PB214
300.36	90.	30.26	0.96	2.000E-02				
327.83	71.	34.33	0.91	1.875E-02				
338.38	215.	10.51	1.20	1.830E-02	338.40	12.010	6.850E-01	AC228
351.96	411.	6.83	1.23	1.775E-02	351.99	37.100	4.336E-01	PB214
398.70	48.	35.38	1.18	1.609E-02				
463.21	82.	24.64	1.55	1.425E-02				
463.21	82.	24.64	1.55	1.425E-02	463.51	10.000	3.977E-01	SB125
510.55	216.	11.59	1.67	1.318E-02	510.72	22.500	4.508E-01	TL208
583.09	400.	7.03	1.30	1.185E-02	583.14	86.000	2.734E-01	TL208
609.24	310.	8.82	1.45	1.144E-02	609.32	46.090	4.052E-01	BI214
661.87	157.	12.62	1.43	1.072E-02	661.62	84.620	1.210E-01	CS137
727.46	82.	29.12	1.58	9.962E-03	727.17	11.800	4.867E-01	BI212
795.00	58.	33.75	1.22	9.308E-03				
835.61	35.	40.37	1.50	8.970E-03	834.81	99.978	PBC<MDA	MN54
860.10	77.	25.34	1.45	8.771E-03				
911.17	266.	8.68	1.61	8.401E-03	911.07	29.000	7.573E-01	AC228
964.68	51.	23.81	1.54	8.051E-03	964.00	14.580	3.039E-01	EU152
969.09	140.	11.25	1.54	8.024E-03	968.90	17.460	7.047E-01	AC228
1120.40	135.	19.29	1.17	7.211E-03	1120.28	15.040	8.611E-01	BI214
1173.33	81.	21.92	1.79	6.971E-03	1173.23	99.860	8.041E-02	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.50	96.	16.00	1.67	6.349E-03	1332.51	99.980	1.032E-01	CO60
1460.84	1294.	2.87	1.89	5.932E-03	1460.75	10.700	1.414E+01	K40
1764.46	64.	13.62	2.11	5.142E-03	1764.51	15.920	5.222E-01	Bl214

********** 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	384.	121.	0.060	73.92	0.743	AC-228
540.05	270.45	316.	118.	0.059	76.36	1.131	AC-228 s
553.77	277.31	177.	69.	0.034	89.86	0.616	TL-208 s
599.86	300.36	270.	90.	0.045	90.77	0.961	PB-212 s
654.80	327.83	229.	71.	0.036	102.99	0.913	AC-228 s
796.54	398.70	117.	48.	0.024	106.15	1.184	SE-75 s
1589.06	795.00	98.	59.	0.029	81.29	1.217	AC-228
1719.24	860.10	92.	77.	0.038	76.01	1.452	TL-208 s
1929.02	964.86	47.	53.	0.026	68.81	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	380.	108.	0.054	79.71	0.993D
PB-212	153.39	77.11	381.	185.	0.093	46.97	0.995A
RA-226	371.14	185.99	774.	117.	0.059	93.74	1.500D
PB-212	476.42	238.63	235.	1175.	0.588	10.21	1.093D
PB-214	483.00	241.92	381.	105.	0.053	66.80	1.095A
PB-214	589.67	295.26	371.	228.	0.114	45.27	1.180
AC-228	675.90	338.38	149.	214.	0.107	31.54	1.204
PB-214	703.05	351.96	177.	406.	0.203	20.48	1.230
SB-125	925.12	463.00	164.	80.	0.040	74.34	1.500s
TL-208	1020.22	510.55	169.	190.	0.095	34.77	1.666s
TL-208	1165.28	583.09	134.	396.	0.198	21.08	1.297
BI-214	1217.57	609.24	152.	304.	0.152	26.47	1.448
CS-137	1322.82	661.87	83.	156.	0.078	37.87	1.426s
BI-212	1454.00	727.46	148.	81.	0.041	87.37	1.583
MN-54	1670.28	835.61	85.	35.	0.018	121.10	1.500
AC-228	1821.38	911.17	84.	262.	0.131	26.04	1.608s
EU-152	1928.76	964.87	99.	42.	0.021	108.79	1.538s

YAEC Chemistry Lab Spectrum name: 103F_30AUG2005_1100.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1936.81	968.90	49.	140.	0.070	32.90	1.541D
Bl-214	2239.77	1120.40	127.	133.	0.066	57.86	1.165s
CO-60	2345.61	1173.33	87.	79.	0.040	65.75	1.790
CO-60	2663.92	1332.50	39.	93.	0.046	48.00	1.669
K-40	2920.55	1460.84	43.	1275.	0.638	8.60	1.891
Bl-214	3527.68	1764.46	6.	61.	0.030	40.86	2.109

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.1540E-01					
			477.56	1.154E-01	%(	3.236E-01	9.71E-02 G
K-40		1.4141E+01					
			1460.75	1.414E+01	(P	3.678E-01	4.11E-01 G
MN-54		2.7779E-02					
			834.81	2.778E-02	(P	3.616E-02	1.13E-02 G
CO-57		-1.3251E-02					
			122.07	-1.325E-02	%(P	5.117E-02	1.54E-02 G K
			136.43	-6.577E-02	%	3.982E-01	1.19E-01 G

```
CO-60        9.1800E-02
                    1332.51 1.032E-01  (P 3.533E-02 1.70E-02 G K
                    1173.23 8.041E-02  (P 4.662E-02 1.81E-02 G K

Sr-85       -2.3962E-02
                    514.00-2.396E-02 %(  4.590E-02 1.40E-02 G

Kr-85       -5.3571E+02
                    513.99-5.357E+02 %(  1.026E+03 3.12E+02 G

Y-88         6.8655E-03
                    1836.01 6.865E-03 &(P 1.822E-02 5.35E-03 G K
                    898.02-8.789E-03 % P 4.104E-02 1.20E-02 G

NB-94        4.8792E-03
                    871.10 4.879E-03 %(  3.313E-02 9.60E-03 G K
                    702.50 2.610E-03 &   3.456E-02 1.00E-02 G K
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	1.6110E-03						
		722.95	1.611E-03	&(	4.007E-02	1.16E-02	G K
		614.37	-9.512E-04	%	P 3.895E-02	1.13E-02	G
		433.93	-1.224E-02	%	3.573E-02	1.07E-02	G
CD-109	1.5651E-02						
		88.04	1.565E-02	&(	1.582E+00	4.70E-01	G
SN-113	-2.1909E-03						
		391.71	-2.191E-03	&(	4.837E-02	1.42E-02	G K
		255.04	-1.965E-01	%	1.354E+00	4.02E-01	G
SB-125	7.9568E-02						
		427.95	-2.775E-02	%(P	1.124E-01	3.35E-02	G K
		600.77	-1.308E-02	&	P 1.936E-01	5.64E-02	G
		636.15	5.206E-02	%	P 1.995E-01	5.83E-02	G
		463.51	3.972E-01	*(P	3.093E-01	1.00E-01	G
		176.29	-3.912E-02	%	5.787E-01	1.73E-01	G
I-131	1.3862E-03						
		364.48	1.386E-03	%(P	4.837E-02	1.42E-02	G K
		636.97	5.620E-02	%	3.916E-01	1.12E-01	G
		284.29	-1.663E-01	%	P 7.034E-01	2.10E-01	G
CS-134	-8.9055E-05						
		604.66	-8.905E-05	%(	3.486E-02	1.01E-02	G K
		795.76	-8.242E-04	%	P 4.269E-02	1.22E-02	G
		569.29	-3.408E-02	%	P 1.919E-01	5.56E-02	G
		801.84	4.602E-02	&	P 3.614E-01	1.04E-01	G

CS-137 1.2097E-01

661.62 1.210E-01 *(P 3.506E-02 1.54E-02 G

CE-139 1.5536E-03

165.85 1.554E-03 &(4.759E-02 1.42E-02 G

EU-152 5.6340E-02

121.78-4.145E-02 %(P 1.493E-01 4.49E-02 G K

344.30 1.653E-02 & P 8.587E-02 2.53E-02 G

1408.08 5.267E-02 & 1.246E-01 3.74E-02 G

964.00 2.525E-01 (P 2.940E-01 9.27E-02 G

1112.07-8.932E-02 % 3.494E-01 1.03E-01 G

778.90-1.349E-03 & 2.755E-01 7.90E-02 G

EU-154 -2.9949E-02

123.10-2.995E-02 %(1.117E-01 3.36E-02 G K

1274.80-8.004E-03 & 1.423E-01 4.10E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30-3.798E-03 %   1.423E-01 4.04E-02 G
                      1004.80 3.219E-02 &   1.869E-01 5.41E-02 G

EU-155       1.0563E-01
                       86.45 1.056E-01 %(  2.341E-01 7.09E-02 G K
                      105.31 7.727E-02 %   2.343E-01 7.07E-02 G

HG-203      -3.1383E-03
                      279.17-3.138E-03 &(P 4.101E-02 1.21E-02 G K
                       72.87-3.758E-01 % P 2.011E+00 6.03E-01 G
                       70.83-4.376E-01 &   4.351E+00 1.30E+00 G
                       82.50-1.151E+00 %   4.069E+00 1.23E+00 G

TL-208       2.7340E-01
                      583.14 2.734E-01  (P 3.919E-02 1.94E-02 G
                      510.72 4.508E-01 + P 1.504E-01 5.96E-02 G

PB-212       8.3089E-01
                      238.63 8.275E-01  (P 5.220E-02 2.85E-02 G K
                                         Energy duplication
                       77.11 7.372E-01 } P 3.722E-01 1.15E-01 G
                       74.81 8.716E-01  (P 7.581E-01 2.38E-01 G

PB-214       4.2988E-01
                      351.99 4.336E-01  (P 6.919E-02 3.00E-02 G K
                      295.22 4.123E-01  (P 1.675E-01 6.33E-02 G
                                         Energy duplication
                       77.11 0.000E+00 } P 8.699E-01 0.00E+00 G
                      241.92 4.299E-01 }   3.836E-01 9.57E-02 G

BI-212       4.8668E-01
```

727.17 4.867E-01 (P 3.552E-01 1.43E-01 G K
1620.56-2.082E-03 % P 9.835E-01 2.60E-01 G
785.42-7.221E-03 % 1.556E+00 4.42E-01 G

BI-214 4.0519E-01
609.32 4.052E-01 (P 8.043E-02 3.65E-02 G K
1764.51 5.222E-01 + P 1.236E-01 7.50E-02 G
1120.28 8.611E-01 + P 3.588E-01 1.68E-01 G

RA-224 8.3770E-01
Derived Ave Activity
241.00 8.377E-01 }(1.257E+00 3.96E-01 G

RA-226 9.7902E-01
Energy duplication
185.99 9.790E-01 *(P 1.106E+00 3.40E-01 G

AC-228 7.2682E-01
911.07 7.573E-01 @(P 1.311E-01 6.66E-02 G K
968.90 7.050E-01 (P 1.768E-01 7.74E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      338.40 6.850E-01  (P 1.909E-01 7.24E-02 G

TH-227       0.0000E+00
                      236.00 0.000E+00 %(  5.135E-01 1.54E-01 G K
                      256.25-7.299E-02 % P 4.774E-01 1.42E-01 G

PA-234      -5.7275E-02
                       98.44-5.728E-02 %(P 1.994E-01 5.99E-02 G K
                      946.00-3.610E-02 & P 1.822E-01 5.32E-02 G
                      131.28-4.330E-02 % P 2.264E-01 6.80E-02 G
                       94.67 1.041E-02 % P 3.979E-01 1.19E-01 G
                      883.24-5.299E-02 %   2.966E-01 8.65E-02 G
                      926.70 9.700E-02 &   2.965E-01 8.80E-02 G
                      569.26-5.042E-02 % P 2.840E-01 8.23E-02 G

TH-234       1.5332E+00
                       63.29 1.533E+00 %(P 6.152E+00 1.84E+00 G K
                       92.80 1.543E+00 & P 2.122E+00 6.47E-01 G
                       92.38 1.767E+00 & P 2.525E+00 7.69E-01 G

AM-241      -1.0006E-01
                       59.54-1.001E-01 &(P 8.954E-01 2.66E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	1.1095E-01	1.1540E-01	2.9128E-01	2.9136E-01	3.112E-01
K-40	1.4141E+01	1.4141E+01	1.2338E+00	1.4820E+00	
MN-54 #A	2.7593E-02	2.7779E-02	3.3983E-02	3.4022E-02	3.592E-02
CO-57 #B	-1.3149E-02	-1.3251E-02	4.7235E-02	4.7241E-02	5.078E-02
CO-60	9.1700E-02	9.1800E-02	3.8332E-02	3.8701E-02	
Sr-85 #A	-2.3199E-02	-2.3962E-02	4.1872E-02	4.1895E-02	4.444E-02
Kr-85 #A	-5.3570E+02	-5.3571E+02	9.3595E+02	9.3646E+02	1.026E+03
Y-88 #B	6.7317E-03	6.8655E-03	1.6055E-02	1.6060E-02	1.787E-02
NB-94 #B	4.8792E-03	4.8792E-03	2.8785E-02	2.8787E-02	3.313E-02
Ag-108M#B	1.6109E-03	1.6110E-03	3.4725E-02	3.4726E-02	4.007E-02
CD-109 #A	1.5579E-02	1.5651E-02	1.4093E+00	1.4093E+00	1.574E+00
SN-113 #B	-2.1513E-03	-2.1909E-03	4.2505E-02	4.2505E-02	4.749E-02
SB-125 #B	7.9403E-02	7.9568E-02	6.0087E-02	6.0265E-02	1.121E-01
I-131 #B	1.0679E-03	1.3862E-03	4.2501E-02	4.2501E-02	3.727E-02
CS-134 #B	-8.8807E-05	-8.9055E-05	3.0200E-02	3.0200E-02	3.477E-02
CS-137 #	1.2095E-01	1.2097E-01	4.6216E-02	4.6746E-02	
CE-139 #A	1.5301E-03	1.5536E-03	4.2539E-02	4.2539E-02	4.687E-02
EU-152 #B	5.6314E-02	5.6340E-02	6.2083E-02	6.2162E-02	1.492E-01
EU-154 #B	-2.9929E-02	-2.9949E-02	1.0088E-01	1.0090E-01	1.116E-01
EU-155 #B	1.0550E-01	1.0563E-01	2.1281E-01	2.1289E-01	2.338E-01
HG-203 #B	-3.0002E-03	-3.1383E-03	3.6831E-02	3.6832E-02	3.921E-02

TL-208		2.7340E-01	2.7340E-01	5.8261E-02	6.0385E-02
PB-212		8.3089E-01	8.3089E-01	8.5707E-02	9.8350E-02
PB-214		4.2988E-01	4.2988E-01	8.9273E-02	9.2696E-02
BI-212		4.8668E-01	4.8668E-01	4.2781E-01	4.2874E-01
BI-214		4.0519E-01	4.0519E-01	1.0953E-01	1.1203E-01
RA-224	A	8.3770E-01	8.3770E-01	1.1630E+00	1.1641E+00
RA-226	#A	9.7902E-01	9.7902E-01	1.0192E+00	1.0208E+00 1.106E+00
AC-228		7.2682E-01	7.2682E-01	1.2787E-01	1.3465E-01
TH-227	#B	0.0000E+00	0.0000E+00	4.6086E-01	4.6086E-01 5.135E-01
PA-234	#B	-5.7275E-02	-5.7275E-02	1.8959E-01	1.8961E-01 1.994E-01
TH-234	#B	1.5332E+00	1.5332E+00	5.5320E+00	5.5327E+00 6.152E+00
AM-241	#A	-1.0006E-01	-1.0006E-01	8.2643E-01	8.2645E-01 8.954E-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 (1120.0 to 2000.7 keV) 1.8344429E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.8344553E+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_30aug2005_1143.An1

Sample description

FSS-NOL-06-01-009-F

Spectrum Filename: C:\GammaVision\Spectra\103f_30aug2005_1143.An1

Acquisition information

Start time:	30-Aug-2005 11:45:57
Live time:	2000
Real time:	2002
Dead time:	0.09 %
Detector ID:	4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb

Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created:	08-Aug-2005 11:09:41
Zero offset:	0.409 keV
Gain:	0.500 keV/channel
Quadratic:	1.092E-08 keV/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: 1.7100E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7100E+03) =
5.8480E+02

Detection limit method: Nureg 4.16

Random error: 1.0000000E+00

Systematic error: 1.0000000E+00

Fraction Limit: 0.000%

Background width: average of five points.

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

Corrections	Status	Comments
Decay correct to date:	YES	27-Aug-2005 11:35:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1989

***** 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	95.	25.17	0.99	9.100E-03	74.81	9.600	8.396E-01	PB212
77.26	162.	16.70	0.99	1.024E-02	77.11	10.700	1.164E+00	PB214
					77.11	17.500	7.116E-01	PB212
92.53	107.	37.03	1.24	1.636E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.12	104.	28.36	1.20	2.566E-02	185.99	3.280	PBC<MDA	RA226
238.93	954.	3.86	1.09	2.318E-02	238.63	43.100	7.442E-01	PB212

242.19	141.	16.54	1.10	2.301E-02	241.00	3.900	1.236E+00	RA224
					241.92	7.470	6.466E-01	PB214
271.14	87.	28.53	1.77	2.146E-02				
295.28	214.	10.17	1.13	2.025E-02	295.22	19.200	4.265E-01	PB214
299.91	54.	31.31	1.13	2.003E-02				
328.09	73.	32.42	1.37	1.874E-02				
338.37	227.	11.68	1.40	1.830E-02	338.40	12.010	8.108E-01	AC228
351.88	362.	8.30	0.99	1.776E-02	351.99	37.100	4.273E-01	PB214
462.81	76.	24.49	1.89	1.426E-02				
462.81	76.	24.49	1.89	1.426E-02	463.51	10.000	4.126E-01	SB125
510.73	156.	17.41	1.29	1.317E-02	510.72	22.500	3.443E-01	TL208
583.29	347.	7.22	1.37	1.184E-02	583.14	86.000	2.656E-01	TL208
609.38	284.	8.69	1.38	1.144E-02	609.32	46.090	4.157E-01	BI214
661.64	111.	20.38	0.94	1.072E-02	661.62	84.620	9.566E-02	CS137
727.00	93.	19.38	1.96	9.967E-03	727.17	11.800	6.244E-01	BI212
795.03	43.	37.86	1.11	9.308E-03				
795.03	43.	37.86	1.11	9.308E-03	795.76	85.400	4.281E-02	CS134
860.32	49.	21.24	1.39	8.769E-03				
911.09	196.	9.12	1.31	8.401E-03	911.07	29.000	6.252E-01	AC228
968.30	189.	12.74	1.90	8.029E-03	968.90	17.460	1.063E+00	AC228
1120.25	85.	23.65	1.61	7.212E-03	1120.28	15.040	6.055E-01	BI214
1460.76	1138.	3.03	1.80	5.932E-03	1460.75	10.700	1.393E+01	K40
1764.39	39.	17.91	1.07	5.142E-03	1764.51	15.920	3.411E-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	
184.24	92.53	612.	107.	0.054	111.08	1.243	TH-234	l
541.43	271.14	223.	87.	0.044	85.58	1.775	AC-228	s
598.60	299.73	227.	62.	0.031	118.78	0.975	TH-227	M
655.33	328.09	203.	73.	0.036	97.27	1.372	AC-228	s
1589.11	795.03	74.	43.	0.022	113.57	1.109	AC-228	l
1719.67	860.32	28.	49.	0.025	63.73	1.386	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	148.79	74.81	300.	93.	0.046	82.07	0.993D
PB-212	153.39	77.11	290.	160.	0.080	39.08	0.995A
RA-226	371.40	186.12	381.	92.	0.046	85.08	1.196s
PB-212	477.02	238.93	580.	923.	0.462	15.94	0.898
RA-224	482.66	241.75	583.	123.	0.061	87.68	1.500

PB-214	483.22	242.03	561.	127.	0.064	83.36	1.500s
PB-214	589.36	295.11	215.	197.	0.099	39.01	1.129
AC-228	675.89	338.37	183.	226.	0.113	35.05	1.403s
PB-214	702.91	351.88	192.	356.	0.178	24.90	0.992
SB-125	925.31	463.10	119.	58.	0.029	86.26	1.500s
TL-208	1020.57	510.73	188.	129.	0.065	52.24	1.293s
TL-208	1165.67	583.29	95.	342.	0.171	21.66	1.368
BI-214	1217.85	609.38	108.	277.	0.139	26.06	1.376s
CS-137	1322.36	661.64	113.	110.	0.055	61.15	0.942s
BI-212	1453.08	727.00	76.	93.	0.046	58.15	1.964s
AC-228	1821.20	911.09	43.	193.	0.096	27.36	1.311
AC-228	1935.61	968.30	89.	188.	0.094	38.23	1.904s
BI-214	2239.48	1120.25	86.	83.	0.042	70.96	1.606s
K-40	2920.39	1460.76	32.	1119.	0.559	9.09	1.803
BI-214	3527.31	1764.28	10.	26.	0.013	68.15	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-6.1066E-03					
			477.56	-6.107E-03	%(	3.268E-01	9.46E-02 G
K-40		1.3929E+01					
			1460.75	1.393E+01	(P	3.631E-01	4.29E-01 G
MN-54		1.6685E-02					
			834.81	1.668E-02	%(P	3.447E-02	1.04E-02 G
CO-57		-4.6203E-04					
			122.07	-4.620E-04	%(P	4.702E-02	1.39E-02 G K
			136.43	1.032E-01	%	3.789E-01	1.14E-01 G
CO-60		1.8683E-03					
			1332.51	1.868E-03	%(P	3.662E-02	1.00E-02 G K
			1173.23	2.609E-02	% P	4.874E-02	1.48E-02 G K
Sr-85		-1.4361E-02					
			514.00	-1.436E-02	%(	4.263E-02	1.28E-02 G
Kr-85		-3.2104E+02					
			513.99	-3.210E+02	%(	9.529E+02	2.86E+02 G
Y-88		-1.2986E-03					
			1836.01	-1.299E-03	%(P	3.118E-02	8.22E-03 G K

898.02-1.426E-03 % P 4.042E-02 1.14E-02 G

NB-94 5.9757E-03

871.10 5.976E-03 &(3.149E-02 9.11E-03 G K

702.50 9.936E-03 % 3.302E-02 9.79E-03 G K

Ag-108M -8.4103E-03

722.95-8.410E-03 %(4.637E-02 1.36E-02 G K

614.37-5.185E-03 % P 3.632E-02 1.06E-02 G

433.93 0.000E+00 & 3.583E-02 1.04E-02 G

CD-109 7.6710E-01

88.04 7.671E-01 %(1.793E+00 5.43E-01 G

SN-113 0.0000E+00

391.71 0.000E+00 &(4.775E-02 1.39E-02 G K

255.04 4.124E-01 % 1.523E+00 4.56E-01 G

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

SB-125       8.1996E-02
                    427.95-6.572E-05 %(P 1.081E-01 3.13E-02 G K
                    600.77 3.718E-02 % P 1.696E-01 4.98E-02 G
                    636.15-5.710E-03 % P 2.794E-01 7.93E-02 G
                    463.51 3.249E-01 *(P 2.975E-01 9.55E-02 G
                    176.29 1.032E-02 %   5.850E-01 1.74E-01 G

I-131       -8.5038E-03
                    364.48-8.504E-03 %(P 4.884E-02 1.44E-02 G K
                    636.97-1.061E-01 &   6.074E-01 1.78E-01 G
                    284.29-8.935E-02 % P 6.542E-01 1.94E-01 G

CS-134      -8.4915E-03
                    604.66-8.492E-03 &(  4.365E-02 1.29E-02 G K
                    795.76 2.433E-02 % P 3.785E-02 1.17E-02 G
                    569.29 4.988E-02 & P 1.787E-01 5.25E-02 G
                    801.84 9.957E-02 % P 3.070E-01 8.98E-02 G

CS-137       9.5664E-02
                    661.62 9.566E-02 *(P 4.555E-02 1.97E-02 G

CE-139       8.3355E-04
                    165.85 8.335E-04 &(  4.654E-02 1.38E-02 G

EU-152       1.9440E-02
                    121.78 1.944E-02 %(P 1.398E-01 4.17E-02 G K
                    344.30 3.764E-02 % P 1.064E-01 3.19E-02 G
                   1408.08 2.281E-02 %   1.471E-01 4.13E-02 G
                    964.00 1.982E-01 % P 3.066E-01 9.47E-02 G
                   1112.07 6.153E-02 &   2.855E-01 8.31E-02 G
```

778.90-4.026E-02 & 2.312E-01 6.68E-02 G

EU-154 -1.1367E-02

123.10-1.137E-02 %(1.016E-01 3.03E-02 G K

1274.80-5.209E-04 % 1.019E-01 2.82E-02 G

723.30-6.532E-02 % 2.313E-01 6.88E-02 G

1004.80-5.246E-02 % 2.228E-01 6.52E-02 G

EU-155 2.9617E-03

86.45 2.962E-03 &(2.230E-01 6.63E-02 G K

105.31 3.175E-02 % 2.259E-01 6.75E-02 G

HG-203 2.4243E-02

279.17 2.424E-02 &(P 3.779E-02 1.16E-02 G K

72.87-5.071E-01 % P 2.257E+00 6.77E-01 G

70.83-1.254E-01 % 3.420E+00 1.01E+00 G

82.50-5.780E-01 % 3.716E+00 1.11E+00 G

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

TL-208       2.6563E-01
                   583.14 2.656E-01  (P 3.727E-02 1.94E-02 G
                   510.72 3.443E-01 + P 1.775E-01 7.24E-02 G

PB-212       7.4108E-01
                   238.63 7.297E-01  (P 9.083E-02 3.93E-02 G K
                                        Energy duplication
                    77.11 7.155E-01 } P 3.661E-01 9.32E-02 G
                    74.81 8.451E-01  (P 7.588E-01 2.39E-01 G

PB-214       4.1841E-01
                   351.99 4.273E-01  (P 8.070E-02 3.60E-02 G K
                   295.22 4.012E-01  (P 1.443E-01 5.32E-02 G
                                        Energy duplication
                    77.11 0.000E+00 } P 8.920E-01 0.00E+00 G
                   241.92 5.847E-01 +   5.198E-01 1.62E-01 G

BI-212       6.2440E-01
                   727.17 6.244E-01 *(P 2.914E-01 1.22E-01 G K
                  1620.56 1.752E-01 % P 1.029E+00 2.85E-01 G
                   785.42 9.541E-01 %   1.743E+00 5.34E-01 G

BI-214       4.1568E-01
                   609.32 4.157E-01 @(P 7.654E-02 3.70E-02 G K
                  1764.51 2.466E-01 - P 1.705E-01 6.32E-02 G
                  1120.28 6.055E-01 + P 3.344E-01 1.46E-01 G

RA-224       1.0792E+00
                   241.00 1.079E+00  (  1.012E+00 3.15E-01 G
```

```
RA-226       8.5935E-01
                 185.99 8.594E-01  (P 8.798E-01 2.78E-01 G

AC-228       6.2515E-01
                 911.07 6.252E-01  (P 1.082E-01 5.80E-02 G K
                 968.90 1.063E+00 + P 2.626E-01 1.35E-01 G
                 338.40 8.108E-01 + P 2.367E-01 9.52E-02 G

TH-227       5.0811E-02
                 236.00 5.081E-02 %(  2.635E-01 7.85E-02 G K
                 256.25 8.380E-02 % P 4.799E-01 1.43E-01 G

PA-234      -5.3747E-03
                  98.44-5.375E-03 %(P 2.277E-01 6.77E-02 G K
                 946.00-1.093E-02 % P 1.793E-01 5.09E-02 G
                 131.28-3.459E-02 % P 2.013E-01 6.02E-02 G
                  94.67-1.115E-01 % P 4.072E-01 1.22E-01 G
                 883.24 1.135E-03 %   2.176E-01 5.98E-02 G
                 926.70 2.630E-04 %   2.880E-01 8.03E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	7.379E-02	%	P	2.643E-01	7.76E-02 G
TH-234	3.4650E+00						
		63.29	3.465E+00	%(P	5.919E+00	1.80E+00	G K
		92.80	1.224E+00	%	P	2.080E+00	6.30E-01 G
		92.38	1.418E+00	%	P	2.531E+00	7.66E-01 G
AM-241	-2.5201E-01						
		59.54	-2.520E-01	%(P	1.155E+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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-5.8728E-03	-6.1066E-03	2.8391E-01	2.8391E-01	3.143E-01
K-40		1.3929E+01	1.3929E+01	1.2871E+00	1.5201E+00	
MN-54	#A	1.6574E-02	1.6685E-02	3.1349E-02	3.1364E-02	3.424E-02
CO-57	#B	-4.5848E-04	-4.6203E-04	9.0989E-02	9.0989E-02	4.666E-02
CO-60	#B	1.8663E-03	1.8683E-03	3.0003E-02	3.0003E-02	3.658E-02

Sr-85 #A	-1.3906E-02	-1.4361E-02	3.8332E-02	3.8341E-02	4.128E-02
Kr-85 #A	-3.2104E+02	-3.2104E+02	8.5695E+02	8.5715E+02	9.529E+02
Y-88 #B	-1.2734E-03	-1.2986E-03	2.8894E-02	2.8894E-02	3.057E-02
NB-94 #B	5.9757E-03	5.9757E-03	2.7331E-02	2.7334E-02	3.149E-02
Ag-108M#B	-8.4099E-03	-8.4103E-03	4.0884E-02	4.0887E-02	4.637E-02
CD-109 #A	7.6358E-01	7.6710E-01	1.6277E+00	1.6283E+00	1.785E+00
SN-113 #B	0.0000E+00	0.0000E+00	4.1580E-02	4.1580E-02	4.690E-02
SB-125 #B	8.1827E-02	8.1996E-02	7.2273E-02	7.2430E-02	1.079E-01
I-131 #B	-6.5615E-03	-8.5038E-03	4.8594E-02	4.8596E-02	3.769E-02
CS-134 #B	-8.4680E-03	-8.4915E-03	3.8703E-02	3.8706E-02	4.353E-02
CS-137 #	9.5646E-02	9.5664E-02	5.9233E-02	5.9493E-02	
CE-139 #A	8.2101E-04	8.3355E-04	4.1457E-02	4.1457E-02	4.584E-02
EU-152 #B	1.9432E-02	1.9440E-02	1.2516E-01	1.2516E-01	1.397E-01
EU-154 #B	-1.1360E-02	-1.1367E-02	9.0934E-02	9.0936E-02	1.015E-01
EU-155 #B	2.9583E-03	2.9617E-03	1.9889E-01	1.9889E-01	2.227E-01
HG-203 #B	2.3182E-02	2.4243E-02	3.4763E-02	3.4791E-02	3.614E-02
TL-208	2.6563E-01	2.6563E-01	5.8261E-02	6.0267E-02	
PB-212	7.4108E-01	7.4108E-01	1.1964E-01	1.2714E-01	
PB-214	4.1841E-01	4.1841E-01	9.8673E-02	1.0162E-01	
BI-212 #	6.2440E-01	6.2440E-01	3.6503E-01	3.6682E-01	
BI-214 #	4.1568E-01	4.1568E-01	1.1084E-01	1.1344E-01	
RA-224	1.0792E+00	1.0792E+00	9.4617E-01	9.4825E-01	1.012E+00
RA-226 #A	8.5935E-01	8.5935E-01	8.3462E-01	8.3611E-01	
AC-228	6.2515E-01	6.2515E-01	1.7401E-01	1.7776E-01	
TH-227 #B	5.0811E-02	5.0811E-02	2.3542E-01	2.3544E-01	2.635E-01
PA-234 #B	-5.3747E-03	-5.3747E-03	3.9204E-01	3.9205E-01	2.277E-01
TH-234 #B	3.4650E+00	3.4650E+00	5.4010E+00	5.4045E+00	5.919E+00
AM-241 #A	-2.5201E-01	-2.5201E-01	1.0541E+00	1.0542E+00	1.155E+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 (87.4 to 2000.7 keV) 1.9053883E+01 pCi/gm

Total Decayed Activity (87.4 to 2000.7 keV) 1.9053905E+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_30AUG2005_1225.An1

Sample description

FSS-NOL-06-01-020-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30AUG2005_1225.An1

Acquisition information

Start time:	30-Aug-2005 12:25:07
Live time:	2000
Real time:	2001
Dead time:	0.05 %
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: 8.1100E+02

Activity scaling factor: 1.0000E+06/(1.0000E+00* 8.1100E+02) =
1.2330E+03

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	27-Aug-2005 13:31:00
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. 8 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1511

***** 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	47.	32.79	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
185.99	83.	27.58	0.89	2.567E-02	185.99	3.280	PBC<MDA	RA226
239.03	377.	8.56	1.06	2.318E-02	238.63	43.100	6.080E-01	PB212
270.07	52.	33.95	1.87	2.152E-02				
295.51	102.	14.46	1.13	2.023E-02	295.22	19.200	4.185E-01	PB214
338.29	101.	18.80	1.18	1.831E-02				
338.29	101.	18.80	1.18	1.831E-02	338.40	12.010	7.604E-01	AC228

351.80	171.	11.25	0.88	1.776E-02	351.99	37.100	4.189E-01	PB214
511.08	22.	26.52	1.50	1.317E-02	510.72	22.500	PBC<MDA	TL208
582.93	101.	14.88	1.06	1.185E-02				
582.93	101.	14.88	1.06	1.185E-02	583.14	86.000	1.582E-01	TL208
609.33	146.	11.57	1.35	1.144E-02	609.32	46.090	4.394E-01	BI214
661.58	178.	9.89	1.58	1.072E-02	661.62	84.620	3.244E-01	CS137
911.01	88.	15.79	1.36	8.402E-03				
911.01	88.	15.79	1.36	8.402E-03	911.07	29.000	5.788E-01	AC228
969.30	29.	37.87	1.54	8.026E-03	968.90	17.460	PBC<MDA	AC228
1119.97	21.	37.35	1.63	7.212E-03	1120.28	15.040	PBC<MDA	BI214
1460.71	678.	3.89	1.98	5.932E-03	1460.75	10.700	1.732E+01	K40
1764.52	16.	23.71	2.03	5.142E-03	1764.51	15.920	3.176E-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	
539.29	270.07	110.	52.	0.026	101.84	1.870	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	111.	47.	0.023	98.37	0.993D
RA-226	371.14	185.99	244.	63.	0.032	91.26	1.500D
PB-212	477.05	238.95	211.	304.	0.152	27.13	1.037
PB-214	590.16	295.51	64.	98.	0.049	43.38	1.129
AC-228	675.73	338.29	83.	77.	0.038	60.13	1.500s
PB-214	702.74	351.80	82.	166.	0.083	33.75	0.880
TL-208	1165.36	583.13	45.	91.	0.046	41.91	1.500
BI-214	1217.69	609.30	54.	123.	0.062	34.65	1.500s
CS-137	1322.25	661.58	45.	177.	0.088	29.67	1.577
AC-228	1821.15	911.06	25.	71.	0.036	43.66	1.505s
AC-228	1937.61	969.30	46.	29.	0.014	113.62	1.541s
BI-214	2238.92	1119.97	27.	21.	0.011	112.06	1.634
K-40	2920.29	1460.71	24.	660.	0.330	11.66	1.976
BI-214	3527.80	1764.52	4.	16.	0.008	71.13	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	---------- Peak ---------- Energy	Activity	Code	MDA Value

	pCi/gm	keV	pCi/gm	pCi/gm	COMMENTS
BE-7	-1.1752E-01				
		477.56	-1.175E-01	&(5.707E-01	1.68E-01 G
K-40	1.7315E+01				
		1460.75	1.732E+01	(P 6.757E-01	6.92E-01 G
MN-54	-7.4154E-03				
		834.81	-7.415E-03	%(P 5.986E-02	1.69E-02 G
CO-57	5.7708E-03				
		122.07	5.771E-03	%(P 6.616E-02	1.95E-02 G K
		136.43	-6.960E-02	% 5.128E-01	1.52E-01 G
CO-60	-6.9545E-03				
		1332.51	-6.955E-03	%(P 8.894E-02	2.41E-02 G K
		1173.23	9.871E-03	% P 6.820E-02	1.91E-02 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sr-85	-8.1327E-03						
		514.00	-8.133E-03	%(	6.330E-02	1.84E-02	G
Kr-85	-1.8660E+02						
		513.99	-1.866E+02	%(	1.416E+03	4.12E+02	G
Y-88	-4.1352E-03						
		1836.01	-4.135E-03	%(P	4.036E-02	1.00E-02	G K
		898.02	5.133E-03	& P	6.284E-02	1.76E-02	G
NB-94	1.5774E-02						
		871.10	1.577E-02	%(	5.202E-02	1.52E-02	G K
		702.50	1.835E-04	%	4.816E-02	1.33E-02	G K
Ag-108M	1.5819E-02						
		722.95	1.582E-02	%(	6.244E-02	1.83E-02	G K
		614.37	-1.042E-02	% P	6.259E-02	1.81E-02	G
		433.93	1.603E-03	&	4.034E-02	1.13E-02	G
CD-109	7.0284E-02						
		88.04	7.028E-02	%(	2.255E+00	6.61E-01	G
SN-113	1.1141E-02						
		391.71	1.114E-02	%(	6.523E-02	1.89E-02	G K
		255.04	5.486E-01	&	2.331E+00	6.92E-01	G
SB-125	4.9007E-02						
		427.95	4.901E-02	%(P	1.420E-01	4.22E-02	G K
		600.77	-1.058E-02	% P	2.591E-01	7.27E-02	G
		636.15	1.004E-01	% P	3.572E-01	1.04E-01	G

463.51 3.245E-01 % P 5.082E-01 1.57E-01 G
176.29 3.822E-03 % 7.425E-01 2.17E-01 G

I-131 2.7234E-02
364.48 2.723E-02 %(P 6.680E-02 2.00E-02 G K
636.97 2.352E-02 & 8.437E-01 2.35E-01 G
284.29 2.031E-02 % P 8.539E-01 2.46E-01 G

CS-134 -1.3666E-03
604.66-1.367E-03 %(5.263E-02 1.48E-02 G K
795.76 4.185E-02 % P 5.699E-02 1.82E-02 G
569.29-7.276E-02 & P 3.374E-01 9.63E-02 G
801.84 8.307E-02 % P 6.267E-01 1.76E-01 G

CS-137 3.2441E-01
661.62 3.244E-01 (P 6.264E-02 3.23E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	6.9226E-03						
		165.85	6.923E-03	%(	5.848E-02	1.72E-02	G
EU-152	1.6396E-02						
		121.78	1.640E-02	&(P	1.928E-01	5.68E-02	G K
		344.30	2.501E-02	& P	1.572E-01	4.58E-02	G
		1408.08	1.109E-01	%	2.045E-01	6.39E-02	G
		964.00	6.916E-02	% P	4.791E-01	1.37E-01	G
		1112.07	-3.153E-02	&	4.875E-01	1.36E-01	G
		778.90	-1.980E-02	&	4.044E-01	1.13E-01	G
EU-154	-2.0197E-02						
		123.10	-2.020E-02	%(	1.465E-01	4.34E-02	G K
		1274.80	-2.917E-02	&	2.197E-01	6.25E-02	G
		723.30	8.047E-02	&	2.749E-01	8.08E-02	G
		1004.80	-5.814E-02	&	3.666E-01	1.05E-01	G
EU-155	1.5840E-01						
		86.45	1.584E-01	%(	3.285E-01	9.96E-02	G K
		105.31	4.679E-02	%	3.046E-01	9.03E-02	G
HG-203	8.0168E-04						
		279.17	8.017E-04	&(P	6.488E-02	1.89E-02	G K
		72.87	-7.653E-01	& P	3.093E+00	9.24E-01	G
		70.83	-1.413E+00	%	5.190E+00	1.55E+00	G
		82.50	-4.552E-02	%	5.610E+00	1.65E+00	G
TL-208	1.4901E-01						
		583.14	1.490E-01	(P	5.580E-02	2.18E-02	G
		510.72	1.223E-01	% P	2.567E-01	7.22E-02	G

PB-212 5.2603E-01

238.63 5.058E-01 (P 1.174E-01 4.76E-02 G K

Energy duplication

77.11 3.346E-01 } P 5.077E-01 1.47E-01 G

74.81 8.948E-01 + P 9.948E-01 3.13E-01 G

PB-214 4.1873E-01

351.99 4.189E-01 (P 1.139E-01 4.87E-02 G K

295.22 4.185E-01 (P 1.718E-01 6.31E-02 G

Energy duplication

77.11 3.349E-01 } P 1.227E+00 2.85E-01 G

241.92 3.609E-01 % 7.571E-01 2.30E-01 G

BI-212 1.7213E-01

727.17 1.721E-01 %(P 4.774E-01 1.42E-01 G K

1620.56 4.402E-01 % P 1.644E+00 4.63E-01 G

785.42 0.000E+00 % 2.595E+00 7.15E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	3.6212E-01						
		609.32	3.898E-01	(P	1.167E-01	4.74E-02	G K
		1764.51	3.176E-01	(P	2.412E-01	9.11E-02	G
		1120.28	3.243E-01	(P	4.157E-01	1.32E-01	G
RA-224	9.2971E-01						
		241.00	9.297E-01	&(	1.419E+00	4.36E-01	G
RA-226	1.2536E+00						
							Energy duplication
		185.99	1.254E+00	(P	1.495E+00	4.59E-01	G
AC-228	5.1439E-01						
		911.07	4.870E-01	(P	1.778E-01	7.42E-02	G K
		968.90	3.422E-01	- P	4.068E-01	1.30E-01	G
		338.40	5.805E-01	(P	3.432E-01	1.18E-01	G
TH-227	1.3570E-02						
		236.00	1.357E-02	&(	6.694E-01	1.98E-01	G K
		256.25	1.385E-01	& P	7.133E-01	2.11E-01	G
PA-234	1.5467E-03						
		98.44	1.547E-03	%(P	2.350E-01	6.83E-02	G K
		946.00	-2.154E-04	% P	3.129E-01	8.65E-02	G
		131.28	-1.312E-02	& P	2.341E-01	6.84E-02	G
		94.67	1.026E-02	& P	4.774E-01	1.40E-01	G
		883.24	9.460E-02	%	3.536E-01	1.02E-01	G
		926.70	5.949E-03	&	5.328E-01	1.47E-01	G
		569.26	-8.703E-02	& P	4.853E-01	1.37E-01	G

TH-234 8.8612E-01

63.29 8.861E-01 &(P 8.567E+00 2.51E+00 G K

92.80 1.308E+00 % P 3.023E+00 9.03E-01 G

92.38 1.492E+00 % P 3.606E+00 1.08E+00 G

AM-241 -4.5714E-01

59.54-4.571E-01 %(P 1.484E+00 4.44E-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	

- -

***** 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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Counting pCi/gm	Total pCi/gm	MDA pCi/gm
BE-7	#A	-1.1310E-01	-1.1752E-01	5.0261E-01	5.0265E-01	5.492E-01	
K-40		1.7315E+01	1.7315E+01	2.0760E+00	2.3066E+00		
MN-54	#A	-7.3670E-03	-7.4154E-03	6.0860E-02	6.0862E-02	5.947E-02	
CO-57	#B	5.7272E-03	5.7708E-03	5.8523E-02	5.8524E-02	6.566E-02	
CO-60	#B	-6.9471E-03	-6.9545E-03	3.8244E-01	3.8244E-01	8.884E-02	

Sr-85	#A	-7.8799E-03	-8.1327E-03	5.5254E-02	5.5256E-02	6.133E-02
Kr-85	#A	-1.8659E+02	-1.8660E+02	1.2369E+03	1.2369E+03	1.416E+03
Y-88	#B	-4.0565E-03	-4.1352E-03	3.3444E-02	3.3445E-02	3.959E-02
NB-94	#B	1.5774E-02	1.5774E-02	4.5708E-02	4.5717E-02	5.202E-02
Ag-108M	#B	1.5818E-02	1.5819E-02	5.4756E-02	5.4763E-02	6.244E-02
CD-109	#A	6.9967E-02	7.0284E-02	1.9835E+00	1.9835E+00	2.244E+00
SN-113	#B	1.0944E-02	1.1141E-02	5.6836E-02	5.6840E-02	6.408E-02
SB-125	#B	4.8908E-02	4.9007E-02	1.2671E-01	1.2675E-01	1.417E-01
I-131	#B	2.1111E-02	2.7234E-02	6.0122E-02	6.0143E-02	5.178E-02
CS-134	#B	-1.3629E-03	-1.3666E-03	4.4448E-02	4.4449E-02	5.248E-02
CS-137		3.2435E-01	3.2441E-01	9.7023E-02	9.8834E-02	
CE-139	#A	6.8202E-03	6.9226E-03	5.1731E-02	5.1732E-02	5.762E-02
EU-152	#B	1.6389E-02	1.6396E-02	1.7042E-01	1.7042E-01	1.927E-01
EU-154	#B	-2.0184E-02	-2.0197E-02	1.3029E-01	1.3030E-01	1.464E-01
EU-155	#B	1.5822E-01	1.5840E-01	2.9892E-01	2.9905E-01	3.281E-01
HG-203	#B	7.6720E-04	8.0168E-04	5.6628E-02	5.6628E-02	6.209E-02
TL-208	#	1.4901E-01	1.4901E-01	6.5401E-02	6.5970E-02	5.580E-02
PB-212		5.2603E-01	5.2603E-01	1.4835E-01	1.5147E-01	
PB-214		4.1873E-01	4.1873E-01	1.1953E-01	1.2197E-01	
BI-212	#B	1.7213E-01	1.7213E-01	4.2517E-01	4.2529E-01	4.774E-01
BI-214	#	3.6212E-01	3.6212E-01	1.3204E-01	1.3370E-01	1.167E-01

RA-224 #A	9.2971E-01	9.2971E-01	1.3066E+00	1.3077E+00	1.419E+00
RA-226 #A	1.2536E+00	1.2536E+00	1.3780E+00	1.3799E+00	1.495E+00
AC-228 #	5.1439E-01	5.1439E-01	1.9604E-01	1.9831E-01	1.778E-01
TH-227 #B	1.3570E-02	1.3570E-02	5.9442E-01	5.9442E-01	6.694E-01
PA-234 #B	1.5467E-03	1.5467E-03	2.0481E-01	2.0481E-01	2.350E-01
TH-234 #B	8.8612E-01	8.8612E-01	7.5371E+00	7.5373E+00	8.567E+00
AM-241 #A	-4.5713E-01	-4.5714E-01	1.3552E+00	1.3555E+00	1.484E+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) 1.8584383E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 1.8584442E+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: 103F_30AUG2005_1303.An1

Sample description

FSS-NOL-06-01-012-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30AUG2005_1303.An1

Acquisition information

Start time:	30-Aug-2005 13:03:35
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: 1.9410E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9410E+03) =
5.1520E+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 27-Aug-2005 11:15:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0846

***** 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
69.35	87.	34.72	1.50	8.140E-03	72.87	6.400	PBC<MDA	HG203
74.92	114.	24.16	0.99	9.052E-03	74.81	9.600	9.105E-01	PB212
77.22	196.	12.27	0.99	1.011E-02	77.11	17.500	8.898E-01	PB212
					77.11	10.700	1.455E+00	PB214
92.77	121.	33.78	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.78	130.	30.43	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234

					92.80	3.000	PBC<MDA	TH234
186.18	232.	17.77	1.15	2.566E-02	185.99	3.280	1.816E+00	RA226
209.47	152.	24.04	1.26	2.470E-02				
238.90	1189.	3.42	1.09	2.318E-02	238.63	43.100	8.198E-01	PB212
241.36	168.	20.92	1.09	2.305E-02	241.00	3.900	1.299E+00	RA224
					241.92	7.470	6.799E-01	PB214
270.72	88.	26.95	1.18	2.149E-02				
277.31	99.	31.75	1.25	2.114E-02				
277.31	99.	31.75	1.25	2.114E-02	279.17	81.500	4.187E-02	HG203
295.17	270.	11.09	1.12	2.025E-02	295.22	19.200	4.755E-01	PB214
300.16	80.	27.27	0.87	2.001E-02				
327.62	54.	37.41	0.77	1.876E-02				
338.37	261.	12.07	1.21	1.830E-02	338.40	12.010	8.233E-01	AC228
351.89	392.	7.89	0.95	1.776E-02	351.99	37.100	4.088E-01	PB214
463.09	91.	28.76	0.79	1.426E-02				
463.09	91.	28.76	0.79	1.426E-02	463.51	10.000	4.389E-01	SB125
510.91	197.	14.67	1.31	1.317E-02	510.72	22.500	4.006E-01	TL208
583.03	392.	8.04	1.23	1.185E-02	583.14	86.000	2.647E-01	TL208
609.32	288.	7.58	1.52	1.144E-02	609.32	46.090	3.712E-01	BI214
727.02	117.	19.80	1.28	9.966E-03	727.17	11.800	6.875E-01	BI212
795.14	43.	26.78	0.80	9.307E-03				
795.14	43.	26.78	0.80	9.307E-03	795.76	85.400	3.781E-02	CS134
860.42	75.	23.43	1.00	8.769E-03				
911.14	276.	7.19	1.34	8.401E-03	911.07	29.000	7.791E-01	AC228
968.04	269.	9.49	1.76	8.031E-03	968.90	17.460	1.338E+00	AC228
1119.65	65.	23.63	1.79	7.212E-03	1120.28	15.040	4.179E-01	BI214
1460.67	1287.	2.91	1.74	5.932E-03	1460.75	10.700	1.391E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1620.74	18.	28.63	0.72	5.488E-03	1620.56	2.750	8.468E-01	Bl212
1764.39	68.	11.87	2.65	5.142E-03	1764.51	15.920	5.760E-01	Bl214

********** 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
418.09	209.47	496.	152.	0.076	72.11	1.257	AC-228 s
540.59	270.72	228.	88.	0.044	80.86	1.184	AC-228 s
553.77	277.31	327.	98.	0.049	84.18	1.247	TL-208 s
599.47	300.16	188.	80.	0.040	81.82	0.875	PB-212
654.39	327.62	177.	54.	0.027	112.22	0.766	AC-228
1719.88	860.42	70.	75.	0.038	70.28	1.000	TL-208 s

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
HG-203	137.87	69.35	425.	87.	0.044	104.15	1.500s
PB-212	148.79	74.81	342.	114.	0.057	72.47	0.993D
PB-212	153.39	77.11	367.	196.	0.098	36.80	0.995A

TH-234	184.71	92.77	1051.	121.	0.061	101.33	1.500
TH-234	184.72	92.78	954.	130.	0.065	91.28	1.500s
RA-226	371.53	186.18	602.	220.	0.110	53.30	1.150s
PB-212	476.42	238.63	225.	1174.	0.587	10.15	1.093D
PB-214	483.00	241.92	371.	107.	0.053	70.04	1.095A
PB-214	589.49	295.17	264.	266.	0.133	33.28	1.120
AC-228	675.88	338.37	262.	260.	0.130	36.20	1.209
PB-214	702.93	351.89	223.	387.	0.193	23.67	0.949
SB-125	925.25	463.06	152.	80.	0.040	72.09	1.500s
TL-208	1020.94	510.91	199.	171.	0.085	44.00	1.309s
TL-208	1165.16	583.03	171.	387.	0.194	24.11	1.234
BI-214	1217.75	609.32	85.	281.	0.141	22.75	1.517s
BI-212	1453.11	727.02	123.	116.	0.058	59.39	1.285
CS-134	1589.21	795.07	51.	41.	0.020	87.94	1.500s
AC-228	1821.31	911.14	52.	273.	0.136	21.56	1.344
AC-228	1935.09	968.04	99.	269.	0.135	28.48	1.759s
BI-214	2238.27	1119.65	70.	65.	0.033	70.88	1.788s
K-40	2920.21	1460.67	44.	1268.	0.634	8.73	1.744

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bi-212	3240.30	1620.74	3.	18.	0.009	85.90	0.718s
Bi-214	3527.54	1764.39	3.	68.	0.034	35.60	2.650s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-9.5176E-03					
			477.56	-9.518E-03	&(	3.078E-01	8.95E-02 G
K-40		1.3909E+01					
			1460.75	1.391E+01	(P	3.685E-01	4.11E-01 G
MN-54		-1.1116E-03					
			834.81	-1.112E-03	&(P	3.823E-02	1.10E-02 G
CO-57		-5.7760E-03					
			122.07	-5.776E-03	%(P	4.952E-02	1.48E-02 G K
			136.43	7.245E-04	&	3.887E-01	1.16E-01 G
CO-60		-8.1052E-04					
			1332.51	-8.105E-04	%(P	2.610E-02	6.72E-03 G K
			1173.23	7.938E-03	& P	5.024E-02	1.46E-02 G K

```
Sr-85       -1.2553E-02
                514.00-1.255E-02 %(  3.878E-02 1.16E-02 G

Kr-85       -2.8041E+02
                513.99-2.804E+02 %(  8.664E+02 2.60E+02 G

Y-88        -4.4712E-03
               1836.01-4.471E-03 %(P 2.788E-02 7.68E-03 G K
                898.02 1.261E-02 % P 2.643E-02 7.99E-03 G

NB-94        -3.6156E-03
                871.10-3.616E-03 &(  3.492E-02 1.01E-02 G K
                702.50 6.332E-03 %   3.462E-02 1.02E-02 G K

Ag-108M     -2.9859E-03
                722.95-2.986E-03 %(  3.902E-02 1.13E-02 G K
                614.37-2.777E-02 & P 4.389E-02 1.35E-02 G
                433.93 5.813E-03 %   3.154E-02 9.31E-03 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	9.4229E-01						
		88.04	9.423E-01	&(	1.878E+00	5.70E-01	G
SN-113	1.1089E-02						
		391.71	1.109E-02	%(	4.411E-02	1.31E-02	G K
		255.04	1.254E-01	&	1.575E+00	4.68E-01	G
SB-125	1.1746E-01						
		427.95	2.454E-02	&(P	8.345E-02	2.48E-02	G K
		600.77	4.361E-02	& P	1.772E-01	5.25E-02	G
		636.15	-3.257E-03	% P	3.172E-01	9.14E-02	G
		463.51	3.925E-01	*(P	2.946E-01	9.58E-02	G
		176.29	9.746E-03	&	5.700E-01	1.70E-01	G
I-131	-6.3682E-04						
		364.48	-6.368E-04	%(P	4.294E-02	1.25E-02	G K
		636.97	7.747E-02	&	5.572E-01	1.63E-01	G
		284.29	1.854E-01	% P	6.529E-01	1.96E-01	G
CS-134	-2.0610E-02						
		604.66	-2.061E-02	%(	3.964E-02	1.21E-02	G K
		795.76	3.577E-02	+ P	3.168E-02	1.05E-02	G
		569.29	9.584E-02	% P	2.002E-01	6.05E-02	G
		801.84	-7.202E-02	& P	4.556E-01	1.32E-01	G
CS-137	1.6503E-02						
		661.62	1.650E-02	%(P	3.676E-02	1.11E-02	G
CE-139	-8.6232E-03						
		165.85	-8.623E-03	%(	4.559E-02	1.37E-02	G

```
EU-152      -1.7342E-02
                 121.78-1.734E-02 %(P 1.484E-01 4.44E-02 G K
                 344.30-1.228E-02 & P 1.156E-01 3.42E-02 G
                1408.08 9.580E-03 %   1.303E-01 3.58E-02 G
                 964.00-6.059E-02 % P 2.737E-01 8.01E-02 G
                1112.07 1.111E-02 %   2.933E-01 8.36E-02 G
                 778.90 1.654E-03 &   2.668E-01 7.64E-02 G

EU-154      -1.6882E-02
                 123.10-1.688E-02 %(  9.499E-02 2.84E-02 G K
                1274.80 0.000E+00 %   1.134E-01 3.19E-02 G
                 723.30 0.000E+00 %   3.055E-01 8.98E-02 G
                1004.80 5.618E-03 &   2.183E-01 6.23E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.3073E-01						
		86.45	1.307E-01	%(	2.314E-01	7.04E-02	G K
		105.31	1.688E-03	%	2.289E-01	6.82E-02	G
HG-203	8.9335E-02						
		279.17	3.489E-04	&(P	3.781E-02	1.11E-02	G K
		72.87	1.223E+00	&(P	1.381E+00	4.28E-01	G
		70.83	-2.626E+00	%	4.175E+00	1.27E+00	G
		82.50	-1.308E+00	%	3.756E+00	1.13E+00	G
TL-208	2.6470E-01						
		583.14	2.647E-01	(P	4.347E-02	2.15E-02	G
		510.72	4.006E-01	+ P	1.610E-01	6.80E-02	G
PB-212	8.4823E-01						
		238.63	8.175E-01	(P	5.052E-02	2.80E-02	G K
							Energy duplication
		77.11	7.720E-01	} P	3.617E-01	9.47E-02	G
		74.81	9.105E-01	(P	7.125E-01	2.26E-01	G
PB-214	4.3158E-01						
		351.99	4.088E-01	(P	7.646E-02	3.27E-02	G K
		295.22	4.755E-01	(P	1.406E-01	5.36E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.688E-01	0.00E+00	G
		241.92	4.316E-01	}	3.745E-01	1.01E-01	G
BI-212	7.1758E-01						
		727.17	6.875E-01	(P	3.219E-01	1.37E-01	G K
		1620.56	8.468E-01	(P	4.746E-01	2.43E-01	G

785.42 4.122E-01 % 1.655E+00 4.88E-01 G

BI-214 3.8271E-01

609.32 3.712E-01 *(P 6.027E-02 2.88E-02 G K

1764.51 5.760E-01 + P 9.474E-02 7.17E-02 G

1120.28 4.179E-01 *(P 2.675E-01 1.02E-01 G

RA-224 8.7074E-01

Derived Ave Activity

241.00 8.707E-01 }(1.215E+00 3.86E-01 G

RA-226 1.8156E+00

185.99 1.816E+00 *(P 9.683E-01 3.42E-01 G

AC-228 7.9202E-01

911.07 7.791E-01 (P 1.041E-01 5.67E-02 G K

968.90 1.338E+00 + P 2.435E-01 1.27E-01 G

338.40 8.233E-01 (P 2.476E-01 9.97E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-6.0290E-02						
		236.00	-6.029E-02	%(	2.940E-01	8.80E-02	G K
		256.25	-8.076E-02	% P	4.941E-01	1.47E-01	G
PA-234	-6.4754E-02						
		98.44	-6.475E-02	%(P	2.096E-01	6.31E-02	G K
		946.00	1.852E-02	% P	1.708E-01	4.91E-02	G
		131.28	2.597E-02	& P	2.082E-01	6.23E-02	G
		94.67	-8.599E-02	% P	3.931E-01	1.18E-01	G
		883.24	4.516E-02	%	2.590E-01	7.51E-02	G
		926.70	6.125E-02	%	2.145E-01	6.27E-02	G
		569.26	1.418E-01	% P	2.962E-01	8.95E-02	G
TH-234	1.3598E+00						
		63.29	5.607E-01	%(P	6.400E+00	1.91E+00	G K
		92.80	1.835E+00	&(P	2.069E+00	6.34E-01	G
		92.38	2.017E+00	&(P	2.555E+00	7.80E-01	G
AM-241	-1.1305E-01						
		59.54	-1.131E-01	%(P	9.450E-01	2.81E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	-9.1451E-03	-9.5176E-03	2.6855E-01	2.6855E-01	2.957E-01
K-40	1.3909E+01	1.3909E+01	1.2324E+00	1.4734E+00	
MN-54 #A	-1.1041E-03	-1.1116E-03	5.5023E-02	5.5023E-02	3.797E-02
CO-57 #B	-5.7306E-03	-5.7760E-03	4.6790E-02	4.6791E-02	4.913E-02
CO-60 #B	-8.0963E-04	-8.1052E-04	3.5764E-02	3.5764E-02	2.607E-02
Sr-85 #A	-1.2147E-02	-1.2553E-02	3.4853E-02	3.4861E-02	3.753E-02
Kr-85 #A	-2.8040E+02	-2.8041E+02	7.7860E+02	7.7877E+02	8.664E+02
Y-88 #B	-4.3827E-03	-4.4712E-03	2.4003E-02	2.4004E-02	2.733E-02
NB-94 #B	-3.6156E-03	-3.6156E-03	3.0250E-02	3.0250E-02	3.492E-02
Ag-108M#B	-2.9858E-03	-2.9859E-03	3.3936E-02	3.3936E-02	3.902E-02
CD-109 #A	9.3786E-01	9.4229E-01	1.7106E+00	1.7114E+00	1.870E+00
SN-113 #B	1.0886E-02	1.1089E-02	3.9353E-02	3.9358E-02	4.330E-02
SB-125 #F	1.1721E-01	1.1746E-01	8.6023E-02	8.6293E-02	8.328E-02
I-131 #B	-4.8850E-04	-6.3682E-04	2.0797E-01	2.0797E-01	3.294E-02
CS-134 #B	-2.0551E-02	-2.0610E-02	3.6187E-02	3.6206E-02	3.953E-02
CS-137 #A	1.6500E-02	1.6503E-02	3.3222E-02	3.3236E-02	3.676E-02
CE-139 #A	-8.4905E-03	-8.6232E-03	4.0990E-02	4.0993E-02	4.489E-02
EU-152 #B	-1.7334E-02	-1.7342E-02	1.4885E-01	1.4886E-01	1.483E-01
EU-154 #B	-1.6870E-02	-1.6882E-02	8.5331E-02	8.5336E-02	9.492E-02
EU-155 #B	1.3057E-01	1.3073E-01	2.1121E-01	2.1133E-01	2.311E-01
HG-203 #F	8.5339E-02	8.9335E-02	9.3811E-02	9.3954E-02	3.612E-02
TL-208	2.6470E-01	2.6470E-01	6.4535E-02	6.6340E-02	

PB-212		8.4823E-01	8.4823E-01	8.7006E-02	9.9977E-02
PB-214		4.3158E-01	4.3158E-01	8.9449E-02	9.2892E-02
BI-212		7.1758E-01	7.1758E-01	3.7583E-01	3.7813E-01
BI-214		3.8271E-01	3.8271E-01	8.9081E-02	9.1810E-02
RA-224	A	8.7074E-01	8.7074E-01	1.1281E+00	1.1293E+00
RA-226	#	1.8156E+00	1.8156E+00	1.0248E+00	1.0302E+00
AC-228		7.9202E-01	7.9202E-01	1.6792E-01	1.7410E-01
TH-227	#B	-6.0290E-02	-6.0290E-02	2.6389E-01	2.6391E-01	2.940E-01
PA-234	#B	-6.4754E-02	-6.4754E-02	1.9829E-01	1.9832E-01	2.096E-01
TH-234	#B	1.3598E+00	1.3598E+00	1.4096E+00	1.4116E+00	6.400E+00
AM-241	#A	-1.1305E-01	-1.1305E-01	8.6994E-01	8.6997E-01	9.450E-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 (270.4 to 2000.7 keV) 2.0032450E+01 pCi/gm

Total Decayed Activity (270.4 to 2000.7 keV) 2.0032455E+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_30AUG2005_1350.An1

Sample description

FSS-NOL-06-01-011-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30AUG2005_1350.An1

Acquisition information

Start time:	30-Aug-2005 13:50:57
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: 1.8680E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8680E+03) =
5.3533E+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	27-Aug-2005 11:25:00
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: 0.1232

***** 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	101.	25.68	0.99	9.100E-03	70.83	3.520	3.031E+00	HG203
					74.81	9.600	8.154E-01	PB212
77.24	161.	17.53	0.99	1.029E-02	77.11	17.500	6.441E-01	PB212
186.41	143.	27.42	1.09	2.565E-02	185.99	3.280	1.118E+00	RA226
209.28	104.	34.31	0.87	2.471E-02				
238.89	1041.	3.71	1.09	2.319E-02	238.63	43.100	7.447E-01	PB212
242.14	118.	19.67	1.10	2.301E-02	241.00	3.900	9.465E-01	RA224

					241.92	7.470	4.952E-01	PB214
270.37	139.	18.76	1.19	2.150E-02				
277.81	94.	29.50	1.00	2.112E-02				
277.81	94.	29.50	1.00	2.112E-02	279.17	81.500	4.149E-02	HG203
295.31	215.	10.51	1.13	2.024E-02	295.22	19.200	3.934E-01	PB214
300.06	60.	31.81	1.13	2.001E-02				
338.29	237.	13.54	1.12	1.831E-02	338.40	12.010	7.764E-01	AC228
351.95	324.	9.39	1.06	1.775E-02	351.99	37.100	3.495E-01	PB214
463.06	76.	25.77	1.38	1.426E-02				
463.06	76.	25.77	1.38	1.426E-02	463.51	10.000	3.803E-01	SB125
510.95	167.	15.59	1.27	1.317E-02	510.72	22.500	3.435E-01	TL208
583.07	354.	7.67	1.36	1.185E-02	583.14	86.000	2.484E-01	TL208
609.17	311.	7.33	1.29	1.144E-02	609.32	46.090	4.178E-01	BI214
661.38	78.	19.88	1.32	1.073E-02	661.62	84.620	6.094E-02	CS137
727.05	85.	18.60	1.02	9.966E-03	727.17	11.800	5.199E-01	BI212
794.68	46.	26.49	1.50	9.301E-03	795.76	85.400	4.161E-02	CS134
860.40	78.	19.58	1.37	8.769E-03				
911.21	249.	8.27	1.52	8.400E-03	911.07	29.000	7.302E-01	AC228
964.52	33.	37.51	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152
968.55	190.	10.48	1.64	8.028E-03	968.90	17.460	9.791E-01	AC228
1120.64	87.	20.79	1.69	7.210E-03	1120.28	15.040	5.703E-01	BI214
1460.67	1140.	3.00	1.91	5.932E-03	1460.75	10.700	1.279E+01	K40
1587.73	28.	22.08	1.59	5.573E-03				
1764.10	64.	13.84	2.70	5.142E-03	1764.51	15.920	5.641E-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
417.72	209.28	472.	104.	0.052	102.94	0.867	AC-228
483.44	242.12	209.	118.	0.059	59.01	1.095	PB-214 ID
539.89	270.37	237.	139.	0.070	56.27	1.186	AC-228 s
554.77	277.81	270.	94.	0.047	88.50	0.999	NP-239 I
599.27	300.09	155.	60.	0.030	95.43	1.130	PB-212 ID
1719.83	860.40	53.	78.	0.039	58.74	1.368	TL-208 s
3174.29	1587.73	5.	28.	0.014	66.23	1.590	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	330.	102.	0.051	78.43	0.993D
PB-212	153.39	77.11	341.	138.	0.069	53.88	0.995A
RA-226	371.62	186.23	679.	123.	0.062	84.51	1.500
PB-212	476.97	238.91	568.	985.	0.492	14.71	0.875
PB-214	589.84	295.34	294.	196.	0.098	44.85	0.922s

AC-228	675.71	338.29	265.	236.	0.118	40.61	1.118
PB-214	703.05	351.95	220.	318.	0.159	28.16	1.055
SB-125	925.16	463.02	144.	61.	0.031	89.29	1.500s
TL-208	1021.01	510.95	187.	141.	0.070	46.78	1.266s
TL-208	1165.25	583.07	128.	350.	0.175	23.02	1.355
BI-214	1217.43	609.17	86.	305.	0.152	21.98	1.287
CS-137	1321.85	661.38	72.	76.	0.038	59.65	1.319s
BI-212	1453.17	727.05	66.	85.	0.042	55.80	1.024
CS-134	1588.42	794.68	50.	46.	0.023	79.47	1.500s
AC-228	1821.45	911.21	60.	246.	0.123	24.81	1.520s
EU-152	1928.06	964.52	63.	33.	0.016	112.54	1.538s
AC-228	1936.11	968.55	57.	190.	0.095	31.44	1.644
BI-214	2240.26	1120.64	75.	86.	0.043	62.38	1.695s
K-40	2920.21	1460.67	28.	1122.	0.561	8.99	1.905
BI-214	3526.96	1764.10	7.	64.	0.032	41.51	2.695s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-5.6120E-02					
			477.56	-5.612E-02	%(	3.190E-01	9.41E-02 G
K-40		1.2785E+01					
			1460.75	1.279E+01	(P	3.130E-01	3.90E-01 G
MN-54		1.5930E-02					
			834.81	1.593E-02	%(P	3.559E-02	1.07E-02 G
CO-57		1.4670E-02					
			122.07	1.467E-02	&(P	3.910E-02	1.18E-02 G K
			136.43	-7.285E-02	%	3.704E-01	1.11E-01 G
CO-60		1.1878E-02					
			1332.51	1.188E-02	%(P	3.809E-02	1.11E-02 G K
			1173.23	2.431E-02	& P	4.335E-02	1.32E-02 G K
Sr-85		-1.6802E-02					
			514.00	-1.680E-02	%(	4.245E-02	1.28E-02 G
Kr-85		-3.7539E+02					
			513.99	-3.754E+02	%(	9.480E+02	2.86E+02 G
Y-88		-9.3840E-05					
			1836.01	-9.384E-05	&(P	2.105E-02	5.14E-03 G K

898.02 9.532E-03 & P 3.639E-02 1.07E-02 G

NB-94 9.0050E-03

871.10 9.005E-03 &(2.651E-02 7.85E-03 G K

702.50 2.076E-03 % 3.195E-02 9.19E-03 G K

Ag-108M -1.7006E-02

722.95-1.701E-02 %(4.670E-02 1.40E-02 G K

614.37-1.013E-03 % P 3.935E-02 1.14E-02 G

433.93-5.057E-03 % 3.171E-02 9.33E-03 G

CD-109 1.3087E+00

88.04 1.309E+00 &(1.786E+00 5.47E-01 G

SN-113 -1.0237E-02

391.71-1.024E-02 %(5.084E-02 1.51E-02 G K

255.04-4.139E-01 % 1.550E+00 4.64E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.0076E-02						
		427.95	1.488E-02	%(P	9.545E-02	2.81E-02	G K
		600.77	2.441E-02	& P	1.617E-01	4.72E-02	G
		636.15	-5.096E-02	% P	2.516E-01	7.32E-02	G
		463.51	3.127E-01	@(P	2.985E-01	9.50E-02	G
		176.29	-1.197E-01	%	5.841E-01	1.75E-01	G
I-131	-7.0991E-03						
		364.48	-7.099E-03	%(P	4.406E-02	1.30E-02	G K
		636.97	8.504E-02	%	4.335E-01	1.26E-01	G
		284.29	9.195E-02	% P	6.400E-01	1.90E-01	G
CS-134	1.7793E-02						
		604.66	-3.043E-03	%(	3.999E-02	1.17E-02	G K
		795.76	4.161E-02	*(P	3.268E-02	1.10E-02	G
		569.29	2.721E-02	% P	2.035E-01	5.93E-02	G
		801.84	7.588E-02	& P	3.292E-01	9.54E-02	G
CS-137	6.0937E-02						
		661.62	6.094E-02	@(P	3.360E-02	1.23E-02	G
CE-139	0.0000E+00						
		165.85	0.000E+00	&(	4.510E-02	1.34E-02	G
EU-152	6.9223E-02						
		121.78	2.652E-03	&(P	1.442E-01	4.29E-02	G K
		344.30	-1.875E-02	% P	1.170E-01	3.47E-02	G
		1408.08	1.294E-02	&	1.556E-01	4.35E-02	G
		964.00	2.027E-01	(P	2.438E-01	7.73E-02	G
		1112.07	-2.065E-02	&	2.836E-01	8.10E-02	G

778.90-2.818E-02 % 2.745E-01 7.95E-02 G

EU-154 6.7694E-03

123.10 6.769E-03 %(1.045E-01 3.12E-02 G K

1274.80 3.411E-02 & 9.501E-02 2.82E-02 G

723.30-7.881E-02 % 2.221E-01 6.66E-02 G

1004.80 1.000E-02 & 1.972E-01 5.60E-02 G

EU-155 1.4867E-01

86.45 1.487E-01 %(2.282E-01 6.97E-02 G K

105.31 3.539E-02 % 2.251E-01 6.74E-02 G

HG-203 2.3141E-02

279.17 2.314E-02 &(P 3.561E-02 1.09E-02 G K

72.87 7.519E-01 & P 1.368E+00 4.16E-01 G

70.83 7.133E-02 % 3.624E+00 1.08E+00 G

82.50-6.600E-04 % 3.881E+00 1.16E+00 G

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

TL-208       2.4842E-01
                   583.14 2.484E-01  (P 3.940E-02 1.93E-02 G
                   510.72 3.435E-01 + P 1.623E-01 6.37E-02 G

PB-212       6.9434E-01
                   238.63 7.123E-01  (P 8.235E-02 3.54E-02 G K
                                        Energy duplication
                    77.11 5.647E-01 } P 3.628E-01 1.01E-01 G
                    74.81 8.514E-01 + P 7.270E-01 2.29E-01 G

PB-214       3.5475E-01
                   351.99 3.495E-01  (P 7.887E-02 3.34E-02 G K
                   295.22 3.650E-01 @(P 1.537E-01 5.57E-02 G
                                        Energy duplication
                    77.11 0.000E+00 } P 8.731E-01 0.00E+00 G
                   241.92 9.453E-03 %   5.985E-01 1.78E-01 G

BI-212       5.1991E-01
                   727.17 5.199E-01  (P 2.505E-01 9.73E-02 G K
                  1620.56 3.151E-01 % P 8.987E-01 2.64E-01 G
                   785.42 7.760E-01 %   1.629E+00 4.94E-01 G

BI-214       4.1784E-01
                   609.32 4.178E-01  (P 6.318E-02 3.13E-02 G K
                  1764.51 5.641E-01 + P 1.342E-01 8.20E-02 G
                  1120.28 5.703E-01 + P 2.881E-01 1.21E-01 G

RA-224       6.5029E-01
                   241.00 6.503E-01 &(  1.019E+00 3.11E-01 G
```

```
RA-226       1.0573E+00
                 185.99 1.057E+00  (P 1.067E+00 3.29E-01 G

AC-228       7.4377E-01
                 911.07 7.302E-01 @(P 1.153E-01 6.12E-02 G K
                 968.90 9.791E-01 + P 1.962E-01 1.03E-01 G
                 338.40 7.764E-01  (P 2.586E-01 1.06E-01 G

TH-227       0.0000E+00
                 236.00 0.000E+00 &(  4.625E-01 1.38E-01 G K
                 256.25 2.836E-02 % P 4.462E-01 1.32E-01 G

PA-234      -3.9049E-03
                  98.44-3.905E-03 %(P 1.816E-01 5.38E-02 G K
                 946.00 9.146E-03 % P 1.696E-01 4.83E-02 G
                 131.28-1.089E-02 % P 1.529E-01 4.53E-02 G
                  94.67-1.365E-01 % P 3.963E-01 1.20E-01 G
                 883.24 4.768E-02 &   2.536E-01 7.35E-02 G
                 926.70 3.694E-02 %   2.810E-01 8.06E-02 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26 4.018E-02 % P 3.012E-01 8.77E-02 G

TH-234 -4.7944E-01
63.29-4.794E-01 &(P 4.709E+00 1.38E+00 G K
92.80 8.498E-01 & P 2.089E+00 6.29E-01 G
92.38 9.882E-01 & P 2.482E+00 7.47E-01 G

AM-241 1.6232E-01
59.54 1.623E-01 %(P 1.015E+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	-5.3905E-02	-5.6120E-02	2.8223E-01	2.8225E-01	3.064E-01
K-40		1.2785E+01	1.2785E+01	1.1686E+00	1.3844E+00	
MN-54	#A	1.5821E-02	1.5930E-02	3.2225E-02	3.2238E-02	3.535E-02
CO-57	#B	1.4554E-02	1.4670E-02	3.5381E-02	3.5390E-02	3.879E-02
CO-60	#B	1.1865E-02	1.1878E-02	3.3263E-02	3.3270E-02	3.805E-02

Sr-85 #A	-1.6254E-02	-1.6802E-02	3.8375E-02	3.8388E-02	4.106E-02
Kr-85 #A	-3.7538E+02	-3.7539E+02	8.5707E+02	8.5735E+02	9.479E+02
Y-88 #B	-9.1967E-05	-9.3840E-05	1.9408E-03	1.9408E-03	2.063E-02
NB-94 #B	9.0050E-03	9.0050E-03	2.3557E-02	2.3563E-02	2.651E-02
Ag-108M#B	-1.7005E-02	-1.7006E-02	4.2026E-02	4.2037E-02	4.670E-02
CD-109 #A	1.3025E+00	1.3087E+00	1.6417E+00	1.6433E+00	1.778E+00
SN-113 #B	-1.0047E-02	-1.0237E-02	4.5275E-02	4.5279E-02	4.990E-02
SB-125 #B	8.9884E-02	9.0076E-02	8.2094E-02	8.2260E-02	9.525E-02
I-131 #B	-5.4336E-03	-7.0991E-03	4.4300E-02	4.4302E-02	3.372E-02
CS-134 #B	1.7743E-02	1.7793E-02	1.4167E-02	1.4205E-02	3.988E-02
CS-137 #	6.0925E-02	6.0937E-02	3.7006E-02	3.7175E-02	
CE-139 #A	0.0000E+00	0.0000E+00	4.0187E-02	4.0187E-02	4.440E-02
EU-152 #B	6.9191E-02	6.9223E-02	7.9191E-02	7.9284E-02	1.441E-01
EU-154 #B	6.7647E-03	6.7694E-03	9.3496E-02	9.3497E-02	1.044E-01
EU-155 #B	1.4849E-01	1.4867E-01	2.0899E-01	2.0915E-01	2.279E-01
HG-203 #B	2.2098E-02	2.3141E-02	3.2763E-02	3.2790E-02	3.400E-02
TL-208	2.4842E-01	2.4842E-01	5.7886E-02	5.9656E-02	
PB-212	6.9434E-01	6.9434E-01	1.0339E-01	1.1097E-01	
PB-214	3.5475E-01	3.5475E-01	9.5792E-02	9.7981E-02	
BI-212	5.1991E-01	5.1991E-01	2.9183E-01	2.9339E-01	
BI-214	4.1784E-01	4.1784E-01	9.3776E-02	9.6863E-02	
RA-224 #A	6.5029E-01	6.5029E-01	9.3339E-01	9.3415E-01	1.019E+00
RA-226 #A	1.0573E+00	1.0573E+00	9.8759E-01	9.8949E-01	1.067E+00
AC-228	7.4377E-01	7.4377E-01	1.7822E-01	1.8338E-01	
TH-227 #B	0.0000E+00	0.0000E+00	4.1426E-01	4.1426E-01	4.625E-01
PA-234 #B	-3.9049E-03	-3.9049E-03	3.7657E-01	3.7657E-01	1.816E-01
TH-234 #B	-4.7944E-01	-4.7944E-01	1.3232E+01	1.3232E+01	4.709E+00
AM-241 #A	1.6232E-01	1.6232E-01	9.0948E-01	9.0953E-01	1.015E+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) 1.5825343E+01 pCi/gm

Total Decayed Activity (86.9 to 2000.7 keV) 1.5825355E+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_30AUG2005_1456.An1

Sample description

FSS-NOL-06-01-015-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30AUG2005_1456.An1

Acquisition information

Start time:	30-Aug-2005 14:56:28
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: 1.8960E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8960E+03) =
5.2743E+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 27-Aug-2005 11:00:00
Decay during acquisition: NO
Decay during collection: NO
True coincidence correction: NO
Peaked background correction: YES 103_150K_05AUG05.Pbc
08-Aug-2005 12:54:15
Absorption (Internal): NO
Geometry correction: NO
Random summing: NO

total peaks alloc. 21 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1406

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.88	142.	20.73	0.99	9.052E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	1.167E+00	PB212
92.96	146.	28.56	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
92.96	138.	30.20	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
185.96	224.	19.66	1.23	2.567E-02				
185.96	224.	19.66	1.23	2.567E-02	185.99	3.280	1.788E+00	RA226
209.62	135.	19.63	1.15	2.470E-02				
238.86	1184.	3.48	1.09	2.319E-02	238.63	43.100	8.358E-01	PB212
241.56	171.	20.07	1.09	2.304E-02	241.00	3.900	1.356E+00	RA224
					241.92	7.470	7.096E-01	PB214
270.42	97.	32.12	1.05	2.150E-02				
277.76	55.	40.53	1.84	2.112E-02				
295.13	269.	12.17	1.12	2.025E-02	295.22	19.200	4.857E-01	PB214
300.06	73.	29.54	0.91	2.001E-02				
328.21	67.	34.57	1.10	1.873E-02				
338.16	274.	12.73	0.96	1.831E-02	338.40	12.010	8.850E-01	AC228
351.94	449.	6.32	0.97	1.776E-02	351.99	37.100	4.793E-01	PB214
462.74	86.	29.72	1.45	1.427E-02				
462.74	86.	29.72	1.45	1.427E-02	463.51	10.000	4.268E-01	SB125
510.57	239.	13.08	1.85	1.318E-02	510.72	22.500	5.111E-01	TL208
562.37	51.	37.06	1.37	1.219E-02				
583.09	437.	6.86	1.31	1.185E-02	583.14	86.000	3.027E-01	TL208
609.18	370.	7.64	1.30	1.144E-02	609.32	46.090	4.912E-01	BI214
727.44	102.	18.61	1.95	9.962E-03	727.17	11.800	6.141E-01	BI212
770.02	68.	24.21	1.13	9.537E-03				
794.90	65.	29.63	1.20	9.309E-03				
794.90	65.	29.63	1.20	9.309E-03	795.76	85.400	5.842E-02	CS134
860.41	66.	21.11	1.31	8.769E-03				
910.96	309.	8.24	1.56	8.402E-03	911.07	29.000	8.947E-01	AC228
964.73	63.	19.64	1.54	8.052E-03	964.00	14.580	3.778E-01	EU152
968.80	169.	9.63	1.54	8.027E-03	968.90	17.460	8.588E-01	AC228
1120.19	94.	31.87	1.25	7.212E-03	1120.28	15.040	6.039E-01	BI214
1460.54	1503.	2.70	1.80	5.933E-03	1460.75	10.700	1.667E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1620.40	21.	26.49	1.53	5.488E-03	1620.56	2.750	9.708E-01	Bl212
1764.18	49.	13.87	1.13	5.142E-03	1764.51	15.920	4.243E-01	Bl214

********** 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
418.41	209.62	301.	135.	0.068	58.89	1.155	NP-239
540.00	270.42	364.	97.	0.049	96.35	1.049	AC-228
554.66	277.76	206.	70.	0.035	93.54	1.836	NP-239 s
599.27	300.06	196.	73.	0.036	88.62	0.909	PB-212
655.57	328.21	215.	67.	0.034	103.72	1.095	AC-228 s
1123.85	562.37	114.	51.	0.025	98.34	1.372	AS-76
1539.10	770.02	76.	68.	0.034	72.63	1.130	Bl-214 sM
1719.86	860.41	56.	66.	0.033	63.32	1.309	TL-208
1928.12	964.62	45.	64.	0.032	58.30	1.538	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	148.79	74.81	385.	142.	0.071	62.18	0.993D
PB-212	153.39	77.11	355.	191.	0.096	39.40	0.995A
TH-234	185.09	92.96	1040.	138.	0.069	90.61	1.500s
TH-234	185.09	92.96	1031.	146.	0.073	85.68	1.500s
RA-226	371.52	186.18	752.	193.	0.097	59.68	1.500s
PB-212	476.84	238.84	680.	1080.	0.540	14.26	0.904
RA-224	482.74	241.79	766.	168.	0.084	73.50	1.500
PB-214	482.21	241.53	433.	78.	0.039	115.28	1.732s
PB-214	589.41	295.13	325.	265.	0.132	36.51	1.117s
AC-228	675.47	338.16	315.	273.	0.136	38.18	0.962
PB-214	703.01	351.94	175.	443.	0.221	18.97	0.969
SB-125	924.66	462.77	172.	70.	0.035	85.23	1.500s
TL-208	1020.26	510.57	226.	213.	0.106	39.23	1.853s
TL-208	1165.29	583.09	153.	433.	0.216	20.59	1.313
BI-214	1217.46	609.18	141.	363.	0.182	22.93	1.301
BI-212	1453.96	727.44	96.	101.	0.051	55.82	1.954s
CS-134	1588.19	794.57	57.	58.	0.029	67.73	1.500s

YAEC Chemistry Lab Spectrum name: 103F_30AUG2005_1456.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1820.95	910.96	95.	306.	0.153	24.71	1.559s
AC-228	1936.81	968.90	45.	169.	0.084	28.56	1.541D
Bl-214	2239.35	1120.19	172.	92.	0.046	95.61	1.250
K-40	2919.95	1460.54	48.	1485.	0.742	8.09	1.799
Bl-212	3239.61	1620.40	3.	21.	0.010	79.47	1.534s
Bl-214	3527.12	1764.18	3.	49.	0.024	41.60	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 -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS

BE-7 8.4486E-02

477.56 8.449E-02 %(3.037E-01 9.04E-02 G

K-40 1.6672E+01

1460.75 1.667E+01 (P 3.942E-01 4.55E-01 G

MN-54 6.7409E-03

834.81 6.741E-03 %(P 3.335E-02 9.73E-03 G

CO-57 -6.3853E-03

122.07-6.385E-03 &(P 5.206E-02 1.56E-02 G K

136.43 0.000E+00 % 4.011E-01 1.20E-01 G

```
CO-60        6.9952E-03
                    1332.51 6.995E-03 &(P 3.457E-02 9.80E-03 G K
                    1173.23 1.126E-02 % P 5.003E-02 1.47E-02 G K

Sr-85       -2.1352E-02
                    514.00-2.135E-02 &(  4.751E-02 1.44E-02 G

Kr-85       -4.7696E+02
                    513.99-4.770E+02 &(  1.060E+03 3.21E+02 G

Y-88         3.5083E-04
                    1836.01 3.508E-04 %(P 2.848E-02 7.46E-03 G K
                    898.02-2.958E-03 % P 4.156E-02 1.19E-02 G

NB-94       -4.0746E-03
                    871.10-4.075E-03 %(  3.609E-02 1.04E-02 G K
                    702.50 1.117E-02 %   3.709E-02 1.10E-02 G K
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	4.7443E-03						
		722.95	4.744E-03	&(	3.548E-02	1.03E-02	G K
		614.37	-1.243E-02	% P	3.304E-02	9.89E-03	G
		433.93	1.799E-03	%	3.328E-02	9.72E-03	G
CD-109	8.7110E-01						
		88.04	8.711E-01	%(	1.905E+00	5.77E-01	G
SN-113	-1.2871E-02						
		391.71	-1.287E-02	%(	4.924E-02	1.47E-02	G K
		255.04	8.200E-02	&	1.324E+00	3.91E-01	G
SB-125	8.7566E-02						
		427.95	-1.750E-03	%(P	1.217E-01	3.57E-02	G K
		600.77	-1.539E-02	& P	1.919E-01	5.59E-02	G
		636.15	-3.335E-03	% P	3.388E-01	9.79E-02	G
		463.51	3.519E-01	(P	3.197E-01	1.02E-01	G
		176.29	-1.992E-01	%	5.681E-01	1.71E-01	G
I-131	9.8905E-03						
		364.48	9.891E-03	&(P	4.854E-02	1.44E-02	G K
		636.97	2.339E-01	%	5.245E-01	1.58E-01	G
		284.29	-2.361E-03	& P	7.175E-01	2.12E-01	G
CS-134	2.9162E-02						
		604.66	8.987E-03	&(	2.387E-02	7.13E-03	G K
		795.76	5.222E-02	(P	3.413E-02	1.18E-02	G
		569.29	-6.697E-03	% P	1.700E-01	4.79E-02	G
		801.84	-1.174E-02	% P	4.041E-01	1.14E-01	G

```
CS-137      8.8415E-03
                661.62 8.842E-03 %(P 3.765E-02 1.11E-02 G

CE-139      2.3232E-03
                165.85 2.323E-03 %(  4.775E-02 1.42E-02 G

EU-152     -1.9125E-02
                121.78-1.913E-02 &(P 1.515E-01 4.53E-02 G K
                344.30-2.662E-02 % P 1.218E-01 3.63E-02 G
                1408.08 3.724E-02 %   1.457E-01 4.22E-02 G
                964.00 1.585E-01 & P 3.430E-01 1.04E-01 G
                1112.07 9.463E-03 %   3.099E-01 8.85E-02 G
                778.90-3.437E-02 %   2.989E-01 8.71E-02 G

EU-154     -1.3512E-02
                123.10-1.351E-02 %(  9.570E-02 2.86E-02 G K
                1274.80-2.397E-02 %   1.318E-01 3.84E-02 G
```

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30 0.000E+00 &   3.016E-01 8.85E-02 G
                     1004.80-2.339E-03 %   1.837E-01 5.16E-02 G

EU-155       8.2477E-02
                       86.45 8.248E-02 %(  2.433E-01 7.34E-02 G K
                      105.31 4.019E-02 %   2.446E-01 7.33E-02 G

HG-203      -8.6831E-03
                      279.17-8.683E-03 &(P 4.309E-02 1.29E-02 G K
                       72.87-8.527E-01 % P 2.228E+00 6.73E-01 G
                       70.83-8.767E-01 &   4.381E+00 1.32E+00 G
                       82.50 2.735E-01 &   3.293E+00 9.81E-01 G

TL-208       3.0268E-01
                      583.14 3.027E-01  (P 4.228E-02 2.10E-02 G
                      510.72 5.111E-01 + P 1.752E-01 7.52E-02 G

PB-212       7.7003E-01
                      238.63 7.700E-01  (P 8.854E-02 3.70E-02 G K
                                         Energy duplication
                       77.11 7.700E-01 } P 3.643E-01 1.01E-01 G
                       74.81 1.167E+00 + P 7.719E-01 2.47E-01 G

PB-214       4.8152E-01
                      351.99 4.793E-01  (P 6.965E-02 3.07E-02 G K
                      295.22 4.857E-01 @(P 1.590E-01 6.00E-02 G
                                         Energy duplication
                       77.11 0.000E+00 } P 9.097E-01 0.00E+00 G
                      241.92 3.237E-01 -   4.131E-01 1.24E-01 G

BI-212       6.8150E-01
```

727.17 6.141E-01 *(P 2.927E-01 1.15E-01 G K
1620.56 9.708E-01 (P 5.365E-01 2.58E-01 G
785.42 4.856E-01 % 2.013E+00 5.95E-01 G

BI-214 4.7399E-01
609.32 4.912E-01 (P 7.838E-02 3.82E-02 G K
1764.51 4.243E-01 (P 9.699E-02 6.28E-02 G
1120.28 6.039E-01 + P 4.195E-01 1.96E-01 G

RA-224 1.3331E+00
241.00 1.333E+00 (1.043E+00 3.27E-01 G

RA-226 1.6370E+00
185.99 1.637E+00 *(P 1.105E+00 3.47E-01 G

AC-228 8.8206E-01
911.07 8.947E-01 *(P 1.409E-01 7.45E-02 G K
968.90 8.591E-01 (P 1.729E-01 8.18E-02 G
338.40 8.850E-01 (P 2.770E-01 1.13E-01 G

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

TH-227      -2.6154E-02
                    236.00-2.615E-02 %(  2.763E-01 8.20E-02 G K
                    256.25 8.927E-02 & P 3.725E-01 1.11E-01 G

PA-234      -3.4849E-02
                     98.44-3.485E-02 %(P 2.381E-01 7.13E-02 G K
                    946.00-2.221E-03 % P 1.679E-01 4.75E-02 G
                    131.28 1.404E-02 % P 2.267E-01 6.77E-02 G
                     94.67-5.011E-04 & P 3.844E-01 1.14E-01 G
                    883.24 1.072E-01 %   2.785E-01 8.34E-02 G
                    926.70-4.379E-03 &   2.757E-01 7.75E-02 G
                    569.26-7.773E-03 & P 2.513E-01 7.09E-02 G

TH-234       1.7193E+00
                     63.29 1.007E+00 &(P 6.199E+00 1.85E+00 G K
                     92.80 2.112E+00  (P 2.200E+00 6.76E-01 G
                     92.38 2.341E+00  (P 2.602E+00 7.98E-01 G

AM-241      -2.7882E-01
                     59.54-2.788E-01 %(P 1.161E+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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	8.1086E-02	8.4486E-02	2.7107E-01	2.7112E-01	2.915E-01
K-40	1.6672E+01	1.6672E+01	1.3653E+00	1.6736E+00	
MN-54 #A	6.6937E-03	6.7409E-03	2.9193E-02	2.9196E-02	3.311E-02
CO-57 #B	-6.3336E-03	-6.3853E-03	4.9029E-02	4.9030E-02	5.163E-02
CO-60 #B	6.9872E-03	6.9952E-03	2.9401E-02	2.9404E-02	3.453E-02
Sr-85 #A	-2.0642E-02	-2.1352E-02	4.3137E-02	4.3155E-02	4.593E-02
Kr-85 #A	-4.7695E+02	-4.7696E+02	9.6283E+02	9.6322E+02	1.060E+03
Y-88 #B	3.4368E-04	3.5083E-04	2.2385E-02	2.2385E-02	2.790E-02
NB-94 #B	-4.0746E-03	-4.0746E-03	3.1319E-02	3.1320E-02	3.609E-02
Ag-108M#B	4.7441E-03	4.7443E-03	3.0911E-02	3.0912E-02	3.548E-02
CD-109 #A	8.6690E-01	8.7110E-01	1.7316E+00	1.7323E+00	1.895E+00
SN-113 #B	-1.2628E-02	-1.2871E-02	4.4038E-02	4.4044E-02	4.831E-02
SB-125 #B	8.7377E-02	8.7566E-02	7.5992E-02	7.6161E-02	1.215E-01
I-131 #B	7.5292E-03	9.8905E-03	4.3206E-02	4.3210E-02	3.695E-02
CS-134 #F	2.9078E-02	2.9162E-02	1.9781E-02	1.9853E-02	2.380E-02
CS-137 #A	8.8398E-03	8.8415E-03	3.3172E-02	3.3176E-02	3.764E-02
CE-139 #A	2.2864E-03	2.3232E-03	4.2702E-02	4.2702E-02	4.699E-02
EU-152 #B	-1.9116E-02	-1.9125E-02	1.5089E-01	1.5089E-01	1.515E-01
EU-154 #B	-1.3503E-02	-1.3512E-02	8.5821E-02	8.5824E-02	9.564E-02
EU-155 #B	8.2377E-02	8.2477E-02	2.2034E-01	2.2039E-01	2.430E-01
HG-203 #B	-8.2838E-03	-8.6831E-03	3.8750E-02	3.8754E-02	4.111E-02
TL-208	3.0268E-01	3.0268E-01	6.2941E-02	6.5348E-02	

PB-212	7.7003E-01	7.7003E-01	1.1102E-01	1.1968E-01	
PB-214	4.8152E-01	4.8152E-01	9.2490E-02	9.6623E-02	
BI-212 #	6.8150E-01	6.8150E-01	3.3195E-01	3.3430E-01	
BI-214	4.7399E-01	4.7399E-01	1.1064E-01	1.1402E-01	
RA-224	1.3331E+00	1.3331E+00	9.7978E-01	9.8284E-01	1.043E+00
RA-226 #	1.6370E+00	1.6370E+00	1.0424E+00	1.0468E+00	1.105E+00
AC-228	8.8206E-01	8.8206E-01	1.5863E-01	1.6669E-01	
TH-227 #B	-2.6154E-02	-2.6154E-02	2.4610E-01	2.4611E-01	2.763E-01
PA-234 #B	-3.4849E-02	-3.4849E-02	2.3370E-01	2.3371E-01	2.381E-01
TH-234 #B	1.7193E+00	1.7193E+00	1.6508E+00	1.6535E+00	6.199E+00
AM-241 #A	-2.7882E-01	-2.7882E-01	1.0593E+00	1.0594E+00	1.161E+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) 2.1596476E+01 pCi/gm

Total Decayed Activity (1120.0 to 2000.7 keV) 2.1596476E+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_30AUG2005_1535.An1

Sample description

FSS-NOL-06-01-005-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30AUG2005_1535.An1

Acquisition information

Start time:	30-Aug-2005 15:35:05
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: 1.6950E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6950E+03) =
5.8997E+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	27-Aug-2005 12:05:00
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: 0.1382

***** 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
74.92	101.	25.65	0.99	9.052E-03	74.81	9.600	9.287E-01	PB212
77.22	141.	15.55	0.99	1.011E-02	77.11	17.500	6.734E-01	PB212
186.17	168.	22.68	1.19	2.566E-02	185.99	3.280	1.472E+00	RA226
209.64	80.	35.41	0.93	2.470E-02				
238.87	840.	4.28	1.09	2.319E-02	238.63	43.100	6.605E-01	PB212
241.89	137.	18.57	1.10	2.302E-02	241.00	3.900	1.212E+00	RA224
					241.92	7.470	6.341E-01	PB214

270.59	86.	35.95	1.53	2.149E-02				
276.89	62.	32.99	1.26	2.117E-02				
295.17	198.	15.49	1.18	2.025E-02	295.22	19.200	3.967E-01	PB214
300.04	52.	40.06	0.82	2.002E-02				
338.14	177.	13.48	1.18	1.831E-02	338.40	12.010	6.388E-01	AC228
351.74	405.	7.14	1.15	1.776E-02	351.99	37.100	4.839E-01	PB214
434.01	67.	32.22	0.95	1.502E-02	433.93	89.881	3.943E-02	Ag108M
462.87	78.	33.05	0.82	1.426E-02				
462.87	78.	33.05	0.82	1.426E-02	463.51	10.000	4.275E-01	SB125
510.62	108.	15.80	1.26	1.318E-02	510.72	22.500	2.175E-01	TL208
583.13	304.	9.28	1.58	1.184E-02	583.14	86.000	2.350E-01	TL208
609.19	270.	7.34	1.32	1.144E-02	609.32	46.090	3.985E-01	BI214
614.35	72.	19.02	1.32	1.137E-02				
614.35	72.	19.02	1.32	1.137E-02	614.37	90.393	5.561E-02	Ag108M
661.48	760.	4.81	1.23	1.072E-02	661.62	84.620	6.668E-01	CS137
722.45	32.	36.25	1.50	1.001E-02				
722.45	32.	36.25	1.50	1.001E-02	722.95	90.499	PBC<MDA	Ag108M
					723.30	19.700	1.297E-01	EU154
727.34	75.	17.12	1.39	9.964E-03	727.17	11.800	5.053E-01	BI212
794.63	33.	39.02	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
860.11	71.	24.34	1.31	8.771E-03				
910.87	195.	12.59	1.69	8.403E-03	911.07	29.000	6.264E-01	AC228
967.62	174.	13.32	2.06	8.034E-03	968.90	17.460	9.880E-01	AC228
1120.21	88.	21.43	1.66	7.212E-03	1120.28	15.040	6.366E-01	BI214
1172.86	276.	8.62	1.60	6.973E-03	1173.23	99.860	3.136E-01	CO60
1332.33	264.	8.85	1.58	6.350E-03	1332.51	99.980	3.284E-01	CO60
1460.55	859.	3.52	1.87	5.933E-03	1460.75	10.700	1.056E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.30	60.	12.91	2.00	5.142E-03	1764.51	15.920	5.525E-01	Bl214

********** 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
418.44	209.64	348.	80.	0.040	106.22	0.931	NP-239 s
540.34	270.59	348.	86.	0.043	107.86	1.533	AC-228 s
599.23	300.04	191.	52.	0.026	120.19	0.819	PB-212
1719.26	860.11	69.	71.	0.036	73.03	1.315	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	309.	101.	0.051	76.94	0.993D
PB-212	153.39	77.11	335.	141.	0.071	46.66	0.995A
RA-226	371.40	186.12	694.	160.	0.080	67.93	1.500s
PB-212	476.91	238.88	641.	779.	0.390	18.68	0.949
RA-224	481.96	241.40	665.	113.	0.056	101.04	1.500s
PB-214	483.42	242.13	688.	92.	0.046	124.37	1.500s

PB-214	589.50	295.17	300.	193.	0.097	46.48	1.175
AC-228	675.42	338.14	180.	176.	0.088	40.44	1.179
PB-214	702.63	351.74	186.	400.	0.200	21.43	1.147
Ag-108M	866.69	433.78	194.	56.	0.028	113.53	1.500s
SB-125	925.22	463.05	175.	63.	0.031	95.00	1.500s
TL-208	1020.29	510.59	190.	106.	0.053	55.72	1.432s
TL-208	1165.36	583.13	154.	300.	0.150	27.83	1.578s
BI-214	1217.39	609.15	134.	258.	0.129	28.32	1.228
Ag-108M	1227.43	614.17	101.	69.	0.034	71.61	1.500
CS-137	1322.05	661.48	149.	759.	0.379	14.43	1.228
Ag-108M	1443.97	722.45	51.	32.	0.016	108.75	1.500s
BI-212	1453.52	727.22	84.	103.	0.051	54.88	1.719s
CS-134	1588.32	794.63	66.	33.	0.016	117.06	1.500s
AC-228	1820.77	910.87	103.	191.	0.096	37.77	1.690s
AC-228	1934.25	967.62	95.	174.	0.087	39.95	2.064s
BI-214	2239.40	1120.21	79.	87.	0.043	64.30	1.659s
CO-60	2344.67	1172.86	84.	274.	0.137	25.87	1.596
CO-60	2663.56	1332.33	64.	261.	0.131	26.56	1.583

YAEC Chemistry Lab Spectrum name: 103F_30AUG2005_1535.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2919.96	1460.55	34.	841.	0.420	10.56	1.873
Bl-214	3527.35	1764.30	3.	57.	0.028	38.73	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		3.0816E-02					
			477.56	3.082E-02	&(	3.891E-01	1.14E-01 G
K-40		1.0560E+01					
			1460.75	1.056E+01	(P	3.769E-01	3.80E-01 G
MN-54		6.6064E-03					
			834.81	6.606E-03	%(P	3.957E-02	1.15E-02 G
CO-57		8.4138E-03					
			122.07	8.414E-03	%(P	5.533E-02	1.66E-02 G K
			136.43	8.981E-02	&	4.005E-01	1.20E-01 G
CO-60		3.2099E-01					
			1332.51	3.284E-01	(P	5.022E-02	2.94E-02 G K
			1173.23	3.136E-01	(P	5.220E-02	2.72E-02 G K

```
Sr-85       -1.0356E-02
                514.00-1.036E-02 %(  4.628E-02 1.38E-02 G

Kr-85       -2.3209E+02
                513.99-2.321E+02 %(  1.033E+03 3.07E+02 G

Y-88        -1.0345E-04
               1836.01-1.034E-04 &(P 4.322E-02 1.18E-02 G K
                898.02-7.645E-03 % P 4.323E-02 1.25E-02 G

NB-94        -4.2158E-03
                871.10-4.216E-03 &(  4.318E-02 1.25E-02 G K
                702.50-3.389E-03 %   3.993E-02 1.16E-02 G K

Ag-108M      3.8172E-02
                722.95 2.821E-02  (  3.181E-02 1.02E-02 G K
                614.37 5.346E-02  (P 3.849E-02 1.28E-02 G
                433.93 3.283E-02 @(  3.988E-02 1.24E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-3.7538E-01						
		88.04	-3.754E-01	%(	1.621E+00	4.86E-01	G
SN-113	-1.0335E-02						
		391.71	-1.033E-02	%(	6.091E-02	1.81E-02	G K
		255.04	-2.322E-01	&	1.797E+00	5.35E-01	G
SB-125	9.9823E-02						
		427.95	1.456E-02	%(P	1.225E-01	3.61E-02	G K
		600.77	5.440E-02	% P	1.934E-01	5.74E-02	G
		636.15	5.200E-02	& P	3.030E-01	8.84E-02	G
		463.51	3.522E-01	@(P	3.610E-01	1.14E-01	G
		176.29	1.476E-01	&	5.247E-01	1.58E-01	G
I-131	4.6439E-03						
		364.48	4.644E-03	%(P	5.434E-02	1.60E-02	G K
		636.97	1.372E-01	&	5.966E-01	1.76E-01	G
		284.29	-4.645E-03	% P	7.705E-01	2.27E-01	G
CS-134	7.3516E-03						
		604.66	-1.510E-02	%(	4.604E-02	1.38E-02	G K
		795.76	3.301E-02	*(P	4.082E-02	1.29E-02	G
		569.29	-6.166E-02	% P	2.534E-01	7.45E-02	G
		801.84	4.508E-02	& P	3.915E-01	1.12E-01	G
CS-137	6.6681E-01						
		661.62	6.668E-01	(P	5.242E-02	3.21E-02	G
CE-139	-1.5473E-02						
		165.85	-1.547E-02	%(	4.898E-02	1.48E-02	G

EU-152 2.3853E-02

121.78 2.385E-02 &(P 1.611E-01 4.82E-02 G K

344.30-6.154E-03 % P 1.252E-01 3.68E-02 G

1408.08 7.452E-02 % 1.277E-01 3.99E-02 G

964.00 2.116E-01 % P 3.538E-01 1.09E-01 G

1112.07 3.284E-02 % 3.253E-01 9.35E-02 G

778.90 1.509E-03 & 2.919E-01 8.33E-02 G

EU-154 2.3385E-02

123.10 2.338E-02 %(1.145E-01 3.43E-02 G K

1274.80-2.285E-03 % 9.192E-02 2.52E-02 G

723.30 9.066E-02 % 1.411E-01 4.39E-02 G

1004.80-1.370E-03 & 2.186E-01 6.16E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.1333E-01						
				Energy duplication			
		86.45	1.133E-01	%(	2.352E-01	7.13E-02	G K
		105.31	5.535E-04	%	2.187E-01	6.49E-02	G
HG-203	-9.0756E-03						
		279.17	-9.076E-03	%(P	4.809E-02	1.43E-02	G K
		72.87	-5.710E-01	& P	2.399E+00	7.21E-01	G
		70.83	3.522E-02	%	4.967E+00	1.48E+00	G
		82.50	-1.177E+00	%	4.180E+00	1.26E+00	G
TL-208	2.4532E-01						
		583.14	2.350E-01	@(P	4.735E-02	2.21E-02	G
		510.72	2.849E-01	*(P	1.801E-01	6.62E-02	G
PB-212	6.3638E-01						
		238.63	6.213E-01	(P	9.622E-02	3.93E-02	G K
				Energy duplication			
		77.11	6.351E-01	} P	3.967E-01	9.88E-02	G
		74.81	9.287E-01	+ P	7.761E-01	2.45E-01	G
PB-214	4.7462E-01						
		351.99	4.839E-01	(P	8.026E-02	3.50E-02	G K
		295.22	3.967E-01	- P	1.710E-01	6.27E-02	G
				Energy duplication			
		77.11	1.501E-01	} P	8.548E-01	2.06E-01	G
		241.92	4.285E-01	(	5.792E-01	1.78E-01	G
BI-212	6.9502E-01						
		727.17	6.950E-01	(P	3.088E-01	1.28E-01	G K

1620.56 2.465E-01 % P 1.085E+00 3.08E-01 G
785.42 6.701E-01 % 1.847E+00 5.52E-01 G

BI-214 3.8972E-01
609.32 3.897E-01 (P 8.575E-02 3.77E-02 G K
1764.51 5.525E-01 + P 1.085E-01 7.54E-02 G
1120.28 6.366E-01 + P 3.251E-01 1.39E-01 G

RA-224 9.9960E-01
241.00 9.996E-01 &(1.089E+00 3.37E-01 G

RA-226 1.5160E+00
185.99 1.516E+00 *(P 1.188E+00 3.71E-01 G

AC-228 6.3005E-01
911.07 6.264E-01 *(P 1.633E-01 8.03E-02 G K
968.90 9.880E-01 + P 2.743E-01 1.32E-01 G
338.40 6.388E-01 (P 2.365E-01 8.66E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-4.0201E-03						
		236.00	-4.020E-03	&(	3.534E-01	1.05E-01	G K
		256.25	1.494E-01	% P	5.235E-01	1.57E-01	G
PA-234	2.7529E-03						
		98.44	2.753E-03	%(P	1.933E-01	5.73E-02	G K
		946.00	-4.125E-02	% P	2.166E-01	6.33E-02	G
		131.28	-1.565E-02	% P	1.972E-01	5.87E-02	G
		94.67	2.491E-01	& P	3.501E-01	1.07E-01	G
		883.24	-6.444E-04	%	3.137E-01	8.89E-02	G
		926.70	6.035E-02	%	3.165E-01	9.18E-02	G
		569.26	-9.180E-02	% P	3.750E-01	1.10E-01	G
TH-234	2.9921E+00						
		63.29	2.992E+00	%(P	6.324E+00	1.91E+00	G K
		92.80	9.054E-01	% P	2.185E+00	6.58E-01	G
		92.38	-2.749E-01	& P	2.509E+00	7.38E-01	G
AM-241	-1.2335E-02						
		59.54	-1.234E-02	%(P	1.236E+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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	2.9583E-02	3.0816E-02	3.4233E-01	3.4233E-01	3.736E-01
K-40	1.0560E+01	1.0560E+01	1.1402E+00	1.2946E+00	
MN-54 #A	6.5604E-03	6.6064E-03	3.4554E-02	3.4556E-02	3.929E-02
CO-57 #B	8.3461E-03	8.4138E-03	4.9690E-02	4.9693E-02	5.489E-02
CO-60	3.2063E-01	3.2099E-01	6.0015E-02	6.2842E-02	
Sr-85 #A	-1.0013E-02	-1.0356E-02	4.1295E-02	4.1300E-02	4.475E-02
Kr-85 #A	-2.3209E+02	-2.3209E+02	9.2195E+02	9.2205E+02	1.033E+03
Y-88 #B	-1.0135E-04	-1.0345E-04	4.4403E-03	4.4403E-03	4.235E-02
NB-94 #B	-4.2158E-03	-4.2158E-03	3.7512E-02	3.7513E-02	4.318E-02
Ag-108M#	3.8170E-02	3.8172E-02	2.1988E-02	2.2099E-02	3.181E-02
CD-109 #A	-3.7358E-01	-3.7538E-01	1.4570E+00	1.4571E+00	1.613E+00
SN-113 #B	-1.0141E-02	-1.0335E-02	5.4209E-02	5.4212E-02	5.977E-02
SB-125 #B	9.9608E-02	9.9823E-02	9.6759E-02	9.6932E-02	1.223E-01
I-131 #B	3.5408E-03	4.6439E-03	4.7923E-02	4.7924E-02	4.143E-02
CS-134 #B	7.3304E-03	7.3516E-03	8.6286E-03	8.6392E-03	4.591E-02
CS-137	6.6668E-01	6.6681E-01	9.6405E-02	1.0389E-01	
CE-139 #A	-1.5229E-02	-1.5473E-02	4.4254E-02	4.4263E-02	4.821E-02
EU-152 #B	2.3841E-02	2.3853E-02	1.4463E-01	1.4464E-01	1.610E-01
EU-154 #B	2.3369E-02	2.3385E-02	1.0300E-01	1.0301E-01	1.144E-01
EU-155 #B	1.1319E-01	1.1333E-01	2.1404E-01	2.1413E-01	2.349E-01
HG-203 #B	-8.6606E-03	-9.0756E-03	4.3226E-02	4.3229E-02	4.590E-02
TL-208 #	2.4532E-01	2.4532E-01	6.9248E-02	7.0698E-02	

PB-212	6.3638E-01	6.3638E-01	1.2068E-01	1.2621E-01	
PB-214	4.7462E-01	4.7462E-01	1.0316E-01	1.0678E-01	
BI-212	6.9502E-01	6.9502E-01	3.8325E-01	3.8537E-01	
BI-214	3.8972E-01	3.8972E-01	1.1314E-01	1.1538E-01	
RA-224 #A	9.9960E-01	9.9960E-01	1.0100E+00	1.0117E+00	1.089E+00
RA-226 #	1.5160E+00	1.5160E+00	1.1131E+00	1.1165E+00	1.188E+00
AC-228	6.3005E-01	6.3005E-01	1.7633E-01	1.8008E-01	
TH-227 #B	-4.0201E-03	-4.0201E-03	3.1436E-01	3.1436E-01	3.534E-01
PA-234 #B	2.7529E-03	2.7529E-03	1.7175E-01	1.7175E-01	1.933E-01
TH-234 #B	2.9921E+00	2.9921E+00	5.7406E+00	5.7430E+00	6.324E+00
AM-241 #A	-1.2335E-02	-1.2335E-02	1.5133E+00	1.5133E+00	1.236E+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 (86.4 to 2000.7 keV) 1.4617929E+01 pCi/gm

Total Decayed Activity (86.4 to 2000.7 keV) 1.4618425E+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_30AUG2005_1611.An1

Sample description

FSS-NOL-06-01-018-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30AUG2005_1611.An1

Acquisition information

Start time:	30-Aug-2005 16:11:42
Live time:	2000
Real time:	2001
Dead time:	0.05 %
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: 8.2800E+02

Activity scaling factor: 1.0000E+06/(1.0000E+00* 8.2800E+02) =
1.2077E+03

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	27-Aug-2005 13:23:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 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
74.79	39.	40.14	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
77.09	56.	31.16	0.99	1.011E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
93.34	67.	33.72	0.99	1.664E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
239.38	394.	7.43	1.06	2.316E-02	238.63	43.100	6.242E-01	PB212

241.86	59.	37.13	1.50	2.307E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.576E-01	PB214
295.12	101.	21.13	1.11	2.025E-02				
295.12	101.	21.13	1.11	2.025E-02	295.22	19.200	4.087E-01	PB214
337.94	91.	18.83	0.94	1.832E-02				
337.94	91.	18.83	0.94	1.832E-02	338.40	12.010	6.676E-01	AC228
351.93	132.	12.10	0.94	1.776E-02				
351.93	132.	12.10	0.94	1.776E-02	351.99	37.100	3.124E-01	PB214
510.22	126.	13.20	2.01	1.318E-02				
510.22	126.	13.20	2.01	1.318E-02	510.72	22.500	5.453E-01	TL208
582.98	123.	14.84	1.50	1.185E-02				
582.98	123.	14.84	1.50	1.185E-02	583.14	86.000	1.902E-01	TL208
609.22	137.	10.59	1.34	1.144E-02	609.32	46.090	4.047E-01	BI214
661.47	252.	8.03	1.23	1.072E-02	661.62	84.620	4.502E-01	CS137
726.92	46.	19.55	1.76	9.967E-03	727.17	11.800	6.372E-01	BI212
911.00	91.	14.80	1.24	8.402E-03				
911.00	91.	14.80	1.24	8.402E-03	911.07	29.000	5.897E-01	AC228
969.02	54.	19.33	1.69	8.025E-03	968.90	17.460	6.226E-01	AC228
1120.32	29.	27.68	2.22	7.212E-03	1120.28	15.040	4.350E-01	BI214
1460.56	660.	4.03	2.03	5.933E-03	1460.75	10.700	1.650E+01	K40
1763.95	33.	16.67	1.42	5.142E-03	1764.51	15.920	6.525E-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	
151.15	75.99	259.	101.	0.051	79.85	1.043	PB-214	l
1019.55	510.22	110.	64.	0.032	78.95	2.005	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	153.39	77.11	142.	56.	0.028	93.48	0.995D
PA-234	185.26	93.04	223.	74.	0.037	92.18	1.500
PB-212	477.91	239.38	178.	382.	0.191	22.28	1.063s
RA-224	482.87	241.86	209.	59.	0.029	111.40	1.500s
PB-214	589.39	295.12	139.	79.	0.040	67.73	1.500
AC-228	675.51	338.18	105.	65.	0.033	74.96	1.500s
PB-214	703.13	352.00	85.	117.	0.058	41.10	1.500
TL-208	1165.32	583.11	41.	95.	0.047	39.71	1.500
BI-214	1217.56	609.23	40.	134.	0.067	32.62	1.342s
CS-137	1322.04	661.47	52.	250.	0.125	24.08	1.226

Bl-212	1452.92	726.92	16.	46.	0.023	58.65	1.761s
AC-228	1821.03	911.00	25.	77.	0.039	41.61	1.505
AC-228	1936.89	968.94	26.	48.	0.024	62.51	1.541
Bl-214	2239.62	1120.32	20.	29.	0.014	83.03	2.217s
K-40	2919.98	1460.56	29.	642.	0.321	12.08	2.029
Bl-214	3526.65	1763.95	3.	33.	0.016	50.00	1.417s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-8.5564E-02					
			477.56	-8.556E-02	%(	5.049E-01	1.47E-01 G
K-40		1.6502E+01					
			1460.75	1.650E+01	(P	7.174E-01	6.84E-01 G
MN-54		1.4525E-02					
			834.81	1.453E-02	&(P	5.396E-02	1.57E-02 G
CO-57		2.0397E-02					
			122.07	2.040E-02	%(P	6.273E-02	1.88E-02 G K
			136.43	2.283E-02	%	4.592E-01	1.35E-01 G
CO-60		-7.1625E-03					
			1332.51	-7.163E-03	%(P	6.826E-02	1.77E-02 G K
			1173.23	2.557E-02	& P	6.594E-02	1.94E-02 G K
Sr-85		-2.8070E-02					
			514.00	-2.807E-02	%(	7.235E-02	2.17E-02 G
Kr-85		-6.2655E+02					
			513.99	-6.265E+02	%(	1.616E+03	4.86E+02 G
Y-88		-1.2420E-03					
			1836.01	-1.242E-03	&(P	3.692E-02	8.56E-03 G K

898.02 1.005E-02 % P 4.682E-02 1.32E-02 G

NB-94 -6.0870E-04

871.10-6.087E-04 %(5.261E-02 1.45E-02 G K

702.50 8.315E-03 & 4.859E-02 1.39E-02 G K

Ag-108M -1.2785E-02

722.95-1.278E-02 %(5.937E-02 1.72E-02 G K

614.37-3.809E-03 % P 4.842E-02 1.36E-02 G

433.93 2.737E-02 % 4.311E-02 1.34E-02 G

CD-109 2.0476E-01

88.04 2.048E-01 %(2.088E+00 6.14E-01 G

SN-113 2.0229E-02

391.71 2.023E-02 &(5.252E-02 1.57E-02 G K

255.04 3.510E-01 % 2.243E+00 6.61E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	4.7912E-02						
		427.95	4.791E-02	%(P	1.317E-01	3.93E-02	G K
		600.77	1.213E-02	& P	2.511E-01	7.06E-02	G
		636.15	-2.550E-03	% P	3.945E-01	1.08E-01	G
		463.51	1.432E-01	% P	4.891E-01	1.44E-01	G
		176.29	1.887E-03	&	7.038E-01	2.05E-01	G
I-131	1.2784E-02						
		364.48	1.278E-02	&(P	7.112E-02	2.08E-02	G K
		636.97	-9.764E-02	%	8.180E-01	2.32E-01	G
		284.29	-1.791E-03	& P	1.045E+00	3.03E-01	G
CS-134	-4.6532E-03						
		604.66	-4.653E-03	%(	1.224E-01	3.60E-02	G K
		795.76	2.313E-02	% P	5.244E-02	1.58E-02	G
		569.29	-5.971E-02	% P	3.147E-01	8.90E-02	G
		801.84	4.796E-02	% P	6.073E-01	1.69E-01	G
CS-137	4.5017E-01						
		661.62	4.502E-01	(P	6.521E-02	3.63E-02	G
CE-139	-7.4210E-03						
		165.85	-7.421E-03	%(	6.091E-02	1.80E-02	G
EU-152	7.4400E-02						
		121.78	7.440E-02	&(P	1.800E-01	5.43E-02	G K
		344.30	3.241E-02	& P	1.653E-01	4.85E-02	G
		1408.08	6.092E-03	&	2.151E-01	5.56E-02	G
		964.00	1.902E-01	% P	3.995E-01	1.21E-01	G
		1112.07	-1.197E-01	&	5.613E-01	1.63E-01	G

778.90 9.229E-02 % 3.932E-01 1.14E-01 G

EU-154 4.6501E-02

123.10 4.650E-02 %(1.229E-01 3.70E-02 G K

1274.80 1.882E-02 & 1.930E-01 5.40E-02 G

723.30-6.419E-02 % 2.889E-01 8.41E-02 G

1004.80-7.293E-02 % 3.438E-01 9.90E-02 G

EU-155 5.9440E-02

86.45 5.944E-02 %(3.139E-01 9.35E-02 G K

105.31 6.992E-02 % 2.880E-01 8.59E-02 G

HG-203 -1.0883E-02

279.17-1.088E-02 &(P 6.099E-02 1.80E-02 G K

72.87-8.374E-01 & P 3.068E+00 9.18E-01 G

70.83-1.656E+00 % 5.933E+00 1.78E+00 G

82.50-1.006E+00 % 5.660E+00 1.69E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.5170E-01						
		583.14	1.517E-01	(P	5.194E-02	2.10E-02	G
		510.72	1.927E-01	% P	2.803E-01	8.21E-02	G
PB-212	6.2424E-01						
		238.63	6.242E-01	@(P	1.058E-01	4.78E-02	G K
							Energy duplication
		77.11	5.156E-01	- P	5.371E-01	1.69E-01	G
		74.81	7.381E-01	% P	1.036E+00	3.20E-01	G
PB-214	3.0393E-01						
		351.99	2.891E-01	(P	1.131E-01	4.15E-02	G K
		295.22	3.327E-01	(P	2.422E-01	7.89E-02	G
							Energy duplication
		77.11	8.054E-01	% P	1.389E+00	4.23E-01	G
		241.92	4.152E-01	%	7.120E-01	2.18E-01	G
BI-212	6.3717E-01						
		727.17	6.372E-01	(P	2.971E-01	1.26E-01	G K
		1620.56	2.569E-01	& P	1.738E+00	4.69E-01	G
		785.42	0.000E+00	&	3.082E+00	8.64E-01	G
BI-214	4.1866E-01						
		609.32	4.133E-01	@(P	1.002E-01	4.71E-02	G K
		1764.51	6.525E-01	+ P	2.221E-01	1.20E-01	G
		1120.28	4.350E-01	(P	3.551E-01	1.28E-01	G
RA-224	1.0658E+00						
		241.00	1.066E+00	&(	1.270E+00	3.96E-01	G

```
RA-226       5.3461E-01
                 185.99 5.346E-01 %(P 1.588E+00 4.72E-01 G

AC-228       5.2110E-01
                 911.07 5.166E-01  (P 1.755E-01 7.48E-02 G K
                 968.90 5.540E-01  (P 3.067E-01 1.16E-01 G
                 338.40 4.842E-01 *(P 3.750E-01 1.23E-01 G

TH-227      -1.3977E-01
                 236.00-1.398E-01 %(  4.916E-01 1.47E-01 G K
                 256.25 3.485E-02 & P 5.529E-01 1.60E-01 G

PA-234       1.9067E-01
                  98.44 2.736E-02 %(P 2.737E-01 8.07E-02 G K
                 946.00 2.933E-02 & P 2.744E-01 7.70E-02 G
                 131.28 1.459E-02 & P 2.855E-01 8.42E-02 G
                  94.67 4.551E-01 &(P 4.457E-01 1.40E-01 G
                 883.24 1.778E-01 &   3.902E-01 1.18E-01 G
                 926.70-1.782E-02 &   5.239E-01 1.45E-01 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments

569.26-1.007E-01 % P 4.825E-01 1.37E-01 G

TH-234 -8.1051E-01

63.29-8.105E-01 %(P 8.335E+00 2.42E+00 G K

92.80 1.669E+00 % P 2.815E+00 8.49E-01 G

92.38 2.066E+00 % P 3.346E+00 1.01E+00 G

AM-241 -1.7779E-03

59.54-1.778E-03 &(P 1.529E+00 4.47E-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	-8.2171E-02	-8.5564E-02	4.4086E-01	4.4088E-01	4.848E-01
K-40		1.6502E+01	1.6502E+01	2.0522E+00	2.2648E+00	
MN-54	#A	1.4425E-02	1.4525E-02	4.7104E-02	4.7112E-02	5.359E-02
CO-57	#B	2.0234E-02	2.0397E-02	5.6412E-02	5.6424E-02	6.223E-02
CO-60	#B	-7.1545E-03	-7.1625E-03	2.1125E+00	2.1125E+00	6.818E-02

Sr-85	#A	-2.7150E-02	-2.8070E-02	6.5236E-02	6.5256E-02	6.998E-02
Kr-85	#A	-6.2653E+02	-6.2655E+02	1.4565E+03	1.4570E+03	1.615E+03
Y-88	#B	-1.2171E-03	-1.2420E-03	3.6231E-02	3.6232E-02	3.618E-02
NB-94	#B	-6.0870E-04	-6.0870E-04	4.3383E-02	4.3383E-02	5.261E-02
Ag-108M	#B	-1.2784E-02	-1.2785E-02	5.1655E-02	5.1661E-02	5.937E-02
CD-109	#A	2.0378E-01	2.0476E-01	1.8428E+00	1.8429E+00	2.078E+00
SN-113	#B	1.9853E-02	2.0229E-02	4.7076E-02	4.7090E-02	5.154E-02
SB-125	#B	4.7809E-02	4.7912E-02	1.1777E-01	1.1780E-01	1.314E-01
I-131	#B	9.7710E-03	1.2784E-02	6.2299E-02	6.2304E-02	5.436E-02
CS-134	#B	-4.6399E-03	-4.6532E-03	1.0812E-01	1.0812E-01	1.220E-01
CS-137		4.5008E-01	4.5017E-01	1.0900E-01	1.1209E-01	
CE-139	#A	-7.3053E-03	-7.4210E-03	5.3986E-02	5.3988E-02	5.996E-02
EU-152	#B	7.4366E-02	7.4400E-02	1.6283E-01	1.6288E-01	1.799E-01
EU-154	#B	4.6469E-02	4.6501E-02	1.1091E-01	1.1094E-01	1.228E-01
EU-155	#B	5.9369E-02	5.9440E-02	2.8044E-01	2.8046E-01	3.135E-01
HG-203	#B	-1.0390E-02	-1.0883E-02	5.4356E-02	5.4360E-02	5.823E-02
TL-208	#	1.5170E-01	1.5170E-01	6.2976E-02	6.3589E-02	5.194E-02
PB-212		6.2424E-01	6.2424E-01	1.4344E-01	1.4795E-01	
PB-214	#	3.0393E-01	3.0393E-01	1.2646E-01	1.2769E-01	1.131E-01
BI-212		6.3717E-01	6.3717E-01	3.7771E-01	3.7952E-01	
BI-214		4.1866E-01	4.1866E-01	1.4321E-01	1.4525E-01	
RA-224	#A	1.0658E+00	1.0658E+00	1.1872E+00	1.1888E+00	1.270E+00
RA-226	#A	5.3461E-01	5.3461E-01	1.4155E+00	1.4158E+00	1.588E+00
AC-228	#	5.2110E-01	5.2110E-01	1.8730E-01	1.8973E-01	1.755E-01
TH-227	#B	-1.3977E-01	-1.3977E-01	4.4117E-01	4.4125E-01	4.916E-01
PA-234	#B	1.9067E-01	1.9067E-01	1.7658E-01	1.7689E-01	2.737E-01
TH-234	#B	-8.1051E-01	-8.1051E-01	4.0648E+01	4.0648E+01	8.335E+00
AM-241	#A	-1.7779E-03	-1.7779E-03	3.5155E+00	3.5155E+00	1.528E+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 (92.9 to 2000.7 keV) 1.8632223E+01 pCi/gm

Total Decayed Activity (92.9 to 2000.7 keV) 1.8632313E+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_30AUG2005_1652.An1

Sample description

FSS-NOL-06-01-007-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30AUG2005_1652.An1

Acquisition information

Start time:	30-Aug-2005 16:52:27
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: 1.6420E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6420E+03) =
6.0901E+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	27-Aug-2005 11:45:00
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. 21 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1548

***** 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	133.	20.19	0.99	9.052E-03	74.81	9.600	1.259E+00	PB212
77.20	104.	21.42	0.99	1.011E-02	77.11	17.500	6.994E-01	PB212
					77.11	10.700	1.144E+00	PB214
86.87	79.	35.04	1.00	1.430E-02	86.45	32.740	1.401E-01	EU155
					88.04	3.790	1.164E+00	CD109
93.22	110.	24.89	1.00	1.662E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234

129.12	97.	38.91	1.06	2.438E-02				
153.68	95.	38.24	0.96	2.594E-02				
163.49	66.	41.39	1.13	2.605E-02				
185.65	122.	26.10	1.08	2.568E-02				
185.65	122.	26.10	1.08	2.568E-02	185.99	3.280		PBC<MDA RA226
209.61	76.	35.65	0.65	2.470E-02				
238.87	1015.	3.65	1.09	2.319E-02	238.63	43.100	8.256E-01	PB212
241.93	166.	15.39	1.10	2.303E-02	241.00	3.900	1.518E+00	RA224
					241.92	7.470	7.943E-01	PB214
270.60	98.	26.92	0.91	2.149E-02				
295.18	202.	14.22	0.97	2.025E-02	295.22	19.200	4.201E-01	PB214
300.14	63.	32.12	0.80	2.001E-02				
327.86	50.	40.50	0.67	1.875E-02				
338.42	207.	14.59	1.31	1.830E-02	338.40	12.010	7.710E-01	AC228
351.88	361.	7.66	1.02	1.776E-02	351.99	37.100	4.440E-01	PB214
462.50	58.	34.56	0.93	1.427E-02				
462.50	58.	34.56	0.93	1.427E-02	463.51	10.000	3.273E-01	SB125
510.86	165.	16.32	1.28	1.317E-02	510.72	22.500	3.852E-01	TL208
582.91	317.	8.55	1.24	1.185E-02	583.14	86.000	2.523E-01	TL208
609.13	294.	9.26	1.19	1.144E-02	609.32	46.090	4.493E-01	BI214
661.38	221.	11.09	1.04	1.073E-02	661.62	84.620	1.992E-01	CS137
726.73	87.	24.88	1.03	9.969E-03	727.17	11.800	6.069E-01	BI212
793.78	50.	30.72	0.97	9.319E-03				
860.04	64.	28.41	1.30	8.771E-03				
910.97	241.	8.98	1.70	8.402E-03	911.07	29.000	8.027E-01	AC228
964.24	43.	25.47	1.54	8.054E-03	964.00	14.580		PBC<MDA EU152
968.85	148.	9.77	1.54	8.026E-03	968.90	17.460	8.687E-01	AC228
1120.26	81.	23.23	1.38	7.212E-03	1120.28	15.040	6.017E-01	BI214
1172.78	81.	22.81	1.41	6.974E-03	1173.23	99.860	9.356E-02	CO60
1332.11	86.	18.70	2.15	6.351E-03	1332.51	99.980	1.087E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.50	1137.	3.02	1.88	5.933E-03	1460.75	10.700	1.450E+01	K40
1764.17	44.	14.59	2.13	5.142E-03	1764.51	15.920	4.396E-01	Bl214

********** 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	
257.41	129.12	564.	113.	0.056	93.67	1.064	AC-228	
306.53	153.68	508.	95.	0.047	114.73	0.963	XE-138	s
418.37	209.61	329.	76.	0.038	106.94	0.650	NP-239	s
540.36	270.60	260.	98.	0.049	80.76	0.915	AC-228	s
599.44	300.14	165.	63.	0.032	96.36	0.798	PB-212	
654.87	327.86	180.	50.	0.025	121.49	0.673	AC-228	s
1586.62	793.78	62.	50.	0.025	79.15	0.968	PA-234	s
1719.12	860.04	78.	64.	0.032	68.97	1.302	TL-208	
1927.54	964.31	39.	44.	0.022	76.03	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	312.	133.	0.066	60.57	0.993D
PB-212	153.39	77.11	327.	104.	0.052	64.26	0.995A
EU-155	173.87	87.35	783.	106.	0.053	116.23	1.500
CD-109	173.75	87.29	728.	100.	0.050	118.25	1.500
TH-234	184.89	92.86	781.	135.	0.068	80.55	1.500
TH-234	184.90	92.86	741.	121.	0.061	86.10	1.500
RA-226	371.29	186.06	622.	100.	0.050	97.24	1.500
PB-212	476.96	238.90	516.	1052.	0.526	13.74	0.954
RA-224	482.76	241.80	596.	164.	0.082	67.39	1.500
PB-214	483.39	242.12	707.	108.	0.054	108.45	1.500s
PB-214	589.51	295.18	255.	198.	0.099	42.65	0.967
AC-228	675.97	338.42	253.	206.	0.103	43.78	1.312s
PB-214	702.91	351.88	174.	355.	0.178	22.97	1.015
SB-125	925.08	462.98	120.	47.	0.023	105.61	1.500
TL-208	1020.83	510.86	192.	139.	0.069	48.95	1.275s
TL-208	1164.92	582.91	127.	312.	0.156	25.65	1.237
BI-214	1217.37	609.13	142.	288.	0.144	27.77	1.189
CS-137	1321.85	661.38	116.	220.	0.110	33.26	1.043

YAEC Chemistry Lab Spectrum name: 103F_30AUG2005_1652.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bl-212	1452.52	726.73	113.	87.	0.043	74.64	1.030
AC-228	1820.98	910.97	68.	238.	0.119	26.94	1.700
AC-228	1936.81	968.90	31.	148.	0.074	29.31	1.541D
Bl-214	2239.49	1120.26	88.	79.	0.040	69.69	1.375
CO-60	2344.52	1172.78	86.	79.	0.040	68.43	1.410
CO-60	2663.13	1332.11	44.	84.	0.042	56.11	2.151s
K-40	2919.88	1460.50	31.	1119.	0.559	9.05	1.875
Bl-214	3527.09	1764.17	3.	44.	0.022	43.76	2.134

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

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

BE-7 8.0817E-02

477.56 8.082E-02 %(2.874E-01 8.52E-02 G

K-40 1.4505E+01

1460.75 1.450E+01 (P 3.733E-01 4.45E-01 G

MN-54 -3.3065E-04

834.81-3.306E-04 &(P 4.888E-02 1.41E-02 G

CO-57 8.7195E-03

122.07 8.719E-03 &(P 5.318E-02 1.59E-02 G K

136.43-4.218E-02 % 3.940E-01 1.18E-01 G

CO-60 1.0114E-01

1332.51 1.087E-01 (P 4.375E-02 2.10E-02 G K

1173.23 9.356E-02 (P 5.434E-02 2.19E-02 G K

Sr-85 -2.3884E-02

514.00-2.388E-02 %(5.050E-02 1.53E-02 G

Kr-85 -5.3274E+02

513.99-5.327E+02 %(1.127E+03 3.41E+02 G

Y-88 2.4785E-03

1836.01 2.478E-03 &(P 2.048E-02 5.22E-03 G K

898.02-4.017E-03 % P 4.226E-02 1.20E-02 G

NB-94 8.0478E-03

871.10 8.048E-03 %(3.072E-02 8.98E-03 G K

702.50 1.161E-02 & 3.378E-02 1.01E-02 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.0216E-02						
		722.95	-1.022E-02	&(	4.984E-02	1.47E-02	G K
		614.37	-5.918E-03	% P	4.049E-02	1.18E-02	G
		433.93	1.110E-02	%	3.403E-02	1.02E-02	G
CD-109	1.4834E+00						
		88.04	1.483E+00	(	1.904E+00	5.85E-01	G
SN-113	3.5319E-04						
		391.71	3.532E-04	%(	4.383E-02	1.27E-02	G K
		255.04	-2.815E-01	%	1.822E+00	5.43E-01	G
SB-125	6.9816E-02						
		427.95	1.883E-03	&(P	1.177E-01	3.43E-02	G K
		600.77	7.080E-02	% P	1.671E-01	5.03E-02	G
		636.15	8.739E-02	& P	2.196E-01	6.56E-02	G
		463.51	2.709E-01	(P	3.117E-01	9.80E-02	G
		176.29	-8.709E-02	%	5.613E-01	1.67E-01	G
I-131	-5.2931E-04						
		364.48	-5.293E-04	%(P	5.760E-02	1.68E-02	G K
		636.97	-1.456E-01	%	6.230E-01	1.83E-01	G
		284.29	-1.432E-01	& P	8.037E-01	2.39E-01	G
CS-134	-4.4194E-03						
		604.66	-4.419E-03	%(	3.729E-02	1.09E-02	G K
		795.76	-9.062E-05	% P	4.748E-02	1.35E-02	G
		569.29	7.541E-02	% P	1.867E-01	5.58E-02	G
		801.84	-4.749E-02	& P	3.917E-01	1.10E-01	G

CS-137 1.9924E-01

661.62 1.992E-01 (P 4.807E-02 2.22E-02 G

CE-139 -7.1746E-03

165.85-7.175E-03 %(4.802E-02 1.43E-02 G

EU-152 2.3634E-02

121.78 2.363E-02 &(P 1.550E-01 4.63E-02 G K

344.30-5.319E-03 % P 1.236E-01 3.62E-02 G

1408.08 8.660E-02 % 1.401E-01 4.41E-02 G

964.00 2.198E-01 & P 3.329E-01 1.03E-01 G

1112.07-9.973E-02 & 4.225E-01 1.25E-01 G

778.90 4.372E-02 % 2.837E-01 8.24E-02 G

EU-154 -9.1750E-04

123.10-9.175E-04 %(1.093E-01 3.25E-02 G K

1274.80 5.445E-02 % 1.195E-01 3.61E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                       723.30 9.621E-04 &   1.773E-01 5.04E-02 G
                      1004.80-3.479E-02 %   2.101E-01 6.06E-02 G

EU-155       1.8835E-01
                        86.45 1.884E-01  (  2.376E-01 7.30E-02 G K
                       105.31 6.618E-02 %   2.295E-01 6.90E-02 G

HG-203      -2.6532E-04
                       279.17-2.653E-04 &(P 4.472E-02 1.32E-02 G K
                        72.87-4.091E-01 % P 2.497E+00 7.48E-01 G
                        70.83 0.000E+00 %   5.322E+00 1.59E+00 G
                        82.50-7.514E-01 &   4.167E+00 1.25E+00 G

TL-208       2.5231E-01
                       583.14 2.523E-01  (P 4.457E-02 2.19E-02 G
                       510.72 3.852E-01 + P 1.870E-01 7.49E-02 G

PB-212       8.6593E-01
                       238.63 8.659E-01  (P 8.936E-02 4.01E-02 G K
                                          Energy duplication
                        77.11 4.844E-01 } P 4.042E-01 1.04E-01 G
                        74.81 1.259E+00 + P 8.054E-01 2.60E-01 G

PB-214       4.4532E-01
                       351.99 4.440E-01  (P 8.012E-02 3.45E-02 G K
                       295.22 4.201E-01  (P 1.631E-01 6.09E-02 G
                                          Energy duplication
                        77.11 3.364E-01 } P 9.698E-01 2.29E-01 G
                       241.92 5.165E-01  (  6.060E-01 1.87E-01 G

BI-212       6.0687E-01
```

727.17 6.069E-01 (P 3.661E-01 1.52E-01 G K
1620.56 5.741E-01 % P 7.767E-01 2.60E-01 G
785.42 7.251E-01 % 1.612E+00 4.87E-01 G

BI-214 4.4681E-01
609.32 4.493E-01 (P 9.096E-02 4.25E-02 G K
1764.51 4.396E-01 (P 1.120E-01 6.89E-02 G
1120.28 6.017E-01 + P 3.517E-01 1.43E-01 G

RA-224 1.4989E+00
241.00 1.499E+00 (1.065E+00 3.37E-01 G

RA-226 9.7349E-01
185.99 9.735E-01 (P 1.163E+00 3.57E-01 G

AC-228 8.1589E-01
911.07 8.027E-01 (P 1.393E-01 7.31E-02 G K
968.90 8.687E-01 (P 1.676E-01 8.49E-02 G
338.40 7.710E-01 @(P 2.877E-01 1.13E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	1.6756E-02						
		236.00	1.676E-02	%(	5.102E-01	1.52E-01	G K
		256.25	6.944E-02	&	P 4.376E-01	1.30E-01	G
PA-234	7.1995E-04						
		98.44	7.200E-04	%(P	2.242E-01	6.65E-02	G K
		946.00	3.611E-02	&	P 1.997E-01	5.80E-02	G
		131.28	-2.807E-02	&	P 2.212E-01	6.61E-02	G
		94.67	-1.091E-01	%	P 4.128E-01	1.24E-01	G
		883.24	5.121E-02	%	3.178E-01	9.21E-02	G
		926.70	-1.595E-02	&	3.698E-01	1.05E-01	G
		569.26	1.116E-01	%	P 2.761E-01	8.25E-02	G
TH-234	1.3510E+00						
		63.29	-2.010E-02	%(P	7.167E+00	2.12E+00	G K
		92.80	2.019E+00	(P	2.160E+00	6.64E-01	G
		92.38	2.652E+00	(P	2.611E+00	8.05E-01	G
AM-241	-1.4698E-02						
		59.54	-1.470E-02	&(P	1.171E+00	3.47E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	7.7515E-02	8.0817E-02	2.5558E-01	2.5563E-01	2.757E-01
K-40	1.4505E+01	1.4505E+01	1.3342E+00	1.5777E+00	
MN-54 #A	-3.2830E-04	-3.3065E-04	3.0160E-02	3.0160E-02	4.853E-02
CO-57 #B	8.6478E-03	8.7195E-03	4.7730E-02	4.7732E-02	5.274E-02
CO-60	1.0102E-01	1.0114E-01	4.5979E-02	4.6352E-02	
Sr-85 #A	-2.3077E-02	-2.3884E-02	4.5924E-02	4.5945E-02	4.880E-02
Kr-85 #A	-5.3273E+02	-5.3274E+02	1.0244E+03	1.0249E+03	1.127E+03
Y-88 #B	2.4272E-03	2.4785E-03	1.5661E-02	1.5662E-02	2.006E-02
NB-94 #B	8.0478E-03	8.0478E-03	2.6937E-02	2.6941E-02	3.072E-02
Ag-108M#B	-1.0216E-02	-1.0216E-02	4.4094E-02	4.4098E-02	4.984E-02
CD-109 #A	1.4761E+00	1.4834E+00	1.7541E+00	1.7560E+00	1.895E+00
SN-113 #B	3.4642E-04	3.5319E-04	3.7965E-02	3.7965E-02	4.299E-02
SB-125 #B	6.9662E-02	6.9816E-02	7.5739E-02	7.5848E-02	1.174E-01
I-131 #B	-4.0123E-04	-5.2931E-04	6.9044E-02	6.9044E-02	4.366E-02
CS-134 #B	-4.4063E-03	-4.4194E-03	3.2586E-02	3.2587E-02	3.718E-02
CS-137	1.9920E-01	1.9924E-01	6.6697E-02	6.7692E-02	
CE-139 #A	-7.0593E-03	-7.1746E-03	4.3033E-02	4.3035E-02	4.725E-02
EU-152 #B	2.3623E-02	2.3634E-02	1.3905E-01	1.3905E-01	1.549E-01
EU-154 #B	-9.1685E-04	-9.1750E-04	9.7466E-02	9.7466E-02	1.093E-01
EU-155 #A	1.8812E-01	1.8835E-01	2.1892E-01	2.1917E-01	2.373E-01
HG-203 #B	-2.5293E-04	-2.6532E-04	4.5715E-02	4.5715E-02	4.263E-02
TL-208	2.5231E-01	2.5231E-01	6.5611E-02	6.7226E-02	

PB-212	8.6593E-01	8.6593E-01	1.2032E-01	1.3040E-01	
PB-214	4.4532E-01	4.4532E-01	1.0393E-01	1.0709E-01	
BI-212	6.0687E-01	6.0687E-01	4.5556E-01	4.5692E-01	
BI-214	4.4681E-01	4.4681E-01	1.2274E-01	1.2545E-01	
RA-224	1.4989E+00	1.4989E+00	1.0102E+00	1.0139E+00	1.065E+00
RA-226 #A	9.7348E-01	9.7349E-01	1.0697E+00	1.0712E+00	1.163E+00
AC-228	8.1589E-01	8.1589E-01	1.6192E-01	1.6870E-01	
TH-227 #B	1.6756E-02	1.6756E-02	4.5723E-01	4.5723E-01	5.102E-01
PA-234 #B	7.1995E-04	7.1995E-04	1.9962E-01	1.9962E-01	2.242E-01
TH-234 #B	1.3510E+00	1.3510E+00	1.2304E+00	1.2327E+00	7.167E+00
AM-241 #A	-1.4697E-02	-1.4698E-02	1.3699E+00	1.3699E+00	1.171E+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) 1.9737215E+01 pCi/gm

Total Decayed Activity (1120.0 to 2000.7 keV) 1.9737373E+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_31AUG2005_0940.An1

Sample description

FSS-NOL-06-01-023-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_31AUG2005_0940.An1

Acquisition information

Start time:	31-Aug-2005 09:40:11
Live time:	2000
Real time:	2018
Dead time:	0.90 %
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: 1.6660E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6660E+03) =
6.0024E+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 29-Aug-2005 15:51:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1638

***** 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	187.	27.04	0.99	1.011E-02	77.11	10.700	PBC<MDA	PB214
					77.11	17.500	8.552E-01	PB212
185.87	197.	36.68	1.20	2.567E-02				
185.87	197.	36.68	1.20	2.567E-02	185.99	3.280	PBC<MDA	RA226
209.51	186.	32.18	1.46	2.470E-02				
232.18	180.	34.13	0.87	2.354E-02				
238.86	888.	6.55	1.09	2.320E-02	238.63	43.100	7.104E-01	PB212

241.88	185.	28.43	1.10	2.303E-02	241.00	3.900	1.670E+00	RA224
					241.92	7.470	8.736E-01	PB214
295.13	166.	31.63	1.31	2.025E-02				
295.13	166.	31.63	1.31	2.025E-02	295.22	19.200	PBC<MDA	PB214
338.36	190.	28.75	1.52	1.830E-02				
338.36	190.	28.75	1.52	1.830E-02	338.40	12.010	PBC<MDA	AC228
352.06	386.	14.29	1.09	1.775E-02	351.99	37.100	4.689E-01	PB214
463.30	170.	34.37	1.90	1.425E-02				
463.30	170.	34.37	1.90	1.425E-02	463.51	10.000	PBC<MDA	SB125
510.80	275.	23.16	1.83	1.317E-02	510.72	22.500	6.785E-01	TL208
582.91	371.	19.20	1.37	1.185E-02				
582.91	371.	19.20	1.37	1.185E-02	583.14	86.000	2.918E-01	TL208
609.28	323.	19.34	1.51	1.144E-02				
609.28	323.	19.34	1.51	1.144E-02	609.32	46.090	4.864E-01	BI214
661.40	669.	9.71	1.25	1.072E-02	661.62	84.620	5.967E-01	CS137
911.41	192.	35.04	1.29	8.399E-03	911.07	29.000	PBC<MDA	AC228
1172.96	19279.	0.85	1.67	6.973E-03	1173.23	99.860	2.247E+01	CO60
1332.19	17528.	0.78	1.86	6.350E-03	1332.51	99.980	2.241E+01	CO60
1460.50	968.	4.18	1.70	5.933E-03	1460.75	10.700	1.214E+01	K40
1763.99	31.	32.96	2.03	5.142E-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
418.17	209.51	1698.	186.	0.093	96.53	1.461	AC-228 s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected
925.72	463.30	1248.	170.	0.085	103.12	1.901	SB-125 l
1020.72	510.80	1471.	150.	0.075	111.10	1.830	TL-208 s
1821.85	911.41	1674.	192.	0.096	105.11	1.294	AC-228 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	153.39	77.11	1222.	187.	0.093	81.11	0.995D
PB-212	476.42	238.63	1288.	866.	0.433	20.01	1.093D
RA-224	481.16	241.00	2050.	177.	0.088	111.03	1.095D
PB-214	589.82	295.33	2210.	175.	0.088	113.44	1.500
AC-228	675.55	338.20	1761.	215.	0.107	84.91	1.500s
PB-214	702.96	351.91	1715.	416.	0.208	44.14	1.500
TL-208	1020.45	510.67	1361.	165.	0.083	83.56	1.500s
TL-208	1165.27	583.08	1330.	327.	0.163	49.49	1.500
BI-214	1217.28	609.09	1240.	262.	0.131	58.41	1.500s
CS-137	1321.89	661.40	1269.	667.	0.334	29.13	1.252
CO-60	2344.88	1172.96	1587.	19277.	9.639	2.55	1.666
CO-60	2663.30	1332.19	314.	17525.	8.762	2.35	1.858
K-40	2919.86	1460.50	155.	950.	0.475	12.53	1.699
BI-214	3526.74	1763.99	51.	31.	0.016	98.89	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 -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS
BE-7		2.4661E-01				
			477.56	2.466E-01	%(	1.005E+00 3.03E-01 G
K-40		1.2138E+01				
			1460.75	1.214E+01	(P	7.766E-01 5.17E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	1.0965E-02						
		834.81	1.097E-02	%(P	1.483E-01	4.44E-02	G
CO-57	1.8756E-02						
		122.07	1.876E-02	%(P	1.117E-01	3.37E-02	G K
		136.43	-1.447E-01	&	8.597E-01	2.59E-01	G
CO-60	2.2441E+01						
		1332.51	2.241E+01	(P	1.091E-01	1.76E-01	G K
		1173.23	2.247E+01	(P	2.196E-01	1.91E-01	G K
Sr-85	-4.5827E-02						
		514.00	-4.583E-02	%(	1.221E-01	3.69E-02	G
Kr-85	-1.0383E+03						
		513.99	-1.038E+03	%(	2.768E+03	8.37E+02	G
Y-88	-5.8128E-04						
		1836.01	-5.813E-04	%(P	5.320E-02	1.48E-02	G K
		898.02	-8.756E-03	% P	1.933E-01	5.79E-02	G
NB-94	-3.4932E-02						
		871.10	-3.493E-02	&(	1.835E-01	5.52E-02	G K
		702.50	1.309E-02	&	1.345E-01	4.03E-02	G K
Ag-108M	1.0855E-02						
		722.95	1.085E-02	%(	1.244E-01	3.72E-02	G K
		614.37	-1.537E-02	% P	1.333E-01	3.99E-02	G
		433.93	1.918E-03	%	1.111E-01	3.33E-02	G

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CD-109       2.1579E-01
                 88.04 2.158E-01 &(  3.842E+00 1.16E+00 G

SN-113       6.3698E-04
                391.71 6.370E-04 &(  1.252E-01 3.74E-02 G K
                255.04-3.575E-01 &   4.533E+00 1.36E+00 G

SB-125       4.5354E-02
                427.95 4.535E-02 %(P 3.345E-01 1.00E-01 G K
                600.77-1.629E-01 & P 5.670E-01 1.71E-01 G
                636.15 4.159E-03 & P 1.112E+00 3.32E-01 G
                463.51 6.618E-01 % P 9.967E-01 3.04E-01 G
                176.29-1.706E-01 %   1.254E+00 3.78E-01 G

I-131       -3.4530E-03
                364.48-3.453E-03 %(P 1.335E-01 4.00E-02 G K
                636.97-1.126E-01 &   2.038E+00 6.10E-01 G
```

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                     284.29-1.683E-01 & P 1.695E+00 5.09E-01 G

CS-134       2.4141E-02
                     604.66 2.414E-02 &(  1.233E-01 3.70E-02 G K
                     795.76 5.049E-02 % P 1.762E-01 5.31E-02 G
                     569.29-6.934E-03 & P 6.411E-01 1.91E-01 G
                     801.84 1.791E-01 & P 1.852E+00 5.55E-01 G

CS-137       5.9673E-01
                     661.62 5.967E-01  (P 1.508E-01 5.80E-02 G

CE-139      -8.3592E-04
                     165.85-8.359E-04 &(  1.040E-01 3.12E-02 G

EU-152       5.4084E-02
                     121.78 5.408E-02 %(P 3.264E-01 9.84E-02 G K
                     344.30 2.011E-02 % P 3.332E-01 9.99E-02 G
                    1408.08 8.453E-02 &   2.485E-01 7.39E-02 G
                     964.00-4.802E-01 % P 1.369E+00 4.14E-01 G
                    1112.07-5.785E-01 %   1.561E+00 4.72E-01 G
                     778.90-1.168E-01 %   1.152E+00 3.45E-01 G

EU-154      -5.5849E-04
                     123.10-5.585E-04 &(  1.735E-01 5.19E-02 G K
                    1274.80-2.267E-02 &   2.443E-01 7.18E-02 G
                     723.30 6.904E-02 &   7.133E-01 2.14E-01 G
                    1004.80 8.356E-02 %   1.057E+00 3.17E-01 G

EU-155       0.0000E+00
                      86.45 0.000E+00 %(  4.798E-01 1.44E-01 G K
                     105.31 1.117E-01 %   4.903E-01 1.48E-01 G
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HG-203      -1.6011E-02
                279.17-1.601E-02 %(P 9.871E-02 2.97E-02 G K
                 72.87-4.554E-02 % P 4.392E+00 1.32E+00 G
                 70.83-1.086E+00 &   8.928E+00 2.69E+00 G
                 82.50 2.093E+00 &   7.587E+00 2.29E+00 G

TL-208      2.6015E-01
                583.14 2.601E-01  (P 1.375E-01 4.35E-02 G
                510.72 4.524E-01 + P 4.778E-01 1.46E-01 G

PB-212      7.0270E-01
                238.63 7.027E-01  (P 1.378E-01 4.75E-02 G K
                                     Energy duplication
                 77.11 8.552E-01 + P 7.590E-01 2.35E-01 G
                 74.81 6.173E-01 % P 2.464E+00 7.44E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	5.1183E-01						
		351.99	5.118E-01	(P	2.410E-01	7.63E-02	G K
		295.22	3.654E-01	- P	4.627E-01	1.41E-01	G
							Energy duplication
		77.11	1.299E+00	% P	2.001E+00	6.09E-01	G
		241.92	3.184E-01	%	1.321E+00	3.99E-01	G
BI-212	3.1552E-01						
		727.17	3.155E-01	%(P	1.211E+00	3.65E-01	G K
		1620.56	9.737E-02	% P	2.009E+00	5.70E-01	G
		785.42	1.956E+00	%	7.110E+00	2.14E+00	G
BI-214	3.7978E-01						
		609.32	4.034E-01	(P	2.566E-01	8.05E-02	G K
		1764.51	3.114E-01	(P	3.577E-01	1.13E-01	G
		1120.28	3.726E-01	% P	1.222E+00	3.68E-01	G
RA-224	1.5930E+00						
		241.00	1.593E+00	(	1.927E+00	5.90E-01	G
RA-226	1.7198E+00						
		185.99	1.720E+00	%(P	2.506E+00	7.63E-01	G
AC-228	5.8141E-01						
		911.07	4.939E-01	%(P	6.929E-01	2.11E-01	G K
		968.90	6.432E-01	% P	1.125E+00	3.42E-01	G
		338.40	7.928E-01	(P	7.316E-01	2.26E-01	G
TH-227	-3.3256E-01						
		236.00	-3.326E-01	%(	8.018E-01	2.43E-01	G K

256.25 2.748E-01 & P 1.299E+00 3.92E-01 G

PA-234 1.0990E-02

98.44 1.099E-02 &(P 4.726E-01 1.42E-01 G K

946.00-1.187E-01 % P 1.088E+00 3.27E-01 G

131.28-2.504E-02 & P 3.740E-01 1.12E-01 G

94.67-1.814E-02 & P 7.791E-01 2.34E-01 G

883.24 7.385E-02 % 1.397E+00 4.18E-01 G

926.70 8.985E-02 % 1.887E+00 5.66E-01 G

569.26-1.217E-02 & P 9.869E-01 2.94E-01 G

TH-234 -1.3728E+00

63.29-1.373E+00 %(P 1.458E+01 4.38E+00 G K

92.80 9.343E-01 % P 4.421E+00 1.33E+00 G

92.38-6.375E-01 % P 4.348E+00 1.30E+00 G

Nuclide Ave activity Energy Activity Code Peak MDA Comments

AM-241 -7.4474E-03

59.54-7.447E-03 %(P 2.279E+00 6.83E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	2.4109E-01	2.4661E-01	9.0822E-01	9.0833E-01	9.830E-01
K-40	1.2138E+01	1.2138E+01	1.5513E+00	1.7039E+00	
MN-54 #A	1.0923E-02	1.0965E-02	1.3307E-01	1.3307E-01	1.477E-01
CO-57 #B	1.8672E-02	1.8756E-02	1.0106E-01	1.0107E-01	1.112E-01
CO-60	2.2427E+01	2.2441E+01	3.8963E-01	1.3599E+00	
Sr-85 #A	-4.4981E-02	-4.5827E-02	1.1082E-01	1.1085E-01	1.199E-01
Kr-85 #A	-1.0382E+03	-1.0383E+03	2.5111E+03	2.5118E+03	2.768E+03
Y-88 #B	-5.7473E-04	-5.8128E-04	6.3810E-02	6.3810E-02	5.260E-02
NB-94 #B	-3.4932E-02	-3.4932E-02	1.6569E-01	1.6570E-01	1.835E-01
Ag-108M#B	1.0854E-02	1.0855E-02	1.1146E-01	1.1146E-01	1.244E-01
CD-109 #A	2.1521E-01	2.1579E-01	3.4659E+00	3.4659E+00	3.832E+00

SN-113 #B	6.3033E-04	6.3698E-04	1.1207E-01	1.1207E-01	1.239E-01
SB-125 #B	4.5300E-02	4.5354E-02	3.0129E-01	3.0130E-01	3.341E-01
I-131 #B	-2.9714E-03	-3.4530E-03	1.5682E-01	1.5682E-01	1.149E-01
CS-134 #B	2.4103E-02	2.4141E-02	1.1114E-01	1.1115E-01	1.231E-01
CS-137	5.9666E-01	5.9673E-01	1.7418E-01	1.7759E-01	
CE-139 #A	-8.2861E-04	-8.3592E-04	9.3720E-02	9.3720E-02	1.031E-01
EU-152 #B	5.4070E-02	5.4084E-02	2.9516E-01	2.9518E-01	3.263E-01
EU-154 #B	-5.5828E-04	-5.5849E-04	1.5583E-01	1.5583E-01	1.734E-01
EU-155 #B	0.0000E+00	0.0000E+00	4.3253E-01	4.3253E-01	4.795E-01
HG-203 #B	-1.5601E-02	-1.6011E-02	8.9273E-02	8.9278E-02	9.618E-02
TL-208 #	2.6015E-01	2.6015E-01	1.3045E-01	1.3132E-01	1.375E-01
PB-212	7.0270E-01	7.0270E-01	1.4252E-01	1.4825E-01	
PB-214 #	5.1183E-01	5.1183E-01	2.2897E-01	2.3089E-01	2.410E-01
BI-212 #B	3.1552E-01	3.1552E-01	1.0945E+00	1.0947E+00	1.211E+00
BI-214 #	3.7978E-01	3.7978E-01	2.2729E-01	2.2835E-01	2.566E-01
RA-224 A	1.5930E+00	1.5930E+00	1.7687E+00	1.7712E+00	
RA-226 #A	1.7198E+00	1.7198E+00	2.2886E+00	2.2908E+00	2.506E+00
AC-228 #B	5.8141E-01	5.8141E-01	4.4820E-01	4.4947E-01	6.929E-01
TH-227 #B	-3.3256E-01	-3.3256E-01	7.2876E-01	7.2901E-01	8.018E-01
PA-234 #B	1.0990E-02	1.0990E-02	4.2605E-01	4.2605E-01	4.726E-01
TH-234 #B	-1.3728E+00	-1.3728E+00	1.9916E+01	1.9916E+01	1.458E+01
AM-241 #A	-7.4473E-03	-7.4474E-03	3.5297E+00	3.5297E+00	2.279E+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) 3.7456539E+01 pCi/gm

Total Decayed Activity (269.4 to 2000.7 keV) 3.7470676E+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_31AUG2005_1017.An1

Sample description

FSS-NOL-06-01-036-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_31AUG2005_1017.An1

Acquisition information

Start time:	31-Aug-2005 10:17:14
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: 1.6300E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6300E+03) =
6.1350E+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	30-Aug-2005 10:44:00
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: 0.1413

***** 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	135.	20.57	0.99	9.052E-03	74.81	9.600	1.287E+00	PB212
77.12	143.	18.28	0.99	1.011E-02	77.11	17.500	9.001E-01	PB212
					77.11	10.700	1.472E+00	PB214
128.01	106.	38.55	0.99	2.425E-02				
185.92	162.	21.39	1.42	2.567E-02				
185.92	162.	21.39	1.42	2.567E-02	185.99	3.280	1.463E+00	RA226
209.13	92.	29.97	1.10	2.472E-02				

238.85	1155.	3.44	1.09	2.319E-02	238.63	43.100	9.477E-01	PB212
242.03	142.	18.59	1.10	2.302E-02	241.00	3.900	1.306E+00	RA224
					241.92	7.470	6.833E-01	PB214
270.24	126.	23.49	0.99	2.151E-02				
276.99	84.	32.69	1.07	2.116E-02				
295.18	215.	11.52	1.21	2.025E-02	295.22	19.200	4.494E-01	PB214
300.30	102.	25.20	0.99	2.000E-02				
338.19	196.	14.80	1.04	1.831E-02	338.40	12.010	7.363E-01	AC228
351.79	396.	7.84	1.04	1.776E-02	351.99	37.100	4.916E-01	PB214
462.36	108.	22.52	1.54	1.428E-02				
462.36	108.	22.52	1.54	1.428E-02	463.51	10.000	6.226E-01	SB125
510.87	207.	13.39	1.29	1.317E-02	510.72	22.500	5.044E-01	TL208
582.97	391.	7.30	1.23	1.185E-02	583.14	86.000	3.149E-01	TL208
609.20	282.	8.10	1.44	1.144E-02	609.32	46.090	4.326E-01	BI214
661.51	53.	28.96	1.50	1.072E-02				
661.51	53.	28.96	1.50	1.072E-02	661.62	84.620	4.813E-02	CS137
727.27	101.	18.02	1.38	9.964E-03	727.17	11.800	7.100E-01	BI212
768.48	58.	31.23	1.69	9.552E-03				
795.16	85.	21.84	1.25	9.307E-03				
795.16	85.	21.84	1.25	9.307E-03	795.76	85.400	8.891E-02	CS134
860.03	66.	31.58	1.53	8.772E-03				
910.89	265.	7.16	1.53	8.403E-03	911.07	29.000	8.917E-01	AC228
964.09	38.	40.75	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152
968.59	235.	9.98	1.32	8.028E-03	968.90	17.460	1.389E+00	AC228
1119.76	108.	19.89	0.87	7.214E-03	1120.28	15.040	8.072E-01	BI214
1172.81	30.	41.00	1.67	6.972E-03	1173.23	99.860	PBC<MDA	CO60
1332.31	35.	24.40	1.77	6.349E-03	1332.51	99.980	4.539E-02	CO60
1460.52	1259.	2.91	1.80	5.933E-03	1460.75	10.700	1.619E+01	K40
1620.55	30.	24.72	1.60	5.488E-03	1620.56	2.750	1.635E+00	BI212
1763.83	58.	13.93	2.19	5.142E-03	1764.51	15.920	5.857E-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
255.19	128.01	583.	155.	0.078	70.16	0.991	AC-228 s
417.43	209.13	334.	92.	0.046	89.90	1.098	AC-228
539.63	270.24	300.	126.	0.063	70.47	0.991	AC-228 s
553.13	276.99	271.	85.	0.043	87.90	1.071	TL-208 s
599.74	300.30	234.	102.	0.051	75.60	0.989	PB-212 s
923.83	462.36	199.	61.	0.031	104.79	1.544	CS-138 s
1536.02	768.48	90.	58.	0.029	93.68	1.693	BI-214 M
1589.38	795.16	120.	42.	0.021	119.33	1.246	AC-228 s
1719.09	860.03	100.	66.	0.033	94.74	1.529	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	148.79	74.81	337.	135.	0.067	61.72	0.993D
PB-212	153.39	77.11	338.	143.	0.071	54.85	0.995A

RA-226	371.50	186.17	650.	132.	0.066	77.94	1.500s
PB-212	477.01	238.93	504.	1195.	0.598	12.27	1.025
RA-224	482.47	241.66	676.	144.	0.072	80.63	1.500
PB-214	482.34	241.59	678.	120.	0.060	96.15	1.500s
PB-214	589.50	295.18	193.	211.	0.105	34.55	1.206
AC-228	675.52	338.19	241.	195.	0.098	44.39	1.035s
PB-214	702.72	351.79	216.	391.	0.195	23.53	1.038
SB-125	924.48	462.68	158.	46.	0.023	121.46	1.500s
TL-208	1020.85	510.87	183.	180.	0.090	40.18	1.294s
TL-208	1165.04	582.97	133.	387.	0.193	21.91	1.235
BI-214	1217.50	609.20	95.	275.	0.138	24.30	1.438
CS-137	1322.10	661.51	97.	53.	0.026	86.88	1.500
BI-212	1453.61	727.27	80.	101.	0.050	54.06	1.378
CS-134	1588.38	794.66	66.	43.	0.021	92.05	1.500s
AC-228	1820.81	910.89	45.	262.	0.131	21.48	1.525
EU-152	1927.20	964.09	104.	38.	0.019	122.24	1.538
AC-228	1936.20	968.59	90.	235.	0.117	29.94	1.315
BI-214	2238.50	1119.76	96.	106.	0.053	59.67	0.872s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2663.52	1332.31	26.	35.	0.017	73.21	1.765s
K-40	2919.90	1460.52	41.	1240.	0.620	8.74	1.797
Bl-212	3239.91	1620.55	7.	30.	0.015	74.17	1.603
Bl-214	3526.41	1763.83	6.	58.	0.029	41.78	2.192

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.1937E-01					
			477.56	1.194E-01	%(	3.417E-01	1.02E-01 G
K-40		1.6195E+01					
			1460.75	1.619E+01	(P	4.257E-01	4.79E-01 G
MN-54		-1.4215E-03					
			834.81	-1.422E-03	&(P	4.347E-02	1.24E-02 G
CO-57		-9.2206E-05					
			122.07	-9.221E-05	&(P	4.891E-02	1.45E-02 G K
			136.43	-4.885E-03	&	4.172E-01	1.24E-01 G
CO-60		4.5394E-02					
			1332.51	4.539E-02	*(P	3.434E-02	1.19E-02 G K

1173.23 3.548E-02 % P 4.990E-02 1.55E-02 G K

Sr-85 -1.3050E-02

514.00-1.305E-02 %(4.826E-02 1.44E-02 G

Kr-85 -2.9811E+02

513.99-2.981E+02 %(1.103E+03 3.29E+02 G

Y-88 -1.0607E-04

1836.01-1.061E-04 %(P 2.380E-02 5.81E-03 G K

898.02-1.452E-03 % P 4.710E-02 1.34E-02 G

NB-94 1.0158E-03

871.10 1.016E-03 %(4.317E-02 1.24E-02 G K

702.50 1.226E-02 % 3.057E-02 9.17E-03 G K

Ag-108M -2.4245E-02

722.95-2.425E-02 %(5.246E-02 1.59E-02 G K

614.37-7.880E-03 % P 4.169E-02 1.22E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	-3.680E-03	%	3.809E-02	1.12E-02	G
CD-109	1.1393E+00						
		88.04	1.139E+00	%(	2.104E+00	6.40E-01	G
SN-113	-1.4164E-03						
		391.71	-1.416E-03	%(	4.783E-02	1.39E-02	G K
		255.04	4.590E-01	&	1.671E+00	5.01E-01	G
SB-125	7.0700E-02						
		427.95	4.852E-03	&(P	1.142E-01	3.33E-02	G K
		600.77	7.691E-03	& P	1.874E-01	5.40E-02	G
		636.15	7.353E-02	% P	2.763E-01	8.13E-02	G
		463.51	2.656E-01	*(P	3.569E-01	1.11E-01	G
		176.29	-1.998E-02	%	5.264E-01	1.56E-01	G
I-131	-7.7480E-04						
		364.48	-7.748E-04	%(P	3.642E-02	1.05E-02	G K
		636.97	1.563E-01	%	4.571E-01	1.36E-01	G
		284.29	-2.025E-02	% P	5.763E-01	1.69E-01	G
CS-134	2.0354E-02						
		604.66	-1.059E-03	&(	3.565E-02	1.03E-02	G K
		795.76	4.483E-02	*(P	4.227E-02	1.38E-02	G
		569.29	-3.237E-02	% P	2.242E-01	6.47E-02	G
		801.84	-7.342E-02	% P	4.923E-01	1.42E-01	G
CS-137	4.8131E-02						
		661.62	4.813E-02	(P	4.439E-02	1.43E-02	G
CE-139	8.3000E-05						

165.85 8.300E-05 %(4.599E-02 1.36E-02 G

EU-152 7.5348E-02

121.78-2.032E-02 &(P 1.537E-01 4.59E-02 G K

344.30-1.723E-02 % P 1.354E-01 4.00E-02 G

1408.08 2.400E-02 % 1.509E-01 4.24E-02 G

964.00 2.672E-01 &(P 3.542E-01 1.10E-01 G

1112.07-8.886E-03 & 3.377E-01 9.59E-02 G

778.90 0.000E+00 % 2.941E-01 8.37E-02 G

EU-154 4.5165E-04

123.10 4.516E-04 %(1.054E-01 3.13E-02 G K

1274.80-1.983E-02 % 1.355E-01 3.91E-02 G

723.30 0.000E+00 % 3.526E-01 1.04E-01 G

1004.80-6.506E-02 % 2.360E-01 6.95E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.0800E-01						
		86.45	1.080E-01	%(	2.531E-01	7.66E-02	G K
		105.31	9.467E-02	%	2.489E-01	7.52E-02	G
HG-203	-1.5115E-03						
		279.17	-1.511E-03	&(P	4.190E-02	1.23E-02	G K
		72.87	-7.573E-01	% P	2.544E+00	7.66E-01	G
		70.83	-7.721E-01	&	4.572E+00	1.37E+00	G
		82.50	-1.903E+00	%	4.364E+00	1.32E+00	G
TL-208	3.1488E-01						
		583.14	3.149E-01	(P	4.596E-02	2.32E-02	G
		510.72	5.044E-01	+ P	1.838E-01	7.76E-02	G
PB-212	9.6467E-01						
		238.63	9.909E-01	(P	8.899E-02	4.09E-02	G K
							Energy duplication
		77.11	6.678E-01	} P	4.139E-01	1.22E-01	G
		74.81	1.287E+00	+ P	8.421E-01	2.71E-01	G
PB-214	4.8900E-01						
		351.99	4.916E-01	(P	8.971E-02	3.91E-02	G K
		295.22	4.494E-01	(P	1.439E-01	5.28E-02	G
							Energy duplication
		77.11	3.416E-01	} P	1.031E+00	2.35E-01	G
		241.92	5.777E-01	?(	5.979E-01	1.85E-01	G
BI-212	7.1005E-01						
		727.17	7.100E-01	(P	3.135E-01	1.29E-01	G K
		1620.56	1.635E+00	+ P	8.379E-01	4.05E-01	G

785.42 1.212E+00 % 1.803E+00 5.61E-01 G

BI-214 4.3262E-01

609.32 4.326E-01 (P 7.563E-02 3.59E-02 G K

1764.51 5.857E-01 + P 1.447E-01 8.62E-02 G

1120.28 8.072E-01 + P 3.704E-01 1.63E-01 G

RA-224 1.3257E+00

241.00 1.326E+00 (1.141E+00 3.56E-01 G

RA-226 1.3006E+00

185.99 1.301E+00 *(P 1.197E+00 3.71E-01 G

AC-228 8.9165E-01

911.07 8.917E-01 (P 1.156E-01 6.47E-02 G K

968.90 1.389E+00 + P 2.778E-01 1.39E-01 G

338.40 7.363E-01 - P 2.830E-01 1.09E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	3.3760E-03						
		236.00	3.376E-03	%(	5.423E-01	1.62E-01	G K
		256.25	1.136E-01	%	P 4.712E-01	1.41E-01	G
PA-234	2.8959E-02						
		98.44	2.896E-02	&(P	2.325E-01	6.94E-02	G K
		946.00	-1.645E-02	%	P 2.162E-01	6.21E-02	G
		131.28	-9.836E-02	%	P 2.432E-01	7.35E-02	G
		94.67	-5.982E-02	%	P 4.412E-01	1.32E-01	G
		883.24	-1.957E-02	%	2.698E-01	7.63E-02	G
		926.70	-4.713E-02	&	3.630E-01	1.05E-01	G
		569.26	-6.265E-02	%	P 3.351E-01	9.73E-02	G
TH-234	9.6328E-01						
		63.29	9.633E-01	%(P	6.692E+00	1.99E+00	G K
		92.80	1.262E+00	%	P 2.383E+00	7.21E-01	G
		92.38	1.067E+00	&	P 2.863E+00	8.61E-01	G
AM-241	2.2364E-01						
		59.54	2.236E-01	&(P	1.125E+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

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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	1.1786E-01	1.1937E-01	3.0704E-01	3.0712E-01	3.373E-01
K-40	1.6195E+01	1.6195E+01	1.4364E+00	1.7168E+00	
MN-54 #A	-1.4184E-03	-1.4215E-03	6.0037E-02	6.0037E-02	4.337E-02
CO-57 #B	-9.1974E-05	-9.2206E-05	1.3647E-01	1.3647E-01	4.879E-02
CO-60 #F	4.5378E-02	4.5394E-02	3.5766E-02	3.5863E-02	3.432E-02
Sr-85 #A	-1.2914E-02	-1.3050E-02	4.3237E-02	4.3243E-02	4.776E-02
Kr-85 #A	-2.9811E+02	-2.9811E+02	9.8773E+02	9.8788E+02	1.103E+03
Y-88 #B	-1.0540E-04	-1.0607E-04	2.1937E-03	2.1937E-03	2.365E-02
NB-94 #B	1.0158E-03	1.0158E-03	3.7069E-02	3.7069E-02	4.317E-02
Ag-108M#B	-2.4245E-02	-2.4245E-02	4.7647E-02	4.7667E-02	5.246E-02
CD-109 #A	1.1376E+00	1.1393E+00	1.9193E+00	1.9204E+00	2.101E+00
SN-113 #B	-1.4080E-03	-1.4164E-03	4.1704E-02	4.1704E-02	4.755E-02
SB-125 #B	7.0653E-02	7.0700E-02	8.8274E-02	8.8369E-02	1.141E-01
I-131 #B	-7.1194E-04	-7.7480E-04	1.1431E-01	1.1431E-01	3.346E-02
CS-134 #B	2.0336E-02	2.0354E-02	1.8775E-02	1.8812E-02	3.562E-02
CS-137	4.8128E-02	4.8131E-02	4.2916E-02	4.3007E-02	4.439E-02
CE-139 #A	8.2590E-05	8.3000E-05	4.0886E-02	4.0886E-02	4.576E-02
EU-152 #B	7.5337E-02	7.5348E-02	9.3429E-02	9.3523E-02	1.537E-01
EU-154 #B	4.5155E-04	4.5165E-04	9.3809E-02	9.3809E-02	1.053E-01
EU-155 #B	1.0796E-01	1.0800E-01	2.2984E-01	2.2992E-01	2.530E-01
HG-203 #B	-1.4896E-03	-1.5115E-03	3.7959E-02	3.7959E-02	4.129E-02
TL-208	3.1488E-01	3.1488E-01	6.9757E-02	7.2113E-02	

PB-212	9.6467E-01	9.6467E-01	1.1955E-01	1.3202E-01	
PB-214	4.8900E-01	4.8900E-01	1.1670E-01	1.2011E-01	
BI-212	7.1005E-01	7.1005E-01	3.8577E-01	3.8797E-01	
BI-214	4.3262E-01	4.3262E-01	1.0760E-01	1.1049E-01	
RA-224	1.3257E+00	1.3257E+00	1.0689E+00	1.0717E+00	1.141E+00
RA-226 #	1.3006E+00	1.3006E+00	1.1131E+00	1.1157E+00	1.197E+00
AC-228	8.9165E-01	8.9165E-01	1.9398E-01	2.0077E-01	
TH-227 #B	3.3760E-03	3.3760E-03	4.8605E-01	4.8605E-01	5.423E-01
PA-234 #B	2.8959E-02	2.8959E-02	2.0832E-01	2.0833E-01	2.325E-01
TH-234 #B	9.6328E-01	9.6328E-01	5.9805E+00	5.9807E+00	6.692E+00
AM-241 #A	2.2364E-01	2.2364E-01	1.0093E+00	1.0094E+00	1.125E+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) 2.1371494E+01 pCi/gm

Total Decayed Activity (86.9 to 2000.7 keV) 2.1371498E+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_31AUG2005_1054.An1

Sample description

FSS-NOL-06-01-037-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_31AUG2005_1054.An1

Acquisition information

Start time:	31-Aug-2005 10:54:36
Live time:	2000
Real time:	2028
Dead time:	1.39 %
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: 1.8410E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8410E+03) =
5.4318E+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	30-Aug-2005 10:58:00
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. 12 cutoff 20.00000 %

Energy Calibration

Normalized diff: 0.1705

***** 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
76.15	518.	29.58	1.01	9.676E-03	77.11	17.500	2.136E+00	PB212
					77.11	10.700	3.493E+00	PB214
239.03	993.	14.79	0.93	2.318E-02	238.63	43.100	7.205E-01	PB212
338.04	468.	28.90	1.48	1.832E-02				
338.04	468.	28.90	1.48	1.832E-02	338.40	12.010	1.558E+00	AC228
351.62	304.	38.17	0.99	1.777E-02				
351.62	304.	38.17	0.99	1.777E-02	351.99	37.100	PBC<MDA	PB214

583.04	444.	11.16	1.30	1.185E-02				
583.04	444.	11.16	1.30	1.185E-02	583.14	86.000	3.167E-01	TL208
609.30	297.	17.62	1.21	1.144E-02	609.32	46.090	4.050E-01	BI214
661.45	107527.	0.32	1.35	1.072E-02	661.62	84.620	8.700E+01	CS137
727.24	122.	21.24	1.34	9.964E-03	727.17	11.800	7.610E-01	BI212
769.34	77.	26.99	1.13	9.543E-03				
795.34	44.	32.91	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
859.40	60.	33.13	1.34	8.776E-03				
910.79	265.	8.53	1.27	8.403E-03				
910.79	265.	8.53	1.27	8.403E-03	911.07	29.000	7.883E-01	AC228
964.48	51.	23.98	1.54	8.053E-03	964.00	14.580	PBC<MDA	EU152
968.86	145.	10.86	1.54	8.026E-03	968.90	17.460	7.579E-01	AC228
1120.14	56.	23.97	1.28	7.212E-03	1120.28	15.040	3.641E-01	BI214
1172.75	205.	13.02	1.80	6.974E-03	1173.23	99.860	2.145E-01	CO60
1332.15	144.	12.47	1.53	6.351E-03	1332.51	99.980	1.640E-01	CO60
1460.44	1314.	2.85	1.76	5.933E-03	1460.75	10.700	1.498E+01	K40
1764.03	62.	14.96	1.43	5.143E-03	1764.51	15.920	5.266E-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	
675.21	338.04	6588.	468.	0.234	86.70	1.483	AC-228	I
1537.74	769.34	106.	77.	0.039	80.97	1.126	BI-214	sM

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected
1717.83	859.40	98.	60.	0.030	99.39	1.344	TL-208
1927.97	964.53	48.	51.	0.025	71.94	1.538	AC-228 D
1936.74	968.91	51.	145.	0.072	32.57	1.541	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	153.39	77.11	9186.	515.	0.258	88.74	1.006D
PB-212	477.22	239.03	8593.	981.	0.491	44.37	0.930
PB-214	702.72	351.79	6711.	290.	0.145	118.76	1.500
TL-208	1165.11	583.01	2070.	430.	0.215	46.72	1.500s
BI-214	1217.70	609.30	1120.	291.	0.145	52.87	1.208
CS-137	1321.98	661.45	1828.	107526.	53.763	0.95	1.349
BI-212	1453.55	727.24	146.	122.	0.061	63.71	1.342
CS-134	1589.74	795.34	82.	44.	0.022	98.74	1.500s
AC-228	1820.87	910.92	66.	241.	0.120	23.61	1.505s
AC-228	1936.71	968.85	92.	134.	0.067	39.95	1.541s
BI-214	2239.26	1120.14	55.	54.	0.027	71.92	1.283
CO-60	2344.45	1172.75	140.	203.	0.102	39.07	1.801
CO-60	2663.21	1332.15	51.	142.	0.071	37.41	1.525

K-40	2919.76	1460.44	43.	1295.	0.647	8.56	1.762
Bl-214	3526.82	1764.03	9.	59.	0.029	44.87	1.429

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

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

BE-7 3.5472E-01

477.56 3.547E-01 %(1.996E+00 6.03E-01 G

K-40 1.4976E+01

1460.75 1.498E+01 (P 3.848E-01 4.33E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	1.3090E-02						
		834.81	1.309E-02	%(P	4.035E-02	1.20E-02	G
CO-57	-9.3795E-04						
		122.07	-9.380E-04	%(P	2.038E-01	6.16E-02	G K
		136.43	-2.196E-01	%	1.557E+00	4.71E-01	G
CO-60	1.8921E-01						
		1332.51	1.640E-01	(P	4.172E-02	2.08E-02	G K
		1173.23	2.145E-01	(P	6.094E-02	2.82E-02	G K
Sr-85	-1.3633E-02						
		514.00	-1.363E-02	&(	1.735E-01	5.23E-02	G
Kr-85	-3.1139E+02						
		513.99	-3.114E+02	&(	3.964E+03	1.19E+03	G
Y-88	-2.6590E-03						
		1836.01	-2.659E-03	&(P	2.776E-02	7.44E-03	G K
		898.02	-8.539E-03	& P	4.585E-02	1.34E-02	G
NB-94	5.0107E-03						
		871.10	5.011E-03	&(	3.182E-02	9.20E-03	G K
		702.50	4.404E-03	&	3.561E-02	1.04E-02	G K
Ag-108M	-1.4418E-03						
		722.95	-1.442E-03	%(	4.681E-02	1.36E-02	G K
		614.37	1.999E-02	& P	1.417E-01	4.26E-02	G
		433.93	5.785E-04	%	2.210E-01	6.66E-02	G

```
CD-109       7.0126E-02
                    88.04 7.013E-02 &(  6.822E+00 2.06E+00 G

SN-113       4.5046E-03
                   391.71 4.505E-03 %(  2.763E-01 8.33E-02 G K
                   255.04 2.673E+00 %   7.046E+00 2.14E+00 G

SB-125      -2.4056E-02
                   427.95-2.406E-02 %(P 5.919E-01 1.78E-01 G K
                   600.77-3.190E-02 & P 7.071E-01 2.12E-01 G
                   636.15-3.377E-01 % P 1.133E+00 3.42E-01 G
                   463.51 6.999E-01 % P 2.162E+00 6.55E-01 G
                   176.29-7.022E-01 %   2.295E+00 6.95E-01 G

I-131        1.7136E-03
                   364.48 1.714E-03 %(P 2.170E-01 6.54E-02 G K
                   636.97 3.145E-01 &   1.916E+00 5.76E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		284.29	-7.132E-01	% P	2.664E+00	8.06E-01	G
CS-134	2.4629E-02						
		604.66	1.077E-02	%(	1.339E-01	4.02E-02	G K
		795.76	4.047E-02	*(P	4.160E-02	1.33E-02	G
		569.29	-9.968E-02	% P	8.770E-01	2.64E-01	G
		801.84	2.517E-02	% P	3.627E-01	1.03E-01	G
CS-137	8.6995E+01						
		661.62	8.700E+01	(P	1.634E-01	2.74E-01	G
CE-139	1.2580E-02						
		165.85	1.258E-02	%(	1.624E-01	4.91E-02	G
EU-152	-3.3063E-03						
		121.78	-3.306E-03	%(P	5.793E-01	1.75E-01	G K
		344.30	3.823E-03	% P	5.591E-01	1.68E-01	G
		1408.08	8.376E-02	%	1.222E-01	3.91E-02	G
		964.00	1.287E-01	% P	3.842E-01	1.15E-01	G
		1112.07	1.069E-01	%	3.023E-01	9.01E-02	G
		778.90	1.287E-01	%	2.373E-01	7.26E-02	G
EU-154	-1.2556E-01						
		123.10	-1.256E-01	%(	4.199E-01	1.27E-01	G K
		1274.80	3.100E-03	&	1.115E-01	3.14E-02	G
		723.30	2.343E-05	%	1.445E-01	4.08E-02	G
		1004.80	-1.568E-02	%	1.848E-01	5.25E-02	G
EU-155	2.3168E-01						
		86.45	2.317E-01	%(	8.043E-01	2.44E-01	G K
		105.31	1.995E-02	&	8.834E-01	2.67E-01	G

```
HG-203       3.2436E-03
                 279.17 3.244E-03 &(P 1.867E-01 5.63E-02 G K
                  72.87-1.985E+00 % P 6.908E+00 2.09E+00 G
                  70.83-5.512E+00 &   1.371E+01 4.16E+00 G
                  82.50-2.810E+00 %   1.230E+01 3.72E+00 G

TL-208       3.0959E-01
                 583.14 3.096E-01  (P 1.547E-01 4.87E-02 G
                 510.72 2.882E-01 % P 7.205E-01 2.18E-01 G

PB-212       7.2050E-01
                 238.63 7.205E-01  (P 3.191E-01 1.08E-01 G K
                                     Energy duplication
                  77.11 2.136E+00 + P 1.863E+00 6.55E-01 G
                  74.81 1.227E+00 % P 4.193E+00 1.27E+00 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.2332E-01						
		351.99	3.233E-01	(P	4.285E-01	1.30E-01	G K
		295.22	2.882E-01	% P	7.554E-01	2.29E-01	G
					Energy duplication		
		77.11	1.833E+00	% P	3.358E+00	1.02E+00	G
		241.92	-2.688E-01	%	2.143E+00	6.48E-01	G
BI-212	7.6101E-01						
		727.17	7.610E-01	(P	3.685E-01	1.62E-01	G K
		1620.56	1.815E-01	% P	8.471E-01	2.36E-01	G
		785.42	7.145E-01	%	1.430E+00	4.35E-01	G
BI-214	4.2218E-01						
		609.32	4.050E-01	(P	2.209E-01	7.30E-02	G K
		1764.51	5.266E-01	(P	1.515E-01	8.32E-02	G
		1120.28	3.641E-01	(P	2.526E-01	9.04E-02	G
RA-224	4.2583E-02						
		241.00	4.258E-02	&(	4.100E+00	1.24E+00	G
RA-226	1.7200E+00						
		185.99	1.720E+00	%(P	5.138E+00	1.56E+00	G
AC-228	7.1620E-01						
		911.07	7.250E-01	@(P	1.220E-01	5.79E-02	G K
		968.90	7.016E-01	*(P	2.489E-01	9.35E-02	G
		338.40	8.427E-01	% P	1.286E+00	3.91E-01	G
TH-227	-8.3613E-01						
		236.00	-8.361E-01	%(	1.462E+00	4.44E-01	G K

256.25 6.598E-01 % P 2.144E+00 6.49E-01 G

PA-234 1.2756E-01

98.44 1.276E-01 %(P 5.798E-01 1.75E-01 G K

946.00-9.488E-05 & P 2.160E-01 6.18E-02 G

131.28-7.585E-02 % P 8.399E-01 2.54E-01 G

94.67-9.797E-03 % P 1.368E+00 4.13E-01 G

883.24 7.573E-03 % 3.071E-01 8.77E-02 G

926.70 1.126E-02 & 3.804E-01 1.09E-01 G

569.26-1.484E-01 % P 1.300E+00 3.91E-01 G

TH-234 2.5068E+00

63.29 2.507E+00 %(P 2.387E+01 7.21E+00 G K

92.80 2.416E+00 % P 7.606E+00 2.30E+00 G

92.38 2.508E+00 % P 8.964E+00 2.71E+00 G

Nuclide Ave activity Energy Activity Code Peak MDA Comments

AM-241 -4.9746E-01

59.54-4.975E-01 %(P 3.494E+00 1.06E+00 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	3.5016E-01	3.5472E-01	1.8089E+00	1.8090E+00	1.970E+00
K-40	1.4976E+01	1.4976E+01	1.2998E+00	1.5638E+00	
MN-54 #A	1.3061E-02	1.3090E-02	3.6044E-02	3.6052E-02	4.026E-02
CO-57 #B	-9.3556E-04	-9.3795E-04	2.5948E-01	2.5948E-01	2.033E-01
CO-60	1.8914E-01	1.8921E-01	5.1886E-02	5.3036E-02	
Sr-85 #A	-1.3488E-02	-1.3633E-02	1.5682E-01	1.5682E-01	1.717E-01
Kr-85 #A	-3.1139E+02	-3.1139E+02	3.5819E+03	3.5820E+03	3.964E+03
Y-88 #B	-2.6418E-03	-2.6590E-03	2.3954E-02	2.3954E-02	2.758E-02
NB-94 #B	5.0107E-03	5.0107E-03	2.7588E-02	2.7590E-02	3.182E-02
Ag-108M#B	-1.4418E-03	-1.4418E-03	4.0752E-02	4.0752E-02	4.681E-02
CD-109 #A	7.0019E-02	7.0126E-02	6.1793E+00	6.1793E+00	6.812E+00

SN-113 #B	4.4777E-03	4.5046E-03	2.4989E-01	2.4989E-01	2.747E-01
SB-125 #B	-2.4039E-02	-2.4056E-02	5.3789E-01	5.3789E-01	5.915E-01
I-131 #B	1.5724E-03	1.7136E-03	1.9619E-01	1.9619E-01	1.991E-01
CS-134 #B	2.4607E-02	2.4629E-02	2.4367E-02	2.4409E-02	1.338E-01
CS-137	8.6990E+01	8.6995E+01	8.2251E-01	5.1173E+00	
CE-139 #A	1.2516E-02	1.2580E-02	1.4715E-01	1.4716E-01	1.616E-01
EU-152 #B	-3.3058E-03	-3.3063E-03	9.9600E-01	9.9600E-01	5.793E-01
EU-154 #B	-1.2553E-01	-1.2556E-01	3.8157E-01	3.8163E-01	4.198E-01
EU-155 #B	2.3159E-01	2.3168E-01	7.3059E-01	7.3071E-01	8.040E-01
HG-203 #B	3.1958E-03	3.2436E-03	1.6893E-01	1.6893E-01	1.839E-01
TL-208 #	3.0959E-01	3.0959E-01	1.4608E-01	1.4718E-01	1.547E-01
PB-212	7.2050E-01	7.2050E-01	3.2359E-01	3.2628E-01	
PB-214 #A	3.2332E-01	3.2332E-01	3.9142E-01	3.9187E-01	4.285E-01
BI-212	7.6101E-01	7.6101E-01	4.8681E-01	4.8881E-01	
BI-214	4.2218E-01	4.2218E-01	1.4562E-01	1.4767E-01	
RA-224 #A	4.2583E-02	4.2583E-02	3.7132E+00	3.7132E+00	4.100E+00
RA-226 #A	1.7200E+00	1.7200E+00	4.6698E+00	4.6709E+00	5.138E+00
AC-228 #	7.1620E-01	7.1620E-01	1.6691E-01	1.7201E-01	1.220E-01
TH-227 #B	-8.3613E-01	-8.3613E-01	1.3322E+00	1.3331E+00	1.462E+00
PA-234 #B	1.2756E-01	1.2756E-01	5.2570E-01	5.2574E-01	5.798E-01
TH-234 #B	2.5068E+00	2.5068E+00	2.1627E+01	2.1627E+01	2.387E+01
AM-241 #A	-4.9745E-01	-4.9746E-01	3.1879E+00	3.1880E+00	3.494E+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) 1.0405865E+02 pCi/gm

Total Decayed Activity (1120.0 to 2000.7 keV) 1.0406420E+02 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_31AUG2005_1131.An1

Sample description

FSS-NOL-06-01-031-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_31AUG2005_1131.An1

Acquisition information

Start time:	31-Aug-2005 11:31:17
Live time:	2000
Real time:	2002
Dead time:	0.09 %
Detector ID:	4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb

Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created:	08-Aug-2005 11:09:41
Zero offset:	0.409 keV
Gain:	0.500 keV/channel
Quadratic:	1.092E-08 keV/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: 1.8050E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8050E+03) =
5.5402E+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	30-Aug-2005 10:23:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1852

***** 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	85.	30.40	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
77.10	108.	20.66	0.99	1.011E-02	77.11	17.500	6.490E-01	PB212
					77.11	10.700	1.061E+00	PB214
86.81	75.	36.37	1.00	1.420E-02				
86.81	75.	36.37	1.00	1.420E-02	88.04	3.790	1.014E+00	CD109
89.89	97.	26.94	1.00	1.537E-02				
93.24	90.	29.85	1.00	1.656E-02	92.38	2.570	PBC<MDA	TH234

					92.80	3.000	PBC<MDA TH234	
185.78	164.	22.35	1.31	2.567E-02				
185.78	164.	22.35	1.31	2.567E-02	185.99	3.280	1.345E+00	RA226
209.64	106.	24.20	1.04	2.470E-02				
238.84	921.	3.96	1.09	2.319E-02	238.63	43.100	6.806E-01	PB212
241.84	141.	17.43	1.10	2.303E-02	241.00	3.900	1.169E+00	RA224
					241.92	7.470	6.117E-01	PB214
270.12	130.	23.20	1.15	2.152E-02				
295.19	194.	13.89	1.05	2.025E-02	295.22	19.200	3.666E-01	PB214
300.12	62.	30.17	1.21	2.001E-02				
327.45	95.	27.42	0.79	1.876E-02				
338.32	182.	15.08	1.12	1.830E-02	338.40	12.010	6.155E-01	AC228
351.73	352.	7.75	1.19	1.776E-02	351.99	37.100	3.939E-01	PB214
463.35	106.	22.91	1.50	1.425E-02				
463.35	106.	22.91	1.50	1.425E-02	463.51	10.000	5.518E-01	SB125
510.69	156.	15.57	1.49	1.317E-02	510.72	22.500	3.274E-01	TL208
582.99	337.	9.17	1.28	1.185E-02	583.14	86.000	2.442E-01	TL208
609.05	267.	9.46	1.45	1.144E-02	609.32	46.090	3.704E-01	BI214
662.65	59.	31.00	1.28	1.071E-02				
727.32	55.	23.46	1.30	9.963E-03	727.17	11.800	3.496E-01	BI212
794.60	46.	25.25	1.50	9.301E-03	795.76	85.400	4.321E-02	CS134
859.54	73.	21.27	1.48	8.775E-03				
910.89	252.	11.45	1.28	8.403E-03	911.07	29.000	7.656E-01	AC228
963.84	34.	29.07	1.54	8.057E-03				
963.84	34.	29.07	1.54	8.057E-03	964.00	14.580	PBC<MDA EU152	
968.75	155.	9.20	1.54	8.027E-03	968.90	17.460	8.298E-01	AC228
1119.74	63.	24.37	0.97	7.214E-03	1120.28	15.040	4.204E-01	BI214
1460.33	1112.	3.05	1.78	5.933E-03	1460.75	10.700	1.290E+01	K40
1620.18	26.	23.99	0.98	5.488E-03	1620.56	2.750	1.283E+00	BI212
1763.89	60.	12.91	1.70	5.143E-03	1764.51	15.920	5.188E-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
172.80	86.69	339.	75.	0.038	109.10	1.001	BI-207 ID
178.95	89.77	293.	97.	0.049	80.82	1.002	PB-214 ID
418.43	209.64	276.	106.	0.053	72.60	1.041	NP-239 s
539.40	270.12	301.	130.	0.065	69.59	1.152	AC-228 s
599.38	300.12	144.	62.	0.031	90.52	1.206	PB-212
654.05	327.45	222.	95.	0.047	82.26	0.789	AC-228 s
1324.38	662.65	88.	59.	0.029	92.99	1.284	CS-137 I
1718.12	859.54	56.	73.	0.036	63.80	1.475	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	318.	85.	0.043	91.19	0.993D
PB-212	153.39	77.11	309.	108.	0.054	61.98	0.995A
RA-226	371.28	186.06	637.	150.	0.075	69.10	1.500s
PB-212	476.95	238.90	599.	893.	0.446	16.35	0.968

RA-224	482.52	241.68	644.	133.	0.067	84.87	1.500
PB-214	482.61	241.73	282.	75.	0.037	94.31	1.739s
PB-214	589.53	295.19	227.	190.	0.095	41.66	1.049
AC-228	675.78	338.32	220.	181.	0.090	45.24	1.120
PB-214	702.56	351.71	172.	356.	0.178	23.14	1.197
SB-125	924.78	462.83	126.	77.	0.038	69.35	1.500s
TL-208	1020.50	510.69	167.	130.	0.065	46.72	1.486s
TL-208	1165.09	582.99	167.	332.	0.166	27.52	1.284
BI-214	1217.20	609.05	119.	261.	0.130	28.38	1.446
BI-212	1453.70	727.32	52.	55.	0.027	70.38	1.300s
CS-134	1588.26	794.60	44.	46.	0.023	75.74	1.500s
AC-228	1820.81	910.89	133.	249.	0.125	34.34	1.284
AC-228	1936.06	968.52	83.	201.	0.100	35.05	1.338
BI-214	2238.45	1119.74	63.	61.	0.030	73.10	0.965s
K-40	2919.53	1460.33	30.	1094.	0.547	9.15	1.780
BI-212	3239.17	1620.18	3.	26.	0.013	71.97	0.981s
BI-214	3526.53	1763.89	3.	57.	0.028	38.73	1.700s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	%(	3.459E-01	1.01E-01 G
K-40		1.2901E+01					
			1460.75	1.290E+01	(P	3.341E-01	4.00E-01 G
MN-54		-5.1089E-03					
			834.81	-5.109E-03	%(P	3.782E-02	1.10E-02 G
CO-57		-5.1911E-03					
			122.07	-5.191E-03	&(P	4.887E-02	1.46E-02 G K
			136.43	2.682E-02	&	3.705E-01	1.10E-01 G
CO-60		-1.5947E-03					
			1332.51	-1.595E-03	&(P	3.611E-02	9.71E-03 G K
			1173.23	1.762E-02	% P	5.134E-02	1.53E-02 G K
Sr-85		-2.2589E-02					
			514.00	-2.259E-02	%(	4.383E-02	1.33E-02 G
Kr-85		-5.1568E+02					
			513.99	-5.157E+02	%(	1.001E+03	3.04E+02 G
Y-88		1.7586E-04					
			1836.01	1.759E-04	%(P	2.822E-02	7.32E-03 G K

898.02 7.111E-03 & P 2.816E-02 8.16E-03 G

NB-94 -7.2993E-03

871.10-7.299E-03 %(3.330E-02 9.72E-03 G K

702.50 1.256E-02 % 3.270E-02 9.80E-03 G K

Ag-108M -1.2728E-03

722.95-1.273E-03 &(4.123E-02 1.19E-02 G K

614.37-2.325E-05 & P 3.559E-02 1.02E-02 G

433.93 1.214E-02 % 3.164E-02 9.51E-03 G

CD-109 1.1462E+00

88.04 1.146E+00 %(1.761E+00 5.38E-01 G

SN-113 3.4810E-03

391.71 3.481E-03 %(4.848E-02 1.42E-02 G K

255.04-2.829E-01 % 1.429E+00 4.26E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.5961E-02						
		427.95	-2.164E-02	%(P	9.366E-02	2.77E-02	G K
		600.77	-4.255E-02	% P	1.980E-01	5.85E-02	G
		636.15	5.121E-02	% P	2.615E-01	7.63E-02	G
		463.51	4.045E-01	*(P	2.888E-01	9.50E-02	G
		176.29	-1.009E-01	%	5.531E-01	1.65E-01	G
I-131	-5.1990E-03						
		364.48	-5.199E-03	&(P	4.055E-02	1.19E-02	G K
		636.97	-3.427E-03	%	4.610E-01	1.32E-01	G
		284.29	-1.137E-01	% P	5.472E-01	1.63E-01	G
CS-134	1.1390E-02						
		604.66	-1.646E-02	%(	4.143E-02	1.25E-02	G K
		795.76	4.321E-02	(P	3.181E-02	1.09E-02	G
		569.29	-5.721E-02	% P	1.903E-01	5.58E-02	G
		801.84	1.074E-01	% P	3.277E-01	9.64E-02	G
CS-137	2.3611E-02						
		661.62	2.361E-02	%(P	3.844E-02	1.18E-02	G
CE-139	-8.9634E-03						
		165.85	-8.963E-03	%(	4.508E-02	1.35E-02	G
EU-152	-1.5760E-02						
		121.78	-1.576E-02	&(P	1.430E-01	4.27E-02	G K
		344.30	8.956E-04	% P	1.085E-01	3.17E-02	G
		1408.08	3.902E-02	%	1.397E-01	4.05E-02	G
		964.00	1.820E-01	% P	2.450E-01	7.69E-02	G
		1112.07	0.000E+00	&	3.935E-01	1.13E-01	G

778.90-2.925E-04 % 2.432E-01 6.88E-02 G

EU-154 -1.8437E-02

123.10-1.844E-02 %(9.904E-02 2.97E-02 G K

1274.80-2.303E-02 & 1.187E-01 3.45E-02 G

723.30 4.044E-03 & 2.758E-01 8.07E-02 G

1004.80 4.954E-02 & 1.549E-01 4.56E-02 G

EU-155 4.3922E-02

86.45 4.392E-02 %(1.973E-01 5.91E-02 G K

105.31 5.759E-02 % 2.111E-01 6.34E-02 G

HG-203 1.7637E-02

279.17 1.764E-02 &(P 3.300E-02 1.00E-02 G K

72.87-3.677E-01 % P 2.152E+00 6.45E-01 G

70.83-1.080E+00 & 4.049E+00 1.22E+00 G

82.50-8.694E-01 % 3.651E+00 1.10E+00 G

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

TL-208       2.4422E-01
                   583.14 2.442E-01  (P 4.621E-02 2.27E-02 G
                   510.72 3.274E-01 + P 1.591E-01 6.15E-02 G

PB-212       6.7245E-01
                   238.63 6.685E-01  (P 8.744E-02 3.69E-02 G K
                                        Energy duplication
                    77.11 4.585E-01 } P 3.577E-01 9.47E-02 G
                    74.81 7.328E-01  (P 7.392E-01 2.31E-01 G

PB-214       3.9157E-01
                   351.99 4.045E-01  (P 7.258E-02 3.17E-02 G K
                   295.22 3.666E-01  (P 1.403E-01 5.20E-02 G
                                        Energy duplication
                    77.11 3.081E-01 } P 8.964E-01 2.05E-01 G
                   241.92 3.261E-01 -   3.525E-01 1.02E-01 G

BI-212       3.4959E-01
                   727.17 3.496E-01 *(P 2.314E-01 8.28E-02 G K
                  1620.56 1.283E+00 + P 5.444E-01 3.08E-01 G
                   785.42 2.194E-01 %   1.669E+00 4.83E-01 G

BI-214       3.8268E-01
                   609.32 3.704E-01  (P 7.609E-02 3.59E-02 G K
                  1764.51 5.188E-01 + P 1.019E-01 7.08E-02 G
                  1120.28 4.204E-01  (P 2.742E-01 1.06E-01 G

RA-224       1.1087E+00
                   241.00 1.109E+00  (  1.006E+00 3.14E-01 G
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RA-226       1.3357E+00
                 185.99 1.336E+00  (P 1.070E+00 3.34E-01 G

AC-228       7.2162E-01
                 911.07 7.656E-01  (P 1.734E-01 8.88E-02 G K
                 968.90 1.072E+00 + P 2.418E-01 1.25E-01 G
                 338.40 6.155E-01  (P 2.448E-01 9.34E-02 G

TH-227       5.2935E-02
                 236.00 5.294E-02 &(  2.593E-01 7.73E-02 G K
                 256.25-2.872E-03 % P 3.832E-01 1.12E-01 G

PA-234      -4.3962E-03
                  98.44-4.396E-03 &(P 1.807E-01 5.35E-02 G K
                 946.00-1.574E-02 & P 1.985E-01 5.71E-02 G
                 131.28 3.635E-02 & P 1.943E-01 5.82E-02 G
                  94.67-9.760E-02 % P 3.924E-01 1.18E-01 G
                 883.24 1.138E-01 %   2.383E-01 7.23E-02 G
                 926.70 8.284E-02 &   2.301E-01 6.83E-02 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments

569.26-8.480E-02 % P 2.821E-01 8.27E-02 G

TH-234 1.1757E+00

63.29 1.176E+00 %(P 6.008E+00 1.79E+00 G K

92.80 1.385E+00 % P 2.046E+00 6.22E-01 G

92.38 1.707E+00 % P 2.407E+00 7.33E-01 G

AM-241 -6.8122E-02

59.54-6.812E-02 &(P 8.323E-01 2.46E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	0.0000E+00	0.0000E+00	3.0188E-01	3.0188E-01	3.413E-01
K-40		1.2901E+01	1.2901E+01	1.2002E+00	1.4148E+00	
MN-54	#A	-5.0970E-03	-5.1089E-03	3.6944E-02	3.6945E-02	3.773E-02
CO-57	#B	-5.1771E-03	-5.1911E-03	4.6555E-02	4.6556E-02	4.874E-02
CO-60	#B	-1.5941E-03	-1.5947E-03	8.9899E-02	8.9899E-02	3.610E-02

Sr-85	#A	-2.2338E-02	-2.2589E-02	3.9979E-02	4.0001E-02	4.334E-02
Kr-85	#A	-5.1568E+02	-5.1568E+02	9.1268E+02	9.1317E+02	1.001E+03
Y-88	#B	1.7466E-04	1.7586E-04	2.1960E-02	2.1960E-02	2.803E-02
NB-94	#B	-7.2993E-03	-7.2993E-03	2.9174E-02	2.9177E-02	3.330E-02
Ag-108M	#B	-1.2727E-03	-1.2728E-03	3.5631E-02	3.5631E-02	4.123E-02
CD-109	#A	1.1443E+00	1.1462E+00	1.6135E+00	1.6148E+00	1.758E+00
SN-113	#B	3.4591E-03	3.4810E-03	4.2631E-02	4.2631E-02	4.818E-02
SB-125	#B	8.5900E-02	8.5961E-02	6.0602E-02	6.0807E-02	9.359E-02
I-131	#B	-4.7501E-03	-5.1990E-03	4.1724E-02	4.1725E-02	3.705E-02
CS-134	#B	1.1379E-02	1.1390E-02	8.6430E-03	8.6682E-03	4.139E-02
CS-137	#A	2.3610E-02	2.3611E-02	3.5405E-02	3.5432E-02	3.844E-02
CE-139	#A	-8.9162E-03	-8.9634E-03	4.0515E-02	4.0519E-02	4.485E-02
EU-152	#B	-1.5758E-02	-1.5760E-02	1.4616E-01	1.4617E-01	1.430E-01
EU-154	#B	-1.8432E-02	-1.8437E-02	8.8971E-02	8.8977E-02	9.902E-02
EU-155	#B	4.3905E-02	4.3922E-02	1.7742E-01	1.7743E-01	1.972E-01
HG-203	#B	1.7365E-02	1.7637E-02	3.0137E-02	3.0155E-02	3.249E-02
TL-208		2.4422E-01	2.4422E-01	6.8092E-02	6.9553E-02	
PB-212		6.7245E-01	6.7245E-01	1.1142E-01	1.1806E-01	
PB-214		3.9157E-01	3.9157E-01	9.2059E-02	9.4825E-02	
BI-212		3.4959E-01	3.4959E-01	2.4826E-01	2.4909E-01	
BI-214		3.8268E-01	3.8268E-01	1.1128E-01	1.1348E-01	
RA-224		1.1087E+00	1.1087E+00	9.4095E-01	9.4315E-01	1.006E+00
RA-226	#	1.3357E+00	1.3357E+00	1.0025E+00	1.0055E+00	1.070E+00
AC-228		7.2162E-01	7.2162E-01	2.0674E-01	2.1094E-01	
TH-227	#B	5.2935E-02	5.2935E-02	2.3193E-01	2.3195E-01	2.593E-01
PA-234	#B	-4.3962E-03	-4.3962E-03	3.4715E-01	3.4715E-01	1.807E-01
TH-234	#B	1.1757E+00	1.1757E+00	5.3819E+00	5.3823E+00	6.008E+00
AM-241	#A	-6.8121E-02	-6.8122E-02	7.7926E-01	7.7927E-01	8.323E-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 (86.4 to 2000.7 keV) 1.6772169E+01 pCi/gm

Total Decayed Activity (86.4 to 2000.7 keV) 1.6772169E+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_31AUG2005_1207.An1

Sample description

FSS-NOL-06-01-038-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_31AUG2005_1207.An1

Acquisition information

Start time:	31-Aug-2005 12:07:35
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: 1.6100E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6100E+03) =
6.2112E+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	30-Aug-2005 10:55:00
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: 0.2114

***** 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	135.	20.56	0.99	9.052E-03	74.81	9.600	1.299E+00	PB212
77.14	123.	19.21	0.99	1.011E-02	77.11	17.500	8.260E-01	PB212
					77.11	10.700	1.351E+00	PB214
92.91	94.	38.23	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
129.16	99.	39.80	1.04	2.438E-02				

186.16	141.	26.37	1.40	2.566E-02	185.99	3.280	1.275E+00	RA226
209.22	114.	27.74	0.76	2.472E-02				
238.82	1056.	3.65	1.09	2.319E-02	238.63	43.100	8.767E-01	PB212
241.54	150.	21.40	1.09	2.305E-02	241.00	3.900	1.401E+00	RA224
					241.92	7.470	7.332E-01	PB214
270.39	139.	22.67	1.49	2.150E-02				
277.46	74.	34.61	0.88	2.114E-02				
295.07	253.	11.30	1.11	2.026E-02	295.22	19.200	5.366E-01	PB214
300.17	81.	27.80	1.22	2.001E-02				
327.70	69.	33.91	1.07	1.875E-02				
338.53	277.	11.77	1.13	1.830E-02	338.40	12.010	1.055E+00	AC228
351.69	356.	11.31	1.04	1.776E-02	351.99	37.100	4.465E-01	PB214
462.87	74.	30.73	0.98	1.426E-02				
462.87	74.	30.73	0.98	1.426E-02	463.51	10.000	4.276E-01	SB125
510.61	184.	15.38	1.41	1.317E-02	510.72	22.500	4.467E-01	TL208
582.93	387.	7.73	1.41	1.185E-02	583.14	86.000	3.155E-01	TL208
609.14	294.	6.80	1.32	1.144E-02	609.32	46.090	4.582E-01	BI214
661.36	298.	9.46	1.45	1.073E-02	661.62	84.620	2.749E-01	CS137
727.10	133.	18.53	1.52	9.966E-03	727.17	11.800	9.487E-01	BI212
785.61	31.	40.06	1.33	9.392E-03	785.42	2.000	1.376E+00	BI212
794.39	88.	21.32	0.88	9.313E-03				
860.47	74.	21.02	1.44	8.768E-03				
911.07	250.	9.52	1.54	8.401E-03	911.07	29.000	8.497E-01	AC228
968.76	130.	11.21	1.54	8.026E-03	968.90	17.460	7.804E-01	AC228
1120.02	87.	23.49	1.18	7.213E-03	1120.28	15.040	6.578E-01	BI214
1172.76	293.	9.92	2.01	6.974E-03	1173.23	99.860	3.514E-01	CO60
1237.84	35.	29.18	1.53	6.703E-03				
1332.13	214.	8.41	1.62	6.351E-03	1332.51	99.980	2.800E-01	CO60
1460.33	1126.	3.14	1.99	5.933E-03	1460.75	10.700	1.465E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1619.19	17.	40.51	0.56	5.488E-03	1620.56	2.750	9.375E-01	Bl212
1763.51	46.	15.23	1.88	5.142E-03	1764.51	15.920	4.761E-01	Bl214

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

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
257.49	129.16	629.	99.	0.049	111.83	1.036	AC-228	s
417.61	209.22	406.	114.	0.057	83.21	0.755	AC-228	
539.94	270.39	326.	139.	0.069	68.01	1.494	AC-228	s
554.07	277.46	266.	76.	0.038	97.79	0.877	TL-208	
599.48	300.17	201.	81.	0.040	83.41	1.223	PB-212	s
654.55	327.70	208.	69.	0.034	101.72	1.075	AC-228	s
1570.28	785.61	55.	31.	0.015	120.18	1.327	Bl-212	l
1587.83	794.39	88.	88.	0.044	55.39	0.884	AC-228	s
1719.98	860.47	53.	74.	0.037	63.05	1.443	TL-208	
2474.62	1237.84	33.	35.	0.018	87.54	1.527	Bl-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 Centroid Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV

PB-212	148.79	74.81	334.	135.	0.067	61.68	0.993D
PB-212	153.39	77.11	360.	123.	0.062	57.63	0.995A
RA-226	371.48	186.16	551.	128.	0.064	79.11	1.400s
PB-212	476.84	238.84	716.	997.	0.499	16.03	0.993
RA-224	482.71	241.78	773.	120.	0.060	102.27	1.500
PB-214	589.29	295.07	248.	249.	0.124	33.90	1.112
AC-228	676.20	338.53	273.	276.	0.138	35.31	1.134s
PB-214	702.52	351.69	378.	350.	0.175	33.93	1.041
SB-125	925.04	462.96	156.	62.	0.031	90.91	1.500
TL-208	1020.34	510.61	220.	158.	0.079	46.13	1.406s
TL-208	1164.96	582.93	168.	383.	0.191	23.18	1.408s
BI-214	1217.36	609.13	155.	311.	0.155	27.13	1.348
CS-137	1321.80	661.36	144.	297.	0.149	28.38	1.452s
BI-212	1453.27	727.10	133.	133.	0.066	55.58	1.524s
AC-228	1821.16	911.07	102.	247.	0.123	28.57	1.542
AC-228	1936.87	968.93	67.	112.	0.056	43.24	1.227
BI-214	2239.01	1120.02	91.	85.	0.043	70.46	1.181s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2344.48	1172.76	131.	291.	0.146	29.76	2.006s
CO-60	2663.16	1332.13	38.	212.	0.106	25.24	1.621
K-40	2919.53	1460.33	43.	1108.	0.554	9.42	1.986
Bl-212	3237.18	1619.19	8.	17.	0.008	121.53	0.565s
Bl-214	3525.78	1763.51	6.	46.	0.023	45.69	1.880s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	%(	3.990E-01	1.16E-01 G
K-40		1.4648E+01					
			1460.75	1.465E+01	(P	4.414E-01	4.68E-01 G
MN-54		2.3570E-02					
			834.81	2.357E-02	%(P	3.659E-02	1.13E-02 G
CO-57		-6.3025E-03					
			122.07	-6.303E-03	%(P	5.612E-02	1.68E-02 G K
			136.43	-9.451E-02	%	4.337E-01	1.30E-01 G
CO-60		2.7996E-01					

1332.51 2.800E-01 (P 4.175E-02 2.38E-02 G K
1173.23 3.514E-01 + P 6.751E-02 3.51E-02 G K

Sr-85 -2.4511E-02
514.00-2.451E-02 &(5.278E-02 1.60E-02 G

Kr-85 -5.5971E+02
513.99-5.597E+02 &(1.205E+03 3.65E+02 G

Y-88 4.0628E-03
1836.01 4.063E-03 %(P 2.727E-02 7.35E-03 G K
898.02 8.194E-04 % P 4.471E-02 1.27E-02 G

NB-94 3.0638E-03
871.10 3.064E-03 %(4.503E-02 1.30E-02 G K
702.50-4.784E-03 & 4.062E-02 1.18E-02 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-2.8885E-02						
		722.95	-2.888E-02	%(	6.107E-02	1.85E-02	G K
		614.37	-3.837E-03	% P	3.942E-02	1.14E-02	G
		433.93	-2.415E-03	%	4.273E-02	1.25E-02	G
CD-109	-2.0926E-01						
		88.04	-2.093E-01	&(	2.275E+00	6.80E-01	G
SN-113	8.5877E-04						
		391.71	8.588E-04	%(	5.965E-02	1.75E-02	G K
		255.04	-6.982E-02	&	1.903E+00	5.64E-01	G
SB-125	9.4351E-02						
		427.95	1.897E-03	&(P	1.226E-01	3.57E-02	G K
		600.77	-1.987E-02	% P	2.103E-01	6.12E-02	G
		636.15	-7.617E-02	% P	3.719E-01	1.09E-01	G
		463.51	3.680E-01	(P	3.588E-01	1.14E-01	G
		176.29	1.525E-01	&	6.541E-01	1.96E-01	G
I-131	6.8906E-03						
		364.48	6.891E-03	%(P	4.071E-02	1.20E-02	G K
		636.97	-1.263E-02	%	5.348E-01	1.53E-01	G
		284.29	-1.129E-01	% P	6.600E-01	1.96E-01	G
CS-134	-2.6967E-02						
		604.66	-2.697E-02	&(	5.202E-02	1.58E-02	G K
		795.76	-9.224E-05	% P	5.317E-02	1.53E-02	G
		569.29	-2.575E-02	% P	2.559E-01	7.40E-02	G
		801.84	5.738E-02	% P	4.651E-01	1.34E-01	G

CS-137 2.7487E-01

661.62 2.749E-01 @(P 5.422E-02 2.61E-02 G

CE-139 -1.8755E-04

165.85-1.876E-04 &(4.428E-02 1.31E-02 G

EU-152 -1.9289E-02

121.78-1.929E-02 %(P 1.642E-01 4.90E-02 G K

344.30-3.262E-02 % P 1.427E-01 4.25E-02 G

1408.08 4.148E-02 % 1.463E-01 4.24E-02 G

964.00 2.396E-01 % P 3.823E-01 1.18E-01 G

1112.07 1.000E-01 % 3.563E-01 1.05E-01 G

778.90 8.512E-02 & 3.144E-01 9.30E-02 G

EU-154 -1.9426E-02

123.10-1.943E-02 &(1.047E-01 3.13E-02 G K

1274.80 1.425E-02 % 1.184E-01 3.37E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30 4.534E-03 %   3.762E-01 1.11E-01 G
                      1004.80 2.139E-02 &   2.113E-01 6.02E-02 G

EU-155       1.2741E-01
                       86.45 1.274E-01 %(  2.597E-01 7.88E-02 G K
                      105.31 2.033E-03 %   2.667E-01 7.94E-02 G

HG-203      -6.4934E-04
                      279.17-6.493E-04 &(P 4.888E-02 1.44E-02 G K
                       72.87-6.225E-01 % P 2.485E+00 7.47E-01 G
                       70.83 1.094E+00 %   4.352E+00 1.31E+00 G
                       82.50-1.196E+00 &   4.515E+00 1.36E+00 G

TL-208       3.1550E-01
                      583.14 3.155E-01 @(P 5.202E-02 2.46E-02 G
                      510.72 4.467E-01 + P 2.035E-01 8.03E-02 G

PB-212       8.3393E-01
                      238.63 8.371E-01  (P 1.069E-01 4.53E-02 G K
                                         Energy duplication
                       77.11 5.836E-01 } P 4.320E-01 1.12E-01 G
                       74.81 1.299E+00 + P 8.494E-01 2.73E-01 G

PB-214       4.7722E-01
                      351.99 4.465E-01  (P 1.189E-01 5.13E-02 G K
                      295.22 5.366E-01  (P 1.644E-01 6.16E-02 G
                                         Energy duplication
                       77.11 3.483E-01 } P 1.068E+00 2.48E-01 G
                      241.92 4.483E-01 %   6.493E-01 1.99E-01 G

BI-212       9.4660E-01
```

727.17 9.487E-01 *(P 4.031E-01 1.76E-01 G K
1620.56 9.375E-01 (P 8.904E-01 3.81E-01 G
785.42 1.151E+00 % 1.955E+00 6.01E-01 G

BI-214 4.8990E-01
609.32 4.947E-01 (P 9.676E-02 4.57E-02 G K
1764.51 4.761E-01 @(P 1.406E-01 7.76E-02 G
1120.28 6.578E-01 + P 3.650E-01 1.58E-01 G

RA-224 1.1169E+00
241.00 1.117E+00 (1.234E+00 3.81E-01 G

RA-226 1.2746E+00
185.99 1.275E+00 @(P 1.118E+00 3.70E-01 G

AC-228 9.0973E-01
911.07 8.497E-01 (P 1.718E-01 8.20E-02 G K
968.90 6.688E-01 - P 2.453E-01 9.65E-02 G
338.40 1.055E+00 @(P 3.043E-01 1.25E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.0944E-02						
		236.00	-1.094E-02	%(	4.100E-01	1.22E-01	G K
		256.25	4.372E-02	&	P 5.444E-01	1.61E-01	G
PA-234	4.5254E-02						
		98.44	4.525E-02	%(P	2.543E-01	7.62E-02	G K
		946.00	-1.085E-04	&	P 2.630E-01	7.56E-02	G
		131.28	-2.976E-03	&	P 2.406E-01	7.16E-02	G
		94.67	-6.374E-03	%	P 4.188E-01	1.25E-01	G
		883.24	-1.652E-02	&	3.624E-01	1.04E-01	G
		926.70	6.408E-03	%	3.621E-01	1.03E-01	G
		569.26	-3.818E-02	%	P 3.792E-01	1.10E-01	G
TH-234	1.8677E+00						
		63.29	1.868E+00	%(P	7.088E+00	2.12E+00	G K
		92.80	1.451E+00	%	P 2.408E+00	7.30E-01	G
		92.38	1.877E+00	%	P 2.805E+00	8.53E-01	G
AM-241	1.5420E-02						
		59.54	1.542E-02	&(P	1.067E+00	3.15E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	Total 3 Sigma pCi/gm	MDA pCi/gm
BE-7 #A	0.0000E+00	0.0000E+00	3.4858E-01	3.4858E-01	3.936E-01
K-40	1.4648E+01	1.4648E+01	1.4036E+00	1.6412E+00	
MN-54 #A	2.3515E-02	2.3570E-02	3.4014E-02	3.4041E-02	3.650E-02
CO-57 #B	-6.2855E-03	-6.3025E-03	5.3242E-02	5.3243E-02	5.597E-02
CO-60	2.7985E-01	2.7996E-01	7.1533E-02	7.3357E-02	
Sr-85 #A	-2.4237E-02	-2.4511E-02	4.7970E-02	4.7991E-02	5.219E-02
Kr-85 #A	-5.5970E+02	-5.5971E+02	1.0951E+03	1.0956E+03	1.205E+03
Y-88 #B	4.0351E-03	4.0628E-03	2.2045E-02	2.2046E-02	2.709E-02
NB-94 #B	3.0638E-03	3.0638E-03	3.8954E-02	3.8954E-02	4.503E-02
Ag-108M#B	-2.8884E-02	-2.8885E-02	5.5528E-02	5.5554E-02	6.107E-02
CD-109 #A	-2.0892E-01	-2.0926E-01	2.0407E+00	2.0407E+00	2.271E+00
SN-113 #B	8.5335E-04	8.5877E-04	5.2377E-02	5.2377E-02	5.927E-02
SB-125 #B	9.4284E-02	9.4351E-02	8.7528E-02	8.7699E-02	1.225E-01
I-131 #B	6.2940E-03	6.8906E-03	3.5979E-02	3.5981E-02	3.718E-02
CS-134 #B	-2.6941E-02	-2.6967E-02	4.7465E-02	4.7490E-02	5.197E-02
CS-137 #	2.7486E-01	2.7487E-01	7.8367E-02	7.9975E-02	
CE-139 #A	-1.8656E-04	-1.8755E-04	3.9325E-02	3.9325E-02	4.405E-02
EU-152 #B	-1.9286E-02	-1.9289E-02	1.6611E-01	1.6612E-01	1.642E-01
EU-154 #B	-1.9422E-02	-1.9426E-02	9.4000E-02	9.4006E-02	1.047E-01
EU-155 #B	1.2736E-01	1.2741E-01	2.3637E-01	2.3648E-01	2.596E-01
HG-203 #B	-6.3927E-04	-6.4934E-04	4.5940E-02	4.5940E-02	4.812E-02
TL-208 #	3.1550E-01	3.1550E-01	7.3951E-02	7.6186E-02	

PB-212	8.3393E-01	8.3393E-01	1.3532E-01	1.4372E-01	
PB-214	4.7722E-01	4.7722E-01	1.1629E-01	1.1955E-01	
BI-212	9.4660E-01	9.4660E-01	5.2805E-01	5.3091E-01	
BI-214	4.8990E-01	4.8990E-01	1.3570E-01	1.3865E-01	
RA-224 A	1.1169E+00	1.1169E+00	1.1422E+00	1.1441E+00	1.234E+00
RA-226 #	1.2746E+00	1.2746E+00	1.1106E+00	1.1131E+00	
AC-228	9.0973E-01	9.0973E-01	2.0821E-01	2.1481E-01	
TH-227 #B	-1.0944E-02	-1.0944E-02	3.6580E-01	3.6580E-01	4.100E-01
PA-234 #B	4.5254E-02	4.5254E-02	2.2856E-01	2.2857E-01	2.543E-01
TH-234 #B	1.8677E+00	1.8677E+00	6.3748E+00	6.3756E+00	7.088E+00
AM-241 #A	1.5419E-02	1.5420E-02	9.4639E-01	9.4639E-01	1.067E+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 (86.4 to 2000.7 keV) 2.1566835E+01 pCi/gm

Total Decayed Activity (86.4 to 2000.7 keV) 2.1566961E+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_31AUG2005_1244.An1

Sample description

FSS-NOL-06-01-027-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_31AUG2005_1244.An1

Acquisition information

Start time:	31-Aug-2005 12:44:52
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: 1.9860E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9860E+03) =
5.0352E+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	30-Aug-2005 08:44:00
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: 0.2483

***** 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
74.87	135.	20.37	0.99	9.052E-03	74.81	9.600	1.057E+00	PB212
77.82	127.	24.14	1.00	1.044E-02	77.11	17.500	4.774E-01	PB212
185.96	172.	23.90	1.41	2.567E-02				
185.96	172.	23.90	1.41	2.567E-02	185.99	3.280	1.285E+00	RA226
209.36	122.	28.46	1.27	2.471E-02				
238.84	1107.	3.55	1.09	2.319E-02	238.63	43.100	7.449E-01	PB212
241.37	142.	21.78	1.09	2.306E-02	241.00	3.900	1.076E+00	RA224

					241.92	7.470	5.629E-01	PB214
269.86	103.	28.18	1.72	2.153E-02				
276.96	64.	40.14	1.09	2.116E-02				
294.99	236.	13.10	1.28	2.026E-02	295.22	19.200	4.060E-01	PB214
300.02	91.	29.33	0.75	2.002E-02				
338.42	257.	13.18	1.20	1.830E-02	338.40	12.010	7.932E-01	AC228
351.80	400.	6.84	1.11	1.776E-02	351.99	37.100	4.070E-01	PB214
462.51	84.	22.89	1.57	1.427E-02				
462.51	84.	22.89	1.57	1.427E-02	463.51	10.000	3.954E-01	SB125
510.72	235.	12.70	1.30	1.317E-02	510.72	22.500	4.783E-01	TL208
582.96	385.	6.82	1.16	1.185E-02	583.14	86.000	2.542E-01	TL208
609.20	318.	7.76	1.35	1.144E-02	609.32	46.090	4.024E-01	BI214
661.48	72.	29.37	1.01	1.072E-02	661.62	84.620	5.311E-02	CS137
726.72	94.	18.71	1.17	9.969E-03	727.17	11.800	5.417E-01	BI212
784.40	45.	35.32	1.24	9.403E-03				
784.40	45.	35.32	1.24	9.403E-03	785.42	2.000	1.644E+00	BI212
859.95	54.	32.84	0.80	8.772E-03				
910.96	253.	7.54	1.70	8.402E-03	911.07	29.000	6.969E-01	AC228
967.45	238.	9.39	1.37	8.035E-03	968.90	17.460	1.153E+00	AC228
1119.69	102.	19.45	1.62	7.215E-03	1120.28	15.040	6.261E-01	BI214
1460.32	1316.	2.91	1.83	5.933E-03	1460.75	10.700	1.390E+01	K40
1619.86	24.	24.10	0.71	5.488E-03	1620.56	2.750	1.094E+00	BI212
1763.38	63.	12.31	0.94	5.142E-03	1764.51	15.920	5.214E-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
417.88	209.36	472.	122.	0.061	85.38	1.270	AC-228 s
538.87	269.86	308.	103.	0.052	84.53	1.724	AC-228 s
553.07	276.96	246.	81.	0.040	88.69	1.092	TL-208
599.18	300.02	259.	91.	0.045	88.00	0.755	PB-212
1567.87	784.40	76.	45.	0.023	105.95	1.238	BI-212 l
1718.94	859.95	84.	54.	0.027	98.51	0.803	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	330.	135.	0.067	61.12	0.993D
PB-212	153.39	77.11	333.	194.	0.097	37.08	0.995A
RA-226	371.55	186.19	657.	143.	0.071	73.23	1.500s
PB-212	476.85	238.85	610.	1057.	0.528	14.22	0.938
RA-224	482.91	241.88	705.	134.	0.067	87.88	1.500
PB-214	589.13	294.99	292.	232.	0.116	39.30	1.284

AC-228	675.98	338.42	289.	256.	0.128	39.53	1.198
PB-214	702.75	351.80	164.	394.	0.197	20.53	1.110
SB-125	924.70	462.79	143.	64.	0.032	86.26	1.500s
TL-208	1020.56	510.72	209.	208.	0.104	38.09	1.298s
TL-208	1165.03	582.96	117.	380.	0.190	20.45	1.163
BI-214	1217.50	609.20	107.	312.	0.156	23.28	1.354
CS-137	1322.04	661.48	123.	71.	0.035	88.12	1.012s
BI-212	1452.51	726.72	80.	94.	0.047	56.12	1.170
AC-228	1820.94	910.96	51.	250.	0.125	22.62	1.696
AC-228	1933.92	967.45	82.	237.	0.119	28.18	1.372s
BI-214	2238.35	1119.69	80.	100.	0.050	58.36	1.617s
K-40	2919.50	1460.32	50.	1297.	0.649	8.74	1.829
BI-212	3238.53	1619.86	3.	24.	0.012	72.29	0.714s
BI-214	3525.51	1763.38	3.	63.	0.031	36.93	0.945s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.6110E-01					
			477.56	1.611E-01	%(	2.974E-01	9.07E-02 G
K-40		1.3905E+01					
			1460.75	1.390E+01	(P	3.820E-01	4.11E-01 G
MN-54		-1.0727E-02					
			834.81	-1.073E-02	%(P	3.304E-02	9.79E-03 G
CO-57		-7.3810E-03					
			122.07	-7.381E-03	%(P	4.387E-02	1.31E-02 G K
			136.43	-1.960E-02	&	3.709E-01	1.11E-01 G
CO-60		5.8931E-03					
			1332.51	5.893E-03	%(P	3.443E-02	9.74E-03 G K
			1173.23	1.129E-02	% P	4.245E-02	1.25E-02 G K
Sr-85		-1.4264E-02					
			514.00	-1.426E-02	%(	4.208E-02	1.26E-02 G
Kr-85		-3.2520E+02					
			513.99	-3.252E+02	%(	9.594E+02	2.88E+02 G
Y-88		-4.7363E-03					
			1836.01	-4.736E-03	%(P	2.516E-02	6.96E-03 G K

898.02 3.737E-03 & P 3.758E-02 1.08E-02 G

NB-94 -8.3370E-04

871.10-8.337E-04 %(3.436E-02 9.82E-03 G K

702.50-4.728E-04 % 3.377E-02 9.72E-03 G K

Ag-108M 5.1273E-04

722.95 5.127E-04 &(3.974E-02 1.15E-02 G K

614.37-8.819E-03 % P 3.764E-02 1.11E-02 G

433.93-5.340E-03 % 3.205E-02 9.46E-03 G

CD-109 0.0000E+00

88.04 0.000E+00 %(1.870E+00 5.58E-01 G

SN-113 7.5586E-03

391.71 7.559E-03 %(4.483E-02 1.33E-02 G K

255.04 1.917E-03 & 1.474E+00 4.35E-01 G

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

SB-125       7.6845E-02
                   427.95-5.652E-05 %(P 1.004E-01 2.92E-02 G K
                   600.77-6.172E-02 % P 1.826E-01 5.46E-02 G
                   636.15 3.427E-04 & P 2.882E-01 8.29E-02 G
                   463.51 3.045E-01  (P 2.796E-01 8.93E-02 G
                   176.29-1.842E-02 &   5.517E-01 1.64E-01 G

I-131        8.7542E-03
                   364.48 8.754E-03 %(P 3.645E-02 1.08E-02 G K
                   636.97-2.518E-02 %   4.670E-01 1.35E-01 G
                   284.29-3.930E-02 % P 5.278E-01 1.56E-01 G

CS-134       3.2275E-03
                   604.66 3.228E-03 &(  7.690E-02 2.29E-02 G K
                   795.76 8.380E-04 % P 4.002E-02 1.15E-02 G
                   569.29-4.528E-02 % P 1.842E-01 5.38E-02 G
                   801.84-1.343E-02 & P 3.593E-01 1.01E-01 G

CS-137       5.3109E-02
                   661.62 5.311E-02 *(P 4.082E-02 1.59E-02 G

CE-139       1.1653E-02
                   165.85 1.165E-02 &(  4.289E-02 1.29E-02 G

EU-152       1.1657E-03
                   121.78 1.166E-03 %(P 1.437E-01 4.28E-02 G K
                   344.30-1.817E-02 % P 1.066E-01 3.16E-02 G
                  1408.08-1.252E-03 %   1.404E-01 3.84E-02 G
                   964.00 1.609E-01 & P 3.399E-01 1.03E-01 G
                  1112.07 5.281E-03 &   2.414E-01 6.78E-02 G
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778.90 1.463E-02 % 2.160E-01 6.16E-02 G

EU-154 2.2707E-02

123.10 2.271E-02 %(9.722E-02 2.92E-02 G K

1274.80-5.900E-05 % 1.043E-01 2.93E-02 G

723.30-6.379E-02 & 2.126E-01 6.34E-02 G

1004.80 6.467E-02 % 1.918E-01 5.70E-02 G

EU-155 9.9913E-02

86.45 9.991E-02 &(2.270E-01 6.87E-02 G K

105.31 6.170E-02 % 2.134E-01 6.42E-02 G

HG-203 -7.6157E-03

279.17-7.616E-03 %(P 3.949E-02 1.18E-02 G K

72.87-3.395E-01 % P 1.893E+00 5.67E-01 G

70.83 1.308E-01 & 3.548E+00 1.06E+00 G

82.50-1.117E+00 % 3.127E+00 9.43E-01 G

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

TL-208       2.5416E-01
                   583.14 2.542E-01  (P 3.541E-02 1.75E-02 G
                   510.72 4.783E-01 + P 1.608E-01 6.85E-02 G

PB-212       7.4745E-01
                   238.63 7.190E-01  (P 8.020E-02 3.45E-02 G K
                                      Energy duplication
                    77.11 7.475E-01 } P 3.375E-01 9.24E-02 G
                    74.81 1.057E+00 + P 6.837E-01 2.20E-01 G

PB-214       4.0665E-01
                   351.99 4.070E-01  (P 6.446E-02 2.82E-02 G K
                   295.22 4.060E-01  (P 1.441E-01 5.41E-02 G
                                      Energy duplication
                    77.11 0.000E+00 } P 7.802E-01 0.00E+00 G
                   241.92 3.577E-01 %   5.212E-01 1.59E-01 G

BI-212       5.4168E-01
                   727.17 5.417E-01  (P 2.575E-01 1.02E-01 G K
                  1620.56 1.094E+00 + P 4.703E-01 2.64E-01 G
                   785.42 1.036E+00 %   1.503E+00 4.68E-01 G

BI-214       4.0244E-01
                   609.32 4.024E-01  (P 6.576E-02 3.19E-02 G K
                  1764.51 5.214E-01 + P 9.260E-02 6.75E-02 G
                  1120.28 6.261E-01 + P 2.788E-01 1.24E-01 G

RA-224       1.0147E+00
                   241.00 1.015E+00  (  9.564E-01 2.97E-01 G
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RA-226       1.1538E+00
                 185.99 1.154E+00  (P 9.877E-01 3.07E-01 G

AC-228       7.2509E-01
                 911.07 6.969E-01  (P 1.009E-01 5.32E-02 G K
                 968.90 1.153E+00 + P 2.175E-01 1.08E-01 G
                 338.40 7.932E-01  (P 2.536E-01 1.05E-01 G

TH-227       9.4934E-02
                 236.00 9.493E-02 %(  2.200E-01 6.65E-02 G K
                 256.25 7.636E-02 & P 4.533E-01 1.35E-01 G

PA-234      -2.4168E-02
                  98.44-2.417E-02 %(P 2.129E-01 6.36E-02 G K
                 946.00-3.763E-02 % P 1.648E-01 4.82E-02 G
                 131.28-2.353E-02 & P 2.022E-01 6.05E-02 G
                  94.67-1.561E-02 % P 3.638E-01 1.08E-01 G
                 883.24-1.648E-03 %   2.619E-01 7.41E-02 G
                 926.70-7.856E-02 &   3.281E-01 9.65E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	-6.706E-02	% P	2.730E-01	7.97E-02	G
TH-234	7.7129E-01						
		63.29	7.713E-01	&(P	6.213E+00	1.85E+00	G K
		92.80	8.379E-01	% P	2.036E+00	6.13E-01	G
		92.38	9.777E-01	% P	2.420E+00	7.29E-01	G
AM-241	-3.0951E-03						
		59.54	-3.095E-03	%(P	9.064E-01	2.68E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	1.5868E-01	1.6110E-01	2.7203E-01	2.7219E-01	2.929E-01
K-40		1.3905E+01	1.3905E+01	1.2325E+00	1.4734E+00	
MN-54	#A	-1.0699E-02	-1.0727E-02	3.0911E-02	3.0917E-02	3.295E-02
CO-57	#B	-7.3589E-03	-7.3810E-03	4.0964E-02	4.0967E-02	4.373E-02
CO-60	#B	5.8906E-03	5.8931E-03	2.9212E-02	2.9214E-02	3.442E-02

Sr-85	#A	-1.4087E-02	-1.4264E-02	3.7913E-02	3.7922E-02	4.156E-02
Kr-85	#A	-3.2519E+02	-3.2520E+02	8.6440E+02	8.6461E+02	9.594E+02
Y-88	#B	-4.7005E-03	-4.7363E-03	2.1656E-02	2.1658E-02	2.497E-02
NB-94	#B	-8.3370E-04	-8.3370E-04	2.9447E-02	2.9447E-02	3.436E-02
Ag-108M	#B	5.1272E-04	5.1273E-04	3.4375E-02	3.4375E-02	3.974E-02
CD-109	#A	0.0000E+00	0.0000E+00	1.6725E+00	1.6725E+00	1.867E+00
SN-113	#B	7.5057E-03	7.5586E-03	3.9763E-02	3.9766E-02	4.452E-02
SB-125	#B	7.6784E-02	7.6845E-02	6.7614E-02	6.7761E-02	1.003E-01
I-131	#B	7.9162E-03	8.7542E-03	3.2490E-02	3.2494E-02	3.296E-02
CS-134	#B	3.2241E-03	3.2275E-03	6.8646E-02	6.8647E-02	7.682E-02
CS-137	#	5.3105E-02	5.3109E-02	4.7718E-02	4.7818E-02	
CE-139	#A	1.1584E-02	1.1653E-02	3.8685E-02	3.8690E-02	4.264E-02
EU-152	#B	1.1655E-03	1.1657E-03	1.2838E-01	1.2838E-01	1.437E-01
EU-154	#B	2.2701E-02	2.2707E-02	8.7592E-02	8.7601E-02	9.720E-02
EU-155	#B	9.9869E-02	9.9913E-02	2.0624E-01	2.0631E-01	2.269E-01
HG-203	#B	-7.4846E-03	-7.6157E-03	3.5493E-02	3.5496E-02	3.881E-02
TL-208		2.5416E-01	2.5416E-01	5.2553E-02	5.4585E-02	
PB-212		7.4745E-01	7.4745E-01	1.0748E-01	1.1591E-01	
PB-214		4.0665E-01	4.0665E-01	8.4696E-02	8.7925E-02	
BI-212		5.4168E-01	5.4168E-01	3.0558E-01	3.0719E-01	
BI-214		4.0244E-01	4.0244E-01	9.5651E-02	9.8463E-02	
RA-224		1.0147E+00	1.0147E+00	8.9171E-01	8.9366E-01	9.564E-01
RA-226	#	1.1538E+00	1.1538E+00	9.2166E-01	9.2409E-01	9.877E-01
AC-228		7.2509E-01	7.2509E-01	1.6618E-01	1.7143E-01	
TH-227	#B	9.4934E-02	9.4934E-02	1.9949E-01	1.9957E-01	2.200E-01
PA-234	#B	-2.4168E-02	-2.4168E-02	2.1556E-01	2.1556E-01	2.129E-01
TH-234	#B	7.7129E-01	7.7129E-01	5.5612E+00	5.5613E+00	6.213E+00
AM-241	#A	-3.0951E-03	-3.0951E-03	2.6573E+00	2.6573E+00	9.064E-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 (86.4 to 2000.7 keV) 1.8050232E+01 pCi/gm

Total Decayed Activity (86.4 to 2000.7 keV) 1.8050236E+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_31AUG2005_1321.An1

Sample description

FSS-NOL-06-01-032-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_31AUG2005_1321.An1

Acquisition information

Start time:	31-Aug-2005 13:21:51
Live time:	2000
Real time:	2002
Dead time:	0.09 %
Detector ID:	4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb

Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created:	08-Aug-2005 11:09:41
Zero offset:	0.409 keV
Gain:	0.500 keV/channel
Quadratic:	1.092E-08 keV/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: 1.7000E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7000E+03) =
5.8824E+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	30-Aug-2005 10:22:00
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: 0.3318

***** 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	104.	25.07	0.99	9.052E-03	74.81	9.600	9.552E-01	PB212
77.13	161.	14.20	0.99	1.011E-02	77.11	17.500	9.390E-01	PB212
129.76	104.	29.42	1.42	2.445E-02				
186.13	167.	19.53	1.30	2.566E-02	185.99	3.280	1.455E+00	RA226
238.83	951.	3.91	1.09	2.319E-02	238.63	43.100	7.466E-01	PB212
241.84	136.	17.81	1.10	2.303E-02	241.00	3.900	1.204E+00	RA224
					241.92	7.470	6.301E-01	PB214

294.98	195.	15.87	1.16	2.026E-02	295.22	19.200	3.912E-01	PB214
300.51	70.	32.54	0.94	1.999E-02				
338.06	232.	12.60	1.08	1.832E-02	338.40	12.010	8.336E-01	AC228
351.77	389.	8.50	1.08	1.776E-02	351.99	37.100	4.627E-01	PB214
462.83	74.	27.18	1.38	1.426E-02				
462.83	74.	27.18	1.38	1.426E-02	463.51	10.000	4.072E-01	SB125
510.83	139.	14.95	1.29	1.317E-02	510.72	22.500	3.018E-01	TL208
583.03	326.	7.27	1.52	1.185E-02	583.14	86.000	2.513E-01	TL208
608.94	309.	8.57	1.25	1.144E-02	609.32	46.090	4.558E-01	BI214
661.00	50.	28.81	1.24	1.073E-02				
661.00	50.	28.81	1.24	1.073E-02	661.62	84.620	4.224E-02	CS137
726.66	80.	18.87	1.87	9.970E-03	727.17	11.800	5.402E-01	BI212
794.47	40.	33.14	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
910.75	242.	7.82	1.51	8.404E-03	911.07	29.000	7.792E-01	AC228
963.87	46.	24.24	1.54	8.055E-03	964.00	14.580	PBC<MDA	EU152
968.64	136.	9.97	1.54	8.026E-03	968.90	17.460	7.680E-01	AC228
1120.21	81.	27.17	1.20	7.212E-03	1120.28	15.040	5.798E-01	BI214
1460.24	1168.	2.95	1.85	5.934E-03	1460.75	10.700	1.440E+01	K40
1763.87	58.	12.80	1.29	5.142E-03	1764.51	15.920	5.606E-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	198.	70.	0.035	97.63	0.936	PB-212
1926.76	964.09	40.	46.	0.023	72.73	1.538	EU-152 ID

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	313.	104.	0.052	75.21	0.993D
PB-212	153.39	77.11	305.	161.	0.081	42.61	0.995A
RA-226	371.36	186.10	551.	152.	0.076	63.96	1.500s
PB-212	476.82	238.83	559.	910.	0.455	15.58	1.000
RA-224	482.95	241.90	610.	120.	0.060	91.52	1.500
PB-214	482.80	241.82	245.	75.	0.038	88.68	1.106
PB-214	589.10	294.98	278.	191.	0.096	47.61	1.164
AC-228	675.26	338.06	222.	231.	0.115	37.80	1.083
PB-214	702.67	351.77	226.	383.	0.192	25.50	1.082
SB-125	924.65	462.76	106.	70.	0.035	70.80	1.500s

TL-208	1020.78	510.83	135.	113.	0.056	44.84	1.294s
TL-208	1165.17	583.03	86.	322.	0.161	21.82	1.515s
Bl-214	1216.97	608.94	122.	302.	0.151	25.71	1.254s
CS-137	1321.37	661.14	85.	48.	0.024	89.72	1.500
Bl-212	1452.39	726.66	58.	80.	0.040	56.61	1.871s
CS-134	1588.00	794.47	67.	40.	0.020	99.41	1.500s
AC-228	1820.52	910.75	48.	239.	0.119	23.46	1.508
AC-228	1935.27	968.13	65.	207.	0.104	30.61	1.377
Bl-214	2239.39	1120.21	98.	79.	0.040	81.50	1.195s
K-40	2919.35	1460.24	25.	1150.	0.575	8.86	1.852
Bl-214	3526.49	1763.87	3.	58.	0.029	38.41	1.286s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		9.1278E-02					
			477.56	9.128E-02	%(	3.156E-01	9.39E-02 G
K-40		1.4398E+01					
			1460.75	1.440E+01	(P	3.276E-01	4.32E-01 G
MN-54		-3.1789E-04					
			834.81	-3.179E-04	%(P	4.882E-02	1.41E-02 G
CO-57		-8.5612E-03					
			122.07	-8.561E-03	%(P	5.151E-02	1.54E-02 G K
			136.43	-1.549E-02	%	3.909E-01	1.16E-01 G
CO-60		7.8293E-03					
			1332.51	7.829E-03	%(P	3.452E-02	9.74E-03 G K
			1173.23	2.075E-02	& P	4.473E-02	1.34E-02 G K
Sr-85		-1.8850E-02					
			514.00	-1.885E-02	%(	4.640E-02	1.40E-02 G
Kr-85		-4.2995E+02					
			513.99	-4.299E+02	%(	1.058E+03	3.19E+02 G
Y-88		2.7764E-03					
			1836.01	2.776E-03	%(P	2.459E-02	6.48E-03 G K

898.02 1.714E-02 % P 3.226E-02 9.84E-03 G

NB-94 1.5229E-02

871.10 1.523E-02 %(2.824E-02 8.66E-03 G K

702.50 1.758E-04 & 3.633E-02 1.04E-02 G K

Ag-108M -1.5734E-02

722.95-1.573E-02 %(4.720E-02 1.41E-02 G K

614.37 2.146E-04 & P 3.336E-02 9.49E-03 G

433.93 1.253E-03 & 3.648E-02 1.06E-02 G

CD-109 1.7226E-01

88.04 1.723E-01 %(1.912E+00 5.71E-01 G

SN-113 1.4216E-02

391.71 1.422E-02 %(5.079E-02 1.51E-02 G K

255.04-2.827E-01 % 1.598E+00 4.76E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0915E-01						
		427.95	1.473E-02	&(P	1.004E-01	2.95E-02	G K
		600.77	4.240E-02	% P	1.662E-01	4.90E-02	G
		636.15	-6.037E-02	% P	3.230E-01	9.44E-02	G
		463.51	3.886E-01	*(P	2.827E-01	9.34E-02	G
		176.29	1.379E-02	%	5.356E-01	1.59E-01	G
I-131	-4.2700E-04						
		364.48	-4.270E-04	%(P	4.823E-02	1.41E-02	G K
		636.97	-1.161E-02	&	5.747E-01	1.66E-01	G
		284.29	-3.395E-02	& P	5.334E-01	1.57E-01	G
CS-134	9.5769E-03						
		604.66	-1.682E-02	%(	4.316E-02	1.30E-02	G K
		795.76	3.975E-02	*(P	4.093E-02	1.32E-02	G
		569.29	-6.203E-03	% P	1.984E-01	5.62E-02	G
		801.84	-7.868E-02	& P	4.452E-01	1.28E-01	G
CS-137	4.1865E-02						
		661.62	4.186E-02	(P	4.000E-02	1.29E-02	G
CE-139	2.4273E-05						
		165.85	2.427E-05	%(	4.736E-02	1.41E-02	G
EU-152	-2.5239E-02						
		121.78	-2.524E-02	%(P	1.507E-01	4.51E-02	G K
		344.30	3.473E-02	% P	8.796E-02	2.64E-02	G
		1408.08	7.401E-02	%	1.384E-01	4.27E-02	G
		964.00	2.109E-01	& P	3.212E-01	9.92E-02	G
		1112.07	-4.109E-02	%	3.179E-01	9.17E-02	G

778.90 0.000E+00 % 3.298E-01 9.48E-02 G

EU-154 -1.7243E-02

123.10-1.724E-02 %(1.055E-01 3.15E-02 G K

1274.80 3.593E-03 % 1.092E-01 3.05E-02 G

723.30-5.723E-02 % 2.172E-01 6.44E-02 G

1004.80 1.548E-02 % 1.889E-01 5.34E-02 G

EU-155 1.0331E-01

86.45 1.033E-01 %(2.366E-01 7.16E-02 G K

105.31 1.350E-02 % 2.385E-01 7.11E-02 G

HG-203 8.1299E-03

279.17 8.130E-03 &(P 4.156E-02 1.24E-02 G K

72.87-8.002E-01 % P 2.377E+00 7.17E-01 G

70.83 6.920E-01 % 4.162E+00 1.25E+00 G

82.50-5.262E-01 % 3.450E+00 1.03E+00 G

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

TL-208       2.6175E-01
                   583.14 2.513E-01 @(P 3.584E-02 1.85E-02 G
                   510.72 3.018E-01 *(P 1.527E-01 5.58E-02 G

PB-212       7.2310E-01
                   238.63 7.231E-01  (P 8.978E-02 3.81E-02 G K
                                      Energy duplication
                    77.11 7.231E-01 } P 3.776E-01 1.03E-01 G
                    74.81 9.552E-01 + P 7.785E-01 2.47E-01 G

PB-214       4.3832E-01
                   351.99 4.627E-01  (P 8.775E-02 3.99E-02 G K
                   295.22 3.912E-01  (P 1.643E-01 6.34E-02 G
                                      Energy duplication
                    77.11 2.370E-01 } P 6.990E-01 1.46E-01 G
                   241.92 3.467E-01 -   3.497E-01 1.02E-01 G

BI-212       5.4019E-01
                   727.17 5.402E-01 *(P 2.584E-01 1.03E-01 G K
                  1620.56 4.127E-01 % P 8.012E-01 2.48E-01 G
                   785.42 5.485E-01 %   1.687E+00 5.01E-01 G

BI-214       5.0166E-01
                   609.32 4.558E-01 @(P 8.158E-02 3.99E-02 G K
                  1764.51 5.606E-01  (P 1.082E-01 7.58E-02 G
                  1120.28 5.798E-01 @(P 3.578E-01 1.61E-01 G

RA-224       1.0603E+00
                   241.00 1.060E+00  (  1.041E+00 3.23E-01 G
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RA-226       1.4387E+00
                 185.99 1.439E+00  (P 1.059E+00 3.33E-01 G

AC-228       7.9517E-01
                 911.07 7.792E-01  (P 1.144E-01 6.18E-02 G K
                 968.90 1.175E+00 + P 2.284E-01 1.20E-01 G
                 338.40 8.336E-01  (P 2.612E-01 1.05E-01 G

TH-227      -1.2894E-01
                 236.00-1.289E-01 &(  3.847E-01 1.16E-01 G K
                 256.25-7.448E-03 & P 3.599E-01 1.05E-01 G

PA-234      -1.6832E-02
                  98.44-1.683E-02 %(P 2.329E-01 6.94E-02 G K
                 946.00 6.611E-02 & P 1.445E-01 4.37E-02 G
                 131.28-8.552E-02 & P 1.726E-01 5.23E-02 G
                  94.67-3.139E-03 % P 3.516E-01 1.04E-01 G
                 883.24 9.621E-02 %   2.541E-01 7.58E-02 G
                 926.70 3.841E-02 &   2.325E-01 6.60E-02 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments

569.26-8.127E-03 % P 2.938E-01 8.33E-02 G

TH-234 4.4796E-01

63.29 4.480E-01 &(P 6.445E+00 1.91E+00 G K

92.80 1.080E+00 % P 2.192E+00 6.62E-01 G

92.38 1.283E+00 % P 2.586E+00 7.81E-01 G

AM-241 -1.4119E-01

59.54-1.412E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	8.9955E-02	9.1278E-02	2.8180E-01	2.8185E-01	3.111E-01
K-40		1.4398E+01	1.4398E+01	1.2958E+00	1.5420E+00	
MN-54	#A	-3.1710E-04	-3.1789E-04	3.0194E-02	3.0194E-02	4.870E-02
CO-57	#B	-8.5365E-03	-8.5612E-03	4.8121E-02	4.8123E-02	5.137E-02
CO-60	#B	7.8261E-03	7.8293E-03	2.9224E-02	2.9227E-02	3.451E-02

Sr-85 #A	-1.8625E-02	-1.8850E-02	4.1985E-02	4.2000E-02	4.584E-02
Kr-85 #A	-4.2995E+02	-4.2995E+02	9.5768E+02	9.5800E+02	1.058E+03
Y-88 #B	2.7562E-03	2.7764E-03	1.9430E-02	1.9430E-02	2.441E-02
NB-94 #B	1.5229E-02	1.5229E-02	2.5990E-02	2.6005E-02	2.824E-02
Ag-108M#B	-1.5733E-02	-1.5734E-02	4.2306E-02	4.2316E-02	4.720E-02
CD-109 #A	1.7196E-01	1.7226E-01	1.7117E+00	1.7117E+00	1.908E+00
SN-113 #B	1.4120E-02	1.4216E-02	4.5447E-02	4.5454E-02	5.045E-02
SB-125 #F	1.0906E-01	1.0915E-01	7.8691E-02	7.8945E-02	1.003E-01
I-131 #B	-3.8754E-04	-4.2700E-04	5.7902E-02	5.7902E-02	4.377E-02
CS-134 #B	9.5670E-03	9.5769E-03	9.5412E-03	9.5574E-03	4.311E-02
CS-137 #	4.1862E-02	4.1865E-02	3.8652E-02	3.8729E-02	4.000E-02
CE-139 #A	2.4136E-05	2.4273E-05	4.2174E-02	4.2174E-02	4.709E-02
EU-152 #B	-2.5235E-02	-2.5239E-02	1.4762E-01	1.4763E-01	1.507E-01
EU-154 #B	-1.7239E-02	-1.7243E-02	9.4643E-02	9.4648E-02	1.054E-01
EU-155 #B	1.0327E-01	1.0331E-01	2.1495E-01	2.1503E-01	2.365E-01
HG-203 #B	7.9950E-03	8.1299E-03	3.7145E-02	3.7148E-02	4.087E-02
TL-208 #	2.6175E-01	2.6175E-01	5.7877E-02	5.9839E-02	
PB-212	7.2310E-01	7.2310E-01	1.1414E-01	1.2162E-01	
PB-214	4.3832E-01	4.3832E-01	1.1340E-01	1.1622E-01	
BI-212 #	5.4019E-01	5.4019E-01	3.0769E-01	3.0928E-01	
BI-214 #	5.0166E-01	5.0166E-01	1.3175E-01	1.3493E-01	
RA-224	1.0603E+00	1.0603E+00	9.7041E-01	9.7236E-01	1.041E+00
RA-226 #	1.4387E+00	1.4387E+00	9.9844E-01	1.0019E+00	1.059E+00
AC-228	7.9517E-01	7.9517E-01	1.7817E-01	1.8406E-01	
TH-227 #B	-1.2894E-01	-1.2894E-01	3.4788E-01	3.4796E-01	3.847E-01
PA-234 #B	-1.6832E-02	-1.6832E-02	2.5544E-01	2.5544E-01	2.329E-01
TH-234 #B	4.4796E-01	4.4796E-01	5.7401E+00	5.7401E+00	6.445E+00
AM-241 #A	-1.4119E-01	-1.4119E-01	1.0476E+00	1.0476E+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 (86.9 to 2000.7 keV) 1.8718807E+01 pCi/gm

Total Decayed Activity (86.9 to 2000.7 keV) 1.8718807E+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_31AUG2005_1359.An1

Sample description

FSS-NOL-06-01-028-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_31AUG2005_1359.An1

Acquisition information

Start time:	31-Aug-2005 13:59:44
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: 1.7500E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7500E+03) =
5.7143E+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	30-Aug-2005 08:55:00
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: 0.2192

***** 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	126.	21.95	0.99	9.052E-03	74.81	9.600	1.118E+00	PB212
77.14	110.	22.66	0.99	1.011E-02	77.11	17.500	7.268E-01	PB212
					77.11	10.700	1.189E+00	PB214
93.03	90.	40.64	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.03	95.	38.28	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234

186.25	120.	29.10	1.72	2.566E-02	185.99	3.280	PBC<MDA RA226
209.56	117.	25.85	1.05	2.470E-02			
238.83	989.	3.70	1.09	2.319E-02	238.63	43.100	7.548E-01 PB212
241.61	143.	20.92	1.09	2.304E-02	241.00	3.900	1.225E+00 RA224
					241.92	7.470	6.408E-01 PB214
270.36	108.	27.54	1.25	2.150E-02			
277.61	53.	39.78	0.70	2.113E-02			
295.16	281.	10.21	1.22	2.025E-02	295.22	19.200	5.493E-01 PB214
300.46	69.	34.80	0.94	2.000E-02			
327.60	73.	33.92	0.87	1.876E-02			
338.20	236.	13.42	1.14	1.831E-02	338.40	12.010	8.249E-01 AC228
351.76	401.	7.19	1.13	1.776E-02	351.99	37.100	4.638E-01 PB214
463.06	72.	33.51	0.92	1.426E-02			
463.06	72.	33.51	0.92	1.426E-02	463.51	10.000	3.837E-01 SB125
510.75	117.	17.93	1.28	1.317E-02	510.72	22.500	2.359E-01 TL208
582.96	374.	7.36	1.32	1.185E-02	583.14	86.000	2.803E-01 TL208
609.02	296.	9.58	1.29	1.144E-02	609.32	46.090	4.240E-01 BI214
726.86	98.	19.09	1.59	9.968E-03	727.17	11.800	6.403E-01 BI212
767.58	65.	35.52	1.00	9.560E-03			
794.69	71.	21.65	1.23	9.311E-03			
794.69	71.	21.65	1.23	9.311E-03	795.76	85.400	6.901E-02 CS134
860.13	31.	40.59	0.93	8.771E-03			
910.94	264.	7.77	1.51	8.402E-03	911.07	29.000	8.248E-01 AC228
964.14	60.	18.88	1.54	8.055E-03	964.00	14.580	3.882E-01 EU152
968.57	161.	9.44	1.54	8.028E-03	968.90	17.460	8.845E-01 AC228
1119.91	75.	17.68	1.35	7.214E-03	1120.28	15.040	5.205E-01 BI214
1460.26	1172.	2.98	1.86	5.933E-03	1460.75	10.700	1.402E+01 K40
1763.51	62.	12.70	1.53	5.144E-03	1764.51	15.920	5.540E-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
418.28	209.56	361.	117.	0.058	77.54	1.047	AC-228 s
539.88	270.36	308.	108.	0.054	82.61	1.247	AC-228
600.06	300.46	213.	69.	0.035	104.40	0.941	PB-212 s
654.35	327.60	216.	73.	0.036	101.75	0.865	AC-228
1534.21	767.58	127.	65.	0.033	106.55	0.998	BI-214 sM
1719.30	860.13	55.	31.	0.016	121.77	0.932	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	148.79	74.81	339.	126.	0.063	65.86	0.993D
PB-212	153.39	77.11	319.	110.	0.055	67.99	0.995A
RA-226	371.54	186.19	680.	112.	0.056	91.91	1.500s
PB-212	476.42	238.63	186.	978.	0.489	11.08	1.093D
PB-214	483.00	241.92	299.	109.	0.055	52.60	1.095A

PB-214	589.47	295.16	229.	277.	0.138	30.64	1.218
AC-228	675.53	338.20	265.	235.	0.117	40.25	1.142
PB-214	702.66	351.76	165.	396.	0.198	21.58	1.134
SB-125	924.74	462.81	121.	60.	0.030	84.81	1.500s
TL-208	1020.62	510.75	151.	91.	0.045	53.80	1.276s
TL-208	1165.01	582.96	132.	370.	0.185	22.08	1.316
BI-214	1217.13	609.02	151.	290.	0.145	28.73	1.285s
BI-212	1452.80	726.86	84.	98.	0.049	57.27	1.591s
CS-134	1588.52	794.73	42.	50.	0.025	69.32	1.500
AC-228	1820.91	910.94	54.	260.	0.130	23.32	1.514
EU-152	1927.28	964.13	107.	41.	0.020	116.23	1.538
AC-228	1935.88	968.43	98.	213.	0.106	34.08	1.262
BI-214	2238.80	1119.91	44.	73.	0.037	53.04	1.350s
K-40	2919.39	1460.26	32.	1153.	0.576	8.95	1.863
BI-214	3525.78	1763.51	3.	59.	0.029	38.10	1.532

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		7.6075E-04					
			477.56	7.607E-04	&(	2.252E-01	6.39E-02 G
K-40		1.4025E+01					
			1460.75	1.402E+01	(P	3.548E-01	4.25E-01 G
MN-54		1.5978E-02					
			834.81	1.598E-02	%(P	4.002E-02	1.20E-02 G
CO-57		6.6979E-03					
			122.07	6.698E-03	&(P	5.146E-02	1.54E-02 G K
			136.43	-1.267E-01	%	4.175E-01	1.26E-01 G
CO-60		-3.2209E-03					
			1332.51	-3.221E-03	%(P	3.856E-02	1.03E-02 G K
			1173.23	-2.323E-03	% P	4.913E-02	1.38E-02 G K
Sr-85		-1.5652E-02					
			514.00	-1.565E-02	%(	4.316E-02	1.30E-02 G
Kr-85		-3.5668E+02					
			513.99	-3.567E+02	%(	9.835E+02	2.96E+02 G
Y-88		-9.8945E-05					
			1836.01	-9.894E-05	&(P	4.134E-02	1.12E-02 G K

898.02 7.120E-03 & P 3.679E-02 1.07E-02 G

NB-94 7.2474E-03

871.10 7.247E-03 %(3.166E-02 9.23E-03 G K

702.50 1.228E-02 % 3.080E-02 9.24E-03 G K

Ag-108M 2.7223E-03

722.95 2.722E-03 %(7.276E-02 2.14E-02 G K

614.37-8.178E-03 % P 3.975E-02 1.17E-02 G

433.93-5.476E-04 % 3.266E-02 9.46E-03 G

CD-109 1.6565E-01

88.04 1.657E-01 &(1.610E+00 4.80E-01 G

SN-113 -1.8127E-04

391.71-1.813E-04 %(4.762E-02 1.38E-02 G K

255.04-1.886E-01 & 1.470E+00 4.36E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.6987E-02						
		427.95	6.225E-03	&(P	1.102E-01	3.22E-02	G K
		600.77	-3.673E-02	% P	1.946E-01	5.72E-02	G
		636.15	-6.560E-02	% P	2.917E-01	8.54E-02	G
		463.51	3.260E-01	@(P	2.929E-01	9.41E-02	G
		176.29	-3.301E-02	&	6.010E-01	1.79E-01	G
I-131	9.5895E-03						
		364.48	9.589E-03	%(P	3.900E-02	1.16E-02	G K
		636.97	-1.191E-01	%	4.776E-01	1.41E-01	G
		284.29	-1.197E-01	& P	6.033E-01	1.80E-01	G
CS-134	2.3307E-02						
		604.66	1.216E-03	%(	4.034E-02	1.17E-02	G K
		795.76	4.855E-02	(P	3.195E-02	1.12E-02	G
		569.29	2.422E-03	% P	2.230E-01	6.41E-02	G
		801.84	7.882E-02	& P	3.152E-01	9.12E-02	G
CS-137	1.1994E-02						
		661.62	1.199E-02	%(P	4.005E-02	1.18E-02	G
CE-139	1.5806E-02						
		165.85	1.581E-02	%(	4.331E-02	1.31E-02	G
EU-152	1.0136E-01						
		121.78	1.879E-02	&(P	1.505E-01	4.50E-02	G K
		344.30	-1.460E-02	% P	1.097E-01	3.23E-02	G
		1408.08	2.083E-02	%	1.376E-01	3.85E-02	G
		964.00	2.670E-01	&(P	3.348E-01	1.05E-01	G
		1112.07	-5.004E-02	&	3.396E-01	9.86E-02	G

778.90 0.000E+00 & 2.626E-01 7.45E-02 G

EU-154 1.0348E-02

123.10 1.035E-02 %(1.080E-01 3.22E-02 G K

1274.80-3.212E-04 % 7.602E-02 2.04E-02 G

723.30-9.941E-02 % 2.554E-01 7.69E-02 G

1004.80 2.870E-03 % 1.749E-01 4.86E-02 G

EU-155 3.5616E-03

86.45 3.562E-03 %(2.511E-01 7.49E-02 G K

105.31 5.641E-02 % 2.292E-01 6.88E-02 G

HG-203 -6.9670E-03

279.17-6.967E-03 &(P 4.260E-02 1.27E-02 G K

72.87-2.506E-01 % P 2.197E+00 6.57E-01 G

70.83 0.000E+00 & 4.822E+00 1.44E+00 G

82.50-6.332E-01 % 3.358E+00 1.00E+00 G

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

TL-208       2.8025E-01
                   583.14 2.803E-01  (P 4.269E-02 2.09E-02 G
                   510.72 2.359E-01 - P 1.565E-01 5.48E-02 G

PB-212       7.4720E-01
                   238.63 7.555E-01  (P 5.112E-02 2.82E-02 G K
                                          Energy duplication
                    77.11 4.801E-01 } P 3.752E-01 1.09E-01 G
                    74.81 1.118E+00 + P 7.867E-01 2.52E-01 G

PB-214       4.9293E-01
                   351.99 4.638E-01  (P 7.345E-02 3.38E-02 G K
                   295.22 5.493E-01  (P 1.456E-01 5.69E-02 G
                                          Energy duplication
                    77.11 3.829E-01 } P 9.316E-01 2.16E-01 G
                   241.92 4.905E-01 }   3.741E-01 8.60E-02 G

BI-212       6.4034E-01
                   727.17 6.403E-01 *(P 2.991E-01 1.23E-01 G K
                  1620.56 2.566E-01 % P 8.813E-01 2.53E-01 G
                   785.42 9.861E-01 %   1.495E+00 4.66E-01 G

BI-214       4.4777E-01
                   609.32 4.240E-01 @(P 8.797E-02 4.15E-02 G K
                  1764.51 5.540E-01 + P 1.051E-01 7.42E-02 G
                  1120.28 5.205E-01  (P 2.391E-01 9.44E-02 G

RA-224       7.4984E-01
                                          Derived Ave Activity
                   241.00 7.498E-01 }(  1.202E+00 3.78E-01 G
```

```
RA-226       1.0247E+00
                 185.99 1.025E+00 *(P 1.139E+00 3.50E-01 G

AC-228       8.2484E-01
                 911.07 8.248E-01  (P 1.169E-01 6.49E-02 G K
                 968.90 1.173E+00 + P 2.693E-01 1.33E-01 G
                 338.40 8.249E-01  (P 2.761E-01 1.11E-01 G

TH-227      -1.1294E-01
                 236.00-1.129E-01 %(  3.525E-01 1.06E-01 G K
                 256.25-4.723E-02 % P 4.660E-01 1.38E-01 G

PA-234      -1.8918E-02
                  98.44-1.892E-02 %(P 1.872E-01 5.56E-02 G K
                 946.00-3.161E-02 % P 1.777E-01 5.15E-02 G
                 131.28-4.790E-02 & P 2.212E-01 6.64E-02 G
                  94.67-9.934E-04 & P 3.989E-01 1.19E-01 G
                 883.24 5.784E-02 &   2.867E-01 8.35E-02 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
926.70-6.314E-02 % 2.754E-01 8.00E-02 G
569.26 3.684E-03 % P 3.304E-01 9.50E-02 G

TH-234 1.5477E+00
63.29 1.548E+00 %(P 6.508E+00 1.95E+00 G K
92.80 1.485E+00 % P 2.218E+00 6.74E-01 G
92.38 1.655E+00 & P 2.651E+00 8.05E-01 G

AM-241 -4.2132E-01
59.54-4.213E-01 &(P 1.124E+00 3.39E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	7.4888E-04	7.6075E-04	1.9160E-01	1.9160E-01	2.217E-01
K-40		1.4025E+01	1.4025E+01	1.2756E+00	1.5133E+00	
MN-54	#A	1.5935E-02	1.5978E-02	3.6037E-02	3.6049E-02	3.991E-02
CO-57	#B	6.6771E-03	6.6979E-03	4.6142E-02	4.6144E-02	5.130E-02

CO-60	#B	-3.2195E-03	-3.2209E-03	1.6402E-01	1.6402E-01	3.854E-02
Sr-85	#A	-1.5450E-02	-1.5652E-02	3.8911E-02	3.8922E-02	4.260E-02
Kr-85	#A	-3.5668E+02	-3.5668E+02	8.8675E+02	8.8699E+02	9.835E+02
Y-88	#B	-9.8168E-05	-9.8945E-05	4.2470E-03	4.2470E-03	4.102E-02
NB-94	#B	7.2474E-03	7.2474E-03	2.7703E-02	2.7706E-02	3.166E-02
Ag-108M	#B	2.7222E-03	2.7223E-03	6.4305E-02	6.4305E-02	7.276E-02
CD-109	#A	1.6534E-01	1.6565E-01	1.4392E+00	1.4392E+00	1.607E+00
SN-113	#B	-1.7996E-04	-1.8127E-04	4.1538E-02	4.1538E-02	4.727E-02
SB-125	#B	8.6915E-02	8.6987E-02	7.5343E-02	7.5512E-02	1.101E-01
I-131	#B	8.6383E-03	9.5895E-03	3.4735E-02	3.4740E-02	3.513E-02
CS-134	#B	2.3281E-02	2.3307E-02	1.6185E-02	1.6241E-02	4.029E-02
CS-137	#A	1.1993E-02	1.1994E-02	3.5546E-02	3.5553E-02	4.005E-02
CE-139	#A	1.5710E-02	1.5806E-02	3.9194E-02	3.9205E-02	4.305E-02
EU-152	#B	1.0134E-01	1.0136E-01	1.1939E-01	1.1953E-01	1.505E-01
EU-154	#B	1.0345E-02	1.0348E-02	9.6711E-02	9.6713E-02	1.080E-01
EU-155	#B	3.5599E-03	3.5616E-03	2.2456E-01	2.2456E-01	2.509E-01
HG-203	#B	-6.8426E-03	-6.9670E-03	3.8224E-02	3.8226E-02	4.184E-02
TL-208		2.8025E-01	2.8025E-01	6.2613E-02	6.4692E-02	
PB-212		7.4720E-01	7.4720E-01	8.3801E-02	9.4364E-02	
PB-214		4.9293E-01	4.9293E-01	9.3715E-02	9.7987E-02	
BI-212	#	6.4034E-01	6.4034E-01	3.6858E-01	3.7045E-01	
BI-214		4.4777E-01	4.4777E-01	1.3152E-01	1.3406E-01	
RA-224	A	7.4984E-01	7.4984E-01	1.1105E+00	1.1114E+00	
RA-226	#A	1.0247E+00	1.0247E+00	1.0510E+00	1.0527E+00	1.139E+00
AC-228		8.2484E-01	8.2484E-01	1.9315E-01	1.9900E-01	
TH-227	#B	-1.1294E-01	-1.1294E-01	3.1842E-01	3.1849E-01	3.525E-01
PA-234	#B	-1.8918E-02	-1.8918E-02	1.9915E-01	1.9916E-01	1.872E-01
TH-234	#B	1.5477E+00	1.5477E+00	5.8461E+00	5.8467E+00	6.508E+00
AM-241	#A	-4.2132E-01	-4.2132E-01	1.0264E+00	1.0266E+00	1.124E+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) 1.8207802E+01 pCi/gm

Total Decayed Activity (269.9 to 2000.7 keV) 1.8207802E+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_+6SEPT2005_1308.An1

Sample description

FSS-NOL-06-01-046-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_+6SEPT2005_1308.An1

Acquisition information

Start time:	06-Sep-2005 13:09:23
Live time:	2000
Real time:	2002
Dead time:	0.09 %
Detector ID:	4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb

Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created:	08-Aug-2005 11:09:41
Zero offset:	0.409 keV
Gain:	0.500 keV/channel
Quadratic:	1.092E-08 keV/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: 1.9360E+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	31-Aug-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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2223

***** 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	95.	27.74	0.99	9.052E-03	74.81	9.600	7.667E-01	PB212
77.13	129.	18.54	0.99	1.011E-02	77.11	17.500	6.328E-01	PB212
					77.11	10.700	1.035E+00	PB214
128.45	87.	40.94	0.60	2.430E-02				
186.01	146.	25.10	1.37	2.567E-02	185.99	3.280	1.099E+00	RA226
209.55	115.	32.41	0.76	2.470E-02				
238.81	873.	4.07	1.09	2.319E-02	238.63	43.100	6.010E-01	PB212

241.54	129.	23.41	1.09	2.305E-02	241.00	3.900	1.003E+00	RA224
					241.92	7.470	5.250E-01	PB214
269.91	76.	32.41	1.37	2.153E-02				
295.14	217.	12.47	1.09	2.025E-02	295.22	19.200	3.820E-01	PB214
300.12	68.	29.72	1.44	2.001E-02				
327.80	60.	32.39	1.12	1.875E-02				
338.12	205.	11.63	1.19	1.831E-02	338.40	12.010	6.466E-01	AC228
351.63	426.	7.12	1.07	1.777E-02	351.99	37.100	4.459E-01	PB214
462.89	83.	22.96	0.98	1.426E-02				
462.89	83.	22.96	0.98	1.426E-02	463.51	10.000	4.011E-01	SB125
510.28	156.	17.00	1.44	1.318E-02	510.72	22.500	3.058E-01	TL208
582.99	315.	9.27	0.93	1.185E-02	583.14	86.000	2.130E-01	TL208
609.08	326.	6.88	1.41	1.144E-02	609.32	46.090	4.224E-01	BI214
661.30	29.	41.32	1.50	1.072E-02	661.62	84.620	PBC<MDA	CS137
726.71	84.	23.78	1.35	9.970E-03	727.17	11.800	4.957E-01	BI212
794.75	41.	36.55	1.63	9.310E-03				
794.75	41.	36.55	1.63	9.310E-03	795.76	85.400	PBC<MDA	CS134
860.50	51.	25.68	1.70	8.768E-03				
910.79	252.	9.32	1.57	8.403E-03	911.07	29.000	7.123E-01	AC228
968.37	160.	12.48	1.58	8.029E-03	964.00	14.580	9.496E-01	EU152
					968.90	17.460	7.973E-01	AC228
1119.93	71.	17.87	1.40	7.213E-03	1120.28	15.040	4.460E-01	BI214
1460.21	1059.	3.13	1.75	5.934E-03	1460.75	10.700	1.144E+01	K40
1764.03	64.	13.94	1.70	5.143E-03	1764.51	15.920	5.144E-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
418.27	209.55	486.	115.	0.057	97.22	0.756	AC-228
538.97	269.91	233.	76.	0.038	97.23	1.371	AC-228 s
599.38	300.12	160.	68.	0.034	89.16	1.436	PB-212 s
654.75	327.80	148.	60.	0.030	97.16	1.124	AC-228
1588.55	794.75	66.	43.	0.022	92.03	1.633	AC-228
1720.04	860.50	44.	51.	0.025	77.03	1.700	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	328.	95.	0.048	83.23	0.993D
PB-212	153.39	77.11	314.	129.	0.065	55.61	0.995A
RA-226	371.05	185.95	590.	123.	0.061	79.31	1.500s
PB-212	476.89	238.87	578.	794.	0.397	17.31	0.959
RA-224	482.55	241.70	618.	133.	0.066	83.54	1.500
PB-214	482.64	241.74	683.	95.	0.047	120.78	1.500s

PB-214	589.42	295.14	218.	213.	0.106	37.41	1.088
AC-228	675.38	338.12	158.	204.	0.102	34.88	1.187
PB-214	702.40	351.63	189.	421.	0.210	21.36	1.073
SB-125	924.77	462.82	106.	64.	0.032	75.69	1.500s
TL-208	1019.67	510.28	184.	130.	0.065	51.00	1.445s
TL-208	1165.09	582.99	150.	311.	0.155	27.82	0.934
CS-134	1199.64	600.27	-25.	-43.	-0.021	6.99	1.500s
BI-214	1217.27	609.08	77.	319.	0.160	20.64	1.412
BI-212	1452.49	726.71	90.	84.	0.042	71.34	1.345s
AC-228	1820.60	910.79	78.	249.	0.124	27.97	1.575
AC-228	1935.75	968.37	65.	160.	0.080	37.45	1.579
BI-214	2237.61	1119.32	52.	87.	0.043	54.23	1.433s
K-40	2919.28	1460.21	29.	1040.	0.520	9.38	1.751
BI-214	3526.82	1764.03	7.	60.	0.030	41.81	1.695

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.1288E-01					
			477.56	1.129E-01	%(	1.734E-01	5.41E-02 G
K-40		1.1436E+01					
			1460.75	1.144E+01	(P	3.063E-01	3.64E-01 G
MN-54		-5.5549E-04					
			834.81	-5.555E-04	&(P	3.345E-02	9.49E-03 G
CO-57		2.2339E-04					
			122.07	2.234E-04	%(P	4.880E-02	1.45E-02 G K
			136.43	-4.787E-02	%	3.524E-01	1.05E-01 G
CO-60		8.4798E-03					
			1332.51	8.480E-03	%(P	3.368E-02	9.64E-03 G K
			1173.23	1.389E-02	% P	3.935E-02	1.16E-02 G K
Sr-85		-1.5448E-02					
			514.00	-1.545E-02	%(	4.094E-02	1.23E-02 G
Kr-85		-3.3454E+02					
			513.99	-3.345E+02	%(	8.867E+02	2.67E+02 G
Y-88		-3.0228E-04					
			1836.01	-3.023E-04	&(P	3.125E-02	8.28E-03 G K

898.02-1.025E-03 % P 2.853E-02 7.87E-03 G

NB-94 -5.4464E-03

871.10-5.446E-03 &(3.261E-02 9.47E-03 G K

702.50 9.075E-03 % 2.948E-02 8.75E-03 G K

Ag-108M -1.0405E-02

722.95-1.040E-02 %(3.737E-02 1.11E-02 G K

614.37 1.456E-02 & P 2.328E-02 7.22E-03 G

433.93 3.482E-04 % 2.923E-02 8.46E-03 G

CD-109 7.7329E-01

88.04 7.733E-01 %(1.616E+00 4.90E-01 G

SN-113 1.5065E-02

391.71 1.506E-02 &(4.114E-02 1.23E-02 G K

255.04 3.746E-01 % 1.270E+00 3.80E-01 G

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

SB-125       7.4252E-02
                    427.95-7.615E-03 %(P 9.344E-02 2.73E-02 G K
                    600.77-1.366E-02 % P 1.428E-01 4.12E-02 G
                    636.15 2.188E-03 % P 2.681E-01 7.67E-02 G
                    463.51 3.166E-01 *(P 2.488E-01 8.15E-02 G
                    176.29-1.211E-01 %   5.201E-01 1.56E-01 G

I-131        6.6184E-03
                    364.48 6.618E-03 %(P 5.685E-02 1.67E-02 G K
                    636.97 3.170E-02 %   6.301E-01 1.81E-01 G
                    284.29-2.099E-01 % P 7.456E-01 2.23E-01 G

CS-134      -2.6824E-02
                    604.66-2.682E-02  (  4.605E-03 6.25E-04 G K
                    795.76-1.958E-03 % P 4.688E-02 1.36E-02 G
                    569.29-6.364E-03 % P 1.918E-01 5.47E-02 G
                    801.84-7.821E-02 & P 3.772E-01 1.09E-01 G

CS-137       2.2478E-02
                    661.62 2.248E-02 %(P 3.122E-02 9.73E-03 G

CE-139      -2.2179E-04
                    165.85-2.218E-04 &(  4.154E-02 1.23E-02 G

EU-152       1.1095E-04
                    121.78 1.109E-04 %(P 1.368E-01 4.07E-02 G K
                    344.30-1.311E-04 & P 1.053E-01 3.08E-02 G
                   1408.08 2.623E-02 %   1.461E-01 4.16E-02 G
                    964.00 1.153E-02 % P 3.234E-01 9.35E-02 G
                   1112.07-6.975E-02 %   2.907E-01 8.53E-02 G
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778.90 2.048E-02 & 1.932E-01 5.50E-02 G

EU-154 2.1938E-03

123.10 2.194E-03 &(9.523E-02 2.83E-02 G K

1274.80 1.249E-02 % 8.592E-02 2.44E-02 G

723.30-4.923E-02 % 1.699E-01 5.04E-02 G

1004.80 1.482E-02 % 1.575E-01 4.45E-02 G

EU-155 8.5410E-02

86.45 8.541E-02 %(2.051E-01 6.21E-02 G K

105.31 7.507E-02 % 2.070E-01 6.25E-02 G

HG-203 8.1807E-03

279.17 8.181E-03 &(P 3.591E-02 1.07E-02 G K

72.87-3.740E-01 % P 2.087E+00 6.25E-01 G

70.83-1.562E+00 & 4.194E+00 1.27E+00 G

82.50-3.160E-01 & 3.552E+00 1.06E+00 G

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

TL-208       2.1303E-01
                   583.14 2.130E-01  (P 4.098E-02 2.00E-02 G
                   510.72 3.058E-01 + P 1.553E-01 6.26E-02 G

PB-212       5.7719E-01
                   238.63 5.546E-01  (P 8.007E-02 3.25E-02 G K
                                        Energy duplication
                    77.11 5.100E-01 } P 3.361E-01 9.45E-02 G
                    74.81 7.667E-01 + P 6.992E-01 2.20E-01 G

PB-214       4.1956E-01
                   351.99 4.459E-01  (P 7.081E-02 3.22E-02 G K
                   295.22 3.820E-01  (P 1.285E-01 4.85E-02 G
                                        Energy duplication
                    77.11 4.575E-03 } P 8.189E-01 1.36E-01 G
                   241.92 3.853E-01  (  5.052E-01 1.55E-01 G

BI-212       4.9571E-01
                   727.17 4.957E-01 @(P 2.792E-01 1.19E-01 G K
                  1620.56 2.512E-01 % P 8.973E-01 2.58E-01 G
                   785.42 3.615E-01 %   1.426E+00 4.19E-01 G

BI-214       4.2236E-01
                   609.32 4.224E-01  (P 5.771E-02 2.96E-02 G K
                  1764.51 5.144E-01 + P 1.258E-01 7.56E-02 G
                  1120.28 5.567E-01 + P 2.347E-01 1.03E-01 G

RA-224       1.0310E+00
                   241.00 1.031E+00  (  9.200E-01 2.87E-01 G
```

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RA-226       1.0187E+00
                 185.99 1.019E+00 *(P 9.606E-01 2.98E-01 G

AC-228       7.2419E-01
                 911.07 7.123E-01  (P 1.260E-01 6.73E-02 G K
                 968.90 7.973E-01  (P 2.006E-01 9.96E-02 G
                 338.40 6.466E-01  (P 1.949E-01 7.55E-02 G

TH-227       0.0000E+00
                 236.00 0.000E+00 %(  3.915E-01 1.17E-01 G K
                 256.25-9.080E-02 & P 4.295E-01 1.28E-01 G

PA-234      -4.6297E-02
                  98.44-4.630E-02 &(P 1.871E-01 5.61E-02 G K
                 946.00 1.211E-02 % P 1.511E-01 4.29E-02 G
                 131.28-3.913E-03 & P 1.933E-01 5.75E-02 G
                  94.67 2.484E-03 & P 3.383E-01 1.01E-01 G
                 883.24 1.489E-02 &   2.233E-01 6.30E-02 G
                 926.70-2.157E-03 %   2.539E-01 7.09E-02 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26-9.390E-03 % P 2.830E-01 8.07E-02 G

TH-234 1.5695E+00
63.29 1.569E+00 %(P 5.418E+00 1.62E+00 G K
92.80 1.056E+00 % P 1.870E+00 5.66E-01 G
92.38 1.240E+00 & P 2.223E+00 6.73E-01 G

AM-241 -1.5944E-01
59.54-1.594E-01 &(P 1.006E+00 3.01E-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	1.0444E-01	1.1288E-01	1.6232E-01	1.6245E-01	1.605E-01
K-40		1.1436E+01	1.1436E+01	1.0922E+00	1.2782E+00	
MN-54	#A	-5.4816E-04	-5.5549E-04	8.7250E-02	8.7250E-02	3.301E-02
CO-57	#B	2.1999E-04	2.2339E-04	4.3564E-02	4.3564E-02	4.806E-02
CO-60	#B	8.4616E-03	8.4798E-03	2.8914E-02	2.8918E-02	3.361E-02

Sr-85	#A	-1.4491E-02	-1.5448E-02	3.6958E-02	3.6969E-02	3.841E-02
Kr-85	#A	-3.3452E+02	-3.3454E+02	8.0036E+02	8.0060E+02	8.867E+02
Y-88	#B	-2.9074E-04	-3.0228E-04	4.6671E-02	4.6671E-02	3.006E-02
NB-94	#B	-5.4464E-03	-5.4464E-03	2.8412E-02	2.8414E-02	3.261E-02
Ag-108M	#B	-1.0404E-02	-1.0405E-02	3.3229E-02	3.3234E-02	3.737E-02
CD-109	#A	7.6625E-01	7.7329E-01	1.4706E+00	1.4712E+00	1.602E+00
SN-113	#B	1.4532E-02	1.5065E-02	3.7039E-02	3.7049E-02	3.969E-02
SB-125	#B	7.3948E-02	7.4252E-02	5.7314E-02	5.7476E-02	9.305E-02
I-131	#B	3.9509E-03	6.6184E-03	5.0160E-02	5.0161E-02	3.394E-02
CS-134	#A	-2.6676E-02	-2.6824E-02	1.8745E-03	2.4370E-03	4.580E-03
CS-137	#A	2.2469E-02	2.2478E-02	2.9188E-02	2.9217E-02	3.121E-02
CE-139	#A	-2.1519E-04	-2.2179E-04	3.6975E-02	3.6975E-02	4.030E-02
EU-152	#B	1.1085E-04	1.1095E-04	1.2198E-01	1.2198E-01	1.367E-01
EU-154	#B	2.1908E-03	2.1938E-03	8.4983E-02	8.4983E-02	9.510E-02
EU-155	#B	8.5214E-02	8.5410E-02	1.8618E-01	1.8624E-01	2.047E-01
HG-203	#B	7.4838E-03	8.1807E-03	3.2108E-02	3.2112E-02	3.285E-02
TL-208		2.1303E-01	2.1303E-01	6.0098E-02	6.1357E-02	
PB-212		5.7719E-01	5.7719E-01	1.0139E-01	1.0678E-01	
PB-214		4.1956E-01	4.1956E-01	9.0840E-02	9.4049E-02	
BI-212	#	4.9571E-01	4.9571E-01	3.5573E-01	3.5689E-01	
BI-214		4.2236E-01	4.2236E-01	8.8966E-02	9.2283E-02	
RA-224		1.0310E+00	1.0310E+00	8.6127E-01	8.6335E-01	9.200E-01
RA-226	#	1.0186E+00	1.0187E+00	8.9305E-01	8.9501E-01	9.606E-01
AC-228		7.2419E-01	7.2419E-01	1.4155E-01	1.4767E-01	
TH-227	#B	0.0000E+00	0.0000E+00	3.4986E-01	3.4986E-01	3.915E-01
PA-234	#B	-4.6297E-02	-4.6297E-02	1.7959E-01	1.7961E-01	1.871E-01
TH-234	#B	1.5695E+00	1.5695E+00	4.8731E+00	4.8739E+00	5.418E+00
AM-241	#A	-1.5943E-01	-1.5944E-01	9.2116E-01	9.2120E-01	1.006E+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) 1.5318643E+01 pCi/gm

Total Decayed Activity (86.9 to 2000.7 keV) 1.5318643E+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_20OCT2005_1304.An1

Sample description

NOL-006-01-06 WET

Spectrum Filename: C:\GammaVision\Spectra\107_20OCT2005_1304.An1

Acquisition information

Start time:	20-Oct-2005 13:05:35
Live time:	1000
Real time:	1002
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: 2.1380E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1380E+03) =
4.6773E+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	20-Oct-2005 12:35:00
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: 0.1503

***** 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	190.	16.94	1.18	2.849E-02	74.81	9.600	8.778E-01	PB212
77.13	268.	9.49	1.18	2.957E-02	77.11	10.700	1.122E+00	PB214
					77.11	17.500	6.916E-01	PB212
92.90	125.	32.57	1.50	3.429E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.92	98.	38.68	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234

128.09	114.	29.98	0.76	3.815E-02				
186.00	157.	25.55	1.27	3.610E-02	185.99	3.280	1.676E+00	RA226
208.54	103.	36.80	1.06	3.435E-02				
238.71	705.	4.58	1.30	3.189E-02	238.63	43.100	6.411E-01	PB212
241.67	123.	19.46	1.30	3.165E-02	241.00	3.900	1.242E+00	RA224
					241.92	7.470	6.521E-01	PB214
270.33	58.	30.84	1.26	2.944E-02				
277.52	65.	36.70	1.72	2.891E-02				
277.52	65.	36.70	1.72	2.891E-02	279.17	81.500	PBC<MDA	HG203
295.23	182.	10.93	1.34	2.769E-02	295.22	19.200	4.276E-01	PB214
300.61	46.	33.82	1.34	2.733E-02				
327.89	67.	38.89	1.28	2.561E-02				
338.34	210.	12.47	1.68	2.501E-02	338.40	12.010	8.756E-01	AC228
351.88	274.	8.67	1.33	2.426E-02	351.99	37.100	3.807E-01	PB214
368.13	44.	38.45	0.95	2.343E-02	364.48	81.240	2.872E-02	I131
409.54	44.	38.80	0.79	2.154E-02				
462.95	94.	22.09	1.57	1.955E-02				
462.95	94.	22.09	1.57	1.955E-02	463.51	10.000	6.027E-01	SB125
510.79	192.	13.54	2.28	1.808E-02	510.72	22.500	5.437E-01	TL208
583.05	282.	9.30	1.38	1.629E-02	583.14	86.000	2.521E-01	TL208
609.25	220.	9.82	1.49	1.574E-02	609.32	46.090	3.799E-01	BI214
661.93	59.	24.90	1.23	1.477E-02	661.62	84.620	5.809E-02	CS137
727.40	32.	41.55	1.64	1.374E-02	727.17	11.800	PBC<MDA	BI212
794.20	53.	30.35	1.06	1.286E-02				
794.20	53.	30.35	1.06	1.286E-02	795.76	85.400	6.069E-02	CS134
860.83	55.	27.75	1.63	1.211E-02				
911.12	167.	9.74	1.76	1.161E-02	911.07	29.000	6.192E-01	AC228
968.27	155.	12.39	1.31	1.110E-02	968.90	17.460	1.002E+00	AC228
1121.11	80.	20.70	1.37	9.964E-03	1120.28	15.040	6.741E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1173.29	51.	26.10	1.93	9.637E-03	1173.23	99.860	6.712E-02	CO60
1332.06	43.	23.27	2.03	8.773E-03	1332.51	99.980	6.249E-02	CO60
1460.54	910.	3.38	1.87	8.192E-03	1460.75	10.700	1.310E+01	K40
1763.87	59.	13.02	1.62	7.086E-03	1764.51	15.920	6.563E-01	Bl214

********** 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	
416.72	208.54	464.	103.	0.103	110.40	1.064	LU-177	s
540.28	270.33	131.	58.	0.058	92.53	1.255	AC-228	
600.42	300.40	111.	54.	0.054	94.33	1.174	PB-212	M
655.40	327.89	194.	67.	0.067	116.66	1.280	AC-228	
735.87	368.13	90.	48.	0.048	94.89	0.954	KR-89	
818.68	409.54	99.	44.	0.044	116.41	0.794	AC-228	s
1721.23	860.83	53.	55.	0.055	68.92	1.625	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	434.	190.	0.190	50.81	1.178D
PB-212	153.89	77.11	429.	268.	0.268	28.46	1.179A
TH-234	185.46	92.90	822.	125.	0.125	97.71	1.500s
RA-226	371.69	186.02	420.	119.	0.119	78.21	1.500s
PB-212	476.89	238.63	180.	694.	0.694	13.83	1.297D
PB-214	483.47	241.92	255.	111.	0.111	66.73	1.299D
PB-214	589.67	295.03	223.	204.	0.204	43.34	1.176s
AC-228	676.29	338.34	165.	208.	0.208	37.42	1.676s
PB-214	703.37	351.88	123.	271.	0.271	26.01	1.328s
SB-125	926.08	463.24	91.	50.	0.050	89.08	1.500s
TL-208	1021.18	510.79	129.	175.	0.175	40.61	2.279s
TL-208	1165.69	583.05	109.	279.	0.279	27.90	1.380
BI-214	1218.09	609.25	82.	218.	0.218	29.46	1.494
CS-137	1323.44	661.93	63.	57.	0.057	74.70	1.231
CS-134	1588.35	794.39	35.	34.	0.034	88.73	1.684s
AC-228	1821.80	911.12	41.	165.	0.165	29.22	1.764
AC-228	1936.10	968.27	66.	153.	0.153	37.18	1.315

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bl-214	2241.78	1121.11	55.	80.	0.080	62.10	1.366s
CO-60	2346.14	1173.29	72.	51.	0.051	78.29	1.931s
CO-60	2663.70	1332.06	35.	43.	0.043	69.80	2.031
K-40	2920.68	1460.54	11.	908.	0.908	10.13	1.870
Bl-214	3527.39	1763.87	0.	59.	0.059	39.06	1.618s

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

BE-7 -7.5616E-02
477.56-7.562E-02 %(2.869E-01 8.47E-02 G

K-40 1.3096E+01
1460.75 1.310E+01 (P 2.627E-01 4.43E-01 G

MN-54 1.7918E-03
834.81 1.792E-03 %(P 2.598E-02 7.16E-03 G

CO-57 7.7551E-04
122.07 7.755E-04 %(P 4.956E-02 1.47E-02 G K
136.43-2.329E-04 & P 3.635E-01 1.08E-01 G

CO-60 6.4806E-02

1332.51 6.249E-02 (P 4.345E-02 1.52E-02 G K
1173.23 6.712E-02 (P 5.543E-02 1.82E-02 G K

Sr-85 -1.6522E-02
514.00-1.652E-02 %(4.431E-02 1.33E-02 G

Kr-85 -4.0583E+02
513.99-4.058E+02 %(P 1.027E+03 3.07E+02 G

Y-88 -1.3774E-03
1836.01-1.377E-03 %(P 3.520E-02 9.07E-03 G K
898.02-7.441E-03 % P 4.676E-02 1.35E-02 G

NB-94 2.1922E-04
871.10 2.192E-04 &(P 3.958E-02 1.12E-02 G K
702.50 6.816E-03 % P 3.415E-02 9.93E-03 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-5.7106E-03						
		722.95	-5.711E-03	%(	4.634E-02	1.34E-02	G K
		614.37	-1.469E-03	%	3.880E-02	1.11E-02	G
		433.93	7.393E-03	& P	3.295E-02	9.68E-03	G
CD-109	-5.5249E-01						
		88.04	-5.525E-01	%(P	1.394E+00	4.21E-01	G
SN-113	-3.1095E-03						
		391.71	-3.110E-03	%(P	3.998E-02	1.14E-02	G K
		255.04	1.019E-01	&	1.517E+00	4.46E-01	G
SB-125	6.4398E-02						
		427.95	-2.242E-02	%(P	1.073E-01	3.15E-02	G K
		600.77	-1.478E-03	% P	1.532E-01	4.27E-02	G
		636.15	-2.610E-02	% P	2.970E-01	8.49E-02	G
		463.51	3.214E-01	(P	3.050E-01	9.81E-02	G
		176.29	-6.859E-02	% P	6.040E-01	1.80E-01	G
I-131	-3.1580E-03						
		364.48	-3.158E-03	%(	3.118E-02	9.03E-03	G K
		636.97	1.048E-01	%	4.116E-01	1.21E-01	G
		284.29	5.333E-04	%	4.823E-01	1.40E-01	G
CS-134	1.7762E-02						
		604.66	-1.117E-03	&(P	9.162E-02	2.71E-02	G K
		795.76	3.934E-02	(P	3.481E-02	1.17E-02	G
		569.29	-1.834E-02	%	2.162E-01	6.23E-02	G
		801.84	-2.870E-02	& P	5.539E-01	1.60E-01	G

CS-137 5.8086E-02

661.62 5.809E-02 (P 4.002E-02 1.49E-02 G

CE-139 -6.9265E-04

165.85-6.927E-04 %(P 4.426E-02 1.31E-02 G

EU-152 -3.3018E-02

121.78-3.302E-02 %(P 1.381E-01 4.14E-02 G K

344.30-5.122E-03 & P 1.057E-01 3.06E-02 G

1408.08 7.605E-02 & P 1.585E-01 4.81E-02 G

964.00 1.378E-01 % P 3.879E-01 1.16E-01 G

1112.07-2.380E-03 % P 4.222E-01 1.20E-01 G

778.90-1.914E-03 % P 3.563E-01 1.02E-01 G

EU-154 -7.0991E-03

123.10-7.099E-03 %(P 9.830E-02 2.92E-02 G K

1274.80-2.015E-02 & P 1.273E-01 3.64E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30-2.463E-02 % P 2.086E-01 6.03E-02 G
                      1004.80 7.963E-03 % P 1.961E-01 5.45E-02 G

EU-155       1.1564E-01
                       86.45 1.156E-01 %(  1.706E-01 5.21E-02 G K
                      105.31 5.060E-02 % P 1.873E-01 5.62E-02 G

HG-203      -3.4892E-04
                      279.17-3.489E-04 &(P 3.633E-02 1.06E-02 G K
                       72.87-5.428E-01 % P 1.242E+00 3.76E-01 G
                       70.83 9.778E-03 %   1.821E+00 5.41E-01 G
                       82.50-3.377E-02 %   2.583E+00 7.70E-01 G

TL-208       2.5205E-01
                      583.14 2.521E-01  (P 4.628E-02 2.36E-02 G
                      510.72 5.437E-01 + P 1.729E-01 8.07E-02 G

PB-212       6.5356E-01
                      238.63 6.381E-01  (P 6.000E-02 2.97E-02 G K
                                         Energy duplication
                       77.11 6.536E-01 }   2.423E-01 6.20E-02 G
                       74.81 8.778E-01 + P 4.612E-01 1.50E-01 G

PB-214       3.8071E-01
                      351.99 3.807E-01 @(P 7.639E-02 3.33E-02 G K
                      295.22 4.859E-01 + P 1.719E-01 7.10E-02 G
                                         Energy duplication
                       77.11 0.000E+00 } P 5.070E-01 0.00E+00 G
                      241.92 5.951E-01 + P 4.124E-01 1.33E-01 G

BI-212       2.5293E-01
```

727.17 2.529E-01 %(P 3.432E-01 1.07E-01 G K
1620.56 3.019E-01 % P 1.005E+00 2.87E-01 G
785.42 3.945E-01 & P 1.592E+00 4.62E-01 G

BI-214 3.7988E-01
609.32 3.799E-01 (P 7.823E-02 3.77E-02 G K
1764.51 6.563E-01 + P 8.262E-02 8.61E-02 G
1120.28 6.741E-01 + P 3.143E-01 1.40E-01 G

RA-224 6.5267E-01
241.00 6.527E-01 %(P 1.178E+00 3.58E-01 G

RA-226 1.2678E+00
185.99 1.268E+00 (1.048E+00 3.31E-01 G

AC-228 6.1918E-01
911.07 6.192E-01 (P 1.224E-01 6.11E-02 G K
968.90 1.002E+00 + P 2.639E-01 1.25E-01 G
338.40 8.756E-01 + P 2.634E-01 1.10E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-2.1253E-01						
		236.00	-2.125E-01	%(P	4.650E-01	1.41E-01	G K
		256.25	5.657E-02	& P	4.876E-01	1.44E-01	G
PA-234	1.9429E-02						
		98.44	1.943E-02	%(	1.750E-01	5.22E-02	G K
		946.00	7.836E-02	%	2.022E-01	6.05E-02	G
		131.28	-3.749E-02	%	2.116E-01	6.34E-02	G
		94.67	-8.634E-02	%	3.272E-01	9.84E-02	G
		883.24	1.266E-01	%	2.563E-01	7.80E-02	G
		926.70	-4.156E-04	%	2.260E-01	6.04E-02	G
		569.26	-2.724E-02	%	3.207E-01	9.24E-02	G
TH-234	1.1187E+00						
		63.29	6.744E-01	%(P	2.046E+00	6.15E-01	G K
		92.80	1.201E+00	% P	1.674E+00	5.11E-01	G
		92.38	1.793E+00	(P	1.955E+00	6.03E-01	G
AM-241	-4.3965E-02						
		59.54	-4.396E-02	&(P	2.767E-01	8.27E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	-7.5595E-02	-7.5616E-02	2.5413E-01	2.5417E-01	2.869E-01
K-40	1.3096E+01	1.3096E+01	1.3296E+00	1.5382E+00	
MN-54 #A	1.7917E-03	1.7918E-03	2.1472E-02	2.1472E-02	2.598E-02
CO-57 #B	7.7546E-04	7.7551E-04	4.4187E-02	4.4187E-02	4.955E-02
CO-60 #	6.4806E-02	6.4806E-02	3.5411E-02	3.5617E-02	4.345E-02
Sr-85 #A	-1.6518E-02	-1.6522E-02	3.9936E-02	3.9948E-02	4.430E-02
Kr-85 #A	-4.0583E+02	-4.0583E+02	1.0399E+03	1.0402E+03	1.027E+03
Y-88 #B	-1.3772E-03	-1.3774E-03	9.3001E-02	9.3001E-02	3.520E-02
NB-94 #B	2.1922E-04	2.1922E-04	3.3457E-02	3.3457E-02	3.958E-02
Ag-108M#B	-5.7106E-03	-5.7106E-03	4.0339E-02	4.0341E-02	4.634E-02
CD-109 #A	-5.5247E-01	-5.5249E-01	1.2715E+00	1.2719E+00	1.394E+00
SN-113 #B	-3.1091E-03	-3.1095E-03	5.8094E-02	5.8094E-02	3.998E-02
SB-125 #B	6.4397E-02	6.4398E-02	5.8991E-02	5.9114E-02	1.073E-01
I-131 #B	-3.1522E-03	-3.1580E-03	2.7103E-02	2.7104E-02	3.112E-02
CS-134 #B	1.7762E-02	1.7762E-02	1.5882E-02	1.5916E-02	9.162E-02
CS-137	5.8086E-02	5.8086E-02	4.4723E-02	4.4855E-02	
CE-139 #A	-6.9258E-04	-6.9265E-04	4.8403E-02	4.8403E-02	4.426E-02
EU-152 #B	-3.3018E-02	-3.3018E-02	1.2483E-01	1.2484E-01	1.381E-01
EU-154 #B	-7.0991E-03	-7.0991E-03	9.3414E-02	9.3415E-02	9.830E-02
EU-155 #B	1.1564E-01	1.1564E-01	1.5640E-01	1.5653E-01	1.706E-01
HG-203 #B	-3.4881E-04	-3.4892E-04	4.1048E-02	4.1048E-02	3.632E-02
TL-208	2.5205E-01	2.5205E-01	7.0897E-02	7.2443E-02	

PB-212	6.5356E-01	6.5356E-01	9.1390E-02	9.9208E-02	
PB-214	3.8071E-01	3.8071E-01	9.9945E-02	1.0244E-01	
BI-212 #B	2.5293E-01	2.5293E-01	3.2150E-01	3.2185E-01	3.432E-01
BI-214	3.7988E-01	3.7988E-01	1.1303E-01	1.1523E-01	
RA-224 #A	6.5267E-01	6.5267E-01	1.0749E+00	1.0756E+00	1.178E+00
RA-226 #	1.2678E+00	1.2678E+00	9.9157E-01	9.9439E-01	1.048E+00
AC-228	6.1918E-01	6.1918E-01	1.8322E-01	1.8683E-01	
TH-227 #B	-2.1253E-01	-2.1253E-01	4.2454E-01	4.2473E-01	4.650E-01
PA-234 #B	1.9429E-02	1.9429E-02	1.5662E-01	1.5662E-01	1.750E-01
TH-234 #B	1.1187E+00	1.1187E+00	1.1280E+00	1.1297E+00	2.046E+00
AM-241 #A	-4.3965E-02	-4.3965E-02	2.5618E-01	2.5620E-01	2.767E-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) 1.5439117E+01 pCi/gm

Total Decayed Activity (270.2 to 2000.1 keV) 1.5439117E+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_20OCT2005_1330.An1

Sample description

NOL-006-01-05-R WET

Spectrum Filename: C:\GammaVision\Spectra\107_20OCT2005_1330.An1

Acquisition information

Start time:	20-Oct-2005 13:31:33
Live time:	1000
Real time:	1002
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: 2.1500E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1500E+03) =
4.6512E+02

Detection limit method: Nureg 4.16

Random error: 1.0000000E+00

Systematic error: 1.0000000E+00

Fraction Limit: 0.000%

Background width: average of five points.

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

Corrections	Status	Comments
Decay correct to date:	YES	20-Oct-2005 12:32:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0943

***** 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	242.	21.78	1.50	2.849E-02	70.83	3.520	3.289E+00	HG203
					74.81	9.600	1.110E+00	PB212
77.08	358.	14.07	1.50	2.957E-02	77.11	10.700	1.422E+00	PB214
					77.11	17.500	8.694E-01	PB212
77.08	360.	14.07	1.50	2.957E-02	77.11	10.700	1.422E+00	PB214
					77.11	17.500	8.752E-01	PB212
87.12	142.	21.51	1.19	3.294E-02	86.45	32.740	1.659E-01	EU155

					88.04	3.790	PBC<MDA	CD109
89.76	108.	29.58	1.19	3.362E-02				
89.76	108.	29.58	1.19	3.362E-02	92.38	2.570	PBC<MDA	TH234
93.23	151.	21.97	1.19	3.441E-02	92.80	3.000	PBC<MDA	TH234
185.80	102.	28.88	1.56	3.612E-02	185.99	3.280	1.088E+00	RA226
209.60	106.	32.39	1.47	3.426E-02				
238.71	964.	3.93	1.30	3.189E-02	238.63	43.100	8.739E-01	PB212
241.70	154.	17.93	1.30	3.165E-02	241.00	3.900	1.550E+00	RA224
					241.92	7.470	8.132E-01	PB214
269.71	88.	31.75	1.57	2.948E-02				
276.88	92.	34.57	0.97	2.896E-02				
295.30	182.	11.95	1.34	2.769E-02				
295.30	182.	11.95	1.34	2.769E-02	295.22	19.200	4.242E-01	PB214
300.48	58.	29.89	1.34	2.734E-02				
338.30	236.	14.27	1.31	2.501E-02	338.40	12.010	9.795E-01	AC228
351.85	351.	9.55	1.68	2.427E-02				
351.85	351.	9.55	1.68	2.427E-02	351.99	37.100	4.873E-01	PB214
463.11	75.	27.29	1.67	1.954E-02				
463.11	75.	27.29	1.67	1.954E-02	463.51	10.000	4.757E-01	SB125
510.83	135.	17.33	2.28	1.808E-02	510.72	22.500	3.642E-01	TL208
583.04	362.	6.30	1.69	1.629E-02	583.14	86.000	3.229E-01	TL208
609.24	302.	7.79	1.63	1.574E-02	609.32	46.090	5.195E-01	BI214
661.26	199.	13.09	1.74	1.478E-02	661.62	84.620	1.984E-01	CS137
727.06	85.	21.40	1.52	1.374E-02	727.17	11.800	6.539E-01	BI212
794.90	49.	23.78	1.68	1.284E-02	795.76	85.400	5.620E-02	CS134
911.19	247.	9.54	1.91	1.161E-02	911.07	29.000	9.152E-01	AC228
964.01	43.	29.71	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152

YAEC Chemistry Lab Spectrum name: 107_20OCT2005_1330.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
969.07	130.	11.10	1.80	1.109E-02	968.90	17.460	8.364E-01	AC228
1119.37	74.	26.80	1.45	9.976E-03	1120.28	15.040	6.167E-01	Bl214
1173.04	175.	13.57	2.14	9.638E-03	1173.23	99.860	2.261E-01	CO60
1332.00	176.	8.65	2.19	8.776E-03	1332.51	99.980	2.501E-01	CO60
1460.51	1063.	3.10	2.26	8.192E-03	1460.75	10.700	1.521E+01	K40
1764.33	56.	16.33	1.73	7.084E-03	1764.51	15.920	6.237E-01	Bl214

********** 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	
173.90	86.81	395.	142.	0.142	64.53	1.187	Bl-207	D
179.19	89.46	454.	108.	0.108	88.74	1.189	PB-214	D
186.12	92.93	472.	151.	0.151	65.91	1.191	TH-234	D
418.84	209.60	429.	106.	0.106	97.16	1.467	NP-239	s
477.06	238.70	236.	964.	0.964	11.80	1.297	PB-212	D
483.02	241.68	302.	154.	0.154	53.80	1.299	PB-214	D
539.05	269.71	280.	88.	0.089	95.26	1.566	AC-228	
553.38	276.88	311.	94.	0.094	85.76	0.966	TL-208	s
600.58	300.25	119.	58.	0.058	89.68	1.341	PB-212	lD
1928.22	964.18	54.	51.	0.051	74.95	1.796	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	149.47	74.90	1286.	242.	0.242	65.33	1.500s
PB-214	153.89	77.11	1107.	358.	0.358	42.21	1.500D
PB-212	153.89	77.11	1105.	360.	0.360	42.21	1.500D
EU-155	174.03	87.18	1051.	139.	0.139	101.90	1.500s
TH-234	186.12	93.23	1002.	139.	0.139	93.25	1.500s
RA-226	371.24	185.80	368.	102.	0.102	86.64	1.558s
PB-212	477.07	238.72	638.	923.	0.923	15.08	1.500s
PB-214	590.26	295.32	317.	165.	0.165	50.48	1.500s
AC-228	676.21	338.30	281.	234.	0.234	42.80	1.313
PB-214	703.43	351.91	185.	325.	0.325	24.07	1.500s
SB-125	925.52	462.96	101.	62.	0.062	76.25	1.500
TL-208	1021.24	510.83	149.	118.	0.118	51.99	2.278s
TL-208	1165.66	583.04	71.	360.	0.360	18.90	1.689

YAEC Chemistry Lab Spectrum name: 107_20OCT2005_1330.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Bl-214	1218.07	609.24	86.	300.	0.300	23.38	1.628s
CS-137	1322.09	661.26	122.	197.	0.197	39.28	1.742s
Bl-212	1453.68	727.06	83.	84.	0.084	64.21	1.516s
CS-134	1589.36	794.90	44.	49.	0.049	71.34	1.684s
AC-228	1821.94	911.19	88.	245.	0.245	28.62	1.915
AC-228	1937.36	968.90	45.	129.	0.129	34.02	1.799D
Bl-214	2238.31	1119.37	84.	74.	0.074	80.39	1.454s
CO-60	2345.66	1173.04	95.	173.	0.173	40.70	2.139
CO-60	2663.57	1332.00	17.	175.	0.175	25.94	2.187s
K-40	2920.62	1460.51	10.	1060.	1.060	9.31	2.258
Bl-214	3528.32	1764.33	7.	56.	0.056	48.98	1.733s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-1.1856E-03					
			477.56	-1.186E-03	%(	3.538E-01	1.02E-01 G
K-40		1.5210E+01					
			1460.75	1.521E+01	(P	2.456E-01	4.73E-01 G
MN-54		2.9405E-02					
			834.81	2.940E-02	&(P	4.200E-02	1.31E-02 G

```
CO-57        6.6380E-03
                 122.07 6.638E-03 &(P 5.236E-02 1.57E-02 G K
                 136.43-9.140E-02 % P 4.234E-01 1.27E-01 G

CO-60        2.3813E-01
                1332.51 2.501E-01 *(P 3.181E-02 2.18E-02 G K
                1173.23 2.261E-01  (P 6.283E-02 3.10E-02 G K

Sr-85       -2.5710E-02
                 514.00-2.571E-02 &(  5.104E-02 1.55E-02 G

Kr-85       -6.1759E+02
                 513.99-6.176E+02 &(P 1.182E+03 3.58E+02 G

Y-88         9.6523E-05
                1836.01 9.652E-05 &(P 2.647E-02 6.42E-03 G K
                 898.02 1.312E-02 % P 4.744E-02 1.40E-02 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	1.2202E-02						
		871.10	1.220E-02	%(P	3.439E-02	1.02E-02	G K
		702.50	-2.591E-03	& P	4.144E-02	1.19E-02	G K
Ag-108M	-1.0878E-02						
		722.95	-1.088E-02	%(	5.501E-02	1.62E-02	G K
		614.37	-5.016E-03	%	5.126E-02	1.50E-02	G
		433.93	-4.093E-03	& P	3.970E-02	1.16E-02	G
CD-109	6.2090E-02						
		88.04	6.209E-02	%(P	1.599E+00	4.78E-01	G
SN-113	9.9273E-04						
		391.71	9.927E-04	%(P	5.578E-02	1.62E-02	G K
		255.04	4.202E-01	%	1.649E+00	4.93E-01	G
SB-125	9.9971E-02						
		427.95	-1.986E-03	&(P	1.167E-01	3.37E-02	G K
		600.77	2.836E-02	% P	1.940E-01	5.63E-02	G
		636.15	-9.617E-02	& P	3.642E-01	1.08E-01	G
		463.51	4.018E-01	(P	3.190E-01	1.04E-01	G
		176.29	1.566E-03	& P	6.694E-01	1.99E-01	G
I-131	-5.7002E-03						
		364.48	-5.700E-03	&(	4.551E-02	1.34E-02	G K
		636.97	-6.300E-02	&	4.726E-01	1.37E-01	G
		284.29	-1.074E-01	%	5.963E-01	1.77E-01	G
CS-134	1.6133E-02						
		604.66	-1.893E-02	%(P	4.816E-02	1.45E-02	G K

795.76 5.620E-02 *(P 3.867E-02 1.34E-02 G
569.29-5.724E-02 % 2.321E-01 6.85E-02 G
801.84 4.484E-02 % P 4.224E-01 1.21E-01 G

CS-137 1.9836E-01
661.62 1.984E-01 @(P 5.444E-02 2.62E-02 G

CE-139 -1.5182E-03
165.85-1.518E-03 &(P 5.018E-02 1.49E-02 G

EU-152 1.5355E-02
121.78 1.535E-02 %(P 1.549E-01 4.63E-02 G K
344.30-2.864E-03 & P 1.342E-01 3.92E-02 G
1408.08-2.414E-02 % P 1.642E-01 4.53E-02 G
964.00-2.777E-02 & P 4.437E-01 1.29E-01 G
1112.07 5.912E-02 % P 3.373E-01 9.75E-02 G
778.90-5.981E-02 % P 3.605E-01 1.05E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	2.5453E-02						
		123.10	2.545E-02	&(P	1.147E-01	3.44E-02	G K
		1274.80	-8.422E-04	& P	1.381E-01	3.87E-02	G
		723.30	-1.023E-03	% P	3.707E-01	1.09E-01	G
		1004.80	2.252E-03	& P	2.692E-01	7.63E-02	G
EU-155	1.6300E-01						
		86.45	1.630E-01	(	1.798E-01	5.54E-02	G K
		105.31	1.146E-01	% P	2.164E-01	6.58E-02	G
HG-203	-1.4882E-03						
		279.17	-1.488E-03	%(P	4.256E-02	1.25E-02	G K
		72.87	-7.630E-01	& P	1.388E+00	4.22E-01	G
		70.83	5.123E-01	%	1.905E+00	5.73E-01	G
		82.50	9.157E-02	%	2.778E+00	8.30E-01	G
TL-208	3.3145E-01						
		583.14	3.229E-01	(P	3.771E-02	2.05E-02	G
		510.72	3.642E-01	*(P	1.842E-01	7.21E-02	G
PB-212	8.5303E-01						
		238.63	8.440E-01	@(P	1.101E-01	4.28E-02	G K
							Energy duplication
		77.11	8.752E-01	*(	3.828E-01	1.23E-01	G
		74.81	1.110E+00	& P	7.805E-01	2.44E-01	G
PB-214	4.3305E-01						
		351.99	4.546E-01	(P	9.228E-02	3.68E-02	G K
		295.22	3.914E-01	(P	2.026E-01	6.68E-02	G
							Energy duplication

77.11 1.422E+00 + P 6.267E-01 2.01E-01 G
241.92-5.345E-02 % P 7.998E-01 2.39E-01 G

BI-212 6.5392E-01
727.17 6.539E-01 (P 3.494E-01 1.41E-01 G K
1620.56 2.497E-01 % P 1.316E+00 3.69E-01 G
785.42 4.369E-01 % P 2.090E+00 6.11E-01 G

BI-214 5.5999E-01
609.32 5.195E-01 *(P 7.964E-02 4.08E-02 G K
1764.51 6.237E-01 (P 1.681E-01 1.03E-01 G
1120.28 6.167E-01 @(P 3.817E-01 1.66E-01 G

RA-224 4.8969E-01
241.00 4.897E-01 %(P 1.388E+00 4.19E-01 G

RA-226 1.0881E+00
185.99 1.088E+00 (9.784E-01 3.14E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	9.0520E-01						
		911.07	9.152E-01	(P	1.733E-01	8.81E-02	G K
		968.90	8.374E-01	(P	2.204E-01	9.58E-02	G
		338.40	9.795E-01	(P	3.384E-01	1.41E-01	G
TH-227	-2.4301E-01						
		236.00	-2.430E-01	%(P	5.234E-01	1.59E-01	G K
		256.25	4.122E-02	& P	5.547E-01	1.64E-01	G
PA-234	4.1585E-02						
		98.44	4.159E-02	%(	1.530E-01	4.59E-02	G K
		946.00	-5.658E-02	&	2.553E-01	7.50E-02	G
		131.28	-2.850E-02	&	2.384E-01	7.13E-02	G
		94.67	1.738E-02	&	3.551E-01	1.06E-01	G
		883.24	4.000E-02	%	3.009E-01	8.61E-02	G
		926.70	-6.982E-02	%	4.434E-01	1.29E-01	G
		569.26	-8.452E-02	%	3.442E-01	1.02E-01	G
TH-234	9.0219E-01						
		63.29	2.960E-01	%(P	2.362E+00	7.06E-01	G K
		92.80	1.690E+00	*(P	1.830E+00	5.63E-01	G
		92.38	3.940E-01	% P	1.962E+00	5.88E-01	G
AM-241	-5.2016E-03						
		59.54	-5.202E-03	%(P	2.944E-01	8.76E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	-1.1850E-03	-1.1856E-03	3.0639E-01	3.0639E-01	3.536E-01
K-40		1.5210E+01	1.5210E+01	1.4188E+00	1.6793E+00	
MN-54	#A	2.9402E-02	2.9405E-02	3.9284E-02	3.9322E-02	4.199E-02
CO-57	#B	6.6373E-03	6.6380E-03	4.6964E-02	4.6966E-02	5.236E-02
CO-60		2.3813E-01	2.3813E-01	5.8133E-02	5.9810E-02	
Sr-85	#A	-2.5699E-02	-2.5710E-02	4.6521E-02	4.6546E-02	5.102E-02
Kr-85	#A	-6.1759E+02	-6.1759E+02	1.1615E+03	1.1620E+03	1.182E+03
Y-88	#B	9.6497E-05	9.6523E-05	1.9273E-02	1.9273E-02	2.646E-02
NB-94	#B	1.2202E-02	1.2202E-02	3.0655E-02	3.0663E-02	3.439E-02
Ag-108M	#B	-1.0878E-02	-1.0878E-02	4.8628E-02	4.8632E-02	5.501E-02
CD-109	#A	6.2086E-02	6.2090E-02	1.4335E+00	1.4335E+00	1.599E+00
SN-113	#B	9.9248E-04	9.9273E-04	4.8638E-02	4.8638E-02	5.577E-02
SB-125	#B	9.9969E-02	9.9971E-02	7.7951E-02	7.8174E-02	1.167E-01
I-131	#B	-5.6800E-03	-5.7002E-03	4.0236E-02	4.0238E-02	4.535E-02
CS-134	#B	1.6132E-02	1.6133E-02	1.1571E-02	1.1611E-02	4.816E-02
CS-137	#	1.9836E-01	1.9836E-01	7.8619E-02	7.9487E-02	
CE-139	#A	-1.5179E-03	-1.5182E-03	4.9133E-02	4.9133E-02	5.017E-02

EU-152 #B	1.5355E-02	1.5355E-02	1.3876E-01	1.3876E-01	1.549E-01
EU-154 #B	2.5453E-02	2.5453E-02	1.0334E-01	1.0335E-01	1.147E-01
EU-155 #A	1.6299E-01	1.6300E-01	1.6610E-01	1.6634E-01	1.798E-01
HG-203 #B	-1.4873E-03	-1.4882E-03	6.0243E-02	6.0243E-02	4.254E-02
TL-208	3.3145E-01	3.3145E-01	6.3050E-02	6.6019E-02	
PB-212 #	8.5303E-01	8.5303E-01	1.2977E-01	1.3921E-01	1.101E-01
PB-214 #	4.3305E-01	4.3305E-01	1.0505E-01	1.0812E-01	9.228E-02
BI-212 #	6.5392E-01	6.5392E-01	4.2310E-01	4.2486E-01	
BI-214 #	5.5999E-01	5.5999E-01	1.3188E-01	1.3596E-01	
RA-224 #A	4.8969E-01	4.8969E-01	1.2558E+00	1.2561E+00	1.388E+00
RA-226	1.0881E+00	1.0881E+00	9.4280E-01	9.4499E-01	
AC-228	9.0520E-01	9.0520E-01	1.8766E-01	1.9512E-01	
TH-227 #B	-2.4301E-01	-2.4301E-01	4.7784E-01	4.7806E-01	5.234E-01
PA-234 #B	4.1585E-02	4.1585E-02	1.3775E-01	1.3777E-01	1.530E-01
TH-234 #B	9.0219E-01	9.0219E-01	9.0106E-01	9.0245E-01	2.362E+00
AM-241 #A	-5.2016E-03	-5.2016E-03	3.4308E-01	3.4308E-01	2.944E-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) 1.9185053E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.9185057E+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_2SEPT2005_1321.An1

Sample description

FSS-NOL-06-01-072-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_2SEPT2005_1321.An1

Acquisition information

Start time:	02-Sep-2005 13:22:27
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: 1.7970E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7970E+03) =
5.5648E+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	01-Sep-2005 11:20:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1661

***** 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	291.	14.10	1.18	2.849E-02	74.81	9.600	8.010E-01	PB212
77.10	325.	11.28	1.18	2.957E-02	77.11	17.500	7.229E-01	PB212
					77.11	10.700	1.171E+00	PB214
77.17	163.	29.69	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
92.84	106.	38.78	1.47	3.439E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234

93.12	164.	30.08	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.96	240.	20.73	2.30	3.610E-02	185.99	3.280	1.521E+00	RA226
208.68	134.	30.72	1.23	3.433E-02				
239.19	1539.	4.20	1.54	3.185E-02	238.63	43.100	8.332E-01	PB212
242.07	177.	20.02	1.30	3.163E-02	241.00	3.900	1.074E+00	RA224
					241.92	7.470	5.620E-01	PB214
295.11	336.	11.05	1.65	2.768E-02	295.22	19.200	4.697E-01	PB214
301.06	75.	35.88	1.76	2.729E-02				
338.52	285.	14.07	1.45	2.500E-02	338.40	12.010	7.052E-01	AC228
351.92	540.	7.30	1.56	2.426E-02	351.99	37.100	4.469E-01	PB214
463.50	104.	31.65	1.31	1.953E-02				
463.50	104.	31.65	1.31	1.953E-02	463.51	10.000	3.884E-01	SB125
510.81	138.	14.79	2.58	1.808E-02	510.72	22.500	2.554E-01	TL208
583.36	409.	6.67	1.34	1.629E-02	583.14	86.000	2.173E-01	TL208
609.48	422.	7.92	1.84	1.574E-02	609.32	46.090	4.325E-01	BI214
661.88	758.	4.68	2.02	1.477E-02	661.62	84.620	4.541E-01	CS137
726.68	147.	17.80	1.71	1.375E-02	727.17	11.800	6.766E-01	BI212
768.91	58.	35.25	0.93	1.317E-02				
795.13	47.	35.50	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
911.35	312.	7.73	1.90	1.161E-02	911.07	29.000	6.875E-01	AC228
964.60	72.	21.06	1.80	1.113E-02				
969.01	200.	9.64	1.80	1.109E-02	968.90	17.460	7.695E-01	AC228
1120.44	125.	17.20	1.74	9.969E-03	1120.28	15.040	6.205E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1173.39	301.	11.51	2.14	9.636E-03	1173.23	99.860	2.318E-01	CO60
1332.55	296.	8.22	2.03	8.773E-03	1332.51	99.980	2.507E-01	CO60
1460.90	1564.	2.58	2.26	8.190E-03	1460.75	10.700	1.338E+01	K40
1764.40	87.	11.83	1.91	7.084E-03	1764.51	15.920	5.748E-01	Bl214

********** 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	
417.00	208.68	624.	134.	0.067	92.15	1.226	LU-177	s
601.74	301.06	285.	75.	0.038	107.65	1.765	PB-212	s
1929.03	964.65	79.	71.	0.035	64.36	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	723.	291.	0.146	42.30	1.178D
PB-212	153.89	77.11	758.	325.	0.162	33.84	1.179A
PB-214	153.89	77.11	1352.	163.	0.082	89.08	1.500A
TH-234	185.91	93.12	1450.	164.	0.082	90.25	1.500s

RA-226	371.57	185.96	824.	240.	0.120	62.20	2.300s
TH-227	471.83	236.10	1391.	-157.	-0.079	103.47	1.500s
PB-212	476.89	238.63	426.	1124.	0.562	11.66	1.297D
PB-214	483.47	241.92	547.	177.	0.088	60.06	1.299D
PB-214	589.85	295.11	392.	332.	0.166	33.16	1.655s
AC-228	676.66	338.52	403.	282.	0.141	42.21	1.453s
PB-214	703.45	351.92	343.	535.	0.267	21.90	1.564s
SB-125	926.42	463.41	241.	58.	0.029	114.38	1.500
TL-208	1021.21	510.81	203.	138.	0.069	44.37	2.576s
TL-208	1166.30	583.36	134.	405.	0.202	20.02	1.342
BI-214	1218.53	609.48	197.	417.	0.209	23.75	1.843s
CS-137	1323.33	661.88	155.	755.	0.377	14.04	2.019s
BI-212	1452.93	726.68	147.	146.	0.073	53.41	1.713s
CS-134	1589.83	795.13	118.	47.	0.023	106.50	1.684s
AC-228	1822.26	911.35	94.	308.	0.154	23.20	1.901
AC-228	1937.36	968.90	98.	193.	0.097	30.19	1.799D
BI-214	2240.44	1120.44	99.	124.	0.062	51.59	1.744
CO-60	2346.36	1173.39	187.	297.	0.148	34.54	2.137s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2664.67	1332.55	67.	292.	0.146	24.65	2.030s
K-40	2921.40	1460.90	18.	1560.	0.780	7.73	2.255
Bl-214	3528.44	1764.40	5.	86.	0.043	35.50	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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.1784E-01					
			477.56	1.178E-01	%(	2.477E-01	7.51E-02 G
K-40		1.3382E+01					
			1460.75	1.338E+01	(P	1.944E-01	3.46E-01 G
MN-54		-1.5828E-04					
			834.81	-1.583E-04	%(P	3.414E-02	9.85E-03 G
CO-57		-8.9689E-04					
			122.07	-8.969E-04	&(P	3.700E-02	1.10E-02 G K
			136.43	1.411E-01	% P	2.274E-01	6.94E-02 G
CO-60		2.4128E-01					
			1332.51	2.507E-01	@(P	3.496E-02	2.09E-02 G K
			1173.23	2.318E-01	@(P	5.199E-02	2.71E-02 G K

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Sr-85      -5.3003E-03
                514.00-5.300E-03 %(  3.637E-02 1.08E-02 G

Kr-85      -1.5005E+02
                513.99-1.500E+02 %(P 8.337E+02 2.46E+02 G

Y-88       -1.7455E-03
               1836.01-1.746E-03 %(P 2.120E-02 5.42E-03 G K
                898.02 2.944E-03 & P 3.194E-02 9.20E-03 G

NB-94       -2.6645E-03
                871.10-2.664E-03 %(P 2.811E-02 8.11E-03 G K
                702.50 1.129E-03 % P 3.110E-02 9.02E-03 G K

Ag-108M     -4.1206E-03
                722.95-4.121E-03 &(  3.347E-02 9.79E-03 G K
                614.37-2.439E-02 &   4.031E-02 1.23E-02 G
                433.93 1.047E-02 % P 2.952E-02 8.85E-03 G
```

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Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

CD-109       4.0056E-01
                     88.04 4.006E-01 %(P 1.060E+00 3.21E-01 G

SN-113      -8.1279E-03
                    391.71-8.128E-03 %(P 4.500E-02 1.33E-02 G K
                    255.04-2.060E-02 &   1.215E+00 3.59E-01 G

SB-125       7.1155E-02
                    427.95 1.969E-02 %(P 8.480E-02 2.52E-02 G K
                    600.77 7.536E-03 & P 1.533E-01 4.45E-02 G
                    636.15 5.051E-02 & P 2.060E-01 6.07E-02 G
                    463.51 2.235E-01  (P 2.893E-01 8.93E-02 G
                    176.29 6.107E-03 & P 3.515E-01 1.04E-01 G

I-131        6.0996E-03
                    364.48 6.100E-03 %(  3.329E-02 9.88E-03 G K
                    636.97 1.081E-02 &   3.528E-01 1.01E-01 G
                    284.29-6.006E-02 &   4.884E-01 1.45E-01 G

CS-134       1.3144E-02
                    604.66-3.479E-03 %(P 6.321E-02 1.88E-02 G K
                    795.76 3.214E-02 @(P 3.663E-02 1.15E-02 G
                    569.29-2.894E-02 %   1.863E-01 5.49E-02 G
                    801.84-9.337E-02 & P 3.754E-01 1.11E-01 G

CS-137       4.5407E-01
                    661.62 4.541E-01 @(P 3.658E-02 2.14E-02 G

CE-139       8.2215E-03
                    165.85 8.221E-03 &(P 3.146E-02 9.45E-03 G
```

EU-152 -5.7390E-03

121.78-5.739E-03 &(P 1.119E-01 3.35E-02 G K

344.30-1.239E-02 % P 9.734E-02 2.88E-02 G

1408.08 5.177E-02 % P 1.202E-01 3.60E-02 G

964.00 1.296E-02 & P 2.207E-01 6.36E-02 G

1112.07-3.107E-03 % P 2.278E-01 6.44E-02 G

778.90-6.250E-02 % P 2.417E-01 7.14E-02 G

EU-154 2.1149E-02

123.10 2.115E-02 %(P 7.364E-02 2.22E-02 G K

1274.80 2.976E-02 % P 1.031E-01 3.05E-02 G

723.30 1.905E-02 & P 1.702E-01 4.99E-02 G

1004.80-1.544E-02 & P 1.976E-01 5.72E-02 G

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

EU-155       5.7211E-02
                    86.45 5.721E-02 %(  1.326E-01 4.02E-02 G K
                   105.31 6.747E-02 % P 1.541E-01 4.67E-02 G

HG-203       5.8303E-03
                   279.17 5.830E-03 %(P 3.464E-02 1.03E-02 G K
                    72.87 2.976E-01 & P 6.537E-01 1.98E-01 G
                    70.83-2.619E-03 %   1.370E+00 4.09E-01 G
                    82.50 2.150E-01 %   1.906E+00 5.72E-01 G

TL-208       2.2521E-01
                   583.14 2.173E-01  (P 3.043E-02 1.47E-02 G
                   510.72 2.554E-01 *(P 1.277E-01 4.70E-02 G

PB-212       6.1469E-01
                   238.63 6.147E-01  (P 5.412E-02 2.42E-02 G K
                                     Energy duplication
                    77.11 4.722E-01 }   1.903E-01 5.33E-02 G
                    74.81 8.010E-01 + P 3.518E-01 1.14E-01 G

PB-214       4.5469E-01
                   351.99 4.469E-01 @(P 7.439E-02 3.29E-02 G K
                   295.22 4.697E-01 @(P 1.344E-01 5.26E-02 G
                                     Energy duplication
                    77.11 3.877E-01 } P 4.137E-01 1.15E-01 G
                   241.92 5.620E-01 + P 3.556E-01 1.13E-01 G

BI-212       6.7664E-01
                   727.17 6.766E-01 *(P 2.746E-01 1.21E-01 G K
                  1620.56 1.134E-01 % P 8.738E-01 2.43E-01 G
```

785.42 3.662E-01 % P 1.543E+00 4.55E-01 G

BI-214 4.3249E-01

609.32 4.325E-01 @(P 7.055E-02 3.46E-02 G K

1764.51 5.748E-01 + P 8.612E-02 6.87E-02 G

1120.28 6.205E-01 + P 2.465E-01 1.07E-01 G

RA-224 5.3022E-01

241.00 5.302E-01 %(P 9.770E-01 2.97E-01 G

RA-226 1.5210E+00

185.99 1.521E+00 *(8.670E-01 3.15E-01 G

AC-228 7.0981E-01

911.07 6.875E-01 (P 1.071E-01 5.39E-02 G K

968.90 7.500E-01 (P 1.895E-01 7.63E-02 G

338.40 7.052E-01 (P 2.412E-01 1.00E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.2928E-01						
		236.00	-3.293E-01	?(P	3.692E-01	1.13E-01	G K
		256.25	-1.687E-02	% P	3.782E-01	1.12E-01	G
PA-234	-1.6093E-02						
		98.44	-1.609E-02	%(	1.377E-01	4.13E-02	G K
		946.00	8.222E-02	%	1.395E-01	4.29E-02	G
		131.28	-8.940E-03	%	1.341E-01	4.00E-02	G
		94.67	-1.611E-01	%	2.629E-01	8.00E-02	G
		883.24	3.111E-02	&	2.574E-01	7.49E-02	G
		926.70	2.627E-02	&	3.066E-01	8.90E-02	G
		569.26	-2.356E-02	%	2.571E-01	7.51E-02	G
TH-234	8.5052E-01						
		63.29	5.868E-01	%(P	1.657E+00	4.99E-01	G K
		92.80	1.193E+00	(P	1.314E+00	4.02E-01	G
		92.38	-4.079E-02	% P	1.547E+00	4.62E-01	G
AM-241	-5.0242E-02						
		59.54	-5.024E-02	&(P	2.288E-01	6.88E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	1.1619E-01	1.1784E-01	2.2523E-01	2.2534E-01	2.442E-01
K-40	1.3382E+01	1.3382E+01	1.0374E+00	1.3042E+00	
MN-54 #A	-1.5790E-04	-1.5828E-04	1.2054E-01	1.2054E-01	3.406E-02
CO-57 #B	-8.9440E-04	-8.9689E-04	3.8232E-02	3.8232E-02	3.690E-02
CO-60 #	2.4118E-01	2.4128E-01	5.1891E-02	5.3812E-02	
Sr-85 #A	-5.2391E-03	-5.3003E-03	3.2374E-02	3.2375E-02	3.595E-02
Kr-85 #A	-1.5005E+02	-1.5005E+02	1.0940E+03	1.0940E+03	8.337E+02
Y-88 #B	-1.7333E-03	-1.7455E-03	5.1143E-02	5.1143E-02	2.105E-02
NB-94 #B	-2.6645E-03	-2.6645E-03	2.5934E-02	2.5934E-02	2.811E-02
Ag-108M#B	-4.1205E-03	-4.1206E-03	2.9366E-02	2.9367E-02	3.347E-02
CD-109 #A	3.9990E-01	4.0056E-01	9.6166E-01	9.6192E-01	1.058E+00
SN-113 #B	-8.0750E-03	-8.1279E-03	5.0674E-02	5.0676E-02	4.471E-02
SB-125 #B	7.1102E-02	7.1155E-02	8.5337E-02	8.5440E-02	8.473E-02
I-131 #B	5.5549E-03	6.0996E-03	2.9650E-02	2.9652E-02	3.032E-02
CS-134 #B	1.3131E-02	1.3144E-02	1.4157E-02	1.4178E-02	6.314E-02
CS-137 #	4.5403E-01	4.5407E-01	6.4050E-02	6.9438E-02	
CE-139 #A	8.1767E-03	8.2215E-03	2.8349E-02	2.8353E-02	3.129E-02
EU-152 #B	-5.7381E-03	-5.7390E-03	1.0375E-01	1.0375E-01	1.119E-01
EU-154 #B	2.1143E-02	2.1149E-02	6.6528E-02	6.6538E-02	7.362E-02
EU-155 #B	5.7187E-02	5.7211E-02	1.2052E-01	1.2056E-01	1.326E-01
HG-203 #B	5.7370E-03	5.8303E-03	3.0995E-02	3.0997E-02	3.409E-02
TL-208	2.2521E-01	2.2521E-01	4.5591E-02	4.7492E-02	

PB-212	6.1469E-01	6.1469E-01	7.2667E-02	8.1231E-02	
PB-214	4.5469E-01	4.5469E-01	9.1474E-02	9.5334E-02	
BI-212 #	6.7664E-01	6.7664E-01	3.6455E-01	3.6673E-01	
BI-214	4.3249E-01	4.3249E-01	1.0379E-01	1.0689E-01	
RA-224 #A	5.3022E-01	5.3022E-01	8.9054E-01	8.9109E-01	9.770E-01
RA-226 #	1.5210E+00	1.5210E+00	9.4603E-01	9.5029E-01	
AC-228	7.0981E-01	7.0981E-01	1.3608E-01	1.4239E-01	
TH-227 #A	-3.2928E-01	-3.2928E-01	3.4131E-01	3.4186E-01	3.692E-01
PA-234 #B	-1.6093E-02	-1.6093E-02	1.2377E-01	1.2377E-01	1.377E-01
TH-234 #B	8.5052E-01	8.5052E-01	8.6012E-01	8.6142E-01	1.657E+00
AM-241 #A	-5.0242E-02	-5.0242E-02	2.1332E-01	2.1334E-01	2.288E-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) 1.8712143E+01 pCi/gm

Total Decayed Activity (1120.2 to 2000.1 keV) 1.8712271E+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_2SEPT2005_1413.An1

Sample description

FSS-NOL-06-01-050-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_2SEPT2005_1413.An1

Acquisition information

Start time:	02-Sep-2005 14:14:08
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: 2.0580E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0580E+03) =
4.8591E+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-Aug-2005 14:06:00
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: 0.1854

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.88	388.	11.98	1.18	2.852E-02	74.81	9.600	9.222E-01	PB212
77.23	561.	9.09	1.18	2.962E-02	77.11	17.500	7.124E-01	PB212
					77.11	10.700	1.155E+00	PB214
93.62	161.	31.80	1.95	3.456E-02	92.80	3.000	PBC<MDA	TH234
					94.67	15.500	1.957E-01	PA234
186.12	172.	22.11	1.69	3.609E-02	185.99	3.280	9.532E-01	RA226
209.77	151.	27.81	1.94	3.425E-02				

239.25	1938.	3.84	1.67	3.184E-02	238.63	43.100	9.182E-01	PB212
					241.00	3.900	1.028E+01	RA224
242.15	181.	22.32	1.30	3.163E-02	241.92	7.470	5.022E-01	PB214
295.35	312.	10.18	1.62	2.767E-02	295.22	19.200	3.802E-01	PB214
328.46	71.	29.86	1.36	2.557E-02				
338.70	404.	12.28	1.68	2.499E-02	338.40	12.010	8.768E-01	AC228
352.20	635.	7.08	1.85	2.425E-02	351.99	37.100	4.597E-01	PB214
463.41	123.	24.01	1.46	1.953E-02				
463.41	123.	24.01	1.46	1.953E-02	463.51	10.000	4.040E-01	SB125
511.29	267.	13.05	1.73	1.806E-02	510.72	22.500	3.773E-01	TL208
583.43	585.	6.33	1.63	1.628E-02	583.14	86.000	2.720E-01	TL208
609.51	512.	7.47	1.77	1.574E-02	609.32	46.090	4.594E-01	BI214
727.65	147.	20.15	2.38	1.374E-02	727.17	11.800	5.896E-01	BI212
795.04	74.	25.06	0.59	1.285E-02				
795.04	74.	25.06	0.59	1.285E-02	795.76	85.400	4.408E-02	CS134
860.23	117.	17.41	1.32	1.211E-02				
911.41	433.	7.75	1.81	1.160E-02	911.07	29.000	8.364E-01	AC228
965.18	67.	21.75	1.80	1.112E-02	964.00	14.580	PBC<MDA	EU152
969.37	210.	9.23	1.80	1.109E-02	968.90	17.460	7.049E-01	AC228
1120.46	98.	25.88	1.28	9.969E-03	1120.28	15.040	4.275E-01	BI214
1461.09	1980.	2.30	2.33	8.190E-03	1460.75	10.700	1.480E+01	K40
1619.10	48.	20.56	1.19	7.569E-03	1620.56	2.750	1.527E+00	BI212
1764.90	94.	11.04	1.69	7.082E-03	1764.51	15.920	5.410E-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
419.17	209.77	672.	151.	0.075	83.44	1.943	NP-239 s
656.84	328.61	230.	85.	0.042	86.24	1.093	RH-106M
1720.03	860.23	92.	117.	0.058	52.24	1.323	TL-208 s
1930.74	965.15	76.	63.	0.031	70.29	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	149.29	74.81	1108.	386.	0.193	39.26	1.178D
PB-212	153.89	77.11	1021.	161.	0.080	80.56	1.179A
PB-214	153.89	77.11	1741.	181.	0.091	90.44	1.500A
TH-234	186.32	93.33	1733.	178.	0.089	91.27	1.500s
RA-226	371.89	186.12	606.	172.	0.086	66.33	1.691s
TH-227	471.59	235.98	1688.	-215.	-0.108	83.63	1.500s
PB-212	476.89	238.63	546.	1383.	0.692	10.63	1.297D
RA-224	477.45	238.91	865.	1359.	0.680	12.24	1.500s

PB-214	483.47	241.92	737.	181.	0.090	66.97	1.300D
PB-214	590.33	295.35	321.	308.	0.154	30.53	1.624s
AC-228	677.17	338.78	500.	376.	0.188	36.81	1.662s
PB-214	704.02	352.20	390.	630.	0.315	21.23	1.852s
SB-125	925.65	463.03	197.	66.	0.033	93.62	1.500s
TL-208	1022.18	511.29	277.	234.	0.117	39.15	1.726s
TL-208	1166.43	583.43	212.	580.	0.290	19.00	1.627s
Bl-214	1218.60	609.51	225.	508.	0.254	22.41	1.766s
Ag-108M	1224.03	612.22	298.	-68.	-0.034	113.55	1.561s
Bl-212	1454.86	727.65	198.	146.	0.073	60.45	2.379s
CS-134	1590.59	795.51	84.	48.	0.024	91.42	1.684s
AC-228	1822.39	911.41	158.	429.	0.214	23.25	1.813
AC-228	1937.36	968.90	94.	208.	0.104	28.37	1.799D
Bl-214	2240.49	1120.46	158.	98.	0.049	77.64	1.278s
K-40	2921.78	1461.09	23.	1975.	0.987	6.89	2.331
Bl-212	3237.81	1619.10	12.	48.	0.024	61.68	1.194s
Bl-214	3529.46	1764.90	4.	93.	0.046	33.12	1.695s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		5.1434E-02					
			477.56	5.143E-02	%(	2.555E-01	7.59E-02 G
K-40		1.4795E+01					
			1460.75	1.480E+01	(P	1.886E-01	3.41E-01 G
MN-54		1.2055E-02					
			834.81	1.205E-02	%(P	2.849E-02	8.58E-03 G
CO-57		3.9273E-03					
			122.07	3.927E-03	%(P	3.308E-02	9.91E-03 G K
			136.43	5.395E-02	& P	2.540E-01	7.63E-02 G
CO-60		-7.2295E-03					
			1332.51	-7.229E-03	%(P	3.148E-02	8.88E-03 G K
			1173.23	7.749E-03	& P	3.954E-02	1.16E-02 G K
Sr-85		-1.6955E-02					
			514.00	-1.696E-02	%(	3.427E-02	1.04E-02 G
Kr-85		-4.0855E+02					
			513.99	-4.086E+02	%(P	7.775E+02	2.35E+02 G
Y-88		-7.9338E-04					
			1836.01	-7.934E-04	%(P	1.664E-02	4.06E-03 G K

898.02-3.314E-03 % P 3.003E-02 8.63E-03 G

NB-94 -5.2911E-03

871.10-5.291E-03 &(P 2.875E-02 8.44E-03 G K

702.50 2.538E-04 % P 3.018E-02 8.78E-03 G K

Ag-108M 3.7352E-03

722.95 3.735E-03 &(2.756E-02 8.05E-03 G K

614.37-3.163E-02 + 3.863E-02 1.20E-02 G

433.93-1.353E-03 & P 2.836E-02 8.30E-03 G

CD-109 6.6429E-01

88.04 6.643E-01 %(P 1.032E+00 3.15E-01 G

SN-113 -7.4039E-03

391.71-7.404E-03 &(P 3.755E-02 1.11E-02 G K

255.04 2.234E-02 & 1.179E+00 3.49E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	4.3235E-02						
		427.95	-1.697E-02	&(P	7.630E-02	2.26E-02	G K
		600.77	-3.073E-03	% P	1.383E-01	3.99E-02	G
		636.15	-6.618E-03	% P	2.247E-01	6.50E-02	G
		463.51	2.214E-01	*(P	2.296E-01	7.21E-02	G
		176.29	7.008E-02	% P	3.303E-01	9.88E-02	G
I-131	1.1434E-02						
		364.48	1.143E-02	&(	2.868E-02	8.64E-03	G K
		636.97	1.447E-01	%	3.651E-01	1.10E-01	G
		284.29	-9.865E-02	&	4.793E-01	1.43E-01	G
CS-134	1.4707E-02						
		604.66	2.594E-03	&(P	5.751E-02	1.71E-02	G K
		795.76	2.855E-02	*(P	2.724E-02	8.80E-03	G
		569.29	1.794E-02	&	1.553E-01	4.55E-02	G
		801.84	5.608E-02	% P	2.871E-01	8.42E-02	G
CS-137	1.0055E-02						
		661.62	1.005E-02	%(P	3.462E-02	1.03E-02	G
CE-139	-4.2145E-04						
		165.85	-4.214E-04	%(P	3.016E-02	8.97E-03	G
EU-152	1.3561E-02						
		121.78	1.356E-02	&(P	8.802E-02	2.64E-02	G K
		344.30	-8.936E-03	% P	9.173E-02	2.71E-02	G
		1408.08	3.342E-02	% P	1.081E-01	3.16E-02	G
		964.00	2.737E-03	& P	3.190E-01	9.35E-02	G
		1112.07	3.739E-02	% P	2.653E-01	7.77E-02	G

778.90 6.075E-02 % P 1.967E-01 5.85E-02 G

EU-154 4.5713E-03

123.10 4.571E-03 %(P 6.655E-02 1.99E-02 G K

1274.80-2.045E-02 % P 1.029E-01 3.02E-02 G

723.30-1.011E-01 & P 1.956E-01 5.94E-02 G

1004.80-3.023E-03 & P 1.556E-01 4.44E-02 G

EU-155 6.6865E-02

86.45 6.687E-02 %(1.275E-01 3.87E-02 G K

105.31 1.604E-02 & P 1.483E-01 4.45E-02 G

HG-203 1.5452E-02

279.17 1.545E-02 &(P 2.948E-02 8.95E-03 G K

72.87-1.094E-01 % P 7.551E-01 2.27E-01 G

70.83-3.621E-01 % 1.570E+00 4.73E-01 G

82.50-6.123E-01 % 1.516E+00 4.59E-01 G

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

TL-208       2.7197E-01
                   583.14 2.720E-01 @(P 3.305E-02 1.74E-02 G
                   510.72 3.773E-01 + P 1.296E-01 5.63E-02 G

PB-212       6.7571E-01
                   238.63 6.608E-01  (P 5.329E-02 2.37E-02 G K
                                      Energy duplication
                    77.11 2.039E-01 }   1.924E-01 5.48E-02 G
                    74.81 9.258E-01 + P 3.789E-01 1.22E-01 G

PB-214       4.6685E-01
                   351.99 4.597E-01 *(P 6.911E-02 3.28E-02 G K
                   295.22 3.802E-01 - P 1.066E-01 3.93E-02 G
                                      Energy duplication
                    77.11 3.760E-01 } P 4.091E-01 1.13E-01 G
                   241.92 5.022E-01  (P 3.592E-01 1.13E-01 G

BI-212       5.8961E-01
                   727.17 5.896E-01  (P 2.767E-01 1.20E-01 G K
                  1620.56 1.527E+00 + P 5.862E-01 3.17E-01 G
                   785.42 3.947E-01 % P 1.302E+00 3.86E-01 G

BI-214       4.6999E-01
                   609.32 4.594E-01 *(P 6.577E-02 3.46E-02 G K
                  1764.51 5.410E-01 *(P 7.069E-02 6.03E-02 G
                  1120.28 4.275E-01  (P 2.687E-01 1.12E-01 G

RA-224       7.2179E+00
                   241.00 7.218E+00 ?(P 7.423E-01 2.95E-01 G
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RA-226       9.5323E-01
                 185.99 9.532E-01  (  6.512E-01 2.11E-01 G

AC-228       7.9405E-01
                 911.07 8.364E-01  (P 1.196E-01 6.55E-02 G K
                 968.90 7.042E-01  (P 1.626E-01 6.73E-02 G
                 338.40 8.226E-01 *(P 2.337E-01 1.02E-01 G

TH-227      -3.9297E-01
                 236.00-3.930E-01 ?(P 3.545E-01 1.09E-01 G K
                 256.25 3.762E-02 & P 3.585E-01 1.07E-01 G

PA-234      -5.6975E-02
                  98.44-5.698E-02 %(  1.165E-01 3.53E-02 G K
                 946.00-2.664E-02 %   1.532E-01 4.50E-02 G
                 131.28-3.411E-02 &   1.513E-01 4.55E-02 G
                  94.67 4.234E-03 %   2.381E-01 7.13E-02 G
                 883.24 1.624E-03 %   1.630E-01 4.58E-02 G
                 926.70 4.328E-02 &   2.556E-01 7.48E-02 G
```

Nuclide Ave activity Energy Activity Code Peak MDA Comments
569.26 2.660E-02 & 2.299E-01 6.74E-02 G

TH-234 8.1410E-01
63.29 5.677E-01 %(P 1.468E+00 4.43E-01 G K
92.80 1.134E+00 (P 1.252E+00 3.83E-01 G
92.38-9.827E-01 & P 1.333E+00 4.06E-01 G

AM-241 -4.8306E-02
59.54-4.831E-02 %(P 2.103E-01 6.33E-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		Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7	#A	5.0112E-02	5.1434E-02	2.2766E-01	2.2768E-01	2.489E-01
K-40		1.4795E+01	1.4795E+01	1.0217E+00	1.3444E+00	
MN-54	#A	1.2001E-02	1.2055E-02	2.5750E-02	2.5759E-02	2.836E-02
CO-57	#B	3.9072E-03	3.9273E-03	2.9734E-02	2.9734E-02	3.291E-02
CO-60	#B	-7.2243E-03	-7.2295E-03	6.0718E-02	6.0720E-02	3.145E-02

Sr-85	#A	-1.6596E-02	-1.6955E-02	3.1205E-02	3.1221E-02	3.354E-02
Kr-85	#A	-4.0855E+02	-4.0855E+02	7.9860E+02	7.9896E+02	7.774E+02
Y-88	#B	-7.8310E-04	-7.9338E-04	1.9817E-02	1.9817E-02	1.642E-02
NB-94	#B	-5.2911E-03	-5.2911E-03	2.6042E-02	2.6044E-02	2.875E-02
Ag-108M	#B	3.7351E-03	3.7352E-03	2.4161E-02	2.4162E-02	2.756E-02
CD-109	#A	6.6225E-01	6.6429E-01	9.4361E-01	9.4433E-01	1.029E+00
SN-113	#B	-7.3150E-03	-7.4039E-03	4.1900E-02	4.1902E-02	3.710E-02
SB-125	#B	4.3175E-02	4.3235E-02	4.2209E-02	4.2286E-02	7.620E-02
I-131	#B	9.6181E-03	1.1434E-02	2.5927E-02	2.5935E-02	2.412E-02
CS-134	#B	1.4680E-02	1.4707E-02	1.3594E-02	1.3622E-02	5.741E-02
CS-137	#A	1.0053E-02	1.0055E-02	3.0854E-02	3.0860E-02	3.461E-02
CE-139	#A	-4.1721E-04	-4.2145E-04	3.8690E-02	3.8690E-02	2.985E-02
EU-152	#B	1.3557E-02	1.3561E-02	7.9133E-02	7.9136E-02	8.800E-02
EU-154	#B	4.5693E-03	4.5713E-03	5.9670E-02	5.9671E-02	6.652E-02
EU-155	#B	6.6814E-02	6.6865E-02	1.1614E-01	1.1620E-01	1.274E-01
HG-203	#B	1.4998E-02	1.5452E-02	2.6865E-02	2.6880E-02	2.861E-02
TL-208	#	2.7197E-01	2.7197E-01	5.2087E-02	5.4507E-02	
PB-212		6.7571E-01	6.7571E-01	7.2662E-02	8.2900E-02	
PB-214		4.6685E-01	4.6685E-01	9.9912E-02	1.0365E-01	
BI-212		5.8961E-01	5.8961E-01	3.5957E-01	3.6125E-01	
BI-214		4.6999E-01	4.6999E-01	1.0624E-01	1.0981E-01	
RA-224	#	7.2179E+00	7.2179E+00	8.8524E-01	9.8254E-01	7.423E-01
RA-226	#	9.5323E-01	9.5323E-01	6.3232E-01	6.3482E-01	
AC-228		7.9405E-01	7.9405E-01	1.3884E-01	1.4655E-01	
TH-227	#A	-3.9297E-01	-3.9297E-01	3.2904E-01	3.2986E-01	3.545E-01
PA-234	#B	-5.6975E-02	-5.6975E-02	1.0603E-01	1.0608E-01	1.165E-01
TH-234	#B	8.1410E-01	8.1410E-01	8.2525E-01	8.2648E-01	1.468E+00
AM-241	#A	-4.8306E-02	-4.8306E-02	1.9567E-01	1.9569E-01	2.103E-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) 1.9016624E+01 pCi/gm

Total Decayed Activity (1120.2 to 2000.1 keV) 1.9016626E+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_2SEPT2005_1452.An1

Sample description

FSS-NOL-06-01-074-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_2SEPT2005_1452.An1

Acquisition information

Start time:	02-Sep-2005 14:53:34
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: 1.9360E+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	01-Sep-2005 11:26:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1515

***** 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
63.35	121.	40.51	1.40	2.020E-02	63.29	3.900	PBC<MDA	TH234
74.96	307.	14.99	1.18	2.867E-02	74.81	9.600	7.748E-01	PB212
77.20	434.	11.39	1.18	2.970E-02	77.11	10.700	9.473E-01	PB214
					77.11	17.500	5.856E-01	PB212
87.57	180.	21.58	1.19	3.318E-02	86.45	32.740	1.169E-01	EU155
					88.04	3.790	PBC<MDA	CD109
90.00	171.	22.66	1.19	3.379E-02				

93.20	206.	18.41	1.19	3.450E-02	92.38	2.570	1.566E+00	TH234
					92.80	3.000	1.259E+00	TH234
186.11	208.	26.83	1.80	3.609E-02	185.99	3.280	1.223E+00	RA226
209.97	152.	28.55	1.34	3.423E-02				
238.88	1283.	3.78	1.30	3.188E-02	238.63	43.100	6.433E-01	PB212
					241.00	3.900	7.229E+00	RA224
241.97	234.	17.01	1.30	3.163E-02	241.92	7.470	6.880E-01	PB214
295.49	242.	11.41	1.34	2.766E-02	295.22	19.200	3.122E-01	PB214
301.02	58.	39.28	1.34	2.729E-02				
338.22	375.	11.37	1.68	2.501E-02	338.40	12.010	8.642E-01	AC228
352.17	567.	9.10	1.46	2.425E-02	351.99	37.100	4.361E-01	PB214
462.62	115.	25.84	1.59	1.956E-02				
462.62	115.	25.84	1.59	1.956E-02	463.51	10.000	4.013E-01	SB125
510.98	213.	15.73	1.58	1.807E-02	510.72	22.500	3.077E-01	TL208
583.48	442.	7.07	2.06	1.628E-02	583.14	86.000	2.180E-01	TL208
609.44	407.	9.91	1.81	1.574E-02	609.32	46.090	3.876E-01	BI214
661.84	1021.	3.79	2.06	1.477E-02	661.62	84.620	5.685E-01	CS137
726.88	165.	16.99	1.91	1.375E-02	727.17	11.800	7.030E-01	BI212
860.97	81.	24.85	2.36	1.211E-02				
911.37	401.	6.58	2.09	1.161E-02	911.07	29.000	8.219E-01	AC228
965.52	62.	26.18	1.80	1.112E-02				
969.21	191.	9.90	1.80	1.109E-02	968.90	17.460	6.814E-01	AC228
1120.64	117.	17.20	2.32	9.970E-03	1120.28	15.040	5.452E-01	BI214
1173.59	302.	9.25	1.98	9.635E-03	1173.23	99.860	2.165E-01	CO60
1332.74	281.	9.18	2.43	8.772E-03	1332.51	99.980	2.204E-01	CO60

YAEC Chemistry Lab Spectrum name: 107F_2SEPT2005_1452.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.15	1629.	2.58	2.00	8.189E-03	1460.75	10.700	1.293E+01	K40
1765.08	73.	12.83	2.57	7.084E-03	1764.51	15.920	4.543E-01	Bl214

********** 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	
126.37	63.35	985.	121.	0.060	121.54	1.395	PA-234	l
174.80	87.73	664.	180.	0.090	64.77	1.187	PB-214	D
179.68	90.17	661.	171.	0.086	67.72	1.189	PB-214	D
186.07	93.37	614.	206.	0.103	55.20	1.191	U-235	D
419.59	209.97	698.	152.	0.076	85.66	1.337	NP-239	s
601.72	301.05	374.	80.	0.040	122.30	1.223	PB-212	s
1721.50	860.97	108.	81.	0.041	74.54	2.361	TL-208	s
1931.53	965.67	110.	53.	0.026	93.86	1.797	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	149.29	74.81	800.	304.	0.152	42.52	1.178	D

PB-212	153.89	77.11	908.	431.	0.216	24.58	1.179A
TH-234	186.32	93.33	1451.	153.	0.076	103.06	1.500s
TH-234	186.28	93.31	1505.	144.	0.072	102.37	1.500s
RA-226	372.01	186.18	982.	153.	0.077	90.01	1.500s
TH-227	472.36	236.36	1721.	-189.	-0.094	95.84	1.500s
PB-212	476.89	238.63	466.	1266.	0.633	10.94	1.297D
RA-224	477.45	238.91	759.	1272.	0.636	12.43	1.500s
PB-214	483.47	241.92	692.	220.	0.110	54.23	1.300D
PB-214	590.64	295.51	279.	283.	0.141	31.19	2.241s
AC-228	676.05	338.22	440.	372.	0.186	34.10	1.680s
PB-214	703.96	352.17	557.	562.	0.281	27.29	1.463
SB-125	926.06	463.23	230.	84.	0.042	80.44	1.500s
TL-208	1021.55	510.98	294.	179.	0.090	47.20	1.580s
TL-208	1166.54	583.48	183.	437.	0.219	21.20	2.060s
BI-214	1218.46	609.44	288.	403.	0.201	29.72	1.806
Ag-108M	1224.20	612.31	297.	-70.	-0.035	110.78	1.561s
CS-137	1323.25	661.84	153.	1018.	0.509	11.38	2.056s
BI-212	1453.33	726.88	164.	163.	0.082	50.96	1.909s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1822.30	911.37	91.	396.	0.198	19.73	2.090s
AC-228	1937.36	968.90	93.	189.	0.094	30.36	1.799D
BI-214	2240.85	1120.64	99.	117.	0.059	51.60	2.316s
CO-60	2346.76	1173.59	142.	298.	0.149	27.76	1.983s
CO-60	2665.05	1332.74	85.	277.	0.138	27.53	2.427
K-40	2921.89	1461.15	31.	1624.	0.812	7.75	2.001
BI-214	3529.81	1765.08	7.	73.	0.037	38.48	2.566

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	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		7.0333E-02					
			477.56	7.033E-02	%(	2.694E-01	8.04E-02 G
K-40		1.2933E+01					
			1460.75	1.293E+01	(P	2.287E-01	3.35E-01 G
MN-54		1.0231E-02					
			834.81	1.023E-02	&(P	3.264E-02	9.73E-03 G
CO-57		1.5022E-02					
			122.07	1.502E-02	%(P	3.316E-02	1.00E-02 G K
			136.43	-8.031E-02	& P	3.012E-01	9.07E-02 G

CO-60 2.1844E-01

1332.51 2.204E-01 (P 3.639E-02 2.05E-02 G K

1173.23 2.165E-01 @(P 4.221E-02 2.03E-02 G K

Sr-85 -1.3627E-02

514.00-1.363E-02 %(3.471E-02 1.05E-02 G

Kr-85 -3.3827E+02

513.99-3.383E+02 %(P 7.951E+02 2.39E+02 G

Y-88 -2.6563E-03

1836.01-2.656E-03 %(P 1.965E-02 5.13E-03 G K

898.02-2.590E-03 & P 3.580E-02 1.03E-02 G

NB-94 -7.5257E-04

871.10-7.526E-04 &(P 2.990E-02 8.61E-03 G K

702.50 3.668E-03 % P 2.627E-02 7.68E-03 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.6337E-02						
		722.95	-1.634E-02	%(	3.898E-02	1.18E-02	G K
		614.37	-3.446E-02	+	4.101E-02	1.27E-02	G
		433.93	-1.037E-03	% P	2.929E-02	8.56E-03	G
CD-109	6.7619E-01						
		88.04	6.762E-01	%(P	1.013E+00	3.09E-01	G
SN-113	-9.0358E-04						
		391.71	-9.036E-04	&(P	4.037E-02	1.18E-02	G K
		255.04	2.842E-01	&	1.122E+00	3.36E-01	G
SB-125	7.1885E-02						
		427.95	-5.288E-03	%(P	8.110E-02	2.37E-02	G K
		600.77	-2.706E-02	% P	1.527E-01	4.49E-02	G
		636.15	1.064E-01	% P	2.104E-01	6.39E-02	G
		463.51	3.003E-01	(P	2.625E-01	8.32E-02	G
		176.29	6.908E-02	% P	4.370E-01	1.31E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	&(	3.342E-02	9.81E-03	G K
		636.97	-7.798E-03	%	4.146E-01	1.20E-01	G
		284.29	1.428E-02	&	4.922E-01	1.46E-01	G
CS-134	1.0183E-02						
		604.66	1.018E-02	&(P	1.735E-02	5.33E-03	G K
		795.76	2.258E-02	% P	3.577E-02	1.10E-02	G
		569.29	5.411E-04	%	1.220E-01	3.48E-02	G
		801.84	-7.495E-02	% P	3.483E-01	1.03E-01	G

CS-137 5.6846E-01

661.62 5.685E-01 *(P 3.372E-02 2.16E-02 G

CE-139 -7.4891E-03

165.85-7.489E-03 &(P 3.395E-02 1.02E-02 G

EU-152 2.8662E-02

121.78 2.866E-02 %(P 1.007E-01 3.03E-02 G K

344.30-3.185E-02 % P 9.879E-02 2.96E-02 G

1408.08 2.416E-02 & P 1.096E-01 3.14E-02 G

964.00-5.450E-02 & P 3.077E-01 9.11E-02 G

1112.07 1.130E-02 % P 2.641E-01 7.62E-02 G

778.90-4.756E-02 % P 2.236E-01 6.58E-02 G

EU-154 2.4469E-02

123.10 2.447E-02 &(P 6.372E-02 1.93E-02 G K

1274.80 2.983E-02 & P 8.130E-02 2.42E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30 1.844E-03 & P 2.637E-01 7.79E-02 G
                      1004.80-7.495E-04 & P 1.902E-01 5.47E-02 G

EU-155       7.6961E-02
                       86.45 7.696E-02 %(  1.245E-01 3.79E-02 G K
                      105.31 4.233E-02 % P 1.447E-01 4.36E-02 G

HG-203       9.4587E-03
                      279.17 9.459E-03 &(P 3.033E-02 9.11E-03 G K
                       72.87-3.410E-01 % P 9.093E-01 2.75E-01 G
                       70.83-1.136E-03 &   1.362E+00 4.07E-01 G
                       82.50-4.628E-01 %   1.855E+00 5.59E-01 G

TL-208       2.1796E-01
                      583.14 2.180E-01 *(P 3.272E-02 1.56E-02 G
                      510.72 3.077E-01 + P 1.417E-01 5.75E-02 G

PB-212       6.2744E-01
                      238.63 6.426E-01  (P 5.248E-02 2.37E-02 G K
                                         Energy duplication
                       77.11 5.817E-01 }   1.931E-01 4.77E-02 G
                       74.81 7.749E-01 + P 3.433E-01 1.11E-01 G

PB-214       4.1401E-01
                      351.99 4.361E-01  (P 8.738E-02 4.00E-02 G K
                      295.22 3.713E-01  (P 1.059E-01 3.93E-02 G
                                         Energy duplication
                       77.11 0.000E+00 } P 3.969E-01 0.00E+00 G
                      241.92 6.499E-01 + P 3.701E-01 1.18E-01 G

BI-212       7.0295E-01
```

727.17 7.030E-01 *(P 2.683E-01 1.20E-01 G K
1620.56 3.991E-01 % P 5.935E-01 1.90E-01 G
785.42 2.759E-01 & P 1.456E+00 4.27E-01 G

BI-214 4.0472E-01
609.32 3.876E-01 (P 7.871E-02 3.88E-02 G K
1764.51 4.543E-01 (P 9.085E-02 5.90E-02 G
1120.28 5.452E-01 + P 2.283E-01 9.45E-02 G

RA-224 7.1801E+00
241.00 7.180E+00 ?(P 7.400E-01 2.98E-01 G

RA-226 9.0409E-01
185.99 9.041E-01 (8.769E-01 2.71E-01 G

AC-228 8.3427E-01
911.07 8.219E-01 *(P 9.761E-02 5.47E-02 G K
968.90 6.798E-01 - P 1.721E-01 6.96E-02 G
338.40 8.642E-01 *(P 2.336E-01 9.92E-02 G

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

TH-227      -3.6661E-01
                    236.00-3.666E-01 ?(P 3.805E-01 1.17E-01 G K
                    256.25-1.906E-02 & P 4.005E-01 1.19E-01 G

PA-234      -3.4724E-04
                     98.44-3.472E-04 &(  1.167E-01 3.48E-02 G K
                    946.00-1.983E-02 &   1.650E-01 4.82E-02 G
                    131.28-2.051E-02 %   1.545E-01 4.63E-02 G
                     94.67-9.750E-02 %   2.343E-01 7.09E-02 G
                    883.24 6.078E-02 %   2.191E-01 6.48E-02 G
                    926.70 2.089E-04 %   2.618E-01 7.49E-02 G
                    569.26 1.082E-03 %   2.359E-01 6.83E-02 G

TH-234       9.3182E-01
                     63.29 7.143E-01 %(P 1.574E+00 4.76E-01 G K
                     92.80 9.770E-01  (P 1.242E+00 3.79E-01 G
                     92.38 1.209E+00  (P 1.427E+00 4.37E-01 G

AM-241       7.9464E-02
                     59.54 7.946E-02 %(P 1.869E-01 5.66E-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

- -

***** 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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	6.9296E-02	7.0333E-02	2.4114E-01	2.4118E-01	2.654E-01
K-40	1.2933E+01	1.2933E+01	1.0055E+00	1.2627E+00	
MN-54 #A	1.0205E-02	1.0231E-02	2.9204E-02	2.9211E-02	3.256E-02
CO-57 #B	1.4978E-02	1.5022E-02	3.0146E-02	3.0158E-02	3.307E-02
CO-60	2.1835E-01	2.1844E-01	4.3294E-02	4.5175E-02	
Sr-85 #A	-1.3461E-02	-1.3627E-02	3.1407E-02	3.1418E-02	3.429E-02
Kr-85 #A	-3.3827E+02	-3.3827E+02	8.4058E+02	8.4081E+02	7.951E+02
Y-88 #B	-2.6366E-03	-2.6563E-03	2.9585E-02	2.9586E-02	1.950E-02
NB-94 #B	-7.5257E-04	-7.5257E-04	3.1909E-02	3.1909E-02	2.990E-02
Ag-108M#B	-1.6337E-02	-1.6337E-02	3.5296E-02	3.5309E-02	3.898E-02
CD-109 #A	6.7501E-01	6.7619E-01	9.2727E-01	9.2803E-01	1.012E+00
SN-113 #B	-8.9738E-04	-9.0358E-04	4.6902E+00	4.6902E+00	4.009E-02
SB-125 #B	7.1828E-02	7.1885E-02	5.9762E-02	5.9912E-02	8.103E-02
I-131 #B	0.0000E+00	0.0000E+00	2.9436E-02	2.9436E-02	3.028E-02
CS-134 #B	1.0172E-02	1.0183E-02	1.5996E-02	1.6007E-02	1.733E-02
CS-137 #	5.6842E-01	5.6846E-01	6.4892E-02	7.3063E-02	
CE-139 #A	-7.4460E-03	-7.4891E-03	3.1240E-02	3.1243E-02	3.375E-02
EU-152 #B	2.8657E-02	2.8662E-02	9.1003E-02	9.1017E-02	1.007E-01
EU-154 #B	2.4463E-02	2.4469E-02	5.7760E-02	5.7776E-02	6.371E-02
EU-155 #B	7.6927E-02	7.6961E-02	1.1375E-01	1.1383E-01	1.245E-01
HG-203 #B	9.2990E-03	9.4587E-03	2.7326E-02	2.7332E-02	2.982E-02
TL-208 #	2.1796E-01	2.1796E-01	4.6697E-02	4.8439E-02	

PB-212	6.2744E-01	6.2744E-01	6.9490E-02	7.8754E-02	
PB-214	4.1401E-01	4.1401E-01	8.6908E-02	9.0283E-02	
BI-212 #	7.0295E-01	7.0295E-01	3.6104E-01	3.6342E-01	
BI-214	4.0472E-01	4.0472E-01	9.9541E-02	1.0237E-01	
RA-224 #	7.1801E+00	7.1801E+00	8.9416E-01	9.8962E-01	7.400E-01
RA-226 #	9.0409E-01	9.0409E-01	8.1380E-01	8.1555E-01	8.769E-01
AC-228	8.3427E-01	8.3427E-01	1.6586E-01	1.7302E-01	
TH-227 #A	-3.6661E-01	-3.6661E-01	3.5186E-01	3.5252E-01	3.805E-01
PA-234 #B	-3.4724E-04	-3.4724E-04	1.0434E-01	1.0434E-01	1.167E-01
TH-234 #B	9.3182E-01	9.3182E-01	7.9343E-01	7.9511E-01	1.574E+00
AM-241 #A	7.9464E-02	7.9464E-02	1.6974E-01	1.6979E-01	1.869E-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) 1.6921013E+01 pCi/gm

Total Decayed Activity (1120.2 to 2000.1 keV) 1.6921144E+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_2SEPT2005_1532.An1

Sample description

FSS-NOL-06-01-059-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_2SEPT2005_1532.An1

Acquisition information

Start time:	02-Sep-2005 15:33:34
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: 2.1040E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1040E+03) =
4.7529E+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-Aug-2005 15:28:00
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: 0.2056

***** 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
74.53	369.	12.83	1.18	2.842E-02	74.81	9.600	8.574E-01	PB212
77.36	647.	7.57	1.18	2.974E-02	77.11	17.500	8.028E-01	PB212
					77.11	10.700	1.303E+00	PB214
87.52	324.	21.49	1.50	3.313E-02	86.45	32.740	1.939E-01	EU155
					88.04	3.790	1.656E+00	CD109
94.02	135.	37.75	1.44	3.464E-02	92.80	3.000	PBC<MDA	TH234
185.88	245.	20.32	1.67	3.611E-02	185.99	3.280	1.330E+00	RA226

208.83	221.	20.70	1.47	3.432E-02				
238.91	1512.	3.41	1.30	3.188E-02	238.63	43.100	6.990E-01	PB212
241.58	262.	19.63	1.30	3.166E-02	241.00	3.900	1.347E+00	RA224
					241.92	7.470	7.070E-01	PB214
270.38	129.	29.92	1.52	2.943E-02				
295.31	276.	10.11	1.34	2.766E-02	295.22	19.200	3.286E-01	PB214
300.87	105.	22.12	1.34	2.729E-02				
338.71	399.	10.60	1.66	2.499E-02	338.40	12.010	8.467E-01	AC228
352.11	597.	7.86	1.51	2.425E-02	351.99	37.100	4.226E-01	PB214
409.23	52.	40.10	1.15	2.156E-02				
463.28	102.	20.54	1.90	1.953E-02				
463.28	102.	20.54	1.90	1.953E-02	463.51	10.000	3.270E-01	SB125
510.99	252.	12.40	2.34	1.807E-02	510.72	22.500	3.439E-01	TL208
583.42	596.	6.38	1.76	1.628E-02	583.14	86.000	2.713E-01	TL208
609.41	488.	7.19	1.97	1.574E-02	609.32	46.090	4.282E-01	BI214
727.64	168.	16.90	1.74	1.374E-02	727.17	11.800	6.603E-01	BI212
795.08	41.	38.74	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
911.55	420.	6.92	1.99	1.160E-02	911.07	29.000	7.933E-01	AC228
934.29	65.	38.66	1.44	1.139E-02				
968.48	329.	9.18	1.65	1.110E-02	964.00	14.580	1.303E+00	EU152
					968.90	17.460	1.085E+00	AC228
1120.70	119.	16.48	2.84	9.967E-03	1120.28	15.040	5.051E-01	BI214
1461.16	1937.	2.32	2.41	8.189E-03	1460.75	10.700	1.416E+01	K40
1620.86	25.	35.26	1.68	7.569E-03	1620.56	2.750	7.621E-01	BI212
1764.90	92.	13.82	2.32	7.084E-03	1764.51	15.920	5.217E-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
174.71	87.52	1680.	324.	0.162	64.47	1.503	Bl-207 l
187.70	94.02	1129.	118.	0.059	123.75	1.438	TH-227 s
417.30	208.83	720.	221.	0.111	62.10	1.472	LU-177 s
540.39	270.38	505.	129.	0.065	89.77	1.516	AC-228 s
601.56	300.97	407.	138.	0.069	77.58	1.641	PB-212 s
818.05	409.23	174.	52.	0.026	120.30	1.148	AC-228 s
1868.15	934.29	136.	65.	0.032	85.05	1.437	Bl-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-212	149.29	74.81	939.	366.	0.183	38.40	1.178D
PB-212	153.89	77.11	1045.	440.	0.220	24.03	1.180A
PB-214	153.89	77.11	1756.	150.	0.075	112.71	1.500A
RA-226	371.41	185.88	861.	245.	0.123	60.97	1.668s
TH-227	471.61	235.99	1640.	-194.	-0.097	91.48	1.500s

PB-212	476.89	238.63	501.	1497.	0.748	9.88	1.297D
PB-214	483.47	241.92	770.	211.	0.106	59.01	1.300D
PB-214	590.44	295.41	320.	295.	0.147	32.12	1.582s
AC-228	677.04	338.71	424.	396.	0.198	31.79	1.655s
PB-214	703.83	352.11	440.	592.	0.296	23.59	1.508s
SB-125	926.12	463.26	202.	87.	0.044	73.71	1.500s
TL-208	1021.57	510.99	252.	218.	0.109	37.20	2.345s
TL-208	1166.42	583.42	241.	592.	0.296	19.14	1.755s
BI-214	1218.41	609.41	200.	484.	0.242	21.58	1.970s
Ag-108M	1224.80	612.61	251.	-59.	-0.029	121.22	1.561s
BI-212	1454.85	727.64	169.	167.	0.083	50.71	1.740s
CS-134	1589.72	795.08	107.	41.	0.020	116.23	1.684s
AC-228	1822.66	911.55	116.	416.	0.208	20.77	1.988s
AC-228	1936.52	968.48	145.	327.	0.164	27.53	1.650s
BI-214	2240.96	1120.70	92.	118.	0.059	49.44	2.841s
K-40	2921.91	1461.16	30.	1932.	0.966	6.96	2.408
BI-212	3241.35	1620.86	13.	25.	0.012	105.79	1.684s
BI-214	3529.46	1764.90	17.	92.	0.046	41.46	2.316s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-3.5726E-03					
			477.56	-3.573E-03	&(	2.552E-01	7.48E-02 G
K-40		1.4158E+01					
			1460.75	1.416E+01	(P	2.070E-01	3.29E-01 G
MN-54		8.3155E-03					
			834.81	8.315E-03	%(P	2.950E-02	8.77E-03 G
CO-57		2.1026E-03					
			122.07	2.103E-03	%(P	2.860E-02	8.54E-03 G K
			136.43	3.179E-02	% P	2.736E-01	8.20E-02 G
CO-60		9.6719E-03					
			1332.51	9.672E-03	&(P	2.784E-02	8.16E-03 G K
			1173.23	4.897E-03	% P	4.006E-02	1.17E-02 G K
Sr-85		-1.6731E-02					
			514.00	-1.673E-02	%(	3.371E-02	1.02E-02 G

Kr-85 -4.0290E+02

513.99-4.029E+02 %(P 7.648E+02 2.31E+02 G

Y-88 6.1800E-04

1836.01 6.180E-04 %(P 1.923E-02 5.04E-03 G K

898.02-4.688E-04 % P 3.087E-02 8.84E-03 G

NB-94 3.5254E-03

871.10 3.525E-03 &(P 2.249E-02 6.53E-03 G K

702.50 4.343E-04 % P 2.863E-02 8.32E-03 G K

Ag-108M -7.4265E-03

722.95-7.427E-03 %(3.535E-02 1.05E-02 G K

614.37-2.661E-02 & 3.476E-02 1.08E-02 G

433.93-1.693E-03 & P 2.579E-02 7.54E-03 G

CD-109 5.9770E-01

88.04 5.977E-01 %(P 1.013E+00 3.08E-01 G

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

SN-113      -6.8321E-04
                 391.71-6.832E-04 %(P 3.820E-02 1.12E-02 G K
                 255.04 2.947E-01 &   1.027E+00 3.08E-01 G

SB-125       6.2893E-02
                 427.95-1.272E-02 &(P 8.007E-02 2.36E-02 G K
                 600.77-1.576E-02 % P 1.245E-01 3.62E-02 G
                 636.15 2.287E-02 & P 1.996E-01 5.81E-02 G
                 463.51 2.867E-01 *(P 2.268E-01 7.27E-02 G
                 176.29 2.951E-02 % P 3.884E-01 1.16E-01 G

I-131       -2.6925E-03
                 364.48-2.693E-03 &(  3.447E-02 1.02E-02 G K
                 636.97 0.000E+00 &   4.167E-01 1.21E-01 G
                 284.29-1.000E-03 %   4.595E-01 1.36E-01 G

CS-134       1.1046E-02
                 604.66-1.767E-04 %(P 2.400E-02 6.93E-03 G K
                 795.76 2.387E-02 *(P 2.993E-02 9.37E-03 G
                 569.29 6.785E-03 &   1.734E-01 5.07E-02 G
                 801.84-3.679E-02 & P 3.038E-01 8.85E-02 G

CS-137      -4.6491E-03
                 661.62-4.649E-03 %(P 3.032E-02 8.76E-03 G

CE-139      -7.5289E-03
                 165.85-7.529E-03 %(P 2.900E-02 8.71E-03 G

EU-152      -3.4845E-02
                 121.78-3.485E-02 %(P 1.005E-01 3.04E-02 G K
```

344.30-1.900E-02 % P 8.843E-02 2.64E-02 G
1408.08 6.294E-02 % P 1.105E-01 3.39E-02 G
964.00 2.778E-02 & P 3.293E-01 9.72E-02 G
1112.07 3.433E-02 & P 2.119E-01 6.17E-02 G
778.90-3.747E-02 % P 2.286E-01 6.72E-02 G

EU-154 -8.3628E-03
123.10-8.363E-03 %(P 6.822E-02 2.04E-02 G K
1274.80-9.611E-03 % P 9.064E-02 2.62E-02 G
723.30-5.465E-02 % P 1.581E-01 4.73E-02 G
1004.80-6.250E-02 & P 1.871E-01 5.59E-02 G

EU-155 8.1734E-02
86.45 8.173E-02 %(1.238E-01 3.77E-02 G K
105.31 2.401E-02 % P 1.424E-01 4.28E-02 G

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

HG-203       1.0722E-02
                    279.17 1.072E-02 %(P 2.760E-02 8.32E-03 G K
                     72.87-1.280E-01 % P 9.000E-01 2.71E-01 G
                     70.83-3.231E-03 %   1.395E+00 4.18E-01 G
                     82.50-8.904E-01 %   1.945E+00 5.90E-01 G

TL-208       2.7135E-01
                    583.14 2.713E-01 *(P 3.442E-02 1.75E-02 G
                    510.72 3.439E-01 + P 1.211E-01 4.93E-02 G

PB-212       7.1552E-01
                    238.63 6.993E-01  (P 5.001E-02 2.33E-02 G K
                                      Energy duplication
                     77.11 5.457E-01 }   1.903E-01 4.37E-02 G
                     74.81 8.592E-01 + P 3.417E-01 1.11E-01 G

PB-214       3.9992E-01
                    351.99 4.226E-01 *(P 7.168E-02 3.35E-02 G K
                    295.22 3.560E-01  (P 1.041E-01 3.87E-02 G
                                      Energy duplication
                     77.11 3.036E-01 } P 4.018E-01 1.14E-01 G
                    241.92 5.740E-01 + P 3.588E-01 1.14E-01 G

BI-212       6.7953E-01
                    727.17 6.603E-01 *(P 2.509E-01 1.13E-01 G K
                   1620.56 7.621E-01 *(P 6.081E-01 2.74E-01 G
                    785.42 6.416E-01 % P 1.344E+00 4.07E-01 G

BI-214       4.4708E-01
                    609.32 4.282E-01 *(P 6.079E-02 3.11E-02 G K
```

1764.51 5.217E-01 + P 1.261E-01 7.28E-02 G
1120.28 5.051E-01 (P 2.032E-01 8.39E-02 G

RA-224 6.1267E-01
241.00 6.127E-01 &(P 8.887E-01 2.71E-01 G

RA-226 1.3300E+00
185.99 1.330E+00 *(7.563E-01 2.70E-01 G

AC-228 8.0892E-01
911.07 7.933E-01 @(P 1.010E-01 5.55E-02 G K
968.90 1.085E+00 + P 1.950E-01 1.00E-01 G
338.40 8.467E-01 (P 2.111E-01 9.05E-02 G

TH-227 -3.4569E-01
236.00-3.457E-01 ?(P 3.419E-01 1.05E-01 G K
256.25-8.584E-02 % P 3.550E-01 1.06E-01 G

Nuclide Ave activity Energy Activity Code Peak MDA Comments

PA-234 -3.8516E-02

98.44-3.852E-02 &(1.270E-01 3.83E-02 G K
946.00-2.167E-02 & 1.648E-01 4.83E-02 G
131.28-2.733E-02 & 1.485E-01 4.46E-02 G
94.67 8.074E-04 % 2.355E-01 7.05E-02 G
883.24 4.674E-02 % 2.156E-01 6.34E-02 G
926.70-9.030E-04 % 2.225E-01 6.34E-02 G
569.26 8.963E-03 & 2.569E-01 7.51E-02 G

TH-234 2.7131E-01

63.29 2.713E-01 %(P 1.559E+00 4.68E-01 G K
92.80-2.340E-02 & P 1.257E+00 3.75E-01 G
92.38-4.710E-02 & P 1.476E+00 4.41E-01 G

AM-241 1.6554E-03

59.54 1.655E-03 %(P 1.985E-01 5.93E-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	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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	-3.4808E-03	-3.5726E-03	2.2427E-01	2.2427E-01	2.486E-01
K-40	1.4158E+01	1.4158E+01	9.8815E-01	1.2945E+00	
MN-54 #A	8.2786E-03	8.3155E-03	2.6300E-02	2.6304E-02	2.936E-02
CO-57 #B	2.0918E-03	2.1026E-03	2.5617E-02	2.5618E-02	2.845E-02
CO-60 #B	9.6649E-03	9.6719E-03	2.4486E-02	2.4493E-02	2.782E-02
Sr-85 #A	-1.6376E-02	-1.6731E-02	3.0699E-02	3.0715E-02	3.300E-02
Kr-85 #A	-4.0289E+02	-4.0290E+02	7.8485E+02	7.8521E+02	7.647E+02
Y-88 #B	6.1000E-04	6.1800E-04	1.5108E-02	1.5108E-02	1.898E-02
NB-94 #B	3.5254E-03	3.5254E-03	1.9581E-02	1.9583E-02	2.249E-02
Ag-108M#B	-7.4263E-03	-7.4265E-03	3.1465E-02	3.1468E-02	3.535E-02
CD-109 #A	5.9588E-01	5.9770E-01	9.2481E-01	9.2541E-01	1.010E+00
SN-113 #B	-6.7501E-04	-6.8321E-04	3.6117E-01	3.6117E-01	3.774E-02
SB-125 #B	6.2807E-02	6.2893E-02	4.7855E-02	4.7999E-02	7.996E-02
I-131 #B	-2.2653E-03	-2.6925E-03	3.0562E-02	3.0562E-02	2.900E-02
CS-134 #B	1.1025E-02	1.1046E-02	1.3006E-02	1.3022E-02	2.395E-02
CS-137 #A	-4.6485E-03	-4.6491E-03	5.9923E-02	5.9924E-02	3.032E-02
CE-139 #A	-7.4533E-03	-7.5289E-03	2.6659E-02	2.6662E-02	2.871E-02
EU-152 #B	-3.4835E-02	-3.4845E-02	9.1482E-02	9.1503E-02	1.005E-01
EU-154 #B	-8.3591E-03	-8.3628E-03	6.4725E-02	6.4727E-02	6.819E-02
EU-155 #B	8.1671E-02	8.1734E-02	1.1317E-01	1.1326E-01	1.237E-01
HG-203 #B	1.0407E-02	1.0722E-02	2.4965E-02	2.4973E-02	2.679E-02
TL-208 #	2.7135E-01	2.7135E-01	5.2340E-02	5.4739E-02	
PB-212	7.1552E-01	7.1552E-01	7.1469E-02	8.3028E-02	
PB-214	3.9992E-01	3.9992E-01	8.0728E-02	8.4112E-02	
BI-212 #	6.7953E-01	6.7953E-01	3.4725E-01	3.4956E-01	
BI-214	4.4708E-01	4.4708E-01	9.7366E-02	1.0088E-01	

RA-224 #A	6.1267E-01	6.1267E-01	8.1375E-01	8.1455E-01	8.887E-01
RA-226 #	1.3300E+00	1.3300E+00	8.1088E-01	8.1468E-01	
AC-228 #	8.0892E-01	8.0892E-01	1.5492E-01	1.6212E-01	
TH-227 #A	-3.4569E-01	-3.4569E-01	3.1669E-01	3.1735E-01	3.419E-01
PA-234 #B	-3.8516E-02	-3.8516E-02	1.1495E-01	1.1497E-01	1.270E-01
TH-234 #B	2.7131E-01	2.7131E-01	1.4030E+00	1.4030E+00	1.559E+00
AM-241 #A	1.6554E-03	1.6554E-03	1.7798E-01	1.7798E-01	1.985E-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

YAEC Chemistry Lab Spectrum name: 107F_2SEPT2005_1532.An1

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

Total Activity (270.2 to 2000.1 keV) 1.8810381E+01 pCi/gm

Total Decayed Activity (270.2 to 2000.1 keV) 1.8810383E+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_6SEP2005_1452.An1

Sample description

FSS-NOL-06-01-070-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEP2005_1452.An1

Acquisition information

Start time:	06-Sep-2005 14:52:56
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: 2.0030E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0030E+03) =
4.9925E+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: 107F_6SEP2005_1452.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	06-Sep-2005 11:13:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1128

***** 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	329.	13.92	1.18	2.842E-02	74.81	9.600	8.012E-01	PB212
77.28	531.	9.58	1.18	2.964E-02	77.11	10.700	1.122E+00	PB214
					77.11	17.500	6.921E-01	PB212
87.22	157.	24.49	1.19	3.306E-02	86.45	32.740	9.843E-02	EU155
					88.04	3.790	PBC<MDA	CD109
90.11	105.	37.26	1.19	3.379E-02				
93.38	172.	23.68	1.19	3.452E-02	92.80	3.000	PBC<MDA	TH234

186.15	259.	18.72	1.78	3.609E-02	185.99	3.280	1.475E+00	RA226
209.92	96.	32.04	0.84	3.423E-02				
238.81	1377.	3.54	1.30	3.188E-02	238.63	43.100	6.683E-01	PB212
					241.00	3.900	7.504E+00	RA224
241.53	233.	19.74	1.30	3.166E-02	241.92	7.470	6.625E-01	PB214
276.95	83.	36.04	1.59	2.895E-02				
295.32	340.	8.56	1.34	2.767E-02	295.22	19.200	4.256E-01	PB214
300.58	82.	28.46	1.34	2.732E-02				
338.64	375.	11.36	1.65	2.499E-02	338.40	12.010	8.344E-01	AC228
352.04	637.	5.49	1.79	2.426E-02	351.99	37.100	4.737E-01	PB214
409.62	63.	35.82	1.07	2.154E-02				
462.40	134.	24.41	1.32	1.956E-02				
462.40	134.	24.41	1.32	1.956E-02	463.51	10.000	4.533E-01	SB125
510.84	197.	16.27	1.82	1.808E-02	510.72	22.500	2.712E-01	TL208
563.07	61.	37.85	1.41	1.674E-02				
573.91	47.	37.91	0.59	1.649E-02				
583.17	486.	6.76	1.84	1.629E-02	583.14	86.000	2.317E-01	TL208
609.37	514.	7.06	1.68	1.574E-02	609.32	46.090	4.739E-01	BI214
661.83	80.	24.75	1.22	1.477E-02	661.62	84.620	4.127E-02	CS137
727.45	129.	16.88	2.00	1.374E-02	727.17	11.800	5.326E-01	BI212
768.69	54.	34.55	0.98	1.318E-02				
795.18	95.	25.03	1.80	1.285E-02				
795.18	95.	25.03	1.80	1.285E-02	795.76	85.400	5.801E-02	CS134
911.13	353.	7.34	2.17	1.161E-02	911.07	29.000	6.998E-01	AC228
968.01	321.	10.10	1.82	1.110E-02	968.90	17.460	1.109E+00	AC228
1119.59	106.	16.83	1.87	9.974E-03	1120.28	15.040	4.721E-01	BI214
1376.46	46.	27.32	1.45	8.564E-03				
1460.52	1885.	2.38	2.12	8.192E-03	1460.75	10.700	1.447E+01	K40
1620.54	60.	17.23	1.16	7.569E-03	1620.56	2.750	1.961E+00	BI212
1764.28	129.	10.03	2.79	7.084E-03	1764.51	15.920	7.724E-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
174.10	87.27	660.	157.	0.078	73.48	1.187	PB-214 D
179.88	90.17	718.	105.	0.053	111.79	1.189	PB-214 D
186.43	93.44	748.	172.	0.086	71.04	1.191	U-235 D
419.48	209.92	425.	96.	0.048	96.12	0.838	NP-239 s
553.52	276.95	349.	76.	0.038	109.55	1.594	TL-208 s
600.70	300.54	337.	90.	0.045	100.41	0.714	PB-212 sM
818.85	409.62	183.	63.	0.031	107.46	1.067	AC-228 s
1125.73	563.07	149.	63.	0.032	90.18	1.412	CS-134 s
2752.51	1376.46	34.	46.	0.023	81.95	1.445	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	149.29	74.81	863.	348.	0.174	38.75	1.178D
PB-212	153.89	77.11	1016.	520.	0.260	22.60	1.179A

EU-155	174.31	87.32	1725.	160.	0.080	112.83	1.500
TH-234	186.41	93.37	1576.	152.	0.076	99.93	1.500s
RA-226	371.94	186.15	803.	259.	0.129	56.16	1.777s
TH-227	471.90	236.13	1469.	-162.	-0.081	103.33	1.500s
PB-212	476.89	238.63	458.	1355.	0.677	10.40	1.297D
RA-224	477.25	238.81	756.	1319.	0.659	12.08	1.500s
PB-214	483.47	241.92	573.	219.	0.109	50.29	1.299D
PB-214	590.20	295.29	473.	354.	0.177	34.14	1.692s
AC-228	676.90	338.64	426.	371.	0.186	34.08	1.651s
PB-214	703.70	352.04	239.	632.	0.316	16.46	1.787s
SB-125	925.47	462.94	200.	70.	0.035	88.66	1.500s
TL-208	1021.27	510.84	278.	164.	0.082	48.81	1.823s
TL-208	1165.93	583.17	184.	481.	0.241	20.28	1.839
BI-214	1218.32	609.37	205.	510.	0.255	21.19	1.682
CS-137	1323.23	661.83	124.	76.	0.038	74.25	1.217
BI-212	1454.48	727.45	121.	128.	0.064	50.64	1.996s
CS-134	1590.30	795.37	90.	61.	0.030	75.99	1.684
AC-228	1821.83	911.13	101.	349.	0.175	22.01	2.169s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1935.58	968.01	161.	318.	0.159	30.31	1.816s
Bl-214	2238.74	1119.59	79.	105.	0.052	50.48	1.869
K-40	2920.64	1460.52	30.	1880.	0.940	7.15	2.125
Bl-212	3240.69	1620.54	10.	60.	0.030	51.70	1.161s
Bl-214	3528.22	1764.28	9.	129.	0.065	30.09	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 -		Average	---------- Peak ----------			
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm COMMENTS

BE-7 -8.2027E-04
477.56-8.203E-04 %(2.074E-01 6.01E-02 G

K-40 1.4472E+01
1460.75 1.447E+01 (P 2.171E-01 3.46E-01 G

MN-54 -9.2037E-03
834.81-9.204E-03 %(P 2.929E-02 8.71E-03 G

CO-57 2.0574E-03
122.07 2.057E-03 &(P 3.435E-02 1.03E-02 G K
136.43 1.363E-04 % P 2.546E-01 7.59E-02 G

CO-60 3.7480E-03

1332.51 3.748E-03 &(P 2.854E-02 8.07E-03 G K
1173.23-3.110E-03 % P 3.905E-02 1.11E-02 G K

Sr-85 -1.3089E-02
514.00-1.309E-02 &(3.233E-02 9.76E-03 G

Kr-85 -3.2826E+02
513.99-3.283E+02 &(P 7.486E+02 2.25E+02 G

Y-88 -8.0540E-04
1836.01-8.054E-04 %(P 7.298E-03 9.90E-04 G K
898.02-1.213E-03 % P 2.997E-02 8.53E-03 G

NB-94 2.8526E-04
871.10 2.853E-04 &(P 2.574E-02 7.36E-03 G K
702.50-4.040E-03 & P 2.851E-02 8.35E-03 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	6.2673E-04						
		722.95	6.267E-04	%(	5.649E-02	1.67E-02	G K
		614.37	-1.548E-02	%	3.329E-02	1.01E-02	G
		433.93	-7.501E-03	% P	2.736E-02	8.13E-03	G
CD-109	3.8170E-02						
		88.04	3.817E-02	%(P	1.076E+00	3.22E-01	G
SN-113	-1.1590E-03						
		391.71	-1.159E-03	&(P	3.887E-02	1.14E-02	G K
		255.04	1.339E-01	&	1.250E+00	3.73E-01	G
SB-125	6.4187E-02						
		427.95	3.783E-03	&(P	8.027E-02	2.35E-02	G K
		600.77	7.327E-03	& P	1.312E-01	3.81E-02	G
		636.15	2.016E-02	& P	2.050E-01	5.96E-02	G
		463.51	2.430E-01	@(P	2.370E-01	7.47E-02	G
		176.29	-4.927E-03	& P	3.985E-01	1.18E-01	G
I-131	3.1943E-03						
		364.48	3.194E-03	&(	2.938E-02	8.69E-03	G K
		636.97	-1.469E-02	%	3.422E-01	9.92E-02	G
		284.29	4.163E-02	&	4.123E-01	1.23E-01	G
CS-134	1.8333E-02						
		604.66	1.698E-03	%(P	6.473E-02	1.93E-02	G K
		795.76	3.734E-02	(P	2.889E-02	9.54E-03	G
		569.29	-3.877E-02	%	1.654E-01	4.91E-02	G
		801.84	6.435E-02	% P	2.154E-01	6.35E-02	G

CS-137 4.1274E-02

661.62 4.127E-02 (P 2.942E-02 1.07E-02 G

CE-139 -6.1606E-03

165.85-6.161E-03 &(P 3.430E-02 1.03E-02 G

EU-152 7.4184E-03

121.78 7.418E-03 &(P 1.031E-01 3.09E-02 G K

344.30 8.642E-04 & P 7.101E-02 2.07E-02 G

1408.08-2.678E-03 & P 1.386E-01 3.87E-02 G

964.00 4.049E-03 & P 3.194E-01 9.36E-02 G

1112.07-5.233E-02 & P 2.368E-01 6.94E-02 G

778.90 4.680E-04 % P 2.090E-01 6.01E-02 G

EU-154 -7.1867E-03

123.10-7.187E-03 &(P 7.331E-02 2.20E-02 G K

1274.80-3.670E-03 & P 1.338E-01 3.89E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30-1.098E-03 % P 2.558E-01 7.56E-02 G
                      1004.80-7.243E-04 % P 1.954E-01 5.63E-02 G

EU-155       1.0024E-01
                       86.45 1.002E-01  (  1.232E-01 3.77E-02 G K
                      105.31 2.304E-02 % P 1.442E-01 4.33E-02 G

HG-203       1.7074E-03
                      279.17 1.707E-03 &(P 2.994E-02 8.87E-03 G K
                       72.87-4.251E-01 % P 9.180E-01 2.78E-01 G
                       70.83-2.039E-02 %   1.533E+00 4.59E-01 G
                       82.50-5.321E-01 %   1.816E+00 5.48E-01 G

TL-208       2.3987E-01
                      583.14 2.317E-01  (P 3.174E-02 1.58E-02 G
                      510.72 2.712E-01 *(P 1.335E-01 5.32E-02 G

PB-212       6.7778E-01
                      238.63 6.649E-01  (P 5.029E-02 2.33E-02 G K
                                          Energy duplication
                       77.11 6.778E-01 }   1.971E-01 5.11E-02 G
                       74.81 8.592E-01 + P 3.442E-01 1.12E-01 G

PB-214       4.6563E-01
                      351.99 4.737E-01 *(P 5.605E-02 2.62E-02 G K
                      295.22 4.501E-01  (P 1.321E-01 5.19E-02 G
                                          Energy duplication
                       77.11 4.031E-02 } P 4.132E-01 1.19E-01 G
                      241.92 6.249E-01 + P 3.263E-01 1.05E-01 G

BI-212       5.3258E-01
```

727.17 5.326E-01 (P 2.245E-01 9.08E-02 G K
1620.56 1.961E+00 + P 5.534E-01 3.41E-01 G
785.42 5.731E-01 % P 1.484E+00 4.45E-01 G

BI-214 4.7347E-01
609.32 4.739E-01 (P 6.461E-02 3.38E-02 G K
1764.51 7.724E-01 + P 9.937E-02 7.80E-02 G
1120.28 4.721E-01 (P 1.987E-01 8.01E-02 G

RA-224 7.1945E+00
241.00 7.195E+00 &(P 7.141E-01 2.90E-01 G

RA-226 1.4745E+00
185.99 1.475E+00 *(7.679E-01 2.76E-01 G

AC-228 7.3921E-01
911.07 6.998E-01 (P 9.921E-02 5.20E-02 G K
968.90 1.109E+00 + P 2.152E-01 1.13E-01 G
338.40 8.344E-01 *(P 2.221E-01 9.57E-02 G

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

TH-227      -3.0373E-01
                    236.00-3.037E-01 ?(P 3.401E-01 1.04E-01 G K
                    256.25 4.741E-02 & P 2.753E-01 8.17E-02 G

PA-234      -2.6902E-02
                     98.44-2.690E-02 %(  1.195E-01 3.59E-02 G K
                    946.00-1.562E-02 &   1.457E-01 4.23E-02 G
                    131.28 3.012E-03 %   1.518E-01 4.54E-02 G
                     94.67-5.355E-02 &   2.213E-01 6.66E-02 G
                    883.24 3.849E-02 &   1.966E-01 5.74E-02 G
                    926.70-5.674E-03 &   2.530E-01 7.26E-02 G
                    569.26-5.745E-02 %   2.454E-01 7.28E-02 G

TH-234       8.5348E-01
                     63.29 7.436E-01 %(P 1.571E+00 4.75E-01 G K
                     92.80 9.963E-01  (P 1.228E+00 3.75E-01 G
                     92.38-3.356E-01 & P 1.199E+00 3.59E-01 G

AM-241      -6.7153E-02
                     59.54-6.715E-02 &(P 2.042E-01 6.16E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7 #A	-8.1865E-04	-8.2027E-04	1.8042E-01	1.8042E-01	2.070E-01
K-40	1.4472E+01	1.4472E+01	1.0369E+00	1.3438E+00	
MN-54 #A	-9.2006E-03	-9.2037E-03	2.7498E-02	2.7503E-02	2.928E-02
CO-57 #B	2.0566E-03	2.0574E-03	3.0820E-02	3.0821E-02	3.434E-02
CO-60 #B	3.7478E-03	3.7480E-03	2.4212E-02	2.4213E-02	2.854E-02
Sr-85 #A	-1.3068E-02	-1.3089E-02	2.9271E-02	2.9282E-02	3.228E-02
Kr-85 #A	-3.2826E+02	-3.2826E+02	7.9126E+02	7.9150E+02	7.486E+02
Y-88 #B	-8.0460E-04	-8.0540E-04	4.8324E-03	4.8327E-03	7.291E-03
NB-94 #B	2.8526E-04	2.8526E-04	2.2072E-02	2.2072E-02	2.574E-02
Ag-108M#B	6.2672E-04	6.2673E-04	5.0131E-02	5.0131E-02	5.649E-02
CD-109 #A	3.8162E-02	3.8170E-02	9.6713E-01	9.6713E-01	1.076E+00
SN-113 #B	-1.1580E-03	-1.1590E-03	2.2623E-01	2.2623E-01	3.883E-02
SB-125 #B	6.4181E-02	6.4187E-02	5.9188E-02	5.9309E-02	8.026E-02
I-131 #B	3.1526E-03	3.1943E-03	2.6066E-02	2.6067E-02	2.900E-02
CS-134 #B	1.8331E-02	1.8333E-02	1.4052E-02	1.4094E-02	6.472E-02
CS-137	4.1274E-02	4.1274E-02	3.2060E-02	3.2153E-02	
CE-139 #A	-6.1559E-03	-6.1606E-03	3.1646E-02	3.1648E-02	3.427E-02
EU-152 #B	7.4182E-03	7.4184E-03	9.2560E-02	9.2561E-02	1.031E-01
EU-154 #B	-7.1864E-03	-7.1867E-03	7.0353E-02	7.0355E-02	7.331E-02
EU-155 #A	1.0024E-01	1.0024E-01	1.1310E-01	1.1324E-01	1.231E-01
HG-203 #B	1.7035E-03	1.7074E-03	2.6611E-02	2.6611E-02	2.987E-02
TL-208	2.3987E-01	2.3987E-01	4.9106E-02	5.1109E-02	

PB-212	6.7778E-01	6.7778E-01	7.1286E-02	8.1756E-02	
PB-214	4.6563E-01	4.6563E-01	7.7278E-02	8.2025E-02	
BI-212	5.3258E-01	5.3258E-01	2.7243E-01	2.7424E-01	
BI-214	4.7347E-01	4.7347E-01	1.0118E-01	1.0497E-01	
RA-224 #	7.1945E+00	7.1945E+00	8.7068E-01	9.6883E-01	7.141E-01
RA-226 #	1.4745E+00	1.4745E+00	8.2809E-01	8.3265E-01	
AC-228	7.3921E-01	7.3921E-01	1.5139E-01	1.5756E-01	
TH-227 #A	-3.0373E-01	-3.0373E-01	3.1436E-01	3.1487E-01	3.401E-01
PA-234 #B	-2.6902E-02	-2.6902E-02	1.0775E-01	1.0776E-01	1.195E-01
TH-234 #B	8.5348E-01	8.5348E-01	9.4967E-01	9.5085E-01	1.571E+00
AM-241 #A	-6.7153E-02	-6.7153E-02	1.8897E-01	1.8901E-01	2.042E-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_6SEP2005_1452.An1

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

Total Activity (248.2 to 2000.1 keV) 1.9116806E+01 pCi/gm

Total Decayed Activity (248.2 to 2000.1 keV) 1.9116806E+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_6SEP2005_1529.An1

Sample description

FSS-NOL-06-01-071-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEP2005_1529.An1

Acquisition information

Start time:	06-Sep-2005 15:29:42
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: 1.9510E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9510E+03) =
5.1256E+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	01-Sep-2005 11:18:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0262

***** 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
62.39	194.	27.68	1.59	1.921E-02				
62.39	194.	27.68	1.59	1.921E-02	63.29	3.900	1.581E+00	TH234
74.80	345.	12.87	1.18	2.849E-02	74.81	9.600	8.740E-01	PB212
77.10	559.	7.07	1.18	2.957E-02	77.11	10.700	1.464E+00	PB214
					77.11	17.500	9.012E-01	PB212
84.33	103.	36.10	0.69	3.222E-02				
87.17	179.	34.06	1.50	3.284E-02	86.45	32.740	PBC<MDA	EU155

					88.04	3.790	PBC<MDA	CD109
92.91	194.	27.55	1.50	3.438E-02	92.38	2.570	1.525E+00	TH234
					92.80	3.000	1.303E+00	TH234
92.93	207.	27.81	1.50	3.429E-02	92.38	2.570	1.625E+00	TH234
					92.80	3.000	PBC<MDA	TH234
129.21	168.	37.22	1.12	3.819E-02				
129.21	168.	37.22	1.12	3.819E-02	131.28	20.000	1.518E-01	PA234
186.12	208.	24.44	1.23	3.609E-02	185.99	3.280	1.214E+00	RA226
208.80	138.	33.20	1.28	3.433E-02				
238.66	1501.	3.06	1.30	3.189E-02	238.63	43.100	7.486E-01	PB212
242.02	252.	13.60	1.30	3.162E-02	241.00	3.900	1.401E+00	RA224
					241.92	7.470	7.355E-01	PB214
270.27	127.	19.95	1.55	2.944E-02				
295.25	327.	8.53	1.34	2.768E-02	295.22	19.200	4.197E-01	PB214
299.86	73.	31.81	1.34	2.737E-02				
328.23	122.	27.82	1.75	2.559E-02				
338.80	339.	11.49	1.25	2.498E-02	338.40	12.010	7.736E-01	AC228
351.90	669.	6.03	1.49	2.426E-02	351.99	37.100	5.109E-01	PB214
462.68	119.	24.06	1.63	1.955E-02				
462.68	119.	24.06	1.63	1.955E-02	463.51	10.000	4.143E-01	SB125
510.76	246.	12.56	1.90	1.808E-02	510.72	22.500	3.619E-01	TL208
583.07	494.	6.55	1.54	1.629E-02	583.14	86.000	2.420E-01	TL208
609.33	490.	6.32	1.81	1.574E-02	609.32	46.090	4.635E-01	BI214
661.61	160.	20.20	1.52	1.477E-02	661.62	84.620	8.662E-02	CS137
727.06	151.	16.83	1.43	1.374E-02	727.17	11.800	6.403E-01	BI212
784.00	58.	32.23	2.75	1.297E-02	778.90	12.990	PBC<MDA	EU152
					785.42	2.000	1.550E+00	BI212
794.61	88.	22.29	1.02	1.285E-02				

YAEC Chemistry Lab Spectrum name: 107F_6SEP2005_1529.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
794.61	88.	22.29	1.02	1.285E-02	795.76	85.400	5.520E-02	CS134
911.12	423.	7.34	1.71	1.161E-02	911.07	29.000	8.616E-01	AC228
967.76	267.	10.15	1.71	1.110E-02	968.90	17.460	9.469E-01	AC228
1119.84	124.	15.50	2.27	9.973E-03	1120.28	15.040	5.710E-01	BI214
1154.83	66.	34.12	1.44	9.750E-03				
1173.00	43.	34.88	1.93	9.637E-03	1173.23	99.860	PBC<MDA	CO60
1460.60	2032.	2.27	2.13	8.192E-03	1460.75	10.700	1.602E+01	K40
1730.11	43.	15.25	1.01	7.194E-03				
1763.70	111.	9.94	2.74	7.084E-03	1764.51	15.920	6.824E-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	
124.46	62.39	1135.	141.	0.071	104.41	1.595	AM-241	s
258.08	129.21	1283.	169.	0.084	93.00	1.116	AC-228	s
417.24	208.80	724.	138.	0.069	99.60	1.277	LU-177	s
540.16	270.27	244.	127.	0.063	59.84	1.546	AC-228	
599.28	299.83	318.	78.	0.039	110.17	1.265	TH-227	sM
656.08	328.23	365.	122.	0.061	83.47	1.754	AC-228	s
2309.23	1154.83	118.	66.	0.033	102.36	1.441	BI-214	
3459.86	1730.11	0.	43.	0.022	45.75	1.012	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	149.29	74.81	838.	345.	0.173	38.60	1.178D
PB-212	153.89	77.11	862.	559.	0.280	21.20	1.179A
EU-155	174.01	87.17	1778.	179.	0.090	102.19	1.500
TH-234	185.53	92.93	1684.	207.	0.103	83.43	1.500s
TH-234	185.48	92.91	1648.	194.	0.097	82.66	1.500s
RA-226	371.88	186.12	876.	208.	0.104	73.31	1.233s
TH-227	472.10	236.23	1448.	-143.	-0.072	115.53	1.500s
PB-212	476.89	238.63	318.	1486.	0.743	9.17	1.297D
PB-214	483.47	241.92	462.	253.	0.126	40.47	1.299D
PB-214	590.07	295.22	360.	343.	0.171	30.35	1.729s
AC-228	677.22	338.80	371.	335.	0.168	34.48	1.252s
PB-214	703.41	351.90	325.	664.	0.332	18.10	1.489s
SB-125	926.05	463.23	203.	86.	0.043	74.90	1.500

YAEC Chemistry Lab Spectrum name: 107F_6SEP2005_1529.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1021.11	510.76	242.	213.	0.106	37.68	1.900s
TL-208	1165.72	583.07	172.	490.	0.245	19.66	1.540
BI-214	1218.24	609.33	156.	485.	0.243	18.96	1.810
CS-137	1322.80	661.61	230.	156.	0.078	60.60	1.522
BI-212	1453.69	727.06	139.	150.	0.075	50.48	1.431s
BI-212	1567.56	784.00	100.	58.	0.029	96.69	2.753s
CS-134	1589.12	794.78	75.	66.	0.033	66.21	1.684s
AC-228	1821.80	911.12	139.	419.	0.209	22.01	1.714s
AC-228	1935.07	967.76	132.	265.	0.132	30.46	1.707s
BI-214	2239.25	1119.84	86.	124.	0.062	46.50	2.270s
CO-60	2345.56	1173.00	114.	43.	0.021	104.64	1.931
K-40	2920.80	1460.60	27.	2027.	1.014	6.82	2.125
BI-214	3527.04	1763.70	4.	111.	0.056	29.83	2.741s

s - Peak fails shape tests.

D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		8.1836E-02					
			477.56	8.184E-02	%(	2.223E-01	6.67E-02 G
K-40		1.6020E+01					
			1460.75	1.602E+01	(P	2.125E-01	3.65E-01 G

MN-54 9.3621E-03

834.81 9.362E-03 &(P 2.974E-02 8.86E-03 G

CO-57 4.1853E-03

122.07 4.185E-03 %(P 3.455E-02 1.04E-02 G K

136.43 2.435E-02 % P 2.865E-01 8.58E-02 G

CO-60 1.7806E-02

1332.51 4.873E-03 %(P 3.086E-02 8.80E-03 G K

1173.23 3.075E-02 (P 3.784E-02 1.18E-02 G K

Sr-85 -2.0730E-02

514.00-2.073E-02 %(3.620E-02 1.10E-02 G

Kr-85 -4.7986E+02

513.99-4.799E+02 %(P 7.943E+02 2.41E+02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	-7.4580E-04						
		1836.01	-7.458E-04	&(P	2.256E-02	5.84E-03	G K
		898.02	-5.751E-03	& P	3.701E-02	1.08E-02	G
NB-94	1.4736E-02						
		871.10	1.474E-02	%(P	2.431E-02	7.49E-03	G K
		702.50	6.271E-03	% P	2.982E-02	8.82E-03	G K
Ag-108M	6.4348E-04						
		722.95	6.435E-04	&(	5.681E-02	1.68E-02	G K
		614.37	-1.120E-02	&	3.480E-02	1.04E-02	G
		433.93	1.671E-04	% P	2.958E-02	8.66E-03	G
CD-109	-5.4822E-02						
		88.04	-5.482E-02	%(P	1.178E+00	3.53E-01	G
SN-113	6.2655E-03						
		391.71	6.265E-03	%(P	3.879E-02	1.15E-02	G K
		255.04	-2.040E-01	&	1.238E+00	3.70E-01	G
SB-125	9.0604E-02						
		427.95	1.818E-02	%(P	7.806E-02	2.32E-02	G K
		600.77	-5.862E-03	% P	1.268E-01	3.64E-02	G
		636.15	-2.114E-02	% P	2.227E-01	6.47E-02	G
		463.51	3.050E-01	(P	2.458E-01	7.86E-02	G
		176.29	6.754E-03	% P	4.546E-01	1.35E-01	G
I-131	4.1067E-03						
		364.48	4.107E-03	&(	4.043E-02	1.19E-02	G K
		636.97	-3.789E-02	%	5.014E-01	1.45E-01	G

284.29-7.214E-02 % 6.406E-01 1.90E-01 G

CS-134 1.9431E-02

604.66-2.359E-04 %(P 6.805E-02 2.03E-02 G K

795.76 4.191E-02 @(P 2.736E-02 9.32E-03 G

569.29-3.862E-03 % 1.485E-01 4.30E-02 G

801.84 4.137E-02 % P 2.976E-01 8.66E-02 G

CS-137 8.6623E-02

661.62 8.662E-02 (P 4.065E-02 1.79E-02 G

CE-139 -3.2619E-03

165.85-3.262E-03 %(P 3.695E-02 1.11E-02 G

EU-152 2.9541E-02

121.78 2.954E-02 %(P 9.557E-02 2.88E-02 G K

344.30-8.825E-03 % P 8.904E-02 2.63E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1408.08	-3.166E-03	&	P	1.183E-01	3.24E-02 G
		964.00	-7.070E-03	&	P	3.338E-01	9.79E-02 G
		1112.07	-1.572E-03	&	P	2.501E-01	7.15E-02 G
		778.90	-2.511E-03	%	P	1.831E-01	5.21E-02 G
EU-154	9.9526E-03						
		123.10	9.953E-03	&(P		7.252E-02	2.17E-02 G K
		1274.80	-4.550E-03	&	P	1.034E-01	2.97E-02 G
		723.30	3.330E-02	&	P	1.127E-01	3.34E-02 G
		1004.80	1.847E-02	%	P	1.567E-01	4.53E-02 G
EU-155	1.1581E-01						
		86.45	1.158E-01	(		1.286E-01	3.94E-02 G K
		105.31	5.344E-02	%	P	1.510E-01	4.56E-02 G
HG-203	-6.7056E-03						
		279.17	-6.706E-03	%(P		3.325E-02	9.92E-03 G K
		72.87	-2.584E-01	%	P	1.012E+00	3.05E-01 G
		70.83	4.379E-01	%		1.531E+00	4.62E-01 G
		82.50	-9.785E-01	%		2.080E+00	6.31E-01 G
TL-208	2.4205E-01						
		583.14	2.420E-01	(P		3.159E-02	1.60E-02 G
		510.72	3.619E-01	+	P	1.282E-01	5.26E-02 G
PB-212	7.4857E-01						
		238.63	7.486E-01	(P		4.326E-02	2.31E-02 G K
							Energy duplication
		77.11	7.486E-01	}		1.867E-01	5.29E-02 G
		74.81	8.740E-01	+	P	3.484E-01	1.14E-01 G

PB-214 4.8916E-01

351.99 5.109E-01 *(P 6.675E-02 3.11E-02 G K

295.22 4.471E-01 (P 1.188E-01 4.58E-02 G

Energy duplication

77.11 2.239E-01 } P 4.063E-01 1.19E-01 G

241.92 7.409E-01 + P 3.016E-01 1.01E-01 G

BI-212 6.4031E-01

727.17 6.403E-01 (P 2.463E-01 1.09E-01 G K

1620.56 2.725E-01 % P 6.971E-01 2.06E-01 G

785.42 1.550E+00 + P 1.317E+00 5.10E-01 G

BI-214 4.6346E-01

609.32 4.635E-01 (P 5.807E-02 2.96E-02 G K

1764.51 6.824E-01 + P 7.314E-02 6.84E-02 G

1120.28 5.710E-01 + P 2.126E-01 8.91E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RA-224	5.9049E-02						
		241.00	5.905E-02	%(P	8.282E-01	2.47E-01	G
RA-226	1.2138E+00						
		185.99	1.214E+00	@(	8.224E-01	2.97E-01	G
AC-228	8.6901E-01						
		911.07	8.616E-01	@(P	1.187E-01	6.39E-02	G K
		968.90	9.469E-01	*(P	2.013E-01	9.69E-02	G
		338.40	7.736E-01	@(P	2.132E-01	8.98E-02	G
TH-227	-2.7625E-01						
		236.00	-2.762E-01	?(P	3.468E-01	1.06E-01	G K
		256.25	-5.059E-02	& P	3.389E-01	1.01E-01	G
PA-234	3.2996E-02						
		98.44	3.300E-02	%(	1.343E-01	4.04E-02	G K
		946.00	-9.907E-04	%	1.881E-01	5.46E-02	G
		131.28	-1.092E-03	&	1.394E-01	4.16E-02	G
		94.67	-1.282E-01	%	2.486E-01	7.55E-02	G
		883.24	6.089E-02	%	2.260E-01	6.68E-02	G
		926.70	7.974E-03	&	2.631E-01	7.56E-02	G
		569.26	-3.804E-02	%	2.421E-01	7.13E-02	G
TH-234	1.2997E+00						
		63.29	1.083E+00	%(P	1.535E+00	4.67E-01	G K
		92.80	1.303E+00	(P	1.289E+00	3.96E-01	G
		92.38	1.625E+00	(P	1.524E+00	4.69E-01	G
AM-241	-1.1005E-01						

59.54-1.100E-01 %(P 2.081E-01 6.32E-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	7.6520E-02	8.1836E-02	2.0017E-01	2.0023E-01	2.079E-01
K-40	1.6020E+01	1.6020E+01	1.0958E+00	1.4477E+00	
MN-54 #A	9.2552E-03	9.3621E-03	2.6568E-02	2.6574E-02	2.940E-02
CO-57 #B	4.1301E-03	4.1853E-03	3.1052E-02	3.1053E-02	3.409E-02
CO-60 #B	1.7773E-02	1.7806E-02	2.0450E-02	2.0477E-02	3.080E-02
Sr-85 #A	-1.9614E-02	-2.0730E-02	3.3125E-02	3.3148E-02	3.426E-02
Kr-85 #A	-4.7984E+02	-4.7986E+02	8.0922E+02	8.0971E+02	7.942E+02
Y-88 #B	-7.2113E-04	-7.4580E-04	2.5834E-01	2.5834E-01	2.181E-02
NB-94 #B	1.4736E-02	1.4736E-02	2.2473E-02	2.2490E-02	2.431E-02
Ag-108M#B	6.4343E-04	6.4348E-04	5.0390E-02	5.0390E-02	5.681E-02

CD-109 #A	-5.4390E-02	-5.4822E-02	1.1304E+00	1.1304E+00	1.168E+00
SN-113 #B	6.0732E-03	6.2655E-03	3.4434E-02	3.4436E-02	3.760E-02
SB-125 #F	9.0284E-02	9.0604E-02	7.0088E-02	7.0292E-02	7.778E-02
I-131 #B	2.6287E-03	4.1067E-03	3.5713E-02	3.5714E-02	2.588E-02
CS-134 #B	1.9339E-02	1.9431E-02	1.2968E-02	1.3018E-02	6.773E-02
CS-137	8.6595E-02	8.6623E-02	5.3680E-02	5.3924E-02	
CE-139 #A	-3.1779E-03	-3.2619E-03	3.4841E-02	3.4841E-02	3.600E-02
EU-152 #B	2.9518E-02	2.9541E-02	8.6435E-02	8.6450E-02	9.550E-02
EU-154 #B	9.9411E-03	9.9526E-03	6.5211E-02	6.5213E-02	7.243E-02
EU-155 #A	1.1558E-01	1.1581E-01	1.1835E-01	1.1852E-01	1.283E-01
HG-203 #B	-6.2087E-03	-6.7056E-03	3.3656E-02	3.3658E-02	3.079E-02
TL-208	2.4205E-01	2.4205E-01	4.8021E-02	5.0104E-02	
PB-212	7.4857E-01	7.4857E-01	6.9379E-02	8.2268E-02	
PB-214	4.8916E-01	4.8916E-01	8.7453E-02	9.2101E-02	
BI-212 #	6.4031E-01	6.4031E-01	3.2600E-01	3.2819E-01	
BI-214	4.6346E-01	4.6346E-01	8.8668E-02	9.2797E-02	
RA-224 #A	5.9049E-02	5.9049E-02	7.4180E-01	7.4181E-01	8.282E-01
RA-226 #	1.2137E+00	1.2138E+00	8.8985E-01	8.9273E-01	
AC-228 #	8.6901E-01	8.6901E-01	1.4910E-01	1.5769E-01	
TH-227 #A	-2.7625E-01	-2.7625E-01	3.1975E-01	3.2017E-01	3.468E-01
PA-234 #B	3.2996E-02	3.2996E-02	1.2128E-01	1.2129E-01	1.343E-01

TH-234 #B	1.2997E+00	1.2997E+00	7.8200E-01	7.8532E-01	1.535E+00
AM-241 #A	-1.1005E-01	-1.1005E-01	1.9223E-01	1.9233E-01	2.081E-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) 2.0772854E+01 pCi/gm
Total Decayed Activity (270.2 to 2000.1 keV) 2.0772888E+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_6SEPT2005_1110.An1

Sample description

FSS-NOL-06-01-077-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEPT2005_1110.An1

Acquisition information

Start time:	06-Sep-2005 11:11:27
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: 2.0720E+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.

YAEC Chemistry Lab Spectrum name: 107F_6SEPT2005_1110.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	01-Sep-2005 12:58:00
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: 0.1108

***** 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	419.	11.83	1.18	2.849E-02	74.81	9.600	9.996E-01	PB212
77.20	437.	9.91	1.18	2.957E-02	77.11	17.500	8.355E-01	PB212
					77.11	10.700	1.357E+00	PB214
77.23	219.	26.20	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
87.10	271.	16.71	1.19	3.305E-02	86.45	32.740	1.648E-01	EU155
					88.04	3.790	1.412E+00	CD109

90.06	188.	23.45	1.19	3.379E-02				
93.37	227.	19.31	1.19	3.453E-02	92.38	2.570	1.622E+00	TH234
					92.80	3.000	PBC<MDA	TH234
128.98	163.	39.19	1.37	3.818E-02				
186.46	224.	20.85	1.57	3.607E-02	185.99	3.280	1.235E+00	RA226
209.66	166.	24.63	1.54	3.426E-02				
238.75	1585.	3.23	1.30	3.189E-02	238.63	43.100	7.443E-01	PB212
242.23	234.	14.78	1.30	3.161E-02	241.00	3.900	1.224E+00	RA224
					241.92	7.470	6.425E-01	PB214
270.33	166.	24.58	1.74	2.944E-02				
295.21	407.	10.65	1.58	2.768E-02	295.22	19.200	4.943E-01	PB214
328.31	119.	36.78	1.17	2.559E-02				
338.36	392.	9.90	1.19	2.501E-02	338.40	12.010	8.435E-01	AC228
351.98	732.	5.38	1.83	2.426E-02	351.99	37.100	5.268E-01	PB214
462.87	173.	20.14	1.42	1.955E-02				
462.87	173.	20.14	1.42	1.955E-02	463.51	10.000	5.700E-01	SB125
511.25	262.	14.17	2.07	1.807E-02	510.72	22.500	3.653E-01	TL208
583.19	639.	6.36	1.64	1.629E-02	583.14	86.000	2.954E-01	TL208
609.15	543.	6.38	1.66	1.575E-02	609.32	46.090	4.841E-01	BI214
661.60	491.	7.25	1.95	1.477E-02	661.62	84.620	2.544E-01	CS137
726.95	192.	16.82	1.67	1.375E-02	727.17	11.800	7.670E-01	BI212
784.50	59.	37.85	1.23	1.297E-02	785.42	2.000	PBC<MDA	BI212
794.62	124.	23.86	1.34	1.285E-02				
794.62	124.	23.86	1.34	1.285E-02	795.76	85.400	7.354E-02	CS134
910.99	446.	6.15	1.79	1.161E-02	911.07	29.000	8.561E-01	AC228
964.20	81.	19.84	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152

YAEC Chemistry Lab Spectrum name: 107F_6SEPT2005_1110.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
968.78	228.	8.49	1.80	1.109E-02	968.90	17.460	7.600E-01	AC228
1120.32	177.	17.19	2.10	9.970E-03	1120.28	15.040	7.665E-01	BI214
1172.77	334.	11.30	1.93	9.640E-03	1173.23	99.860	2.242E-01	CO60
1332.16	290.	9.03	2.02	8.775E-03	1332.51	99.980	2.128E-01	CO60
1460.39	2055.	2.29	2.21	8.192E-03	1460.75	10.700	1.526E+01	K40
1763.83	105.	11.30	2.54	7.084E-03	1764.51	15.920	6.044E-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	
173.86	87.21	892.	271.	0.136	50.14	1.187	PB-214	D
179.78	90.17	876.	188.	0.094	70.34	1.189	PB-214	D
186.41	93.49	849.	227.	0.114	57.92	1.191	U-235	D
257.61	128.98	1434.	188.	0.094	88.08	1.375	AC-228	s
418.96	209.66	688.	166.	0.083	73.88	1.544	NP-239	s
540.28	270.33	556.	166.	0.083	73.74	1.740	AC-228	s
656.23	328.31	575.	119.	0.059	110.33	1.172	RH-106M	
1928.03	964.36	87.	81.	0.041	58.86	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	1046.	419.	0.210	35.50	1.178D
PB-212	153.89	77.11	1099.	437.	0.219	29.73	1.179A
PB-214	153.89	77.11	1958.	219.	0.110	78.59	1.500A
EU-155	174.08	87.21	2179.	195.	0.098	103.59	1.500s
CD-109	174.02	87.18	2000.	209.	0.105	92.94	1.500
TH-234	186.09	93.21	2019.	171.	0.085	101.82	1.500s
RA-226	372.55	186.46	853.	224.	0.112	62.56	1.568s
TH-227	472.04	236.20	2061.	-254.	-0.127	78.11	1.500s
PB-212	476.89	238.63	530.	1569.	0.784	9.68	1.297D
PB-214	483.47	241.92	707.	248.	0.124	49.08	1.299D
PB-214	590.04	295.21	550.	403.	0.201	31.94	1.584
AC-228	676.34	338.36	415.	388.	0.194	29.69	1.187s
PB-214	703.57	351.98	332.	727.	0.363	16.13	1.832s
SB-125	925.71	463.06	250.	105.	0.052	68.53	1.500s
TL-208	1022.09	511.25	351.	228.	0.114	42.51	2.067s

YAEC Chemistry Lab Spectrum name: 107F_6SEPT2005_1110.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1165.97	583.19	271.	634.	0.317	19.07	1.642s
Bl-214	1217.88	609.15	216.	539.	0.269	19.15	1.662s
Ag-108M	1224.43	612.42	276.	-60.	-0.030	123.06	1.561s
CS-137	1322.77	661.60	232.	487.	0.244	21.74	1.951s
Bl-212	1453.48	726.95	225.	191.	0.095	50.47	1.671
Bl-212	1568.57	784.50	148.	59.	0.029	113.55	1.231s
CS-134	1589.33	794.88	141.	74.	0.037	76.39	1.684s
AC-228	1821.55	910.99	118.	442.	0.221	18.46	1.790
AC-228	1937.36	968.90	93.	226.	0.113	26.65	1.799D
Bl-214	2240.21	1120.32	184.	176.	0.088	51.58	2.099s
CO-60	2345.10	1172.77	242.	330.	0.165	33.89	1.934s
CO-60	2663.91	1332.16	91.	286.	0.143	27.09	2.015s
K-40	2920.38	1460.39	39.	2050.	1.025	6.88	2.214
Bl-214	3527.32	1763.83	8.	105.	0.052	33.90	2.536

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		2.3207E-02					
			477.56	2.321E-02	&(	2.887E-01	8.52E-02 G
K-40		1.5256E+01					
			1460.75	1.526E+01	(P	2.365E-01	3.50E-01 G

MN-54 1.6339E-02

834.81 1.634E-02 %(P 2.976E-02 9.08E-03 G

CO-57 3.7592E-03

122.07 3.759E-03 &(P 3.699E-02 1.11E-02 G K

136.43 9.032E-03 & P 3.012E-01 9.02E-02 G

CO-60 2.1852E-01

1332.51 2.128E-01 *(P 3.518E-02 1.95E-02 G K

1173.23 2.242E-01 @(P 5.103E-02 2.56E-02 G K

Sr-85 -1.6197E-02

514.00-1.620E-02 %(3.717E-02 1.12E-02 G

Kr-85 -3.7998E+02

513.99-3.800E+02 %(P 8.170E+02 2.46E+02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	-8.0313E-04						
		1836.01	-8.031E-04	%(	P	7.278E-03	9.87E-04 G K
		898.02	-1.716E-03	&	P	3.848E-02	1.11E-02 G
NB-94	-7.4288E-04						
		871.10	-7.429E-04	&(	P	3.501E-02	1.02E-02 G K
		702.50	-8.465E-05	%	P	3.026E-02	8.79E-03 G K
Ag-108M	1.9476E-03						
		722.95	1.948E-03	%(		4.168E-02	1.23E-02 G K
		614.37	-2.785E-02	+		3.699E-02	1.14E-02 G
		433.93	5.221E-03	%	P	2.733E-02	8.10E-03 G
CD-109	1.0897E+00						
		88.04	1.090E+00	(P		1.100E+00	3.38E-01 G
SN-113	-7.8655E-03						
		391.71	-7.866E-03	%(	P	4.184E-02	1.24E-02 G K
		255.04	4.233E-01	%		1.260E+00	3.80E-01 G
SB-125	6.5188E-02						
		427.95	-3.119E-02	%(	P	8.984E-02	2.69E-02 G K
		600.77	-1.607E-02	&	P	1.572E-01	4.60E-02 G
		636.15	-3.748E-02	%	P	2.380E-01	6.99E-02 G
		463.51	3.505E-01	*(	P	2.560E-01	8.22E-02 G
		176.29	-4.986E-02	%	P	4.579E-01	1.37E-01 G
I-131	5.8685E-04						
		364.48	5.869E-04	&(		4.628E-02	1.36E-02 G K
		636.97	-1.499E-02	%		5.528E-01	1.61E-01 G

284.29-1.371E-01 & 6.929E-01 2.07E-01 G

CS-134 2.0876E-02

604.66 7.132E-04 %(P 7.095E-02 2.12E-02 G K

795.76 4.392E-02 (P 3.470E-02 1.13E-02 G

569.29 1.035E-02 & 1.620E-01 4.73E-02 G

801.84-1.390E-01 & P 3.675E-01 1.10E-01 G

CS-137 2.5443E-01

661.62 2.544E-01 (P 3.842E-02 1.86E-02 G

CE-139 5.6704E-03

165.85 5.670E-03 &(P 3.644E-02 1.09E-02 G

EU-152 1.5400E-02

121.78 1.540E-02 &(P 1.067E-01 3.20E-02 G K

344.30-1.449E-02 & P 9.135E-02 2.71E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                     1408.08 3.190E-02 % P 1.200E-01 3.50E-02 G
                      964.00 1.216E-01 & P 3.437E-01 1.03E-01 G
                     1112.07 3.310E-02 % P 3.234E-01 9.50E-02 G
                      778.90-5.399E-02 % P 2.227E-01 6.58E-02 G

EU-154      -2.0692E-03
                      123.10-2.069E-03 &(P 7.807E-02 2.34E-02 G K
                     1274.80-6.151E-03 % P 1.046E-01 3.02E-02 G
                      723.30-6.638E-03 & P 2.547E-01 7.54E-02 G
                     1004.80-1.495E-02 & P 2.181E-01 6.37E-02 G

EU-155       1.1876E-01
                       86.45 1.188E-01 @(  1.338E-01 4.10E-02 G K
                      105.31 1.963E-02 % P 1.528E-01 4.59E-02 G

HG-203       1.8854E-02
                      279.17 1.885E-02 &(P 2.946E-02 9.01E-03 G K
                       72.87-6.488E-01 % P 1.050E+00 3.19E-01 G
                       70.83 1.047E-01 %   1.690E+00 5.07E-01 G
                       82.50-1.209E+00 %   2.054E+00 6.25E-01 G

TL-208       2.9537E-01
                      583.14 2.954E-01 *(P 3.694E-02 1.89E-02 G
                      510.72 3.653E-01 + P 1.443E-01 5.94E-02 G

PB-212       7.7066E-01
                      238.63 7.443E-01  (P 5.219E-02 2.43E-02 G K
                                         Energy duplication
                       77.11 5.512E-01 }   1.981E-01 5.46E-02 G
                       74.81 9.996E-01 + P 3.658E-01 1.19E-01 G
```

```
PB-214      5.1571E-01
                351.99 5.268E-01 *(P 6.351E-02 2.85E-02 G K
                295.22 4.943E-01  (P 1.375E-01 5.32E-02 G
                                     Energy duplication
                 77.11 4.523E-01 } P 4.306E-01 1.18E-01 G
                241.92 6.836E-01 + P 3.496E-01 1.12E-01 G

BI-212      7.6701E-01
                727.17 7.670E-01  (P 2.922E-01 1.30E-01 G K
               1620.56 1.448E-01 % P 6.467E-01 1.82E-01 G
                785.42 1.477E+00 + P 1.495E+00 5.71E-01 G

BI-214      4.8412E-01
                609.32 4.841E-01 *(P 6.406E-02 3.11E-02 G K
               1764.51 6.044E-01 + P 9.423E-02 6.89E-02 G
               1120.28 7.665E-01 + P 2.866E-01 1.32E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RA-224	4.3445E-01						
		241.00	4.345E-01	%(P	9.742E-01	2.95E-01	G
RA-226	1.2349E+00						
		185.99	1.235E+00	*(	7.645E-01	2.58E-01	G
AC-228	8.2483E-01						
		911.07	8.561E-01	(P	1.034E-01	5.32E-02	G K
		968.90	7.601E-01	(P	1.607E-01	6.82E-02	G
		338.40	8.435E-01	*(P	2.120E-01	8.42E-02	G
TH-227	-4.6128E-01						
		236.00	-4.613E-01	?(P	3.886E-01	1.20E-01	G K
		256.25	9.173E-02	% P	3.971E-01	1.19E-01	G
PA-234	-6.4772E-02						
		98.44	-6.477E-02	%(	1.299E-01	3.94E-02	G K
		946.00	-4.177E-02	%	1.669E-01	4.95E-02	G
		131.28	-2.122E-02	&	1.607E-01	4.82E-02	G
		94.67	-8.188E-02	%	2.501E-01	7.56E-02	G
		883.24	-5.253E-02	%	2.763E-01	8.16E-02	G
		926.70	3.358E-04	%	2.728E-01	7.86E-02	G
		569.26	1.592E-02	&	2.391E-01	6.99E-02	G
TH-234	6.5233E-01						
		63.29	3.226E-01	%(P	1.624E+00	4.88E-01	G K
		92.80	1.081E+00	(P	1.341E+00	4.09E-01	G
		92.38	-5.113E-02	% P	1.612E+00	4.82E-01	G
AM-241	-1.2607E-02						

59.54-1.261E-02 &(P 2.112E-01 6.33E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	2.1769E-02	2.3207E-02	2.5555E-01	2.5555E-01	2.708E-01
K-40	1.5256E+01	1.5256E+01	1.0516E+00	1.3848E+00	
MN-54 #A	1.6161E-02	1.6339E-02	2.7235E-02	2.7252E-02	2.943E-02
CO-57 #B	3.7119E-03	3.7592E-03	3.3273E-02	3.3274E-02	3.652E-02
CO-60 #	2.1813E-01	2.1852E-01	4.8012E-02	4.9717E-02	
Sr-85 #A	-1.5366E-02	-1.6197E-02	3.3734E-02	3.3747E-02	3.526E-02
Kr-85 #A	-3.7997E+02	-3.7998E+02	8.4391E+02	8.4421E+02	8.170E+02
Y-88 #B	-7.7781E-04	-8.0313E-04	4.8188E-03	4.8190E-03	7.048E-03
NB-94 #B	-7.4288E-04	-7.4288E-04	3.7337E-02	3.7337E-02	3.501E-02
Ag-108M#B	1.9474E-03	1.9476E-03	3.6780E-02	3.6780E-02	4.167E-02

CD-109 #A	1.0815E+00	1.0897E+00	1.0143E+00	1.0161E+00	1.092E+00
SN-113 #B	-7.6356E-03	-7.8655E-03	4.6270E-02	4.6272E-02	4.062E-02
SB-125 #B	6.4968E-02	6.5188E-02	4.5873E-02	4.6034E-02	8.954E-02
I-131 #B	3.8379E-04	5.8685E-04	4.0884E-02	4.0884E-02	3.026E-02
CS-134 #B	2.0782E-02	2.0876E-02	1.6061E-02	1.6109E-02	7.063E-02
CS-137	2.5435E-01	2.5443E-01	5.5718E-02	5.7709E-02	
CE-139 #A	5.5313E-03	5.6704E-03	3.2795E-02	3.2797E-02	3.554E-02
EU-152 #B	1.5389E-02	1.5400E-02	9.6121E-02	9.6125E-02	1.066E-01
EU-154 #B	-2.0669E-03	-2.0692E-03	8.7569E-02	8.7569E-02	7.799E-02
EU-155 #A	1.1854E-01	1.1876E-01	1.2303E-01	1.2320E-01	1.336E-01
HG-203 #B	1.7522E-02	1.8854E-02	2.7021E-02	2.7044E-02	2.738E-02
TL-208 #	2.9537E-01	2.9537E-01	5.6728E-02	5.9350E-02	
PB-212	7.7066E-01	7.7066E-01	7.5336E-02	8.8018E-02	
PB-214	5.1571E-01	5.1571E-01	8.3782E-02	8.9147E-02	
BI-212	7.6701E-01	7.6701E-01	3.8970E-01	3.9232E-01	
BI-214	4.8412E-01	4.8412E-01	9.3433E-02	9.7710E-02	
RA-224 #A	4.3445E-01	4.3445E-01	8.8535E-01	8.8573E-01	9.742E-01
RA-226 #	1.2348E+00	1.2349E+00	7.7249E-01	7.7592E-01	
AC-228	8.2483E-01	8.2483E-01	1.2198E-01	1.3135E-01	
TH-227 #A	-4.6128E-01	-4.6128E-01	3.6069E-01	3.6172E-01	3.886E-01
PA-234 #B	-6.4772E-02	-6.4772E-02	1.1832E-01	1.1837E-01	1.299E-01

TH-234 #B	6.5233E-01	6.5233E-01	7.4087E-01	7.4175E-01	1.624E+00
AM-241 #A	-1.2607E-02	-1.2607E-02	2.1262E-01	2.1262E-01	2.112E-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 (1086.7 to 2000.1 keV) 2.0620613E+01 pCi/gm
Total Decayed Activity (1086.7 to 2000.1 keV) 2.0621086E+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_6SEPT2005_1315.An1

Sample description

FSS-NOL-06-01-063-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEPT2005_1315.An1

Acquisition information

Start time:	06-Sep-2005 13:16:33
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: 2.0610E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0610E+03) =
4.8520E+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	01-Sep-2005 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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2618

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.87	436.	11.46	1.18	2.849E-02	74.81	9.600	1.045E+00	PB212
77.17	646.	6.54	1.18	2.957E-02	77.11	10.700	1.400E+00	PB214
					77.11	17.500	8.619E-01	PB212
87.29	170.	39.13	1.50	3.284E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
87.30	171.	37.11	1.50	3.327E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109

186.07	319.	17.12	2.16	3.610E-02	185.99	3.280	1.765E+00	RA226
209.29	185.	26.05	2.32	3.429E-02				
238.76	1705.	3.20	1.30	3.188E-02	238.63	43.100	8.059E-01	PB212
					241.00	3.900	9.032E+00	RA224
242.12	243.	14.21	1.30	3.161E-02	241.92	7.470	6.700E-01	PB214
270.25	203.	16.54	2.49	2.944E-02				
295.35	392.	7.75	1.34	2.767E-02	295.22	19.200	4.780E-01	PB214
300.16	128.	18.83	1.34	2.735E-02				
338.38	406.	11.31	1.44	2.500E-02	338.40	12.010	8.803E-01	AC228
351.97	777.	6.02	1.54	2.426E-02	351.99	37.100	5.625E-01	PB214
386.65	67.	31.03	0.89	2.254E-02				
409.50	47.	41.31	1.72	2.155E-02				
462.60	141.	24.48	1.45	1.956E-02				
462.60	141.	24.48	1.45	1.956E-02	463.51	10.000	4.656E-01	SB125
510.56	275.	13.63	1.64	1.809E-02	510.72	22.500	3.888E-01	TL208
583.22	700.	5.61	1.61	1.629E-02	583.14	86.000	3.254E-01	TL208
609.32	471.	5.75	1.56	1.575E-02	609.32	46.090	4.214E-01	BI214
726.96	156.	12.66	2.12	1.375E-02	727.17	11.800	6.276E-01	BI212
767.61	60.	25.95	1.67	1.319E-02				
794.86	104.	24.83	1.90	1.285E-02				
794.86	104.	24.83	1.90	1.285E-02	795.76	85.400	6.247E-02	CS134
835.74	49.	34.01	1.71	1.239E-02	834.81	99.978	PBC<MDA	MN54
860.27	103.	19.93	1.41	1.211E-02				
910.97	530.	7.33	1.77	1.161E-02	911.07	29.000	1.024E+00	AC228
967.94	375.	8.48	2.08	1.110E-02	968.90	17.460	1.262E+00	AC228
1120.05	180.	16.18	2.76	9.970E-03	1120.28	15.040	7.863E-01	BI214
1460.49	2011.	2.33	2.10	8.192E-03	1460.75	10.700	1.501E+01	K40
1619.47	29.	36.80	1.20	7.569E-03	1620.56	2.750	9.229E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.15	106.	10.76	1.52	7.085E-03	1764.51	15.920	6.111E-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	209.29	826.	185.	0.093	78.14	2.325	AC-228	s
540.12	270.25	385.	203.	0.101	49.61	2.488	AC-228	s
599.87	300.12	288.	115.	0.057	70.12	1.324	PB-212	M
818.60	409.50	165.	47.	0.023	123.94	1.717	AC-228	s
1534.84	767.64	178.	66.	0.033	112.32	1.576	BI-214	
1720.10	860.27	103.	103.	0.052	59.78	1.409	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	149.29	74.81	1056.	436.	0.218	34.39	1.178	D
PB-212	153.89	77.11	1166.	646.	0.323	19.61	1.179	A
EU-155	174.24	87.29	2115.	170.	0.085	117.38	1.500	s

CD-109	174.26	87.30	1933.	171.	0.085	111.34	1.500s
RA-226	371.77	186.07	984.	319.	0.159	51.35	2.164s
TH-227	471.79	236.08	1800.	-192.	-0.096	96.31	1.500s
PB-212	476.89	238.63	575.	1684.	0.842	9.37	1.297D
RA-224	477.22	238.79	991.	1605.	0.803	11.18	1.500
PB-214	483.47	241.92	734.	245.	0.123	50.28	1.299D
PB-214	590.57	295.47	548.	562.	0.281	25.42	1.657s
AC-228	676.38	338.38	505.	403.	0.202	33.92	1.438s
PB-214	703.54	351.97	433.	772.	0.386	18.06	1.537s
SB-125	925.23	462.82	207.	93.	0.047	70.00	1.500s
TL-208	1020.71	510.56	339.	241.	0.121	40.89	1.635s
TL-208	1166.03	583.22	226.	695.	0.348	16.83	1.614s
BI-214	1218.22	609.32	136.	466.	0.233	17.26	1.558D
Ag-108M	1223.79	612.11	239.	-66.	-0.033	106.14	1.561s
BI-212	1453.50	726.96	96.	155.	0.078	37.99	2.117s
CS-134	1589.46	794.95	125.	77.	0.038	70.35	1.684
MN-54	1671.04	835.74	118.	49.	0.025	102.02	1.711s
AC-228	1821.51	910.97	200.	526.	0.263	22.00	1.766

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1935.45	967.94	157.	373.	0.186	25.43	2.076
Bl-214	2239.67	1120.05	165.	180.	0.090	48.53	2.758s
K-40	2920.57	1460.49	43.	2006.	1.003	6.99	2.102
Bl-212	3238.56	1619.47	24.	29.	0.015	110.41	1.200s
Bl-214	3527.95	1764.15	7.	105.	0.053	32.27	1.516s

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

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

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

BE-7 -1.8164E-02
477.56-1.816E-02 %(2.365E-01 6.93E-02 G

K-40 1.5009E+01
1460.75 1.501E+01 (P 2.482E-01 3.50E-01 G

MN-54 2.6372E-02
834.81 2.637E-02 &(P 2.859E-02 9.05E-03 G

CO-57 -9.2797E-04
122.07-9.280E-04 &(P 3.587E-02 1.07E-02 G K
136.43-2.978E-04 % P 2.189E-01 6.51E-02 G

CO-60 -5.2396E-03

1332.51-5.240E-03 %(P 3.089E-02 8.62E-03 G K
1173.23 8.944E-03 % P 3.930E-02 1.15E-02 G K

Sr-85 -2.0244E-02
514.00-2.024E-02 %(3.534E-02 1.08E-02 G

Kr-85 -4.6793E+02
513.99-4.679E+02 %(P 7.754E+02 2.36E+02 G

Y-88 -8.1384E-04
1836.01-8.138E-04 %(P 2.461E-02 6.53E-03 G K
898.02-8.056E-03 % P 3.490E-02 1.02E-02 G

NB-94 -2.7026E-03
871.10-2.703E-03 %(P 2.484E-02 7.18E-03 G K
702.50 1.550E-03 % P 3.041E-02 8.88E-03 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.8274E-03						
		722.95	-1.827E-03	&(	5.852E-02	1.74E-02	G K
		614.37	-3.057E-02	+	3.466E-02	1.08E-02	G
		433.93	-5.338E-04	% P	2.769E-02	8.09E-03	G
CD-109	8.9567E-01						
		88.04	8.957E-01	(P	1.088E+00	3.33E-01	G
SN-113	-8.3690E-03						
		391.71	-8.369E-03	%(P	3.520E-02	1.04E-02	G K
		255.04	-2.703E-01	%	1.310E+00	3.92E-01	G
SB-125	9.0280E-02						
		427.95	1.449E-02	%(P	7.953E-02	2.36E-02	G K
		600.77	-8.024E-03	% P	1.558E-01	4.54E-02	G
		636.15	-2.234E-02	& P	2.037E-01	5.91E-02	G
		463.51	3.146E-01	(P	2.348E-01	7.56E-02	G
		176.29	1.578E-01	% P	4.410E-01	1.33E-01	G
I-131	-9.3568E-04						
		364.48	-9.357E-04	&(	4.598E-02	1.35E-02	G K
		636.97	-3.720E-02	&	5.685E-01	1.66E-01	G
		284.29	-6.310E-03	&	7.154E-01	2.12E-01	G
CS-134	2.2848E-02						
		604.66	2.598E-03	&(P	6.608E-02	1.97E-02	G K
		795.76	4.599E-02	(P	3.297E-02	1.09E-02	G
		569.29	-2.468E-02	&	1.742E-01	5.14E-02	G
		801.84	-1.005E-01	% P	3.645E-01	1.08E-01	G

CS-137 -8.2082E-03

661.62-8.208E-03 %(P 3.611E-02 1.06E-02 G

CE-139 1.6346E-03

165.85 1.635E-03 &(P 3.660E-02 1.09E-02 G

EU-152 -1.1778E-03

121.78-1.178E-03 &(P 8.689E-02 2.59E-02 G K

344.30-2.514E-02 % P 9.668E-02 2.89E-02 G

1408.08 3.809E-02 % P 1.126E-01 3.32E-02 G

964.00 7.251E-02 & P 3.430E-01 1.02E-01 G

1112.07 7.504E-02 & P 2.599E-01 7.72E-02 G

778.90 8.664E-03 & P 2.185E-01 6.33E-02 G

EU-154 1.3350E-02

123.10 1.335E-02 %(P 7.368E-02 2.21E-02 G K

1274.80 1.256E-02 & P 1.025E-01 2.98E-02 G

```
Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                      723.30-1.054E-01 % P 2.059E-01 6.25E-02 G
                      1004.80 3.664E-04 & P 1.590E-01 4.54E-02 G

EU-155       1.0359E-01
                       86.45 1.036E-01  (  1.326E-01 4.05E-02 G K
                      105.31 4.449E-02 % P 1.493E-01 4.50E-02 G

HG-203       1.3732E-02
                      279.17 1.373E-02 &(P 3.086E-02 9.34E-03 G K
                       72.87-7.652E-01 & P 1.063E+00 3.24E-01 G
                       70.83-1.192E+00 %   1.704E+00 5.20E-01 G
                       82.50-9.361E-01 %   2.117E+00 6.42E-01 G

TL-208       3.2540E-01
                      583.14 3.254E-01 *(P 3.404E-02 1.84E-02 G
                      510.72 3.888E-01 + P 1.426E-01 6.04E-02 G

PB-212       8.2016E-01
                      238.63 8.032E-01  (P 5.459E-02 2.53E-02 G K
                                         Energy duplication
                       77.11 8.180E-01 }   2.050E-01 5.35E-02 G
                       74.81 1.045E+00 + P 3.695E-01 1.21E-01 G

PB-214       5.6250E-01
                      351.99 5.625E-01 *(P 7.261E-02 3.41E-02 G K
                      295.22 6.936E-01 + P 1.379E-01 5.93E-02 G
                                         Energy duplication
                       77.11 5.542E-02 } P 4.395E-01 1.25E-01 G
                      241.92 6.809E-01 + P 3.578E-01 1.15E-01 G

BI-212       6.2757E-01
```

727.17 6.276E-01 *(P 1.954E-01 8.01E-02 G K
1620.56 9.229E-01 + P 8.000E-01 3.45E-01 G
785.42 3.384E-01 % P 1.442E+00 4.26E-01 G

BI-214 4.2144E-01
609.32 4.214E-01 (P 5.150E-02 2.45E-02 G K
1764.51 6.111E-01 + P 8.691E-02 6.63E-02 G
1120.28 7.863E-01 + P 2.737E-01 1.28E-01 G

RA-224 8.5126E+00
241.00 8.513E+00 &(P 7.925E-01 3.18E-01 G

RA-226 1.7647E+00
185.99 1.765E+00 *(8.246E-01 3.02E-01 G

AC-228 9.8198E-01
911.07 1.024E+00 (P 1.337E-01 7.57E-02 G K
968.90 1.262E+00 + P 2.070E-01 1.08E-01 G
338.40 8.803E-01 *(P 2.345E-01 1.00E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.5019E-01						
		236.00	-3.502E-01	?(	P	3.654E-01	1.12E-01 G K
		256.25	-8.975E-02	%	P	3.791E-01	1.13E-01 G
PA-234	-1.3469E-02						
		98.44	-1.347E-02	&(		1.373E-01	4.12E-02 G K
		946.00	2.540E-02	&		1.387E-01	4.06E-02 G
		131.28	-1.821E-03	&		1.527E-01	4.56E-02 G
		94.67	-6.517E-02	%		2.551E-01	7.69E-02 G
		883.24	-2.705E-02	&		2.443E-01	7.12E-02 G
		926.70	6.536E-03	%		2.913E-01	8.43E-02 G
		569.26	-3.644E-02	&		2.572E-01	7.59E-02 G
TH-234	5.0661E-01						
		63.29	5.066E-01	%(	P	1.586E+00	4.78E-01 G K
		92.80	8.181E-01	%	P	1.339E+00	4.07E-01 G
		92.38	1.235E-02	&	P	1.520E+00	4.55E-01 G
AM-241	-2.1976E-02						
		59.54	-2.198E-02	%(	P	2.027E-01	6.08E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	-1.6992E-02	-1.8164E-02	2.0793E-01	2.0794E-01	2.213E-01
K-40	1.5009E+01	1.5009E+01	1.0511E+00	1.3750E+00	
MN-54 #A	2.6073E-02	2.6372E-02	2.7138E-02	2.7182E-02	2.826E-02
CO-57 #B	-9.1582E-04	-9.2797E-04	3.6342E-02	3.6342E-02	3.540E-02
CO-60 #B	-5.2299E-03	-5.2396E-03	8.6038E-02	8.6038E-02	3.084E-02
Sr-85 #A	-1.9163E-02	-2.0244E-02	3.2328E-02	3.2351E-02	3.345E-02
Kr-85 #A	-4.6791E+02	-4.6793E+02	7.8747E+02	7.8796E+02	7.754E+02
Y-88 #B	-7.8711E-04	-8.1384E-04	5.9705E+00	5.9705E+00	2.380E-02
NB-94 #B	-2.7026E-03	-2.7026E-03	2.2771E-02	2.2772E-02	2.484E-02
Ag-108M#B	-1.8273E-03	-1.8274E-03	5.2066E-02	5.2066E-02	5.852E-02
CD-109 #A	8.8867E-01	8.9567E-01	9.9915E-01	1.0004E+00	1.080E+00
SN-113 #B	-8.1141E-03	-8.3690E-03	3.8412E-02	3.8416E-02	3.413E-02
SB-125 #F	8.9963E-02	9.0280E-02	6.5104E-02	6.5322E-02	7.925E-02
I-131 #B	-6.0091E-04	-9.3568E-04	4.0603E-02	4.0603E-02	2.953E-02
CS-134 #B	2.2740E-02	2.2848E-02	1.6184E-02	1.6241E-02	6.577E-02
CS-137 #A	-8.2056E-03	-8.2082E-03	5.0314E-02	5.0317E-02	3.610E-02
CE-139 #A	1.5928E-03	1.6346E-03	3.2813E-02	3.2813E-02	3.566E-02
EU-152 #B	-1.1769E-03	-1.1778E-03	8.9267E-02	8.9267E-02	8.682E-02
EU-154 #B	1.3335E-02	1.3350E-02	6.6409E-02	6.6413E-02	7.360E-02
EU-155 #A	1.0338E-01	1.0359E-01	1.2159E-01	1.2172E-01	1.323E-01
HG-203 #B	1.2722E-02	1.3732E-02	2.8009E-02	2.8020E-02	2.859E-02
TL-208 #	3.2540E-01	3.2540E-01	5.5107E-02	5.8362E-02	

PB-212	8.2016E-01	8.2016E-01	7.7564E-02	9.1447E-02	
PB-214	5.6250E-01	5.6250E-01	1.0226E-01	1.0752E-01	
BI-212	6.2757E-01	6.2757E-01	2.4039E-01	2.4323E-01	
BI-214	4.2144E-01	4.2144E-01	7.3416E-02	7.7521E-02	
RA-224 #	8.5126E+00	8.5126E+00	9.5264E-01	1.0772E+00	7.925E-01
RA-226 #	1.7647E+00	1.7647E+00	9.0626E-01	9.1223E-01	
AC-228	9.8198E-01	9.8198E-01	2.0010E-01	2.0833E-01	
TH-227 #A	-3.5019E-01	-3.5019E-01	3.3776E-01	3.3839E-01	3.654E-01
PA-234 #B	-1.3469E-02	-1.3469E-02	1.2351E-01	1.2351E-01	1.373E-01
TH-234 #B	5.0661E-01	5.0661E-01	1.4332E+00	1.4335E+00	1.586E+00
AM-241 #A	-2.1975E-02	-2.1976E-02	1.9463E-01	1.9464E-01	2.027E-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

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

Total Activity (726.7 to 2000.1 keV) 2.0539158E+01 pCi/gm

Total Decayed Activity (726.7 to 2000.1 keV) 2.0539469E+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_7SEPT2005_1129.An1

Sample description

FSS-NOL-06-01-049-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_7SEPT2005_1129.An1

Acquisition information

Start time:	07-Sep-2005 11:30:36
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: 2.1290E+03

Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1290E+03) =
4.6970E+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 01-Apr-2004 12:00:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0882

***** 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	432.	11.61	1.18	2.842E-02	74.81	9.600	9.936E-01	PB212
77.18	807.	6.62	1.18	2.963E-02	77.11	17.500	9.894E-01	PB212
84.11	122.	33.87	1.18	3.208E-02				
86.82	242.	18.34	1.19	3.288E-02	86.45	32.740	1.747E-01	EU155
90.31	181.	23.78	1.19	3.377E-02				
93.36	215.	20.49	1.19	3.445E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234

					98.44	25.100	1.531E-01	PA234
129.16	121.	37.32	0.84	3.818E-02				
186.11	237.	22.14	1.24	3.609E-02	185.99	3.280	1.271E+00	RA226
208.99	222.	21.15	1.45	3.431E-02				
238.74	1721.	3.14	1.30	3.188E-02	238.63	43.100	7.876E-01	PB212
241.34	301.	16.80	1.30	3.167E-02	241.00	3.900	1.533E+00	RA224
					241.92	7.470	8.044E-01	PB214
270.43	146.	30.45	1.30	2.943E-02				
295.33	442.	7.08	1.34	2.767E-02	295.22	19.200	5.224E-01	PB214
300.12	113.	22.09	1.34	2.735E-02				
327.95	144.	25.79	1.41	2.561E-02				
338.15	420.	12.51	1.59	2.502E-02	338.40	12.010	8.820E-01	AC228
352.02	807.	6.57	1.66	2.426E-02	351.99	37.100	5.653E-01	PB214
463.34	119.	23.41	1.50	1.953E-02				
463.34	119.	23.41	1.50	1.953E-02	463.51	10.000	5.403E-01	SB125
510.76	218.	13.17	2.38	1.808E-02	510.72	22.500	2.876E-01	TL208
583.15	662.	5.21	1.77	1.629E-02	583.14	86.000	2.979E-01	TL208
609.25	614.	5.24	1.66	1.574E-02	609.32	46.090	5.330E-01	BI214
727.16	167.	14.30	1.76	1.374E-02	727.17	11.800	6.471E-01	BI212
783.97	111.	20.76	1.18	1.298E-02	785.42	2.000	2.686E+00	BI212
795.44	90.	24.36	2.21	1.284E-02				
795.44	90.	24.36	2.21	1.284E-02	795.76	85.400	8.427E-02	CS134
860.93	124.	21.88	1.03	1.211E-02				
911.07	504.	6.51	1.94	1.161E-02	911.07	29.000	9.414E-01	AC228
964.30	72.	20.60	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152
968.91	269.	7.59	1.80	1.109E-02	968.90	17.460	8.739E-01	AC228
1119.61	164.	18.17	1.97	9.974E-03	1120.28	15.040	6.913E-01	BI214
1376.88	61.	19.86	1.88	8.562E-03				
1460.65	2079.	2.26	2.23	8.191E-03	1460.75	10.700	1.503E+01	K40
1619.95	22.	37.51	2.49	7.569E-03	1620.56	2.750	6.739E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.23	135.	8.61	1.87	7.084E-03	1764.51	15.920	7.548E-01	Bl214

********** 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	
167.88	83.87	799.	122.	0.061	101.60	1.185	TA-182	D
173.31	86.59	865.	242.	0.121	55.02	1.187	Bl-207	D
180.29	90.08	841.	181.	0.091	71.35	1.189	PB-214	D
186.39	93.13	860.	215.	0.107	61.47	1.191	U-235	D
257.98	129.16	909.	132.	0.066	100.21	0.843	AC-228	
417.62	208.99	796.	222.	0.111	63.44	1.450	AC-228	s
540.49	270.43	635.	146.	0.073	91.34	1.296	AC-228	s
599.75	300.06	440.	94.	0.047	109.66	1.081	PB-212	M
655.51	327.95	441.	144.	0.072	77.36	1.412	AC-228	s
1721.43	860.93	150.	127.	0.064	48.77	1.026	TL-208	s
1928.23	964.33	74.	73.	0.036	61.24	1.796	AC-228	D
2753.35	1376.88	27.	61.	0.030	59.58	1.883	Bl-214	

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	1030.	445.	0.223	33.42	1.178D
PB-212	153.89	77.11	1022.	638.	0.319	20.03	1.179A
EU-155	173.84	87.09	2126.	188.	0.094	106.16	1.500
TH-234	186.00	93.17	1934.	177.	0.089	102.94	1.500s
TH-234	185.95	93.14	2002.	173.	0.086	100.58	1.500s
RA-226	371.87	186.11	968.	237.	0.119	66.43	1.237s
TH-227	471.70	236.03	1815.	-207.	-0.103	89.99	1.500s
PB-212	476.89	238.63	530.	1694.	0.847	9.18	1.297D
RA-224	482.90	241.63	1553.	142.	0.071	118.45	1.500
PB-214	483.47	241.92	702.	262.	0.131	46.39	1.299D
PB-214	590.35	295.36	622.	538.	0.269	27.40	1.238
AC-228	675.91	338.15	638.	417.	0.209	37.54	1.591
PB-214	703.65	352.02	518.	802.	0.401	19.71	1.660s
SB-125	925.60	463.00	205.	92.	0.046	70.68	1.500s
TL-208	1021.11	510.76	243.	184.	0.092	39.51	2.378s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1165.89	583.15	181.	657.	0.329	15.63	1.768s
Bl-214	1218.07	609.25	149.	609.	0.305	15.71	1.661
Bl-212	1453.89	727.16	127.	165.	0.083	42.91	1.763s
Bl-212	1567.51	783.97	121.	110.	0.055	62.28	1.180s
CS-134	1589.58	795.01	97.	68.	0.034	70.37	1.684s
AC-228	1821.70	911.07	144.	499.	0.250	19.54	1.937s
AC-228	1937.36	968.90	86.	267.	0.133	23.32	1.799D
Bl-214	2238.78	1119.61	174.	163.	0.082	54.50	1.968s
K-40	2920.90	1460.65	38.	2075.	1.037	6.78	2.228
Bl-212	3239.52	1619.95	16.	22.	0.011	112.54	2.493s
Bl-214	3528.11	1764.23	1.	134.	0.067	25.82	1.875

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

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

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

BE-7 8.5763E-02
477.56 8.576E-02 &(2.256E+02 6.61E+01 G

K-40 1.5025E+01
1460.75 1.503E+01 (P 2.286E-01 3.40E-01 G

MN-54 5.1922E-02
834.81 5.192E-02 %(P 9.121E-02 2.79E-02 G

CO-57 3.6380E-02

122.07 3.638E-02 %(P 1.361E-01 4.10E-02 G K

136.43-1.250E-01 % P 1.101E+00 3.30E-01 G

CO-60 7.7104E-03

1332.51 7.710E-03 &(P 3.287E-02 9.46E-03 G K

1173.23-5.985E-04 % P 5.023E-02 1.45E-02 G K

Sr-85 -5.4509E+00

514.00-5.451E+00 %(9.154E+00 2.79E+00 G

Kr-85 -4.9118E+02

513.99-4.912E+02 %(P 7.863E+02 2.39E+02 G

Y-88 6.9461E-02

1836.01 6.946E-02 %(P 5.329E-01 1.43E-01 G K

898.02-1.396E-01 % P 9.760E-01 2.84E-01 G

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

NB-94       -6.6975E-03
                871.10-6.697E-03 %(P 2.499E-02 7.39E-03 G K
                702.50-5.438E-04 % P 2.880E-02 8.37E-03 G K

Ag-108M     -1.2638E-02
                722.95-1.264E-02 %(  3.608E-02 1.08E-02 G K
                614.37-1.777E-02 &   3.160E-02 9.64E-03 G
                433.93 5.224E-03 % P 2.474E-02 7.33E-03 G

CD-109       3.1274E-01
                 88.04 3.127E-01 %(P 2.019E+00 6.06E-01 G

SN-113       8.5677E-02
                391.71 8.568E-02 %(P 8.441E-01 2.49E-01 G K
                255.04 5.118E+00 &   2.697E+01 8.07E+00 G

SB-125       9.7480E-02
                427.95-1.424E-02 %(P 1.112E-01 3.27E-02 G K
                600.77 5.351E-02 % P 1.775E-01 5.28E-02 G
                636.15-3.186E-03 & P 3.257E-01 9.43E-02 G
                463.51 4.282E-01 @(P 3.231E-01 1.04E-01 G
                176.29-2.371E-02 % P 6.422E-01 1.92E-01 G

I-131        0.0000E+00
                364.48 0.000E+00 &(  0.000E+00 0.00E+00 G K
                636.97 0.000E+00 &   0.000E+00 0.00E+00 G
                284.29 0.000E+00 %   0.000E+00 0.00E+00 G

CS-134      -2.9759E-02
                604.66-2.976E-02 %(P 5.532E-02 1.68E-02 G K
```

795.76 6.420E-02 + P 4.558E-02 1.52E-02 G
569.29 5.268E-02 % 2.606E-01 7.72E-02 G
801.84-9.180E-02 & P 5.504E-01 1.62E-01 G

CS-137 8.2032E-03
661.62 8.203E-03 &(P 3.318E-02 9.81E-03 G

CE-139 2.3528E-01
165.85 2.353E-01 %(P 4.568E-01 1.39E-01 G

EU-152 2.6960E-02
121.78 2.696E-02 %(P 1.160E-01 3.49E-02 G K
344.30-2.332E-02 % P 1.008E-01 3.01E-02 G
1408.08 5.092E-02 % P 1.116E-01 3.36E-02 G
964.00-2.425E-03 & P 3.925E-01 1.16E-01 G
1112.07 1.902E-02 % P 2.720E-01 7.89E-02 G
778.90-6.117E-02 % P 2.547E-01 7.54E-02 G

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

EU-154       5.6021E-06
                   123.10 5.602E-06 &(P 8.316E-02 2.49E-02 G K
                  1274.80 1.430E-02 % P 1.106E-01 3.22E-02 G
                   723.30-6.107E-02 % P 1.837E-01 5.50E-02 G
                  1004.80 2.151E-02 & P 1.887E-01 5.49E-02 G

EU-155       1.3584E-01
                    86.45 1.358E-01  (  1.570E-01 4.81E-02 G K
                   105.31 7.169E-02 % P 1.829E-01 5.53E-02 G

HG-203       1.5000E+01
                   279.17 1.500E+01 %(P 7.331E+01 2.19E+01 G K
                    72.87-5.584E+02 % P 2.285E+03 6.90E+02 G
                    70.83-2.229E+03 %   3.703E+03 1.13E+03 G
                    82.50 5.398E+02 %   3.289E+03 9.86E+02 G

TL-208       2.9575E-01
                   583.14 2.979E-01 @(P 2.960E-02 1.56E-02 G
                   510.72 2.876E-01 *(P 1.175E-01 4.48E-02 G

PB-212       7.8211E-01
                   238.63 7.821E-01  (P 5.079E-02 2.42E-02 G K
                                     Energy duplication
                    77.11 7.821E-01 }   1.860E-01 5.22E-02 G
                    74.81 1.033E+00 + P 3.533E-01 1.16E-01 G

PB-214       6.0498E-01
                   351.99 5.653E-01  (P 7.674E-02 3.74E-02 G K
                   295.22 6.427E-01  (P 1.421E-01 5.92E-02 G
                                     Energy duplication
```

77.11 0.000E+00 } P 3.961E-01 0.00E+00 G
241.92 7.048E-01 (P 3.389E-01 1.10E-01 G

BI-212 6.5212E-01
727.17 6.471E-01 *(P 2.159E-01 9.33E-02 G K
1620.56 6.739E-01 @(P 6.493E-01 2.58E-01 G
785.42 2.686E+00 + P 1.322E+00 5.63E-01 G

BI-214 5.3301E-01
609.32 5.330E-01 (P 5.209E-02 2.81E-02 G K
1764.51 7.548E-01 + P 4.148E-02 6.54E-02 G
1120.28 6.913E-01 + P 2.714E-01 1.26E-01 G

RA-224 7.2929E-01
241.00 7.293E-01 ?(P 9.567E-01 2.92E-01 G

RA-226 1.2712E+00
185.99 1.271E+00 *(7.922E-01 2.82E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	9.0907E-01						
		911.07	9.414E-01	@(	P 1.105E-01	6.18E-02	G K
		968.90	8.740E-01	(	P 1.508E-01	6.85E-02	G
		338.40	8.820E-01	(	P 2.545E-01	1.11E-01	G
TH-227	-3.6496E-01						
		236.00	-3.650E-01	&(	P 3.552E-01	1.09E-01	G K
		256.25	5.158E-02	&	P 3.356E-01	1.00E-01	G
PA-234	4.1261E-03						
		98.44	4.126E-03	%(	1.017E-01	3.03E-02	G K
		946.00	-3.559E-03	&	1.450E-01	4.18E-02	G
		131.28	-3.252E-02	%	1.478E-01	4.45E-02	G
		94.67	-1.178E-01	%	2.591E-01	7.86E-02	G
		883.24	2.781E-02	&	2.021E-01	5.87E-02	G
		926.70	5.046E-02	%	2.413E-01	7.09E-02	G
		569.26	-3.315E-03	%	2.086E-01	6.04E-02	G
TH-234	8.8735E-01						
		63.29	4.966E-01	%(	P 1.574E+00	4.74E-01	G K
		92.80	1.062E+00	(	P 1.300E+00	3.97E-01	G
		92.38	1.276E+00	(	P 1.496E+00	4.58E-01	G
AM-241	-4.1433E-02						
		59.54	-4.143E-02	%(	P 2.104E-01	6.33E-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	Activity pCi/gm	Time of Count Activity pCi/gm	Time Corrected Counting pCi/gm	Uncertainty Total pCi/gm	3 Sigma MDA pCi/gm
BE-7 #A	9.5387E-05	8.5763E-02	1.9822E+02	1.9822E+02	2.509E-01
K-40	1.5025E+01	1.5025E+01	1.0207E+00	1.3525E+00	
MN-54 #A	1.6222E-02	5.1922E-02	8.3646E-02	8.3702E-02	2.850E-02
CO-57 #B	9.4768E-03	3.6380E-02	1.2303E-01	1.2305E-01	3.545E-02
CO-60 #B	6.3850E-03	7.7104E-03	2.8393E-02	2.8397E-02	2.722E-02
Sr-85 #A	-2.0128E-02	-5.4509E+00	8.3830E+00	8.3892E+00	3.380E-02
Kr-85 #A	-4.8928E+02	-4.9118E+02	7.9319E+02	7.9372E+02	7.832E+02
Y-88 #B	2.3018E-03	6.9461E-02	4.2982E-01	4.2984E-01	1.766E-02
NB-94 #B	-6.6972E-03	-6.6975E-03	2.2639E-02	2.2643E-02	2.499E-02
Ag-108M#B	-1.2539E-02	-1.2638E-02	3.2498E-02	3.2506E-02	3.580E-02
CD-109 #A	1.4034E-01	3.1274E-01	1.8188E+00	1.8189E+00	9.059E-01
SN-113 #B	3.6514E-03	8.5677E-02	7.4703E-01	7.4704E-01	3.597E-02
SB-125 #B	6.8078E-02	9.7480E-02	7.1008E-02	7.1241E-02	7.768E-02
I-131 #B	1.6775E-03	>12 Halflives	2.4446E-02	2.4446E-02	2.763E-02
CS-134 #B	-1.8373E-02	-2.9759E-02	5.1651E-02	5.1681E-02	3.415E-02
CS-137 #A	7.9367E-03	8.2032E-03	2.9426E-02	2.9430E-02	3.210E-02
CE-139 #A	1.6766E-02	2.3528E-01	4.1614E-01	4.1637E-01	3.255E-02

EU-152 #B	2.4930E-02	2.6960E-02	1.0484E-01	1.0485E-01	1.073E-01
EU-154 #B	4.9836E-06	5.6021E-06	7.4562E-02	7.4562E-02	7.398E-02
EU-155 #A	1.1116E-01	1.3584E-01	1.4421E-01	1.4440E-01	1.284E-01
HG-203 #B	6.1732E-03	1.5000E+01	6.5760E+01	6.5765E+01	3.017E-02
TL-208 #	2.9575E-01	2.9575E-01	4.6554E-02	4.9723E-02	
PB-212	7.8211E-01	7.8211E-01	7.2488E-02	8.5955E-02	
PB-214	6.0498E-01	6.0498E-01	1.1642E-01	1.2178E-01	
BI-212 #	6.5212E-01	6.5212E-01	2.8202E-01	2.8463E-01	
BI-214	5.3301E-01	5.3301E-01	8.4327E-02	9.0011E-02	
RA-224 #A	7.2929E-01	7.2929E-01	8.7745E-01	8.7851E-01	9.567E-01
RA-226 #	1.2704E+00	1.2712E+00	8.4440E-01	8.4773E-01	
AC-228	9.0907E-01	9.0907E-01	1.4759E-01	1.5705E-01	
TH-227 #A	-3.6496E-01	-3.6496E-01	3.2887E-01	3.2957E-01	3.552E-01
PA-234 #B	4.1261E-03	4.1261E-03	9.0939E-02	9.0939E-02	1.017E-01
TH-234 #B	8.8735E-01	8.8735E-01	9.5451E-01	9.5578E-01	1.574E+00
AM-241 #A	-4.1338E-02	-4.1433E-02	1.9642E-01	1.9643E-01	2.100E-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) 2.0072756E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 2.0073545E+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_28JUNE2006_1020.An1

Sample description
FSS-NOL-06-02-032-FB

Spectrum Filename: C:\GammaVision\Spectra\107F_28JUNE2006_1020.An1

Acquisition information

Start time:	28-Jun-2006 10:22:11
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:	2.0340E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.0340E+03) = 4.9164E+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-Jun-2006 11:28:00
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: 0.2732

***** 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	312.	14.06	1.18	2.849E-02	74.81	9.600	7.583E-01	PB212
77.08	358.	10.70	1.18	2.957E-02	77.11	17.500	6.916E-01	PB212
					77.11	10.700	1.121E+00	PB214
77.12	175.	29.04	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
87.07	202.	20.37	1.19	3.305E-02	86.45	32.740	1.248E-01	EU155
					88.04	3.790	1.069E+00	CD109
90.01	103.	37.14	1.19	3.379E-02				
90.01	103.	37.14	1.19	3.379E-02	92.38	2.570	PBC<MDA	TH234
93.15	250.	15.44	1.19	3.449E-02	92.80	3.000	1.485E+00	TH234
185.97	247.	19.85	1.62	3.610E-02	185.99	3.280	1.388E+00	RA226
209.12	154.	33.00	1.21	3.430E-02				
238.81	1352.	3.44	1.30	3.187E-02	238.63	43.100	6.457E-01	PB212
241.88	248.	14.10	1.30	3.163E-02	241.00	3.900	1.322E+00	RA224
					241.92	7.470	6.943E-01	PB214
270.49	132.	25.58	1.79	2.943E-02				
295.43	305.	9.19	1.34	2.766E-02	295.22	19.200	3.761E-01	PB214
300.12	112.	20.28	1.34	2.735E-02				
328.14	87.	33.98	0.60	2.560E-02				
338.60	322.	13.15	1.29	2.499E-02	338.40	12.010	7.053E-01	AC228
352.01	570.	6.59	1.49	2.426E-02	351.99	37.100	4.172E-01	PB214
463.43	93.	23.45	1.24	1.953E-02				
463.43	93.	23.45	1.24	1.953E-02	463.51	10.000	3.079E-01	SB125
510.76	232.	12.10	1.89	1.808E-02	510.72	22.500	3.231E-01	TL208
583.52	560.	7.10	1.59	1.628E-02	583.14	86.000	2.633E-01	TL208
609.46	438.	6.94	1.62	1.574E-02	609.32	46.090	3.969E-01	BI214
727.44	101.	16.33	1.55	1.374E-02	727.17	11.800	4.081E-01	BI212

795.50	56.	26.91	1.18	1.284E-02				
795.50	56.	26.91	1.18	1.284E-02	795.76	85.400	3.370E-02	CS134
860.85	61.	29.00	0.81	1.211E-02				
911.49	379.	6.74	1.58	1.160E-02	911.07	29.000	7.400E-01	AC228
968.53	276.	11.17	2.47	1.110E-02	968.90	17.460	9.408E-01	AC228
1120.67	135.	18.27	2.16	9.967E-03	1120.28	15.040	5.951E-01	BI214
1461.24	1987.	2.35	2.14	8.189E-03	1460.75	10.700	1.503E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1621.46	36.	24.21	1.60	7.569E-03	1620.56	2.750	1.159E+00	BI212
1765.34	84.	13.74	1.84	7.081E-03	1764.51	15.920	4.908E-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	
179.68	90.17	684.	103.	0.052	111.42	1.189	PB-214	lD
185.55	93.31	621.	251.	0.126	46.17	1.191	U-235	D
417.88	209.12	840.	154.	0.077	99.00	1.210	AC-228	s
540.60	270.49	406.	132.	0.066	76.74	1.790	AC-228	s
599.82	300.10	291.	112.	0.056	75.02	1.150	PB-212	sM
655.90	328.14	306.	87.	0.044	101.94	0.596	AC-228	s
1721.27	860.85	90.	61.	0.031	87.01	0.805	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	149.29	74.81	833.	312.	0.156	42.17	1.178D
PB-212	153.89	77.11	839.	358.	0.179	32.11	1.179A
PB-214	153.89	77.11	1504.	175.	0.087	87.12	1.500A
EU-155	174.15	87.24	1709.	195.	0.097	92.51	1.500
CD-109	175.74	88.04	776.	174.	0.087	71.46	1.187D
TH-234	185.75	93.05	1470.	231.	0.116	67.09	1.500
RA-226	371.58	185.97	801.	247.	0.124	59.54	1.620s
TH-227	472.11	236.24	1482.	-151.	-0.075	111.30	1.500s
PB-212	476.89	238.63	349.	1332.	0.666	9.99	1.297D
RA-224	483.11	241.74	1048.	150.	0.075	93.23	1.500
PB-214	483.47	241.92	504.	233.	0.116	45.07	1.299D
PB-214	590.65	295.51	498.	425.	0.212	30.92	1.557s
AC-228	676.82	338.60	423.	319.	0.159	39.44	1.294
PB-214	703.63	352.01	296.	565.	0.283	19.78	1.491
SB-125	926.26	463.33	168.	87.	0.044	68.35	1.500
TL-208	1021.11	510.76	212.	198.	0.099	36.30	1.890s
TL-208	1166.62	583.52	248.	555.	0.278	21.31	1.594
BI-214	1218.49	609.46	152.	433.	0.217	20.82	1.617s
BI-212	1454.45	727.44	75.	100.	0.050	48.98	1.547

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	1590.40	795.41	95.	58.	0.029	80.04	1.684
AC-228	1822.53	911.49	90.	375.	0.187	20.23	1.585
AC-228	1936.62	968.53	153.	274.	0.137	33.51	2.469s
BI-214	2240.92	1120.67	123.	134.	0.067	54.81	2.156s
K-40	2922.08	1461.24	41.	1982.	0.991	7.06	2.136
BI-212	3242.55	1621.46	12.	36.	0.018	72.62	1.600
BI-214	3530.34	1765.34	12.	83.	0.042	41.23	1.837

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		8.4138E-02					
			477.56	8.414E-02	%(	2.358E-01 7.08E-02 G	
K-40		1.5027E+01					
			1460.75	1.503E+01	(P	2.460E-01 3.54E-01 G	
MN-54		-5.6242E-03					
			834.81	-5.624E-03	%(P	3.063E-02 9.00E-03 G	
CO-57		1.6352E-04					
			122.07	1.635E-04	&(P	3.381E-02 1.01E-02 G K	
			136.43	-5.543E-03	% P	2.788E-01 8.33E-02 G	
CO-60		8.7851E-03					
			1332.51	8.785E-03	&(P	2.934E-02 8.55E-03 G K	
			1173.23	8.596E-03	& P	3.587E-02 1.05E-02 G K	
Sr-85		-1.5182E-02					
			514.00	-1.518E-02	%(	3.324E-02 1.01E-02 G	
Kr-85		-3.5857E+02					
			513.99	-3.586E+02	%(P	7.312E+02 2.20E+02 G	
Y-88		1.2970E-03					
			1836.01	1.297E-03	&(P	2.270E-02 6.10E-03 G K	
			898.02	-9.671E-04	% P	2.911E-02 8.25E-03 G	
NB-94		-8.4021E-03					
			871.10	-8.402E-03	%(P	2.866E-02 8.51E-03 G K	
			702.50	7.970E-03	& P	2.844E-02 8.46E-03 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	4.7731E-03						
		722.95	4.773E-03	&(	2.792E-02	8.19E-03	G K
		614.37	-2.150E-02	%	3.318E-02	1.02E-02	G
		433.93	1.417E-03	& P	2.296E-02	6.69E-03	G
CD-109	9.2425E-01						
		88.04	9.243E-01	(P	7.036E-01	2.21E-01	G
SN-113	-1.3757E-03						
		391.71	-1.376E-03	%(P	3.796E-02	1.11E-02	G K
		255.04	-2.301E-02	%	1.186E+00	3.51E-01	G
SB-125	6.8130E-02						
		427.95	-9.297E-03	%(P	7.880E-02	2.31E-02	G K
		600.77	1.441E-02	% P	1.254E-01	3.65E-02	G
		636.15	3.724E-02	% P	2.076E-01	6.09E-02	G
		463.51	2.973E-01	(P	2.152E-01	6.99E-02	G
		176.29	-2.068E-02	% P	3.833E-01	1.14E-01	G
I-131	1.2273E-02						
		364.48	1.227E-02	&(	3.879E-02	1.16E-02	G K
		636.97	-3.882E-02	%	5.093E-01	1.48E-01	G
		284.29	4.387E-02	&	5.951E-01	1.76E-01	G
CS-134	1.7509E-02						
		604.66	1.679E-03	%(P	5.509E-02	1.64E-02	G K
		795.76	3.560E-02	(P	2.929E-02	9.58E-03	G
		569.29	-2.036E-02	%	1.620E-01	4.76E-02	G
		801.84	-1.601E-03	% P	3.079E-01	8.84E-02	G
CS-137	1.1925E-02						
		661.62	1.192E-02	%(P	3.357E-02	1.00E-02	G
CE-139	4.4462E-03						
		165.85	4.446E-03	%(P	2.663E-02	7.96E-03	G
EU-152	-4.7092E-03						
		121.78	-4.709E-03	%(P	9.854E-02	2.95E-02	G K
		344.30	1.585E-02	% P	8.401E-02	2.50E-02	G
		1408.08	-2.749E-03	% P	1.193E-01	3.29E-02	G
		964.00	1.016E-01	& P	2.819E-01	8.47E-02	G
		1112.07	-2.890E-02	% P	2.473E-01	7.18E-02	G
		778.90	-1.248E-02	% P	2.278E-01	6.61E-02	G
EU-154	-8.9855E-03						
		123.10	-8.986E-03	&(P	7.031E-02	2.11E-02	G K
		1274.80	1.047E-03	& P	8.494E-02	2.41E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-6.637E-02 & P 1.628E-01 4.90E-02 G
                         1004.80-6.143E-04 & P 1.839E-01 5.29E-02 G

EU-155       1.2068E-01
                           86.45 1.207E-01  (  1.210E-01 3.72E-02 G K
                          105.31 4.723E-02 % P 1.404E-01 4.24E-02 G

HG-203      -5.6319E-03
                          279.17-5.632E-03 &(P 3.160E-02 9.41E-03 G K
                           72.87-9.561E-02 & P 9.312E-01 2.80E-01 G
                           70.83-8.476E-02 %   1.606E+00 4.82E-01 G
                           82.50-3.500E-01 %   2.023E+00 6.09E-01 G

TL-208       2.6333E-01
                          583.14 2.633E-01  (P 3.607E-02 1.89E-02 G
                          510.72 3.231E-01 + P 1.153E-01 4.58E-02 G

PB-212       6.5750E-01
                          238.63 6.436E-01  (P 4.340E-02 2.17E-02 G K
                                                          Energy duplication
                           77.11 4.598E-01 }   1.768E-01 4.92E-02 G
                           74.81 7.583E-01 + P 3.332E-01 1.08E-01 G

PB-214       4.1723E-01
                          351.99 4.172E-01  (P 6.117E-02 2.78E-02 G K
                          295.22 5.313E-01 + P 1.334E-01 5.54E-02 G
                                                          Energy duplication
                           77.11 3.673E-01 } P 3.852E-01 1.07E-01 G
                          241.92 6.549E-01 + P 3.018E-01 9.90E-02 G

BI-212       4.0811E-01
                          727.17 4.081E-01  (P 1.769E-01 6.75E-02 G K
                         1620.56 1.159E+00 + P 5.953E-01 2.84E-01 G
                          785.42-4.830E-01 % P 1.369E+00 4.07E-01 G

BI-214       3.9693E-01
                          609.32 3.969E-01 @(P 5.501E-02 2.78E-02 G K
                         1764.51 4.908E-01 + P 1.099E-01 6.82E-02 G
                         1120.28 5.951E-01 + P 2.407E-01 1.09E-01 G

RA-224       8.0715E-01
                          241.00 8.071E-01 ?(P 8.252E-01 2.55E-01 G

RA-226       1.3875E+00
                          185.99 1.388E+00 *(  7.550E-01 2.75E-01 G

AC-228       7.2987E-01
                          911.07 7.400E-01  (P 9.262E-02 5.05E-02 G K
                          968.90 9.408E-01 + P 2.069E-01 1.06E-01 G
                          338.40 7.053E-01  (P 2.181E-01 9.37E-02 G
```

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

TH-227      -2.7844E-01
                          236.00-2.784E-01 ?(P 3.365E-01 1.03E-01 G K
                          256.25-8.972E-03 & P 2.891E-01 8.49E-02 G

PA-234       6.1918E-02
                           98.44 6.192E-02 %(  1.240E-01 3.76E-02 G K
                          946.00-1.314E-02 &   1.604E-01 4.67E-02 G
                          131.28-1.302E-02 %   1.501E-01 4.50E-02 G
                           94.67-8.328E-02 %   2.271E-01 6.87E-02 G
                          883.24 6.565E-02 %   1.854E-01 5.53E-02 G
                          926.70 4.658E-03 &   2.720E-01 7.84E-02 G
                          569.26-2.403E-02 %   2.383E-01 6.98E-02 G

TH-234       8.5634E-01
                           63.29 3.691E-01 %(P 1.533E+00 4.60E-01 G K
                           92.80 1.490E+00  (P 1.168E+00 3.62E-01 G
                           92.38-4.688E-01 % P 1.397E+00 4.20E-01 G

AM-241      -4.7561E-02
                           59.54-4.756E-02 &(P 1.991E-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                 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	7.8898E-02	8.4138E-02	2.1234E-01	2.1239E-01	2.211E-01
K-40		1.5027E+01	1.5027E+01	1.0630E+00	1.3848E+00	
MN-54	#A	-5.5627E-03	-5.6242E-03	2.9326E-02	2.9327E-02	3.029E-02
CO-57	#B	1.6146E-04	1.6352E-04	3.0276E-02	3.0276E-02	3.338E-02
CO-60	#B	8.7694E-03	8.7851E-03	2.5642E-02	2.5647E-02	2.929E-02
Sr-85	#A	-1.4399E-02	-1.5182E-02	3.0195E-02	3.0208E-02	3.152E-02
Kr-85	#A	-3.5855E+02	-3.5857E+02	7.6331E+02	7.6360E+02	7.312E+02
Y-88	#B	1.2559E-03	1.2970E-03	1.8303E-02	1.8303E-02	2.198E-02
NB-94	#B	-8.4021E-03	-8.4021E-03	2.5996E-02	2.6001E-02	2.866E-02
Ag-108M	#B	4.7728E-03	4.7731E-03	2.4574E-02	2.4576E-02	2.792E-02
CD-109		9.1728E-01	9.2425E-01	6.6171E-01	6.6369E-01	
SN-113	#B	-1.3352E-03	-1.3757E-03	1.4678E-01	1.4678E-01	3.685E-02
SB-125	#B	6.7899E-02	6.8130E-02	4.8072E-02	4.8240E-02	7.853E-02
I-131	#B	8.0070E-03	1.2273E-02	3.4859E-02	3.4867E-02	2.531E-02
CS-134	#B	1.7429E-02	1.7509E-02	1.4141E-02	1.4179E-02	5.484E-02
CS-137	#A	1.1921E-02	1.1925E-02	3.0066E-02	3.0074E-02	3.356E-02
CE-139	#A	4.3365E-03	4.4462E-03	2.3874E-02	2.3876E-02	2.598E-02
EU-152	#B	-4.7057E-03	-4.7092E-03	9.1539E-02	9.1540E-02	9.847E-02
EU-154	#B	-8.9756E-03	-8.9855E-03	6.6583E-02	6.6585E-02	7.024E-02
EU-155	#A	1.2046E-01	1.2068E-01	1.1165E-01	1.1185E-01	1.207E-01
HG-203	#B	-5.2317E-03	-5.6319E-03	3.2492E-02	3.2494E-02	2.936E-02
TL-208		2.6333E-01	2.6333E-01	5.6574E-02	5.8673E-02	
PB-212		6.5750E-01	6.5750E-01	6.6479E-02	7.6989E-02	
PB-214		4.1723E-01	4.1723E-01	8.3258E-02	8.6828E-02	
BI-212		4.0811E-01	4.0811E-01	2.0246E-01	2.0389E-01	
BI-214		3.9693E-01	3.9693E-01	8.3485E-02	8.6713E-02	
RA-224	#A	8.0715E-01	8.0715E-01	7.6365E-01	7.6514E-01	8.252E-01
RA-226	#	1.3875E+00	1.3875E+00	8.2618E-01	8.3024E-01	
AC-228		7.2987E-01	7.2987E-01	1.4931E-01	1.5541E-01	
TH-227	#A	-2.7844E-01	-2.7844E-01	3.1046E-01	3.1089E-01	3.365E-01
PA-234	#B	6.1918E-02	6.1918E-02	1.1287E-01	1.1293E-01	1.240E-01
TH-234	#B	8.5634E-01	8.5634E-01	6.2355E-01	6.2536E-01	1.533E+00
AM-241	#A	-4.7560E-02	-4.7561E-02	1.8532E-01	1.8534E-01	1.991E-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) 2.0204399E+01 pCi/gm
Total Decayed Activity (270.2 to 2000.1 keV) 2.0211382E+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-27JUN2006_1816.An1

Sample description
FSS-NOL-06-02-015-F

Spectrum Filename: C:\GammaVision\Spectra\101F-27JUN2006_1816.An1

Acquisition information
Start time: 27-Jun-2006 18:16:36
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: 1.8960E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8960E+03) =
5.2743E+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	26-Jun-2006 07:20:00
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. 11 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1679

***** 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	179.	26.55	1.50	1.654E-02				
74.76	179.	26.55	1.50	1.654E-02	74.81	9.600	8.026E-01	PB212
77.09	312.	15.30	1.50	1.720E-02	77.11	17.500	7.377E-01	PB212
					77.11	10.700	1.192E+00	PB214
77.09	308.	15.30	1.50	1.720E-02	77.11	17.500	7.289E-01	PB212
					77.11	10.700	1.192E+00	PB214
87.17	132.	22.39	1.01	1.918E-02				
93.00	127.	23.58	1.02	1.990E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.00	106.	32.49	1.11	2.110E-02				
186.17	104.	27.92	0.94	1.857E-02	185.99	3.280	1.216E+00	RA226
209.23	72.	31.43	1.08	1.722E-02				
238.74	697.	4.58	1.12	1.557E-02	238.63	43.100	7.330E-01	PB212
241.90	110.	20.86	1.12	1.541E-02	241.00	3.900	1.297E+00	RA224
					241.92	7.470	PBC<MDA	PB214
270.23	82.	32.46	1.64	1.400E-02				
295.34	177.	10.80	1.16	1.292E-02	295.22	19.200	5.022E-01	PB214
299.95	50.	31.68	1.16	1.273E-02				
328.04	58.	36.35	1.14	1.169E-02				
338.54	150.	13.29	1.28	1.135E-02	338.40	12.010	7.739E-01	AC228
351.82	267.	9.08	1.26	1.093E-02				
351.82	267.	9.08	1.26	1.093E-02	351.99	37.100	4.657E-01	PB214
462.97	43.	30.41	1.54	8.351E-03				
462.97	43.	30.41	1.54	8.351E-03	463.51	10.000	3.571E-01	SB125
510.91	145.	16.34	1.44	7.588E-03	510.72	22.500	5.374E-01	TL208
583.09	250.	9.34	1.39	6.685E-03	583.14	86.000	3.065E-01	TL208
609.31	180.	11.29	1.42	6.413E-03	609.32	46.090	4.324E-01	BI214

727.46	32.	37.13	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
736.33	29.	33.18	1.08	5.381E-03				
910.88	161.	9.31	1.27	4.447E-03	911.07	29.000	8.807E-01	AC228
968.40	130.	13.70	1.48	4.214E-03	968.90	17.460	1.253E+00	AC228
1119.85	46.	28.41	2.04	3.711E-03	1120.28	15.040	5.864E-01	BI214
1460.63	679.	4.07	1.94	2.943E-03	1460.75	10.700	1.531E+01	K40
1764.81	36.	18.98	1.02	2.481E-03	1764.51	15.920	6.452E-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	
173.92	87.02	372.	132.	0.066	67.16	1.014	PB-214	lD
185.62	92.84	391.	121.	0.061	74.45	1.018	TH-234	D
418.14	209.23	220.	72.	0.036	94.28	1.084	AC-228	
477.19	238.67	161.	697.	0.348	13.75	1.122	PB-212	D
483.50	241.82	210.	110.	0.055	62.57	1.124	PB-214	D
540.18	270.23	238.	82.	0.041	97.37	1.640	AC-228	s
599.66	299.96	98.	50.	0.025	95.03	1.165	TH-227	lD
655.85	328.04	161.	58.	0.029	109.04	1.143	AC-228	s
1472.82	736.33	29.	29.	0.015	99.55	1.080	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-212	149.08	74.76	1107.	179.	0.089	79.65	1.499
PB-212	153.79	77.11	981.	312.	0.156	45.91	1.499D
PB-214	153.79	77.11	985.	308.	0.154	45.91	1.499D
TH-234	185.66	93.04	974.	128.	0.064	98.44	1.499s
TH-234	185.65	93.03	928.	140.	0.070	91.83	1.499s
RA-226	372.00	186.17	457.	112.	0.056	85.58	1.499
PB-212	477.17	238.74	423.	543.	0.271	20.31	1.499
RA-224	483.02	241.66	502.	91.	0.045	108.37	1.499s
PB-214	590.29	295.27	223.	150.	0.075	48.21	1.499
AC-228	676.87	338.54	115.	148.	0.074	39.86	1.278
PB-214	703.79	351.99	149.	237.	0.119	28.98	1.499s
SB-125	926.02	463.06	69.	46.	0.023	85.16	1.499s
TL-208	1021.75	510.91	125.	129.	0.064	49.02	1.435s
TL-208	1166.19	583.09	89.	247.	0.124	28.02	1.388s
BI-214	1218.66	609.31	77.	179.	0.090	33.87	1.415s
BI-212	1455.07	727.46	58.	32.	0.016	111.40	1.499s
AC-228	1822.10	910.88	26.	159.	0.080	27.94	1.265
AC-228	1937.21	968.40	53.	129.	0.065	41.10	1.477
BI-214	2240.29	1119.85	44.	46.	0.023	85.23	2.042
K-40	2922.28	1460.63	19.	676.	0.338	12.21	1.942
BI-214	3531.06	1764.81	4.	36.	0.018	56.95	1.017s

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		1.4433E-01					
			477.56	1.443E-01	%(	3.489E-01 1.05E-01	G
K-40		1.5310E+01					
			1460.75	1.531E+01	(P	5.173E-01 6.25E-01	G
MN-54		-5.9279E-04					
			834.81	-5.928E-04	&(P	4.758E-02 1.31E-02	G
CO-57		-1.2069E-02					
			122.07	-1.207E-02	%(	4.984E-02 1.50E-02	G K
			136.43	-4.557E-02	&	4.142E-01 1.24E-01	G
CO-60		1.4741E-02					
			1332.51	1.474E-02	%(P	4.565E-02 1.33E-02	G K
			1173.23	9.518E-03	% P	7.678E-02 2.21E-02	G K
Sr-85		-1.2017E-02					
			514.00	-1.202E-02	%(	5.656E-02 1.67E-02	G
Kr-85		-2.9903E+02					
			513.99	-2.990E+02	%(P	1.291E+03 3.80E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	6.758E-02 1.80E-02	G K
			898.02	8.996E-03	& P	4.255E-02 1.21E-02	G
NB-94		1.5566E-02					
			871.10	1.557E-02	%(P	4.165E-02 1.24E-02	G K
			702.50	1.971E-02	& P	3.698E-02 1.13E-02	G K
Ag-108M		-2.2734E-02					
			722.95	-2.273E-02	&(	6.192E-02 1.85E-02	G K
			614.37	-1.944E-02	% P	5.170E-02 1.55E-02	G
			433.93	-2.409E-03	%	4.592E-02 1.33E-02	G
CD-109		1.2473E-01					
			88.04	1.247E-01	&(P	1.511E+00 4.52E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-2.1528E-03						
		391.71	-2.153E-03	&(	6.767E-02	1.97E-02	G K
		255.04	-2.690E-01	& P	1.939E+00	5.74E-01	G
SB-125	1.0149E-01						
		427.95	1.973E-03	&(P	1.316E-01	3.78E-02	G K
		600.77	-1.328E-03	% P	2.562E-01	7.27E-02	G
		636.15	-4.887E-02	& P	3.664E-01	1.05E-01	G
		463.51	3.961E-01	(P	3.553E-01	1.16E-01	G
		176.29	8.021E-02	% P	6.416E-01	1.91E-01	G
I-131	6.0675E-03						
		364.48	6.068E-03	%(	3.701E-02	1.07E-02	G K
		636.97	-8.515E-02	&	5.949E-01	1.70E-01	G
		284.29	-1.421E-01	%	7.563E-01	2.25E-01	G
CS-134	-2.6356E-02						
		604.66	-2.636E-02	%(P	5.959E-02	1.79E-02	G K
		795.76	3.731E-02	% P	5.081E-02	1.61E-02	G
		569.29	4.468E-02	% P	2.442E-01	7.06E-02	G
		801.84	1.571E-01	%	3.717E-01	1.12E-01	G
CS-137	2.3240E-02						
		661.62	2.324E-02	%(P	4.758E-02	1.44E-02	G
CE-139	6.2016E-04						
		165.85	6.202E-04	%(P	4.807E-02	1.42E-02	G
EU-152	-3.6985E-02						
		121.78	-3.698E-02	%(P	1.464E-01	4.39E-02	G K
		344.30	2.755E-02	& P	1.365E-01	4.02E-02	G
		1408.08	3.411E-02	& P	2.339E-01	6.47E-02	G
		964.00	-1.562E-01	% P	5.206E-01	1.54E-01	G
		1112.07	1.116E-01	& P	5.081E-01	1.48E-01	G
		778.90	1.397E-01	% P	3.428E-01	1.03E-01	G
EU-154	-1.6162E-02						
		123.10	-1.616E-02	%(P	1.108E-01	3.31E-02	G K
		1274.80	1.241E-02	& P	1.636E-01	4.55E-02	G
		723.30	-9.266E-02	% P	2.871E-01	8.51E-02	G
		1004.80	3.259E-02	& P	3.203E-01	9.08E-02	G
EU-155	4.2506E-02						
		86.45	4.251E-02	%(	1.430E-01	4.30E-02	G K
		105.31	-6.316E-02	&	2.073E-01	6.24E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-5.1942E-03						
		279.17	-5.194E-03	&(	5.136E-02	1.52E-02	G K
		72.87	-1.576E-01	% P	1.234E+00	3.69E-01	G
		70.83	7.492E-01	&	1.707E+00	5.17E-01	G
		82.50	-3.757E-02	&	2.879E+00	8.60E-01	G
TL-208	3.0652E-01						
		583.14	3.065E-01	@(P	5.780E-02	2.89E-02	G
		510.72	5.374E-01	+ P	2.289E-01	9.87E-02	G
PB-212	5.7650E-01						
		238.63	5.765E-01	(P	1.046E-01	3.95E-02	G K
							Energy duplication
		77.11	7.377E-01	+	3.520E-01	1.13E-01	G
		74.81	8.026E-01	& P	7.082E-01	2.19E-01	G
PB-214	4.2163E-01						
		351.99	4.170E-01	@(P	1.048E-01	4.06E-02	G K
		295.22	4.307E-01	(P	2.077E-01	7.00E-02	G
							Energy duplication
		77.11	1.192E+00	+ P	5.768E-01	1.85E-01	G
		241.92	2.520E-01	% P	7.093E-01	2.14E-01	G
BI-212	3.5437E-01						
		727.17	3.544E-01	*(P	4.228E-01	1.34E-01	G K
		1620.56	3.712E-01	%	1.785E+00	5.00E-01	G
		785.42	7.323E-02	& P	2.769E+00	7.85E-01	G
BI-214	4.3236E-01						
		609.32	4.324E-01	@(P	1.050E-01	4.91E-02	G K
		1764.51	6.452E-01	+ P	2.220E-01	1.24E-01	G
		1120.28	5.864E-01	+ P	4.297E-01	1.68E-01	G
RA-224	1.0745E+00						
		241.00	1.074E+00	(P	1.267E+00	3.91E-01	G
RA-226	1.3137E+00						
		185.99	1.314E+00	(	1.197E+00	3.75E-01	G
AC-228	8.4942E-01						
		911.07	8.807E-01	(P	1.455E-01	8.30E-02	G K
		968.90	1.253E+00	+ P	3.542E-01	1.73E-01	G
		338.40	7.739E-01	(P	2.755E-01	1.04E-01	G
TH-227	-2.1796E-01						
		236.00	-2.180E-01	%(P	4.844E-01	1.47E-01	G K
		256.25	1.110E-01	% P	5.792E-01	1.72E-01	G

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

PA-234      -7.2124E-03
                            98.44-7.212E-03 %(  1.845E-01 5.49E-02 G K
                           946.00-4.049E-02 %   2.868E-01 8.23E-02 G
                           131.28-3.919E-02 %   2.194E-01 6.57E-02 G
                            94.67-8.400E-02 %   3.524E-01 1.06E-01 G
                           883.24 1.442E-01 %   3.719E-01 1.11E-01 G
                           926.70 1.736E-01 &   3.558E-01 1.08E-01 G
                           569.26 7.031E-02 %   3.605E-01 1.05E-01 G

TH-234       1.2755E+00
                            63.29 6.403E-01 %(P 2.250E+00 6.76E-01 G K
                            92.80 1.666E+00 *(P 1.728E+00 5.33E-01 G
                            92.38 1.783E+00 *(P 2.070E+00 6.35E-01 G

AM-241      -5.1205E-02
                            59.54-5.121E-02 %(P 2.934E-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	1.4163E-01	1.4433E-01	3.1469E-01	3.1479E-01	3.424E-01
K-40		1.5310E+01	1.5310E+01	1.8750E+00	2.0650E+00	
MN-54	#A	-5.9088E-04	-5.9279E-04	1.6509E+00	1.6509E+00	4.742E-02
CO-57	#B	-1.2024E-02	-1.2069E-02	4.4878E-02	4.4883E-02	4.965E-02
CO-60	#B	1.4733E-02	1.4741E-02	3.9896E-02	3.9904E-02	4.562E-02
Sr-85	#A	-1.1832E-02	-1.2017E-02	5.0162E-02	5.0167E-02	5.569E-02
Kr-85	#A	-2.9903E+02	-2.9903E+02	1.3559E+03	1.3560E+03	1.291E+03
Y-88	#B	0.0000E+00	0.0000E+00	5.4060E-02	5.4060E-02	6.695E-02
NB-94	#B	1.5566E-02	1.5566E-02	3.7106E-02	3.7116E-02	4.165E-02
Ag-108M	#B	-2.2734E-02	-2.2734E-02	5.5540E-02	5.5555E-02	6.192E-02
CD-109	#A	1.2446E-01	1.2473E-01	1.3555E+00	1.3555E+00	1.508E+00
SN-113	#B	-2.1340E-03	-2.1528E-03	5.8987E-02	5.8987E-02	6.708E-02
SB-125	#B	1.0139E-01	1.0149E-01	8.9128E-02	8.9312E-02	1.315E-01
I-131	#B	5.3518E-03	6.0675E-03	3.2185E-02	3.2187E-02	3.265E-02
CS-134	#B	-2.6321E-02	-2.6356E-02	5.6746E-02	5.6766E-02	5.951E-02
CS-137	#A	2.3238E-02	2.3240E-02	4.3196E-02	4.3216E-02	4.757E-02
CE-139	#A	6.1562E-04	6.2016E-04	4.2663E-02	4.2663E-02	4.772E-02
EU-152	#B	-3.6977E-02	-3.6985E-02	1.3841E-01	1.3842E-01	1.464E-01
EU-154	#B	-1.6157E-02	-1.6162E-02	1.0916E-01	1.0917E-01	1.108E-01
EU-155	#B	4.2482E-02	4.2506E-02	1.2904E-01	1.2906E-01	1.429E-01
HG-203	#B	-5.0829E-03	-5.1942E-03	4.5479E-02	4.5480E-02	5.026E-02
TL-208	#	3.0652E-01	3.0652E-01	8.6702E-02	8.8415E-02	
PB-212	#	5.7650E-01	5.7650E-01	1.1843E-01	1.2283E-01	1.046E-01
PB-214	#	4.2163E-01	4.2163E-01	1.1987E-01	1.2222E-01	1.048E-01
BI-212	#A	3.5437E-01	3.5437E-01	4.0313E-01	4.0363E-01	4.228E-01
BI-214		4.3236E-01	4.3236E-01	1.4733E-01	1.4935E-01	
RA-224	#A	1.0745E+00	1.0745E+00	1.1735E+00	1.1751E+00	1.267E+00
RA-226	#	1.3137E+00	1.3137E+00	1.1243E+00	1.1267E+00	1.197E+00
AC-228		8.4942E-01	8.4942E-01	2.0961E-01	2.1503E-01	
TH-227	#B	-2.1796E-01	-2.1796E-01	4.4709E-01	4.4726E-01	4.844E-01
PA-234	#B	-7.2124E-03	-7.2124E-03	1.6479E-01	1.6479E-01	1.845E-01
TH-234	#B	1.2755E+00	1.2755E+00	1.2233E+00	1.2253E+00	2.250E+00
AM-241	#A	-5.1205E-02	-5.1205E-02	2.8513E-01	2.8514E-01	2.934E-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

YAEC Chemistry Lab Spectrum name: 101F-27JUN2006_1816.An1

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

Total Activity (270.1 to 1999.1 keV) 1.6898735E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.6898735E+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_27JUN2006_1534.An1

Sample description
FSS-NOL-06-02-008-F

Spectrum Filename: C:\GammaVision\Spectra\101F_27JUN2006_1534.An1

Acquisition information
Start time: 27-Jun-2006 15:34:48
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: 1.9580E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9580E+03) =
5.1073E+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-Jun-2006 15:00:00
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: 0.1276

***** 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
74.69	240.	13.96	1.00	1.665E-02	74.81	9.600	1.021E+00	PB212
77.23	429.	8.53	1.01	1.736E-02	77.11	10.700	1.595E+00	PB214
					77.11	17.500	9.835E-01	PB212
87.09	153.	19.67	1.01	1.919E-02				
87.09	153.	19.67	1.01	1.919E-02	88.04	3.790	PBC<MDA	CD109
89.87	119.	24.53	1.02	1.956E-02				
93.75	123.	24.95	1.02	1.999E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.61	128.	27.26	1.35	1.860E-02				
185.61	128.	27.26	1.35	1.860E-02	185.99	3.280	1.455E+00	RA226
209.25	123.	29.85	1.33	1.722E-02				
238.72	859.	4.04	1.12	1.558E-02				
238.72	859.	4.04	1.12	1.558E-02	238.63	43.100	8.772E-01	PB212
241.74	124.	19.25	1.12	1.542E-02	241.00	3.900	1.417E+00	RA224
					241.92	7.470	PBC<MDA	PB214
269.47	100.	26.97	1.47	1.404E-02				
277.49	109.	26.97	0.84	1.367E-02				
295.33	157.	13.40	1.16	1.292E-02	295.22	19.200	4.310E-01	PB214
300.28	60.	36.87	1.54	1.272E-02				
327.63	58.	34.81	1.43	1.171E-02				
338.46	160.	19.10	0.78	1.135E-02	338.40	12.010	7.990E-01	AC228
351.88	342.	8.26	1.25	1.093E-02				
351.88	342.	8.26	1.25	1.093E-02	351.99	37.100	5.790E-01	PB214
463.24	51.	24.43	1.06	8.346E-03				
463.24	51.	24.43	1.06	8.346E-03	463.51	10.000	4.144E-01	SB125
510.71	110.	16.05	1.56	7.591E-03	510.72	22.500	3.798E-01	TL208
583.35	257.	9.06	1.18	6.682E-03	583.14	86.000	3.057E-01	TL208

609.48	184.	10.95	1.38	6.411E-03	609.32	46.090	4.271E-01	BI214
727.36	82.	27.25	1.49	5.442E-03	727.17	11.800	8.717E-01	BI212
795.09	41.	27.79	1.33	5.020E-03				
795.09	41.	27.79	1.33	5.020E-03	795.76	85.400	6.514E-02	CS134
910.88	187.	10.42	1.53	4.447E-03	911.07	29.000	9.909E-01	AC228
967.95	128.	15.73	1.81	4.216E-03	968.90	17.460	1.198E+00	AC228
1119.86	56.	25.28	1.74	3.711E-03	1120.28	15.040	6.964E-01	BI214
1184.34	19.	41.11	1.40	3.536E-03				
1460.62	760.	3.73	1.92	2.943E-03	1460.75	10.700	1.661E+01	K40
1763.37	34.	17.15	0.69	2.481E-03	1764.51	15.920	5.864E-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	
148.95	75.18	442.	240.	0.120	41.89	1.005	PB-214	D
154.02	77.71	455.	429.	0.215	25.60	1.007	PB-214	D
173.75	87.10	376.	153.	0.076	59.01	1.014	PB-214	lD
179.31	89.87	366.	119.	0.059	73.58	1.016	PB-214	lD
418.17	209.25	452.	123.	0.061	89.55	1.329	AC-228	s
477.15	238.58	172.	859.	0.430	12.12	1.122	PB-212	D
483.18	241.60	225.	124.	0.062	57.76	1.124	PB-214	D
538.66	269.47	233.	100.	0.050	80.92	1.469	AC-228	s
554.71	277.49	255.	112.	0.056	66.65	0.845	NP-239	s
600.32	300.28	176.	60.	0.030	110.62	1.538	PB-212	s
655.03	327.63	142.	58.	0.029	104.44	1.428	AC-228	s
2369.35	1184.34	21.	19.	0.009	123.32	1.401	-	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	1307.	182.	0.091	84.67	1.499
PB-214	153.79	77.11	1096.	349.	0.174	42.88	1.499D
PB-212	153.79	77.11	1093.	352.	0.176	42.88	1.499D
TH-234	186.00	93.21	991.	137.	0.068	93.18	1.499s
TH-234	185.97	93.20	1014.	147.	0.073	91.46	1.499s
RA-226	372.03	186.19	531.	111.	0.055	92.75	1.499s
PB-212	477.13	238.71	441.	695.	0.347	16.97	1.499
RA-224	482.87	241.59	510.	112.	0.056	89.65	1.499
PB-214	590.36	295.30	232.	148.	0.074	49.43	1.499
AC-228	676.70	338.46	244.	158.	0.079	57.31	0.776
PB-214	703.78	351.99	146.	280.	0.140	25.39	1.499
SB-125	926.20	463.15	82.	39.	0.020	104.53	1.499
TL-208	1021.37	510.71	88.	94.	0.047	48.14	1.558s
TL-208	1166.71	583.35	86.	255.	0.127	27.19	1.183
BI-214	1219.00	609.48	75.	183.	0.091	32.85	1.380
BI-212	1454.19	727.02	100.	98.	0.049	67.42	1.557s
CS-134	1590.23	795.00	23.	41.	0.021	67.27	1.502
AC-228	1822.12	910.88	57.	185.	0.093	31.25	1.528s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1936.31	967.95	76.	128.	0.064	47.20	1.810s
BI-214	2240.30	1119.86	52.	56.	0.028	75.84	1.744
K-40	2922.26	1460.62	12.	758.	0.379	11.20	1.918
BI-214	3528.18	1763.37	0.	34.	0.017	51.45	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	Peak MDA Value pCi/gm	COMMENTS
BE-7		2.4399E-01					
			477.56	2.440E-01	%(	3.486E-01 1.09E-01 G	
K-40		1.6606E+01					
			1460.75	1.661E+01	(P	4.203E-01 6.22E-01 G	
MN-54		-2.1782E-03					
			834.81	-2.178E-03	&(P	6.289E-02 1.79E-02 G	
CO-57		-1.3728E-05					
			122.07	-1.373E-05	%(	4.805E-02 1.43E-02 G K	
			136.43	-1.053E-01	%	4.149E-01 1.25E-01 G	
CO-60		2.2029E-02					
			1332.51	2.203E-02	%(P	5.257E-02 1.58E-02 G K	
			1173.23	9.780E-03	& P	6.433E-02 1.84E-02 G K	
Sr-85		-1.6742E-02					
			514.00	-1.674E-02	%(	5.430E-02 1.62E-02 G	
Kr-85		-3.9523E+02					
			513.99	-3.952E+02	%(P	1.206E+03 3.58E+02 G	
Y-88		1.0989E-02					
			1836.01	1.099E-02	%(	3.611E-02 1.03E-02 G K	
			898.02	1.090E-02	& P	5.363E-02 1.55E-02 G	
NB-94		1.1322E-02					
			871.10	1.132E-02	%(P	4.983E-02 1.45E-02 G K	
			702.50	1.060E-02	& P	4.931E-02 1.44E-02 G K	
Ag-108M		4.4481E-03					
			722.95	4.448E-03	%(	5.778E-02 1.66E-02 G K	
			614.37	-9.227E-03	% P	5.128E-02 1.49E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	8.560E-03	%	3.299E-02	9.69E-03	G
CD-109	1.0658E-01						
		88.04	1.066E-01	%(P	1.574E+00	4.71E-01	G
SN-113	-9.8837E-03						
		391.71	-9.884E-03	%(	6.744E-02	1.98E-02	G K
		255.04	-9.720E-02	& P	1.919E+00	5.65E-01	G
SB-125	6.2258E-02						
		427.95	-2.717E-02	&(P	1.368E-01	4.02E-02	G K
		600.77	-2.828E-02	& P	2.743E-01	7.94E-02	G
		636.15	-3.065E-02	& P	3.674E-01	1.04E-01	G
		463.51	3.270E-01	(P	3.733E-01	1.18E-01	G
		176.29	3.654E-02	% P	6.515E-01	1.93E-01	G
I-131	1.5672E-02						
		364.48	1.567E-02	&(	5.967E-02	1.77E-02	G K
		636.97	-1.287E-02	&	8.316E-01	2.35E-01	G
		284.29	-1.983E-01	&	9.089E-01	2.70E-01	G
CS-134	2.9358E-02						
		604.66	-3.019E-03	%(P	9.564E-02	2.81E-02	G K
		795.76	6.636E-02	(P	4.043E-02	1.50E-02	G
		569.29	-3.806E-03	& P	2.961E-01	8.43E-02	G
		801.84	-5.349E-02	&	5.173E-01	1.47E-01	G
CS-137	1.5844E-02						
		661.62	1.584E-02	%(P	4.697E-02	1.39E-02	G
CE-139	-1.4182E-02						
		165.85	-1.418E-02	&(P	5.271E-02	1.58E-02	G
EU-152	-3.8471E-04						
		121.78	-3.847E-04	%(P	1.380E-01	4.09E-02	G K
		344.30	1.824E-02	% P	1.412E-01	4.14E-02	G
		1408.08	5.653E-02	& P	2.173E-01	6.20E-02	G
		964.00	-1.076E-02	% P	5.902E-01	1.70E-01	G
		1112.07	-4.190E-02	& P	4.358E-01	1.23E-01	G
		778.90	-3.059E-03	& P	3.313E-01	9.20E-02	G
EU-154	1.1896E-02						
		123.10	1.190E-02	%(P	1.052E-01	3.14E-02	G K
		1274.80	1.226E-02	& P	1.707E-01	4.77E-02	G
		723.30	4.605E-02	% P	2.806E-01	8.16E-02	G
		1004.80	9.672E-02	% P	2.470E-01	7.36E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	3.5981E-03						
		86.45	3.598E-03	%(	1.384E-01	4.11E-02	G K
		105.31	7.661E-02	%	2.071E-01	6.25E-02	G
HG-203	-2.4111E-03						
		279.17	-2.411E-03	&(	5.600E-02	1.65E-02	G K
		72.87	1.088E-02	& P	1.592E+00	4.77E-01	G
		70.83	-8.167E-01	&	2.462E+00	7.43E-01	G
		82.50	-7.187E-01	&	2.725E+00	8.20E-01	G
TL-208	3.2106E-01						
		583.14	3.057E-01	(P	5.525E-02	2.80E-02	G
		510.72	3.798E-01	*(P	1.876E-01	7.13E-02	G
PB-212	7.4806E-01						
		238.63	7.143E-01	(P	1.035E-01	4.08E-02	G K
							Energy duplication
		77.11	8.079E-01	(	3.593E-01	1.15E-01	G
		74.81	7.907E-01	&(P	7.440E-01	2.30E-01	G
PB-214	4.5529E-01						
		351.99	4.776E-01	(P	1.007E-01	4.07E-02	G K
		295.22	4.122E-01	(P	2.050E-01	6.87E-02	G
							Energy duplication
		77.11	1.307E+00	+ P	5.887E-01	1.89E-01	G
		241.92	-1.165E-02	% P	7.959E-01	2.37E-01	G
BI-212	1.0566E+00						
		727.17	1.057E+00	*(P	5.291E-01	2.39E-01	G K
		1620.56	2.782E-01	&	1.280E+00	3.51E-01	G
		785.42	9.349E-01	% P	2.543E+00	7.58E-01	G
BI-214	4.2707E-01						
		609.32	4.271E-01	(P	1.006E-01	4.71E-02	G K
		1764.51	5.864E-01	+ P	1.288E-01	1.02E-01	G
		1120.28	6.964E-01	+ P	4.478E-01	1.77E-01	G
RA-224	1.2809E+00						
		241.00	1.281E+00	(P	1.237E+00	3.85E-01	G
RA-226	1.2547E+00						
		185.99	1.255E+00	*(	1.247E+00	3.88E-01	G
AC-228	1.0688E+00						
		911.07	9.909E-01	@(P	2.026E-01	1.04E-01	G K
		968.90	1.198E+00	@(P	4.075E-01	1.89E-01	G
		338.40	7.990E-01	- P	3.824E-01	1.55E-01	G

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

TH-227      -2.6168E-01
                          236.00-2.617E-01 %(P 4.939E-01 1.50E-01 G K
                          256.25-6.172E-03 & P 4.777E-01 1.39E-01 G

PA-234       2.0554E-05
                           98.44 2.055E-05 %(  1.751E-01 5.20E-02 G K
                          946.00-6.468E-02 %   3.463E-01 1.01E-01 G
                          131.28 5.633E-02 &   2.191E-01 6.58E-02 G
                           94.67-7.463E-04 &   3.409E-01 1.02E-01 G
                          883.24 0.000E+00 &   4.688E-01 1.32E-01 G
                          926.70-2.426E-02 %   4.475E-01 1.25E-01 G
                          569.26-2.882E-03 &   4.370E-01 1.25E-01 G

TH-234       1.4436E+00
                           63.29 9.806E-01 %(P 2.355E+00 7.11E-01 G K
                           92.80 1.694E+00  (P 1.747E+00 5.38E-01 G
                           92.38 1.853E+00 &(P 2.022E+00 6.21E-01 G

AM-241       3.2379E-02
                           59.54 3.238E-02 %(P 3.114E-01 9.30E-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	2.3157E-01	2.4399E-01	3.2664E-01	3.2693E-01	3.309E-01
K-40		1.6606E+01	1.6606E+01	1.8655E+00	2.0882E+00	
MN-54	#A	-2.1589E-03	-2.1782E-03	9.5094E-02	9.5094E-02	6.233E-02
CO-57	#B	-1.3586E-05	-1.3728E-05	4.2797E-02	4.2797E-02	4.756E-02
CO-60	#B	2.1997E-02	2.2029E-02	4.7260E-02	4.7276E-02	5.249E-02
Sr-85	#A	-1.6037E-02	-1.6742E-02	4.8581E-02	4.8590E-02	5.202E-02
Kr-85	#A	-3.9522E+02	-3.9523E+02	1.2196E+03	1.2198E+03	1.206E+03
Y-88	#B	1.0705E-02	1.0989E-02	3.0759E-02	3.0765E-02	3.518E-02
NB-94	#B	1.1322E-02	1.1322E-02	4.3444E-02	4.3449E-02	4.983E-02
Ag-108M	#B	4.4478E-03	4.4481E-03	4.9728E-02	4.9728E-02	5.777E-02
CD-109	#A	1.0593E-01	1.0658E-01	1.4125E+00	1.4125E+00	1.564E+00
SN-113	#B	-9.6471E-03	-9.8837E-03	5.9479E-02	5.9481E-02	6.582E-02
SB-125	#B	6.2086E-02	6.2258E-02	6.7467E-02	6.7559E-02	1.364E-01
I-131	#B	1.1077E-02	1.5672E-02	5.3054E-02	5.3062E-02	4.218E-02
CS-134	#B	2.9250E-02	2.9358E-02	1.9949E-02	2.0018E-02	9.529E-02
CS-137	#A	1.5840E-02	1.5844E-02	4.1603E-02	4.1613E-02	4.695E-02
CE-139	#A	-1.3897E-02	-1.4182E-02	4.8460E-02	4.8467E-02	5.165E-02
EU-152	#B	-3.8448E-04	-3.8471E-04	3.1524E-01	3.1524E-01	1.379E-01
EU-154	#B	1.1886E-02	1.1896E-02	9.4251E-02	9.4254E-02	1.051E-01
EU-155	#B	3.5926E-03	3.5981E-03	1.2339E-01	1.2339E-01	1.382E-01
HG-203	#B	-2.2710E-03	-2.4111E-03	4.9500E-02	4.9501E-02	5.275E-02
TL-208		3.2106E-01	3.2106E-01	8.8113E-02	8.9961E-02	
PB-212	#	7.4806E-01	7.4806E-01	1.2805E-01	1.3485E-01	1.035E-01
PB-214	#	4.5529E-01	4.5529E-01	1.1642E-01	1.1922E-01	1.007E-01
BI-212	#	1.0566E+00	1.0566E+00	7.1724E-01	7.1972E-01	
BI-214		4.2707E-01	4.2707E-01	1.4115E-01	1.4320E-01	
RA-224	#	1.2809E+00	1.2809E+00	1.1557E+00	1.1580E+00	1.237E+00
RA-226	#	1.2547E+00	1.2547E+00	1.1637E+00	1.1659E+00	1.247E+00
AC-228		1.0688E+00	1.0688E+00	3.0464E-01	3.1056E-01	
TH-227	#B	-2.6168E-01	-2.6168E-01	4.5613E-01	4.5637E-01	4.939E-01
PA-234	#B	2.0554E-05	2.0554E-05	1.5609E-01	1.5609E-01	1.751E-01
TH-234	#B	1.4436E+00	1.4436E+00	1.2411E+00	1.2436E+00	2.355E+00
AM-241	#A	3.2379E-02	3.2379E-02	2.7913E-01	2.7914E-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 (269.1 to 1999.1 keV) 1.9479113E+01 pCi/gm
Total Decayed Activity (269.1 to 1999.1 keV) 1.9479113E+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_27JUN2006_1612.An1

Sample description
FSS-NOL-06-02-005-F

Spectrum Filename: C:\GammaVision\Spectra\101F_27JUN2006_1612.An1

Acquisition information
Start time: 27-Jun-2006 16:12:08
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: 2.1410E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1410E+03) =
4.6707E+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-Jun-2006 18:12:00
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: 0.0474

***** 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	207.	25.79	1.50	1.654E-02				
74.81	207.	25.79	1.50	1.654E-02	74.81	9.600	8.231E-01	PB212
77.08	390.	13.15	1.50	1.720E-02	77.11	10.700	1.338E+00	PB214
					77.11	17.500	8.179E-01	PB212
77.08	394.	13.15	1.50	1.720E-02	77.11	10.700	1.338E+00	PB214
					77.11	17.500	8.257E-01	PB212
93.01	145.	31.37	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.05	134.	33.29	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.90	74.	39.97	0.92	2.110E-02				
186.52	127.	26.81	0.97	1.855E-02	185.99	3.280	1.313E+00	RA226
209.30	96.	31.41	1.26	1.721E-02				
238.79	879.	3.93	1.12	1.556E-02	238.63	43.100	8.206E-01	PB212
241.51	118.	22.04	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.19	109.	25.19	0.96	1.401E-02				
295.18	179.	13.70	1.21	1.292E-02				
295.18	179.	13.70	1.21	1.292E-02	295.22	19.200	4.519E-01	PB214
300.70	74.	29.27	1.17	1.270E-02				
327.69	54.	38.64	1.26	1.171E-02				
338.41	179.	13.15	1.18	1.135E-02	338.40	12.010	8.169E-01	AC228
352.00	296.	8.46	1.08	1.092E-02	351.99	37.100	4.585E-01	PB214
462.31	82.	23.11	1.65	8.363E-03				
462.31	82.	23.11	1.65	8.363E-03	463.51	10.000	6.112E-01	SB125
511.08	168.	12.42	1.60	7.585E-03	510.72	22.500	5.613E-01	TL208
					513.99	0.004	3.244E+03	Kr85

583.08	298.	7.33	1.27	6.685E-03	583.14	86.000	3.243E-01	TL208
609.30	179.	10.31	1.66	6.413E-03	609.32	46.090	3.795E-01	BI214
726.81	86.	21.73	1.93	5.445E-03	727.17	11.800	8.346E-01	BI212
794.80	36.	28.28	1.50	5.016E-03	795.76	85.400	5.275E-02	CS134
860.18	62.	20.51	1.23	4.679E-03				
911.00	186.	10.70	1.63	4.447E-03	911.07	29.000	9.013E-01	AC228
964.55	35.	36.49	1.61	4.231E-03	964.00	14.580	PBC<MDA	EU152
967.98	160.	11.97	1.25	4.216E-03	968.90	17.460	1.365E+00	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.17	67.	28.61	1.27	3.711E-03	1120.28	15.040	7.624E-01	BI214
1460.57	786.	3.57	1.62	2.943E-03	1460.75	10.700	1.571E+01	K40
1764.64	34.	17.15	2.06	2.481E-03	1764.51	15.920	5.363E-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	
257.41	128.90	412.	90.	0.045	101.32	0.923	AC-228	
418.28	209.30	358.	96.	0.048	94.23	1.261	AC-228	s
477.27	238.84	156.	879.	0.439	11.78	1.122	PB-212	D
482.71	241.56	280.	118.	0.059	66.13	1.124	PB-214	D
540.11	270.19	248.	109.	0.054	75.57	0.963	AC-228	s
601.16	300.70	170.	74.	0.037	82.86	1.172	PB-212	s
655.16	327.69	162.	54.	0.027	115.91	1.264	AC-228	s
1720.66	860.18	32.	62.	0.031	61.54	1.229	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	149.19	74.81	1398.	207.	0.104	77.37	1.499s
PB-214	153.79	77.11	1147.	390.	0.195	39.44	1.499D
PB-212	153.79	77.11	1144.	394.	0.197	39.44	1.499D
TH-234	185.68	93.05	1103.	134.	0.067	99.87	1.499
TH-234	185.60	93.01	1056.	145.	0.073	94.12	1.499
RA-226	371.96	186.15	587.	126.	0.063	86.11	1.499s
PB-212	477.25	238.78	533.	731.	0.366	17.22	1.499
PB-214	590.40	295.32	230.	170.	0.085	43.88	1.499
AC-228	676.59	338.41	158.	176.	0.088	39.45	1.180
PB-214	703.80	352.00	160.	293.	0.146	25.18	1.499
SB-125	925.65	462.88	102.	57.	0.028	83.12	1.499s
TL-208	1022.10	511.08	102.	152.	0.076	37.26	1.604s
TL-208	1166.17	583.08	69.	295.	0.148	22.00	1.268
BI-214	1218.63	609.30	68.	178.	0.089	30.94	1.658s
BI-212	1453.77	726.81	82.	85.	0.042	65.20	1.928s
CS-134	1589.83	794.80	34.	36.	0.018	84.85	1.502s
AC-228	1822.36	911.00	62.	184.	0.092	32.10	1.631
EU-152	1929.51	964.55	68.	35.	0.018	109.46	1.612

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1936.37	967.98	58.	159.	0.080	35.90	1.246s
BI-214	2240.92	1120.17	82.	67.	0.034	85.84	1.268
K-40	2922.16	1460.57	2.	784.	0.392	10.70	1.618
BI-214	3530.72	1764.64	0.	34.	0.017	51.45	2.061

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		-8.4710E-03					
			477.56	-8.471E-03	%(	4.063E-01 1.17E-01 G	
K-40		1.5712E+01					
			1460.75	1.571E+01	(P	1.954E-01 5.62E-01 G	
MN-54		-1.7406E-03					
			834.81	-1.741E-03	&(P	5.547E-02 1.57E-02 G	
CO-57		1.3294E-02					
			122.07	1.329E-02	&(	4.828E-02 1.45E-02 G K	
			136.43	-3.057E-03	&	3.906E-01 1.16E-01 G	
CO-60		2.4896E-02					
			1332.51	2.490E-02	&(P	4.653E-02 1.43E-02 G K	
			1173.23	1.862E-02	% P	6.173E-02 1.82E-02 G K	
Sr-85		-1.1098E-02					
			514.00	-1.110E-02	%(	5.754E-02 1.70E-02 G	
Kr-85		-2.7273E+02					
			513.99	-2.727E+02	%(P	1.253E+03 3.70E+02 G	
Y-88		-2.7662E-03					
			1836.01	-2.766E-03	%(	4.914E-02 1.30E-02 G K	
			898.02	-3.764E-04	% P	5.201E-02 1.45E-02 G	
NB-94		-1.8190E-04					
			871.10	-1.819E-04	&(P	5.960E-02 1.69E-02 G K	
			702.50	5.372E-04	% P	4.197E-02 1.18E-02 G K	
Ag-108M		-4.3677E-04					
			722.95	-4.368E-04	%(	6.258E-02 1.80E-02 G K	
			614.37	-2.231E-02	& P	5.185E-02 1.56E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	-3.798E-03	%	4.147E-02	1.21E-02	G
CD-109	2.4445E-01						
		88.04	2.444E-01	%(P	1.377E+00	4.13E-01	G
SN-113	2.2203E-02						
		391.71	2.220E-02	&(	5.356E-02	1.61E-02	G K
		255.04	6.196E-01	& P	1.753E+00	5.27E-01	G
SB-125	1.0957E-01						
		427.95	1.160E-03	%(P	9.975E-02	2.83E-02	G K
		600.77	6.179E-02	% P	2.360E-01	6.96E-02	G
		636.15	-5.994E-02	& P	4.112E-01	1.19E-01	G
		463.51	4.305E-01	@(P	3.781E-01	1.22E-01	G
		176.29	1.285E-01	% P	5.916E-01	1.77E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	%(	6.261E-02	1.82E-02	G K
		636.97	-1.021E-02	&	7.866E-01	2.23E-01	G
		284.29	-3.026E-02	%	7.754E-01	2.27E-01	G
CS-134	1.7214E-02						
		604.66	-1.388E-02	%(P	5.723E-02	1.69E-02	G K
		795.76	5.275E-02	(P	4.446E-02	1.51E-02	G
		569.29	4.334E-02	& P	2.452E-01	7.12E-02	G
		801.84	-1.027E-01	%	5.307E-01	1.54E-01	G
CS-137	-2.6502E-03						
		661.62	-2.650E-03	&(P	5.254E-02	1.49E-02	G
CE-139	8.5109E-03						
		165.85	8.511E-03	%(P	5.019E-02	1.50E-02	G
EU-152	1.3767E-01						
		121.78	2.518E-02	&(P	1.284E-01	3.85E-02	G K
		344.30	1.434E-02	% P	1.422E-01	4.17E-02	G
		1408.08	5.433E-02	% P	1.919E-01	5.51E-02	G
		964.00	3.633E-01	&(P	4.226E-01	1.34E-01	G
		1112.07	1.084E-01	& P	3.771E-01	1.10E-01	G
		778.90	-6.601E-02	& P	4.248E-01	1.24E-01	G
EU-154	9.7440E-03						
		123.10	9.744E-03	&(P	1.062E-01	3.17E-02	G K
		1274.80	-2.532E-02	% P	1.755E-01	5.02E-02	G
		723.30	-2.132E-03	% P	4.230E-01	1.23E-01	G
		1004.80	5.441E-02	& P	2.645E-01	7.62E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	9.6866E-03						
		86.45	9.687E-03	%(	1.740E-01	5.21E-02	G K
		105.31	6.865E-02	%	2.028E-01	6.12E-02	G
HG-203	2.7261E-02						
		279.17	2.726E-02	&(	4.408E-02	1.35E-02	G K
		72.87	-5.055E-01	& P	1.270E+00	3.84E-01	G
		70.83	6.491E-01	%	1.820E+00	5.49E-01	G
		82.50	-7.404E-01	%	2.244E+00	6.77E-01	G
TL-208	3.2425E-01						
		583.14	3.243E-01	(P	4.538E-02	2.40E-02	G
		510.72	5.613E-01	+ P	1.841E-01	7.71E-02	G
PB-212	6.8751E-01						
		238.63	6.875E-01	(P	1.037E-01	3.98E-02	G K
							Energy duplication
		77.11	8.257E-01	+	3.361E-01	1.09E-01	G
		74.81	8.231E-01	+ P	7.034E-01	2.18E-01	G
PB-214	4.4737E-01						
		351.99	4.556E-01	(P	9.611E-02	3.85E-02	G K
		295.22	4.315E-01	(P	1.868E-01	6.38E-02	G
							Energy duplication
		77.11	1.338E+00	+ P	5.505E-01	1.78E-01	G
		241.92	8.856E-02	% P	7.246E-01	2.16E-01	G
BI-212	8.3456E-01						
		727.17	8.346E-01	*(P	4.415E-01	1.83E-01	G K
		1620.56	3.172E-01	%	1.631E+00	4.55E-01	G
		785.42	6.683E-01	% P	2.204E+00	6.50E-01	G
BI-214	3.7947E-01						
		609.32	3.795E-01	(P	8.804E-02	3.94E-02	G K
		1764.51	5.363E-01	+ P	1.178E-01	9.32E-02	G
		1120.28	7.624E-01	+ P	5.067E-01	2.19E-01	G
RA-224	8.0602E-01						
		241.00	8.060E-01	%(P	1.290E+00	3.94E-01	G
RA-226	1.3005E+00						
		185.99	1.301E+00	*(	1.197E+00	3.73E-01	G
AC-228	8.7657E-01						
		911.07	9.013E-01	(P	1.927E-01	9.74E-02	G K
		968.90	1.365E+00	+ P	3.276E-01	1.64E-01	G
		338.40	8.169E-01	(P	2.834E-01	1.09E-01	G

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

TH-227      -1.8337E-01
                          236.00-1.834E-01 %(P 4.479E-01 1.35E-01 G K
                          256.25 1.902E-01 % P 5.301E-01 1.59E-01 G

PA-234       2.2437E-03
                           98.44 2.244E-03 %(  1.815E-01 5.41E-02 G K
                          946.00-5.138E-02 %   2.684E-01 7.79E-02 G
                          131.28-3.915E-02 %   2.169E-01 6.50E-02 G
                           94.67-7.461E-02 %   3.266E-01 9.82E-02 G
                          883.24 5.610E-02 %   4.106E-01 1.18E-01 G
                          926.70 1.209E-02 %   3.936E-01 1.09E-01 G
                          569.26 6.927E-02 &   3.610E-01 1.05E-01 G

TH-234       1.1481E+00
                           63.29 5.145E-01 %(P 2.021E+00 6.06E-01 G K
                           92.80 1.534E+00  (P 1.630E+00 5.02E-01 G
                           92.38 1.659E+00 &(P 1.948E+00 5.97E-01 G

AM-241      -6.3412E-02
                           59.54-6.341E-02 %(P 2.868E-01 8.60E-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

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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	-8.0511E-03	-8.4710E-03	3.5116E-01	3.5116E-01	3.862E-01
K-40		1.5712E+01	1.5712E+01	1.6861E+00	1.9055E+00	
MN-54	#A	-1.7255E-03	-1.7406E-03	9.1314E-02	9.1314E-02	5.499E-02
CO-57	#B	1.3161E-02	1.3294E-02	4.3578E-02	4.3584E-02	4.780E-02
CO-60	#B	2.4860E-02	2.4896E-02	4.2954E-02	4.2977E-02	4.646E-02
Sr-85	#A	-1.0643E-02	-1.1098E-02	5.1083E-02	5.1087E-02	5.518E-02
Kr-85	#A	-2.7273E+02	-2.7273E+02	1.3123E+03	1.3124E+03	1.253E+03
Y-88	#B	-2.6967E-03	-2.7662E-03	3.8900E-02	3.8900E-02	4.791E-02
NB-94	#B	-1.8190E-04	-1.8190E-04	1.3560E-02	1.3560E-02	5.960E-02
Ag-108M	#B	-4.3674E-04	-4.3677E-04	5.3881E-02	5.3881E-02	6.258E-02
CD-109	#A	2.4299E-01	2.4445E-01	1.2399E+00	1.2400E+00	1.369E+00
SN-113	#B	2.1686E-02	2.2203E-02	4.8401E-02	4.8418E-02	5.231E-02
SB-125	#F	1.0928E-01	1.0957E-01	9.3393E-02	9.3598E-02	9.948E-02
I-131	#B	0.0000E+00	0.0000E+00	5.4455E-02	5.4455E-02	4.467E-02
CS-134	#B	1.7152E-02	1.7214E-02	1.4777E-02	1.4809E-02	5.702E-02
CS-137	#A	-2.6495E-03	-2.6502E-03	1.0910E-01	1.0910E-01	5.253E-02
CE-139	#A	8.3445E-03	8.5109E-03	4.5034E-02	4.5037E-02	4.921E-02
EU-152	#F	1.3759E-01	1.3767E-01	1.5265E-01	1.5284E-01	1.283E-01
EU-154	#B	9.7355E-03	9.7440E-03	9.5162E-02	9.5163E-02	1.061E-01
EU-155	#B	9.6721E-03	9.6866E-03	1.5620E-01	1.5620E-01	1.737E-01
HG-203	#B	2.5718E-02	2.7261E-02	4.0513E-02	4.0542E-02	4.158E-02
TL-208		3.2425E-01	3.2425E-01	7.1917E-02	7.4215E-02	
PB-212	#	6.8751E-01	6.8751E-01	1.1936E-01	1.2552E-01	1.037E-01
PB-214	#	4.4737E-01	4.4737E-01	1.1342E-01	1.1620E-01	9.611E-02
BI-212	#	8.3456E-01	8.3456E-01	5.4846E-01	5.5048E-01	
BI-214		3.7947E-01	3.7947E-01	1.1815E-01	1.2008E-01	
RA-224	#A	8.0602E-01	8.0602E-01	1.1811E+00	1.1820E+00	1.290E+00
RA-226	#	1.3005E+00	1.3005E+00	1.1199E+00	1.1223E+00	1.197E+00
AC-228		8.7657E-01	8.7657E-01	2.2546E-01	2.3084E-01	
TH-227	#B	-1.8337E-01	-1.8337E-01	4.1306E-01	4.1319E-01	4.479E-01
PA-234	#B	2.2437E-03	2.2437E-03	1.6230E-01	1.6230E-01	1.815E-01
TH-234	#B	1.1481E+00	1.1481E+00	1.1266E+00	1.1284E+00	2.021E+00
AM-241	#A	-6.3411E-02	-6.3412E-02	2.7327E-01	2.7329E-01	2.868E-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) 1.8126368E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.8126368E+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_27JUN2006_1650.An1

Sample description
FSS-NOL-06-02-004-F

Spectrum Filename: C:\GammaVision\Spectra\101F_27JUN2006_1650.An1

Acquisition information
Start time: 27-Jun-2006 16:50:43
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: 1.6940E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6940E+03) =
5.9032E+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-Jun-2006 11:30:00
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: 0.0687

***** 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	193.	16.19	1.00	1.651E-02				
74.68	193.	16.19	1.00	1.651E-02	74.81	9.600	9.408E-01	PB212
74.93	170.	25.39	1.50	1.654E-02	72.87	6.400	1.420E+00	HG203
					74.81	9.600	8.547E-01	PB212
76.98	268.	16.17	1.50	1.720E-02	77.11	10.700	1.147E+00	PB214
					77.11	17.500	7.114E-01	PB212
77.07	312.	10.07	1.01	1.720E-02	77.11	10.700	1.354E+00	PB214
					77.11	17.500	8.280E-01	PB212
87.04	125.	33.72	1.50	1.910E-02	86.45	32.740	PBC<MDA	EU155
129.55	110.	33.19	1.37	2.109E-02				
186.25	75.	31.01	1.14	1.857E-02	185.99	3.280	9.816E-01	RA226
238.75	637.	4.73	1.12	1.557E-02	238.63	43.100	7.500E-01	PB212
241.23	96.	30.19	1.12	1.544E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.639E-01	PB214
270.17	89.	26.90	1.55	1.401E-02				
295.26	155.	13.15	1.32	1.292E-02	295.22	19.200	4.924E-01	PB214
338.40	135.	13.41	1.23	1.135E-02	338.40	12.010	7.755E-01	AC228
352.18	226.	9.45	1.14	1.092E-02	351.99	37.100	4.399E-01	PB214
462.94	87.	21.51	1.56	8.352E-03				
462.94	87.	21.51	1.56	8.352E-03	463.51	10.000	8.167E-01	SB125
510.50	86.	16.61	1.01	7.594E-03	510.72	22.500	3.245E-01	TL208
583.18	193.	10.40	1.20	6.684E-03	583.14	86.000	2.642E-01	TL208
609.23	158.	10.07	1.13	6.414E-03	609.32	46.090	4.240E-01	BI214
911.17	122.	10.91	1.79	4.446E-03	911.07	29.000	7.463E-01	AC228
968.78	98.	14.94	1.22	4.213E-03	968.90	17.460	1.057E+00	AC228
1119.95	50.	31.13	1.52	3.711E-03	1120.28	15.040	7.149E-01	BI214
1460.65	596.	4.31	2.03	2.943E-03	1460.75	10.700	1.504E+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	
148.92	74.72	389.	193.	0.096	48.57	1.005	BI-207	D
258.71	129.55	493.	101.	0.050	98.28	1.365	AC-228	s
477.18	238.68	135.	637.	0.319	14.17	1.122	PB-212	D
540.06	270.17	175.	89.	0.045	80.70	1.551	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	149.43	74.93	909.	170.	0.085	76.16	1.499s
PB-214	153.79	77.11	353.	312.	0.156	30.21	1.006D
PB-212	153.79	77.11	808.	268.	0.134	48.52	1.499D
EU-155	173.65	87.04	826.	125.	0.063	101.16	1.499
RA-226	371.99	186.17	386.	86.	0.043	102.25	1.499s
PB-212	477.15	238.73	359.	528.	0.264	19.77	1.499
PB-214	483.54	241.92	137.	102.	0.051	56.50	1.124D
PB-214	590.26	295.26	115.	153.	0.077	39.46	1.321s
AC-228	676.58	338.40	93.	133.	0.066	40.24	1.228
PB-214	704.16	352.18	93.	224.	0.112	28.35	1.141s
SB-125	925.39	462.75	78.	45.	0.023	90.36	1.499s
TL-208	1020.94	510.50	63.	69.	0.035	49.84	1.010s
TL-208	1166.37	583.18	75.	190.	0.095	31.21	1.203
BI-214	1218.50	609.23	38.	157.	0.079	30.22	1.126s
AC-228	1822.70	911.17	24.	121.	0.060	32.74	1.786
AC-228	1937.97	968.78	39.	97.	0.049	44.83	1.219
BI-214	2240.50	1119.95	58.	50.	0.025	93.40	1.521
K-40	2922.32	1460.65	16.	594.	0.297	12.92	2.028

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		-5.5477E-02					
			477.56	-5.548E-02	%(	4.697E-01 1.36E-01	G
K-40		1.5043E+01					
			1460.75	1.504E+01	(P	5.451E-01 6.50E-01	G
MN-54		2.0651E-02					
			834.81	2.065E-02	%(P	4.168E-02 1.27E-02	G
CO-57		-1.7890E-03					
			122.07	-1.789E-03	&(	4.884E-02 1.45E-02	G K
			136.43	-5.707E-02	&	4.236E-01 1.26E-01	G
CO-60		-2.1949E-03					
			1332.51	-2.195E-03	%(P	5.734E-02 1.55E-02	G K
			1173.23	-6.521E-03	& P	7.116E-02 2.01E-02	G K
Sr-85		-2.1699E-02					
			514.00	-2.170E-02	%(	5.884E-02 1.76E-02	G
Kr-85		-5.0778E+02					
			513.99	-5.078E+02	%(P	1.305E+03 3.89E+02	G
Y-88		-3.3357E-03					
			1836.01	-3.336E-03	%(	6.203E-02 1.63E-02	G K
			898.02	2.726E-02	% P	5.410E-02 1.65E-02	G
NB-94		2.2198E-03					
			871.10	2.220E-03	&(P	5.283E-02 1.47E-02	G K
			702.50	-1.340E-03	% P	5.676E-02 1.61E-02	G K
Ag-108M		1.0664E-03					
			722.95	1.066E-03	%(	4.913E-02 1.36E-02	G K
			614.37	-7.945E-03	% P	4.883E-02 1.41E-02	G
			433.93	-9.563E-03	%	4.602E-02 1.35E-02	G
CD-109		7.5653E-02					
			88.04	7.565E-02	&(P	1.573E+00 4.69E-01	G
SN-113		0.0000E+00					
			391.71	0.000E+00	&(	6.848E-02 1.97E-02	G K
			255.04	5.573E-01	% P	2.032E+00 6.07E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.5312E-01						
		427.95	5.754E-02	&(P	1.194E-01	3.62E-02	G K
		600.77	6.821E-02	% P	2.288E-01	6.73E-02	G
		636.15	3.868E-02	% P	4.033E-01	1.15E-01	G
		463.51	4.360E-01	@(P	4.202E-01	1.36E-01	G
		176.29	-2.675E-04	& P	6.491E-01	1.91E-01	G
I-131	6.7286E-03						
		364.48	6.729E-03	%(	6.198E-02	1.80E-02	G K
		636.97	2.733E-02	%	1.006E+00	2.85E-01	G
		284.29	1.508E-02	%	9.635E-01	2.81E-01	G
CS-134	-2.5482E-02						
		604.66	-2.548E-02	%(P	6.127E-02	1.84E-02	G K
		795.76	8.008E-03	% P	5.366E-02	1.52E-02	G
		569.29	-8.980E-02	& P	3.397E-01	9.99E-02	G
		801.84	2.291E-02	%	5.402E-01	1.50E-01	G
CS-137	2.6491E-02						
		661.62	2.649E-02	%(P	6.250E-02	1.88E-02	G
CE-139	8.1903E-03						
		165.85	8.190E-03	%(P	5.385E-02	1.60E-02	G
EU-152	-4.8560E-03						
		121.78	-4.856E-03	&(P	1.452E-01	4.30E-02	G K
		344.30	3.552E-02	% P	1.485E-01	4.39E-02	G
		1408.08	1.300E-02	& P	2.638E-01	7.08E-02	G
		964.00	2.971E-02	% P	5.147E-01	1.47E-01	G
		1112.07	-4.670E-02	% P	5.791E-01	1.65E-01	G
		778.90	-4.838E-02	% P	3.439E-01	9.73E-02	G
EU-154	-2.2839E-03						
		123.10	-2.284E-03	%(P	9.920E-02	2.93E-02	G K
		1274.80	6.584E-02	& P	1.777E-01	5.27E-02	G
		723.30	4.316E-02	% P	2.823E-01	8.14E-02	G
		1004.80	8.543E-03	% P	3.076E-01	8.47E-02	G
EU-155	1.5979E-01						
		86.45	1.598E-01	(	1.746E-01	5.39E-02	G K
		105.31	4.464E-02	%	1.994E-01	5.97E-02	G
HG-203	8.6709E-03						
		279.17	8.671E-03	%(	5.112E-02	1.51E-02	G K
		72.87	-1.756E-01	% P	1.358E+00	4.06E-01	G
		70.83	-4.258E-01	%	2.298E+00	6.89E-01	G
		82.50	-4.979E-01	%	2.818E+00	8.44E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7674E-01						
		583.14	2.642E-01	(P	5.960E-02	2.78E-02	G
		510.72	3.245E-01	*(P	1.848E-01	6.63E-02	G
PB-212	6.5168E-01						
		238.63	6.275E-01	(P	1.081E-01	4.18E-02	G K
							Energy duplication
		77.11	7.114E-01	(	3.583E-01	1.15E-01	G
		74.81	8.547E-01	& P	7.193E-01	2.24E-01	G
PB-214	4.5783E-01						
		351.99	4.399E-01	@(P	9.401E-02	4.20E-02	G K
		295.22	4.924E-01	(P	1.693E-01	6.55E-02	G
							Energy duplication
		77.11	1.354E+00	+ P	3.909E-01	1.38E-01	G
		241.92	7.084E-01	+ P	3.968E-01	1.34E-01	G
BI-212	3.1942E-01						
		727.17	3.194E-01	%(P	4.880E-01	1.51E-01	G K
		1620.56	3.319E-01	%	1.701E+00	4.67E-01	G
		785.42	1.017E+00	% P	2.128E+00	6.45E-01	G
BI-214	4.2400E-01						
		609.32	4.240E-01	@(P	8.475E-02	4.30E-02	G K
		1764.51	1.989E-01	% P	3.414E-01	1.07E-01	G
		1120.28	7.149E-01	+ P	5.459E-01	2.24E-01	G
RA-224	9.7153E-01						
		241.00	9.715E-01	%(P	1.335E+00	4.10E-01	G
RA-226	1.1250E+00						
		185.99	1.125E+00	(	1.234E+00	3.83E-01	G
AC-228	7.5484E-01						
		911.07	7.463E-01	(P	1.591E-01	8.27E-02	G K
		968.90	1.057E+00	+ P	3.431E-01	1.59E-01	G
		338.40	7.755E-01	(P	2.795E-01	1.06E-01	G
TH-227	-1.6906E-01						
		236.00	-1.691E-01	%(P	4.821E-01	1.45E-01	G K
		256.25	1.632E-01	& P	5.693E-01	1.70E-01	G
PA-234	4.6670E-02						
		98.44	4.667E-02	%(	1.885E-01	5.66E-02	G K
		946.00	3.259E-03	%	3.025E-01	8.43E-02	G
		131.28	1.676E-02	&	2.243E-01	6.67E-02	G
		94.67	-4.896E-02	%	3.307E-01	9.89E-02	G
		883.24	5.236E-02	&	3.733E-01	1.05E-01	G
		926.70	-2.695E-02	%	4.420E-01	1.22E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.277E-01 &   5.007E-01 1.48E-01 G

TH-234       4.1461E-01
                           63.29 4.146E-01 %(P 2.371E+00 7.08E-01 G K
                           92.80 1.139E+00 % P 1.669E+00 5.10E-01 G
                           92.38-2.530E-01 % P 2.019E+00 5.96E-01 G

AM-241      -6.9470E-02
                           59.54-6.947E-02 %(P 3.110E-01 9.31E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	-5.2518E-02	-5.5477E-02	4.0891E-01	4.0892E-01	4.446E-01
K-40		1.5043E+01	1.5043E+01	1.9513E+00	2.1284E+00	
MN-54	#A	2.0458E-02	2.0651E-02	3.8000E-02	3.8018E-02	4.129E-02
CO-57	#B	-1.7697E-03	-1.7890E-03	4.3449E-02	4.3449E-02	4.831E-02
CO-60	#B	-2.1915E-03	-2.1949E-03	5.6591E-02	5.6591E-02	5.726E-02

Sr-85	#A	-2.0741E-02	-2.1699E-02	5.2916E-02	5.2930E-02	5.624E-02
Kr-85	#A	-5.0776E+02	-5.0778E+02	1.3088E+03	1.3091E+03	1.305E+03
Y-88	#B	-3.2454E-03	-3.3357E-03	4.9028E-02	4.9028E-02	6.035E-02
NB-94	#B	2.2198E-03	2.2198E-03	4.4191E-02	4.4191E-02	5.283E-02
Ag-108M	#B	1.0663E-03	1.0664E-03	4.0942E-02	4.0942E-02	4.912E-02
CD-109	#A	7.5166E-02	7.5653E-02	1.4075E+00	1.4075E+00	1.563E+00
SN-113	#B	0.0000E+00	0.0000E+00	5.9152E-02	5.9152E-02	6.676E-02
SB-125	#F	1.5268E-01	1.5312E-01	1.4277E-01	1.4303E-01	1.190E-01
I-131	#B	4.6754E-03	6.7286E-03	5.3889E-02	5.3890E-02	4.307E-02
CS-134	#B	-2.5383E-02	-2.5482E-02	5.8611E-02	5.8629E-02	6.104E-02
CS-137	#A	2.6484E-02	2.6491E-02	5.6268E-02	5.6288E-02	6.249E-02
CE-139	#A	8.0178E-03	8.1903E-03	4.8141E-02	4.8144E-02	5.272E-02
EU-152	#B	-4.8529E-03	-4.8560E-03	1.9709E-01	1.9709E-01	1.451E-01
EU-154	#B	-2.2818E-03	-2.2839E-03	1.9266E-01	1.9266E-01	9.910E-02
EU-155	#A	1.5954E-01	1.5979E-01	1.6164E-01	1.6189E-01	1.744E-01
HG-203	#B	8.1429E-03	8.6709E-03	4.5315E-02	4.5318E-02	4.801E-02
TL-208		2.7674E-01	2.7674E-01	8.7435E-02	8.8823E-02	
PB-212	#	6.5168E-01	6.5168E-01	1.3034E-01	1.3544E-01	1.081E-01
PB-214		4.5783E-01	4.5783E-01	1.1241E-01	1.1535E-01	
BI-212	#B	3.1942E-01	3.1942E-01	4.5371E-01	4.5407E-01	4.880E-01
BI-214		4.2400E-01	4.2400E-01	1.2902E-01	1.3122E-01	
RA-224	#A	9.7153E-01	9.7153E-01	1.2302E+00	1.2314E+00	1.335E+00
RA-226	#A	1.1250E+00	1.1250E+00	1.1504E+00	1.1522E+00	1.234E+00
AC-228		7.5484E-01	7.5484E-01	1.9895E-01	2.0347E-01	
TH-227	#B	-1.6906E-01	-1.6906E-01	4.4579E-01	4.4589E-01	4.821E-01
PA-234	#B	4.6670E-02	4.6670E-02	1.6968E-01	1.6970E-01	1.885E-01
TH-234	#B	4.1461E-01	4.1461E-01	2.1234E+00	2.1235E+00	2.371E+00
AM-241	#A	-6.9469E-02	-6.9470E-02	2.9839E-01	2.9841E-01	3.110E-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) 1.6956676E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.6956676E+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_27JUN2006_1733.An1

Sample description
FSS-NOL-06-02-025-F-B

Spectrum Filename: C:\GammaVision\Spectra\101F_27JUN2006_1733.An1

Acquisition information
Start time: 27-Jun-2006 17:33:13
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: 1.5830E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5830E+03) =
6.3171E+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-Jun-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: 0.1650

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.86	217.	22.10	1.50	1.654E-02				
74.86	217.	22.10	1.50	1.654E-02	74.81	9.600	1.167E+00	PB212
77.06	323.	15.01	1.50	1.720E-02	77.11	17.500	9.157E-01	PB212
					77.11	10.700	1.480E+00	PB214
77.06	319.	15.01	1.50	1.720E-02	77.11	17.500	9.051E-01	PB212
					77.11	10.700	1.480E+00	PB214
93.00	147.	29.44	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.102E+00	TH234
93.02	138.	30.91	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.79	82.	41.00	1.46	2.109E-02				
129.79	82.	41.00	1.46	2.109E-02	131.28	20.000	1.666E-01	PA234
186.60	112.	30.06	0.85	1.855E-02	185.99	3.280	1.576E+00	RA226
209.29	68.	34.74	0.63	1.722E-02				
238.77	893.	3.89	1.12	1.558E-02				
238.77	893.	3.89	1.12	1.558E-02	238.63	43.100	1.128E+00	PB212
241.45	119.	28.13	1.12	1.543E-02	241.00	3.900	1.681E+00	RA224
270.28	124.	24.24	1.49	1.400E-02				
295.35	158.	11.83	1.16	1.291E-02	295.22	19.200	5.380E-01	PB214
300.28	67.	23.35	1.16	1.272E-02				
328.07	62.	40.82	1.45	1.169E-02				
338.41	174.	13.83	1.11	1.135E-02	338.40	12.010	1.076E+00	AC228
351.91	295.	10.88	1.39	1.093E-02				
351.91	295.	10.88	1.39	1.093E-02	351.99	37.100	6.172E-01	PB214
462.82	57.	23.26	1.56	8.354E-03				
462.82	57.	23.26	1.56	8.354E-03	463.51	10.000	5.702E-01	SB125
510.71	144.	15.69	2.09	7.591E-03	510.72	22.500	6.377E-01	TL208

583.20	275.	8.64	1.23	6.684E-03	583.14	86.000	4.042E-01	TL208
609.32	207.	8.80	1.68	6.413E-03	609.32	46.090	5.958E-01	BI214
662.34	56.	27.13	1.38	5.931E-03	661.62	84.620	9.401E-02	CS137
727.12	31.	37.65	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
794.43	34.	27.84	1.50	5.016E-03	795.76	85.400	6.813E-02	CS134
911.05	147.	10.12	1.70	4.447E-03	911.07	29.000	9.621E-01	AC228
968.12	149.	13.74	1.62	4.215E-03	968.90	17.460	1.719E+00	AC228
1119.28	58.	25.57	1.48	3.711E-03	1120.28	15.040	8.813E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.56	701.	3.82	1.77	2.943E-03	1460.75	10.700	1.895E+01	K40
1764.37	32.	19.60	1.73	2.482E-03	1764.51	15.920	6.777E-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	
418.26	209.29	245.	68.	0.034	104.21	0.631	AC-228	s
477.25	238.62	157.	893.	0.446	11.67	1.122	PB-212	D
540.29	270.28	270.	124.	0.062	72.73	1.489	AC-228	s
600.35	300.30	116.	55.	0.027	92.41	1.082	PB-212	
655.91	328.07	205.	62.	0.031	122.46	1.449	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	74.86	1101.	217.	0.109	66.29	1.499s
PB-212	153.79	77.11	1013.	323.	0.161	45.02	1.499D
PB-214	153.79	77.11	1017.	319.	0.160	45.02	1.499D
TH-234	185.62	93.02	991.	138.	0.069	92.73	1.499s
TH-234	185.59	93.00	946.	147.	0.073	88.33	1.499s
PA-234	258.13	129.26	544.	88.	0.044	116.61	1.499s
RA-226	372.11	186.22	508.	86.	0.043	115.62	1.499s
PB-212	477.16	238.73	438.	769.	0.384	15.67	1.499
RA-224	481.70	241.00	506.	117.	0.058	85.71	1.123D
PB-214	590.47	295.36	227.	146.	0.073	49.54	1.499s
AC-228	676.60	338.41	164.	172.	0.086	41.49	1.111
PB-214	703.69	351.95	148.	241.	0.121	28.52	1.499
SB-125	925.80	462.95	59.	61.	0.030	64.19	1.499s
TL-208	1021.36	510.71	126.	128.	0.064	47.08	2.085s
TL-208	1166.40	583.20	90.	272.	0.136	25.92	1.229
BI-214	1218.67	609.32	56.	206.	0.103	26.39	1.683s
Ag-108M	1222.75	611.36	85.	-37.	-0.018	118.05	1.499s
CS-137	1324.77	662.34	62.	55.	0.028	81.40	1.377
BI-212	1454.39	727.12	55.	31.	0.015	112.95	1.499s
CS-134	1589.09	794.43	29.	34.	0.017	83.53	1.502s
AC-228	1822.46	911.05	31.	145.	0.073	30.37	1.701
AC-228	1936.65	968.12	62.	148.	0.074	41.22	1.618s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2239.14	1119.28	54.	58.	0.029	76.72	1.476
K-40	2922.15	1460.56	7.	699.	0.349	11.47	1.771
BI-214	3530.17	1764.37	3.	31.	0.016	58.79	1.734

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	&(	5.700E-01 1.64E-01	G
K-40		1.8945E+01					
			1460.75	1.895E+01	(P	4.144E-01 7.27E-01	G
MN-54		-7.4948E-04					
			834.81	-7.495E-04	&(P	7.205E-02 2.03E-02	G
CO-57		9.9818E-04					
			122.07	9.982E-04	&(	5.169E-02 1.53E-02	G K
			136.43	-6.764E-02	%	4.927E-01 1.47E-01	G
CO-60		4.0196E-02					
			1332.51	4.020E-02	&(P	5.888E-02 1.88E-02	G K
			1173.23	3.354E-02	% P	9.829E-02 2.92E-02	G K
Sr-85		-1.0590E-02					
			514.00	-1.059E-02	%(	7.082E-02 2.08E-02	G
Kr-85		-2.6447E+02					
			513.99	-2.645E+02	%(P	1.567E+03 4.59E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	2.723E-02 3.69E-03	G K
			898.02	-2.343E-04	% P	8.496E-02 2.41E-02	G
NB-94		2.3015E-03					
			871.10	2.302E-03	&(P	4.711E-02 1.29E-02	G K
			702.50	1.550E-03	% P	8.203E-02 2.37E-02	G K
Ag-108M		-1.0281E-02					
			722.95	-1.028E-02	%(	7.345E-02 2.13E-02	G K
			614.37	-5.419E-02	+ P	6.764E-02 2.13E-02	G
			433.93	1.721E-02	%	5.036E-02 1.50E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-1.2475E-01						
		88.04	-1.248E-01	%(P	1.881E+00	5.62E-01	G
SN-113	1.4661E-02						
		391.71	1.466E-02	%(	8.004E-02	2.36E-02	G K
		255.04	9.128E-02	& P	2.281E+00	6.71E-01	G
SB-125	2.0041E-01						
		427.95	5.792E-02	%(P	1.533E-01	4.59E-02	G K
		600.77	1.279E-01	& P	2.953E-01	8.90E-02	G
		636.15	2.559E-01	& P	3.581E-01	1.13E-01	G
		463.51	6.222E-01	(P	3.939E-01	1.36E-01	G
		176.29	8.394E-02	% P	7.922E-01	2.36E-01	G
I-131	1.7762E-03						
		364.48	1.776E-03	%(	7.506E-02	2.17E-02	G K
		636.97	-3.662E-01	%	1.316E+00	3.90E-01	G
		284.29	2.476E-01	%	1.119E+00	3.33E-01	G
CS-134	2.9029E-02						
		604.66	-5.182E-03	&(P	1.345E-01	3.97E-02	G K
		795.76	6.813E-02	*(P	5.583E-02	1.92E-02	G
		569.29	-6.965E-02	% P	3.492E-01	1.02E-01	G
		801.84	1.023E-01	&	5.859E-01	1.68E-01	G
CS-137	9.4012E-02						
		661.62	9.401E-02	(P	6.681E-02	2.59E-02	G
CE-139	7.9351E-03						
		165.85	7.935E-03	&(P	5.682E-02	1.69E-02	G
EU-152	-4.2581E-02						
		121.78	-4.258E-02	&(P	1.800E-01	5.40E-02	G K
		344.30	2.710E-03	% P	1.648E-01	4.77E-02	G
		1408.08	6.922E-02	% P	2.512E-01	7.18E-02	G
		964.00	4.459E-01	% P	6.199E-01	1.93E-01	G
		1112.07	4.620E-02	& P	6.330E-01	1.80E-01	G
		778.90	1.124E-01	& P	3.217E-01	9.49E-02	G
EU-154	-2.0691E-02						
		123.10	-2.069E-02	%(P	1.275E-01	3.81E-02	G K
		1274.80	2.728E-02	% P	1.947E-01	5.49E-02	G
		723.30	-4.579E-02	% P	3.289E-01	9.49E-02	G
		1004.80	-7.404E-04	& P	4.245E-01	1.19E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	0.0000E+00						
		86.45	0.000E+00	%(	2.186E-01	6.52E-02	G K
		105.31	9.613E-02	&	2.266E-01	6.86E-02	G
HG-203	1.6355E-04						
		279.17	1.636E-04	&(	6.037E-02	1.77E-02	G K
		72.87	-7.768E-01	% P	1.624E+00	4.92E-01	G
		70.83	-7.280E-02	%	3.323E+00	9.95E-01	G
		82.50	0.000E+00	%	3.429E+00	1.02E+00	G
TL-208	4.0425E-01						
		583.14	4.042E-01	(P	6.959E-02	3.52E-02	G
		510.72	6.377E-01	+ P	2.754E-01	1.13E-01	G
PB-212	9.5995E-01						
		238.63	9.779E-01	(P	1.275E-01	5.15E-02	G K
							Energy duplication
		77.11	9.157E-01	@(	4.282E-01	1.37E-01	G
		74.81	1.167E+00	& P	8.460E-01	2.64E-01	G
PB-214	5.0667E-01						
		351.99	5.081E-01	(P	1.250E-01	4.87E-02	G K
		295.22	5.038E-01	@(P	2.510E-01	8.42E-02	G
							Energy duplication
		77.11	1.480E+00	+ P	7.016E-01	2.25E-01	G
		241.92	1.069E-03	% P	8.762E-01	2.60E-01	G
BI-212	4.0735E-01						
		727.17	4.073E-01	*(P	4.935E-01	1.57E-01	G K
		1620.56	5.208E-01	%	1.707E+00	4.89E-01	G
		785.42	1.532E+00	% P	2.814E+00	8.62E-01	G
BI-214	6.1686E-01						
		609.32	5.958E-01	(P	1.083E-01	5.27E-02	G K
		1764.51	6.777E-01	(P	2.221E-01	1.35E-01	G
		1120.28	8.813E-01	+ P	5.671E-01	2.27E-01	G
RA-224	1.6558E+00						
		241.00	1.656E+00	(P	1.524E+00	4.76E-01	G
RA-226	1.2067E+00						
		185.99	1.207E+00	*(	1.509E+00	4.65E-01	G
AC-228	9.9548E-01						
		911.07	9.621E-01	(P	1.888E-01	9.87E-02	G K
		968.90	1.719E+00	+ P	4.571E-01	2.37E-01	G
		338.40	1.076E+00	(P	3.909E-01	1.51E-01	G

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

TH-227      -3.6321E-01
                          236.00-3.632E-01 %(P 5.856E-01 1.79E-01 G K
                          256.25-8.341E-03 & P 7.142E-01 2.09E-01 G

PA-234       6.5570E-02
                           98.44-2.461E-02 &(  2.219E-01 6.63E-02 G K
                          946.00 5.845E-02 %   3.447E-01 9.94E-02 G
                          131.28 1.788E-01 &(  2.257E-01 6.95E-02 G
                           94.67-2.920E-03 %   3.940E-01 1.17E-01 G
                          883.24 1.549E-01 &   5.094E-01 1.50E-01 G
                          926.70 2.178E-02 &   5.173E-01 1.44E-01 G
                          569.26-9.728E-02 %   5.293E-01 1.55E-01 G

TH-234       1.7177E+00
                           63.29 1.035E+00 %(P 2.688E+00 8.10E-01 G K
                           92.80 2.102E+00 @(P 2.089E+00 6.45E-01 G
                           92.38 2.305E+00 &(P 2.501E+00 7.69E-01 G

AM-241      -7.6920E-02
                           59.54-7.692E-02 &(P 3.859E-01 1.16E-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	0.0000E+00	0.0000E+00	4.9229E-01	4.9229E-01	5.391E-01
K-40		1.8945E+01	1.8945E+01	2.1804E+00	2.4290E+00	
MN-54	#A	-7.4235E-04	-7.4948E-04	5.0947E-02	5.0947E-02	7.137E-02
CO-57	#B	9.8721E-04	9.9818E-04	4.5928E-02	4.5928E-02	5.112E-02
CO-60	#B	4.0134E-02	4.0196E-02	5.6326E-02	5.6372E-02	5.879E-02
Sr-85	#A	-1.0114E-02	-1.0590E-02	6.2449E-02	6.2452E-02	6.763E-02
Kr-85	#A	-2.6447E+02	-2.6447E+02	1.7420E+03	1.7421E+03	1.567E+03
Y-88	#B	0.0000E+00	0.0000E+00	1.1084E-02	1.1086E-02	2.648E-02
NB-94	#B	2.3015E-03	2.3015E-03	3.8783E-02	3.8783E-02	4.711E-02
Ag-108M	#B	-1.0280E-02	-1.0281E-02	6.3880E-02	6.3883E-02	7.345E-02
CD-109	#A	-1.2394E-01	-1.2475E-01	1.8426E+00	1.8426E+00	1.869E+00
SN-113	#B	1.4286E-02	1.4661E-02	7.0751E-02	7.0756E-02	7.799E-02
SB-125	#F	1.9982E-01	2.0041E-01	1.3170E-01	1.3219E-01	1.529E-01
I-131	#B	1.2256E-03	1.7762E-03	6.4956E-02	6.4957E-02	5.179E-02
CS-134	#B	2.8915E-02	2.9029E-02	2.4545E-02	2.4600E-02	1.339E-01
CS-137		9.3986E-02	9.4012E-02	7.7747E-02	7.7928E-02	
CE-139	#A	7.7648E-03	7.9351E-03	5.0748E-02	5.0750E-02	5.560E-02
EU-152	#B	-4.2553E-02	-4.2581E-02	1.7042E-01	1.7044E-01	1.799E-01
EU-154	#B	-2.0672E-02	-2.0691E-02	1.2485E-01	1.2486E-01	1.274E-01
EU-155	#B	0.0000E+00	0.0000E+00	1.9564E-01	1.9564E-01	2.182E-01
HG-203	#B	1.5341E-04	1.6355E-04	5.2950E-02	5.2950E-02	5.663E-02
TL-208		4.0425E-01	4.0425E-01	1.0571E-01	1.0815E-01	
PB-212	#	9.5995E-01	9.5995E-01	1.5162E-01	1.6103E-01	1.275E-01
PB-214	#	5.0667E-01	5.0667E-01	1.4570E-01	1.4849E-01	1.250E-01
BI-212	#A	4.0735E-01	4.0735E-01	4.7028E-01	4.7084E-01	4.935E-01
BI-214		6.1686E-01	6.1686E-01	1.6369E-01	1.6736E-01	
RA-224		1.6558E+00	1.6558E+00	1.4278E+00	1.4309E+00	
RA-226	#A	1.2067E+00	1.2067E+00	1.3953E+00	1.3969E+00	1.509E+00
AC-228		9.9548E-01	9.9548E-01	2.5919E-01	2.6522E-01	
TH-227	#B	-3.6321E-01	-3.6321E-01	5.4222E-01	5.4261E-01	5.856E-01
PA-234	#B	6.5570E-02	6.5570E-02	7.6460E-02	7.6546E-02	2.219E-01
TH-234	#B	1.7177E+00	1.7177E+00	1.5537E+00	1.5566E+00	2.688E+00
AM-241	#A	-7.6918E-02	-7.6920E-02	3.6981E-01	3.6984E-01	3.859E-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 (252.1 to 1999.1 keV) 2.2711412E+01 pCi/gm
Total Decayed Activity (252.1 to 1999.1 keV) 2.2711437E+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_27JUN2006_1854.An1

Sample description
FSS-NOL-06-02-013-F-S

Spectrum Filename: C:\GammaVision\Spectra\101F_27JUN2006_1854.An1

Acquisition information

Start time:	27-Jun-2006 18:54:15
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:	1.9880E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.9880E+03) = 5.0302E+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	26-Jun-2006 08:14:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 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
74.71	225.	21.62	1.50	1.654E-02	74.81	9.600	9.625E-01	PB212
74.80	293.	11.49	1.00	1.657E-02	74.81	9.600	1.233E+00	PB212
77.01	368.	9.49	1.01	1.720E-02	77.11	10.700	1.360E+00	PB214
					77.11	17.500	8.316E-01	PB212
77.03	315.	15.96	1.50	1.720E-02	77.11	10.700	1.150E+00	PB214
					77.11	17.500	7.118E-01	PB212
92.99	139.	31.71	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.00	129.	33.33	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.14	81.	37.91	0.78	2.110E-02				
186.13	162.	24.93	1.39	1.857E-02	185.99	3.280	1.807E+00	RA226
209.03	59.	35.52	0.99	1.723E-02				
238.74	790.	4.34	1.12	1.557E-02	238.63	43.100	7.940E-01	PB212
241.42	118.	19.46	1.12	1.543E-02	241.00	3.900	1.319E+00	RA224
					241.92	7.470	6.911E-01	PB214
270.26	92.	30.13	1.08	1.400E-02				
295.44	172.	11.26	1.16	1.291E-02	295.22	19.200	4.660E-01	PB214
300.23	78.	20.17	1.16	1.272E-02				
328.56	60.	31.41	1.82	1.168E-02				
338.59	135.	17.83	1.15	1.134E-02	338.40	12.010	6.628E-01	AC228
351.92	302.	8.95	1.40	1.093E-02	351.99	37.100	5.032E-01	PB214
463.68	55.	33.67	1.41	8.339E-03	463.51	10.000	4.368E-01	SB125
510.65	124.	16.24	1.45	7.591E-03	510.72	22.500	4.286E-01	TL208
583.02	237.	10.42	1.27	6.686E-03	583.14	86.000	2.774E-01	TL208
609.02	228.	9.75	1.32	6.416E-03	609.32	46.090	5.227E-01	BI214
726.29	81.	17.94	1.39	5.449E-03	723.30	19.700	5.089E-01	EU154

					727.17	11.800	8.501E-01	BI212
910.96	183.	11.81	1.21	4.447E-03	911.07	29.000	9.548E-01	AC228
967.95	77.	19.36	2.28	4.212E-03	964.00	14.580	8.518E-01	EU152
					968.90	17.460	7.143E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.71	58.	28.08	2.04	3.711E-03	1120.28	15.040	7.054E-01	BI214
1460.49	697.	3.84	1.77	2.943E-03	1460.75	10.700	1.501E+01	K40
1764.15	41.	15.62	1.12	2.481E-03	1764.51	15.920	6.980E-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	
149.16	74.90	421.	293.	0.147	34.47	1.005	PB-214	D
257.89	129.14	422.	90.	0.045	102.29	0.784	AC-228	s
417.73	209.03	213.	59.	0.030	106.57	0.992	AC-228	
477.17	238.69	193.	790.	0.395	13.02	1.122	PB-212	D
540.24	270.26	239.	92.	0.046	90.40	1.078	AC-228	s
600.12	300.19	113.	64.	0.032	79.83	0.841	PB-212	
656.90	328.56	133.	60.	0.030	94.23	1.819	RH-106M	s
927.26	463.68	96.	55.	0.027	101.02	1.412	SB-125	l

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

This section based on library: FSS_Rev_1.Lib

********** 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	148.99	74.71	1128.	225.	0.112	64.86	1.499s
PB-214	153.79	77.11	442.	368.	0.184	28.48	1.006D
PB-212	153.79	77.11	1108.	315.	0.158	47.88	1.499D
TH-234	185.57	93.00	1033.	129.	0.065	99.98	1.499s
TH-234	185.57	92.99	990.	139.	0.069	95.13	1.499s
RA-226	371.96	186.15	554.	133.	0.067	79.29	1.499s
PB-212	477.25	238.77	449.	537.	0.269	20.87	1.499
RA-224	483.39	241.84	506.	114.	0.057	87.61	1.499
PB-214	483.54	241.92	167.	127.	0.064	50.40	1.124D
PB-214	590.54	295.40	148.	156.	0.078	41.02	1.053
AC-228	676.96	338.59	167.	133.	0.066	53.49	1.149
PB-214	703.63	351.92	155.	300.	0.150	26.85	1.401
TL-208	1021.24	510.65	106.	108.	0.054	48.72	1.454s
TL-208	1166.05	583.02	100.	235.	0.117	31.25	1.275s
BI-214	1218.07	609.02	85.	227.	0.114	29.25	1.320s
BI-212	1452.73	726.29	43.	80.	0.040	53.82	1.387s
AC-228	1822.27	910.96	68.	181.	0.091	35.42	1.212
AC-228	1936.32	967.95	51.	77.	0.039	58.08	2.281s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2242.01	1120.71	57.	58.	0.029	84.25	2.039s
K-40	2921.99	1460.49	8.	695.	0.348	11.53	1.775
BI-214	3529.74	1764.15	0.	41.	0.020	46.85	1.124s

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		8.0523E-02					
			477.56	8.052E-02	%(	3.266E-01 9.59E-02	G
K-40		1.5008E+01					
			1460.75	1.501E+01	(P	3.409E-01 5.79E-01	G
MN-54		-5.9302E-04					
			834.81	-5.930E-04	%(P	4.948E-02 1.38E-02	G
CO-57		4.6643E-03					
			122.07	4.664E-03	&(	4.957E-02 1.48E-02	G K
			136.43	1.085E-01	%	4.112E-01 1.24E-01	G
CO-60		1.5821E-03					
			1332.51	1.582E-03	%(P	4.916E-02 1.33E-02	G K
			1173.23	1.604E-02	% P	6.968E-02 2.03E-02	G K
Sr-85		-2.3077E-02					
			514.00	-2.308E-02	&(	5.728E-02 1.73E-02	G
Kr-85		-5.4925E+02					
			513.99	-5.492E+02	&(P	1.307E+03 3.92E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	4.787E-02 1.22E-02	G K
			898.02	9.308E-03	% P	3.920E-02 1.12E-02	G
NB-94		2.1388E-02					
			871.10	2.139E-02	&(P	3.706E-02 1.15E-02	G K
			702.50	7.612E-03	% P	4.481E-02 1.30E-02	G K
Ag-108M		-1.1981E-02					
			722.95	-1.198E-02	%(	5.846E-02 1.71E-02	G K
			614.37	-1.178E-02	& P	5.155E-02 1.51E-02	G
			433.93	8.475E-03	%	3.946E-02 1.16E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-1.1768E-01						
		88.04	-1.177E-01	&(P	1.521E+00	4.55E-01	G
SN-113	6.6781E-03						
		391.71	6.678E-03	%(	5.280E-02	1.54E-02	G K
		255.04	-6.352E-02	% P	1.915E+00	5.64E-01	G
SB-125	1.8087E-03						
		427.95	1.809E-03	&(P	1.232E-01	3.53E-02	G K
		600.77	-8.578E-03	% P	2.157E-01	6.10E-02	G
		636.15	-7.005E-02	& P	4.307E-01	1.25E-01	G
		463.51	2.503E-01	% P	3.934E-01	1.21E-01	G
		176.29	-4.762E-04	& P	6.754E-01	2.00E-01	G
I-131	-7.9144E-03						
		364.48	-7.914E-03	%(	5.114E-02	1.50E-02	G K
		636.97	-6.583E-03	%	6.409E-01	1.81E-01	G
		284.29	2.097E-01	%	7.248E-01	2.17E-01	G
CS-134	-2.8630E-02						
		604.66	-2.863E-02	&(P	6.373E-02	1.92E-02	G K
		795.76	2.923E-02	% P	5.032E-02	1.55E-02	G
		569.29	-7.865E-02	% P	2.942E-01	8.66E-02	G
		801.84	0.000E+00	%	6.002E-01	1.69E-01	G
CS-137	4.1734E-02						
		661.62	4.173E-02	%(P	6.002E-02	1.86E-02	G
CE-139	6.3648E-03						
		165.85	6.365E-03	%(P	5.351E-02	1.60E-02	G
EU-152	-1.2891E-02						
		121.78	-1.289E-02	&(P	1.481E-01	4.42E-02	G K
		344.30	2.343E-03	% P	1.405E-01	4.08E-02	G
		1408.08	3.645E-02	% P	1.679E-01	4.64E-02	G
		964.00	-6.232E-03	% P	4.519E-01	1.28E-01	G
		1112.07	1.783E-01	& P	3.516E-01	1.07E-01	G
		778.90	6.917E-02	& P	3.247E-01	9.39E-02	G
EU-154	6.9969E-03						
		123.10	6.997E-03	%(P	9.629E-02	2.87E-02	G K
		1274.80	2.991E-02	% P	1.739E-01	4.98E-02	G
		723.30	-4.045E-02	& P	2.999E-01	8.70E-02	G
		1004.80	-6.321E-02	& P	3.541E-01	1.03E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.0022E-01						
		86.45	1.002E-01	%(	1.680E-01	5.12E-02	G K
		105.31	4.016E-02	&	1.991E-01	5.97E-02	G
HG-203	2.4808E-03						
		279.17	2.481E-03	&(	5.077E-02	1.49E-02	G K
		72.87	-3.997E-01	% P	1.141E+00	3.44E-01	G
		70.83	4.470E-01	%	1.714E+00	5.15E-01	G
		82.50	-5.987E-01	&	2.698E+00	8.11E-01	G
TL-208	2.7743E-01						
		583.14	2.774E-01	(P	5.841E-02	2.92E-02	G
		510.72	4.286E-01	+ P	2.020E-01	8.00E-02	G
PB-212	5.4404E-01						
		238.63	5.440E-01	(P	1.027E-01	3.83E-02	G K
							Energy duplication
		77.11	7.118E-01	+	3.564E-01	1.14E-01	G
		74.81	9.625E-01	& P	6.815E-01	2.13E-01	G
PB-214	4.7729E-01						
		351.99	5.032E-01	(P	1.018E-01	4.53E-02	G K
		295.22	4.273E-01	(P	1.628E-01	5.91E-02	G
							Energy duplication
		77.11	1.360E+00	+ P	3.716E-01	1.30E-01	G
		241.92	7.505E-01	+ P	3.718E-01	1.27E-01	G
BI-212	8.5010E-01						
		727.17	8.501E-01	*(P	3.509E-01	1.54E-01	G K
		1620.56	5.147E-01	%	9.397E-01	3.02E-01	G
		785.42	1.352E+00	% P	1.979E+00	6.22E-01	G
BI-214	5.2275E-01						
		609.32	5.227E-01	@(P	1.049E-01	5.12E-02	G K
		1764.51	6.980E-01	+ P	1.268E-01	1.10E-01	G
		1120.28	7.054E-01	+ P	4.618E-01	1.99E-01	G
RA-224	1.2874E+00						
		241.00	1.287E+00	(P	1.213E+00	3.78E-01	G
RA-226	1.4871E+00						
		185.99	1.487E+00	*(	1.254E+00	3.93E-01	G
AC-228	9.5485E-01						
		911.07	9.548E-01	(P	2.167E-01	1.14E-01	G K
		968.90	7.143E-01	- P	3.318E-01	1.39E-01	G
		338.40	6.628E-01	- P	3.139E-01	1.20E-01	G

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

TH-227      -1.3316E-01
                          236.00-1.332E-01 %(P 4.387E-01 1.32E-01 G K
                          256.25-6.192E-02 & P 5.767E-01 1.70E-01 G

PA-234      -6.4229E-03
                           98.44-6.423E-03 %(  1.514E-01 4.49E-02 G K
                          946.00 0.000E+00 &   3.482E-01 9.92E-02 G
                          131.28-1.431E-02 &   2.159E-01 6.44E-02 G
                           94.67-9.625E-02 &   3.409E-01 1.03E-01 G
                          883.24-4.684E-02 %   3.521E-01 9.96E-02 G
                          926.70-5.895E-02 %   4.149E-01 1.18E-01 G
                          569.26-1.123E-01 %   4.348E-01 1.28E-01 G

TH-234       1.1414E+00
                           63.29 4.190E-01 %(P 2.276E+00 6.81E-01 G K
                           92.80 1.581E+00  (P 1.701E+00 5.24E-01 G
                           92.38 1.725E+00  (P 2.032E+00 6.23E-01 G

AM-241       3.4717E-02
                           59.54 3.472E-02 %(P 2.969E-01 8.87E-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	7.9027E-02	8.0523E-02	2.8756E-01	2.8759E-01	3.206E-01
K-40		1.5008E+01	1.5008E+01	1.7364E+00	1.9324E+00	
MN-54	#A	-5.9112E-04	-5.9302E-04	3.4563E-02	3.4563E-02	4.932E-02
CO-57	#B	4.6470E-03	4.6643E-03	4.4381E-02	4.4381E-02	4.939E-02
CO-60	#B	1.5813E-03	1.5821E-03	3.9833E-02	3.9833E-02	4.913E-02
Sr-85	#A	-2.2723E-02	-2.3077E-02	5.1758E-02	5.1774E-02	5.640E-02
Kr-85	#A	-5.4924E+02	-5.4925E+02	1.2872E+03	1.2875E+03	1.307E+03
Y-88	#B	0.0000E+00	0.0000E+00	3.6454E-02	3.6455E-02	4.742E-02
NB-94	#B	2.1388E-02	2.1388E-02	3.4453E-02	3.4474E-02	3.706E-02
Ag-108M	#B	-1.1981E-02	-1.1981E-02	5.1299E-02	5.1303E-02	5.846E-02
CD-109	#A	-1.1742E-01	-1.1768E-01	1.4696E+00	1.4696E+00	1.517E+00
SN-113	#B	6.6203E-03	6.6781E-03	4.6107E-02	4.6109E-02	5.235E-02
SB-125	#B	1.8069E-03	1.8087E-03	1.0598E-01	1.0598E-01	1.231E-01
I-131	#B	-6.9876E-03	-7.9144E-03	4.5056E-02	4.5059E-02	4.515E-02
CS-134	#B	-2.8592E-02	-2.8630E-02	6.0404E-02	6.0425E-02	6.365E-02
CS-137	#A	4.1731E-02	4.1734E-02	5.5907E-02	5.5956E-02	6.001E-02
CE-139	#A	6.3186E-03	6.3648E-03	4.7897E-02	4.7899E-02	5.312E-02
EU-152	#B	-1.2888E-02	-1.2891E-02	1.5153E-01	1.5154E-01	1.481E-01
EU-154	#B	6.9946E-03	6.9969E-03	8.5966E-02	8.5967E-02	9.626E-02
EU-155	#B	1.0016E-01	1.0022E-01	1.5353E-01	1.5363E-01	1.679E-01
HG-203	#B	2.4281E-03	2.4808E-03	4.4832E-02	4.4832E-02	4.969E-02
TL-208	#	2.7743E-01	2.7743E-01	8.7571E-02	8.8963E-02	
PB-212	#	5.4404E-01	5.4404E-01	1.1483E-01	1.1888E-01	1.027E-01
PB-214		4.7729E-01	4.7729E-01	1.1816E-01	1.2120E-01	
BI-212	#	8.5010E-01	8.5010E-01	4.6143E-01	4.6392E-01	
BI-214		5.2275E-01	5.2275E-01	1.5365E-01	1.5646E-01	
RA-224	#	1.2874E+00	1.2874E+00	1.1350E+00	1.1373E+00	1.213E+00
RA-226	#	1.4871E+00	1.4871E+00	1.1791E+00	1.1820E+00	1.254E+00
AC-228		9.5485E-01	9.5485E-01	3.4168E-01	3.4592E-01	
TH-227	#B	-1.3316E-01	-1.3316E-01	4.0568E-01	4.0575E-01	4.387E-01
PA-234	#B	-6.4229E-03	-6.4229E-03	1.3483E-01	1.3483E-01	1.514E-01
TH-234	#B	1.1414E+00	1.1414E+00	1.1341E+00	1.1359E+00	2.276E+00
AM-241	#A	3.4717E-02	3.4717E-02	2.6614E-01	2.6615E-01	2.969E-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) 1.8090221E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.8090221E+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_27JUN2006_1931.An1

Sample description
FSS-NOL-06-02-028-F-B

Spectrum Filename: C:\GammaVision\Spectra\101F_27JUN2006_1931.An1

Acquisition information
Start time: 27-Jun-2006 19:31:27
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: 1.7990E+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	23-Jun-2006 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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0917

***** 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	276.	12.93	1.00	1.651E-02	70.83	3.520	4.160E+00	HG203
					74.81	9.600	1.282E+00	PB212
92.85	110.	38.05	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.85	115.	37.41	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.43	162.	20.70	1.39	1.856E-02	185.99	3.280	1.990E+00	RA226
209.40	88.	27.65	1.15	1.721E-02				
238.73	885.	3.91	1.12	1.558E-02	238.63	43.100	9.834E-01	PB212
241.63	119.	20.61	1.12	1.542E-02	241.00	3.900	1.469E+00	RA224
					241.92	7.470	7.697E-01	PB214
270.56	107.	24.55	1.59	1.399E-02				
277.40	46.	41.33	0.88	1.368E-02				
277.40	46.	41.33	0.88	1.368E-02	279.17	81.500	3.298E-02	HG203
295.36	176.	11.17	1.16	1.292E-02	295.22	19.200	5.261E-01	PB214
300.57	73.	28.98	1.27	1.271E-02				
328.68	57.	35.16	0.72	1.167E-02				
338.43	216.	13.98	1.22	1.135E-02	338.40	12.010	1.179E+00	AC228
351.90	263.	10.71	1.38	1.093E-02	351.99	37.100	4.830E-01	PB214
462.35	74.	22.40	1.28	8.362E-03				
462.35	74.	22.40	1.28	8.362E-03	463.51	10.000	6.571E-01	SB125
510.56	126.	16.00	1.24	7.593E-03	510.72	22.500	4.841E-01	TL208
516.51	29.	29.45	0.95	7.508E-03				
583.18	248.	10.51	1.53	6.684E-03	583.14	86.000	3.203E-01	TL208
609.22	185.	11.14	1.54	6.414E-03	609.32	46.090	4.674E-01	BI214
727.30	36.	34.09	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
794.87	25.	37.66	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134

860.56	40.	24.96	1.67	4.677E-03				
911.03	166.	10.01	1.65	4.447E-03	911.07	29.000	9.561E-01	AC228
968.68	118.	14.14	1.36	4.213E-03	968.90	17.460	1.195E+00	AC228
1120.55	60.	27.98	0.85	3.711E-03	1120.28	15.040	8.051E-01	BI214
1172.66	30.	38.59	1.43	3.566E-03	1173.23	99.860	PBC<MDA	CO60
1332.41	51.	23.58	0.83	3.190E-03	1332.51	99.980	1.201E-01	CO60
1460.54	620.	4.14	2.16	2.943E-03	1460.75	10.700	1.474E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.21	37.	17.85	1.76	2.481E-03	1764.51	15.920	7.086E-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	
153.68	77.05	440.	384.	0.192	27.76	1.006	PB-214	lD
418.48	209.40	252.	88.	0.044	82.95	1.148	AC-228	
540.84	270.56	218.	107.	0.054	73.64	1.593	AC-228	s
554.53	277.40	147.	46.	0.023	120.93	0.878	TL-208	
600.89	300.57	164.	73.	0.037	86.93	1.268	PB-212	
657.14	328.68	141.	57.	0.028	105.47	0.719	LA-140	s
1721.41	860.56	26.	40.	0.020	74.87	1.672	TL-208	s
2345.96	1172.66	40.	30.	0.015	115.76	1.431	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	149.19	74.81	438.	271.	0.136	36.64	1.005D
PB-212	153.79	77.11	440.	380.	0.190	23.30	1.006A
TH-234	185.29	92.85	981.	115.	0.058	112.22	1.499
RA-226	371.95	186.15	458.	137.	0.068	71.30	1.499s
PB-212	476.96	238.63	163.	879.	0.439	11.74	1.122D
RA-224	482.78	241.54	528.	99.	0.049	102.67	1.499
PB-214	483.54	241.92	189.	98.	0.049	66.53	1.124D
PB-214	590.23	295.24	219.	188.	0.094	44.15	1.209
AC-228	676.64	338.43	220.	214.	0.107	41.93	1.222s
PB-214	703.60	351.90	184.	261.	0.130	32.14	1.381
SB-125	926.01	463.06	76.	62.	0.031	68.67	1.499s
TL-208	1020.88	510.47	138.	125.	0.062	51.35	1.247s
TL-208	1166.36	583.18	125.	245.	0.123	31.52	1.527s
BI-214	1218.48	609.22	81.	184.	0.092	33.43	1.544
BI-212	1454.75	727.30	60.	36.	0.018	102.28	1.499s
CS-134	1589.96	794.87	34.	25.	0.013	112.97	1.502s
AC-228	1822.41	911.03	40.	164.	0.082	30.03	1.653s
AC-228	1937.78	968.68	49.	117.	0.058	42.43	1.356
BI-214	2241.70	1120.55	59.	60.	0.030	83.93	0.847s
CO-60	2665.67	1332.41	26.	51.	0.025	70.74	0.834s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2922.10	1460.54	10.	618.	0.309	12.43	2.158
BI-214	3529.85	1764.21	3.	37.	0.019	53.55	1.762

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		5.6754E-02					
			477.56	5.675E-02	&(	4.608E-01 1.34E-01	G
K-40		1.4738E+01					
			1460.75	1.474E+01	(P	4.211E-01 6.13E-01	G
MN-54		1.6660E-02					
			834.81	1.666E-02	%(P	4.284E-02 1.27E-02	G
CO-57		8.1116E-05					
			122.07	8.112E-05	%(	5.315E-02 1.58E-02	G K
			136.43	-9.157E-04	%	3.558E-01 1.05E-01	G
CO-60		1.2009E-01					
			1332.51	1.201E-01	(P	6.253E-02 2.84E-02	G K
			1173.23	2.390E-02	% P	7.348E-02 2.17E-02	G K
Sr-85		-2.4128E-02					
			514.00	-2.413E-02	&(	6.275E-02 1.89E-02	G
Kr-85		-5.5846E+02					
			513.99	-5.585E+02	&(P	1.388E+03 4.16E+02	G
Y-88		-4.5571E-03					
			1836.01	-4.557E-03	&(	4.216E-02 1.08E-02	G K
			898.02	8.353E-03	& P	6.000E-02 1.71E-02	G
NB-94		6.7810E-03					
			871.10	6.781E-03	&(P	5.360E-02 1.53E-02	G K
			702.50	1.005E-02	% P	4.695E-02 1.36E-02	G K
Ag-108M		-7.7544E-03					
			722.95	-7.754E-03	%(	6.452E-02 1.87E-02	G K
			614.37	-1.828E-02	& P	5.595E-02 1.66E-02	G
			433.93	1.144E-05	&	3.844E-02 1.09E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.3478E-01						
		88.04	1.348E-01	&(P	1.652E+00	4.94E-01	G
SN-113	6.5183E-04						
		391.71	6.518E-04	%(	6.060E-02	1.74E-02	G K
		255.04	-3.350E-01	& P	2.010E+00	5.96E-01	G
SB-125	1.2980E-01						
		427.95	-1.632E-02	%(P	1.277E-01	3.70E-02	G K
		600.77	-2.358E-02	& P	2.755E-01	7.92E-02	G
		636.15	5.677E-02	& P	4.182E-01	1.20E-01	G
		463.51	5.623E-01	*(P	3.912E-01	1.32E-01	G
		176.29	-4.811E-02	& P	6.110E-01	1.80E-01	G
I-131	7.7851E-03						
		364.48	7.785E-03	&(	7.325E-02	2.14E-02	G K
		636.97	-2.169E-02	&	1.008E+00	2.87E-01	G
		284.29	-6.294E-03	%	9.046E-01	2.64E-01	G
CS-134	1.6687E-02						
		604.66	-7.572E-03	&(P	5.950E-02	1.73E-02	G K
		795.76	4.441E-02	@(P	5.276E-02	1.70E-02	G
		569.29	-1.281E-02	& P	3.115E-01	8.88E-02	G
		801.84	4.917E-02	&	5.492E-01	1.55E-01	G
CS-137	2.3298E-02						
		661.62	2.330E-02	%(P	6.708E-02	2.00E-02	G
CE-139	1.3901E-03						
		165.85	1.390E-03	%(P	4.313E-02	1.27E-02	G
EU-152	-4.1145E-03						
		121.78	-4.114E-03	&(P	1.301E-01	3.85E-02	G K
		344.30	-6.146E-03	% P	1.534E-01	4.45E-02	G
		1408.08	-2.798E-02	% P	2.689E-01	7.38E-02	G
		964.00	2.228E-02	% P	9.270E-01	2.72E-01	G
		1112.07	8.885E-04	% P	5.195E-01	1.45E-01	G
		778.90	-8.165E-02	% P	3.981E-01	1.15E-01	G
EU-154	1.6594E-02						
		123.10	1.659E-02	%(P	1.131E-01	3.38E-02	G K
		1274.80	-1.938E-02	% P	1.992E-01	5.63E-02	G
		723.30	-1.071E-01	% P	3.418E-01	1.01E-01	G
		1004.80	-3.900E-03	& P	3.749E-01	1.05E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.0460E-01						
		86.45	1.046E-01	%(	1.897E-01	5.77E-02	G K
		105.31	5.610E-02	%	2.116E-01	6.36E-02	G
HG-203	-1.1451E-04						
		279.17	-1.145E-04	&(	5.167E-02	1.51E-02	G K
		72.87	-4.946E-01	% P	1.452E+00	4.38E-01	G
		70.83	-8.649E-01	%	2.292E+00	6.93E-01	G
		82.50	-4.251E-01	&	2.814E+00	8.43E-01	G
TL-208	3.2030E-01						
		583.14	3.203E-01	@(P	7.159E-02	3.40E-02	G
		510.72	5.488E-01	+ P	2.529E-01	1.06E-01	G
PB-212	9.7630E-01						
		238.63	9.834E-01	(P	6.967E-02	3.88E-02	G K
							Energy duplication
		77.11	9.486E-01	}	2.506E-01	7.37E-02	G
		74.81	1.284E+00	+ P	4.740E-01	1.60E-01	G
PB-214	5.2675E-01						
		351.99	4.830E-01	(P	1.223E-01	5.21E-02	G K
		295.22	5.681E-01	(P	2.172E-01	8.44E-02	G
							Energy duplication
		77.11	0.000E+00	} P	5.964E-01	0.00E+00	G
		241.92	6.376E-01	(P	4.364E-01	1.42E-01	G
BI-212	4.1826E-01						
		727.17	4.183E-01	@(P	4.526E-01	1.45E-01	G K
		1620.56	2.983E-01	%	1.606E+00	4.40E-01	G
		785.42	1.381E+00	% P	2.392E+00	7.37E-01	G
BI-214	4.6736E-01						
		609.32	4.674E-01	(P	1.135E-01	5.24E-02	G K
		1764.51	7.086E-01	+ P	1.982E-01	1.28E-01	G
		1120.28	8.051E-01	+ P	5.190E-01	2.27E-01	G
RA-224	1.2289E+00						
		241.00	1.229E+00	(P	1.369E+00	4.24E-01	G
RA-226	1.6829E+00						
		185.99	1.683E+00	*(	1.263E+00	4.00E-01	G
AC-228	1.0733E+00						
		911.07	9.561E-01	@(P	1.872E-01	9.68E-02	G K
		968.90	1.195E+00	(P	3.609E-01	1.70E-01	G
		338.40	1.179E+00	@(P	3.958E-01	1.67E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-2.6468E-01						
		236.00	-2.647E-01	%(P	4.942E-01	1.50E-01	G K
		256.25	1.493E-01	% P	6.127E-01	1.83E-01	G
PA-234	1.0886E-01						
		98.44	1.089E-01	%(	1.803E-01	5.50E-02	G K
		946.00	0.000E+00	&	2.810E-01	7.81E-02	G
		131.28	-5.184E-02	&	2.194E-01	6.58E-02	G
		94.67	-7.834E-02	%	3.688E-01	1.11E-01	G
		883.24	3.785E-02	&	4.092E-01	1.15E-01	G
		926.70	0.000E+00	&	6.875E-01	1.96E-01	G
		569.26	2.044E-03	&	4.053E-01	1.14E-01	G
TH-234	1.2237E+00						
		63.29	1.047E+00	%(P	2.399E+00	7.25E-01	G K
		92.80	1.454E+00	(P	1.871E+00	5.73E-01	G
		92.38	1.623E+00	% P	2.223E+00	6.79E-01	G
AM-241	-9.0846E-02						
		59.54	-9.085E-02	%(P	3.445E-01	1.04E-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	5.3627E-02	5.6754E-02	4.0208E-01	4.0210E-01	4.354E-01
K-40		1.4738E+01	1.4738E+01	1.8388E+00	2.0186E+00	
MN-54	#A	1.6499E-02	1.6660E-02	3.8213E-02	3.8224E-02	4.243E-02
CO-57	#B	8.0212E-05	8.1116E-05	4.7355E-02	4.7355E-02	5.255E-02
CO-60	F	1.1990E-01	1.2009E-01	8.5092E-02	8.5362E-02	
Sr-85	#A	-2.3028E-02	-2.4128E-02	5.6586E-02	5.6603E-02	5.988E-02
Kr-85	#A	-5.5844E+02	-5.5846E+02	1.3746E+03	1.3750E+03	1.388E+03
Y-88	#B	-4.4295E-03	-4.5571E-03	3.2486E-02	3.2487E-02	4.098E-02
NB-94	#B	6.7810E-03	6.7810E-03	4.5847E-02	4.5849E-02	5.359E-02
Ag-108M	#B	-7.7539E-03	-7.7544E-03	5.5953E-02	5.5955E-02	6.452E-02
CD-109	#A	1.3389E-01	1.3478E-01	1.4825E+00	1.4825E+00	1.641E+00
SN-113	#B	6.3491E-04	6.5183E-04	5.2231E-02	5.2231E-02	5.903E-02
SB-125	#F	1.2941E-01	1.2980E-01	9.1201E-02	9.1495E-02	1.274E-01
I-131	#B	5.3433E-03	7.7851E-03	6.4244E-02	6.4245E-02	5.028E-02
CS-134	#B	1.6620E-02	1.6687E-02	1.9163E-02	1.9186E-02	5.927E-02
CS-137	#A	2.3291E-02	2.3298E-02	5.9908E-02	5.9922E-02	6.707E-02
CE-139	#A	1.3599E-03	1.3901E-03	3.8133E-02	3.8133E-02	4.219E-02
EU-152	#B	-4.1118E-03	-4.1145E-03	1.8516E-01	1.8516E-01	1.300E-01
EU-154	#B	1.6578E-02	1.6594E-02	1.0141E-01	1.0142E-01	1.130E-01
EU-155	#B	1.0442E-01	1.0460E-01	1.7306E-01	1.7315E-01	1.894E-01
HG-203	#B	-1.0731E-04	-1.1451E-04	4.5270E-02	4.5270E-02	4.842E-02
TL-208	#	3.2030E-01	3.2030E-01	1.0194E-01	1.0353E-01	
PB-212		9.7630E-01	9.7630E-01	1.1542E-01	1.2792E-01	
PB-214		5.2675E-01	5.2675E-01	1.5231E-01	1.5519E-01	
BI-212	#A	4.1826E-01	4.1826E-01	4.3591E-01	4.3655E-01	4.526E-01
BI-214		4.6736E-01	4.6736E-01	1.5718E-01	1.5939E-01	
RA-224	#A	1.2289E+00	1.2289E+00	1.2708E+00	1.2727E+00	1.369E+00
RA-226	#	1.6829E+00	1.6829E+00	1.2000E+00	1.2037E+00	1.263E+00
AC-228		1.0733E+00	1.0733E+00	2.4104E-01	2.4855E-01	
TH-227	#B	-2.6468E-01	-2.6468E-01	4.5698E-01	4.5722E-01	4.942E-01
PA-234	#B	1.0886E-01	1.0886E-01	1.6495E-01	1.6506E-01	1.803E-01
TH-234	#B	1.2237E+00	1.2237E+00	1.4467E+00	1.4483E+00	2.399E+00
AM-241	#A	-9.0845E-02	-9.0846E-02	3.2575E-01	3.2579E-01	3.445E-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 (270.1 to 1999.1 keV) 1.8221745E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.8221931E+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_27JUNE2006_1346.An1

Sample description
FSS-NOL-06-02-011-F

Spectrum Filename: C:\GammaVision\Spectra\101F_27JUNE2006_1346.An1

Acquisition information
Start time: 27-Jun-2006 13:47:43
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: 1.8710E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8710E+03) =
5.3447E+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-Jun-2006 07:43:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2401

***** 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	166.	26.81	1.50	1.654E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	7.533E-01	PB212
77.15	230.	19.37	1.50	1.720E-02	77.11	10.700	9.014E-01	PB214
					77.11	17.500	PBC<MDA	PB212
77.15	233.	19.37	1.50	1.720E-02	77.11	10.700	9.014E-01	PB214
					77.11	17.500	5.601E-01	PB212
83.93	74.	35.35	1.01	1.868E-02				
86.64	81.	35.44	1.01	1.912E-02	86.45	32.740	9.399E-02	EU155
90.04	92.	28.08	1.02	1.958E-02	88.04	3.790	PBC<MDA	CD109
93.62	99.	28.03	1.02	1.998E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	2.302E-01	PA234
185.78	143.	23.22	1.30	1.860E-02	185.99	3.280	1.695E+00	RA226
209.62	63.	38.56	1.19	1.720E-02				
238.79	713.	4.44	1.12	1.557E-02	238.63	43.100	7.609E-01	PB212
241.93	97.	21.79	1.12	1.541E-02				
241.93	97.	21.79	1.12	1.541E-02	241.92	7.470	PBC<MDA	PB214
269.21	100.	23.61	1.48	1.405E-02				
295.36	130.	13.66	1.16	1.292E-02	295.22	19.200	3.727E-01	PB214
300.28	45.	29.67	1.16	1.272E-02				
328.33	53.	41.33	1.54	1.168E-02				
338.72	177.	14.93	1.36	1.134E-02	338.40	12.010	9.279E-01	AC228
352.03	264.	11.21	1.21	1.092E-02	351.99	37.100	4.669E-01	PB214
510.56	96.	22.42	1.75	7.593E-03	510.72	22.500	3.382E-01	TL208
583.08	222.	10.29	1.40	6.685E-03	583.14	86.000	2.757E-01	TL208
609.14	197.	10.36	1.29	6.414E-03	609.32	46.090	4.792E-01	BI214
726.77	50.	30.58	1.38	5.446E-03				

726.77	50.	30.58	1.38	5.446E-03	727.17	11.800	5.524E-01	BI212
794.66	39.	32.79	0.91	5.022E-03				
860.53	39.	32.20	1.29	4.677E-03				
911.43	142.	11.03	1.55	4.445E-03	911.07	29.000	7.871E-01	AC228
967.88	118.	14.84	1.36	4.216E-03	968.90	17.460	1.157E+00	AC228
1120.03	64.	26.62	1.70	3.711E-03	1120.28	15.040	8.233E-01	BI214
1460.73	544.	4.55	2.05	2.942E-03	1460.75	10.700	1.243E+01	K40
1763.93	28.	18.90	0.73	2.481E-03	1764.51	15.920	5.039E-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	
167.43	83.92	304.	74.	0.037	106.05	1.011	TA-182	lD
172.86	86.64	374.	81.	0.041	106.33	1.013	BI-207	lD
179.66	90.03	287.	92.	0.046	84.25	1.016	PB-214	lD
418.92	209.62	252.	63.	0.032	115.69	1.188	NP-239	
477.28	238.67	145.	713.	0.357	13.32	1.122	PB-212	D
483.55	241.81	176.	97.	0.049	65.36	1.124	PB-214	D
538.14	269.21	176.	100.	0.050	70.84	1.481	AC-228	s
600.13	300.19	79.	37.	0.018	111.56	1.000	PB-212	
656.43	328.33	151.	53.	0.026	123.98	1.540	RH-106M	s
1589.55	794.66	44.	39.	0.020	85.92	0.914	AC-228	s
1721.35	860.53	41.	39.	0.019	96.61	1.291	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	969.	166.	0.083	80.43	1.499
PB-214	153.79	77.11	910.	230.	0.115	58.12	1.499D
PB-212	153.79	77.11	906.	233.	0.117	58.12	1.499D
PA-234	186.00	93.21	676.	101.	0.051	113.17	1.499s
RA-226	371.21	185.78	384.	143.	0.072	69.67	1.297s
PB-212	477.22	238.76	377.	591.	0.296	18.38	1.499
PB-214	590.47	295.36	192.	129.	0.065	51.75	1.499
AC-228	677.23	338.72	161.	175.	0.088	44.80	1.361s
PB-214	703.84	352.02	129.	239.	0.120	27.69	1.499
TL-208	1021.06	510.56	124.	80.	0.040	67.26	1.747s
TL-208	1166.17	583.08	86.	219.	0.110	30.88	1.404
BI-214	1218.32	609.14	66.	196.	0.098	31.09	1.288s
BI-212	1454.52	727.18	36.	27.	0.014	106.07	1.499
AC-228	1823.20	911.43	35.	141.	0.070	33.08	1.553s
AC-228	1936.17	967.88	47.	118.	0.059	44.51	1.359
BI-214	2240.64	1120.03	58.	64.	0.032	79.85	1.700s
K-40	2922.47	1460.73	17.	542.	0.271	13.66	2.054
BI-214	3529.30	1763.93	0.	28.	0.014	56.69	0.729s

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		5.2234E-02					
			477.56	5.223E-02	%(	3.292E-01 9.49E-02	G
K-40		1.2432E+01					
			1460.75	1.243E+01	(P	5.040E-01 5.68E-01	G
MN-54		-7.1167E-04					
			834.81	-7.117E-04	%(P	4.962E-02 1.37E-02	G
CO-57		1.3019E-02					
			122.07	1.302E-02	%(	4.616E-02 1.39E-02	G K
			136.43	-2.382E-02	%	3.411E-01 1.01E-01	G
CO-60		2.0220E-02					
			1332.51	2.022E-02	%(P	5.444E-02 1.61E-02	G K
			1173.23	6.172E-03	% P	7.020E-02 1.99E-02	G K
Sr-85		-2.3003E-02					
			514.00	-2.300E-02	&(	5.894E-02 1.77E-02	G
Kr-85		-5.3366E+02					
			513.99	-5.337E+02	&(P	1.305E+03 3.91E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	&(	2.303E-02 3.12E-03	G K
			898.02	-5.783E-04	& P	5.323E-02 1.47E-02	G
NB-94		-8.3776E-03					
			871.10	-8.378E-03	%(P	5.050E-02 1.45E-02	G K
			702.50	9.057E-03	& P	4.340E-02 1.26E-02	G K
Ag-108M		1.8240E-03					
			722.95	1.824E-03	&(	3.340E-02 9.08E-03	G K
			614.37	-4.312E-04	% P	5.329E-02 1.51E-02	G
			433.93	-3.519E-03	%	4.274E-02 1.24E-02	G
CD-109		1.6034E-02					
			88.04	1.603E-02	&(P	1.533E+00 4.57E-01	G
SN-113		1.6234E-02					
			391.71	1.623E-02	%(	5.403E-02 1.60E-02	G K
			255.04	-4.517E-03	% P	2.015E+00 5.91E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-2.3892E-03						
		427.95	-2.389E-03	%(P	1.279E-01	3.66E-02	G K
		600.77	3.147E-02	& P	2.144E-01	6.16E-02	G
		636.15	2.253E-02	& P	3.450E-01	9.71E-02	G
		463.51	1.623E-01	% P	4.042E-01	1.21E-01	G
		176.29	-1.330E-02	& P	6.377E-01	1.88E-01	G
I-131	8.1506E-03						
		364.48	8.151E-03	%(	5.686E-02	1.66E-02	G K
		636.97	-1.049E-01	%	8.719E-01	2.50E-01	G
		284.29	5.052E-02	&	8.728E-01	2.56E-01	G
CS-134	-1.4232E-02						
		604.66	-1.423E-02	%(P	4.905E-02	1.44E-02	G K
		795.76	-7.068E-04	% P	5.810E-02	1.62E-02	G
		569.29	7.101E-02	& P	2.641E-01	7.76E-02	G
		801.84	-1.151E-01	%	6.152E-01	1.78E-01	G
CS-137	1.5328E-02						
		661.62	1.533E-02	%(P	3.973E-02	1.18E-02	G
CE-139	-4.6667E-03						
		165.85	-4.667E-03	%(P	4.423E-02	1.31E-02	G
EU-152	3.3570E-02						
		121.78	3.357E-02	%(P	1.383E-01	4.15E-02	G K
		344.30	-2.566E-02	% P	1.448E-01	4.25E-02	G
		1408.08	2.316E-02	% P	2.288E-01	6.22E-02	G
		964.00	-5.406E-03	% P	9.637E-01	2.83E-01	G
		1112.07	1.213E-01	& P	3.958E-01	1.16E-01	G
		778.90	-4.536E-02	% P	3.590E-01	1.02E-01	G
EU-154	-8.0640E-03						
		123.10	-8.064E-03	&(P	8.638E-02	2.56E-02	G K
		1274.80	-3.347E-02	% P	2.166E-01	6.23E-02	G
		723.30	3.136E-02	& P	1.975E-01	5.62E-02	G
		1004.80	-1.051E-01	% P	3.779E-01	1.11E-01	G
EU-155	9.4939E-02						
		86.45	9.494E-02	%(	1.621E-01	4.94E-02	G K
		105.31	-1.375E-03	%	1.901E-01	5.64E-02	G
HG-203	-6.0378E-04						
		279.17	-6.038E-04	&(	4.501E-02	1.31E-02	G K
		72.87	-2.736E-01	% P	1.267E+00	3.80E-01	G
		70.83	-8.777E-01	&	2.318E+00	7.01E-01	G
		82.50	-9.816E-01	%	2.577E+00	7.79E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8865E-01						
		583.14	2.757E-01	(P	5.757E-02	2.87E-02	G
		510.72	3.382E-01	*(P	2.309E-01	9.10E-02	G
PB-212	6.1421E-01						
		238.63	6.362E-01	(P	1.003E-01	3.94E-02	G K
							Energy duplication
		77.11	5.601E-01	(	3.430E-01	1.09E-01	G
		74.81	7.533E-01	& P	6.721E-01	2.08E-01	G
PB-214	4.0923E-01						
		351.99	4.260E-01	(P	9.917E-02	3.97E-02	G K
		295.22	3.768E-01	(P	1.960E-01	6.59E-02	G
							Energy duplication
		77.11	9.014E-01	+ P	5.621E-01	1.77E-01	G
		241.92	-3.377E-01	% P	7.251E-01	2.20E-01	G
BI-212	3.0810E-01						
		727.17	3.081E-01	(P	3.445E-01	1.12E-01	G K
		1620.56	1.435E-01	%	1.760E+00	4.69E-01	G
		785.42	5.511E-01	% P	2.413E+00	7.01E-01	G
BI-214	4.8554E-01						
		609.32	4.792E-01	(P	9.907E-02	4.99E-02	G K
		1764.51	5.039E-01	(P	1.348E-01	9.67E-02	G
		1120.28	8.233E-01	+ P	4.959E-01	2.20E-01	G
RA-224	1.8585E-01						
		241.00	1.858E-01	&(P	9.203E-01	2.73E-01	G
RA-226	1.6945E+00						
		185.99	1.695E+00	*(	1.114E+00	3.93E-01	G
AC-228	8.2836E-01						
		911.07	7.871E-01	@(P	1.706E-01	8.80E-02	G K
		968.90	1.157E+00	+ P	3.411E-01	1.73E-01	G
		338.40	9.279E-01	@(P	3.276E-01	1.40E-01	G
TH-227	-1.7514E-01						
		236.00	-1.751E-01	%(P	4.326E-01	1.31E-01	G K
		256.25	1.078E-01	& P	5.445E-01	1.62E-01	G
PA-234	7.1792E-02						
		98.44	-2.875E-02	%(	1.744E-01	5.22E-02	G K
		946.00	-9.137E-03	&	2.418E-01	6.71E-02	G
		131.28	2.426E-02	&	2.164E-01	6.46E-02	G
		94.67	2.346E-01	?(	2.876E-01	8.85E-02	G
		883.24	5.887E-02	&	3.622E-01	1.03E-01	G
		926.70	2.409E-02	%	4.510E-01	1.26E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.094E-01 &   3.890E-01 1.15E-01 G

TH-234       2.8853E-01
                           63.29 2.885E-01 &(P 2.207E+00 6.58E-01 G K
                           92.80 1.187E+00 % P 1.673E+00 5.11E-01 G
                           92.38 1.250E+00 & P 2.003E+00 6.09E-01 G

AM-241       1.8832E-02
                           59.54 1.883E-02 %(P 2.873E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	4.9428E-02	5.2234E-02	2.8477E-01	2.8478E-01	3.115E-01
K-40		1.2432E+01	1.2432E+01	1.7050E+00	1.8440E+00	
MN-54	#A	-7.0498E-04	-7.1167E-04	7.1479E-01	7.1479E-01	4.915E-02
CO-57	#B	1.2878E-02	1.3019E-02	4.1605E-02	4.1611E-02	4.566E-02
CO-60	#B	2.0189E-02	2.0220E-02	4.8390E-02	4.8403E-02	5.435E-02

Sr-85	#A	-2.1980E-02	-2.3003E-02	5.3172E-02	5.3188E-02	5.632E-02
Kr-85	#A	-5.3364E+02	-5.3366E+02	1.2941E+03	1.2944E+03	1.305E+03
Y-88	#B	0.0000E+00	0.0000E+00	9.3745E-03	9.3762E-03	2.240E-02
NB-94	#B	-8.3776E-03	-8.3776E-03	4.5608E-02	4.5610E-02	5.050E-02
Ag-108M	#B	1.8239E-03	1.8240E-03	2.7253E-02	2.7253E-02	3.340E-02
CD-109	#A	1.5930E-02	1.6034E-02	1.3715E+00	1.3715E+00	1.523E+00
SN-113	#B	1.5823E-02	1.6234E-02	4.8115E-02	4.8124E-02	5.267E-02
SB-125	#B	-2.3823E-03	-2.3892E-03	2.3865E-01	2.3865E-01	1.275E-01
I-131	#B	5.6486E-03	8.1506E-03	4.9675E-02	4.9677E-02	3.941E-02
CS-134	#B	-1.4176E-02	-1.4232E-02	4.7842E-02	4.7849E-02	4.886E-02
CS-137	#A	1.5324E-02	1.5328E-02	3.5299E-02	3.5309E-02	3.972E-02
CE-139	#A	-4.5677E-03	-4.6667E-03	4.2012E-02	4.2013E-02	4.329E-02
EU-152	#B	3.3549E-02	3.3570E-02	1.2439E-01	1.2440E-01	1.382E-01
EU-154	#B	-8.0563E-03	-8.0640E-03	9.3094E-02	9.3095E-02	8.630E-02
EU-155	#B	9.4785E-02	9.4939E-02	1.4809E-01	1.4818E-01	1.618E-01
HG-203	#B	-5.6676E-04	-6.0378E-04	3.9315E-02	3.9315E-02	4.225E-02
TL-208		2.8865E-01	2.8865E-01	9.0108E-02	9.1572E-02	
PB-212	#	6.1421E-01	6.1421E-01	1.1405E-01	1.1922E-01	1.003E-01
PB-214	#	4.0923E-01	4.0923E-01	1.1427E-01	1.1659E-01	9.917E-02
BI-212	#A	3.0810E-01	3.0810E-01	3.3489E-01	3.3534E-01	3.445E-01
BI-214		4.8554E-01	4.8554E-01	1.5179E-01	1.5424E-01	
RA-224	#A	1.8585E-01	1.8585E-01	8.2003E-01	8.2010E-01	9.203E-01
RA-226	#	1.6945E+00	1.6945E+00	1.1807E+00	1.1845E+00	
AC-228		8.2836E-01	8.2836E-01	2.3360E-01	2.3824E-01	
TH-227	#B	-1.7514E-01	-1.7514E-01	3.9991E-01	4.0003E-01	4.326E-01
PA-234	#B	7.1792E-02	7.1792E-02	8.1248E-02	8.1345E-02	1.744E-01
TH-234	#B	2.8853E-01	2.8853E-01	1.9746E+00	1.9746E+00	2.207E+00
AM-241	#A	1.8831E-02	1.8832E-02	2.5650E-01	2.5651E-01	2.873E-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) 1.5728914E+01 pCi/gm
Total Decayed Activity (269.1 to 1999.1 keV) 1.5728922E+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_27JUNE2006_1432.An1

Sample description
FSS-NOL-06-02-012-F

Spectrum Filename: C:\GammaVision\Spectra\101F_27JUNE2006_1432.An1

Acquisition information
Start time: 27-Jun-2006 14:33:57
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: 1.6880E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6880E+03) =
5.9242E+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-Jun-2006 07:50:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0791

***** 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	161.	27.40	1.50	1.654E-02				
74.80	161.	27.40	1.50	1.654E-02	74.81	9.600	8.118E-01	PB212
77.12	273.	16.40	1.50	1.720E-02	77.11	17.500	7.258E-01	PB212
					77.11	10.700	1.171E+00	PB214
77.12	269.	16.40	1.50	1.720E-02	77.11	17.500	7.159E-01	PB212
					77.11	10.700	1.171E+00	PB214
83.92	71.	37.58	1.01	1.870E-02				
86.92	114.	24.68	1.01	1.918E-02	86.45	32.740	1.457E-01	EU155
90.10	95.	30.75	1.02	1.960E-02				
93.29	124.	23.43	1.02	1.995E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.14	118.	31.08	1.57	1.857E-02	185.99	3.280	1.550E+00	RA226
238.79	717.	4.45	1.12	1.557E-02	238.63	43.100	8.477E-01	PB212
242.19	97.	22.67	1.12	1.539E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.27	50.	34.17	0.95	1.400E-02				
295.32	159.	12.45	1.16	1.292E-02	295.22	19.200	5.090E-01	PB214
300.16	54.	29.60	1.16	1.272E-02				
338.71	121.	19.13	1.28	1.134E-02	338.40	12.010	6.955E-01	AC228
352.10	259.	10.42	1.19	1.092E-02	351.99	37.100	5.073E-01	PB214
462.86	54.	30.93	1.24	8.353E-03				
462.86	54.	30.93	1.24	8.353E-03	463.51	10.000	5.058E-01	SB125
511.33	110.	17.83	1.33	7.582E-03	510.72	22.500	4.396E-01	TL208
583.08	208.	10.13	1.23	6.685E-03	583.14	86.000	2.859E-01	TL208
609.26	168.	12.02	1.30	6.413E-03	609.32	46.090	4.529E-01	BI214
661.91	77.	20.58	1.58	5.935E-03	661.62	84.620	1.213E-01	CS137
727.27	63.	18.93	2.10	5.443E-03	727.17	11.800	7.818E-01	BI212

911.10	137.	10.15	1.51	4.446E-03	911.07	29.000	8.408E-01	AC228
964.25	25.	35.87	1.61	4.230E-03	964.00	14.580	PBC<MDA	EU152
969.05	76.	15.28	1.62	4.212E-03	968.90	17.460	8.176E-01	AC228
1119.96	68.	19.59	2.12	3.711E-03	1120.28	15.040	9.742E-01	BI214
1173.49	29.	35.88	1.75	3.565E-03	1173.23	99.860	PBC<MDA	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.57	669.	4.00	1.94	2.943E-03	1460.75	10.700	1.695E+01	K40
1764.49	35.	21.60	0.88	2.481E-03	1764.51	15.920	7.045E-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	
167.42	84.04	318.	71.	0.035	112.73	1.011	TA-182	lD
173.42	87.03	336.	114.	0.057	74.04	1.014	PB-214	lD
179.78	90.21	380.	95.	0.048	92.26	1.016	PB-214	lD
484.08	242.20	194.	97.	0.049	68.00	1.124	PB-214	lD
540.27	270.27	130.	50.	0.025	102.52	0.953	AC-228	
600.07	300.12	102.	54.	0.027	88.80	1.165	PB-212	lD
1929.09	964.19	27.	27.	0.013	101.42	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	149.17	74.80	960.	161.	0.081	82.21	1.499
PB-212	153.79	77.11	865.	273.	0.136	49.20	1.499D
PB-214	153.79	77.11	869.	269.	0.135	49.20	1.499D
TH-234	185.58	93.00	923.	134.	0.067	92.02	1.499s
TH-234	185.58	93.00	880.	143.	0.071	87.70	1.499s
RA-226	371.81	186.08	506.	101.	0.051	99.07	1.499s
PB-212	477.21	238.75	444.	579.	0.290	19.59	1.499
PB-214	590.30	295.28	229.	176.	0.088	42.35	1.499s
AC-228	677.21	338.71	161.	118.	0.059	57.40	1.283
PB-214	703.80	352.00	119.	247.	0.124	26.44	1.499
SB-125	926.01	463.06	98.	49.	0.024	93.26	1.499
TL-208	1022.61	511.33	104.	94.	0.047	53.49	1.326s
TL-208	1166.17	583.08	74.	205.	0.103	30.40	1.225
BI-214	1218.55	609.26	79.	167.	0.084	36.06	1.302
CS-137	1323.91	661.91	59.	76.	0.038	61.73	1.577s
BI-212	1454.69	727.27	34.	63.	0.031	56.79	2.099s
AC-228	1822.56	911.10	27.	135.	0.068	30.44	1.506
AC-228	1938.21	968.90	30.	75.	0.038	45.81	1.616D
BI-214	2240.52	1119.96	36.	68.	0.034	58.76	2.116s
CO-60	2347.62	1173.49	40.	29.	0.014	107.64	1.746s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2922.16	1460.57	14.	667.	0.333	12.01	1.938
BI-214	3530.42	1764.49	6.	35.	0.017	64.81	0.877s

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		1.0685E-01					
			477.56	1.068E-01	%(	4.237E-01 1.25E-01	G
K-40		1.6953E+01					
			1460.75	1.695E+01	(P	5.167E-01 6.81E-01	G
MN-54		-1.2322E-02					
			834.81	-1.232E-02	%(P	5.457E-02 1.57E-02	G
CO-57		-1.1605E-02					
			122.07	-1.160E-02	%(	5.584E-02 1.67E-02	G K
			136.43	-6.372E-02	%	4.190E-01 1.25E-01	G
CO-60		5.3315E-02					
			1332.51	4.166E-02	%(P	6.238E-02 1.97E-02	G K
			1173.23	6.499E-02	(P	7.232E-02 2.34E-02	G K
Sr-85		-4.1085E-03					
			514.00	-4.109E-03	&(	6.033E-02 1.75E-02	G
Kr-85		-1.2227E+02					
			513.99	-1.223E+02	&(P	1.337E+03 3.87E+02	G
Y-88		-5.5519E-03					
			1836.01	-5.552E-03	%(	5.222E-02 1.37E-02	G K
			898.02	-3.457E-04	& P	6.604E-02 1.84E-02	G
NB-94		-1.1534E-02					
			871.10	-1.153E-02	&(P	5.460E-02 1.58E-02	G K
			702.50	1.195E-02	% P	5.204E-02 1.52E-02	G K
Ag-108M		1.6487E-02					
			722.95	1.649E-02	%(	4.784E-02 1.42E-02	G K
			614.37	9.520E-04	% P	5.950E-02 1.69E-02	G
			433.93	3.499E-04	%	4.639E-02 1.33E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-5.5315E-01						
		88.04	-5.531E-01	%(P	1.795E+00	5.41E-01	G
SN-113	2.3676E-02						
		391.71	2.368E-02	&(	5.747E-02	1.73E-02	G K
		255.04	-3.368E-02	& P	2.250E+00	6.61E-01	G
SB-125	1.1867E-01						
		427.95	3.672E-04	%(P	1.418E-01	4.05E-02	G K
		600.77	-7.336E-02	% P	3.027E-01	8.90E-02	G
		636.15	3.477E-02	& P	4.383E-01	1.25E-01	G
		463.51	4.688E-01	(P	4.699E-01	1.50E-01	G
		176.29	-5.017E-02	& P	7.408E-01	2.19E-01	G
I-131	-2.8735E-03						
		364.48	-2.874E-03	%(	9.382E-02	2.74E-02	G K
		636.97	2.974E-01	&	8.851E-01	2.62E-01	G
		284.29	4.563E-02	&	1.173E+00	3.45E-01	G
CS-134	6.2423E-03						
		604.66	6.242E-03	%(P	4.246E-02	1.21E-02	G K
		795.76	2.717E-02	% P	5.936E-02	1.79E-02	G
		569.29	5.682E-02	% P	2.731E-01	7.92E-02	G
		801.84	3.250E-02	%	6.198E-01	1.75E-01	G
CS-137	1.2132E-01						
		661.62	1.213E-01	*(P	6.131E-02	2.53E-02	G
CE-139	-1.0277E-02						
		165.85	-1.028E-02	%(P	5.794E-02	1.73E-02	G
EU-152	-3.1921E-02						
		121.78	-3.192E-02	%(P	1.657E-01	4.96E-02	G K
		344.30	1.845E-04	% P	1.383E-01	3.97E-02	G
		1408.08	6.243E-02	% P	2.305E-01	6.57E-02	G
		964.00	1.796E-01	% P	4.758E-01	1.42E-01	G
		1112.07	-1.140E-02	% P	5.055E-01	1.41E-01	G
		778.90	-4.989E-02	% P	3.866E-01	1.10E-01	G
EU-154	-2.8357E-02						
		123.10	-2.836E-02	%(P	1.117E-01	3.35E-02	G K
		1274.80	2.079E-02	& P	2.061E-01	5.82E-02	G
		723.30	-1.854E-01	% P	4.185E-01	1.26E-01	G
		1004.80	8.381E-02	% P	3.039E-01	8.85E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.2726E-01						
		86.45	1.273E-01	%(	1.885E-01	5.76E-02	G K
		105.31	7.943E-02	%	2.218E-01	6.69E-02	G
HG-203	5.9759E-03						
		279.17	5.976E-03	&(	5.744E-02	1.69E-02	G K
		72.87	2.472E-02	% P	1.067E+00	3.17E-01	G
		70.83	0.000E+00	&	2.864E+00	8.56E-01	G
		82.50	-7.527E-01	&	2.990E+00	8.99E-01	G
TL-208	2.8594E-01						
		583.14	2.859E-01	(P	5.948E-02	2.93E-02	G
		510.72	4.396E-01	+ P	2.357E-01	9.18E-02	G
PB-212	7.1603E-01						
		238.63	6.907E-01	(P	1.203E-01	4.56E-02	G K
							Energy duplication
		77.11	7.258E-01	(	3.717E-01	1.19E-01	G
		74.81	8.118E-01	&(P	7.417E-01	2.30E-01	G
PB-214	5.1595E-01						
		351.99	4.883E-01	(P	1.056E-01	4.34E-02	G K
		295.22	5.693E-01	*(P	2.363E-01	8.12E-02	G
							Energy duplication
		77.11	1.171E+00	+ P	6.092E-01	1.95E-01	G
		241.92	9.721E-02	% P	8.313E-01	2.48E-01	G
BI-212	7.8181E-01						
		727.17	7.818E-01	@(P	3.739E-01	1.50E-01	G K
		1620.56	1.674E-01	%	1.986E+00	5.31E-01	G
		785.42	9.850E-01	% P	2.937E+00	8.71E-01	G
BI-214	4.5286E-01						
		609.32	4.529E-01	(P	1.194E-01	5.48E-02	G K
		1764.51	7.045E-01	+ P	2.908E-01	1.54E-01	G
		1120.28	9.742E-01	+ P	4.404E-01	1.92E-01	G
RA-224	8.6508E-01						
		241.00	8.651E-01	%(P	1.461E+00	4.46E-01	G
RA-226	1.3270E+00						
		185.99	1.327E+00	(	1.413E+00	4.38E-01	G
AC-228	8.0411E-01						
		911.07	8.408E-01	(P	1.659E-01	8.65E-02	G K
		968.90	8.179E-01	(P	3.067E-01	1.26E-01	G
		338.40	6.955E-01	(P	3.627E-01	1.36E-01	G

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

TH-227      -2.8750E-01
                          236.00-2.875E-01 %(P 5.447E-01 1.65E-01 G K
                          256.25 7.198E-04 & P 6.267E-01 1.83E-01 G

PA-234      -2.6988E-03
                           98.44-2.699E-03 &(  1.944E-01 5.78E-02 G K
                          946.00-5.837E-02 &   3.386E-01 9.79E-02 G
                          131.28-7.903E-02 &   2.549E-01 7.68E-02 G
                           94.67-1.642E-01 %   3.638E-01 1.10E-01 G
                          883.24-7.836E-02 &   4.694E-01 1.35E-01 G
                          926.70-1.951E-02 &   5.027E-01 1.40E-01 G
                          569.26 9.216E-02 %   3.966E-01 1.16E-01 G

TH-234       1.5519E+00
                           63.29 9.114E-01 %(P 2.441E+00 7.35E-01 G K
                           92.80 1.915E+00 *(P 1.890E+00 5.84E-01 G
                           92.38 2.100E+00 *(P 2.264E+00 6.96E-01 G

AM-241      -1.3556E-02
                           59.54-1.356E-02 %(P 3.402E-01 1.01E-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	1.0107E-01	1.0685E-01	3.7403E-01	3.7408E-01	4.008E-01
K-40		1.6953E+01	1.6953E+01	2.0426E+00	2.2560E+00	
MN-54	#A	-1.2205E-02	-1.2322E-02	5.2905E-02	5.2909E-02	5.405E-02
CO-57	#B	-1.1478E-02	-1.1605E-02	5.0205E-02	5.0210E-02	5.523E-02
CO-60	#B	5.3233E-02	5.3315E-02	4.7580E-02	4.7675E-02	6.228E-02
Sr-85	#A	-3.9247E-03	-4.1085E-03	5.2561E-02	5.2561E-02	5.763E-02
Kr-85	#A	-1.2226E+02	-1.2227E+02	1.8821E+03	1.8821E+03	1.337E+03
Y-88	#B	-5.3995E-03	-5.5519E-03	4.1155E-02	4.1156E-02	5.079E-02
NB-94	#B	-1.1534E-02	-1.1534E-02	4.9188E-02	4.9192E-02	5.460E-02
Ag-108M	#B	1.6486E-02	1.6487E-02	4.2492E-02	4.2502E-02	4.784E-02
CD-109	#A	-5.4954E-01	-5.5315E-01	1.6540E+00	1.6543E+00	1.783E+00
SN-113	#B	2.3073E-02	2.3676E-02	5.1860E-02	5.1877E-02	5.601E-02
SB-125	#B	1.1832E-01	1.1867E-01	1.1396E-01	1.1415E-01	1.414E-01
I-131	#B	-1.9868E-03	-2.8735E-03	8.2304E-02	8.2304E-02	6.487E-02
CS-134	#B	6.2177E-03	6.2423E-03	3.6383E-02	3.6385E-02	4.229E-02
CS-137	#	1.2128E-01	1.2132E-01	7.5753E-02	7.6062E-02	
CE-139	#A	-1.0058E-02	-1.0277E-02	5.3659E-02	5.3662E-02	5.671E-02
EU-152	#B	-3.1901E-02	-3.1921E-02	1.5854E-01	1.5855E-01	1.656E-01
EU-154	#B	-2.8329E-02	-2.8357E-02	1.0674E-01	1.0676E-01	1.116E-01
EU-155	#B	1.2705E-01	1.2726E-01	1.7279E-01	1.7294E-01	1.882E-01
HG-203	#B	5.6072E-03	5.9759E-03	5.0806E-02	5.0807E-02	5.390E-02
TL-208		2.8594E-01	2.8594E-01	8.7932E-02	8.9404E-02	
PB-212	#	7.1603E-01	7.1603E-01	1.4174E-01	1.4740E-01	1.203E-01
PB-214	#	5.1595E-01	5.1595E-01	1.3001E-01	1.3324E-01	1.056E-01
BI-212	#	7.8181E-01	7.8181E-01	4.4879E-01	4.5096E-01	
BI-214		4.5286E-01	4.5286E-01	1.6437E-01	1.6635E-01	
RA-224	#A	8.6508E-01	8.6508E-01	1.3366E+00	1.3375E+00	1.461E+00
RA-226	#A	1.3270E+00	1.3270E+00	1.3147E+00	1.3169E+00	1.413E+00
AC-228		8.0411E-01	8.0411E-01	2.1624E-01	2.2096E-01	
TH-227	#B	-2.8750E-01	-2.8750E-01	5.0337E-01	5.0363E-01	5.447E-01
PA-234	#B	-2.6988E-03	-2.6988E-03	1.7328E-01	1.7328E-01	1.944E-01
TH-234	#B	1.5519E+00	1.5519E+00	1.4200E+00	1.4226E+00	2.441E+00
AM-241	#A	-1.3555E-02	-1.3556E-02	4.2716E-01	4.2717E-01	3.402E-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) 1.9398935E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 1.9398968E+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_28JUNE2006_1536.An1

Sample description
FSS- NOL-06-02-030-F-B

Spectrum Filename: C:\GammaVision\Spectra\101F_28JUNE2006_1536.An1

Acquisition information

Start time:	28-Jun-2006 15:37:39
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:	1.9820E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.9820E+03) = 5.0454E+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-Jun-2006 11:06:00
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. 1 cutoff 20.00000 %

***** 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
83.06	200.	16.34	1.01	1.860E-02	82.50	2.240	3.563E+00	HG203
85.30	378.	8.50	1.01	1.898E-02				
96.19	102.	29.45	1.02	2.021E-02				
99.76	82.	35.87	1.02	2.048E-02	98.44	25.100	1.091E-01	PA234
103.19	116.	24.61	1.03	2.069E-02				
206.25	119.	23.04	1.52	1.739E-02				
232.08	67.	37.21	0.98	1.593E-02				
264.73	980.	4.98	1.16	1.426E-02				
298.55	93.	30.35	1.01	1.279E-02				
326.95	174.	12.83	1.26	1.173E-02				
332.64	92.	26.20	1.43	1.154E-02				
374.90	170.	17.18	1.79	1.027E-02				
389.68	277.	11.34	1.42	9.890E-03				
512.73	57.	29.72	1.49	7.562E-03				
512.73	57.	29.72	1.49	7.562E-03	513.99	0.004	1.178E+03	Kr85
					514.00	99.270	5.505E-02	Sr85
565.13	138.	16.76	1.77	6.887E-03				
645.69	256.	8.12	1.74	6.074E-03				
674.72	193.	11.18	1.55	5.831E-03				
879.92	46.	32.97	1.39	4.585E-03				
952.63	33.	30.38	1.27	4.275E-03				
1008.45	163.	9.91	1.59	4.067E-03				
1073.18	78.	17.93	1.84	3.852E-03				
1617.21	723.	3.72	1.91	2.687E-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

165.70	83.45	432.	200.	0.100	49.02	1.011	HG-203	D
170.17	85.68	326.	378.	0.189	25.49	1.012	BI-207	D
191.85	96.13	674.	104.	0.052	109.99	0.782	NP-237	
199.10	99.70	391.	82.	0.041	107.61	1.023	PA-234	lD
205.85	103.13	485.	113.	0.057	87.21	1.382	GD-153	s
412.16	206.25	304.	119.	0.060	69.13	1.518	U-235	s
463.85	232.08	264.	67.	0.034	109.20	0.982	CE-143	
529.19	264.73	425.	980.	0.490	13.10	1.156	SE-75	s
596.84	298.55	238.	105.	0.052	69.16	1.010	TB-160	s
653.68	326.95	142.	174.	0.087	38.49	1.264	AC-228	
665.06	332.64	178.	94.	0.047	67.76	1.432	U-237	s
749.61	374.90	207.	170.	0.085	51.54	1.790	PA-234	s
779.19	389.68	183.	292.	0.146	26.34	1.418	RH-106M	
1130.25	565.13	91.	159.	0.079	34.86	1.770	J-134	s
1291.44	645.69	63.	256.	0.128	24.37	1.739	RH-106M	s
1349.54	674.72	83.	193.	0.097	33.54	1.545	SB-126	s
1760.15	879.92	46.	55.	0.027	66.75	1.389	CE-143	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
1905.66	952.63	27.	33.	0.016	84.79	1.266	SB-126	
2017.35	1008.45	18.	176.	0.088	24.74	1.594	BR-82	s
2146.89	1073.18	41.	78.	0.039	53.78	1.838	J-134	
3235.66	1617.21	-21.	744.	0.372	10.68	1.914	BI-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	165.35	82.89	1044.	195.	0.098	73.50	1.499
Kr-85	1025.34	512.70	64.	44.	0.022	86.11	1.499
Sr-85	1025.36	512.71	63.	46.	0.023	86.04	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		3.4270E-02					
			477.56	3.427E-02	%(	3.956E-01 1.14E-01	G
K-40		3.6188E-02					
			1460.75	3.619E-02	%(P	6.057E-01 1.65E-01	G
MN-54		-1.0093E-02					
			834.81	-1.009E-02	%(P	4.856E-02 1.40E-02	G
CO-57		-1.3994E-02					
			122.07	-1.399E-02	%(	4.880E-02 1.47E-02	G K
			136.43	-5.768E-02	&	3.918E-01 1.17E-01	G
CO-60		1.5407E-02					
			1332.51	1.541E-02	%(P	8.215E-02 2.39E-02	G K
			1173.23	3.520E-03	& P	6.630E-02 1.87E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sr-85	4.3983E-02						
		514.00	4.398E-02	(	3.822E-02	1.26E-02	G
Kr-85	9.3526E+02						
		513.99	9.353E+02	(P	8.422E+02	2.76E+02	G
Y-88	-4.5888E-04						
		1836.01	-4.589E-04	&(	3.701E-02	8.87E-03	G K
		898.02	5.257E-03	& P	5.246E-02	1.48E-02	G
NB-94	1.0263E-02						
		871.10	1.026E-02	%(P	4.534E-02	1.31E-02	G K
		702.50	-3.098E-04	% P	4.303E-02	1.21E-02	G K
Ag-108M	-5.8730E-04						
		722.95	-5.873E-04	%(	4.869E-02	1.37E-02	G K
		614.37	-1.220E-02	& P	4.884E-02	1.43E-02	G
		433.93	1.372E-02	%	3.885E-02	1.16E-02	G
CD-109	-8.9038E-01						
		88.04	-8.904E-01	%(P	1.456E+00	4.43E-01	G
SN-113	-1.6387E-02						
		391.71	-1.639E-02	%(	7.384E-02	2.19E-02	G K
		255.04	2.027E-02	% P	2.136E+00	6.30E-01	G
SB-125	-1.2662E-02						
		427.95	-1.266E-02	&(P	1.461E-01	4.26E-02	G K
		600.77	8.683E-02	% P	1.710E-01	5.21E-02	G
		636.15	4.701E-03	& P	3.473E-01	9.73E-02	G
		463.51	8.949E-02	% P	3.932E-01	1.15E-01	G
		176.29	2.109E-01	% P	6.437E-01	1.94E-01	G
I-131	4.0368E-02						
		364.48	4.037E-02	&(	7.034E-02	2.15E-02	G K
		636.97	4.196E-01	%	9.497E-01	2.87E-01	G
		284.29	3.475E-01	%	1.056E+00	3.17E-01	G
CS-134	-2.2790E-03						
		604.66	-2.279E-03	%(P	3.505E-02	9.76E-03	G K
		795.76	-5.489E-03	% P	6.043E-02	1.72E-02	G
		569.29	-1.429E-01	% P	3.456E-01	1.04E-01	G
		801.84	-3.179E-01	%	8.354E-01	2.51E-01	G
CS-137	-7.3637E-03						
		661.62	-7.364E-03	&(P	5.886E-02	1.69E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-139	1.8436E-02						
		165.85	1.844E-02	&(P	4.337E-02	1.31E-02	G
EU-152	-3.7914E-02						
		121.78	-3.791E-02	%(P	1.449E-01	4.35E-02	G K
		344.30	-1.493E-02	& P	1.484E-01	4.34E-02	G
		1408.08	3.974E-02	& P	2.956E-01	8.34E-02	G
		964.00	5.585E-02	& P	3.526E-01	1.01E-01	G
		1112.07	-4.890E-02	& P	3.933E-01	1.11E-01	G
		778.90	-6.508E-02	% P	4.180E-01	1.21E-01	G
EU-154	4.1780E-03						
		123.10	4.178E-03	%(P	1.014E-01	3.02E-02	G K
		1274.80	4.628E-02	% P	1.973E-01	5.75E-02	G
		723.30	-1.332E-02	& P	2.432E-01	6.89E-02	G
		1004.80	-1.314E-01	% P	4.465E-01	1.32E-01	G
EU-155	-1.0440E-01						
		86.45	-1.044E-01	&(	1.772E-01	5.39E-02	G K
		105.31	3.208E-03	%	2.058E-01	6.12E-02	G
HG-203	9.8849E-02						
		279.17	5.921E-03	&(	5.346E-02	1.58E-02	G K
		72.87	-9.507E-02	% P	1.028E+00	3.06E-01	G
		70.83	4.780E-01	&	1.673E+00	5.03E-01	G
		82.50	3.480E+00	?(	2.735E+00	8.53E-01	G
TL-208	-1.5437E-02						
		583.14	-1.544E-02	&(P	5.681E-02	1.65E-02	G
		510.72	-6.398E-02	& P	2.119E-01	5.67E-02	G
PB-212	1.7654E-02						
		238.63	1.765E-02	%(P	9.663E-02	2.87E-02	G K
							Energy duplication
		77.11	7.232E-03	&	3.185E-01	9.49E-02	G
		74.81	1.390E-02	& P	5.873E-01	1.75E-01	G
PB-214	-4.7956E-03						
		351.99	-4.796E-03	%(P	1.057E-01	3.06E-02	G K
		295.22	-3.896E-02	% P	2.312E-01	6.84E-02	G
							Energy duplication
		77.11	-1.951E-03	& P	5.219E-01	1.55E-01	G
		241.92	1.893E-02	% P	5.430E-01	1.60E-01	G
BI-212	-3.6684E-02						
		727.17	-3.668E-02	%(P	4.234E-01	1.20E-01	G K
		1620.56	-1.967E+00	%	4.961E+00	1.49E+00	G
		785.42	-3.952E-01	% P	2.470E+00	7.11E-01	G

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

BI-214      -1.3183E-02
                          609.32-1.318E-02 %(P 9.180E-02 2.62E-02 G K
                         1764.51-3.055E-03 % P 4.119E-01 1.10E-01 G
                         1120.28 1.026E-01 % P 3.202E-01 9.37E-02 G

RA-224       2.3630E-02
                          241.00 2.363E-02 &(P 1.068E+00 3.15E-01 G

RA-226       4.9533E-03
                          185.99 4.953E-03 %(  1.078E+00 3.18E-01 G

AC-228       1.6434E-02
                          911.07 1.643E-02 %(P 1.724E-01 4.83E-02 G K
                          968.90-5.563E-02 % P 3.152E-01 8.99E-02 G
                          338.40-4.221E-02 % P 3.293E-01 9.61E-02 G

TH-227      -4.0084E-02
                          236.00-4.008E-02 &(P 3.943E-01 1.17E-01 G K
                          256.25-9.859E-02 & P 6.492E-01 1.93E-01 G

PA-234      -8.9071E-03
                           98.44-8.907E-03 &(  2.051E-01 6.12E-02 G K
                          946.00 5.585E-03 &   2.171E-01 5.97E-02 G
                          131.28-1.723E-03 %   2.123E-01 6.31E-02 G
                           94.67-1.277E-02 &   3.290E-01 9.82E-02 G
                          883.24-1.091E-01 %   5.042E-01 1.47E-01 G
                          926.70 1.116E-01 &   4.963E-01 1.45E-01 G
                          569.26-2.068E-01 %   5.094E-01 1.53E-01 G

TH-234      -9.7415E-02
                           63.29-9.742E-02 %(P 1.923E+00 5.68E-01 G K
                           92.80-8.381E-02 % P 1.769E+00 5.26E-01 G
                           92.38-3.742E-01 & P 1.998E+00 5.95E-01 G

AM-241      -7.3780E-02
                           59.54-7.378E-02 %(P 2.436E-01 7.31E-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:
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	3.2038E-02	3.4270E-02	3.4258E-01	3.4259E-01	3.699E-01
K-40	#A	3.6188E-02	3.6188E-02	4.9542E-01	4.9542E-01	6.057E-01
MN-54	#A	-9.9769E-03	-1.0093E-02	4.7273E-02	4.7277E-02	4.801E-02
CO-57	#B	-1.3809E-02	-1.3994E-02	4.4038E-02	4.4045E-02	4.816E-02
CO-60	#B	1.5379E-02	1.5407E-02	7.1586E-02	7.1591E-02	8.199E-02
Sr-85	#	4.1610E-02	4.3983E-02	3.7842E-02	3.7924E-02	3.616E-02
Kr-85	#	9.3522E+02	9.3526E+02	8.2666E+02	8.2834E+02	8.422E+02
Y-88	#B	-4.4365E-04	-4.5888E-04	2.6603E-02	2.6603E-02	3.578E-02
NB-94	#B	1.0263E-02	1.0263E-02	3.9378E-02	3.9382E-02	4.534E-02
Ag-108M	#B	-5.8726E-04	-5.8730E-04	4.1024E-02	4.1024E-02	4.869E-02
CD-109	#A	-8.8335E-01	-8.9038E-01	1.3436E+00	1.3445E+00	1.444E+00
SN-113	#B	-1.5883E-02	-1.6387E-02	6.5738E-02	6.5744E-02	7.157E-02
SB-125	#B	-1.2617E-02	-1.2662E-02	1.4568E-01	1.4569E-01	1.456E-01
I-131	#B	2.5809E-02	4.0368E-02	6.4570E-02	6.4610E-02	4.497E-02
CS-134	#B	-2.2682E-03	-2.2790E-03	5.3751E-02	5.3751E-02	3.488E-02
CS-137	#A	-7.3613E-03	-7.3637E-03	7.0432E-02	7.0434E-02	5.884E-02
CE-139	#A	1.7960E-02	1.8436E-02	3.9330E-02	3.9344E-02	4.225E-02
EU-152	#B	-3.7884E-02	-3.7914E-02	1.3664E-01	1.3665E-01	1.448E-01
EU-154	#B	4.1732E-03	4.1780E-03	9.0467E-02	9.0467E-02	1.013E-01
EU-155	#B	-1.0419E-01	-1.0440E-01	1.6183E-01	1.6193E-01	1.768E-01
HG-203	#F	9.1506E-02	9.8849E-02	7.2658E-02	7.2873E-02	4.949E-02
TL-208	#A	-1.5437E-02	-1.5437E-02	7.1676E-02	7.1681E-02	5.681E-02
PB-212	#B	1.7654E-02	1.7654E-02	8.6076E-02	8.6082E-02	9.663E-02
PB-214	#B	-4.7956E-03	-4.7956E-03	5.0849E-01	5.0849E-01	1.057E-01
BI-212	#B	-3.6684E-02	-3.6684E-02	5.3755E-01	5.3755E-01	4.234E-01

BI-214 #B	-1.3183E-02	-1.3183E-02	1.1644E-01	1.1645E-01	9.180E-02

RA-224	#A	2.3630E-02	2.3630E-02	9.4490E-01	9.4490E-01	1.068E+00
RA-226	#A	4.9533E-03	4.9533E-03	9.5445E-01	9.5445E-01	1.078E+00
AC-228	#B	1.6434E-02	1.6434E-02	1.4500E-01	1.4500E-01	1.724E-01
TH-227	#B	-4.0084E-02	-4.0084E-02	3.8212E-01	3.8213E-01	3.943E-01
PA-234	#B	-8.9071E-03	-8.9071E-03	1.8371E-01	1.8371E-01	2.051E-01
TH-234	#B	-9.7415E-02	-9.7415E-02	1.1680E+01	1.1680E+01	1.923E+00
AM-241	#A	-7.3778E-02	-7.3780E-02	2.3134E-01	2.3137E-01	2.436E-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 (95.7 to 1999.1 keV) 0.0000000E+00 pCi/gm
Total Decayed Activity (95.7 to 1999.1 keV) 0.0000000E+00 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_26JUN2006_1643.An1

Sample description
FSS-NOL-06-02-015-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\102F_26JUN2006_1643.An1

Acquisition information
Start time: 26-Jun-2006 16:43:57
Live time: 2000
Real time: 2021
Dead time: 1.05 %
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: 2.1070E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1070E+03) =
4.7461E+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	26-Jun-2006 07:20:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.6349

***** 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	120.	37.54	1.50	8.847E-03				
74.82	120.	37.54	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.27	167.	27.12	1.50	9.541E-03	77.11	10.700	1.047E+00	PB214
					77.11	17.500	6.400E-01	PB212
77.27	167.	27.12	1.50	9.541E-03	77.11	10.700	1.047E+00	PB214
					77.11	17.500	6.400E-01	PB212
92.17	111.	36.54	1.37	1.321E-02	88.04	3.790	PBC<MDA	CD109
					92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.777E+00	TH234
209.36	76.	35.61	0.96	1.519E-02				
239.00	659.	4.68	1.22	1.379E-02	238.63	43.100	7.109E-01	PB212
241.96	111.	22.86	1.22	1.366E-02	241.00	3.900	1.324E+00	RA224
					241.92	7.470	7.006E-01	PB214
270.78	47.	40.74	0.57	1.241E-02				
295.69	142.	12.23	1.25	1.145E-02	295.22	19.200	4.145E-01	PB214
300.45	55.	29.13	1.26	1.128E-02				
328.65	40.	41.16	1.09	1.035E-02				
338.86	98.	18.27	1.11	1.005E-02	338.40	12.010	5.218E-01	AC228
352.52	235.	12.08	1.15	9.664E-03	351.99	37.100	4.187E-01	PB214
463.71	44.	29.50	1.50	7.365E-03	463.51	10.000	3.797E-01	SB125
511.11	80.	23.09	1.31	6.690E-03	510.72	22.500	3.393E-01	TL208
584.05	222.	9.35	1.78	5.881E-03	583.14	86.000	2.803E-01	TL208
610.23	187.	9.92	1.09	5.641E-03	609.32	46.090	4.596E-01	BI214
727.97	67.	24.38	1.62	4.789E-03	727.17	11.800	7.596E-01	BI212
768.94	38.	34.91	0.96	4.558E-03				
796.11	33.	31.42	1.36	4.418E-03	795.76	85.400	5.576E-02	CS134
912.82	128.	12.11	1.22	3.915E-03	911.07	29.000	7.233E-01	AC228

969.25	168.	10.73	1.93	3.717E-03	968.90	17.460	1.657E+00	AC228
1121.36	48.	29.47	1.34	3.280E-03	1120.28	15.040	6.287E-01	BI214
1462.74	551.	4.37	2.16	2.618E-03	1460.75	10.700	1.261E+01	K40
1767.04	35.	16.90	1.29	2.223E-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	
418.33	209.36	289.	76.	0.038	106.83	0.965	AC-228	
477.62	238.85	146.	659.	0.330	14.03	1.215	PB-212	D
483.55	241.81	269.	111.	0.056	68.57	1.217	PB-214	D
541.20	270.78	153.	47.	0.024	122.22	0.568	AC-228	s
600.38	300.36	104.	49.	0.024	97.01	1.308	PB-212	
656.98	328.65	110.	40.	0.020	123.47	1.089	LA-140	
1537.87	768.94	46.	38.	0.019	104.74	0.957	BI-214	sM
3535.72	1767.04	0.	35.	0.018	50.48	2.238	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	149.21	74.82	1009.	120.	0.060	112.62	1.500
PB-214	153.80	77.11	938.	167.	0.083	81.37	1.500D
PB-212	153.80	77.11	938.	167.	0.083	81.37	1.500D
PB-212	477.72	239.04	404.	558.	0.279	19.87	1.500
RA-224	483.43	241.90	455.	85.	0.043	109.72	1.500
PB-214	483.51	241.94	457.	80.	0.040	118.32	1.500
PB-214	590.95	295.65	181.	130.	0.065	51.33	1.500
AC-228	677.40	338.86	107.	98.	0.049	54.80	1.108
PB-214	704.78	352.55	124.	210.	0.105	30.51	1.500
SB-125	927.17	463.71	68.	44.	0.022	88.49	1.500s
TL-208	1022.01	511.11	89.	80.	0.040	69.27	1.311s
TL-208	1167.94	584.05	68.	221.	0.111	28.05	1.778s
BI-214	1220.32	610.23	50.	187.	0.093	29.77	1.088
BI-212	1455.89	727.97	54.	67.	0.034	73.14	1.619s
CS-134	1592.09	796.04	28.	26.	0.013	104.58	1.601
AC-228	1825.06	912.46	48.	97.	0.049	42.65	1.679s
AC-228	1938.70	969.25	36.	168.	0.084	32.19	1.927s
BI-214	2243.11	1121.36	46.	48.	0.024	88.41	1.336
K-40	2926.52	1462.80	9.	527.	0.263	13.29	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		0.0000E+00					
			477.56	0.000E+00	%(	4.227E-01 1.21E-01	G
K-40		1.2049E+01					
			1460.75	1.205E+01	(P	3.813E-01 5.34E-01	G
MN-54		-4.5579E-03					
			834.81	-4.558E-03	&(P	4.518E-02 1.27E-02	G
CO-57		2.2527E-03					
			122.07	2.253E-03	&(	5.416E-02 1.61E-02	G K
			136.43	6.260E-02	&	4.030E-01 1.20E-01	G
CO-60		-1.2104E-03					
			1332.51	-1.210E-03	%(P	6.425E-02 1.77E-02	G K
			1173.23	-1.279E-02	%	6.054E-02 1.75E-02	G K
Sr-85		-1.1480E-02					
			514.00	-1.148E-02	&(	5.730E-02 1.69E-02	G
Kr-85		-2.6392E+02					
			513.99	-2.639E+02	&(	1.317E+03 3.89E+02	G
Y-88		6.1089E-04					
			1836.01	6.109E-04	%(P	5.088E-02 1.30E-02	G K
			898.02	-4.806E-03	% P	5.366E-02 1.50E-02	G
NB-94		-2.2490E-03					
			871.10	-2.249E-03	%(	4.817E-02 1.35E-02	G K
			702.50	1.349E-02	%	4.542E-02 1.34E-02	G K
Ag-108M		-7.5007E-03					
			722.95	-7.501E-03	%(	5.296E-02 1.52E-02	G K
			614.37	-3.972E-02	% P	6.929E-02 2.12E-02	G
			433.93	6.815E-04	%	3.921E-02 1.12E-02	G
CD-109		-2.0189E-01					
			88.04	-2.019E-01	&(P	1.925E+00 5.74E-01	G
SN-113		0.0000E+00					
			391.71	0.000E+00	&(	6.396E-02 1.85E-02	G K
			255.04	8.105E-02	%	1.313E+00 3.81E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.8412E-02						
		427.95	-9.988E-03	&(P	1.421E-01	4.09E-02	G K
		600.77	-8.506E-04	% P	2.241E-01	6.29E-02	G
		636.15	-1.169E-01	% P	3.443E-01	1.02E-01	G
		463.51	3.797E-01	*(P	3.573E-01	1.16E-01	G
		176.29	1.872E-01	& P	5.768E-01	1.73E-01	G
I-131	8.5731E-03						
		364.48	8.573E-03	&(	4.208E-02	1.24E-02	G K
		636.97	3.250E-03	%	4.617E-01	1.26E-01	G
		284.29	1.500E-01	%	6.195E-01	1.84E-01	G
CS-134	2.1884E-02						
		604.66	2.182E-03	%(	3.698E-02	1.04E-02	G K
		795.76	4.440E-02	(	4.682E-02	1.55E-02	G
		569.29	-6.494E-02	%	2.946E-01	8.64E-02	G
		801.84	-4.390E-02	% P	4.665E-01	1.30E-01	G
CS-137	1.2593E-02						
		661.62	1.259E-02	&(	5.990E-02	1.75E-02	G
CE-139	-8.9729E-04						
		165.85	-8.973E-04	&(P	5.074E-02	1.50E-02	G
EU-152	1.2637E-03						
		121.78	1.264E-03	%(P	1.644E-01	4.88E-02	G K
		344.30	1.033E-03	&	1.252E-01	3.61E-02	G
		1408.08	-1.262E-02	&	2.433E-01	6.57E-02	G
		964.00	-2.710E-03	& P	5.347E-01	1.52E-01	G
		1112.07	1.533E-01	%	4.047E-01	1.21E-01	G
		778.90	4.212E-02	% P	3.575E-01	1.02E-01	G
EU-154	2.9324E-03						
		123.10	2.932E-03	&(P	9.279E-02	2.74E-02	G K
		1274.80	-2.468E-02	&	2.074E-01	5.92E-02	G
		723.30	-5.863E-03	% P	2.431E-01	6.83E-02	G
		1004.80	-5.322E-02	&	3.319E-01	9.53E-02	G
EU-155	5.2146E-02						
		86.45	5.215E-02	%(P	2.478E-01	7.44E-02	G K
		105.31	2.647E-03	%	2.443E-01	7.26E-02	G
HG-203	-8.7359E-03						
		279.17	-8.736E-03	%(P	4.922E-02	1.46E-02	G K
		72.87	-5.914E-01	&	1.965E+00	5.92E-01	G
		70.83	-1.548E-02	%	3.568E+00	1.06E+00	G
		82.50	-5.967E-01	&	3.762E+00	1.13E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9256E-01						
		583.14	2.803E-01	*(P	5.195E-02	2.63E-02	G
		510.72	3.393E-01	*(	1.990E-01	7.84E-02	G
PB-212	6.1267E-01						
		238.63	6.016E-01	(	1.039E-01	3.98E-02	G K
							Energy duplication
		77.11	6.400E-01	(	5.586E-01	1.74E-01	G
		74.81	9.066E-01	& P	1.138E+00	3.49E-01	G
PB-214	3.7566E-01						
		351.99	3.747E-01	(P	9.739E-02	3.82E-02	G K
		295.22	3.776E-01	(	1.906E-01	6.46E-02	G
							Energy duplication
		77.11	1.047E+00	+	9.135E-01	2.84E-01	G
		241.92	5.027E-01	+	6.435E-01	1.98E-01	G
BI-212	7.5961E-01						
		727.17	7.596E-01	(	4.190E-01	1.85E-01	G K
		1620.56	-4.239E-01	& P	1.986E+00	5.52E-01	G
		785.42	5.624E-01	% P	1.966E+00	5.74E-01	G
BI-214	4.5964E-01						
		609.32	4.596E-01	(	8.817E-02	4.57E-02	G K
		1764.51	-7.312E-02	% P	3.614E-01	1.01E-01	G
		1120.28	6.287E-01	+	4.439E-01	1.85E-01	G
RA-224	1.0212E+00						
		241.00	1.021E+00	&(P	1.226E+00	3.79E-01	G
RA-226	7.7420E-01						
		185.99	7.742E-01	%(P	1.246E+00	3.80E-01	G
AC-228	5.4155E-01						
		911.07	5.497E-01	&(P	1.971E-01	7.83E-02	G K
		968.90	1.657E+00	+ P	3.043E-01	1.78E-01	G
		338.40	5.218E-01	(	2.699E-01	9.54E-02	G
TH-227	-1.1732E-03						
		236.00	-1.173E-03	%(P	5.089E-01	1.51E-01	G K
		256.25	-1.548E-01	&	5.739E-01	1.72E-01	G
PA-234	-2.8788E-02						
		98.44	-2.879E-02	&(	2.429E-01	7.26E-02	G K
		946.00	6.556E-02	%	2.205E-01	6.44E-02	G
		131.28	5.946E-03	%	2.215E-01	6.58E-02	G
		94.67	-9.599E-02	&	4.412E-01	1.33E-01	G
		883.24	-1.512E-03	%	3.364E-01	9.13E-02	G
		926.70	-2.257E-04	%	4.217E-01	1.16E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.016E-01 %   4.374E-01 1.28E-01 G

TH-234       1.0419E+00
                           63.29 1.042E+00 &(P 4.240E+00 1.27E+00 G K
                           92.80 1.340E+00 %   2.287E+00 6.97E-01 G
                           92.38-4.216E-02 % P 2.729E+00 8.13E-01 G

AM-241       9.0708E-02
                           59.54 9.071E-02 %(  6.188E-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	0.0000E+00	0.0000E+00	3.6323E-01	3.6323E-01	4.205E-01
K-40		1.2049E+01	1.2049E+01	1.6013E+00	1.7382E+00	3.813E-01
MN-54	#A	-4.5540E-03	-4.5579E-03	4.3855E-02	4.3856E-02	4.514E-02
CO-57	#B	2.2505E-03	2.2527E-03	4.8305E-02	4.8306E-02	5.411E-02
CO-60	#B	-1.2102E-03	-1.2104E-03	7.1106E-02	7.1106E-02	6.424E-02

Sr-85	#A	-1.1432E-02	-1.1480E-02	5.0761E-02	5.0765E-02	5.706E-02
Kr-85	#A	-2.6392E+02	-2.6392E+02	1.1670E+03	1.1671E+03	1.317E+03
Y-88	#B	6.0934E-04	6.1089E-04	3.9097E-02	3.9097E-02	5.075E-02
NB-94	#B	-2.2490E-03	-2.2490E-03	4.0372E-02	4.0372E-02	4.817E-02
Ag-108M	#B	-7.5007E-03	-7.5007E-03	4.5692E-02	4.5694E-02	5.296E-02
CD-109	#A	-2.0176E-01	-2.0189E-01	2.1102E+00	2.1102E+00	1.924E+00
SN-113	#B	0.0000E+00	0.0000E+00	5.5396E-02	5.5396E-02	6.381E-02
SB-125	#B	8.8388E-02	8.8412E-02	8.1008E-02	8.1159E-02	1.420E-01
I-131	#B	8.2885E-03	8.5731E-03	3.7081E-02	3.7084E-02	4.069E-02
CS-134	#B	2.1876E-02	2.1884E-02	2.2886E-02	2.2919E-02	3.697E-02
CS-137	#A	1.2593E-02	1.2593E-02	5.2546E-02	5.2550E-02	5.990E-02
CE-139	#A	-8.9552E-04	-8.9729E-04	7.1940E-02	7.1940E-02	5.064E-02
EU-152	#B	1.2637E-03	1.2637E-03	1.4650E-01	1.4650E-01	1.644E-01
EU-154	#B	2.9322E-03	2.9324E-03	8.2303E-02	8.2303E-02	9.278E-02
EU-155	#B	5.2138E-02	5.2146E-02	2.2310E-01	2.2312E-01	2.478E-01
HG-203	#B	-8.6851E-03	-8.7359E-03	4.4387E-02	4.4390E-02	4.893E-02
TL-208	#	2.9256E-01	2.9256E-01	8.2218E-02	8.3841E-02	
PB-212	#	6.1267E-01	6.1267E-01	1.2172E-01	1.2648E-01	1.039E-01
PB-214	#	3.7566E-01	3.7566E-01	1.1221E-01	1.1417E-01	9.739E-02
BI-212	#	7.5961E-01	7.5961E-01	5.5556E-01	5.5720E-01	
BI-214		4.5964E-01	4.5964E-01	1.3683E-01	1.3924E-01	
RA-224	#A	1.0212E+00	1.0212E+00	1.1358E+00	1.1372E+00	1.226E+00
RA-226	#A	7.7420E-01	7.7420E-01	1.1396E+00	1.1404E+00	1.246E+00
AC-228		5.4155E-01	5.4155E-01	1.8819E-01	1.9063E-01	1.971E-01
TH-227	#B	-1.1732E-03	-1.1732E-03	2.5853E-01	2.5853E-01	5.089E-01
PA-234	#B	-2.8788E-02	-2.8788E-02	2.1781E-01	2.1781E-01	2.429E-01
TH-234	#B	1.0419E+00	1.0419E+00	3.8185E+00	3.8189E+00	4.240E+00
AM-241	#A	9.0708E-02	9.0708E-02	5.5461E-01	5.5463E-01	6.188E-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 (1766.8 to 1999.0 keV) 1.4102802E+01 pCi/gm
Total Decayed Activity (1766.8 to 1999.0 keV) 1.4102802E+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_27JUN2006_1928.An1

Sample description
FSS-NOL-06-02-009-F

Spectrum Filename: C:\GammaVision\Spectra\102F_27JUN2006_1928.An1

Acquisition information
Start time: 27-Jun-2006 19:28:17
Live time: 2000
Real time: 2021
Dead time: 1.06 %
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: 1.8740E+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	23-Jun-2006 15:15:00
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: 0.7833

***** 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	139.	34.14	1.50	8.847E-03				
74.91	139.	34.14	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.20	227.	21.05	1.50	9.541E-03	77.11	17.500	9.809E-01	PB212
					77.11	10.700	1.604E+00	PB214
77.20	227.	21.05	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.604E+00	PB214
185.89	156.	27.19	1.09	1.627E-02	185.99	3.280	2.044E+00	RA226
209.52	85.	35.35	1.11	1.518E-02				
239.13	721.	4.59	1.22	1.379E-02	238.63	43.100	8.741E-01	PB212
242.16	132.	18.07	1.22	1.365E-02	241.00	3.900	1.773E+00	RA224
					241.92	7.470	9.367E-01	PB214
257.80	52.	32.31	1.55	1.295E-02				
271.41	86.	27.72	1.26	1.238E-02				
295.72	173.	11.23	1.26	1.145E-02	295.22	19.200	5.666E-01	PB214
300.93	49.	32.48	1.26	1.126E-02				
328.91	40.	37.92	1.28	1.033E-02				
338.82	148.	14.52	1.50	1.005E-02	338.40	12.010	8.803E-01	AC228
352.64	270.	9.32	1.33	9.661E-03	351.99	37.100	5.408E-01	PB214
463.69	37.	39.74	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
512.07	111.	19.29	1.71	6.678E-03	510.72	22.500	5.323E-01	TL208
					513.99	0.004	2.803E+03	Kr85
					514.00	99.270	1.270E-01	Sr85
584.18	222.	9.62	1.61	5.880E-03	583.14	86.000	3.155E-01	TL208
610.58	201.	9.98	1.34	5.638E-03	609.32	46.090	5.567E-01	BI214
728.69	88.	18.03	1.47	4.785E-03	727.17	11.800	1.128E+00	BI212
912.65	152.	13.26	1.99	3.916E-03	911.07	29.000	9.635E-01	AC228
966.31	36.	28.78	1.72	3.726E-03				

970.82	93.	13.11	1.72	3.711E-03
1122.44	86.	20.10	1.57	3.278E-03
1463.35	740.	3.71	1.84	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.66	209.52	337.	85.	0.042	106.05	1.105	AC-228	M
477.88	239.05	187.	721.	0.361	13.76	1.215	PB-212	D
483.94	242.08	221.	132.	0.066	54.22	1.217	PB-214	D
542.47	271.41	190.	86.	0.043	83.16	1.264	PA-234	sM
601.40	300.87	122.	42.	0.021	120.80	0.881	PB-212	M
658.05	329.19	156.	55.	0.027	115.06	1.559	LA-140	sM
1932.82	966.34	37.	36.	0.018	86.35	1.716	TB-160	D
1941.84	970.85	28.	93.	0.047	39.34	1.719	J-135	D
2245.20	1122.44	31.	57.	0.029	57.39	1.820	TA-182	D
2927.61	1463.35	7.	738.	0.369	11.14	1.841	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	149.40	74.91	1111.	139.	0.070	102.43	1.500s
PB-212	153.80	77.11	1029.	227.	0.114	63.15	1.500D
PB-214	153.80	77.11	1029.	227.	0.114	63.15	1.500D
RA-226	371.60	185.99	494.	143.	0.071	76.70	1.062s
PB-212	477.90	239.13	517.	675.	0.338	18.37	1.500
PB-214	591.16	295.75	223.	174.	0.087	42.98	1.500s
AC-228	677.73	339.03	143.	137.	0.068	45.11	1.500
PB-214	704.74	352.53	151.	257.	0.129	27.52	1.500s
SB-125	927.13	463.69	99.	37.	0.018	119.21	1.500s
TL-208	1023.91	512.07	106.	111.	0.056	57.88	1.712s
Kr-85	1023.67	511.95	82.	70.	0.035	65.38	1.499s
Sr-85	1023.67	511.95	82.	70.	0.035	65.38	1.499s
TL-208	1168.20	584.18	78.	222.	0.111	28.86	1.607
BI-214	1221.01	610.58	72.	201.	0.101	29.95	1.341
Ag-108M	1224.46	612.30	208.	-59.	-0.030	110.36	1.499s
BI-212	1457.34	728.69	48.	88.	0.044	54.10	1.465s
AC-228	1825.77	912.81	39.	126.	0.063	33.91	1.679

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		-1.1002E-02					
			477.56	-1.100E-02	%(	5.250E-01 1.51E-01	G
K-40		3.3410E-02					
			1460.75	3.341E-02	%(P	1.246E+00 3.58E-01	G
MN-54		1.7432E-05					
			834.81	1.743E-05	&(P	6.180E-02 1.73E-02	G
CO-57		1.4078E-02					
			122.07	1.408E-02	&(	6.500E-02 1.95E-02	G K
			136.43	-4.221E-03	&	4.998E-01 1.48E-01	G
CO-60		3.0781E-03					
			1332.51	3.078E-03	%(P	6.091E-02 1.66E-02	G K
			1173.23	-1.606E-02	&	8.451E-02 2.45E-02	G K
Sr-85		8.0287E-02					
			514.00	8.029E-02	&(	5.135E-02 1.75E-02	G
Kr-85		1.7726E+03					
			513.99	1.773E+03	&(	1.134E+03 3.86E+02	G
Y-88		-5.1948E-03					
			1836.01	-5.195E-03	%(P	4.608E-02 1.19E-02	G K
			898.02	-1.204E-03	& P	7.947E-02 2.24E-02	G
NB-94		-3.0156E-03					
			871.10	-3.016E-03	%(	5.167E-02 1.44E-02	G K
			702.50	1.588E-02	%	5.408E-02 1.60E-02	G K
Ag-108M		-1.1182E-02					
			722.95	-1.118E-02	%(	5.700E-02 1.65E-02	G K
			614.37	-8.461E-02	+ P	9.954E-02 3.10E-02	G
			433.93	1.265E-02	%	4.767E-02 1.41E-02	G
CD-109		-1.1805E-01					
			88.04	-1.181E-01	&(P	2.555E+00 7.63E-01	G
SN-113		-1.6238E-02					
			391.71	-1.624E-02	%(	7.466E-02 2.21E-02	G K
			255.04	-4.037E-01	%	2.201E+00 6.54E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.1578E-02						
		427.95	1.976E-04	&(P	1.729E-01	4.99E-02	G K
		600.77	-7.057E-02	% P	2.961E-01	8.69E-02	G
		636.15	-6.675E-02	% P	4.688E-01	1.35E-01	G
		463.51	3.621E-01	*(P	4.816E-01	1.50E-01	G
		176.29	-1.026E-02	& P	7.605E-01	2.25E-01	G
I-131	1.0690E-03						
		364.48	1.069E-03	%(	6.102E-02	1.74E-02	G K
		636.97	-8.554E-02	%	1.038E+00	2.97E-01	G
		284.29	-9.378E-02	&	1.102E+00	3.25E-01	G
CS-134	1.6704E-02						
		604.66	1.670E-02	&(	4.587E-02	1.37E-02	G K
		795.76	1.987E-02	%	7.576E-02	2.23E-02	G
		569.29	2.278E-03	&	3.196E-01	9.07E-02	G
		801.84	1.354E-01	% P	6.840E-01	1.99E-01	G
CS-137	4.5301E-03						
		661.62	4.530E-03	%(	5.464E-02	1.55E-02	G
CE-139	1.5523E-05						
		165.85	1.552E-05	%(P	6.204E-02	1.84E-02	G
EU-152	-1.3125E-02						
		121.78	-1.312E-02	&(P	1.820E-01	5.42E-02	G K
		344.30	-2.565E-02	%	1.612E-01	4.74E-02	G
		1408.08	2.963E-02	&	2.329E-01	6.34E-02	G
		964.00	-1.072E-03	% P	5.161E-01	1.46E-01	G
		1112.07	3.341E-02	%	5.499E-01	1.55E-01	G
		778.90	-5.589E-02	% P	4.559E-01	1.31E-01	G
EU-154	2.6292E-02						
		123.10	2.629E-02	&(P	1.336E-01	4.00E-02	G K
		1274.80	-4.540E-02	%	2.439E-01	7.06E-02	G
		723.30	-5.676E-02	% P	2.597E-01	7.52E-02	G
		1004.80	1.344E-01	%	3.497E-01	1.04E-01	G
EU-155	-1.1502E-01						
		86.45	-1.150E-01	&(P	2.717E-01	8.20E-02	G K
		105.31	1.149E-01	%	2.790E-01	8.44E-02	G
HG-203	-9.6916E-04						
		279.17	-9.692E-04	&(P	5.746E-02	1.68E-02	G K
		72.87	-6.987E-01	&	2.473E+00	7.45E-01	G
		70.83	-1.572E+00	%	4.392E+00	1.33E+00	G
		82.50	-1.133E+00	%	4.639E+00	1.40E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.1546E-01						
		583.14	3.155E-01	(P	6.260E-02	3.05E-02	G
		510.72	5.323E-01	+	2.424E-01	1.03E-01	G
PB-212	8.1812E-01						
		238.63	8.181E-01	(	1.317E-01	5.01E-02	G K
							Energy duplication
		77.11	9.809E-01	+	6.574E-01	2.06E-01	G
		74.81	1.182E+00	+ P	1.342E+00	4.12E-01	G
PB-214	5.3464E-01						
		351.99	5.166E-01	@(P	1.204E-01	4.75E-02	G K
		295.22	5.695E-01	@(	2.369E-01	8.16E-02	G
							Energy duplication
		77.11	1.604E+00	+	1.075E+00	3.38E-01	G
		241.92	5.445E-01	%	8.304E-01	2.54E-01	G
BI-212	1.1281E+00						
		727.17	1.128E+00	@(	4.439E-01	2.04E-01	G K
		1620.56	-1.538E-01	% P	2.289E+00	6.09E-01	G
		785.42	8.716E-04	& P	2.973E+00	8.36E-01	G
BI-214	5.5667E-01						
		609.32	5.567E-01	(	1.170E-01	5.57E-02	G K
		1764.51	-6.229E-02	% P	4.063E-01	1.12E-01	G
		1120.28	-3.193E-02	%	5.806E-01	1.66E-01	G
RA-224	1.1393E+00						
		241.00	1.139E+00	%(P	1.587E+00	4.86E-01	G
RA-226	1.9319E+00						
		185.99	1.932E+00	*(P	1.437E+00	5.09E-01	G
AC-228	8.0557E-01						
		911.07	8.012E-01	(P	2.024E-01	9.07E-02	G K
		968.90	9.889E-02	% P	2.887E-01	8.52E-02	G
		338.40	8.162E-01	(	3.489E-01	1.23E-01	G
TH-227	-4.2768E-01						
		236.00	-4.277E-01	%(P	6.150E-01	1.88E-01	G K
		256.25	-1.643E-01	&	6.398E-01	1.91E-01	G
PA-234	-3.2636E-02						
		98.44	-3.264E-02	&(	2.760E-01	8.25E-02	G K
		946.00	7.983E-02	&	2.449E-01	7.20E-02	G
		131.28	-3.053E-03	&	2.308E-01	6.84E-02	G
		94.67	-1.422E-01	%	5.508E-01	1.66E-01	G
		883.24	-1.158E-02	%	3.749E-01	1.02E-01	G
		926.70	-4.588E-02	&	5.479E-01	1.55E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 6.779E-03 &   4.467E-01 1.26E-01 G

TH-234       1.4446E+00
                           63.29 1.445E+00 %(P 5.140E+00 1.55E+00 G K
                           92.80 1.994E+00 %   2.796E+00 8.55E-01 G
                           92.38 2.182E+00 % P 3.348E+00 1.02E+00 G

AM-241      -9.0495E-02
                           59.54-9.049E-02 &(  7.459E-01 2.23E-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	-1.0422E-02	-1.1002E-02	4.5356E-01	4.5356E-01	4.973E-01
K-40	A	3.3410E-02	3.3410E-02	1.0739E+00	1.0739E+00	1.246E+00
MN-54	#A	1.7272E-05	1.7432E-05	5.1975E-02	5.1975E-02	6.123E-02
CO-57	#B	1.3928E-02	1.4078E-02	5.8482E-02	5.8488E-02	6.431E-02
CO-60	#B	3.0734E-03	3.0781E-03	4.9831E-02	4.9831E-02	6.082E-02

Sr-85	#	7.6782E-02	8.0287E-02	5.2489E-02	5.2682E-02	4.911E-02
Kr-85	#	1.7726E+03	1.7726E+03	1.1589E+03	1.1631E+03	1.134E+03
Y-88	#B	-5.0556E-03	-5.1948E-03	3.6020E-02	3.6021E-02	4.484E-02
NB-94	#B	-3.0156E-03	-3.0156E-03	4.3236E-02	4.3236E-02	5.167E-02
Ag-108M	#B	-1.1182E-02	-1.1182E-02	4.9523E-02	4.9527E-02	5.699E-02
CD-109	#A	-1.1730E-01	-1.1805E-01	3.3997E+00	3.3997E+00	2.539E+00
SN-113	#B	-1.5835E-02	-1.6238E-02	6.6189E-02	6.6195E-02	7.281E-02
SB-125	#B	9.1316E-02	9.1578E-02	1.1375E-01	1.1387E-01	1.724E-01
I-131	#B	7.4584E-04	1.0690E-03	5.2321E-02	5.2321E-02	4.257E-02
CS-134	#B	1.6640E-02	1.6704E-02	4.1010E-02	4.1021E-02	4.570E-02
CS-137	#A	4.5289E-03	4.5301E-03	4.6444E-02	4.6445E-02	5.462E-02
CE-139	#A	1.5200E-05	1.5523E-05	5.5138E-02	5.5138E-02	6.075E-02
EU-152	#B	-1.3116E-02	-1.3125E-02	1.9781E-01	1.9781E-01	1.819E-01
EU-154	#B	2.6268E-02	2.6292E-02	1.2002E-01	1.2003E-01	1.334E-01
EU-155	#B	-1.1484E-01	-1.1502E-01	2.7799E-01	2.7807E-01	2.713E-01
HG-203	#B	-9.1078E-04	-9.6916E-04	5.8569E-02	5.8569E-02	5.400E-02
TL-208		3.1546E-01	3.1546E-01	9.1199E-02	9.2901E-02	
PB-212	#	8.1812E-01	8.1812E-01	1.5027E-01	1.5713E-01	1.317E-01
PB-214	#	5.3464E-01	5.3464E-01	1.3648E-01	1.3974E-01	1.204E-01
BI-212	#	1.1281E+00	1.1281E+00	6.1037E-01	6.1364E-01	
BI-214		5.5667E-01	5.5667E-01	1.6671E-01	1.6961E-01	
RA-224	#A	1.1393E+00	1.1393E+00	1.4588E+00	1.4602E+00	1.587E+00
RA-226	#	1.9319E+00	1.9319E+00	1.5281E+00	1.5320E+00	
AC-228		8.0557E-01	8.0557E-01	2.2747E-01	2.3192E-01	2.024E-01
TH-227	#B	-4.2768E-01	-4.2768E-01	5.6788E-01	5.6839E-01	6.150E-01
PA-234	#B	-3.2636E-02	-3.2636E-02	2.4753E-01	2.4753E-01	2.760E-01
TH-234	#B	1.4446E+00	1.4446E+00	4.6394E+00	4.6401E+00	5.140E+00
AM-241	#A	-9.0493E-02	-9.0495E-02	6.6849E-01	6.6851E-01	7.459E-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 (1460.5 to 1999.0 keV) 4.7377329E+00 pCi/gm
Total Decayed Activity (1460.5 to 1999.0 keV) 4.7377429E+00 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-NOL-06-02-010-F

Spectrum Filename: C:\GammaVision\Spectra\102F_27JUN2006_2005.An1

Acquisition information

Start time:	27-Jun-2006 20:05:46
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:	1.8290E+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	23-Jun-2006 07:36:00
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: 0.6099

***** 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	110.	27.49	1.10	8.971E-03	74.81	9.600	PBC<MDA	PB212
77.28	196.	15.29	1.10	9.696E-03	77.11	10.700	1.418E+00	PB214
					77.11	17.500	8.673E-01	PB212
128.58	112.	34.57	0.72	1.713E-02				
186.38	98.	23.40	1.10	1.625E-02	185.99	3.280	1.295E+00	RA226
210.11	108.	26.26	0.89	1.515E-02				
239.16	615.	4.77	1.22	1.379E-02	238.63	43.100	7.635E-01	PB212
242.12	88.	29.92	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.395E-01	PB214
270.70	65.	31.77	1.67	1.241E-02				
295.79	148.	12.23	1.26	1.144E-02	295.22	19.200	4.956E-01	PB214
300.77	50.	29.25	1.26	1.126E-02				
339.02	178.	14.73	1.22	1.004E-02	338.40	12.010	1.088E+00	AC228
352.55	246.	10.11	1.41	9.664E-03	351.99	37.100	5.054E-01	PB214
511.54	78.	22.82	1.38	6.684E-03	510.72	22.500	3.841E-01	TL208
584.10	233.	9.68	1.84	5.881E-03	583.14	86.000	3.393E-01	TL208
610.21	191.	9.93	1.74	5.642E-03	609.32	46.090	5.426E-01	BI214
728.61	50.	29.49	1.09	4.785E-03	727.17	11.800	6.557E-01	BI212
912.74	159.	12.77	1.64	3.916E-03	911.07	29.000	1.033E+00	AC228
969.89	93.	15.20	1.72	3.715E-03	968.90	17.460	1.056E+00	AC228
1121.21	62.	19.33	1.95	3.283E-03	1120.28	15.040	9.277E-01	BI214
1463.36	500.	4.54	2.10	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 Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide

149.27	75.21	403.	110.	0.055	82.46	1.098	PB-214	D
154.13	77.64	351.	196.	0.098	45.87	1.100	PB-214	D
256.75	128.58	503.	128.	0.064	78.95	0.718	AC-228	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
419.83	210.11	269.	108.	0.054	78.77	0.885	NP-239	sM
477.94	239.05	123.	615.	0.307	14.32	1.215	PB-212	D
483.86	242.01	305.	88.	0.044	89.76	1.217	PB-214	D
541.04	270.70	153.	65.	0.033	95.30	1.672	AC-228	sM
601.19	300.87	80.	50.	0.025	87.76	1.259	PB-212	lD
677.72	339.02	256.	76.	0.038	95.37	1.222	AC-228	sM
1825.63	912.74	164.	53.	0.027	109.51	1.643	AC-228	sM
2927.63	1463.36	6.	499.	0.249	13.59	2.103	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-214	153.80	77.11	848.	183.	0.091	71.15	1.500D
PB-212	153.80	77.11	848.	183.	0.091	71.15	1.500D
RA-226	372.36	186.38	218.	94.	0.047	70.21	1.095
PB-212	477.93	239.15	362.	551.	0.276	19.44	1.500
PB-214	591.27	295.81	165.	148.	0.074	44.33	1.500s
AC-228	677.56	338.94	161.	122.	0.061	51.82	1.500
PB-214	704.97	352.64	112.	218.	0.109	28.81	1.500s
TL-208	1022.87	511.54	78.	78.	0.039	68.45	1.379s
TL-208	1168.02	584.10	69.	233.	0.116	29.05	1.836s
BI-214	1220.27	610.21	53.	191.	0.096	29.78	1.736s
BI-212	1457.00	728.52	34.	37.	0.019	82.03	1.554
AC-228	1825.90	912.88	63.	106.	0.053	43.19	1.679
AC-228	1941.78	970.79	35.	59.	0.030	57.53	1.718
BI-214	2242.82	1121.21	24.	62.	0.031	57.98	1.953s

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		-9.5174E-02					
			477.56	-9.517E-02	%(	4.019E-01 1.18E-01	G
K-40		3.4232E-02					
			1460.75	3.423E-02	%(P	8.284E-01 2.31E-01	G
MN-54		6.9514E-05					
			834.81	6.951E-05	%(P	4.550E-02 1.23E-02	G
CO-57		-1.7968E-02					
			122.07	-1.797E-02	%(	6.001E-02 1.80E-02	G K
			136.43	-3.217E-02	%	4.231E-01 1.26E-01	G
CO-60		-2.0316E-04					
			1332.51	-2.032E-04	%(P	8.597E-02 2.39E-02	G K
			1173.23	1.943E-02	%	8.337E-02 2.43E-02	G K
Sr-85		-4.8125E-04					
			514.00	-4.812E-04	&(	5.255E-02 1.50E-02	G
Kr-85		-1.2765E+01					
			513.99	-1.276E+01	&(	1.116E+03 3.18E+02	G
Y-88		-2.3394E-05					
			1836.01	-2.339E-05	%(P	8.082E-02 2.16E-02	G K
			898.02	-1.058E-03	% P	5.222E-02 1.40E-02	G
NB-94		-2.3442E-03					
			871.10	-2.344E-03	%(	5.633E-02 1.57E-02	G K
			702.50	-1.086E-03	%	4.524E-02 1.26E-02	G K
Ag-108M		1.0402E-03					
			722.95	1.040E-03	&(	5.733E-02 1.61E-02	G K
			614.37	-2.266E-02	% P	6.694E-02 1.99E-02	G
			433.93	-9.622E-04	&	3.395E-02 9.50E-03	G
CD-109		1.1514E-01					
			88.04	1.151E-01	%(P	2.247E+00 6.70E-01	G
SN-113		-9.6418E-03					
			391.71	-9.642E-03	&(	6.792E-02 1.98E-02	G K
			255.04	-1.700E-02	&	2.049E+00 5.99E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-1.8564E-02						
		427.95	-1.856E-02	&(P	1.509E-01	4.36E-02	G K
		600.77	8.415E-02	% P	2.253E-01	6.71E-02	G
		636.15	5.948E-02	% P	3.492E-01	9.96E-02	G
		463.51	2.608E-01	% P	4.288E-01	1.32E-01	G
		176.29	1.906E-02	% P	6.262E-01	1.84E-01	G
I-131	4.2220E-03						
		364.48	4.222E-03	&(	7.105E-02	2.05E-02	G K
		636.97	1.123E-02	%	7.695E-01	2.11E-01	G
		284.29	-2.410E-01	%	9.699E-01	2.88E-01	G
CS-134	-4.1772E-03						
		604.66	-4.177E-03	%(	5.111E-02	1.46E-02	G K
		795.76	2.482E-02	%	6.136E-02	1.84E-02	G
		569.29	-2.733E-02	&	2.610E-01	7.41E-02	G
		801.84	1.059E-02	% P	4.912E-01	1.34E-01	G
CS-137	1.6282E-02						
		661.62	1.628E-02	%(	6.107E-02	1.79E-02	G
CE-139	-8.1752E-05						
		165.85	-8.175E-05	&(P	5.551E-02	1.64E-02	G
EU-152	-5.2687E-02						
		121.78	-5.269E-02	%(P	1.743E-01	5.24E-02	G K
		344.30	-5.806E-02	%	1.627E-01	4.88E-02	G
		1408.08	-6.607E-03	%	2.911E-01	7.83E-02	G
		964.00	-6.202E-02	% P	4.276E-01	1.22E-01	G
		1112.07	6.469E-02	%	3.937E-01	1.11E-01	G
		778.90	4.898E-03	% P	3.929E-01	1.09E-01	G
EU-154	-2.1048E-02						
		123.10	-2.105E-02	%(P	1.179E-01	3.52E-02	G K
		1274.80	1.694E-02	%	1.588E-01	4.38E-02	G
		723.30	-3.748E-02	& P	2.753E-01	7.88E-02	G
		1004.80	5.751E-02	&	3.190E-01	9.10E-02	G
EU-155	9.9788E-02						
		86.45	9.979E-02	%(P	2.670E-01	8.06E-02	G K
		105.31	7.134E-02	&	2.603E-01	7.82E-02	G
HG-203	2.1798E-02						
		279.17	2.180E-02	%(P	5.199E-02	1.57E-02	G K
		72.87	1.651E-02	%	2.226E+00	6.63E-01	G
		70.83	-8.753E-03	%	3.730E+00	1.11E+00	G
		82.50	-6.564E-01	%	3.631E+00	1.09E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.4855E-01						
		583.14	3.393E-01	*(P	6.058E-02	3.30E-02	G
		510.72	3.841E-01	*(	2.148E-01	8.78E-02	G
PB-212	7.2022E-01						
		238.63	6.843E-01	(	1.135E-01	4.43E-02	G K
							Energy duplication
		77.11	8.088E-01	@(	6.125E-01	1.92E-01	G
		74.81	7.322E-01	& P	1.251E+00	3.81E-01	G
PB-214	4.6547E-01						
		351.99	4.492E-01	(P	1.069E-01	4.32E-02	G K
		295.22	4.968E-01	*(	2.101E-01	7.34E-02	G
							Energy duplication
		77.11	1.323E+00	+	1.002E+00	3.14E-01	G
		241.92	3.887E-01	%	7.196E-01	2.19E-01	G
BI-212	4.8938E-01						
		727.17	4.894E-01	(	3.890E-01	1.34E-01	G K
		1620.56	-3.761E-02	% P	1.840E+00	4.57E-01	G
		785.42	-2.484E-01	% P	2.904E+00	8.26E-01	G
BI-214	5.4255E-01						
		609.32	5.426E-01	@(	1.038E-01	5.39E-02	G K
		1764.51	6.914E-03	% P	4.764E-01	1.28E-01	G
		1120.28	9.277E-01	+	3.821E-01	1.79E-01	G
RA-224	8.3960E-01						
		241.00	8.396E-01	%(P	1.361E+00	4.16E-01	G
RA-226	1.2954E+00						
		185.99	1.295E+00	(P	9.914E-01	3.18E-01	G
AC-228	6.9463E-01						
		911.07	6.855E-01	(P	2.584E-01	9.89E-02	G K
		968.90	6.747E-01	(P	3.449E-01	1.29E-01	G
		338.40	7.455E-01	(	3.779E-01	1.29E-01	G
TH-227	-2.7197E-01						
		236.00	-2.720E-01	%(P	5.372E-01	1.63E-01	G K
		256.25	-3.334E-02	%	6.110E-01	1.79E-01	G
PA-234	1.0092E-03						
		98.44	1.009E-03	&(	2.470E-01	7.33E-02	G K
		946.00	-3.609E-03	%	2.363E-01	6.40E-02	G
		131.28	-4.876E-02	%	2.529E-01	7.57E-02	G
		94.67	-1.116E-01	%	4.653E-01	1.40E-01	G
		883.24	-6.071E-02	%	4.808E-01	1.37E-01	G
		926.70	-7.585E-03	&	5.026E-01	1.39E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-4.115E-02 &   3.859E-01 1.10E-01 G

TH-234       7.8236E-01
                           63.29 7.824E-01 %(P 4.888E+00 1.46E+00 G K
                           92.80 1.670E+00 %   2.418E+00 7.40E-01 G
                           92.38 2.141E-01 % P 2.620E+00 7.80E-01 G

AM-241       7.9157E-02
                           59.54 7.916E-02 &(  6.915E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	-8.9750E-02	-9.5174E-02	3.5281E-01	3.5285E-01	3.790E-01
K-40	A	3.4232E-02	3.4232E-02	6.9440E-01	6.9440E-01	8.284E-01
MN-54	#A	6.8820E-05	6.9514E-05	3.7014E-02	3.7014E-02	4.505E-02
CO-57	#B	-1.7760E-02	-1.7968E-02	5.4136E-02	5.4145E-02	5.932E-02
CO-60	#B	-2.0283E-04	-2.0316E-04	1.1163E-02	1.1163E-02	8.583E-02

Sr-85	#A	-4.5854E-04	-4.8125E-04	4.5003E-02	4.5004E-02	5.007E-02
Kr-85	#A	-1.2765E+01	-1.2765E+01	9.5383E+02	9.5383E+02	1.116E+03
Y-88	#B	-2.2716E-05	-2.3394E-05	8.5022E-04	8.5022E-04	7.848E-02
NB-94	#B	-2.3442E-03	-2.3442E-03	4.7219E-02	4.7219E-02	5.633E-02
Ag-108M	#B	1.0401E-03	1.0402E-03	4.8183E-02	4.8183E-02	5.733E-02
CD-109	#A	1.1435E-01	1.1514E-01	2.0095E+00	2.0095E+00	2.231E+00
SN-113	#B	-9.3828E-03	-9.6418E-03	5.9485E-02	5.9488E-02	6.610E-02
SB-125	#B	-1.8506E-02	-1.8564E-02	1.8388E-01	1.8388E-01	1.505E-01
I-131	#B	2.8593E-03	4.2220E-03	6.1586E-02	6.1587E-02	4.812E-02
CS-134	#B	-4.1599E-03	-4.1772E-03	4.3812E-02	4.3813E-02	5.090E-02
CS-137	#A	1.6277E-02	1.6282E-02	5.3805E-02	5.3813E-02	6.105E-02
CE-139	#A	-7.9910E-05	-8.1752E-05	9.9090E-02	9.9090E-02	5.426E-02
EU-152	#B	-5.2651E-02	-5.2687E-02	1.6516E-01	1.6518E-01	1.742E-01
EU-154	#B	-2.1027E-02	-2.1048E-02	1.0786E-01	1.0787E-01	1.178E-01
EU-155	#B	9.9615E-02	9.9788E-02	2.4175E-01	2.4181E-01	2.666E-01
HG-203	#B	2.0380E-02	2.1798E-02	4.7054E-02	4.7069E-02	4.861E-02
TL-208	#	3.4855E-01	3.4855E-01	1.0143E-01	1.0330E-01	
PB-212	#	7.2022E-01	7.2022E-01	1.4004E-01	1.4576E-01	1.135E-01
PB-214	#	4.6547E-01	4.6547E-01	1.2311E-01	1.2585E-01	1.069E-01
BI-212		4.8938E-01	4.8938E-01	4.0145E-01	4.0239E-01	3.890E-01
BI-214	#	5.4255E-01	5.4255E-01	1.6156E-01	1.6440E-01	
RA-224	#A	8.3960E-01	8.3960E-01	1.2467E+00	1.2476E+00	1.361E+00
RA-226		1.2953E+00	1.2954E+00	9.5282E-01	9.5558E-01	
AC-228		6.9463E-01	6.9463E-01	2.0543E-01	2.0910E-01	2.584E-01
TH-227	#B	-2.7197E-01	-2.7197E-01	4.9412E-01	4.9436E-01	5.372E-01
PA-234	#B	1.0092E-03	1.0092E-03	2.1986E-01	2.1986E-01	2.470E-01
TH-234	#B	7.8236E-01	7.8236E-01	4.3846E+00	4.3848E+00	4.888E+00
AM-241	#A	7.9156E-02	7.9157E-02	6.1850E-01	6.1851E-01	6.915E-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) 3.3704717E+00 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 3.3704786E+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: 102F_27JUN2006_2042.An1

Sample description
FSS-NOL-06-02-010-F-RC

Spectrum Filename: C:\GammaVision\Spectra\102F_27JUN2006_2042.An1

Acquisition information
Start time: 27-Jun-2006 20:42:58
Live time: 2000
Real time: 2019
Dead time: 0.95 %
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: 1.8290E+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	23-Jun-2006 07:36:00
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: 0.5958

***** 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	96.	29.83	1.10	8.817E-03				
74.57	96.	29.83	1.10	8.817E-03	74.81	9.600	PBC<MDA	PB212
77.25	191.	15.23	1.10	9.625E-03	77.11	10.700	1.380E+00	PB214
					77.11	17.500	8.439E-01	PB212
186.31	116.	24.71	1.06	1.625E-02	185.99	3.280	1.545E+00	RA226
239.10	574.	5.03	1.22	1.378E-02	238.63	43.100	7.123E-01	PB212
241.80	84.	29.88	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.050E-01	PB214
270.69	74.	33.36	0.83	1.241E-02				
295.81	141.	12.11	1.26	1.145E-02	295.22	19.200	4.741E-01	PB214
300.81	40.	33.66	1.26	1.127E-02				
339.57	163.	13.90	1.24	1.003E-02	338.40	12.010	9.992E-01	AC228
352.53	231.	11.03	1.30	9.664E-03	351.99	37.100	4.737E-01	PB214
511.62	92.	18.87	1.45	6.683E-03	510.72	22.500	4.503E-01	TL208
584.31	188.	10.51	1.55	5.879E-03	583.14	86.000	2.735E-01	TL208
610.40	162.	10.39	1.62	5.640E-03	609.32	46.090	4.591E-01	BI214
728.08	77.	19.64	0.96	4.789E-03	727.17	11.800	1.006E+00	BI212
912.92	118.	12.70	1.63	3.915E-03				
970.82	80.	19.73	2.18	3.712E-03	968.90	17.460	9.124E-01	AC228
1121.59	44.	32.26	1.94	3.283E-03	1120.28	15.040	6.584E-01	BI214
1463.34	529.	4.46	2.04	2.617E-03	1460.75	10.700	1.392E+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

148.72	74.71	364.	96.	0.048	89.48	1.098	BI-207	D
154.08	77.40	326.	191.	0.095	45.68	1.100	PB-214	D
477.84	239.07	130.	574.	0.287	15.09	1.215	PB-212	D

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
483.22	241.76	269.	84.	0.042	89.63	1.217	PB-214	D
541.03	270.69	196.	74.	0.037	100.09	0.830	AC-228	sM
600.84	300.59	130.	52.	0.026	111.21	1.104	PB-212	M
1825.99	912.92	31.	118.	0.059	34.19	1.630	AC-228	M
1941.85	970.82	43.	82.	0.041	47.24	2.185	J-135	sM

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.80	77.11	781.	206.	0.103	61.29	1.500D
PB-212	153.80	77.11	781.	206.	0.103	61.29	1.500D
RA-226	372.24	186.31	298.	112.	0.056	74.13	1.065
PB-212	477.76	239.06	359.	513.	0.256	20.53	1.500
RA-224	484.01	242.19	353.	67.	0.033	122.81	1.500
PB-214	591.35	295.85	146.	150.	0.075	42.02	1.500s
AC-228	677.62	338.97	136.	131.	0.066	45.81	1.500
PB-214	704.82	352.57	121.	204.	0.102	31.04	1.500s
TL-208	1023.02	511.62	67.	92.	0.046	56.61	1.450s
TL-208	1168.46	584.31	66.	187.	0.094	31.52	1.554
BI-214	1220.65	610.40	43.	162.	0.081	31.18	1.621s
BI-212	1456.12	728.08	46.	77.	0.038	58.93	0.958s
BI-214	2243.57	1121.59	45.	44.	0.022	96.78	1.943
K-40	2927.60	1463.35	26.	489.	0.245	14.26	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		1.4572E-01					
			477.56	1.457E-01	&(	3.902E-01 1.17E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	1.2894E+01						
		1460.75	1.289E+01	(P	6.980E-01	6.13E-01	G
MN-54	-1.9769E-03						
		834.81	-1.977E-03	%(P	5.893E-02	1.65E-02	G
CO-57	-5.2036E-03						
		122.07	-5.204E-03	&(	5.743E-02	1.71E-02	G K
		136.43	0.000E+00	%	4.752E-01	1.41E-01	G
CO-60	7.7317E-03						
		1332.51	7.732E-03	&(P	7.194E-02	2.02E-02	G K
		1173.23	9.779E-03	&	7.223E-02	2.06E-02	G K
Sr-85	-1.7171E-02						
		514.00	-1.717E-02	%(	6.166E-02	1.83E-02	G
Kr-85	-3.7766E+02						
		513.99	-3.777E+02	%(	1.356E+03	4.03E+02	G
Y-88	-4.3410E-03						
		1836.01	-4.341E-03	%(P	6.261E-02	1.65E-02	G K
		898.02	1.591E-03	% P	5.612E-02	1.54E-02	G
NB-94	0.0000E+00						
		871.10	0.000E+00	%(	6.690E-02	1.88E-02	G K
		702.50	4.336E-03	%	5.562E-02	1.59E-02	G K
Ag-108M	5.6609E-03						
		722.95	5.661E-03	%(	5.093E-02	1.44E-02	G K
		614.37	-2.984E-02	% P	6.924E-02	2.09E-02	G
		433.93	3.609E-03	%	4.785E-02	1.38E-02	G
CD-109	-4.3127E-01						
		88.04	-4.313E-01	&(P	2.434E+00	7.29E-01	G
SN-113	3.4077E-03						
		391.71	3.408E-03	%(	5.862E-02	1.68E-02	G K
		255.04	-3.684E-01	&	1.977E+00	5.86E-01	G
SB-125	2.9607E-02						
		427.95	2.961E-02	%(P	1.512E-01	4.42E-02	G K
		600.77	-9.734E-03	% P	2.252E-01	6.29E-02	G
		636.15	-5.818E-02	% P	4.567E-01	1.31E-01	G
		463.51	2.556E-01	% P	4.273E-01	1.31E-01	G
		176.29	-1.223E-02	% P	7.402E-01	2.18E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	1.1237E-04						
		364.48	1.124E-04	%(	6.922E-02	1.98E-02	G K
		636.97	6.715E-04	%	9.068E-01	2.52E-01	G
		284.29	-9.250E-02	%	1.071E+00	3.15E-01	G
CS-134	0.0000E+00						
		604.66	0.000E+00	%(	6.334E-02	1.81E-02	G K
		795.76	3.664E-02	%	6.543E-02	2.01E-02	G
		569.29	-6.503E-03	&	2.651E-01	7.42E-02	G
		801.84	-2.161E-02	& P	5.022E-01	1.38E-01	G
CS-137	-1.0168E-02						
		661.62	-1.017E-02	%(	6.171E-02	1.78E-02	G
CE-139	-2.7088E-03						
		165.85	-2.709E-03	&(P	5.687E-02	1.68E-02	G
EU-152	2.3800E-02						
		121.78	2.380E-02	&(P	1.521E-01	4.53E-02	G K
		344.30	-5.512E-02	%	1.834E-01	5.48E-02	G
		1408.08	4.170E-02	%	2.626E-01	7.29E-02	G
		964.00	-8.440E-02	% P	4.625E-01	1.33E-01	G
		1112.07	-7.070E-03	&	5.052E-01	1.40E-01	G
		778.90	5.001E-02	% P	4.081E-01	1.16E-01	G
EU-154	1.4997E-02						
		123.10	1.500E-02	&(P	1.191E-01	3.55E-02	G K
		1274.80	4.934E-02	%	1.654E-01	4.81E-02	G
		723.30	1.935E-02	% P	2.400E-01	6.75E-02	G
		1004.80	6.341E-02	&	2.878E-01	8.24E-02	G
EU-155	-8.5063E-03						
		86.45	-8.506E-03	%(P	2.361E-01	6.99E-02	G K
		105.31	5.201E-02	%	2.441E-01	7.31E-02	G
HG-203	2.1547E-02						
		279.17	2.155E-02	&(P	5.274E-02	1.59E-02	G K
		72.87	-8.428E-01	%	2.328E+00	7.03E-01	G
		70.83	-1.670E-01	&	2.804E+00	8.29E-01	G
		82.50	1.068E-01	%	4.586E+00	1.37E+00	G
TL-208	2.7348E-01						
		583.14	2.735E-01	(P	5.897E-02	2.88E-02	G
		510.72	4.503E-01	+	2.007E-01	8.51E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	6.3671E-01						
		238.63	6.367E-01	(	1.131E-01	4.36E-02	G K
							Energy duplication
		77.11	9.104E-01	+	5.881E-01	1.86E-01	G
		74.81	8.132E-01	& P	1.233E+00	3.76E-01	G
PB-214	4.4795E-01						
		351.99	4.189E-01	@(P	1.111E-01	4.34E-02	G K
		295.22	5.040E-01	*(	1.982E-01	7.06E-02	G
							Energy duplication
		77.11	1.489E+00	+	9.619E-01	3.04E-01	G
		241.92	3.668E-01	%	6.880E-01	2.09E-01	G
BI-212	1.0057E+00						
		727.17	1.006E+00	(	4.482E-01	1.98E-01	G K
		1620.56	-1.211E-01	& P	1.819E+00	4.61E-01	G
		785.42	2.955E-01	% P	3.077E+00	8.80E-01	G
BI-214	4.5913E-01						
		609.32	4.591E-01	@(	9.460E-02	4.78E-02	G K
		1764.51	-3.821E-02	% P	3.802E-01	1.02E-01	G
		1120.28	6.584E-01	+	5.083E-01	2.13E-01	G
RA-224	9.2261E-01						
		241.00	9.226E-01	(P	1.249E+00	3.84E-01	G
RA-226	1.5446E+00						
		185.99	1.545E+00	(P	1.152E+00	3.97E-01	G
AC-228	2.3421E-01						
		911.07	-1.487E-03	%(P	2.120E-01	5.88E-02	G K
		968.90	-2.369E-02	% P	4.569E-01	1.30E-01	G
		338.40	8.033E-01	(	3.483E-01	1.23E-01	G
TH-227	-1.1238E-01						
		236.00	-1.124E-01	&(P	4.658E-01	1.39E-01	G K
		256.25	1.932E-01	%	5.765E-01	1.73E-01	G
PA-234	3.6529E-02						
		98.44	3.653E-02	%(	2.469E-01	7.37E-02	G K
		946.00	-2.908E-04	%	2.994E-01	8.29E-02	G
		131.28	-2.517E-03	&	2.391E-01	7.08E-02	G
		94.67	-1.554E-01	%	4.901E-01	1.48E-01	G
		883.24	6.768E-02	%	3.864E-01	1.10E-01	G
		926.70	4.876E-03	%	4.709E-01	1.29E-01	G
		569.26	-1.088E-02	&	4.064E-01	1.14E-01	G

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

TH-234       7.1615E-01
                           63.29 7.161E-01 %(P 4.853E+00 1.45E+00 G K
                           92.80 1.783E+00 %   2.520E+00 7.71E-01 G
                           92.38-1.179E-01 % P 3.055E+00 9.10E-01 G

AM-241       1.3667E-01
                           59.54 1.367E-01 &(  5.687E-01 1.70E-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	1.3737E-01	1.4572E-01	3.4955E-01	3.4964E-01	3.678E-01
K-40		1.2894E+01	1.2894E+01	1.8390E+00	1.9763E+00	6.980E-01
MN-54	#A	-1.9570E-03	-1.9769E-03	7.2660E-02	7.2660E-02	5.833E-02
CO-57	#B	-5.1432E-03	-5.2036E-03	5.1246E-02	5.1247E-02	5.677E-02
CO-60	#B	7.7190E-03	7.7317E-03	6.0532E-02	6.0534E-02	7.182E-02
Sr-85	#A	-1.6356E-02	-1.7171E-02	5.4921E-02	5.4930E-02	5.874E-02

Kr-85	#A	-3.7764E+02	-3.7766E+02	1.2078E+03	1.2080E+03	1.356E+03
Y-88	#B	-4.2146E-03	-4.3410E-03	5.0144E-02	5.0144E-02	6.078E-02
NB-94	#B	0.0000E+00	0.0000E+00	5.6435E-02	5.6435E-02	6.690E-02
Ag-108M	#B	5.6605E-03	5.6609E-03	4.3201E-02	4.3202E-02	5.093E-02
CD-109	#A	-4.2828E-01	-4.3127E-01	2.4419E+00	2.4420E+00	2.417E+00
SN-113	#B	3.3157E-03	3.4077E-03	5.0436E-02	5.0436E-02	5.704E-02
SB-125	#B	2.9515E-02	2.9607E-02	1.3275E-01	1.3276E-01	1.507E-01
I-131	#B	7.5932E-05	1.1237E-04	5.9482E-02	5.9482E-02	4.677E-02
CS-134	#B	0.0000E+00	0.0000E+00	5.4375E-02	5.4375E-02	6.308E-02
CS-137	#A	-1.0165E-02	-1.0168E-02	5.3511E-02	5.3514E-02	6.169E-02
CE-139	#A	-2.6474E-03	-2.7088E-03	6.0442E-02	6.0442E-02	5.558E-02
EU-152	#B	2.3784E-02	2.3800E-02	1.3586E-01	1.3587E-01	1.520E-01
EU-154	#B	1.4982E-02	1.4997E-02	1.0644E-01	1.0645E-01	1.190E-01
EU-155	#B	-8.4915E-03	-8.5063E-03	2.5167E+00	2.5167E+00	2.357E-01
HG-203	#B	2.0137E-02	2.1547E-02	4.7694E-02	4.7709E-02	4.929E-02
TL-208		2.7348E-01	2.7348E-01	8.6384E-02	8.7737E-02	
PB-212	#	6.3671E-01	6.3671E-01	1.3074E-01	1.3553E-01	1.131E-01
PB-214	#	4.4795E-01	4.4795E-01	1.1709E-01	1.1976E-01	1.111E-01
BI-212		1.0057E+00	1.0057E+00	5.9268E-01	5.9536E-01	
BI-214		4.5913E-01	4.5913E-01	1.4315E-01	1.4545E-01	
RA-224	#A	9.2261E-01	9.2261E-01	1.1527E+00	1.1539E+00	1.249E+00
RA-226		1.5446E+00	1.5446E+00	1.1908E+00	1.1940E+00	
AC-228	F	2.3421E-01	2.3421E-01	1.0729E-01	1.0809E-01	2.120E-01
TH-227	#B	-1.1238E-01	-1.1238E-01	4.2817E-01	4.2822E-01	4.658E-01
PA-234	#B	3.6529E-02	3.6529E-02	2.2123E-01	2.2124E-01	2.469E-01
TH-234	#B	7.1615E-01	7.1615E-01	4.3508E+00	4.3510E+00	4.853E+00
AM-241	#A	1.3666E-01	1.3667E-01	5.1037E-01	5.1043E-01	5.686E-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) 1.6411177E+01 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.6411184E+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_27JUNE2006_1351.An1

Sample description
FSS-NOL-06-02-022-F

Spectrum Filename: C:\GammaVision\Spectra\102F_27JUNE2006_1351.An1

Acquisition information
Start time: 27-Jun-2006 13:53:14
Live time: 2000
Real time: 2013
Dead time: 0.65 %
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: 8.2100E+02
Activity scaling factor: 1.0000E+06/(1.0000E+00* 8.2100E+02) =
1.2180E+03
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	26-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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.7197

***** 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
75.76	129.	26.37	0.99	9.139E-03				
186.17	74.	29.25	1.48	1.626E-02	185.99	3.280	2.152E+00	RA226
239.52	287.	9.96	1.34	1.376E-02	238.63	43.100	7.940E-01	PB212
295.60	70.	25.63	0.96	1.145E-02	295.22	19.200	5.234E-01	PB214
339.23	56.	27.63	1.59	1.004E-02	338.40	12.010	7.684E-01	AC228
352.50	122.	16.04	1.07	9.665E-03	351.99	37.100	5.584E-01	PB214
511.97	68.	18.96	1.50	6.695E-03	510.72	22.500	7.441E-01	TL208
584.09	82.	20.60	1.20	5.881E-03	583.14	86.000	2.645E-01	TL208
609.89	90.	16.45	1.47	5.644E-03	609.32	46.090	5.721E-01	BI214
663.09	92.	12.96	1.57	5.219E-03	661.62	84.620	3.407E-01	CS137
912.52	73.	15.98	1.35	3.916E-03	911.07	29.000	1.053E+00	AC228
970.91	29.	30.26	1.22	3.711E-03				
1463.40	366.	5.29	1.93	2.617E-03	1460.75	10.700	2.144E+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	
151.10	75.76	397.	129.	0.065	79.11	0.987	PB-214	l
1942.02	970.91	15.	30.	0.015	76.68	1.216	J-135	

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
RA-226	372.49	186.44	134.	48.	0.024	101.50	1.500s
PB-212	477.74	239.06	179.	198.	0.099	35.69	1.500s
PB-214	591.59	295.97	57.	56.	0.028	70.39	1.500
AC-228	678.14	339.23	67.	56.	0.028	82.90	1.591s
PB-214	704.76	352.54	55.	97.	0.049	44.08	1.500
TL-208	1023.71	511.97	30.	68.	0.034	56.89	1.498s
TL-208	1168.02	584.09	54.	81.	0.041	61.80	1.199
BI-214	1219.63	609.89	38.	90.	0.045	49.36	1.472s
CS-137	1326.07	663.09	15.	92.	0.046	38.87	1.571s
AC-228	1825.17	912.51	12.	67.	0.033	46.49	1.343
K-40	2927.77	1463.43	10.	354.	0.177	16.39	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	Peak MDA Value pCi/gm	COMMENTS
BE-7		-3.2157E-02					
			477.56	-3.216E-02	%(	7.347E-01 2.06E-01	G
K-40		2.0773E+01					
			1460.75	2.077E+01	(P	1.037E+00 1.14E+00	G
MN-54		-8.3145E-04					
			834.81	-8.315E-04	&(P	1.128E-01 3.09E-02	G
CO-57		1.5189E-02					
			122.07	1.519E-02	%(	7.732E-02 2.29E-02	G K
			136.43	-1.365E-01	%	6.489E-01 1.93E-01	G
CO-60		-1.5827E-02					
			1332.51	-1.583E-02	%(P	1.162E-01 3.18E-02	G K
			1173.23	-2.344E-03	%	1.402E-01 3.84E-02	G K
Sr-85		-1.5029E-02					
			514.00	-1.503E-02	%(	1.008E-01 2.92E-02	G
Kr-85		-3.4266E+02					
			513.99	-3.427E+02	%(	2.299E+03 6.65E+02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	-1.2081E-02						
		1836.01	-1.208E-02	%(P	1.012E-01	2.61E-02	G K
		898.02	-8.759E-03	& P	1.111E-01	3.01E-02	G
NB-94	5.2362E-03						
		871.10	5.236E-03	%(	1.027E-01	2.82E-02	G K
		702.50	1.086E-03	%	8.718E-02	2.38E-02	G K
Ag-108M	-2.7381E-02						
		722.95	-2.738E-02	%(	1.072E-01	3.11E-02	G K
		614.37	-4.407E-02	% P	1.250E-01	3.71E-02	G
		433.93	-1.118E-04	%	7.193E-02	1.99E-02	G
CD-109	2.2690E-02						
		88.04	2.269E-02	%(P	3.941E+00	1.17E+00	G
SN-113	0.0000E+00						
		391.71	0.000E+00	%(	1.167E-01	3.30E-02	G K
		255.04	-1.190E-01	%	2.931E+00	8.43E-01	G
SB-125	-1.8116E-02						
		427.95	-1.812E-02	%(P	2.031E-01	5.57E-02	G K
		600.77	7.502E-02	% P	3.737E-01	1.06E-01	G
		636.15	-3.350E-03	& P	7.123E-01	1.94E-01	G
		463.51	2.683E-01	% P	5.523E-01	1.66E-01	G
		176.29	-5.812E-02	% P	8.337E-01	2.38E-01	G
I-131	1.0729E-02						
		364.48	1.073E-02	%(	7.341E-02	2.09E-02	G K
		636.97	0.000E+00	&	1.248E+00	3.41E-01	G
		284.29	8.853E-02	%	1.098E+00	3.16E-01	G
CS-134	-9.1080E-04						
		604.66	-9.108E-04	&(	9.815E-02	2.74E-02	G K
		795.76	3.178E-02	&	8.635E-02	2.55E-02	G
		569.29	5.758E-02	%	3.471E-01	9.62E-02	G
		801.84	-5.020E-02	% P	9.633E-01	2.61E-01	G
CS-137	3.4074E-01						
		661.62	3.407E-01	@(	7.811E-02	4.42E-02	G
CE-139	-1.6842E-02						
		165.85	-1.684E-02	%(P	8.596E-02	2.55E-02	G
EU-152	3.9510E-02						
		121.78	3.951E-02	%(P	2.210E-01	6.53E-02	G K
		344.30	-1.538E-02	%	2.561E-01	7.33E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1408.08	-7.729E-02	%	5.813E-01	1.60E-01	G
		964.00	1.045E-01	% P	7.263E-01	2.03E-01	G
		1112.07	9.332E-02	&	9.968E-01	2.79E-01	G
		778.90	2.378E-01	% P	5.845E-01	1.74E-01	G
EU-154	2.9258E-02						
		123.10	2.926E-02	%(P	1.597E-01	4.72E-02	G K
		1274.80	-3.263E-02	&	3.512E-01	9.63E-02	G
		723.30	-1.433E-01	% P	4.938E-01	1.44E-01	G
		1004.80	8.684E-02	%	5.590E-01	1.56E-01	G
EU-155	-1.6013E-02						
		86.45	-1.601E-02	%(P	4.568E-01	1.35E-01	G K
		105.31	-2.724E-02	&	3.532E-01	1.04E-01	G
HG-203	-1.0553E-03						
		279.17	-1.055E-03	%(P	7.781E-02	2.22E-02	G K
		72.87	6.767E-02	%	3.714E+00	1.10E+00	G
		70.83	-2.133E+00	%	6.973E+00	2.10E+00	G
		82.50	-2.751E-01	&	6.013E+00	1.77E+00	G
TL-208	2.6449E-01						
		583.14	2.645E-01	(P	1.197E-01	5.49E-02	G
		510.72	7.441E-01	+	3.080E-01	1.41E-01	G
PB-212	5.4784E-01						
		238.63	5.478E-01	@(	1.798E-01	6.52E-02	G K
							Energy duplication
		77.11	5.227E-01	%	1.008E+00	3.06E-01	G
		74.81	9.206E-01	% P	2.001E+00	6.05E-01	G
PB-214	4.3569E-01						
		351.99	4.460E-01	(P	1.702E-01	6.58E-02	G K
		295.22	4.157E-01	(	2.840E-01	9.75E-02	G
							Energy duplication
		77.11	8.549E-01	%	1.648E+00	5.01E-01	G
		241.92	2.165E-01	%	1.183E+00	3.51E-01	G
BI-212	5.1586E-02						
		727.17	5.159E-02	%(	6.949E-01	1.91E-01	G K
		1620.56	-4.869E-01	% P	3.654E+00	9.36E-01	G
		785.42	-2.332E-01	% P	3.986E+00	1.08E+00	G
BI-214	5.7210E-01						
		609.32	5.721E-01	@(	1.975E-01	9.42E-02	G K
		1764.51	-1.374E-01	% P	8.676E-01	2.38E-01	G
		1120.28	-8.685E-04	&	1.002E+00	2.77E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RA-224	6.7789E-01						
		241.00	6.779E-01	%(P	2.187E+00	6.54E-01	G
RA-226	1.4710E+00						
		185.99	1.471E+00	(P	1.748E+00	5.44E-01	G
AC-228	9.0834E-01						
		911.07	9.663E-01	(P	2.751E-01	1.50E-01	G K
		968.90	-7.451E-02	% P	7.313E-01	2.06E-01	G
		338.40	7.684E-01	(	5.550E-01	2.13E-01	G
TH-227	-2.5599E-01						
		236.00	-2.560E-01	%(P	8.153E-01	2.44E-01	G K
		256.25	-9.035E-02	%	8.550E-01	2.48E-01	G
PA-234	4.3916E-02						
		98.44	4.392E-02	%(	3.502E-01	1.03E-01	G K
		946.00	-5.736E-03	&	5.202E-01	1.40E-01	G
		131.28	7.544E-02	%	3.307E-01	9.83E-02	G
		94.67	-5.741E-03	&	6.764E-01	1.99E-01	G
		883.24	-1.481E-01	%	7.738E-01	2.19E-01	G
		926.70	0.000E+00	%	6.388E-01	1.62E-01	G
		569.26	8.125E-02	%	5.169E-01	1.43E-01	G
TH-234	-7.7150E-01						
		63.29	-7.715E-01	&(P	8.877E+00	2.63E+00	G K
		92.80	2.367E+00	&	3.916E+00	1.20E+00	G
		92.38	-1.608E-01	% P	4.843E+00	1.43E+00	G
AM-241	4.5546E-01						
		59.54	4.555E-01	%(	1.210E+00	3.65E-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	-3.1675E-02	-3.2157E-02	6.1822E-01	6.1823E-01	7.237E-01
K-40		2.0773E+01	2.0773E+01	3.4070E+00	3.6009E+00	1.037E+00
MN-54	#A	-8.2931E-04	-8.3145E-04	3.9562E-02	3.9562E-02	1.125E-01
CO-57	#B	1.5144E-02	1.5189E-02	6.8720E-02	6.8725E-02	7.709E-02
CO-60	#B	-1.5820E-02	-1.5827E-02	1.0110E-01	1.0111E-01	1.161E-01
Sr-85	#A	-1.4844E-02	-1.5029E-02	8.7526E-02	8.7530E-02	9.956E-02
Kr-85	#A	-3.4266E+02	-3.4266E+02	1.9957E+03	1.9958E+03	2.298E+03
Y-88	#B	-1.1990E-02	-1.2081E-02	7.9111E-02	7.9114E-02	1.004E-01
NB-94	#B	5.2362E-03	5.2362E-03	8.4642E-02	8.4643E-02	1.027E-01
Ag-108M	#B	-2.7380E-02	-2.7381E-02	9.3364E-02	9.3376E-02	1.071E-01
CD-109	#A	2.2650E-02	2.2690E-02	3.4995E+00	3.4995E+00	3.934E+00
SN-113	#B	0.0000E+00	0.0000E+00	9.8918E-02	9.8918E-02	1.159E-01
SB-125	#B	-1.8101E-02	-1.8116E-02	3.7685E-01	3.7686E-01	2.030E-01
I-131	#B	9.7062E-03	1.0729E-02	6.2793E-02	6.2796E-02	6.641E-02
CS-134	#B	-9.0983E-04	-9.1080E-04	8.2185E-02	8.2185E-02	9.804E-02
CS-137	#	3.4071E-01	3.4074E-01	1.3246E-01	1.3383E-01	
CE-139	#A	-1.6743E-02	-1.6842E-02	8.1340E-02	8.1345E-02	8.546E-02
EU-152	#B	3.9503E-02	3.9510E-02	1.9577E-01	1.9578E-01	2.209E-01
EU-154	#B	2.9250E-02	2.9258E-02	1.4165E-01	1.4166E-01	1.596E-01
EU-155	#B	-1.6006E-02	-1.6013E-02	3.0840E+00	3.0840E+00	4.566E-01
HG-203	#B	-1.0372E-03	-1.0553E-03	9.0149E-02	9.0149E-02	7.647E-02
TL-208		2.6449E-01	2.6449E-01	1.6427E-01	1.6494E-01	
PB-212	#	5.4784E-01	5.4784E-01	1.9555E-01	1.9795E-01	1.798E-01
PB-214	#	4.3569E-01	4.3569E-01	1.8113E-01	1.8277E-01	1.702E-01
BI-212	#B	5.1586E-02	5.1586E-02	5.7278E-01	5.7279E-01	6.949E-01
BI-214	#	5.7210E-01	5.7210E-01	2.8241E-01	2.8423E-01	
RA-224	#A	6.7789E-01	6.7789E-01	1.9614E+00	1.9618E+00	2.187E+00
RA-226	#A	1.4710E+00	1.4710E+00	1.6328E+00	1.6349E+00	1.748E+00
AC-228		9.0834E-01	9.0834E-01	4.2373E-01	4.2679E-01	
TH-227	#B	-2.5599E-01	-2.5599E-01	7.4983E-01	7.4997E-01	8.153E-01

PA-234 #B	4.3916E-02	4.3916E-02	3.1046E-01	3.1047E-01	3.502E-01

TH-234 #B	-7.7150E-01	-7.7150E-01	8.5172E+00	8.5173E+00	8.877E+00
AM-241 #A	4.5545E-01	4.5546E-01	1.0940E+00	1.0943E+00	1.210E+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 (970.9 to 1999.0 keV) 2.2858597E+01 pCi/gm
Total Decayed Activity (970.9 to 1999.0 keV) 2.2858622E+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_27JUNE2006_1439.An1

Sample description
FSS-NOL-06-02-019-F

Spectrum Filename: C:\GammaVision\Spectra\102F_27JUNE2006_1439.An1

Acquisition information
Start time: 27-Jun-2006 14:41:12
Live time: 2000
Real time: 2015
Dead time: 0.74 %
Detector ID: 3

Detector system
Det 102 - DSPP-468

Calibration
Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration
Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/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: 1.5170E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5170E+03) =
6.5920E+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-Jun-2006 08:25:00
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. 11 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5900

***** 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	142.	25.83	1.50	9.541E-03	77.11	17.500	7.571E-01	PB212
					77.11	10.700	1.238E+00	PB214
77.08	142.	25.83	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.238E+00	PB214
87.24	113.	36.07	1.16	1.217E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
186.39	72.	28.14	0.98	1.625E-02	185.99	3.280	PBC<MDA	RA226
239.46	487.	7.58	1.23	1.377E-02	238.63	43.100	7.291E-01	PB212
270.91	48.	32.74	1.27	1.240E-02				
295.61	106.	16.74	1.03	1.145E-02	295.22	19.200	4.269E-01	PB214
338.78	101.	22.22	1.11	1.005E-02	338.40	12.010	7.447E-01	AC228
352.59	142.	13.76	1.25	9.662E-03	351.99	37.100	3.513E-01	PB214
463.79	50.	24.08	1.65	7.360E-03	463.51	10.000	5.914E-01	SB125
511.39	88.	17.83	1.55	6.686E-03	510.72	22.500	5.180E-01	TL208
584.17	142.	11.67	1.55	5.880E-03	583.14	86.000	2.481E-01	TL208
610.51	117.	16.54	1.29	5.639E-03	609.32	46.090	3.989E-01	BI214
727.76	43.	23.88	1.25	4.791E-03				
912.74	85.	12.59	1.69	3.916E-03	911.07	29.000	6.671E-01	AC228
966.70	20.	28.64	1.72	3.725E-03				
970.63	64.	14.02	1.72	3.712E-03	968.90	17.460	8.836E-01	AC228
1463.27	354.	5.31	1.47	2.617E-03	1460.75	10.700	1.124E+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

174.06	87.24	571.	113.	0.056	108.20	1.163	PB-214	l
478.54	239.46	627.	110.	0.055	100.96	1.233	PB-212	sM

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
541.46	270.91	84.	48.	0.024	98.22	1.272	AC-228	M
1022.55	511.39	93.	45.	0.023	100.11	1.550	RH-106M	s
1455.47	727.76	35.	32.	0.016	96.18	1.248	J-132	M
1933.61	966.82	7.	20.	0.010	85.91	1.716	TB-160	D
1941.47	970.75	9.	64.	0.032	42.06	1.719	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	153.80	77.11	601.	142.	0.071	77.49	1.500D
PB-214	153.80	77.11	601.	142.	0.071	77.49	1.500D
RA-226	372.37	186.38	224.	72.	0.036	88.99	1.500
PB-212	477.83	239.10	246.	361.	0.181	24.24	1.500
PB-214	591.14	295.74	91.	94.	0.047	52.89	1.500s
AC-228	677.90	339.11	82.	74.	0.037	62.80	1.500
PB-214	704.70	352.51	73.	129.	0.064	38.41	1.500
SB-125	927.41	463.83	34.	46.	0.023	67.24	1.500s
TL-208	1022.67	511.45	54.	54.	0.027	71.08	1.499s
TL-208	1168.27	584.22	44.	105.	0.052	39.59	1.499s
BI-214	1220.88	610.51	59.	117.	0.058	49.63	1.288
AC-228	1825.62	912.74	11.	84.	0.042	36.72	1.679
AC-228	1941.37	970.58	10.	55.	0.027	47.28	1.718
K-40	2927.50	1463.29	4.	320.	0.160	16.95	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		1.0026E-01					
			477.56	1.003E-01	%(	4.430E-01	1.29E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	1.0153E+01						
		1460.75	1.015E+01	(P	3.638E-01	5.74E-01	G
MN-54	-6.9778E-03						
		834.81	-6.978E-03	%(P	6.411E-02	1.80E-02	G
CO-57	-6.6169E-03						
		122.07	-6.617E-03	&(	5.483E-02	1.63E-02	G K
		136.43	-1.172E-02	%	4.307E-01	1.27E-01	G
CO-60	1.1936E-02						
		1332.51	1.194E-02	&(P	5.489E-02	1.53E-02	G K
		1173.23	6.208E-03	&	6.847E-02	1.89E-02	G K
Sr-85	-1.8943E-02						
		514.00	-1.894E-02	&(	6.317E-02	1.87E-02	G
Kr-85	-4.1798E+02						
		513.99	-4.180E+02	&(	1.393E+03	4.13E+02	G
Y-88	5.1549E-03						
		1836.01	5.155E-03	%(P	4.074E-02	1.00E-02	G K
		898.02	8.762E-03	% P	5.395E-02	1.50E-02	G
NB-94	-4.1332E-03						
		871.10	-4.133E-03	&(	6.276E-02	1.75E-02	G K
		702.50	8.136E-03	%	4.720E-02	1.34E-02	G K
Ag-108M	-1.0945E-02						
		722.95	-1.094E-02	%(	6.781E-02	1.95E-02	G K
		614.37	-4.641E-02	& P	8.790E-02	2.68E-02	G
		433.93	0.000E+00	&	5.507E-02	1.57E-02	G
CD-109	-4.8847E-02						
		88.04	-4.885E-02	%(P	2.349E+00	6.96E-01	G
SN-113	1.7263E-03						
		391.71	1.726E-03	%(	6.282E-02	1.78E-02	G K
		255.04	-2.890E-01	%	1.860E+00	5.46E-01	G
SB-125	1.3652E-01						
		427.95	-5.541E-03	&(P	1.328E-01	3.69E-02	G K
		600.77	-4.758E-02	% P	2.609E-01	7.47E-02	G
		636.15	-1.725E-02	% P	3.670E-01	1.00E-01	G
		463.51	5.570E-01	(P	3.645E-01	1.29E-01	G
		176.29	-1.488E-01	% P	6.400E-01	1.89E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	0.0000E+00						
		364.48	0.000E+00	&(	8.264E-02	2.37E-02	G K
		636.97	-4.486E-02	%	7.814E-01	2.14E-01	G
		284.29	2.324E-01	%	8.719E-01	2.58E-01	G
CS-134	1.2210E-02						
		604.66	1.221E-02	%(	4.671E-02	1.36E-02	G K
		795.76	2.780E-02	%	5.656E-02	1.72E-02	G
		569.29	2.750E-02	&	2.574E-01	7.21E-02	G
		801.84	-1.598E-03	% P	5.512E-01	1.48E-01	G
CS-137	2.4091E-02						
		661.62	2.409E-02	%(	6.844E-02	2.03E-02	G
CE-139	-6.9480E-04						
		165.85	-6.948E-04	%(P	4.597E-02	1.34E-02	G
EU-152	-2.5464E-02						
		121.78	-2.546E-02	%(P	1.654E-01	4.91E-02	G K
		344.30	-1.062E-04	&	1.639E-01	4.70E-02	G
		1408.08	-4.003E-02	%	3.127E-01	8.58E-02	G
		964.00	-3.958E-02	% P	4.100E-01	1.13E-01	G
		1112.07	1.350E-01	%	5.355E-01	1.55E-01	G
		778.90	-5.694E-02	% P	3.714E-01	1.04E-01	G
EU-154	7.3975E-03						
		123.10	7.398E-03	%(P	1.156E-01	3.41E-02	G K
		1274.80	8.805E-02	%	1.729E-01	5.31E-02	G
		723.30	-5.756E-02	% P	3.204E-01	9.22E-02	G
		1004.80	3.051E-02	&	3.558E-01	9.86E-02	G
EU-155	1.5226E-01						
		86.45	1.523E-01	%(P	2.685E-01	8.16E-02	G K
		105.31	2.845E-03	%	2.696E-01	7.97E-02	G
HG-203	-1.5066E-02						
		279.17	-1.507E-02	%(P	5.735E-02	1.70E-02	G K
		72.87	-3.966E-01	%	2.417E+00	7.24E-01	G
		70.83	-3.526E-01	&	3.971E+00	1.18E+00	G
		82.50	-1.693E+00	%	4.384E+00	1.32E+00	G
TL-208	1.8423E-01						
		583.14	1.842E-01	@(P	5.921E-02	2.44E-02	G
		510.72	3.176E-01	+	2.187E-01	7.52E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	5.4110E-01						
		238.63	5.411E-01	(	1.134E-01	4.37E-02	G K
							Energy duplication
		77.11	7.571E-01	+	6.238E-01	1.96E-01	G
		74.81	8.044E-01	& P	1.329E+00	4.05E-01	G
PB-214	3.4060E-01						
		351.99	3.196E-01	(P	1.052E-01	4.10E-02	G K
		295.22	3.812E-01	@(	1.907E-01	6.72E-02	G
							Energy duplication
		77.11	1.238E+00	+	1.020E+00	3.20E-01	G
		241.92	2.242E-01	%	7.171E-01	2.15E-01	G
BI-212	1.8004E-01						
		727.17	1.800E-01	%(	4.158E-01	1.25E-01	G K
		1620.56	-3.376E-02	& P	1.903E+00	4.55E-01	G
		785.42	4.200E-02	& P	2.531E+00	6.89E-01	G
BI-214	3.9892E-01						
		609.32	3.989E-01	(	1.321E-01	6.61E-02	G K
		1764.51	-2.179E-03	& P	1.853E-01	2.51E-02	G
		1120.28	-9.834E-02	&	5.957E-01	1.71E-01	G
RA-224	2.4480E-01						
		241.00	2.448E-01	%(P	1.402E+00	4.16E-01	G
RA-226	1.2037E+00						
		185.99	1.204E+00	(P	1.210E+00	3.79E-01	G
AC-228	6.9047E-01						
		911.07	6.555E-01	(P	1.424E-01	8.04E-02	G K
		968.90	7.485E-01	(P	2.368E-01	1.18E-01	G
		338.40	5.443E-01	-	3.320E-01	1.14E-01	G
TH-227	1.8014E-01						
		236.00	1.801E-01	&(P	2.835E-01	8.74E-02	G K
		256.25	-1.071E-02	%	6.497E-01	1.89E-01	G
PA-234	2.0276E-02						
		98.44	2.028E-02	&(	1.975E-01	5.83E-02	G K
		946.00	-5.119E-02	&	3.183E-01	9.03E-02	G
		131.28	-2.764E-04	&	2.290E-01	6.74E-02	G
		94.67	-3.406E-02	%	3.849E-01	1.14E-01	G
		883.24	1.238E-03	%	4.747E-01	1.29E-01	G
		926.70	-5.471E-02	%	5.189E-01	1.44E-01	G
		569.26	9.347E-02	&	3.960E-01	1.14E-01	G

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

TH-234       9.3532E-01
                           63.29 9.353E-01 %(P 4.999E+00 1.49E+00 G K
                           92.80 1.467E+00 %   2.462E+00 7.51E-01 G
                           92.38 8.067E-02 & P 2.940E+00 8.71E-01 G

AM-241       2.5135E-02
                           59.54 2.514E-02 %(  5.074E-01 1.49E-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	9.4867E-02	1.0026E-01	3.8697E-01	3.8701E-01	4.191E-01
K-40		1.0153E+01	1.0153E+01	1.7220E+00	1.8138E+00	3.638E-01
MN-54	#A	-6.9121E-03	-6.9778E-03	6.1652E-02	6.1653E-02	6.351E-02
CO-57	#B	-6.5449E-03	-6.6169E-03	4.8761E-02	4.8762E-02	5.423E-02
CO-60	#B	1.1918E-02	1.1936E-02	4.5963E-02	4.5968E-02	5.481E-02
Sr-85	#A	-1.8099E-02	-1.8943E-02	5.6209E-02	5.6219E-02	6.035E-02

Kr-85	#A	-4.1797E+02	-4.1798E+02	1.2399E+03	1.2402E+03	1.393E+03
Y-88	#B	5.0140E-03	5.1549E-03	3.0012E-02	3.0014E-02	3.963E-02
NB-94	#B	-4.1332E-03	-4.1332E-03	5.2534E-02	5.2534E-02	6.276E-02
Ag-108M	#B	-1.0944E-02	-1.0945E-02	5.8441E-02	5.8444E-02	6.780E-02
CD-109	#A	-4.8530E-02	-4.8847E-02	7.9194E+00	7.9194E+00	2.333E+00
SN-113	#B	1.6826E-03	1.7263E-03	5.3397E-02	5.3398E-02	6.123E-02
SB-125	#F	1.3612E-01	1.3652E-01	9.4894E-02	9.5203E-02	1.324E-01
I-131	#B	0.0000E+00	0.0000E+00	7.1057E-02	7.1058E-02	5.723E-02
CS-134	#B	1.2162E-02	1.2210E-02	4.0785E-02	4.0791E-02	4.653E-02
CS-137	#A	2.4085E-02	2.4091E-02	6.1031E-02	6.1046E-02	6.842E-02
CE-139	#A	-6.8003E-04	-6.9480E-04	9.8523E-02	9.8523E-02	4.499E-02
EU-152	#B	-2.5448E-02	-2.5464E-02	1.6691E-01	1.6692E-01	1.653E-01
EU-154	#B	7.3905E-03	7.3975E-03	1.0245E-01	1.0245E-01	1.155E-01
EU-155	#B	1.5201E-01	1.5226E-01	2.4492E-01	2.4506E-01	2.681E-01
HG-203	#B	-1.4140E-02	-1.5066E-02	5.1718E-02	5.1725E-02	5.383E-02
TL-208	#	1.8423E-01	1.8423E-01	7.3222E-02	7.3949E-02	5.921E-02
PB-212	#	5.4110E-01	5.4110E-01	1.3117E-01	1.3464E-01	1.134E-01
PB-214	#	3.4060E-01	3.4060E-01	1.1143E-01	1.1305E-01	1.052E-01
BI-212	#B	1.8004E-01	1.8004E-01	3.7543E-01	3.7556E-01	4.158E-01
BI-214		3.9892E-01	3.9892E-01	1.9796E-01	1.9923E-01	
RA-224	#A	2.4480E-01	2.4480E-01	1.2487E+00	1.2488E+00	1.402E+00
RA-226	#A	1.2037E+00	1.2037E+00	1.1374E+00	1.1394E+00	1.210E+00
AC-228		6.9047E-01	6.9047E-01	2.0696E-01	2.1056E-01	1.424E-01
TH-227	#B	1.8014E-01	1.8014E-01	2.6212E-01	2.6231E-01	2.835E-01
PA-234	#B	2.0276E-02	2.0276E-02	1.7499E-01	1.7500E-01	1.975E-01
TH-234	#B	9.3532E-01	9.3532E-01	4.4793E+00	4.4796E+00	4.999E+00
AM-241	#A	2.5135E-02	2.5135E-02	4.4625E-01	4.4625E-01	5.073E-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 (1119.8 to 1999.0 keV) 1.1242280E+01 pCi/gm
Total Decayed Activity (1119.8 to 1999.0 keV) 1.1242280E+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_27JUN2006_1542.An1

Sample description
FSS-NOL-06-02-006-F-B

Spectrum Filename: C:\GammaVision\Spectra\103F_27JUN2006_1542.An1

Acquisition information

Start time:	27-Jun-2006 15:42:16
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:	2.2470E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.2470E+03) = 4.4504E+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-Jun-2006 18:00:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4595

***** 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	97.	32.18	0.99	9.173E-03	74.81	9.600	PBC<MDA	PB212
77.35	223.	14.06	0.99	1.030E-02	77.11	17.500	7.481E-01	PB212
87.48	114.	26.37	1.00	1.456E-02				
87.48	114.	26.37	1.00	1.456E-02	88.04	3.790	1.238E+00	CD109
93.36	145.	21.84	1.00	1.669E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.52	108.	41.13	0.75	2.442E-02				
129.52	108.	41.13	0.75	2.442E-02	131.28	20.000	PBC<MDA	PA234
186.61	163.	21.68	1.37	2.565E-02	185.99	3.280	1.072E+00	RA226
210.11	135.	26.56	1.15	2.467E-02				
238.97	1217.	3.49	1.09	2.318E-02	238.63	43.100	7.247E-01	PB212
241.95	147.	20.42	1.10	2.302E-02	241.00	3.900	9.796E-01	RA224
					241.92	7.470	5.125E-01	PB214
277.65	77.	38.56	1.28	2.113E-02				
277.65	77.	38.56	1.28	2.113E-02	279.17	81.500	PBC<MDA	HG203
295.73	260.	10.41	1.17	2.022E-02	295.22	19.200	3.953E-01	PB214
300.71	108.	24.87	1.29	1.998E-02				
328.12	77.	35.26	1.03	1.874E-02				
338.80	262.	13.04	1.18	1.828E-02	338.40	12.010	7.153E-01	AC228
352.37	424.	7.85	1.19	1.774E-02	351.99	37.100	3.817E-01	PB214
410.62	79.	32.39	0.97	1.571E-02				
463.40	63.	27.22	1.35	1.425E-02				
463.40	63.	27.22	1.35	1.425E-02	463.51	10.000	PBC<MDA	SB125
511.10	177.	13.54	1.61	1.316E-02	510.72	22.500	3.050E-01	TL208
583.88	424.	6.65	1.34	1.183E-02	583.14	86.000	2.476E-01	TL208
610.11	327.	7.08	1.40	1.143E-02	609.32	46.090	3.656E-01	BI214
786.50	71.	25.09	1.14	9.384E-03	785.42	2.000	2.273E+00	BI212

796.34	56.	23.40	1.45	9.296E-03	795.76	85.400	4.218E-02	CS134
862.24	76.	20.73	1.47	8.755E-03				
912.28	320.	8.26	1.56	8.393E-03	911.07	29.000	7.804E-01	AC228
965.48	53.	25.16	1.54	8.048E-03	964.00	14.580	2.709E-01	EU152
970.18	176.	9.41	1.54	8.019E-03	968.90	17.460	7.566E-01	AC228
1121.99	98.	21.49	1.15	7.204E-03	1120.28	15.040	5.301E-01	BI214
1379.41	18.	37.54	0.96	6.189E-03				
1462.60	1638.	2.55	1.96	5.926E-03	1460.75	10.700	1.534E+01	K40
1590.41	52.	14.98	1.69	5.566E-03				
1766.28	75.	13.50	1.66	5.138E-03	1764.51	15.920	5.240E-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	
174.13	87.62	396.	114.	0.057	79.10	1.001	PB-214	lD
258.21	129.52	772.	110.	0.055	111.38	0.749	AC-228	s
419.38	210.11	502.	135.	0.068	79.68	1.148	NP-239	s
600.57	300.71	258.	108.	0.054	74.60	1.292	PB-212	
655.39	328.12	264.	77.	0.038	105.77	1.027	AC-228	s
820.37	410.62	203.	79.	0.039	97.17	0.967	EU-152	s
1457.77	729.35	100.	103.	0.052	58.47	1.327	J-132	l
1723.52	862.24	65.	76.	0.038	62.19	1.473	TL-208	s
1929.62	965.30	69.	48.	0.024	86.12	1.539	AC-228	D
2757.71	1379.41	14.	18.	0.009	112.61	0.964	BI-214	sM
3179.64	1590.41	2.	52.	0.026	44.94	1.694	AC-228	
3532.01	1766.28	4.	67.	0.034	38.59	2.035	BI-214	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	443.	98.	0.049	92.89	0.993D
PB-212	153.39	77.11	425.	201.	0.101	37.33	0.995A
TH-234	185.83	93.33	1102.	133.	0.066	95.96	1.500s
RA-226	372.38	186.61	530.	150.	0.075	65.04	1.365s
PB-212	477.16	239.00	760.	1234.	0.617	13.76	1.059
RA-224	482.79	241.82	892.	119.	0.060	109.96	1.500s
PB-214	590.61	295.73	228.	256.	0.128	31.24	1.173
AC-228	676.74	338.80	315.	261.	0.131	39.12	1.181
PB-214	703.87	352.37	259.	418.	0.209	23.56	1.187
SB-125	926.33	463.60	172.	67.	0.034	88.71	1.500
TL-208	1021.31	511.10	186.	150.	0.075	40.62	1.610s
TL-208	1166.87	583.88	132.	419.	0.210	19.94	1.336
BI-214	1219.31	610.11	97.	321.	0.160	21.25	1.395
BI-212	1572.05	786.50	77.	71.	0.036	75.28	1.145s
CS-134	1591.09	796.02	57.	55.	0.028	70.78	1.500s
AC-228	1823.60	912.28	111.	316.	0.158	24.77	1.556
EU-152	1931.26	966.12	68.	61.	0.031	68.26	1.538s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1936.81	968.90	161.	82.	0.041	73.85	1.541D
BI-214	2242.71	1121.87	91.	74.	0.037	63.30	1.634
K-40	2924.09	1462.61	57.	1584.	0.792	7.67	1.845
BI-214	3527.77	1764.51	16.	49.	0.025	50.12	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		-4.0810E-02					
			477.56	-4.081E-02	&(	2.988E-01 8.81E-02	G
K-40		1.5008E+01					
			1460.75	1.501E+01	(P	3.604E-01 3.88E-01	G
MN-54		1.1336E-02					
			834.81	1.134E-02	&(P	3.466E-02 1.03E-02	G
CO-57		1.4025E-02					
			122.07	1.403E-02	%(P	4.441E-02 1.34E-02	G K
			136.43	-3.977E-02	%	3.570E-01 1.07E-01	G
CO-60		-7.9760E-03					
			1332.51	-7.976E-03	%(P	3.640E-02 1.03E-02	G K
			1173.23	3.901E-03	& P	3.866E-02 1.11E-02	G K
Sr-85		-1.5046E-02					
			514.00	-1.505E-02	&(	4.184E-02 1.26E-02	G
Kr-85		-3.3315E+02					
			513.99	-3.332E+02	&(	9.265E+02 2.79E+02	G
Y-88		6.9715E-04					
			1836.01	6.972E-04	&(P	2.320E-02 6.08E-03	G K
			898.02	-4.897E-04	& P	3.058E-02 8.60E-03	G
NB-94		1.4618E-02					
			871.10	1.462E-02	%(	2.689E-02 8.23E-03	G K
			702.50	4.576E-03	&	3.153E-02 9.23E-03	G K
Ag-108M		-1.8405E-03					
			722.95	-1.840E-03	%(	3.469E-02 1.00E-02	G K
			614.37	-2.466E-02	& P	4.231E-02 1.29E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	-5.395E-03	&	3.225E-02	9.55E-03	G
CD-109	9.2338E-02						
		88.04	9.234E-02	%(	1.824E+00	5.46E-01	G
SN-113	-3.4288E-03						
		391.71	-3.429E-03	&(	4.493E-02	1.32E-02	G K
		255.04	3.721E-01	%	1.417E+00	4.25E-01	G
SB-125	4.7440E-02						
		427.95	-3.257E-02	%(P	1.043E-01	3.12E-02	G K
		600.77	3.563E-02	% P	1.380E-01	4.08E-02	G
		636.15	5.739E-02	% P	2.435E-01	7.18E-02	G
		463.51	2.843E-01	(P	2.700E-01	8.57E-02	G
		176.29	-1.179E-02	%	5.185E-01	1.54E-01	G
I-131	4.5250E-03						
		364.48	4.525E-03	&(P	4.661E-02	1.37E-02	G K
		636.97	1.292E-01	%	5.123E-01	1.51E-01	G
		284.29	-9.362E-02	& P	6.529E-01	1.94E-01	G
CS-134	2.4690E-02						
		604.66	9.623E-03	%(	2.819E-02	8.43E-03	G K
		795.76	4.191E-02	@(P	2.889E-02	9.90E-03	G
		569.29	-6.781E-03	% P	1.980E-01	5.72E-02	G
		801.84	2.658E-02	& P	3.664E-01	1.06E-01	G
CS-137	2.4111E-03						
		661.62	2.411E-03	%(P	3.323E-02	9.59E-03	G
CE-139	-2.1365E-03						
		165.85	-2.137E-03	&(	4.027E-02	1.20E-02	G
EU-152	1.0305E-01						
		121.78	-2.029E-03	&(P	1.356E-01	4.04E-02	G K
		344.30	9.017E-03	% P	8.610E-02	2.53E-02	G
		1408.08	-1.385E-02	&	1.445E-01	4.08E-02	G
		964.00	3.138E-01	?(P	2.114E-01	7.20E-02	G
		1112.07	8.964E-02	&	2.753E-01	8.19E-02	G
		778.90	-3.370E-03	%	2.227E-01	6.37E-02	G
EU-154	2.7082E-02						
		123.10	2.708E-02	%(	9.529E-02	2.87E-02	G K
		1274.80	7.120E-04	%	1.082E-01	3.07E-02	G
		723.30	-1.634E-03	%	1.625E-01	4.69E-02	G
		1004.80	-2.725E-03	%	1.795E-01	5.10E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-2.7767E-03						
		86.45	-2.777E-03	&(	2.149E-01	6.42E-02	G K
		105.31	5.341E-02	%	2.022E-01	6.08E-02	G
HG-203	-1.0186E-03						
		279.17	-1.019E-03	&(P	3.766E-02	1.11E-02	G K
		72.87	-4.505E-01	% P	1.670E+00	5.02E-01	G
		70.83	-1.023E+00	%	3.850E+00	1.16E+00	G
		82.50	-4.850E-02	%	3.601E+00	1.07E+00	G
TL-208	2.4761E-01						
		583.14	2.476E-01	(P	3.316E-02	1.66E-02	G
		510.72	3.050E-01	+ P	1.343E-01	4.87E-02	G
PB-212	7.3509E-01						
		238.63	7.423E-01	(P	7.890E-02	3.44E-02	G K
							Energy duplication
		77.11	6.837E-01	} P	3.355E-01	8.51E-02	G
		74.81	6.786E-01	(P	6.975E-01	2.17E-01	G
PB-214	3.8637E-01						
		351.99	3.817E-01	(P	7.095E-02	3.04E-02	G K
		295.22	3.953E-01	(P	1.132E-01	4.19E-02	G
							Energy duplication
		77.11	0.000E+00	} P	7.888E-01	0.00E+00	G
		241.92	2.802E-01	%	5.042E-01	1.53E-01	G
BI-212	3.1790E-01						
		727.17	-1.342E-02	&(P	3.158E-01	9.18E-02	G K
		1620.56	-1.495E-01	% P	9.171E-01	2.57E-01	G
		785.42	2.273E+00	(	1.396E+00	5.71E-01	G
BI-214	3.7339E-01						
		609.32	3.656E-01	(P	5.557E-02	2.64E-02	G K
		1764.51	3.629E-01	(P	1.554E-01	6.47E-02	G
		1120.28	4.083E-01	&(P	2.617E-01	8.84E-02	G
RA-224	7.9563E-01						
		241.00	7.956E-01	?(	9.486E-01	2.92E-01	G
RA-226	1.0719E+00						
		185.99	1.072E+00	*(P	7.857E-01	2.53E-01	G
AC-228	7.6129E-01						
		911.07	7.804E-01	(P	1.278E-01	6.52E-02	G K
		968.90	3.499E-01	- P	2.658E-01	8.63E-02	G
		338.40	7.153E-01	(P	2.336E-01	9.37E-02	G

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

TH-227       1.0423E-01
                          236.00 1.042E-01 &(  2.610E-01 7.89E-02 G K
                          256.25-3.158E-02 & P 3.986E-01 1.18E-01 G

PA-234      -6.5467E-02
                           98.44-6.547E-02 %(P 1.903E-01 5.74E-02 G K
                          946.00-1.910E-02 % P 1.564E-01 4.52E-02 G
                          131.28-2.927E-03 & P 1.753E-01 5.22E-02 G
                           94.67-1.554E-01 % P 3.589E-01 1.09E-01 G
                          883.24-1.892E-02 %   2.561E-01 7.37E-02 G
                          926.70 4.872E-03 &   2.436E-01 6.87E-02 G
                          569.26-9.888E-03 % P 2.927E-01 8.45E-02 G

TH-234       8.0536E-01
                           63.29 1.791E-01 %(P 5.884E+00 1.75E+00 G K
                           92.80 1.619E+00  (P 1.918E+00 5.87E-01 G
                           92.38-2.532E-01 & P 2.207E+00 6.53E-01 G

AM-241       9.1717E-02
                           59.54 9.172E-02 %(P 9.649E-01 2.88E-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	-3.8793E-02	-4.0810E-02	2.6425E-01	2.6426E-01	2.841E-01
K-40		1.5008E+01	1.5008E+01	1.1651E+00	1.4549E+00	3.604E-01
MN-54	#A	1.1238E-02	1.1336E-02	3.0998E-02	3.1005E-02	3.436E-02
CO-57	#B	1.3885E-02	1.4025E-02	4.0157E-02	4.0164E-02	4.396E-02
CO-60	#B	-7.9648E-03	-7.9760E-03	5.9218E-02	5.9219E-02	3.635E-02
Sr-85	#A	-1.4430E-02	-1.5046E-02	3.7780E-02	3.7790E-02	4.013E-02
Kr-85	#A	-3.3314E+02	-3.3315E+02	8.3655E+02	8.3677E+02	9.265E+02
Y-88	#B	6.7968E-04	6.9715E-04	1.8240E-02	1.8240E-02	2.262E-02
NB-94	#B	1.4618E-02	1.4618E-02	2.4690E-02	2.4705E-02	2.689E-02
Ag-108M	#B	-1.8404E-03	-1.8405E-03	3.0124E-02	3.0124E-02	3.468E-02
CD-109	#A	9.1789E-02	9.2338E-02	1.6365E+00	1.6365E+00	1.813E+00
SN-113	#B	-3.3491E-03	-3.4288E-03	3.9682E-02	3.9683E-02	4.388E-02
SB-125	#B	4.7313E-02	4.7440E-02	4.2884E-02	4.2972E-02	1.040E-01
I-131	#B	3.2317E-03	4.5250E-03	4.1224E-02	4.1225E-02	3.329E-02
CS-134	#B	2.4602E-02	2.4690E-02	1.7504E-02	1.7563E-02	2.809E-02
CS-137	#A	2.4105E-03	2.4111E-03	2.8774E-02	2.8775E-02	3.322E-02
CE-139	#A	-2.0949E-03	-2.1365E-03	3.6019E-02	3.6019E-02	3.949E-02
EU-152	#B	1.0299E-01	1.0305E-01	7.0964E-02	7.1193E-02	1.355E-01
EU-154	#B	2.7059E-02	2.7082E-02	8.6101E-02	8.6114E-02	9.521E-02
EU-155	#B	-2.7725E-03	-2.7767E-03	1.9256E-01	1.9256E-01	2.146E-01
HG-203	#B	-9.6110E-04	-1.0186E-03	3.4369E-02	3.4369E-02	3.553E-02
TL-208		2.4761E-01	2.4761E-01	4.9873E-02	5.1903E-02	
PB-212		7.3509E-01	7.3509E-01	1.0212E-01	1.1068E-01	
PB-214		3.8637E-01	3.8637E-01	7.6730E-02	7.9942E-02	
BI-212	#F	3.1790E-01	3.1790E-01	2.3931E-01	2.4002E-01	3.158E-01
BI-214		3.7339E-01	3.7339E-01	8.0932E-02	8.3785E-02	
RA-224	#A	7.9563E-01	7.9563E-01	8.7490E-01	8.7612E-01	9.486E-01
RA-226	#	1.0719E+00	1.0719E+00	7.5732E-01	7.5987E-01	
AC-228		7.6129E-01	7.6129E-01	1.7731E-01	1.8273E-01	
TH-227	#B	1.0423E-01	1.0423E-01	2.3655E-01	2.3663E-01	2.610E-01
PA-234	#B	-6.5467E-02	-6.5467E-02	1.7914E-01	1.7918E-01	1.903E-01
TH-234	#B	8.0536E-01	8.0536E-01	8.7546E-01	8.7660E-01	5.884E+00
AM-241	#A	9.1716E-02	9.1717E-02	8.6381E-01	8.6382E-01	9.649E-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 (1766.1 to 2000.7 keV) 1.8901545E+01 pCi/gm
Total Decayed Activity (1766.1 to 2000.7 keV) 1.8901550E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-NOL-06-02-002-F

Spectrum Filename: C:\GammaVision\Spectra\103F_27JUN2006_1622.An1

Acquisition information
Start time: 27-Jun-2006 16:22:52
Live time: 2000
Real time: 2002
Dead time: 0.09 %
Detector ID: 4

Detector system
Det 103 - DSPE-471

Calibration
Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration
Created: 08-Aug-2005 11:09:41
Zero offset: 0.409 keV
Gain: 0.500 keV/channel
Quadratic: 1.092E-08 keV/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: 1.6510E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6510E+03) =
6.0569E+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-Jun-2006 10:46:00
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: 0.6117

***** 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.	19.14	0.99	9.052E-03	74.81	9.600	1.240E+00	PB212
77.23	122.	18.24	0.99	1.011E-02	77.11	17.500	7.607E-01	PB212
					77.11	10.700	1.244E+00	PB214
93.19	105.	26.42	1.00	1.667E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
186.47	120.	21.31	1.49	2.565E-02	185.99	3.280	PBC<MDA	RA226
209.71	86.	33.81	1.34	2.469E-02				
239.00	872.	4.06	1.09	2.318E-02	238.63	43.100	7.041E-01	PB212
242.09	136.	17.23	1.10	2.301E-02	241.00	3.900	1.240E+00	RA224
					241.92	7.470	6.488E-01	PB214
270.91	70.	37.57	1.08	2.148E-02				
295.59	215.	13.64	1.27	2.023E-02	295.22	19.200	4.441E-01	PB214
300.97	74.	31.64	1.28	1.997E-02				
328.66	61.	27.55	1.24	1.871E-02				
338.96	195.	14.12	1.08	1.828E-02	338.40	12.010	7.236E-01	AC228
352.32	354.	8.21	1.06	1.774E-02	351.99	37.100	4.332E-01	PB214
463.93	61.	29.49	0.95	1.424E-02	463.51	10.000	3.441E-01	SB125
511.39	169.	16.71	2.31	1.316E-02	510.72	22.500	3.925E-01	TL208
583.92	284.	7.59	1.25	1.183E-02	583.14	86.000	2.251E-01	TL208
610.01	271.	9.32	1.50	1.143E-02	609.32	46.090	4.100E-01	BI214
728.36	53.	30.11	1.76	9.952E-03	727.17	11.800	3.655E-01	BI212
769.72	63.	25.64	0.96	9.540E-03				
795.91	54.	29.80	0.95	9.300E-03	795.76	85.400	5.598E-02	CS134
861.85	80.	20.85	1.49	8.758E-03				
912.19	236.	8.77	1.72	8.394E-03	911.07	29.000	7.815E-01	AC228
969.94	156.	13.08	2.03	8.019E-03	968.90	17.460	9.092E-01	AC228

1121.53	112.	18.00	1.74	7.206E-03	1120.28	15.040	8.286E-01	BI214
1239.78	76.	29.39	1.49	6.695E-03				
1462.61	1175.	2.98	2.07	5.926E-03	1460.75	10.700	1.491E+01	K40
1766.51	53.	13.36	2.00	5.142E-03	1764.51	15.920	5.272E-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	
418.58	209.71	347.	86.	0.043	101.42	1.345	NP-239	s
540.97	270.91	259.	70.	0.035	112.71	1.080	AC-228	
601.09	300.97	199.	74.	0.037	94.93	1.285	PB-212	s
656.47	328.66	116.	61.	0.030	82.65	1.240	LA-140	
1538.50	769.72	66.	63.	0.031	66.50	0.955	BI-214	s
1722.74	861.85	58.	80.	0.040	52.11	1.493	TL-208	
1939.48	969.94	45.	100.	0.050	41.16	1.542	AC-228	D
2478.49	1239.78	102.	76.	0.038	88.18	1.495	CO-56	sM

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	268.	132.	0.066	57.43	0.993D
PB-212	153.39	77.11	296.	122.	0.061	54.71	0.995A
TH-234	185.87	93.35	791.	113.	0.057	93.79	1.500s
PA-234	185.82	93.33	594.	133.	0.066	81.98	1.500s
RA-226	371.84	186.34	552.	126.	0.063	75.15	1.500s
PB-212	477.22	239.03	522.	909.	0.455	15.61	1.059
RA-224	482.90	241.87	600.	129.	0.065	84.70	1.500s
PB-214	482.86	241.85	625.	103.	0.052	107.10	1.500s
PB-214	590.33	295.59	252.	211.	0.105	40.91	1.272s
AC-228	677.06	338.96	219.	194.	0.097	42.36	1.078
PB-214	703.77	352.32	194.	349.	0.174	24.62	1.059
SB-125	926.09	463.48	110.	53.	0.026	91.54	1.500
TL-208	1021.91	511.40	202.	127.	0.064	53.40	2.266s
TL-208	1166.94	583.92	80.	280.	0.140	22.77	1.255
BI-214	1219.11	610.01	121.	264.	0.132	27.97	1.504
Ag-108M	1223.43	612.17	250.	-78.	-0.039	92.56	1.500s
BI-212	1455.79	728.36	72.	53.	0.026	90.32	1.764s
CS-134	1590.85	795.90	72.	46.	0.023	89.86	1.500
AC-228	1823.41	912.19	58.	233.	0.116	26.31	1.724
AC-228	1936.81	968.90	65.	103.	0.052	44.39	1.541D
BI-214	2242.03	1121.53	73.	110.	0.055	53.99	1.743s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2924.14	1462.64	29.	1120.	0.560	8.98	1.845
BI-214	3531.76	1766.51	3.	53.	0.026	40.09	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		1.1733E-01					
			477.56	1.173E-01	&(	2.975E-01 8.94E-02	G
K-40		1.4437E+01					
			1460.75	1.444E+01	(P	3.610E-01 4.39E-01	G
MN-54		7.6048E-03					
			834.81	7.605E-03	&(P	3.774E-02 1.10E-02	G
CO-57		2.8370E-03					
			122.07	2.837E-03	&(P	5.003E-02 1.49E-02	G K
			136.43	-1.587E-02	%	3.955E-01 1.18E-01	G
CO-60		5.5794E-03					
			1332.51	5.579E-03	&(P	3.621E-02 1.01E-02	G K
			1173.23	1.131E-02	% P	4.729E-02 1.38E-02	G K
Sr-85		-1.2537E-02					
			514.00	-1.254E-02	&(	4.869E-02 1.45E-02	G
Kr-85		-2.7662E+02					
			513.99	-2.766E+02	&(	1.074E+03 3.20E+02	G
Y-88		-1.0696E-04					
			1836.01	-1.070E-04	&(P	1.252E-02 1.70E-03	G K
			898.02	-9.739E-04	& P	3.538E-02 9.81E-03	G
NB-94		5.8701E-03					
			871.10	5.870E-03	%(	2.905E-02 8.38E-03	G K
			702.50	-8.514E-04	%	3.985E-02 1.15E-02	G K
Ag-108M		8.6426E-03					
			722.95	8.643E-03	%(	3.442E-02 1.01E-02	G K
			614.37	-6.214E-02	& P	6.084E-02 1.91E-02	G
			433.93	4.134E-04	%	3.142E-02 9.05E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	8.2530E-01						
		88.04	8.253E-01	%(	1.940E+00	5.87E-01	G
SN-113	-2.9030E-04						
		391.71	-2.903E-04	&(	4.802E-02	1.39E-02	G K
		255.04	-3.870E-02	%	1.780E+00	5.26E-01	G
SB-125	1.1565E-01						
		427.95	5.199E-02	%(P	1.011E-01	3.07E-02	G K
		600.77	5.320E-02	& P	1.382E-01	4.13E-02	G
		636.15	3.224E-03	% P	3.129E-01	8.95E-02	G
		463.51	3.041E-01	(P	2.975E-01	9.50E-02	G
		176.29	-1.748E-01	%	5.813E-01	1.75E-01	G
I-131	1.9016E-02						
		364.48	1.902E-02	%(P	5.269E-02	1.58E-02	G K
		636.97	-1.213E-01	%	6.894E-01	2.02E-01	G
		284.29	-1.476E-02	& P	7.618E-01	2.24E-01	G
CS-134	1.8445E-02						
		604.66	-7.025E-03	%(	3.514E-02	1.03E-02	G K
		795.76	4.755E-02	(P	4.377E-02	1.43E-02	G
		569.29	8.505E-02	% P	1.866E-01	5.61E-02	G
		801.84	-1.666E-02	% P	4.394E-01	1.24E-01	G
CS-137	-5.1659E-03						
		661.62	-5.166E-03	%(P	4.529E-02	1.31E-02	G
CE-139	-8.3746E-04						
		165.85	-8.375E-04	%(	4.549E-02	1.35E-02	G
EU-152	8.5062E-03						
		121.78	8.506E-03	&(P	1.492E-01	4.44E-02	G K
		344.30	9.357E-03	% P	1.258E-01	3.70E-02	G
		1408.08	-2.244E-02	%	1.645E-01	4.63E-02	G
		964.00	1.301E-03	% P	2.593E-01	7.28E-02	G
		1112.07	4.863E-02	%	2.862E-01	8.25E-02	G
		778.90	2.535E-02	%	2.650E-01	7.61E-02	G
EU-154	8.5272E-03						
		123.10	8.527E-03	&(	1.046E-01	3.11E-02	G K
		1274.80	4.711E-02	%	9.542E-02	2.91E-02	G
		723.30	0.000E+00	%	2.386E-01	6.90E-02	G
		1004.80	-1.443E-02	%	2.397E-01	6.85E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	0.0000E+00						
		86.45	0.000E+00	&(	2.486E-01	7.40E-02	G K
		105.31	5.902E-02	%	2.302E-01	6.91E-02	G
HG-203	3.7693E-04						
		279.17	3.769E-04	&(P	3.864E-02	1.13E-02	G K
		72.87	-5.814E-01	% P	1.977E+00	5.94E-01	G
		70.83	-1.514E+00	%	4.685E+00	1.41E+00	G
		82.50	-7.649E-01	&	4.004E+00	1.20E+00	G
TL-208	2.2506E-01						
		583.14	2.251E-01	(P	3.565E-02	1.74E-02	G
		510.72	3.511E-01	+ P	1.903E-01	7.57E-02	G
PB-212	7.4894E-01						
		238.63	7.441E-01	(P	8.937E-02	3.93E-02	G K
							Energy duplication
		77.11	5.637E-01	} P	3.836E-01	1.03E-01	G
		74.81	1.240E+00	+ P	7.446E-01	2.43E-01	G
PB-214	4.4318E-01						
		351.99	4.332E-01	(P	8.412E-02	3.62E-02	G K
		295.22	4.441E-01	@(P	1.615E-01	6.18E-02	G
							Energy duplication
		77.11	2.750E-01	} P	8.953E-01	2.38E-01	G
		241.92	4.905E-01	?(	5.674E-01	1.75E-01	G
BI-212	3.6549E-01						
		727.17	3.655E-01	(P	2.951E-01	1.11E-01	G K
		1620.56	1.236E-01	& P	9.439E-01	2.55E-01	G
		785.42	-1.157E-02	&	1.922E+00	5.48E-01	G
BI-214	4.1004E-01						
		609.32	4.100E-01	(P	8.374E-02	3.92E-02	G K
		1764.51	5.272E-01	+ P	1.114E-01	7.49E-02	G
		1120.28	8.286E-01	+ P	3.213E-01	1.52E-01	G
RA-224	1.1747E+00						
		241.00	1.175E+00	&(	1.063E+00	3.32E-01	G
RA-226	1.2281E+00						
		185.99	1.228E+00	(P	1.091E+00	3.39E-01	G
AC-228	7.6457E-01						
		911.07	7.815E-01	(P	1.287E-01	6.96E-02	G K
		968.90	6.017E-01	- P	2.354E-01	8.92E-02	G
		338.40	7.236E-01	(P	2.667E-01	1.03E-01	G

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

TH-227      -2.3646E-01
                          236.00-2.365E-01 %(  4.096E-01 1.25E-01 G K
                          256.25-6.162E-02 & P 5.156E-01 1.53E-01 G

PA-234       1.6332E-01
                           98.44 1.097E-02 &(P 2.270E-01 6.75E-02 G K
                          946.00 4.688E-02 % P 1.061E-01 3.20E-02 G
                          131.28-9.900E-03 % P 2.196E-01 6.54E-02 G
                           94.67 4.100E-01 &(P 3.595E-01 1.12E-01 G
                          883.24 0.000E+00 %   2.822E-01 7.91E-02 G
                          926.70 0.000E+00 &   4.206E-01 1.20E-01 G
                          569.26 1.219E-01 % P 2.759E-01 8.28E-02 G

TH-234       1.5294E+00
                           63.29 1.259E+00 %(P 6.578E+00 1.96E+00 G K
                           92.80 1.881E+00 @(P 2.219E+00 6.79E-01 G
                           92.38-1.991E-01 & P 2.608E+00 7.68E-01 G

AM-241      -2.3336E-02
                           59.54-2.334E-02 &(P 1.171E+00 3.47E-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	1.1106E-01	1.1733E-01	2.6809E-01	2.6818E-01	2.816E-01
K-40		1.4437E+01	1.4437E+01	1.3174E+00	1.5615E+00	3.610E-01
MN-54	#A	7.5336E-03	7.6048E-03	3.3009E-02	3.3012E-02	3.738E-02
CO-57	#B	2.8063E-03	2.8370E-03	4.4644E-02	4.4644E-02	4.949E-02
CO-60	#B	5.5709E-03	5.5794E-03	3.0196E-02	3.0198E-02	3.615E-02
Sr-85	#A	-1.1982E-02	-1.2537E-02	4.3570E-02	4.3576E-02	4.654E-02
Kr-85	#A	-2.7661E+02	-2.7662E+02	9.6135E+02	9.6149E+02	1.074E+03
Y-88	#B	-1.0405E-04	-1.0696E-04	6.4176E-04	6.4179E-04	1.218E-02
NB-94	#B	5.8701E-03	5.8701E-03	2.5137E-02	2.5139E-02	2.905E-02
Ag-108M	#B	8.6420E-03	8.6426E-03	3.0290E-02	3.0294E-02	3.442E-02
CD-109	#A	8.1997E-01	8.2530E-01	1.7615E+00	1.7621E+00	1.928E+00
SN-113	#B	-2.8300E-04	-2.9030E-04	4.1765E-02	4.1765E-02	4.681E-02
SB-125	#F	1.1531E-01	1.1565E-01	1.0842E-01	1.0863E-01	1.008E-01
I-131	#B	1.3201E-02	1.9016E-02	4.7397E-02	4.7410E-02	3.658E-02
CS-134	#B	1.8373E-02	1.8445E-02	1.6606E-02	1.6641E-02	3.500E-02
CS-137	#A	-5.1645E-03	-5.1659E-03	6.4220E-02	6.4220E-02	4.528E-02
CE-139	#A	-8.1978E-04	-8.3746E-04	4.0468E-02	4.0468E-02	4.453E-02
EU-152	#B	8.5009E-03	8.5062E-03	1.3321E-01	1.3321E-01	1.491E-01
EU-154	#B	8.5191E-03	8.5272E-03	9.3438E-02	9.3439E-02	1.045E-01
EU-155	#B	0.0000E+00	0.0000E+00	2.2200E-01	2.2200E-01	2.482E-01
HG-203	#B	3.5392E-04	3.7693E-04	3.3949E-02	3.3949E-02	3.628E-02
TL-208		2.2506E-01	2.2506E-01	5.2028E-02	5.3644E-02	
PB-212		7.4894E-01	7.4894E-01	1.1848E-01	1.2621E-01	
PB-214		4.4318E-01	4.4318E-01	1.1088E-01	1.1383E-01	
BI-212		3.6549E-01	3.6549E-01	3.3321E-01	3.3389E-01	
BI-214		4.1004E-01	4.1004E-01	1.1752E-01	1.1990E-01	
RA-224	#	1.1747E+00	1.1747E+00	9.9499E-01	9.9733E-01	1.063E+00
RA-226	#	1.2281E+00	1.2281E+00	1.0176E+00	1.0201E+00	1.091E+00
AC-228		7.6457E-01	7.6457E-01	1.9217E-01	1.9723E-01	
TH-227	#B	-2.3646E-01	-2.3646E-01	3.7419E-01	3.7444E-01	4.096E-01
PA-234	#B	1.6332E-01	1.6332E-01	1.3424E-01	1.3455E-01	2.270E-01
TH-234	#B	1.5294E+00	1.5294E+00	1.6576E+00	1.6598E+00	6.578E+00
AM-241	#A	-2.3335E-02	-2.3336E-02	1.2365E+00	1.2365E+00	1.171E+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 (983.5 to 2000.7 keV) 1.7394342E+01 pCi/gm
Total Decayed Activity (983.5 to 2000.7 keV) 1.7394342E+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_27JUN2006_1701.An1

Sample description
FSS-NOL-06-02-031-F-B

Spectrum Filename: C:\GammaVision\Spectra\103F_27JUN2006_1701.An1

Acquisition information
Start time: 27-Jun-2006 17:02:01
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: 1.9690E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9690E+03) =
5.0787E+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-Jun-2006 11:12:00
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: 0.5254

***** 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	131.	21.67	0.99	9.100E-03	74.81	9.600	1.013E+00	PB212
77.25	248.	13.31	0.99	1.017E-02	77.11	17.500	9.486E-01	PB212
					77.11	10.700	1.551E+00	PB214
93.21	103.	39.06	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.55	150.	26.10	1.11	2.565E-02	185.99	3.280	1.121E+00	RA226
209.63	127.	25.99	1.01	2.470E-02				
239.00	1257.	3.42	1.09	2.318E-02	238.63	43.100	8.546E-01	PB212
241.88	190.	15.85	1.10	2.302E-02	241.00	3.900	1.447E+00	RA224
					241.92	7.470	7.571E-01	PB214
278.13	78.	33.59	1.15	2.110E-02				
278.13	78.	33.59	1.15	2.110E-02	279.17	81.500	PBC<MDA	HG203
295.63	250.	11.53	1.06	2.023E-02	295.22	19.200	4.351E-01	PB214
300.46	90.	29.15	0.98	2.000E-02				
328.56	78.	33.75	0.67	1.872E-02				
338.74	298.	11.49	1.07	1.829E-02	338.40	12.010	9.258E-01	AC228
352.34	475.	8.86	1.14	1.774E-02	351.99	37.100	4.895E-01	PB214
463.83	87.	22.83	1.57	1.424E-02	463.51	10.000	4.151E-01	SB125
511.61	231.	11.20	1.35	1.315E-02	510.72	22.500	4.731E-01	TL208
583.98	400.	7.07	1.16	1.183E-02	583.14	86.000	2.665E-01	TL208
610.14	400.	7.86	1.27	1.143E-02	609.32	46.090	5.125E-01	BI214
728.36	75.	18.80	1.41	9.952E-03	727.17	11.800	4.331E-01	BI212
795.99	77.	25.19	1.06	9.299E-03	795.76	85.400	6.706E-02	CS134
861.79	60.	19.15	0.80	8.758E-03				
912.28	296.	7.96	1.42	8.393E-03	911.07	29.000	8.238E-01	AC228
947.38	46.	30.90	1.15	8.161E-03	946.00	20.000	1.914E-01	PA234
965.90	56.	22.74	1.54	8.044E-03	964.00	14.580	3.259E-01	EU152

970.24	167.	9.97	1.54	8.017E-03	968.90	17.460	8.189E-01	AC228
1121.42	91.	22.52	2.02	7.212E-03	1120.28	15.040	5.733E-01	BI214
1462.61	1479.	2.66	2.12	5.926E-03	1460.75	10.700	1.579E+01	K40
1766.75	78.	11.95	2.07	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
418.42	209.63	460.	127.	0.064	77.97	1.007	NP-239
600.06	300.46	263.	90.	0.045	87.45	0.981	PB-212 s
656.27	328.56	246.	78.	0.039	101.25	0.672	RH-106M s
1722.62	861.79	36.	60.	0.030	57.45	0.798	TL-208 s
1930.93	965.96	54.	56.	0.028	68.76	1.539	TB-160 D
3532.10	1766.75	6.	71.	0.035	38.52	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	413.	128.	0.064	70.37	0.993D
PB-212	153.39	77.11	422.	185.	0.093	42.67	0.995A
RA-226	372.27	186.55	593.	137.	0.069	78.31	1.114s
PB-212	477.26	239.05	648.	1365.	0.683	12.12	0.932
RA-224	483.01	241.93	775.	180.	0.090	69.15	1.500
PB-214	482.98	241.91	423.	83.	0.041	105.29	1.363s
HG-203	554.88	277.86	349.	76.	0.038	109.37	1.500s
PB-214	590.41	295.63	258.	246.	0.123	34.58	1.061
AC-228	676.61	338.74	312.	297.	0.148	34.47	1.069
PB-214	703.82	352.34	387.	470.	0.235	26.57	1.136
SB-125	926.54	463.71	168.	77.	0.038	77.97	1.500s
TL-208	1022.32	511.61	173.	204.	0.102	33.59	1.348s
TL-208	1167.05	583.98	147.	395.	0.198	21.20	1.163
BI-214	1219.38	610.14	170.	394.	0.197	23.58	1.266
Ag-108M	1222.70	611.80	338.	-128.	-0.064	66.50	1.500s
BI-212	1455.80	728.36	59.	74.	0.037	56.39	1.412
CS-134	1591.09	796.01	90.	48.	0.024	93.59	1.500
AC-228	1823.60	912.28	82.	292.	0.146	23.87	1.418
EU-152	1930.80	965.89	71.	48.	0.024	84.80	1.538s
AC-228	1936.81	968.90	157.	65.	0.033	89.26	1.541D
BI-214	2241.82	1121.42	99.	91.	0.045	67.55	2.019s
K-40	2924.14	1462.64	49.	1408.	0.704	8.11	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	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		8.9356E-02					
			477.56	8.936E-02	%(	3.090E-01 9.21E-02	G
K-40		1.5219E+01					
			1460.75	1.522E+01	(P	3.815E-01 4.17E-01	G
MN-54		1.0232E-02					
			834.81	1.023E-02	&(P	3.684E-02 1.09E-02	G
CO-57		-8.8432E-04					
			122.07	-8.843E-04	%(P	5.403E-02 1.61E-02	G K
			136.43	3.106E-02	&	3.864E-01 1.15E-01	G
CO-60		1.4002E-04					
			1332.51	1.400E-04	%(P	4.189E-02 1.17E-02	G K
			1173.23	1.788E-02	% P	4.778E-02 1.43E-02	G K
Sr-85		-1.1753E-03					
			514.00	-1.175E-03	&(	4.156E-02 1.22E-02	G
Kr-85		-2.5929E+01					
			513.99	-2.593E+01	&(	9.168E+02 2.69E+02	G
Y-88		-3.6122E-03					
			1836.01	-3.612E-03	%(P	3.121E-02 8.58E-03	G K
			898.02	-1.818E-03	& P	3.971E-02 1.13E-02	G
NB-94		-1.8927E-04					
			871.10	-1.893E-04	&(	3.497E-02 9.97E-03	G K
			702.50	4.531E-03	&	3.433E-02 1.00E-02	G K
Ag-108M		1.0003E-02					
			722.95	1.000E-02	%(	3.348E-02 9.93E-03	G K
			614.37	-8.552E-02	+ P	5.905E-02 1.89E-02	G
			433.93	3.159E-05	&	3.324E-02 9.67E-03	G
CD-109		-3.9536E-02					
			88.04	-3.954E-02	&(	2.003E+00 5.98E-01	G
SN-113		-3.9549E-04					
			391.71	-3.955E-04	&(	5.198E-02 1.52E-02	G K
			255.04	1.383E-01	%	1.492E+00 4.43E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.9873E-02						
		427.95	-1.850E-02	%(P	9.746E-02	2.88E-02	G K
		600.77	-4.987E-03	% P	1.771E-01	5.12E-02	G
		636.15	-3.686E-02	% P	2.824E-01	8.21E-02	G
		463.51	3.711E-01	(P	3.050E-01	9.80E-02	G
		176.29	3.599E-04	%	5.681E-01	1.69E-01	G
I-131	1.4682E-02						
		364.48	1.468E-02	&(P	5.132E-02	1.53E-02	G K
		636.97	-7.644E-02	%	6.070E-01	1.77E-01	G
		284.29	-1.166E-02	% P	5.461E-01	1.59E-01	G
CS-134	1.6257E-02						
		604.66	-6.249E-03	%(	3.707E-02	1.09E-02	G K
		795.76	4.198E-02	(P	4.075E-02	1.31E-02	G
		569.29	3.476E-03	& P	2.083E-01	6.01E-02	G
		801.84	-8.490E-02	% P	3.744E-01	1.08E-01	G
CS-137	1.6217E-02						
		661.62	1.622E-02	%(P	3.981E-02	1.19E-02	G
CE-139	-4.6103E-03						
		165.85	-4.610E-03	%(	4.605E-02	1.38E-02	G
EU-152	7.7375E-02						
		121.78	-2.430E-02	%(P	1.534E-01	4.60E-02	G K
		344.30	7.961E-04	% P	1.040E-01	3.04E-02	G
		1408.08	0.000E+00	%	9.351E-02	2.40E-02	G
		964.00	2.813E-01	?(P	2.451E-01	8.04E-02	G
		1112.07	8.331E-02	%	2.834E-01	8.38E-02	G
		778.90	4.732E-02	&	2.448E-01	7.16E-02	G
EU-154	5.1722E-03						
		123.10	5.172E-03	%(	8.846E-02	2.63E-02	G K
		1274.80	-2.415E-02	%	1.201E-01	3.50E-02	G
		723.30	3.710E-03	%	2.457E-01	7.18E-02	G
		1004.80	-1.143E-02	%	1.913E-01	5.45E-02	G
EU-155	7.4215E-02						
		86.45	7.422E-02	%(	2.350E-01	7.09E-02	G K
		105.31	5.346E-02	%	2.370E-01	7.12E-02	G
HG-203	3.2524E-02						
		279.17	3.252E-02	*(P	3.827E-02	1.19E-02	G K
		72.87	-5.382E-01	% P	2.437E+00	7.33E-01	G
		70.83	2.494E-01	&	4.561E+00	1.36E+00	G
		82.50	-1.664E+00	%	3.967E+00	1.20E+00	G

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

TL-208       2.6646E-01
                          583.14 2.665E-01  (P 3.983E-02 1.91E-02 G
                          510.72 4.731E-01 + P 1.481E-01 6.00E-02 G

PB-212       9.5043E-01
                          238.63 9.371E-01  (P 8.327E-02 3.83E-02 G K
                                                          Energy duplication
                           77.11 7.185E-01 } P 3.818E-01 1.02E-01 G
                           74.81 1.014E+00  (P 7.691E-01 2.44E-01 G

PB-214       4.7094E-01
                          351.99 4.895E-01  (P 9.838E-02 4.39E-02 G K
                          295.22 4.351E-01  (P 1.368E-01 5.10E-02 G
                                                          Energy duplication
                           77.11 2.925E-01 } P 9.274E-01 2.20E-01 G
                          241.92 3.304E-01 -   3.934E-01 1.16E-01 G

BI-212       4.3312E-01
                          727.17 4.331E-01  (P 2.244E-01 8.21E-02 G K
                         1620.56 3.237E-01 & P 7.303E-01 2.20E-01 G
                          785.42-3.129E-02 %   1.551E+00 4.42E-01 G

BI-214       5.2748E-01
                          609.32 5.125E-01  (P 8.268E-02 4.10E-02 G K
                         1764.51-2.743E-02 % P 1.549E-01 3.39E-02 G
                         1120.28 5.733E-01  (P 3.111E-01 1.32E-01 G

RA-224       1.3765E+00
                          241.00 1.376E+00  (  1.010E+00 3.17E-01 G

RA-226       1.1205E+00
                          185.99 1.121E+00 *(P 9.469E-01 3.20E-01 G

AC-228       8.5366E-01
                          911.07 8.238E-01  (P 1.262E-01 6.64E-02 G K
                          968.90 3.196E-01 - P 2.990E-01 9.53E-02 G
                          338.40 9.258E-01  (P 2.657E-01 1.07E-01 G

TH-227      -1.9563E-02
                          236.00-1.956E-02 %(  5.418E-01 1.62E-01 G K
                          256.25-1.523E-01 % P 4.904E-01 1.47E-01 G

PA-234       5.1244E-04
                           98.44 5.124E-04 &(P 1.775E-01 5.26E-02 G K
                          946.00-3.660E-02 & P 1.874E-01 5.48E-02 G
                          131.28-7.120E-02 % P 2.250E-01 6.78E-02 G
                           94.67-8.634E-02 & P 4.135E-01 1.24E-01 G
                          883.24 1.008E-03 %   2.656E-01 7.52E-02 G
                          926.70-6.587E-02 %   2.990E-01 8.74E-02 G
```

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 6.908E-03 & P 3.074E-01 8.87E-02 G

TH-234      -1.9428E-01
                           63.29-1.943E-01 &(P 5.258E+00 1.55E+00 G K
                           92.80 1.431E+00 % P 2.153E+00 6.55E-01 G
                           92.38 1.579E+00 % P 2.574E+00 7.81E-01 G

AM-241      -2.1611E-01
                           59.54-2.161E-01 &(P 1.124E+00 3.37E-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	8.4568E-02	8.9356E-02	2.7628E-01	2.7633E-01	2.924E-01
K-40		1.5219E+01	1.5219E+01	1.2507E+00	1.5313E+00	3.815E-01
MN-54	#A	1.0136E-02	1.0232E-02	3.2706E-02	3.2712E-02	3.649E-02
CO-57	#B	-8.7474E-04	-8.8432E-04	6.7942E-02	6.7942E-02	5.344E-02
CO-60	#B	1.3980E-04	1.4002E-04	3.5086E-02	3.5086E-02	4.182E-02

Sr-85	#A	-1.1231E-03	-1.1753E-03	3.6552E-02	3.6552E-02	3.971E-02
Kr-85	#A	-2.5929E+01	-2.5929E+01	8.0644E+02	8.0644E+02	9.168E+02
Y-88	#B	-3.5139E-03	-3.6122E-03	2.7055E-02	2.7056E-02	3.036E-02
NB-94	#B	-1.8927E-04	-1.8927E-04	2.9914E-02	2.9914E-02	3.497E-02
Ag-108M	#B	1.0002E-02	1.0003E-02	2.9784E-02	2.9790E-02	3.348E-02
CD-109	#A	-3.9280E-02	-3.9536E-02	1.7939E+00	1.7939E+00	1.990E+00
SN-113	#B	-3.8552E-04	-3.9549E-04	4.5691E-02	4.5691E-02	5.067E-02
SB-125	#B	7.9641E-02	7.9873E-02	6.3307E-02	6.3477E-02	9.718E-02
I-131	#B	1.0184E-02	1.4682E-02	4.5978E-02	4.5986E-02	3.560E-02
CS-134	#B	1.6194E-02	1.6257E-02	1.5242E-02	1.5271E-02	3.693E-02
CS-137	#A	1.6213E-02	1.6217E-02	3.5846E-02	3.5858E-02	3.980E-02
CE-139	#A	-4.5127E-03	-4.6103E-03	4.1265E-02	4.1266E-02	4.508E-02
EU-152	#B	7.7326E-02	7.7375E-02	6.6357E-02	6.6495E-02	1.533E-01
EU-154	#B	5.1673E-03	5.1722E-03	7.8971E-02	7.8972E-02	8.837E-02
EU-155	#B	7.4095E-02	7.4215E-02	2.1265E-01	2.1269E-01	2.346E-01
HG-203	#A	3.0534E-02	3.2524E-02	3.5590E-02	3.5640E-02	3.593E-02
TL-208		2.6646E-01	2.6646E-01	5.7097E-02	5.9155E-02	
PB-212		9.5043E-01	9.5043E-01	1.1617E-01	1.2861E-01	
PB-214		4.7094E-01	4.7094E-01	1.0420E-01	1.0773E-01	
BI-212		4.3312E-01	4.3312E-01	2.4585E-01	2.4713E-01	
BI-214		5.2748E-01	5.2748E-01	1.2645E-01	1.3011E-01	
RA-224		1.3765E+00	1.3765E+00	9.5188E-01	9.5523E-01	1.010E+00
RA-226	#	1.1205E+00	1.1205E+00	9.6022E-01	9.6242E-01	
AC-228		8.5366E-01	8.5366E-01	1.8009E-01	1.8678E-01	
TH-227	#B	-1.9563E-02	-1.9563E-02	4.8729E-01	4.8730E-01	5.418E-01
PA-234	#B	5.1244E-04	5.1244E-04	1.5786E-01	1.5786E-01	1.775E-01
TH-234	#B	-1.9428E-01	-1.9428E-01	4.6305E+01	4.6305E+01	5.258E+00
AM-241	#A	-2.1611E-01	-2.1611E-01	1.0260E+00	1.0260E+00	1.124E+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) 2.1218098E+01 pCi/gm
Total Decayed Activity (1766.6 to 2000.7 keV) 2.1218103E+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_27JUN2006_1741.An1

Sample description
FSS-NOL-06-02-027-F-B

Spectrum Filename: C:\GammaVision\Spectra\103F_27JUN2006_1741.An1

Acquisition information
Start time: 27-Jun-2006 17:41:23
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: 1.6170E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6170E+03) =
6.1843E+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-Jun-2006 10:42:00
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: 0.5837

***** 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	137.	20.92	0.99	9.052E-03	74.81	9.600	1.315E+00	PB212
77.32	210.	13.92	0.99	1.011E-02	77.11	17.500	1.154E+00	PB212
87.34	93.	33.30	1.00	1.448E-02				
87.34	93.	33.30	1.00	1.448E-02	88.04	3.790	1.395E+00	CD109
90.00	79.	36.16	1.00	1.548E-02				
93.52	131.	23.03	1.00	1.672E-02	92.80	3.000	PBC<MDA	TH234
106.16	82.	39.55	1.55	2.038E-02	105.31	21.800	1.561E-01	EU155
186.60	152.	22.44	1.30	2.565E-02	185.99	3.280	1.382E+00	RA226
209.64	102.	26.61	1.05	2.470E-02				
239.02	1148.	3.51	1.09	2.318E-02	238.63	43.100	9.497E-01	PB212
242.22	150.	17.72	1.10	2.301E-02	241.00	3.900	1.393E+00	RA224
					241.92	7.470	7.286E-01	PB214
270.52	128.	19.76	1.60	2.150E-02				
295.31	285.	12.00	1.15	2.024E-02	295.22	19.200	6.044E-01	PB214
300.57	110.	24.02	1.46	1.999E-02				
328.58	86.	28.86	1.23	1.872E-02				
338.64	304.	12.32	1.22	1.829E-02	338.40	12.010	1.152E+00	AC228
352.30	423.	7.04	1.08	1.774E-02	351.99	37.100	5.296E-01	PB214
410.17	68.	27.15	1.42	1.572E-02				
463.97	103.	24.62	1.08	1.424E-02	463.51	10.000	5.985E-01	SB125
511.42	193.	14.84	1.73	1.316E-02	510.72	22.500	4.696E-01	TL208
583.90	425.	7.75	1.32	1.183E-02	583.14	86.000	3.450E-01	TL208
610.04	339.	8.41	1.34	1.143E-02	609.32	46.090	5.265E-01	BI214
662.35	41.	37.32	1.50	1.072E-02	661.62	84.620	PBC<MDA	CS137
728.44	113.	15.53	0.82	9.951E-03	727.17	11.800	7.996E-01	BI212
772.86	62.	32.65	0.67	9.510E-03				
795.90	54.	23.66	0.94	9.300E-03	795.76	85.400	5.674E-02	CS134

862.45	57.	26.59	1.59	8.753E-03				
912.37	282.	7.30	1.85	8.392E-03	911.07	29.000	9.544E-01	AC228
965.60	70.	17.72	1.54	8.046E-03				
970.13	178.	9.25	1.54	8.018E-03	968.90	17.460	1.062E+00	AC228
1005.67	18.	38.72	0.69	7.808E-03				
1121.76	96.	16.72	0.84	7.212E-03	1120.28	15.040	7.413E-01	BI214
1462.66	1437.	2.67	1.92	5.926E-03	1460.75	10.700	1.867E+01	K40
1632.48	19.	27.35	1.52	5.457E-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	
173.86	87.41	428.	93.	0.046	99.89	1.001	PB-214	lD
179.17	90.07	364.	79.	0.039	108.49	1.002	PB-214	lD
211.49	106.16	485.	82.	0.041	118.66	1.554	NP-239	l
418.43	209.64	338.	102.	0.051	79.82	1.047	NP-239	
540.19	270.52	243.	128.	0.064	59.27	1.600	AC-228	s
600.29	300.57	245.	110.	0.055	72.05	1.460	PB-212	s
656.31	328.58	228.	86.	0.043	86.57	1.225	RH-106M	s
819.47	410.17	122.	68.	0.034	81.45	1.424	AC-228	s
1544.78	772.86	122.	62.	0.031	97.94	0.667	W-187	sM
1723.94	862.45	61.	57.	0.028	70.70	1.586	TL-208	s
1930.41	965.70	41.	71.	0.035	52.57	1.539	TB-160	D
3263.77	1632.48	4.	19.	0.009	82.04	1.517	AC-228	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	361.	137.	0.068	62.77	0.993D
PB-212	153.39	77.11	381.	210.	0.105	41.76	0.995A
TH-234	185.75	93.29	971.	138.	0.069	87.33	1.500s
RA-226	372.29	186.56	690.	155.	0.077	69.81	1.500s
PB-212	477.17	239.00	672.	1188.	0.594	13.65	1.041
RA-224	483.26	242.05	748.	134.	0.067	90.61	1.500s
PB-214	589.77	295.31	321.	281.	0.141	36.01	1.150s
AC-228	676.43	338.64	356.	303.	0.152	36.97	1.222
PB-214	703.73	352.30	192.	417.	0.209	21.13	1.081s
SB-125	926.47	463.67	168.	71.	0.035	83.96	1.500s
TL-208	1021.95	511.42	211.	167.	0.083	44.51	1.729s
TL-208	1166.91	583.90	183.	420.	0.210	23.25	1.316
BI-214	1219.18	610.04	154.	332.	0.166	25.22	1.344
Ag-108M	1223.26	612.08	281.	-89.	-0.044	86.41	1.500
CS-137	1323.78	662.35	108.	41.	0.021	111.96	1.500
BI-212	1455.95	728.44	78.	113.	0.056	46.59	0.824s
CS-134	1591.05	796.00	70.	51.	0.025	81.46	1.500s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1823.76	912.37	54.	278.	0.139	21.90	1.847s
AC-228	1936.81	968.90	150.	80.	0.040	72.74	1.541D
BI-214	2242.49	1121.76	61.	96.	0.048	50.15	0.842s
K-40	2924.20	1462.67	57.	1383.	0.692	8.23	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	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		9.2101E-02					
			477.56	9.210E-02	&(	3.892E-01 1.16E-01	G
K-40		1.8210E+01					
			1460.75	1.821E+01	&(P	4.976E-01 5.06E-01	G
MN-54		-1.3380E-03					
			834.81	-1.338E-03	&(P	4.804E-02 1.38E-02	G
CO-57		-1.1984E-02					
			122.07	-1.198E-02	&(P	6.097E-02 1.83E-02	G K
			136.43	-8.388E-02	&	4.805E-01 1.44E-01	G
CO-60		-5.8732E-03					
			1332.51	-5.873E-03	&(P	4.722E-02 1.30E-02	G K
			1173.23	9.974E-03	% P	5.128E-02 1.49E-02	G K
Sr-85		-1.8516E-02					
			514.00	-1.852E-02	&(	5.270E-02 1.58E-02	G
Kr-85		-4.0830E+02					
			513.99	-4.083E+02	&(	1.162E+03 3.49E+02	G
Y-88		-1.0930E-03					
			1836.01	-1.093E-03	&(P	3.247E-02 8.51E-03	G K
			898.02	-6.305E-03	% P	4.304E-02 1.24E-02	G
NB-94		8.7465E-03					
			871.10	8.746E-03	%(	3.783E-02 1.11E-02	G K
			702.50	1.320E-02	&	3.704E-02 1.11E-02	G K
Ag-108M		1.0213E-02					
			722.95	1.021E-02	%(	4.184E-02 1.23E-02	G K
			614.37	-7.213E-02	+ P	6.577E-02 2.08E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	1.583E-02	%	3.718E-02	1.12E-02	G
CD-109	1.5354E+00						
		88.04	1.535E+00	%(	2.206E+00	6.75E-01	G
SN-113	2.5750E-04						
		391.71	2.575E-04	%(	5.119E-02	1.49E-02	G K
		255.04	-2.634E-02	&	1.517E+00	4.46E-01	G
SB-125	1.1514E-01						
		427.95	1.364E-02	&(P	1.227E-01	3.61E-02	G K
		600.77	2.428E-02	% P	1.970E-01	5.74E-02	G
		636.15	6.301E-02	% P	3.239E-01	9.49E-02	G
		463.51	4.155E-01	*(P	3.711E-01	1.18E-01	G
		176.29	6.932E-02	&	5.694E-01	1.70E-01	G
I-131	-8.8713E-03						
		364.48	-8.871E-03	&(P	6.043E-02	1.78E-02	G K
		636.97	2.675E-01	%	7.160E-01	2.14E-01	G
		284.29	-1.328E-02	& P	9.343E-01	2.76E-01	G
CS-134	3.2000E-02						
		604.66	1.312E-02	%(	4.057E-02	1.21E-02	G K
		795.76	5.357E-02	(P	4.400E-02	1.46E-02	G
		569.29	-7.608E-03	& P	2.755E-01	7.95E-02	G
		801.84	-2.114E-02	% P	4.272E-01	1.20E-01	G
CS-137	3.8201E-02						
		661.62	3.820E-02	(P	4.708E-02	1.47E-02	G
CE-139	-2.0918E-04						
		165.85	-2.092E-04	%(	5.324E-02	1.58E-02	G
EU-152	-3.5369E-02						
		121.78	-3.537E-02	%(P	1.770E-01	5.31E-02	G K
		344.30	-2.540E-02	% P	1.396E-01	4.15E-02	G
		1408.08	-7.960E-03	%	1.883E-01	5.23E-02	G
		964.00	-2.373E-02	& P	3.453E-01	9.94E-02	G
		1112.07	4.086E-02	%	2.682E-01	7.67E-02	G
		778.90	-5.919E-04	%	2.834E-01	8.04E-02	G
EU-154	-2.3095E-02						
		123.10	-2.310E-02	%(	1.269E-01	3.80E-02	G K
		1274.80	4.486E-02	&	1.086E-01	3.26E-02	G
		723.30	3.231E-02	&	1.859E-01	5.42E-02	G
		1004.80	-3.487E-02	%	2.094E-01	6.03E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-8.2363E-02						
		86.45	-8.236E-02	&(	2.819E-01	8.49E-02	G K
		105.31	1.464E-01	%	2.676E-01	8.14E-02	G
HG-203	3.0464E-05						
		279.17	3.046E-05	&(P	5.049E-02	1.49E-02	G K
		72.87	-9.086E-01	& P	2.770E+00	8.35E-01	G
		70.83	2.386E-02	&	4.468E+00	1.33E+00	G
		82.50	-6.362E-01	%	4.330E+00	1.30E+00	G
TL-208	3.4498E-01						
		583.14	3.450E-01	(P	5.387E-02	2.70E-02	G
		510.72	4.696E-01	+ P	1.987E-01	8.09E-02	G
PB-212	9.9333E-01						
		238.63	9.933E-01	(P	1.032E-01	4.57E-02	G K
							Energy duplication
		77.11	9.933E-01	} P	4.420E-01	1.38E-01	G
		74.81	1.315E+00	+ P	8.779E-01	2.81E-01	G
PB-214	5.5508E-01						
		351.99	5.296E-01	@(P	8.529E-02	3.78E-02	G K
		295.22	6.044E-01	@(P	1.853E-01	7.36E-02	G
							Energy duplication
		77.11	0.000E+00	} P	1.007E+00	0.00E+00	G
		241.92	4.105E-01	%	6.782E-01	2.07E-01	G
BI-212	7.9962E-01						
		727.17	7.996E-01	(P	3.127E-01	1.25E-01	G K
		1620.56	-2.533E-01	% P	1.322E+00	3.74E-01	G
		785.42	1.228E+00	%	1.978E+00	6.10E-01	G
BI-214	5.2645E-01						
		609.32	5.265E-01	(P	9.592E-02	4.52E-02	G K
		1764.51	-1.868E-02	& P	9.925E-02	1.02E-02	G
		1120.28	7.413E-01	+ P	3.008E-01	1.26E-01	G
RA-224	1.2411E+00						
		241.00	1.241E+00	&(	1.209E+00	3.75E-01	G
RA-226	1.5354E+00						
		185.99	1.535E+00	@(P	1.242E+00	3.87E-01	G
AC-228	1.0123E+00						
		911.07	9.544E-01	(P	1.265E-01	7.06E-02	G K
		968.90	4.784E-01	- P	3.563E-01	1.16E-01	G
		338.40	1.152E+00	(P	3.446E-01	1.43E-01	G

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

TH-227      -2.3576E-01
                          236.00-2.358E-01 %(  4.635E-01 1.41E-01 G K
                          256.25 4.693E-02 % P 5.568E-01 1.65E-01 G

PA-234       4.6740E-02
                           98.44 4.674E-02 %(P 2.502E-01 7.50E-02 G K
                          946.00-5.649E-03 % P 2.530E-01 7.28E-02 G
                          131.28-1.121E-03 & P 2.553E-01 7.61E-02 G
                           94.67-1.787E-02 % P 4.712E-01 1.41E-01 G
                          883.24-6.281E-02 %   3.499E-01 1.02E-01 G
                          926.70-5.392E-02 %   3.291E-01 9.50E-02 G
                          569.26-1.124E-02 & P 4.072E-01 1.17E-01 G

TH-234       2.4053E+00
                           63.29 2.453E+00 %(P 7.070E+00 2.13E+00 G K
                           92.80 2.343E+00 @(P 2.505E+00 7.69E-01 G
                           92.38-4.580E-01 & P 3.038E+00 8.99E-01 G

AM-241      -3.2177E-01
                           59.54-3.218E-01 %(P 1.339E+00 4.02E-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

- -

***** 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	8.7111E-02	9.2101E-02	3.4654E-01	3.4659E-01	3.681E-01
K-40		1.8210E+01	1.8210E+01	1.5184E+00	1.8502E+00	4.976E-01
MN-54	#A	-1.3253E-03	-1.3380E-03	6.9304E-02	6.9304E-02	4.758E-02
CO-57	#B	-1.1853E-02	-1.1984E-02	5.6558E-02	5.6562E-02	6.031E-02
CO-60	#B	-5.8641E-03	-5.8732E-03	1.5339E-01	1.5339E-01	4.715E-02
Sr-85	#A	-1.7686E-02	-1.8516E-02	4.7518E-02	4.7530E-02	5.034E-02
Kr-85	#A	-4.0829E+02	-4.0830E+02	1.0478E+03	1.0481E+03	1.162E+03
Y-88	#B	-1.0630E-03	-1.0930E-03	3.1189E-02	3.1189E-02	3.158E-02
NB-94	#B	8.7465E-03	8.7465E-03	3.3224E-02	3.3228E-02	3.783E-02
Ag-108M	#B	1.0213E-02	1.0213E-02	3.6981E-02	3.6986E-02	4.184E-02
CD-109	#A	1.5254E+00	1.5354E+00	2.0236E+00	2.0254E+00	2.192E+00
SN-113	#B	2.5093E-04	2.5750E-04	4.4607E-02	4.4607E-02	4.989E-02
SB-125	#B	1.1480E-01	1.1514E-01	9.8412E-02	9.8639E-02	1.223E-01
I-131	#B	-6.1279E-03	-8.8713E-03	6.1015E-02	6.1017E-02	4.174E-02
CS-134	#B	3.1874E-02	3.2000E-02	2.6111E-02	2.6177E-02	4.041E-02
CS-137	#A	3.8191E-02	3.8201E-02	4.4202E-02	4.4257E-02	4.707E-02
CE-139	#A	-2.0470E-04	-2.0918E-04	4.7469E-02	4.7469E-02	5.210E-02
EU-152	#B	-3.5347E-02	-3.5369E-02	1.7013E-01	1.7014E-01	1.769E-01
EU-154	#B	-2.3073E-02	-2.3095E-02	1.1415E-01	1.1415E-01	1.267E-01
EU-155	#B	-8.2227E-02	-8.2363E-02	2.5482E-01	2.5486E-01	2.814E-01
HG-203	#B	2.8579E-05	3.0464E-05	4.4686E-02	4.4686E-02	4.737E-02
TL-208		3.4498E-01	3.4498E-01	8.1040E-02	8.3478E-02	
PB-212		9.9333E-01	9.9333E-01	1.3691E-01	1.4856E-01	
PB-214	#	5.5508E-01	5.5508E-01	1.1754E-01	1.2188E-01	
BI-212		7.9962E-01	7.9962E-01	3.7420E-01	3.7707E-01	
BI-214		5.2645E-01	5.2645E-01	1.3536E-01	1.3877E-01	
RA-224	#	1.2411E+00	1.2411E+00	1.1245E+00	1.1268E+00	1.209E+00
RA-226	#	1.5354E+00	1.5354E+00	1.1616E+00	1.1650E+00	1.242E+00
AC-228		1.0123E+00	1.0123E+00	2.1876E-01	2.2652E-01	
TH-227	#B	-2.3576E-01	-2.3576E-01	4.2219E-01	4.2241E-01	4.635E-01
PA-234	#B	4.6740E-02	4.6740E-02	2.2497E-01	2.2498E-01	2.502E-01
TH-234	#B	2.4053E+00	2.4053E+00	2.3686E+00	2.3723E+00	7.070E+00
AM-241	#A	-3.2177E-01	-3.2177E-01	1.2212E+00	1.2214E+00	1.339E+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 (1005.5 to 2000.7 keV) 4.2317467E+00 pCi/gm
Total Decayed Activity (1005.5 to 2000.7 keV) 4.2317467E+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: 103F_27JUN2006_1824.An1

Sample description
FSS-NOL-06-02-007-F

Spectrum Filename: C:\GammaVision\Spectra\103F_27JUN2006_1824.An1

Acquisition information
Start time: 27-Jun-2006 18:25:01
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: 1.8020E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8020E+03) =
5.5494E+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-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: 0.5295

***** 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	134.	21.15	0.99	9.052E-03	74.81	9.600	1.153E+00	PB212
77.24	227.	12.82	0.99	1.011E-02	77.11	10.700	1.729E+00	PB214
					77.11	17.500	1.057E+00	PB212
87.67	77.	36.93	1.00	1.455E-02	86.45	32.740	1.255E-01	EU155
					88.04	3.790	1.044E+00	CD109
89.98	79.	38.44	1.00	1.542E-02				
93.16	141.	21.06	1.00	1.655E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.25	181.	19.56	1.18	2.566E-02	185.99	3.280	1.500E+00	RA226
209.87	106.	25.87	1.35	2.469E-02				
239.01	1242.	3.37	1.09	2.318E-02	238.63	43.100	9.227E-01	PB212
242.13	179.	14.42	1.10	2.301E-02	241.00	3.900	1.492E+00	RA224
					241.92	7.470	7.808E-01	PB214
270.25	115.	24.91	1.01	2.151E-02				
277.48	99.	28.82	1.56	2.114E-02				
295.52	326.	9.92	1.21	2.023E-02	295.22	19.200	6.210E-01	PB214
300.41	112.	24.48	0.97	2.000E-02				
328.57	72.	35.59	1.17	1.872E-02				
338.77	266.	10.88	1.16	1.829E-02	338.40	12.010	9.031E-01	AC228
352.29	415.	8.30	1.28	1.774E-02	351.99	37.100	4.661E-01	PB214
463.44	78.	27.24	1.26	1.425E-02				
463.44	78.	27.24	1.26	1.425E-02	463.51	10.000	4.077E-01	SB125
511.43	191.	15.32	1.10	1.316E-02	510.72	22.500	4.158E-01	TL208
583.75	395.	7.07	1.14	1.183E-02	583.14	86.000	2.877E-01	TL208
610.04	342.	7.40	1.45	1.143E-02	609.32	46.090	4.770E-01	BI214
662.06	40.	33.87	1.50	1.072E-02	661.62	84.620	PBC<MDA	CS137
728.24	116.	19.34	1.75	9.953E-03	727.17	11.800	7.367E-01	BI212

796.04	59.	24.92	1.50	9.301E-03	795.76	85.400	5.555E-02	CS134
860.93	71.	21.65	2.07	8.765E-03				
912.38	294.	7.41	1.81	8.392E-03	911.07	29.000	8.952E-01	AC228
965.87	39.	28.40	1.54	8.044E-03				
970.26	147.	10.52	1.54	8.017E-03	968.90	17.460	7.833E-01	AC228
1462.61	1478.	2.70	2.02	5.926E-03	1460.75	10.700	1.724E+01	K40
1766.62	55.	15.61	2.03	5.142E-03	1764.51	15.920	5.012E-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	
174.50	87.60	367.	77.	0.039	110.79	1.001	PB-214	lD
179.13	89.91	417.	79.	0.039	115.32	1.002	PB-214	lD
418.89	209.87	323.	106.	0.053	77.61	1.353	NP-239	s
483.42	242.08	244.	179.	0.090	43.27	1.095	PB-214	lD
539.65	270.25	294.	115.	0.058	74.73	1.015	AC-228	s
554.11	277.48	289.	105.	0.053	74.42	1.564	TL-208	s
599.97	300.41	254.	112.	0.056	73.45	0.967	PB-212	s
656.28	328.57	242.	72.	0.036	106.78	1.171	RH-106M	
1720.91	860.93	57.	71.	0.036	64.95	2.072	TL-208	s
1930.83	965.91	41.	39.	0.019	84.79	1.539	TB-160	D
2242.81	1121.92	80.	80.	0.040	67.08	1.420	TA-182	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	352.	134.	0.067	63.45	0.993D
PB-212	153.39	77.11	374.	227.	0.113	38.46	0.995A
TH-234	185.67	93.25	950.	138.	0.069	86.39	1.500
TH-234	185.68	93.25	941.	136.	0.068	87.29	1.500
RA-226	372.28	186.56	759.	160.	0.080	70.60	1.500s
PB-212	477.08	238.96	716.	1227.	0.614	13.56	1.008
PB-214	590.20	295.52	292.	322.	0.161	29.76	1.214s
AC-228	676.69	338.77	220.	265.	0.132	32.63	1.158s
PB-214	703.71	352.29	272.	409.	0.205	24.90	1.278
SB-125	926.24	463.56	179.	76.	0.038	81.08	1.500
TL-208	1021.87	511.38	216.	174.	0.087	44.54	1.100s
TL-208	1166.60	583.75	128.	391.	0.195	21.20	1.135s
BI-214	1219.17	610.04	113.	335.	0.168	22.19	1.452
CS-137	1323.21	662.06	78.	40.	0.020	101.61	1.500s
BI-212	1455.54	728.23	101.	111.	0.055	53.51	1.745s
CS-134	1591.13	796.04	78.	59.	0.029	74.77	1.500s
AC-228	1823.79	912.38	68.	291.	0.145	22.24	1.812s
AC-228	1936.81	968.90	137.	53.	0.026	102.51	1.541D
K-40	2924.15	1462.64	42.	1432.	0.716	8.00	1.845

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3531.99	1766.62	15.	55.	0.027	46.84	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	Peak COMMENTS
BE-7		2.2176E-04					
			477.56	2.218E-04	%(	3.372E-01 9.78E-02	G
K-40		1.6916E+01					
			1460.75	1.692E+01	(P	3.907E-01 4.57E-01	G
MN-54		1.9892E-02					
			834.81	1.989E-02	%(P	3.634E-02 1.11E-02	G
CO-57		-4.2578E-03					
			122.07	-4.258E-03	%(P	5.446E-02 1.63E-02	G K
			136.43	2.982E-02	%	4.209E-01 1.26E-01	G
CO-60		-9.0875E-03					
			1332.51	-9.088E-03	%(P	3.903E-02 1.09E-02	G K
			1173.23	-2.100E-03	& P	4.935E-02 1.39E-02	G K
Sr-85		-1.2784E-02					
			514.00	-1.278E-02	&(	4.683E-02 1.40E-02	G
Kr-85		-2.8156E+02					
			513.99	-2.816E+02	&(	1.032E+03 3.08E+02	G
Y-88		2.7178E-03					
			1836.01	2.718E-03	%(P	2.257E-02 5.92E-03	G K
			898.02	-5.227E-03	% P	4.107E-02 1.18E-02	G
NB-94		3.4340E-03					
			871.10	3.434E-03	&(	3.288E-02 9.43E-03	G K
			702.50	-9.966E-03	%	3.915E-02 1.16E-02	G K
Ag-108M		1.0352E-02					
			722.95	1.035E-02	&(	4.017E-02 1.19E-02	G K
			614.37	-1.138E-02	% P	4.348E-02 1.29E-02	G
			433.93	-4.200E-03	%	3.526E-02 1.04E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.7283E-01						
		88.04	1.728E-01	%(	2.108E+00	6.30E-01	G
SN-113	1.2626E-03						
		391.71	1.263E-03	%(	5.107E-02	1.49E-02	G K
		255.04	-8.300E-02	%	1.417E+00	4.18E-01	G
SB-125	9.4071E-02						
		427.95	-9.247E-03	%(P	1.108E-01	3.25E-02	G K
		600.77	5.179E-02	% P	1.891E-01	5.61E-02	G
		636.15	3.721E-02	& P	3.076E-01	8.95E-02	G
		463.51	3.999E-01	(P	3.439E-01	1.10E-01	G
		176.29	-1.019E-01	%	6.202E-01	1.86E-01	G
I-131	-2.6961E-04						
		364.48	-2.696E-04	%(P	5.522E-02	1.61E-02	G K
		636.97	9.898E-02	&	6.554E-01	1.91E-01	G
		284.29	-1.482E-01	% P	7.640E-01	2.27E-01	G
CS-134	2.0480E-02						
		604.66	-1.021E-02	&(	3.768E-02	1.12E-02	G K
		795.76	5.555E-02	*(P	4.152E-02	1.39E-02	G
		569.29	-4.214E-02	& P	2.140E-01	6.23E-02	G
		801.84	1.356E-02	% P	2.714E-01	7.46E-02	G
CS-137	3.2968E-02						
		661.62	3.297E-02	*(P	3.636E-02	1.16E-02	G
CE-139	1.7151E-05						
		165.85	1.715E-05	%(	3.547E-02	1.05E-02	G
EU-152	-3.7255E-03						
		121.78	-3.726E-03	%(P	1.350E-01	4.01E-02	G K
		344.30	3.363E-02	& P	1.066E-01	3.19E-02	G
		1408.08	-2.056E-02	%	1.635E-01	4.62E-02	G
		964.00	6.307E-04	& P	2.639E-01	7.47E-02	G
		1112.07	-4.347E-03	&	3.192E-01	9.08E-02	G
		778.90	-1.900E-02	%	2.826E-01	8.15E-02	G
EU-154	-2.5889E-02						
		123.10	-2.589E-02	%(	1.152E-01	3.46E-02	G K
		1274.80	1.885E-02	%	1.268E-01	3.67E-02	G
		723.30	3.385E-02	&	1.907E-01	5.59E-02	G
		1004.80	1.711E-02	%	2.157E-01	6.17E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	9.4725E-02						
		86.45	9.473E-02	&(	2.416E-01	7.30E-02	G K
		105.31	9.093E-03	&	2.485E-01	7.41E-02	G
HG-203	-3.3241E-03						
		279.17	-3.324E-03	&(P	4.651E-02	1.38E-02	G K
		72.87	-5.348E-02	% P	1.690E+00	5.01E-01	G
		70.83	-6.157E-01	&	4.663E+00	1.40E+00	G
		82.50	-6.880E-01	%	4.044E+00	1.21E+00	G
TL-208	2.8770E-01						
		583.14	2.877E-01	@(P	4.084E-02	2.06E-02	G
		510.72	4.391E-01	+ P	1.803E-01	7.53E-02	G
PB-212	9.5985E-01						
		238.63	9.204E-01	(P	9.554E-02	4.21E-02	G K
							Energy duplication
		77.11	9.598E-01	} P	3.931E-01	1.23E-01	G
		74.81	1.153E+00	+ P	7.784E-01	2.49E-01	G
PB-214	4.6610E-01						
		351.99	4.661E-01	(P	9.053E-02	3.92E-02	G K
		295.22	6.210E-01	+ P	1.588E-01	6.24E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.497E-01	0.00E+00	G
		241.92	3.242E-01	%	6.237E-01	1.89E-01	G
BI-212	7.0605E-01						
		727.17	7.060E-01	(P	3.164E-01	1.27E-01	G K
		1620.56	-2.218E-03	% P	1.032E+00	2.72E-01	G
		785.42	-4.133E-02	%	1.863E+00	5.34E-01	G
BI-214	4.8318E-01						
		609.32	4.770E-01	(P	7.421E-02	3.60E-02	G K
		1764.51	5.012E-01	&(P	1.916E-01	8.29E-02	G
		1120.28	-6.855E-02	& P	3.398E-01	9.85E-02	G
RA-224	-7.8410E-02						
		241.00	-7.841E-02	%(	1.108E+00	3.30E-01	G
RA-226	1.4290E+00						
		185.99	1.429E+00	@(P	1.167E+00	3.63E-01	G
AC-228	8.9752E-01						
		911.07	8.952E-01	(P	1.268E-01	6.72E-02	G K
		968.90	2.825E-01	- P	3.066E-01	9.68E-02	G
		338.40	9.031E-01	*(P	2.452E-01	9.87E-02	G

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

TH-227      -1.7782E-01
                          236.00-1.778E-01 %(  3.833E-01 1.16E-01 G K
                          256.25 3.126E-03 & P 4.622E-01 1.36E-01 G

PA-234      -5.5855E-02
                           98.44-5.585E-02 %(P 2.263E-01 6.80E-02 G K
                          946.00 6.066E-02 & P 1.739E-01 5.18E-02 G
                          131.28-8.712E-03 & P 2.007E-01 5.97E-02 G
                           94.67-1.246E-01 & P 4.350E-01 1.31E-01 G
                          883.24 1.935E-02 %   3.033E-01 8.69E-02 G
                          926.70 1.603E-02 &   3.405E-01 9.73E-02 G
                          569.26-6.249E-02 & P 3.163E-01 9.21E-02 G

TH-234       1.9907E+00
                           63.29 1.611E+00 %(P 6.704E+00 2.01E+00 G K
                           92.80 2.068E+00  (P 2.214E+00 6.80E-01 G
                           92.38 2.477E+00  (P 2.618E+00 8.04E-01 G

AM-241       1.4155E-03
                           59.54 1.416E-03 %(P 1.014E+00 3.00E-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	2.0956E-04	2.2176E-04	2.9332E-01	2.9332E-01	3.186E-01
K-40		1.6916E+01	1.6916E+01	1.3718E+00	1.6872E+00	3.907E-01
MN-54	#A	1.9700E-02	1.9892E-02	3.3320E-02	3.3340E-02	3.599E-02
CO-57	#B	-4.2104E-03	-4.2578E-03	5.2660E-02	5.2661E-02	5.385E-02
CO-60	#B	-9.0733E-03	-9.0875E-03	6.6801E-02	6.6803E-02	3.897E-02
Sr-85	#A	-1.2202E-02	-1.2784E-02	4.1981E-02	4.1987E-02	4.470E-02
Kr-85	#A	-2.8155E+02	-2.8156E+02	9.2504E+02	9.2519E+02	1.032E+03
Y-88	#B	2.6419E-03	2.7178E-03	1.7772E-02	1.7772E-02	2.194E-02
NB-94	#B	3.4340E-03	3.4340E-03	2.8282E-02	2.8283E-02	3.288E-02
Ag-108M	#B	1.0351E-02	1.0352E-02	3.5627E-02	3.5632E-02	4.016E-02
CD-109	#A	1.7168E-01	1.7283E-01	1.8914E+00	1.8914E+00	2.094E+00
SN-113	#B	1.2299E-03	1.2626E-03	4.4772E-02	4.4772E-02	4.974E-02
SB-125	#B	9.3790E-02	9.4071E-02	7.7560E-02	7.7752E-02	1.105E-01
I-131	#B	-1.8517E-04	-2.6961E-04	1.4744E-01	1.4744E-01	3.793E-02
CS-134	#B	2.0398E-02	2.0480E-02	1.5336E-02	1.5383E-02	3.752E-02
CS-137	#A	3.2959E-02	3.2968E-02	3.4666E-02	3.4718E-02	3.635E-02
CE-139	#A	1.6778E-05	1.7151E-05	3.1387E-02	3.1387E-02	3.470E-02
EU-152	#B	-3.7231E-03	-3.7255E-03	2.1416E-01	2.1416E-01	1.349E-01
EU-154	#B	-2.5863E-02	-2.5889E-02	1.0383E-01	1.0384E-01	1.151E-01
EU-155	#B	9.4567E-02	9.4725E-02	2.1909E-01	2.1916E-01	2.412E-01
HG-203	#B	-3.1154E-03	-3.3241E-03	4.1812E-02	4.1813E-02	4.359E-02
TL-208	#	2.8770E-01	2.8770E-01	6.1650E-02	6.3873E-02	
PB-212		9.5985E-01	9.5985E-01	1.3147E-01	1.4279E-01	
PB-214		4.6610E-01	4.6610E-01	1.1765E-01	1.2073E-01	
BI-212		7.0605E-01	7.0605E-01	3.7951E-01	3.8172E-01	
BI-214		4.8318E-01	4.8318E-01	1.0929E-01	1.1283E-01	
RA-224	#A	-7.8410E-02	-7.8410E-02	9.9109E-01	9.9110E-01	1.108E+00
RA-226	#	1.4290E+00	1.4290E+00	1.0903E+00	1.0935E+00	1.167E+00
AC-228		8.9752E-01	8.9752E-01	1.7835E-01	1.8581E-01	
TH-227	#B	-1.7782E-01	-1.7782E-01	3.4856E-01	3.4871E-01	3.833E-01
PA-234	#B	-5.5855E-02	-5.5855E-02	2.1605E-01	2.1607E-01	2.263E-01
TH-234	#B	1.9907E+00	1.9907E+00	1.9390E+00	1.9422E+00	6.704E+00
AM-241	#A	1.4155E-03	1.4155E-03	9.0086E-01	9.0086E-01	1.014E+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) 2.0716694E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.0716694E+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_27JUN2006_1902.An1

Sample description
FSS-NOL-06-02-016-F

Spectrum Filename: C:\GammaVision\Spectra\103F_27JUN2006_1902.An1

Acquisition information
Start time: 27-Jun-2006 19:02:23
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: 1.8460E+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	23-Jun-2006 07:50:00
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: 0.5880

***** 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	146.	19.65	0.99	9.052E-03	74.81	9.600	1.229E+00	PB212
77.32	193.	14.52	0.99	1.011E-02	77.11	17.500	9.580E-01	PB212
					77.11	10.700	1.567E+00	PB214
93.43	123.	29.99	1.15	1.667E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.35	175.	25.45	1.48	2.565E-02	185.99	3.280	1.406E+00	RA226
209.58	122.	28.40	0.92	2.470E-02				
238.98	1186.	3.40	1.09	2.319E-02	238.63	43.100	8.598E-01	PB212
241.93	167.	17.01	1.10	2.303E-02	241.00	3.900	1.361E+00	RA224
					241.92	7.470	7.118E-01	PB214
270.30	116.	21.48	1.30	2.151E-02				
295.58	232.	11.21	1.09	2.023E-02	295.22	19.200	4.288E-01	PB214
300.43	76.	34.42	1.24	2.000E-02				
328.08	72.	33.61	0.89	1.874E-02				
338.90	255.	11.97	1.17	1.828E-02	338.40	12.010	8.470E-01	AC228
352.39	432.	8.26	1.10	1.774E-02	351.99	37.100	4.739E-01	PB214
463.37	82.	24.21	1.42	1.425E-02				
463.37	82.	24.21	1.42	1.425E-02	463.51	10.000	4.161E-01	SB125
511.25	144.	17.01	1.78	1.316E-02	510.72	22.500	2.898E-01	TL208
583.89	410.	7.95	1.43	1.183E-02	583.14	86.000	2.912E-01	TL208
610.01	374.	9.13	1.37	1.143E-02	609.32	46.090	5.103E-01	BI214
663.15	96.	21.95	2.04	1.070E-02	661.62	84.620	7.636E-02	CS137
727.79	122.	19.00	1.52	9.958E-03	727.17	11.800	7.533E-01	BI212
796.02	69.	27.75	1.32	9.299E-03	795.76	85.400	6.340E-02	CS134
861.82	61.	22.24	0.98	8.758E-03				
912.20	281.	8.30	1.49	8.393E-03	911.07	29.000	8.342E-01	AC228
966.12	60.	18.52	1.54	8.043E-03				

970.25	156.	9.79	1.54	8.018E-03	968.90	17.460	8.151E-01	AC228
1121.73	90.	31.85	1.53	7.205E-03	1120.28	15.040	5.980E-01	BI214
1462.57	1329.	2.78	1.83	5.927E-03	1460.75	10.700	1.511E+01	K40
1766.50	61.	14.56	1.15	5.137E-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	
418.32	209.58	451.	122.	0.061	85.19	0.922	NP-239	s
539.76	270.30	241.	116.	0.058	64.44	1.301	AC-228	s
600.01	300.43	255.	76.	0.038	103.25	1.238	PB-212	s
655.30	328.08	211.	72.	0.036	100.82	0.885	AC-228	s
1722.69	861.82	50.	61.	0.030	66.71	0.980	TL-208	
1931.14	966.06	33.	60.	0.030	56.00	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	357.	146.	0.073	58.95	0.993D
PB-212	153.39	77.11	348.	193.	0.097	43.56	0.995A
TH-234	185.60	93.21	994.	126.	0.063	95.88	1.500s
TH-234	185.63	93.23	961.	130.	0.065	91.86	1.500s
RA-226	372.34	186.59	728.	146.	0.073	75.39	1.500s
TH-227	479.40	240.12	990.	-138.	-0.069	100.14	1.500
PB-212	477.17	239.01	613.	1138.	0.569	13.28	0.969
RA-224	482.78	241.81	726.	148.	0.074	81.17	1.500s
PB-214	590.32	295.58	215.	228.	0.114	33.63	1.086
AC-228	676.94	338.90	253.	254.	0.127	35.91	1.173s
PB-214	703.91	352.39	286.	426.	0.213	24.77	1.101
SB-125	926.35	463.61	137.	72.	0.036	75.74	1.500s
TL-208	1021.22	511.05	183.	125.	0.062	51.14	1.786s
TL-208	1166.88	583.89	180.	405.	0.203	23.84	1.428
BI-214	1219.12	610.01	209.	368.	0.184	27.39	1.370
CS-137	1324.35	662.63	125.	65.	0.032	80.47	1.500s
BI-212	1454.66	727.79	118.	121.	0.061	56.99	1.523s
CS-134	1591.26	796.10	75.	43.	0.021	97.43	1.500
AC-228	1823.44	912.20	78.	278.	0.139	24.89	1.493
AC-228	1936.81	968.90	147.	56.	0.028	99.23	1.541D
BI-214	2242.41	1121.72	115.	73.	0.037	84.25	1.521
K-40	2924.06	1462.60	35.	1275.	0.637	8.45	1.845
BI-214	3531.68	1766.47	10.	34.	0.017	57.10	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	MDA Value pCi/gm	COMMENTS
BE-7		-3.7044E-02					
			477.56	-3.704E-02	%(	3.275E-01 9.60E-02	G
K-40		1.4700E+01					
			1460.75	1.470E+01	(P	3.499E-01 4.20E-01	G
MN-54		-9.5088E-03					
			834.81	-9.509E-03	&(P	4.310E-02 1.27E-02	G
CO-57		1.3081E-02					
			122.07	1.308E-02	&(P	4.880E-02 1.47E-02	G K
			136.43	-1.309E-02	&	4.010E-01 1.20E-01	G
CO-60		2.0748E-02					
			1332.51	2.075E-02	%(P	3.482E-02 1.06E-02	G K
			1173.23	1.890E-02	% P	4.858E-02 1.45E-02	G K
Sr-85		-1.1979E-02					
			514.00	-1.198E-02	%(	4.176E-02 1.25E-02	G
Kr-85		-2.6364E+02					
			513.99	-2.636E+02	%(	9.192E+02 2.75E+02	G
Y-88		-9.5806E-05					
			1836.01	-9.581E-05	&(P	2.491E-02 6.28E-03	G K
			898.02	2.833E-03	& P	3.493E-02 9.93E-03	G
NB-94		7.8762E-03					
			871.10	7.876E-03	%(	2.907E-02 8.53E-03	G K
			702.50	8.682E-03	%	3.312E-02 9.78E-03	G K
Ag-108M		-2.7827E-03					
			722.95	-2.783E-03	%(	3.991E-02 1.15E-02	G K
			614.37	-1.624E-02	& P	4.422E-02 1.33E-02	G
			433.93	2.031E-04	%	3.649E-02 1.06E-02	G
CD-109		8.8709E-01					
			88.04	8.871E-01	%(	1.935E+00 5.86E-01	G
SN-113		-1.0584E-02					
			391.71	-1.058E-02	%(	4.855E-02 1.44E-02	G K
			255.04	6.645E-02	%	1.694E+00 5.02E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.4626E-02						
		427.95	5.438E-04	&(P	1.045E-01	3.04E-02	G K
		600.77	5.154E-03	% P	1.970E-01	5.71E-02	G
		636.15	2.884E-03	% P	3.681E-01	1.07E-01	G
		463.51	3.731E-01	*(P	2.955E-01	9.59E-02	G
		176.29	9.586E-02	%	5.523E-01	1.65E-01	G
I-131	-5.9280E-03						
		364.48	-5.928E-03	%(P	5.862E-02	1.73E-02	G K
		636.97	-9.542E-02	%	7.448E-01	2.18E-01	G
		284.29	1.675E-02	% P	8.057E-01	2.38E-01	G
CS-134	2.0491E-02						
		604.66	3.891E-03	&(	3.889E-02	1.14E-02	G K
		795.76	3.946E-02	(P	3.985E-02	1.28E-02	G
		569.29	-9.589E-03	% P	2.205E-01	6.34E-02	G
		801.84	4.484E-03	% P	5.079E-01	1.46E-01	G
CS-137	5.2180E-02						
		661.62	5.218E-02	&(P	4.428E-02	1.43E-02	G
CE-139	-1.4377E-02						
		165.85	-1.438E-02	&(	5.031E-02	1.51E-02	G
EU-152	3.8218E-02						
		121.78	3.822E-02	%(P	1.415E-01	4.25E-02	G K
		344.30	-1.251E-02	& P	1.269E-01	3.75E-02	G
		1408.08	3.266E-03	%	1.410E-01	3.84E-02	G
		964.00	-7.224E-02	& P	2.901E-01	8.52E-02	G
		1112.07	1.516E-01	%	2.593E-01	8.00E-02	G
		778.90	7.573E-02	&	2.236E-01	6.64E-02	G
EU-154	2.8784E-03						
		123.10	2.878E-03	&(	1.115E-01	3.32E-02	G K
		1274.80	3.794E-04	%	8.470E-02	2.31E-02	G
		723.30	-2.206E-02	%	1.985E-01	5.79E-02	G
		1004.80	4.020E-02	&	1.824E-01	5.30E-02	G
EU-155	5.0709E-03						
		86.45	5.071E-03	%(	2.504E-01	7.47E-02	G K
		105.31	3.365E-02	%	2.396E-01	7.17E-02	G
HG-203	2.4732E-02						
		279.17	2.473E-02	&(P	4.132E-02	1.26E-02	G K
		72.87	-8.431E-01	% P	2.205E+00	6.66E-01	G
		70.83	-5.670E-01	%	3.018E+00	9.00E-01	G
		82.50	5.279E-02	%	3.949E+00	1.18E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9479E-01						
		583.14	2.912E-01	(P	4.685E-02	2.34E-02	G
		510.72	3.086E-01	*(P	1.624E-01	6.39E-02	G
PB-212	8.6945E-01						
		238.63	8.335E-01	(P	8.643E-02	3.73E-02	G K
							Energy duplication
		77.11	7.989E-01	} P	3.709E-01	1.16E-01	G
		74.81	1.229E+00	+ P	7.647E-01	2.47E-01	G
PB-214	4.5852E-01						
		351.99	4.739E-01	(P	9.055E-02	3.97E-02	G K
		295.22	4.288E-01	(P	1.338E-01	4.90E-02	G
							Energy duplication
		77.11	2.206E-02	} P	8.816E-01	2.43E-01	G
		241.92	3.724E-01	%	5.877E-01	1.79E-01	G
BI-212	7.5334E-01						
		727.17	7.533E-01	*(P	3.320E-01	1.44E-01	G K
		1620.56	-2.165E-03	& P	1.370E+00	3.76E-01	G
		785.42	-1.878E-01	%	1.715E+00	4.96E-01	G
BI-214	5.0664E-01						
		609.32	5.103E-01	(P	9.741E-02	4.74E-02	G K
		1764.51	3.019E-01	& P	1.533E-01	6.30E-02	G
		1120.28	4.954E-01	(P	3.550E-01	1.43E-01	G
RA-224	1.2030E+00						
		241.00	1.203E+00	?(	1.044E+00	3.25E-01	G
RA-226	1.2667E+00						
		185.99	1.267E+00	(P	1.117E+00	3.47E-01	G
AC-228	8.3794E-01						
		911.07	8.342E-01	(P	1.321E-01	7.01E-02	G K
		968.90	2.945E-01	- P	3.089E-01	9.77E-02	G
		338.40	8.470E-01	@(P	2.557E-01	1.02E-01	G
TH-227	-3.8607E-01						
		236.00	-3.861E-01	&(	4.182E-01	1.29E-01	G K
		256.25	8.846E-04	% P	4.842E-01	1.43E-01	G
PA-234	-7.7944E-02						
		98.44	-7.794E-02	%(P	2.222E-01	6.70E-02	G K
		946.00	-2.626E-02	% P	1.712E-01	4.95E-02	G
		131.28	-2.286E-02	& P	2.243E-01	6.71E-02	G
		94.67	1.377E-02	% P	4.132E-01	1.23E-01	G
		883.24	1.555E-02	%	2.637E-01	7.49E-02	G
		926.70	-5.511E-02	&	2.775E-01	8.04E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.372E-02 % P 3.257E-01 9.36E-02 G

TH-234       1.1001E+00
                           63.29-2.535E-01 &(P 6.371E+00 1.89E+00 G K
                           92.80 1.922E+00 *(P 2.183E+00 6.69E-01 G
                           92.38 2.194E+00 &(P 2.614E+00 8.00E-01 G

AM-241       2.5164E-03
                           59.54 2.516E-03 %(P 1.112E+00 3.30E-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	-3.4957E-02	-3.7044E-02	2.8792E-01	2.8793E-01	3.090E-01
K-40		1.4700E+01	1.4700E+01	1.2600E+00	1.5218E+00	3.499E-01
MN-54	#A	-9.4149E-03	-9.5088E-03	4.0494E-02	4.0498E-02	4.268E-02
CO-57	#B	1.2932E-02	1.3081E-02	4.4006E-02	4.4012E-02	4.824E-02
CO-60	#B	2.0715E-02	2.0748E-02	3.1883E-02	3.1905E-02	3.477E-02

Sr-85	#A	-1.1420E-02	-1.1979E-02	3.7425E-02	3.7432E-02	3.981E-02
Kr-85	#A	-2.6363E+02	-2.6364E+02	8.2372E+02	8.2387E+02	9.191E+02
Y-88	#B	-9.3063E-05	-9.5806E-05	2.3742E-03	2.3742E-03	2.419E-02
NB-94	#B	7.8762E-03	7.8762E-03	2.5585E-02	2.5589E-02	2.907E-02
Ag-108M	#B	-2.7826E-03	-2.7827E-03	3.4633E-02	3.4634E-02	3.991E-02
CD-109	#A	8.8105E-01	8.8709E-01	1.7591E+00	1.7598E+00	1.922E+00
SN-113	#B	-1.0303E-02	-1.0584E-02	4.3227E-02	4.3232E-02	4.726E-02
SB-125	#B	9.4337E-02	9.4626E-02	7.2930E-02	7.3137E-02	1.041E-01
I-131	#B	-4.0333E-03	-5.9280E-03	6.1820E-02	6.1821E-02	3.988E-02
CS-134	#B	2.0407E-02	2.0491E-02	2.0004E-02	2.0039E-02	3.873E-02
CS-137	#	5.2166E-02	5.2180E-02	4.2892E-02	4.2999E-02	4.427E-02
CE-139	#A	-1.4057E-02	-1.4377E-02	4.5431E-02	4.5439E-02	4.919E-02
EU-152	#B	3.8193E-02	3.8218E-02	1.2764E-01	1.2766E-01	1.414E-01
EU-154	#B	2.8756E-03	2.8784E-03	9.9725E-02	9.9726E-02	1.114E-01
EU-155	#B	5.0622E-03	5.0709E-03	2.2425E-01	2.2425E-01	2.500E-01
HG-203	#B	2.3142E-02	2.4732E-02	3.7857E-02	3.7884E-02	3.866E-02
TL-208		2.9479E-01	2.9479E-01	7.1022E-02	7.3055E-02	
PB-212		8.6945E-01	8.6945E-01	1.1664E-01	1.2710E-01	
PB-214		4.5852E-01	4.5852E-01	9.7309E-02	1.0088E-01	
BI-212	#	7.5334E-01	7.5334E-01	4.3109E-01	4.3331E-01	
BI-214		5.0664E-01	5.0664E-01	1.4120E-01	1.4423E-01	
RA-224	#	1.2030E+00	1.2030E+00	9.7639E-01	9.7888E-01	1.044E+00
RA-226	#	1.2667E+00	1.2667E+00	1.0399E+00	1.0425E+00	1.117E+00
AC-228		8.3794E-01	8.3794E-01	1.8432E-01	1.9063E-01	
TH-227	#A	-3.8607E-01	-3.8607E-01	3.8662E-01	3.8726E-01	4.182E-01
PA-234	#B	-7.7944E-02	-7.7944E-02	2.0930E-01	2.0935E-01	2.222E-01
TH-234	#B	1.1001E+00	1.1001E+00	1.1483E+00	1.1499E+00	6.371E+00
AM-241	#A	2.5163E-03	2.5164E-03	9.9052E-01	9.9052E-01	1.112E+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) 1.8473194E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.8473209E+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_27JUN2006_1939.An1

Sample description
FSS-NOL-06-02-017-F

Spectrum Filename: C:\GammaVision\Spectra\103F_27JUN2006_1939.An1

Acquisition information
Start time: 27-Jun-2006 19:39:26
Live time: 2000
Real time: 2002
Dead time: 0.07 %
Detector ID: 4

Detector system
Det 103 - DSPE-471

Calibration
Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration
Created: 08-Aug-2005 11:09:41
Zero offset: 0.409 keV
Gain: 0.500 keV/channel
Quadratic: 1.092E-08 keV/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: 1.7220E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7220E+03) =
5.8072E+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-Jun-2006 07:23:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5606

***** 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	107.	20.27	0.99	9.100E-03	74.81	9.600	9.406E-01	PB212
77.25	165.	14.91	0.99	1.018E-02	77.11	17.500	7.183E-01	PB212
					77.11	10.700	1.175E+00	PB214
186.07	145.	25.08	1.39	2.566E-02	185.99	3.280	1.235E+00	RA226
239.01	799.	4.19	1.09	2.318E-02	236.00	11.200	2.399E+00	TH227
					238.63	43.100	6.177E-01	PB212
241.80	121.	18.64	1.09	2.303E-02	241.00	3.900	1.054E+00	RA224
					241.92	7.470	5.513E-01	PB214
270.66	96.	30.68	1.06	2.149E-02				
295.39	187.	12.09	1.20	2.024E-02	295.22	19.200	3.685E-01	PB214
328.24	36.	38.01	1.14	1.873E-02				
338.98	148.	15.13	1.02	1.828E-02	338.40	12.010	5.245E-01	AC228
352.23	282.	9.70	1.23	1.774E-02	351.99	37.100	3.299E-01	PB214
463.36	55.	27.06	0.76	1.425E-02				
463.36	55.	27.06	0.76	1.425E-02	463.51	10.000	2.946E-01	SB125
511.47	154.	11.74	0.76	1.316E-02	510.72	22.500	3.382E-01	TL208
583.86	284.	8.58	1.06	1.183E-02	583.14	86.000	2.156E-01	TL208
609.99	250.	7.96	1.16	1.143E-02	609.32	46.090	3.625E-01	BI214
728.13	62.	19.62	1.39	9.955E-03	727.17	11.800	4.078E-01	BI212
912.30	225.	9.41	1.29	8.393E-03	911.07	29.000	7.145E-01	AC228
965.69	58.	18.05	1.54	8.045E-03				
970.15	106.	12.08	1.54	8.018E-03	968.90	17.460	5.901E-01	AC228
1121.81	38.	30.01	1.63	7.212E-03	1120.28	15.040	2.756E-01	BI214
1462.57	714.	4.01	1.84	5.927E-03	1460.75	10.700	8.602E+00	K40
1589.99	34.	19.06	1.44	5.567E-03				
1622.13	13.	34.15	0.97	5.488E-03	1620.56	2.750	6.685E-01	BI212
1766.72	51.	14.00	1.76	5.137E-03	1764.51	15.920	4.576E-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	
540.46	270.66	266.	96.	0.048	92.04	1.058	AC-228	s
655.63	328.24	84.	36.	0.018	114.02	1.137	AC-228	
1930.41	965.70	25.	58.	0.029	54.25	1.539	TB-160	D
3178.81	1589.99	2.	34.	0.017	57.19	1.445	AC-228	
3532.49	1766.72	4.	42.	0.021	50.43	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	222.	104.	0.052	65.28	0.993D
PB-212	153.39	77.11	223.	124.	0.062	47.42	0.995A
RA-226	371.84	186.34	495.	99.	0.050	87.62	1.500s
TH-227	477.21	239.03	120.	825.	0.412	11.87	1.500
PB-212	477.17	239.01	403.	815.	0.407	15.42	0.987
RA-224	483.19	242.02	449.	116.	0.058	82.20	1.500s
PB-214	483.16	242.00	507.	96.	0.048	103.77	1.500s
PB-214	589.93	295.39	150.	183.	0.091	36.26	1.195s
AC-228	677.10	338.98	137.	147.	0.073	45.40	1.021s
PB-214	703.60	352.23	167.	277.	0.138	29.10	1.228
SB-125	925.97	463.42	90.	46.	0.023	94.43	1.500s
TL-208	1022.06	511.47	91.	128.	0.064	35.23	0.756s
TL-208	1166.82	583.86	101.	280.	0.140	25.73	1.059
BI-214	1219.08	609.99	62.	244.	0.122	23.87	1.161
BI-212	1455.33	728.13	39.	61.	0.031	58.86	1.395
AC-228	1823.62	912.30	62.	222.	0.111	28.22	1.291
AC-228	1936.81	968.90	94.	47.	0.024	96.79	1.541D
BI-214	2242.60	1121.81	54.	38.	0.019	90.03	1.634s
K-40	2924.14	1462.64	38.	651.	0.325	11.92	1.845s
BI-212	3243.07	1622.13	2.	13.	0.006	102.46	0.965s
BI-214	3527.77	1764.51	10.	29.	0.014	63.65	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	MDA Value pCi/gm	COMMENTS
BE-7		-1.0436E-02					
			477.56	-1.044E-02	%(	2.689E-01 7.72E-02	G
K-40		8.0435E+00					
			1460.75	8.043E+00	?(P	3.882E-01 3.29E-01	G
MN-54		-4.0612E-03					
			834.81	-4.061E-03	%(P	3.342E-02 9.56E-03	G
CO-57		2.4598E-03					
			122.07	2.460E-03	&(P	3.854E-02 1.14E-02	G K
			136.43	-8.927E-03	&	3.409E-01 1.01E-01	G
CO-60		-1.2226E-03					
			1332.51	-1.223E-03	&(P	3.496E-02 9.30E-03	G K
			1173.23	-2.677E-03	% P	3.225E-02 8.60E-03	G K
Sr-85		-8.7195E-03					
			514.00	-8.720E-03	%(	3.612E-02 1.07E-02	G
Kr-85		-1.9433E+02					
			513.99	-1.943E+02	%(	7.950E+02 2.36E+02	G
Y-88		-4.7615E-04					
			1836.01	-4.761E-04	%(P	2.401E-02 5.97E-03	G K
			898.02	-8.305E-03	% P	3.416E-02 9.87E-03	G
NB-94		1.0237E-02					
			871.10	1.024E-02	%(	2.229E-02 6.75E-03	G K
			702.50	-6.371E-03	%	3.130E-02 9.14E-03	G K
Ag-108M		9.4926E-04					
			722.95	9.493E-04	&(	2.555E-02 7.10E-03	G K
			614.37	-1.242E-02	% P	3.525E-02 1.05E-02	G
			433.93	-6.185E-04	%	2.926E-02 8.42E-03	G
CD-109		1.0707E+00					
			88.04	1.071E+00	%(	1.646E+00 5.03E-01	G
SN-113		8.1982E-04					
			391.71	8.198E-04	%(	4.513E-02 1.31E-02	G K
			255.04	-3.714E-01	%	1.426E+00 4.26E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.9419E-02						
		427.95	1.986E-02	%(P	8.522E-02	2.51E-02	G K
		600.77	-3.210E-02	& P	1.540E-01	4.50E-02	G
		636.15	4.477E-02	% P	2.308E-01	6.68E-02	G
		463.51	2.557E-01	*(P	2.586E-01	8.27E-02	G
		176.29	1.392E-01	%	4.774E-01	1.43E-01	G
I-131	8.5887E-03						
		364.48	8.589E-03	%(P	4.467E-02	1.31E-02	G K
		636.97	6.475E-02	%	5.383E-01	1.55E-01	G
		284.29	6.825E-04	% P	7.233E-01	2.12E-01	G
CS-134	1.6016E-03						
		604.66	1.602E-03	&(	2.162E-02	6.08E-03	G K
		795.76	2.499E-02	% P	3.350E-02	1.06E-02	G
		569.29	-2.648E-02	% P	1.933E-01	5.54E-02	G
		801.84	-8.172E-02	& P	3.044E-01	8.63E-02	G
CS-137	9.1656E-03						
		661.62	9.166E-03	%(P	3.589E-02	1.05E-02	G
CE-139	-4.1814E-03						
		165.85	-4.181E-03	&(	4.224E-02	1.26E-02	G
EU-152	-6.9407E-03						
		121.78	-6.941E-03	&(P	1.329E-01	3.94E-02	G K
		344.30	-2.033E-02	% P	9.400E-02	2.78E-02	G
		1408.08	-2.957E-02	%	1.797E-01	5.13E-02	G
		964.00	-3.644E-03	% P	2.847E-01	8.06E-02	G
		1112.07	6.232E-02	%	2.443E-01	7.12E-02	G
		778.90	7.968E-02	%	2.013E-01	6.02E-02	G
EU-154	7.0908E-03						
		123.10	7.091E-03	&(	9.341E-02	2.78E-02	G K
		1274.80	-1.564E-02	%	1.144E-01	3.27E-02	G
		723.30	8.825E-03	&	1.439E-01	4.08E-02	G
		1004.80	1.754E-02	%	1.664E-01	4.69E-02	G
EU-155	1.4796E-02						
		86.45	1.480E-02	%(	1.845E-01	5.48E-02	G K
		105.31	0.000E+00	&	2.066E-01	6.12E-02	G
HG-203	2.6891E-04						
		279.17	2.689E-04	&(P	3.631E-02	1.06E-02	G K
		72.87	-6.490E-01	% P	2.024E+00	6.09E-01	G
		70.83	-2.657E-01	&	3.894E+00	1.16E+00	G
		82.50	-6.234E-01	&	3.319E+00	9.92E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.1563E-01						
		583.14	2.156E-01	(P	3.819E-02	1.88E-02	G
		510.72	3.382E-01	+ P	1.251E-01	4.81E-02	G
PB-212	6.6212E-01						
		238.63	6.393E-01	(P	7.559E-02	3.34E-02	G K
							Energy duplication
		77.11	5.496E-01	} P	3.205E-01	8.69E-02	G
		74.81	9.407E-01	+ P	6.513E-01	2.11E-01	G
PB-214	3.5435E-01						
		351.99	3.299E-01	(P	7.501E-02	3.27E-02	G K
		295.22	3.685E-01	@(P	1.209E-01	4.55E-02	G
							Energy duplication
		77.11	2.285E-01	} P	7.456E-01	1.90E-01	G
		241.92	4.396E-01	(	4.912E-01	1.52E-01	G
BI-212	4.5709E-01						
		727.17	4.078E-01	(P	2.120E-01	8.07E-02	G K
		1620.56	6.685E-01	(P	4.958E-01	2.29E-01	G
		785.42	5.641E-01	%	1.561E+00	4.65E-01	G
BI-214	3.6248E-01						
		609.32	3.625E-01	(P	5.886E-02	2.96E-02	G K
		1764.51	2.758E-01	- P	1.697E-01	6.52E-02	G
		1120.28	2.756E-01	& P	2.671E-01	8.68E-02	G
RA-224	1.0138E+00						
		241.00	1.014E+00	&(	8.849E-01	2.78E-01	G
RA-226	9.2650E-01						
		185.99	9.265E-01	*(P	9.918E-01	3.06E-01	G
AC-228	7.1453E-01						
		911.07	7.145E-01	(P	1.271E-01	6.83E-02	G K
		968.90	2.650E-01	- P	2.678E-01	8.58E-02	G
		338.40	5.245E-01	- P	2.045E-01	8.01E-02	G
TH-227	2.4766E+00						
		236.00	2.477E+00	&(	1.613E-01	9.80E-02	G K
		256.25	9.153E-02	% P	4.018E-01	1.20E-01	G
PA-234	2.8690E-02						
		98.44	2.869E-02	%(P	1.984E-01	5.92E-02	G K
		946.00	8.918E-03	% P	1.701E-01	4.81E-02	G
		131.28	9.743E-02	& P	1.603E-01	4.89E-02	G
		94.67	5.806E-03	% P	3.497E-01	1.04E-01	G
		883.24	-2.032E-02	%	2.301E-01	6.48E-02	G
		926.70	2.180E-03	&	2.696E-01	7.49E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.912E-02 % P 2.855E-01 8.18E-02 G

TH-234       9.4267E-01
                           63.29 9.427E-01 %(P 5.563E+00 1.65E+00 G K
                           92.80 9.473E-01 % P 1.954E+00 5.89E-01 G
                           92.38 4.354E-01 & P 2.207E+00 6.56E-01 G

AM-241      -1.2142E-02
                           59.54-1.214E-02 %(P 1.070E+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	-9.8421E-03	-1.0436E-02	2.3168E-01	2.3168E-01	2.536E-01
K-40	#	8.0435E+00	8.0435E+00	9.8670E-01	1.0916E+00	3.882E-01
MN-54	#A	-4.0208E-03	-4.0612E-03	3.3528E-02	3.3529E-02	3.309E-02
CO-57	#B	2.4315E-03	2.4598E-03	3.4234E-02	3.4234E-02	3.810E-02
CO-60	#B	-1.2206E-03	-1.2226E-03	6.1086E-02	6.1086E-02	3.491E-02

Sr-85	#A	-8.3090E-03	-8.7195E-03	3.2109E-02	3.2113E-02	3.442E-02
Kr-85	#A	-1.9433E+02	-1.9433E+02	7.0689E+02	7.0698E+02	7.950E+02
Y-88	#B	-4.6238E-04	-4.7615E-04	2.7756E-02	2.7756E-02	2.332E-02
NB-94	#B	1.0237E-02	1.0237E-02	2.0241E-02	2.0249E-02	2.229E-02
Ag-108M	#B	9.4920E-04	9.4926E-04	2.1298E-02	2.1298E-02	2.555E-02
CD-109	#A	1.0633E+00	1.0707E+00	1.5092E+00	1.5104E+00	1.634E+00
SN-113	#B	7.9785E-04	8.1982E-04	3.9261E-02	3.9261E-02	4.392E-02
SB-125	#B	7.9173E-02	7.9419E-02	7.7061E-02	7.7199E-02	8.495E-02
I-131	#B	5.8212E-03	8.5887E-03	3.9395E-02	3.9398E-02	3.027E-02
CS-134	#B	1.5949E-03	1.6016E-03	1.8229E-02	1.8230E-02	2.153E-02
CS-137	#A	9.1630E-03	9.1656E-03	3.1540E-02	3.1544E-02	3.588E-02
CE-139	#A	-4.0874E-03	-4.1814E-03	3.7702E-02	3.7703E-02	4.129E-02
EU-152	#B	-6.9361E-03	-6.9407E-03	1.6268E-01	1.6268E-01	1.328E-01
EU-154	#B	7.0836E-03	7.0908E-03	8.3331E-02	8.3332E-02	9.332E-02
EU-155	#B	1.4770E-02	1.4796E-02	1.6448E-01	1.6448E-01	1.842E-01
HG-203	#B	2.5145E-04	2.6891E-04	3.1872E-02	3.1872E-02	3.396E-02
TL-208		2.1563E-01	2.1563E-01	5.6326E-02	5.7701E-02	
PB-212		6.6212E-01	6.6212E-01	1.0361E-01	1.1052E-01	
PB-214		3.5435E-01	3.5435E-01	1.0521E-01	1.0721E-01	
BI-212		4.5709E-01	4.5709E-01	2.7123E-01	2.7253E-01	
BI-214		3.6248E-01	3.6248E-01	8.8814E-02	9.1273E-02	
RA-224	#	1.0138E+00	1.0138E+00	8.3333E-01	8.3540E-01	8.849E-01
RA-226	#A	9.2649E-01	9.2650E-01	9.1758E-01	9.1915E-01	9.918E-01
AC-228		7.1453E-01	7.1453E-01	2.0467E-01	2.0884E-01	
TH-227	#	2.4766E+00	2.4766E+00	2.9386E-01	3.2715E-01	1.613E-01
PA-234	#B	2.8690E-02	2.8690E-02	1.7755E-01	1.7756E-01	1.984E-01
TH-234	#B	9.4267E-01	9.4267E-01	4.9645E+00	4.9648E+00	5.563E+00
AM-241	#A	-1.2142E-02	-1.2142E-02	1.3059E+00	1.3059E+00	1.070E+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) 2.7662010E+00 pCi/gm
Total Decayed Activity (1766.6 to 2000.7 keV) 2.7662010E+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: 103F_27JUNE2006_1335.An1

Sample description
FSS-NOL-06-02-003-F

Spectrum Filename: C:\GammaVision\Spectra\103F_27JUNE2006_1335.An1

Acquisition information
Start time: 27-Jun-2006 13:37:05
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: 1.8170E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8170E+03) =
5.5036E+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_27JUNE2006_1335.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	23-Jun-2006 11:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5677

***** 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	153.	18.15	0.99	9.052E-03	74.81	9.600	1.308E+00	PB212
77.31	151.	14.99	0.99	1.011E-02	77.11	17.500	7.374E-01	PB212
93.21	92.	40.65	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
125.69	82.	40.35	0.57	2.397E-02				
186.38	190.	23.52	1.66	2.565E-02	185.99	3.280	1.561E+00	RA226
209.87	109.	28.35	0.99	2.469E-02				
239.00	1146.	3.47	1.09	2.318E-02	238.63	43.100	8.434E-01	PB212
242.15	134.	18.32	1.10	2.301E-02	241.00	3.900	1.104E+00	RA224
					241.92	7.470	5.776E-01	PB214
270.27	106.	29.95	1.47	2.151E-02				
295.56	217.	12.11	1.04	2.023E-02	295.22	19.200	4.081E-01	PB214
300.41	74.	30.98	0.80	2.000E-02				
328.61	66.	36.39	1.25	1.871E-02				
338.85	254.	10.47	1.25	1.828E-02	338.40	12.010	8.558E-01	AC228
352.41	409.	7.94	0.99	1.774E-02	351.99	37.100	4.550E-01	PB214
463.75	110.	21.08	1.47	1.424E-02	463.51	10.000	5.666E-01	SB125
511.83	197.	12.44	1.34	1.315E-02	510.72	22.500	4.274E-01	TL208
583.92	420.	6.76	1.41	1.183E-02	583.14	86.000	3.035E-01	TL208
610.06	296.	8.73	1.38	1.143E-02	609.32	46.090	4.090E-01	BI214
728.43	90.	21.43	1.89	9.952E-03	727.17	11.800	5.642E-01	BI212
796.17	56.	28.27	0.72	9.298E-03	795.76	85.400	5.217E-02	CS134
912.27	311.	8.86	1.31	8.393E-03	911.07	29.000	9.391E-01	AC228
965.39	30.	32.40	1.54	8.048E-03				
970.27	134.	10.75	1.54	8.018E-03	968.90	17.460	7.086E-01	AC228
1121.48	86.	21.96	1.97	7.212E-03	1120.28	15.040	5.904E-01	BI214
1462.65	1293.	2.81	1.94	5.926E-03	1460.75	10.700	1.493E+01	K40

1766.86	50.	15.34	1.36	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
418.89	209.87	388.	109.	0.055	85.06	0.995	NP-239 s
539.69	270.27	337.	106.	0.053	89.84	1.466	AC-228 s
599.96	300.41	208.	74.	0.037	92.93	0.799	PB-212 s
656.37	328.61	216.	66.	0.033	109.17	1.254	RH-106M
1324.37	662.64	58.	30.	0.015	116.70	0.968	CS-137 l
1929.72	965.35	34.	29.	0.015	101.02	1.539	AC-228 D
3532.47	1766.86	3.	50.	0.025	44.38	1.358	XE-138 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.	153.	0.076	54.44	0.993D
PB-212	153.39	77.11	359.	151.	0.075	44.97	0.995A
RA-226	371.76	186.30	749.	137.	0.069	80.48	1.500s
PB-212	477.15	239.00	555.	1162.	0.581	12.86	1.050
RA-224	483.26	242.05	652.	109.	0.054	103.54	1.500
PB-214	590.27	295.56	231.	213.	0.107	36.33	1.035
AC-228	676.84	338.85	190.	253.	0.126	31.42	1.248s
PB-214	703.96	352.41	236.	403.	0.201	23.83	0.985
SB-125	926.08	463.48	135.	84.	0.042	65.81	1.500s
TL-208	1022.78	511.83	171.	170.	0.085	37.31	1.345s
TL-208	1166.94	583.92	137.	416.	0.208	20.27	1.412
BI-214	1219.21	610.06	123.	290.	0.145	26.19	1.383s
BI-212	1455.92	728.43	91.	89.	0.045	64.30	1.894s
CS-134	1591.49	796.22	76.	40.	0.020	103.23	1.500s
AC-228	1823.56	912.27	105.	308.	0.154	26.59	1.314
AC-228	1936.81	968.90	109.	53.	0.027	92.44	1.541D
BI-214	2241.94	1121.48	86.	86.	0.043	65.89	1.969s
K-40	2924.22	1462.68	36.	1250.	0.625	8.54	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	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.4572E-01					
			477.56	1.457E-01	&(	2.773E-01 8.45E-02	G
K-40		1.4651E+01					
			1460.75	1.465E+01	(P	3.615E-01 4.23E-01	G
MN-54		-1.0024E-02					
			834.81	-1.002E-02	%(P	4.022E-02 1.18E-02	G
CO-57		-1.2766E-02					
			122.07	-1.277E-02	%(P	5.234E-02 1.57E-02	G K
			136.43	-3.139E-02	&	3.971E-01 1.19E-01	G
CO-60		-7.4123E-03					
			1332.51	-7.412E-03	&(P	3.891E-02 1.07E-02	G K
			1173.23	1.903E-02	% P	4.608E-02 1.38E-02	G K
Sr-85		-7.2290E-03					
			514.00	-7.229E-03	%(	4.473E-02 1.32E-02	G
Kr-85		-1.5970E+02					
			513.99	-1.597E+02	%(	9.883E+02 2.93E+02	G
Y-88		4.6191E-03					
			1836.01	4.619E-03	%(P	2.742E-02 7.53E-03	G K
			898.02	1.102E-02	% P	2.910E-02 8.64E-03	G
NB-94		-4.9415E-04					
			871.10	-4.942E-04	%(	2.835E-02 7.93E-03	G K
			702.50	-4.851E-03	&	4.090E-02 1.20E-02	G K
Ag-108M		-4.1211E-03					
			722.95	-4.121E-03	&(	3.243E-02 9.35E-03	G K
			614.37	-3.089E-02	% P	4.512E-02 1.39E-02	G
			433.93	4.996E-03	%	2.951E-02 8.66E-03	G
CD-109		1.1756E+00					
			88.04	1.176E+00	&(	1.864E+00 5.69E-01	G
SN-113		1.1101E-02					
			391.71	1.110E-02	%(	4.729E-02 1.40E-02	G K
			255.04	1.670E-01	&	1.515E+00 4.49E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3144E-01						
		427.95	2.642E-02	%(P	1.044E-01	3.10E-02	G K
		600.77	1.003E-03	& P	1.832E-01	5.27E-02	G
		636.15	1.398E-01	% P	2.227E-01	6.89E-02	G
		463.51	4.423E-01	*(P	2.981E-01	9.85E-02	G
		176.29	1.450E-01	%	5.753E-01	1.73E-01	G
I-131	4.9744E-04						
		364.48	4.974E-04	%(P	4.997E-02	1.45E-02	G K
		636.97	-1.660E-01	%	6.968E-01	2.06E-01	G
		284.29	1.519E-01	& P	7.294E-01	2.17E-01	G
CS-134	1.6296E-02						
		604.66	-2.553E-03	&(	3.041E-02	8.78E-03	G K
		795.76	3.784E-02	*(P	4.080E-02	1.30E-02	G
		569.29	-3.546E-02	& P	2.324E-01	6.77E-02	G
		801.84	1.096E-01	% P	3.662E-01	1.08E-01	G
CS-137	-1.0532E-02						
		661.62	-1.053E-02	%(P	4.311E-02	1.26E-02	G
CE-139	1.4142E-04						
		165.85	1.414E-04	&(	4.749E-02	1.41E-02	G
EU-152	-4.1246E-02						
		121.78	-4.125E-02	%(P	1.484E-01	4.46E-02	G K
		344.30	-9.946E-04	& P	1.192E-01	3.49E-02	G
		1408.08	6.302E-02	%	1.232E-01	3.78E-02	G
		964.00	-5.914E-02	% P	2.308E-01	6.72E-02	G
		1112.07	8.736E-03	%	3.845E-01	1.11E-01	G
		778.90	-1.018E-03	%	2.569E-01	7.30E-02	G
EU-154	-2.5114E-02						
		123.10	-2.511E-02	%(	1.150E-01	3.46E-02	G K
		1274.80	2.319E-02	%	1.132E-01	3.29E-02	G
		723.30	-1.844E-02	&	1.545E-01	4.46E-02	G
		1004.80	1.111E-02	%	1.944E-01	5.51E-02	G
EU-155	1.7170E-03						
		86.45	1.717E-03	%(	2.621E-01	7.82E-02	G K
		105.31	6.827E-02	&	2.242E-01	6.75E-02	G
HG-203	2.7338E-04						
		279.17	2.734E-04	&(P	3.482E-02	1.02E-02	G K
		72.87	-4.090E-01	% P	1.844E+00	5.52E-01	G
		70.83	-1.024E+00	%	4.396E+00	1.32E+00	G
		82.50	-1.164E-01	%	3.866E+00	1.15E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.0350E-01						
		583.14	3.035E-01	(P	4.185E-02	2.07E-02	G
		510.72	4.274E-01	+ P	1.596E-01	6.16E-02	G
PB-212	8.6435E-01						
		238.63	8.644E-01	(P	8.367E-02	3.75E-02	G K
							Energy duplication
		77.11	6.338E-01	} P	3.821E-01	9.50E-02	G
		74.81	1.308E+00	+ P	7.424E-01	2.42E-01	G
PB-214	4.3903E-01						
		351.99	4.550E-01	(P	8.390E-02	3.67E-02	G K
		295.22	4.081E-01	(P	1.406E-01	5.04E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.843E-01	0.00E+00	G
		241.92	1.833E-01	%	5.769E-01	1.74E-01	G
BI-212	5.6423E-01						
		727.17	5.642E-01	@(P	2.980E-01	1.22E-01	G K
		1620.56	7.629E-02	% P	8.595E-01	2.28E-01	G
		785.42	1.044E+00	%	1.597E+00	4.96E-01	G
BI-214	4.0898E-01						
		609.32	4.090E-01	@(P	7.675E-02	3.65E-02	G K
		1764.51	-2.973E-02	% P	2.121E-01	5.19E-02	G
		1120.28	5.904E-01	+ P	3.147E-01	1.33E-01	G
RA-224	9.0017E-01						
		241.00	9.002E-01	(	1.006E+00	3.11E-01	G
RA-226	1.2122E+00						
		185.99	1.212E+00	*(P	1.151E+00	3.56E-01	G
AC-228	9.1468E-01						
		911.07	9.391E-01	(P	1.543E-01	8.42E-02	G K
		968.90	2.826E-01	- P	2.723E-01	8.73E-02	G
		338.40	8.558E-01	@(P	2.266E-01	9.01E-02	G
TH-227	-1.9806E-01						
		236.00	-1.981E-01	%(	3.930E-01	1.19E-01	G K
		256.25	5.195E-03	& P	4.293E-01	1.26E-01	G
PA-234	-1.7030E-02						
		98.44	-1.703E-02	%(P	2.282E-01	6.81E-02	G K
		946.00	5.096E-02	& P	1.715E-01	5.06E-02	G
		131.28	-1.172E-02	& P	2.133E-01	6.36E-02	G
		94.67	1.251E-03	& P	4.179E-01	1.25E-01	G
		883.24	1.234E-02	&	2.721E-01	7.72E-02	G
		926.70	-1.165E-02	&	3.163E-01	8.98E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-4.223E-02 & P 3.410E-01 9.90E-02 G

TH-234       1.0724E-01
                           63.29 1.072E-01 %(P 6.110E+00 1.81E+00 G K
                           92.80 1.388E+00 % P 2.214E+00 6.72E-01 G
                           92.38 1.559E+00 & P 2.642E+00 8.01E-01 G

AM-241       1.9244E-01
                           59.54 1.924E-01 &(P 9.071E-01 2.71E-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	1.3816E-01	1.4572E-01	2.5354E-01	2.5368E-01	2.629E-01
K-40		1.4651E+01	1.4651E+01	1.2697E+00	1.5282E+00	3.615E-01
MN-54	#A	-9.9327E-03	-1.0024E-02	3.7721E-02	3.7726E-02	3.985E-02
CO-57	#B	-1.2632E-02	-1.2766E-02	4.8375E-02	4.8380E-02	5.179E-02
CO-60	#B	-7.4013E-03	-7.4123E-03	7.8680E-02	7.8681E-02	3.885E-02

Sr-85	#A	-6.9184E-03	-7.2290E-03	3.9745E-02	3.9747E-02	4.281E-02
Kr-85	#A	-1.5970E+02	-1.5970E+02	8.7814E+02	8.7818E+02	9.883E+02
Y-88	#B	4.4973E-03	4.6191E-03	2.2593E-02	2.2595E-02	2.670E-02
NB-94	#B	-4.9415E-04	-4.9415E-04	2.3781E-02	2.3781E-02	2.835E-02
Ag-108M	#B	-4.1209E-03	-4.1211E-03	2.8047E-02	2.8048E-02	3.243E-02
CD-109	#A	1.1682E+00	1.1756E+00	1.7064E+00	1.7076E+00	1.853E+00
SN-113	#B	1.0830E-02	1.1101E-02	4.2129E-02	4.2134E-02	4.613E-02
SB-125	#F	1.3108E-01	1.3144E-01	8.7814E-02	8.8145E-02	1.041E-01
I-131	#B	3.4906E-04	4.9744E-04	4.3630E-02	4.3630E-02	3.506E-02
CS-134	#B	1.6235E-02	1.6296E-02	1.6860E-02	1.6886E-02	3.029E-02
CS-137	#A	-1.0529E-02	-1.0532E-02	4.7113E-02	4.7117E-02	4.310E-02
CE-139	#A	1.3853E-04	1.4142E-04	4.2341E-02	4.2341E-02	4.651E-02
EU-152	#B	-4.1221E-02	-4.1246E-02	1.4075E-01	1.4077E-01	1.483E-01
EU-154	#B	-2.5091E-02	-2.5114E-02	1.0367E-01	1.0368E-01	1.149E-01
EU-155	#B	1.7143E-03	1.7170E-03	2.3473E-01	2.3473E-01	2.617E-01
HG-203	#B	2.5717E-04	2.7338E-04	3.0578E-02	3.0578E-02	3.275E-02
TL-208		3.0350E-01	3.0350E-01	6.2172E-02	6.4621E-02	
PB-212		8.6435E-01	8.6435E-01	1.1227E-01	1.2298E-01	
PB-214		4.3903E-01	4.3903E-01	9.7056E-02	1.0035E-01	
BI-212	#	5.6423E-01	5.6423E-01	3.6481E-01	3.6628E-01	
BI-214		4.0898E-01	4.0898E-01	1.0950E-01	1.1204E-01	
RA-224	A	9.0017E-01	9.0017E-01	9.3203E-01	9.3349E-01	1.006E+00
RA-226	#	1.2122E+00	1.2122E+00	1.0678E+00	1.0701E+00	1.151E+00
AC-228		9.1468E-01	9.1468E-01	1.8957E-01	1.9687E-01	
TH-227	#B	-1.9806E-01	-1.9806E-01	3.5790E-01	3.5808E-01	3.930E-01
PA-234	#B	-1.7030E-02	-1.7030E-02	2.4677E-01	2.4677E-01	2.282E-01
TH-234	#B	1.0724E-01	1.0724E-01	5.4302E+00	5.4302E+00	6.110E+00
AM-241	#A	1.9243E-01	1.9244E-01	8.1308E-01	8.1315E-01	9.071E-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 (1766.6 to 2000.7 keV) 1.9045702E+01 pCi/gm
Total Decayed Activity (1766.6 to 2000.7 keV) 1.9045702E+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-06-02-003-F-RC

Spectrum Filename: C:\GammaVision\Spectra\103F_27JUNE2006_1417.An1

Acquisition information
Start time: 27-Jun-2006 14:18:48
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: 1.8170E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8170E+03) =
5.5036E+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-Jun-2006 11:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5555

***** 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	116.	24.36	0.99	9.052E-03	74.81	9.600	9.958E-01	PB212
77.22	201.	12.13	0.99	1.011E-02	77.11	17.500	9.274E-01	PB212
92.92	98.	38.77	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.93	96.	40.12	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.36	234.	16.74	1.65	2.565E-02	185.99	3.280	1.948E+00	RA226
209.49	85.	30.76	1.07	2.470E-02				
238.97	1072.	3.66	1.09	2.318E-02	238.63	43.100	7.882E-01	PB212
241.75	151.	17.21	1.09	2.303E-02	241.00	3.900	1.248E+00	RA224
					241.92	7.470	6.528E-01	PB214
270.73	91.	30.35	1.07	2.149E-02				
295.66	249.	9.02	1.13	2.022E-02	295.22	19.200	4.677E-01	PB214
300.29	63.	29.39	1.13	2.000E-02				
328.37	57.	34.42	1.32	1.873E-02				
338.87	225.	13.18	1.06	1.828E-02	338.40	12.010	7.563E-01	AC228
352.34	342.	8.57	1.06	1.774E-02	351.99	37.100	3.794E-01	PB214
463.46	122.	20.62	1.23	1.425E-02				
463.46	122.	20.62	1.23	1.425E-02	463.51	10.000	6.299E-01	SB125
511.54	204.	12.92	1.56	1.316E-02	510.72	22.500	4.462E-01	TL208
583.90	346.	6.87	1.00	1.183E-02	583.14	86.000	2.495E-01	TL208
610.02	318.	8.79	1.21	1.143E-02	609.32	46.090	4.390E-01	BI214
728.33	91.	18.92	1.61	9.953E-03	727.17	11.800	5.737E-01	BI212
795.57	36.	34.67	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
861.76	49.	27.76	1.76	8.758E-03				
912.29	315.	8.10	1.36	8.393E-03	911.07	29.000	9.513E-01	AC228
969.91	225.	10.37	1.94	8.020E-03	968.90	17.460	1.191E+00	AC228

1121.75	45.	32.19	1.63	7.212E-03	1120.28	15.040	PBC<MDA	BI214
1462.62	1228.	2.88	1.95	5.926E-03	1460.75	10.700	1.418E+01	K40
1766.93	59.	13.80	1.67	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	
418.13	209.49	315.	85.	0.043	92.27	1.072	AC-228	
540.60	270.73	280.	91.	0.045	91.06	1.068	AC-228	s
599.92	300.39	173.	79.	0.040	78.29	1.563	PB-212	s
655.89	328.37	164.	57.	0.029	103.27	1.322	RH-106M	
1722.56	861.76	53.	49.	0.025	83.27	1.757	TL-208	
3532.25	1766.93	1.	57.	0.029	40.40	2.035	XE-138	D

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

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.	116.	0.058	73.08	0.993D
PB-212	153.39	77.11	388.	201.	0.100	36.40	0.995A
RA-226	371.99	186.41	660.	171.	0.085	62.79	1.500s
PB-212	477.14	238.99	631.	1088.	0.544	14.35	1.014
RA-224	482.91	241.88	728.	130.	0.065	91.88	1.500
PB-214	590.64	295.75	198.	234.	0.117	32.57	1.113s
AC-228	676.89	338.87	242.	224.	0.112	39.54	1.058
PB-214	703.82	352.34	204.	336.	0.168	25.72	1.059
SB-125	926.23	463.55	130.	87.	0.043	63.54	1.500s
TL-208	1022.18	511.54	176.	178.	0.089	38.75	1.556s
TL-208	1166.90	583.90	95.	342.	0.171	20.60	1.004
BI-214	1219.13	610.02	147.	311.	0.156	26.38	1.210
BI-212	1455.73	728.33	74.	91.	0.045	56.77	1.612
CS-134	1590.20	795.57	62.	36.	0.018	104.01	1.500s
AC-228	1823.60	912.29	87.	312.	0.156	24.30	1.363
AC-228	1938.83	969.91	89.	224.	0.112	31.12	1.936s
BI-214	2242.47	1121.75	91.	45.	0.022	96.58	1.634s
K-40	2924.11	1462.62	23.	1185.	0.593	8.68	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	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.7578E-02					
			477.56	1.758E-02	%(	2.554E-01 7.37E-02	G
K-40		1.3887E+01					
			1460.75	1.389E+01	(P	2.944E-01 4.08E-01	G
MN-54		6.1239E-03					
			834.81	6.124E-03	&(P	3.146E-02 9.13E-03	G
CO-57		3.4751E-03					
			122.07	3.475E-03	&(P	4.857E-02 1.45E-02	G K
			136.43	4.150E-02	%	3.930E-01 1.17E-01	G
CO-60		7.7461E-03					
			1332.51	7.746E-03	%(P	3.301E-02 9.35E-03	G K
			1173.23	4.322E-03	% P	4.776E-02 1.37E-02	G K
Sr-85		-1.5101E-02					
			514.00	-1.510E-02	%(	4.463E-02 1.34E-02	G
Kr-85		-3.3355E+02					
			513.99	-3.336E+02	%(	9.857E+02 2.96E+02	G
Y-88		-5.1940E-03					
			1836.01	-5.194E-03	%(P	3.014E-02 8.35E-03	G K
			898.02	-1.579E-03	& P	3.101E-02 8.61E-03	G
NB-94		-3.3260E-03					
			871.10	-3.326E-03	&(	3.240E-02 9.28E-03	G K
			702.50	-1.547E-03	%	3.414E-02 9.82E-03	G K
Ag-108M		-3.2587E-03					
			722.95	-3.259E-03	%(	3.808E-02 1.10E-02	G K
			614.37	-3.344E-02	% P	4.986E-02 1.53E-02	G
			433.93	1.172E-03	&	3.413E-02 9.94E-03	G
CD-109		1.1145E+00					
			88.04	1.115E+00	%(	1.998E+00 6.08E-01	G
SN-113		-6.8948E-03					
			391.71	-6.895E-03	%(	5.290E-02 1.56E-02	G K
			255.04	1.757E-02	&	1.611E+00 4.76E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.2224E-01						
		427.95	1.048E-02	%(P	9.847E-02	2.88E-02	G K
		600.77	2.311E-02	& P	1.610E-01	4.69E-02	G
		636.15	-4.997E-02	% P	2.746E-01	7.99E-02	G
		463.51	4.530E-01	@(P	2.927E-01	9.74E-02	G
		176.29	4.342E-02	%	5.640E-01	1.68E-01	G
I-131	-1.0478E-02						
		364.48	-1.048E-02	%(P	5.564E-02	1.65E-02	G K
		636.97	-2.228E-02	%	5.558E-01	1.59E-01	G
		284.29	-1.695E-01	% P	7.773E-01	2.32E-01	G
CS-134	1.7575E-02						
		604.66	2.978E-03	&(	3.612E-02	1.05E-02	G K
		795.76	3.426E-02	*(P	3.705E-02	1.19E-02	G
		569.29	-4.587E-02	% P	2.178E-01	6.36E-02	G
		801.84	2.354E-02	& P	2.825E-01	7.86E-02	G
CS-137	1.6428E-02						
		661.62	1.643E-02	%(P	4.232E-02	1.27E-02	G
CE-139	-6.9839E-04						
		165.85	-6.984E-04	%(	4.683E-02	1.39E-02	G
EU-152	1.0395E-02						
		121.78	1.039E-02	&(P	1.455E-01	4.34E-02	G K
		344.30	-3.137E-02	% P	1.257E-01	3.75E-02	G
		1408.08	-3.788E-05	&	1.489E-01	4.05E-02	G
		964.00	7.191E-03	& P	2.954E-01	8.46E-02	G
		1112.07	-6.740E-02	%	3.322E-01	9.73E-02	G
		778.90	-4.375E-02	%	2.796E-01	8.15E-02	G
EU-154	1.2034E-03						
		123.10	1.203E-03	&(	9.261E-02	2.75E-02	G K
		1274.80	6.126E-03	&	1.168E-01	3.31E-02	G
		723.30	5.068E-02	%	1.270E-01	3.80E-02	G
		1004.80	3.061E-02	%	2.260E-01	6.54E-02	G
EU-155	8.5853E-03						
		86.45	8.585E-03	&(	2.711E-01	8.10E-02	G K
		105.31	6.018E-02	%	2.366E-01	7.11E-02	G
HG-203	2.7114E-04						
		279.17	2.711E-04	&(P	3.343E-02	9.77E-03	G K
		72.87	-4.841E-01	% P	2.517E+00	7.56E-01	G
		70.83	1.682E+00	&	3.751E+00	1.14E+00	G
		82.50	-7.485E-01	%	3.848E+00	1.15E+00	G

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

TL-208       2.4947E-01
                          583.14 2.495E-01  (P 3.519E-02 1.74E-02 G
                          510.72 4.462E-01 + P 1.620E-01 6.63E-02 G

PB-212       8.4352E-01
                          238.63 8.095E-01  (P 8.907E-02 3.92E-02 G K
                                                          Energy duplication
                           77.11 8.435E-01 } P 3.972E-01 1.02E-01 G
                           74.81 9.958E-01 + P 7.869E-01 2.49E-01 G

PB-214       4.0236E-01
                          351.99 3.794E-01  (P 7.823E-02 3.31E-02 G K
                          295.22 4.468E-01 @(P 1.308E-01 4.94E-02 G
                                                          Energy duplication
                           77.11 4.136E-02 } P 7.917E-01 1.97E-01 G
                          241.92 3.265E-01 %   5.806E-01 1.77E-01 G

BI-212       5.7372E-01
                          727.17 5.737E-01  (P 2.712E-01 1.09E-01 G K
                         1620.56-7.053E-02 % P 1.160E+00 3.16E-01 G
                          785.42 9.198E-01 %   1.563E+00 4.81E-01 G

BI-214       4.3902E-01
                          609.32 4.390E-01  (P 8.346E-02 3.95E-02 G K
                         1764.51-9.132E-02 % P 2.269E-01 6.16E-02 G
                         1120.28 3.067E-01 & P 3.238E-01 1.03E-01 G

RA-224       1.0746E+00
                          241.00 1.075E+00 &(  1.061E+00 3.29E-01 G

RA-226       1.5084E+00
                          185.99 1.508E+00 *(P 1.082E+00 3.40E-01 G

AC-228       9.5129E-01
                          911.07 9.513E-01  (P 1.412E-01 7.80E-02 G K
                          968.90 1.191E+00 + P 2.471E-01 1.24E-01 G
                          338.40 7.563E-01 - P 2.547E-01 1.00E-01 G

TH-227       0.0000E+00
                          236.00 0.000E+00 &(  5.328E-01 1.59E-01 G K
                          256.25 2.706E-03 % P 4.569E-01 1.35E-01 G

PA-234      -6.7843E-03
                           98.44-6.784E-03 %(P 2.305E-01 6.86E-02 G K
                          946.00-3.120E-02 & P 1.892E-01 5.50E-02 G
                          131.28 5.210E-02 & P 1.970E-01 5.92E-02 G
                           94.67-5.942E-02 % P 4.239E-01 1.27E-01 G
                          883.24-4.031E-02 &   2.790E-01 8.06E-02 G
                          926.70 1.165E-03 &   3.079E-01 8.68E-02 G
```

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-6.770E-02 % P 3.219E-01 9.40E-02 G

TH-234       1.0525E+00
                           63.29 1.052E+00 %(P 6.340E+00 1.89E+00 G K
                           92.80 1.482E+00 % P 2.229E+00 6.78E-01 G
                           92.38 1.703E+00 % P 2.663E+00 8.09E-01 G

AM-241      -1.0353E-02
                           59.54-1.035E-02 &(P 1.091E+00 3.24E-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	1.6659E-02	1.7578E-02	2.2097E-01	2.2097E-01	2.420E-01
K-40		1.3887E+01	1.3887E+01	1.2241E+00	1.4658E+00	2.944E-01
MN-54	#A	6.0679E-03	6.1239E-03	2.7387E-02	2.7390E-02	3.117E-02
CO-57	#B	3.4383E-03	3.4751E-03	4.3426E-02	4.3426E-02	4.806E-02
CO-60	#B	7.7345E-03	7.7461E-03	2.8045E-02	2.8049E-02	3.296E-02

Sr-85	#A	-1.4448E-02	-1.5101E-02	4.0179E-02	4.0189E-02	4.270E-02
Kr-85	#A	-3.3354E+02	-3.3355E+02	8.8746E+02	8.8767E+02	9.857E+02
Y-88	#B	-5.0561E-03	-5.1940E-03	2.5990E-02	2.5992E-02	2.934E-02
NB-94	#B	-3.3260E-03	-3.3260E-03	2.7851E-02	2.7851E-02	3.240E-02
Ag-108M	#B	-3.2585E-03	-3.2587E-03	3.3013E-02	3.3013E-02	3.808E-02
CD-109	#A	1.1075E+00	1.1145E+00	1.8231E+00	1.8241E+00	1.985E+00
SN-113	#B	-6.7251E-03	-6.8948E-03	4.6849E-02	4.6851E-02	5.160E-02
SB-125	#F	1.2190E-01	1.2224E-01	7.8813E-02	7.9132E-02	9.819E-02
I-131	#B	-7.3338E-03	-1.0478E-02	5.4548E-02	5.4551E-02	3.895E-02
CS-134	#B	1.7508E-02	1.7575E-02	1.8324E-02	1.8352E-02	3.598E-02
CS-137	#A	1.6424E-02	1.6428E-02	3.8021E-02	3.8033E-02	4.231E-02
CE-139	#A	-6.8397E-04	-6.9839E-04	4.1762E-02	4.1762E-02	4.586E-02
EU-152	#B	1.0388E-02	1.0395E-02	1.3011E-01	1.3011E-01	1.454E-01
EU-154	#B	1.2023E-03	1.2034E-03	8.2441E-02	8.2442E-02	9.252E-02
EU-155	#B	8.5717E-03	8.5853E-03	2.4306E-01	2.4306E-01	2.706E-01
HG-203	#B	2.5495E-04	2.7114E-04	2.9316E-02	2.9316E-02	3.143E-02
TL-208		2.4947E-01	2.4947E-01	5.2036E-02	5.4014E-02	
PB-212		8.4352E-01	8.4352E-01	1.2241E-01	1.3184E-01	
PB-214		4.0236E-01	4.0236E-01	8.4912E-02	8.8067E-02	
BI-212		5.7372E-01	5.7372E-01	3.2747E-01	3.2916E-01	
BI-214		4.3902E-01	4.3902E-01	1.1824E-01	1.2096E-01	
RA-224	#	1.0746E+00	1.0746E+00	9.8736E-01	9.8932E-01	1.061E+00
RA-226	#	1.5084E+00	1.5084E+00	1.0190E+00	1.0228E+00	1.082E+00
AC-228		9.5129E-01	9.5129E-01	2.3366E-01	2.4010E-01	
TH-227	#B	0.0000E+00	0.0000E+00	4.7808E-01	4.7808E-01	5.328E-01
PA-234	#B	-6.7843E-03	-6.7843E-03	3.3358E-01	3.3358E-01	2.305E-01
TH-234	#B	1.0525E+00	1.0525E+00	5.6776E+00	5.6779E+00	6.340E+00
AM-241	#A	-1.0353E-02	-1.0353E-02	1.3828E+00	1.3828E+00	1.091E+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) 1.7346092E+01 pCi/gm
Total Decayed Activity (1766.6 to 2000.7 keV) 1.7346092E+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_28JUNE2006_1015.An1

Sample description
FSS-NOL-06-02-013-F

Spectrum Filename: C:\GammaVision\Spectra\103F_28JUNE2006_1015.An1

Acquisition information
Start time: 28-Jun-2006 10:16:57
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: 1.6390E+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	26-Jun-2006 08:14:00
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: 0.5963

***** 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	115.	24.81	0.99	9.052E-03	74.81	9.600	1.089E+00	PB212
77.28	144.	17.41	0.99	1.011E-02	77.11	17.500	9.104E-01	PB212
					77.11	10.700	1.489E+00	PB214
129.32	95.	41.49	1.14	2.440E-02				
186.46	174.	20.37	1.53	2.565E-02	185.99	3.280	1.577E+00	RA226
210.13	111.	33.20	1.17	2.467E-02				
238.99	1129.	3.57	1.09	2.318E-02	238.63	43.100	9.210E-01	PB212
241.73	170.	15.35	1.09	2.303E-02	241.00	3.900	1.558E+00	RA224
					241.92	7.470	8.154E-01	PB214
270.55	92.	29.47	1.02	2.149E-02				
295.58	273.	9.98	1.22	2.023E-02	295.22	19.200	5.695E-01	PB214
300.87	73.	32.81	1.23	1.998E-02				
338.67	236.	12.50	1.23	1.829E-02	338.40	12.010	8.804E-01	AC228
352.24	471.	6.73	1.27	1.774E-02	351.99	37.100	5.826E-01	PB214
464.05	67.	32.21	0.74	1.423E-02	463.51	10.000	3.832E-01	SB125
511.38	179.	12.88	1.66	1.316E-02	510.72	22.500	4.240E-01	TL208
583.86	364.	7.36	1.37	1.183E-02	583.14	86.000	2.911E-01	TL208
601.69	33.	29.50	1.50	1.151E-02	600.77	18.400	PBC<MDA	SB125
					604.66	97.600	2.401E-02	CS134
609.99	347.	7.44	1.49	1.143E-02	609.32	46.090	5.319E-01	BI214
662.48	70.	20.31	1.56	1.071E-02	661.62	84.620	6.281E-02	CS137
728.07	123.	20.20	1.31	9.955E-03	727.17	11.800	8.604E-01	BI212
795.81	50.	29.10	1.74	9.301E-03	795.76	85.400	5.232E-02	CS134
861.76	88.	23.00	1.91	8.758E-03				
912.36	281.	8.09	1.74	8.392E-03	911.07	29.000	9.409E-01	AC228
969.86	188.	13.63	1.33	8.020E-03	968.90	17.460	1.107E+00	AC228
1120.96	83.	23.59	1.20	7.209E-03	1120.28	15.040	6.181E-01	BI214

1239.33	42.	38.23	0.87	6.697E-03				
1462.42	1412.	2.70	1.83	5.927E-03	1460.75	10.700	1.810E+01	K40
1766.54	79.	11.59	1.44	5.137E-03	1764.51	15.920	7.648E-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	
419.42	210.13	524.	111.	0.056	99.61	1.167	NP-239	
540.26	270.55	281.	92.	0.046	88.40	1.021	AC-228	s
600.88	300.87	217.	73.	0.036	98.44	1.225	PB-212	
1722.57	861.76	88.	88.	0.044	68.99	1.906	TL-208	s
2477.60	1239.33	82.	42.	0.021	114.68	0.871	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	371.	115.	0.057	74.42	0.993D
PB-212	153.39	77.11	389.	144.	0.072	52.22	0.995A
RA-226	372.01	186.42	756.	153.	0.076	73.59	1.500s
PB-212	477.09	238.97	658.	1091.	0.545	14.35	0.904
RA-224	482.54	241.69	711.	137.	0.069	86.43	1.500
PB-214	482.56	241.70	374.	73.	0.036	115.70	0.648s
PB-214	590.30	295.58	216.	269.	0.134	29.93	1.225
AC-228	676.48	338.67	244.	235.	0.117	37.49	1.234
PB-214	703.63	352.24	219.	465.	0.233	20.18	1.271s
SB-125	926.17	463.52	160.	51.	0.025	111.25	1.500s
TL-208	1021.88	511.38	158.	152.	0.076	38.65	1.660s
TL-208	1166.81	583.86	130.	360.	0.180	22.07	1.369
CS-134	1202.48	601.69	30.	33.	0.016	88.50	1.500s
BI-214	1219.07	609.99	120.	340.	0.170	22.31	1.492
CS-137	1324.05	662.48	60.	69.	0.035	60.93	1.557s
BI-212	1455.21	728.07	138.	123.	0.061	60.60	1.314
CS-134	1590.86	795.90	78.	51.	0.026	84.06	1.500s
AC-228	1823.75	912.36	73.	278.	0.139	24.26	1.737
AC-228	1938.73	969.86	115.	188.	0.094	40.89	1.327s
BI-214	2240.89	1120.96	91.	81.	0.041	70.76	1.199s
K-40	2923.71	1462.42	33.	1393.	0.697	8.11	1.832
BI-214	3531.84	1766.54	5.	76.	0.038	34.77	1.438

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		2.6334E-02					
			477.56	2.633E-02	%(	3.634E-01 1.06E-01	G
K-40		1.8101E+01					
			1460.75	1.810E+01	(P	3.804E-01 4.96E-01	G
MN-54		-1.6263E-03					
			834.81	-1.626E-03	&(P	3.404E-02 9.60E-03	G
CO-57		-1.7800E-04					
			122.07	-1.780E-04	%(P	5.702E-02 1.70E-02	G K
			136.43	6.531E-02	%	4.396E-01 1.32E-01	G
CO-60		2.7253E-03					
			1332.51	2.725E-03	%(P	3.954E-02 1.09E-02	G K
			1173.23	-5.110E-03	% P	6.392E-02 1.84E-02	G K
Sr-85		-1.5514E-02					
			514.00	-1.551E-02	%(	4.947E-02 1.48E-02	G
Kr-85		-3.5024E+02					
			513.99	-3.502E+02	%(	1.117E+03 3.35E+02	G
Y-88		4.8905E-04					
			1836.01	4.891E-04	%(P	3.151E-02 8.21E-03	G K
			898.02	-1.139E-05	& P	4.150E-02 1.17E-02	G
NB-94		-3.6266E-03					
			871.10	-3.627E-03	&(	2.974E-02 8.45E-03	G K
			702.50	7.528E-03	%	4.077E-02 1.20E-02	G K
Ag-108M		7.8260E-03					
			722.95	7.826E-03	%(	4.628E-02 1.36E-02	G K
			614.37	-1.530E-02	& P	4.681E-02 1.40E-02	G
			433.93	1.537E-03	%	3.170E-02 9.17E-03	G
CD-109		-1.2624E-01					
			88.04	-1.262E-01	&(	2.298E+00 6.87E-01	G
SN-113		1.3464E-03					
			391.71	1.346E-03	&(	5.562E-02 1.63E-02	G K
			255.04	-5.438E-01	&	1.796E+00 5.39E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	6.5016E-02						
		427.95	-1.191E-02	%(P	1.230E-01	3.61E-02	G K
		600.77	-6.562E-02	& P	2.140E-01	6.38E-02	G
		636.15	8.162E-02	% P	3.312E-01	9.77E-02	G
		463.51	2.927E-01	(P	3.570E-01	1.11E-01	G
		176.29	2.331E-01	%	6.329E-01	1.91E-01	G
I-131	-5.1070E-03						
		364.48	-5.107E-03	%(P	4.923E-02	1.45E-02	G K
		636.97	-1.002E-02	%	5.525E-01	1.58E-01	G
		284.29	-4.612E-02	& P	7.024E-01	2.07E-01	G
CS-134	3.7733E-02						
		604.66	2.401E-02	?(	2.078E-02	7.08E-03	G K
		795.76	5.342E-02	@(P	4.570E-02	1.50E-02	G
		569.29	-5.212E-02	& P	2.481E-01	7.25E-02	G
		801.84	-7.683E-02	& P	4.698E-01	1.35E-01	G
CS-137	6.2812E-02						
		661.62	6.281E-02	(P	3.524E-02	1.30E-02	G
CE-139	2.8575E-02						
		165.85	2.857E-02	%(	4.607E-02	1.41E-02	G
EU-152	-1.1508E-03						
		121.78	-1.151E-03	%(P	1.620E-01	4.81E-02	G K
		344.30	1.562E-02	% P	1.331E-01	3.93E-02	G
		1408.08	-4.525E-03	%	1.409E-01	3.79E-02	G
		964.00	9.639E-03	& P	2.915E-01	8.29E-02	G
		1112.07	-3.559E-03	&	3.230E-01	9.13E-02	G
		778.90	-5.844E-02	%	3.109E-01	9.10E-02	G
EU-154	0.0000E+00						
		123.10	0.000E+00	%(	1.202E-01	3.58E-02	G K
		1274.80	-4.463E-02	%	1.539E-01	4.56E-02	G
		723.30	-6.372E-02	%	2.451E-01	7.28E-02	G
		1004.80	9.841E-02	%	2.138E-01	6.47E-02	G
EU-155	9.1082E-02						
		86.45	9.108E-02	%(	2.734E-01	8.25E-02	G K
		105.31	8.829E-02	%	2.673E-01	8.06E-02	G
HG-203	2.7068E-02						
		279.17	2.707E-02	&(P	4.430E-02	1.35E-02	G K
		72.87	-1.279E-01	% P	2.597E+00	7.76E-01	G
		70.83	3.977E-03	%	4.958E+00	1.48E+00	G
		82.50	-8.836E-01	%	3.974E+00	1.19E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9114E-01						
		583.14	2.911E-01	(P	4.525E-02	2.17E-02	G
		510.72	4.240E-01	+ P	1.703E-01	6.43E-02	G
PB-212	9.0253E-01						
		238.63	8.993E-01	(P	1.008E-01	4.36E-02	G K
							Energy duplication
		77.11	6.697E-01	} P	4.405E-01	1.17E-01	G
		74.81	1.089E+00	+ P	8.777E-01	2.77E-01	G
PB-214	5.7811E-01						
		351.99	5.826E-01	@(P	8.965E-02	3.97E-02	G K
		295.22	5.695E-01	(P	1.511E-01	5.77E-02	G
							Energy duplication
		77.11	2.105E-01	} P	1.058E+00	2.50E-01	G
		241.92	3.481E-01	-	4.453E-01	1.34E-01	G
BI-212	8.6041E-01						
		727.17	8.604E-01	(P	4.033E-01	1.75E-01	G K
		1620.56	-7.312E-02	% P	1.216E+00	3.30E-01	G
		785.42	6.903E-01	%	2.033E+00	6.06E-01	G
BI-214	5.5309E-01						
		609.32	5.319E-01	(P	8.402E-02	4.03E-02	G K
		1764.51	7.648E-01	+ P	1.330E-01	9.25E-02	G
		1120.28	6.181E-01	@(P	3.579E-01	1.49E-01	G
RA-224	1.2562E+00						
		241.00	1.256E+00	(	1.164E+00	3.62E-01	G
RA-226	1.4955E+00						
		185.99	1.495E+00	*(P	1.281E+00	3.98E-01	G
AC-228	9.7810E-01						
		911.07	9.409E-01	(P	1.439E-01	7.71E-02	G K
		968.90	1.107E+00	@(P	3.098E-01	1.51E-01	G
		338.40	8.804E-01	(P	2.834E-01	1.11E-01	G
TH-227	-1.6414E-01						
		236.00	-1.641E-01	%(	4.164E-01	1.26E-01	G K
		256.25	-1.078E-01	% P	5.795E-01	1.73E-01	G
PA-234	-7.4400E-02						
		98.44	-7.440E-02	%(P	2.249E-01	6.77E-02	G K
		946.00	2.176E-03	% P	2.178E-01	6.20E-02	G
		131.28	2.847E-03	& P	2.341E-01	6.97E-02	G
		94.67	-2.919E-02	% P	3.745E-01	1.11E-01	G
		883.24	-2.086E-02	&	3.065E-01	8.74E-02	G
		926.70	1.914E-01	%	2.737E-01	8.63E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-4.740E-02 & P 3.494E-01 1.01E-01 G

TH-234       1.3494E+00
                           63.29 1.349E+00 %(P 7.332E+00 2.19E+00 G K
                           92.80 1.414E+00 % P 2.458E+00 7.45E-01 G
                           92.38 1.661E+00 & P 2.918E+00 8.84E-01 G

AM-241      -2.3838E-02
                           59.54-2.384E-02 %(P 1.125E+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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	2.5631E-02	2.6334E-02	3.1844E-01	3.1844E-01	3.537E-01
K-40		1.8101E+01	1.8101E+01	1.4879E+00	1.8216E+00	
MN-54	#A	-1.6188E-03	-1.6263E-03	4.3499E-02	4.3499E-02	3.389E-02
CO-57	#B	-1.7705E-04	-1.7800E-04	4.3899E-02	4.3899E-02	5.672E-02
CO-60	#B	2.7233E-03	2.7253E-03	3.2666E-02	3.2666E-02	3.951E-02

Sr-85	#A	-1.5172E-02	-1.5514E-02	4.4467E-02	4.4476E-02	4.838E-02
Kr-85	#A	-3.5023E+02	-3.5024E+02	1.0039E+03	1.0041E+03	1.117E+03
Y-88	#B	4.8247E-04	4.8905E-04	2.4645E-02	2.4645E-02	3.109E-02
NB-94	#B	-3.6266E-03	-3.6266E-03	2.5354E-02	2.5355E-02	2.974E-02
Ag-108M	#B	7.8258E-03	7.8260E-03	4.0681E-02	4.0684E-02	4.627E-02
CD-109	#A	-1.2584E-01	-1.2624E-01	2.0599E+00	2.0599E+00	2.291E+00
SN-113	#B	1.3296E-03	1.3464E-03	4.8774E-02	4.8774E-02	5.493E-02
SB-125	#B	6.4923E-02	6.5016E-02	7.4153E-02	7.4249E-02	1.228E-01
I-131	#B	-4.2666E-03	-5.1070E-03	5.2378E-02	5.2379E-02	4.113E-02
CS-134	#	3.7660E-02	3.7733E-02	2.3047E-02	2.3151E-02	2.074E-02
CS-137	#	6.2804E-02	6.2812E-02	3.9043E-02	3.9213E-02	
CE-139	#A	2.8276E-02	2.8575E-02	4.2191E-02	4.2223E-02	4.558E-02
EU-152	#B	-1.1504E-03	-1.1508E-03	2.7600E-01	2.7600E-01	1.619E-01
EU-154	#B	0.0000E+00	0.0000E+00	1.0734E-01	1.0734E-01	1.202E-01
EU-155	#B	9.1009E-02	9.1082E-02	2.4751E-01	2.4756E-01	2.732E-01
HG-203	#B	2.6241E-02	2.7068E-02	4.0626E-02	4.0656E-02	4.295E-02
TL-208		2.9114E-01	2.9114E-01	6.5011E-02	6.7172E-02	
PB-212		9.0253E-01	9.0253E-01	1.3097E-01	1.4107E-01	
PB-214		5.7811E-01	5.7811E-01	1.0583E-01	1.1102E-01	
BI-212		8.6041E-01	8.6041E-01	5.2349E-01	5.2586E-01	
BI-214		5.5309E-01	5.5309E-01	1.2572E-01	1.2976E-01	
RA-224		1.2562E+00	1.2562E+00	1.0857E+00	1.0882E+00	1.164E+00
RA-226	#	1.4955E+00	1.4955E+00	1.1939E+00	1.1970E+00	1.281E+00
AC-228		9.7810E-01	9.7810E-01	1.9820E-01	2.0618E-01	
TH-227	#B	-1.6414E-01	-1.6414E-01	3.7758E-01	3.7770E-01	4.164E-01
PA-234	#B	-7.4400E-02	-7.4400E-02	2.1303E-01	2.1307E-01	2.249E-01
TH-234	#B	1.3494E+00	1.3494E+00	6.5767E+00	6.5771E+00	7.332E+00
AM-241	#A	-2.3838E-02	-2.3838E-02	1.1844E+00	1.1844E+00	1.125E+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 (87.4 to 2000.7 keV) 2.3583427E+01 pCi/gm
Total Decayed Activity (87.4 to 2000.7 keV) 2.3583439E+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_27JUN2006_1538.An1

Sample description
FSS-NOL-06-02-001-F

Spectrum Filename: C:\GammaVision\Spectra\107F_27JUN2006_1538.An1

Acquisition information
Start time: 27-Jun-2006 15:38:49
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: 1.7600E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7600E+03) =
5.6818E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	23-Jun-2006 10:35:00
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: 0.2481

***** 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	320.	14.29	1.18	2.842E-02	74.81	9.600	8.885E-01	PB212
77.10	560.	8.61	1.18	2.959E-02	77.11	17.500	8.306E-01	PB212
					77.11	10.700	1.347E+00	PB214
93.07	158.	30.36	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.09	172.	30.42	1.50	3.429E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.83	124.	41.31	1.55	3.818E-02				
185.83	271.	20.13	1.71	3.611E-02	185.99	3.280	1.755E+00	RA226
209.41	146.	22.48	1.90	3.428E-02				
239.19	1692.	3.97	1.56	3.185E-02	238.63	43.100	9.360E-01	PB212
					241.00	3.900	1.049E+01	RA224
242.08	160.	23.23	1.30	3.163E-02	241.92	7.470	5.189E-01	PB214
270.27	156.	27.20	1.32	2.944E-02				
278.56	100.	31.48	1.23	2.884E-02				
278.56	100.	31.48	1.23	2.884E-02	279.17	81.500	3.452E-02	HG203
295.40	271.	9.64	1.34	2.767E-02	295.22	19.200	3.853E-01	PB214
300.59	74.	29.42	1.34	2.732E-02				
328.00	80.	35.19	0.98	2.560E-02				
338.65	354.	11.06	1.75	2.499E-02	338.40	12.010	8.956E-01	AC228
351.99	565.	6.28	1.80	2.426E-02	351.99	37.100	4.773E-01	PB214
409.80	59.	33.33	1.43	2.153E-02				
463.69	122.	17.79	1.66	1.952E-02	463.51	10.000	4.692E-01	SB125
511.18	256.	13.55	1.11	1.807E-02	510.72	22.500	4.196E-01	TL208
583.53	470.	7.42	1.87	1.628E-02	583.14	86.000	2.554E-01	TL208
609.68	358.	7.47	1.38	1.573E-02	609.32	46.090	3.745E-01	BI214
727.37	134.	18.83	2.30	1.374E-02	727.17	11.800	6.260E-01	BI212

795.05	51.	30.72	1.68	1.284E-02	795.76	85.400	3.576E-02	CS134
860.96	109.	23.86	1.46	1.211E-02				
911.55	368.	7.45	1.98	1.160E-02	911.07	29.000	8.306E-01	AC228
968.23	298.	10.38	1.62	1.110E-02	968.90	17.460	1.174E+00	AC228
1120.94	125.	16.57	2.32	9.970E-03	1120.28	15.040	6.396E-01	BI214
1461.27	1670.	2.53	2.26	8.189E-03	1460.75	10.700	1.458E+01	K40
1764.94	95.	11.76	2.52	7.084E-03	1764.51	15.920	6.475E-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	
257.31	128.83	965.	124.	0.062	123.94	1.553	AC-228	l
418.46	209.41	442.	146.	0.073	67.45	1.900	AC-228	s
540.16	270.27	529.	156.	0.078	81.61	1.323	AC-228	s
600.80	300.55	199.	74.	0.037	88.27	1.341	PB-212	lD
655.62	328.00	285.	80.	0.040	105.57	0.983	AC-228	
819.21	409.80	140.	59.	0.029	100.00	1.427	AC-228	s
1721.49	860.96	133.	108.	0.054	53.73	1.459	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	149.29	74.81	883.	326.	0.163	41.50	1.178D
PB-212	153.89	77.11	880.	389.	0.194	29.48	1.179A
PB-214	153.89	77.11	1486.	161.	0.081	97.16	1.500A
TH-234	185.84	93.09	1418.	172.	0.086	91.25	1.500s
TH-234	185.81	93.07	1391.	158.	0.079	91.07	1.500s
RA-226	371.30	185.83	869.	271.	0.135	60.38	1.709s
TH-227	471.87	236.12	1552.	-200.	-0.100	86.50	1.500s
PB-212	476.89	238.63	461.	1212.	0.606	11.25	1.297D
RA-224	477.31	238.84	735.	1191.	0.596	12.96	1.500s
PB-214	483.47	241.92	621.	160.	0.080	69.69	1.299D
HG-203	555.27	277.82	330.	80.	0.040	100.13	1.500s
PB-214	590.36	295.37	353.	286.	0.143	35.77	1.504s
AC-228	676.92	338.65	360.	350.	0.175	33.19	1.749s
PB-214	703.59	351.99	245.	559.	0.280	18.85	1.796s
SB-125	925.85	463.12	138.	74.	0.037	72.53	1.500s
TL-208	1021.95	511.18	271.	222.	0.111	40.66	1.113s
TL-208	1166.64	583.53	207.	466.	0.233	22.27	1.871s
BI-214	1218.95	609.69	177.	373.	0.187	24.89	1.378s
Ag-108M	1223.55	611.99	285.	-83.	-0.042	91.92	1.561s
BI-212	1454.32	727.37	144.	132.	0.066	56.50	2.295s
CS-134	1589.66	795.05	99.	51.	0.025	92.16	1.684s
AC-228	1822.66	911.55	103.	364.	0.182	22.35	1.983s
AC-228	1936.03	968.23	143.	296.	0.148	31.14	1.618s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2241.44	1120.94	82.	125.	0.062	49.70	2.321s
K-40	2922.13	1461.27	29.	1665.	0.832	7.58	2.264
BI-214	3529.53	1764.94	8.	95.	0.048	35.29	2.521s

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		5.2965E-02					
			477.56	5.296E-02	%(	2.534E-01 7.50E-02	G
K-40		1.4584E+01					
			1460.75	1.458E+01	(P	2.445E-01 3.70E-01	G
MN-54		1.3021E-02					
			834.81	1.302E-02	%(P	3.271E-02 9.83E-03	G
CO-57		9.4689E-03					
			122.07	9.469E-03	&(P	3.688E-02 1.11E-02	G K
			136.43	-1.340E-03	% P	2.837E-01 8.45E-02	G
CO-60		-4.9250E-03					
			1332.51	-4.925E-03	%(P	2.894E-02 7.79E-03	G K
			1173.23	1.068E-02	& P	3.518E-02 1.03E-02	G K
Sr-85		-1.5681E-02					
			514.00	-1.568E-02	%(	3.722E-02 1.12E-02	G
Kr-85		-3.7580E+02					
			513.99	-3.758E+02	%(P	8.255E+02 2.48E+02	G
Y-88		-1.3892E-03					
			1836.01	-1.389E-03	&(P	2.131E-02 5.36E-03	G K
			898.02	-7.227E-04	& P	3.302E-02 9.36E-03	G
NB-94		6.5314E-03					
			871.10	6.531E-03	%(P	2.463E-02 7.24E-03	G K
			702.50	-9.164E-04	% P	3.225E-02 9.34E-03	G K
Ag-108M		-2.0267E-02					
			722.95	-2.027E-02	%(	4.273E-02 1.30E-02	G K
			614.37	-4.534E-02	&	4.423E-02 1.39E-02	G
			433.93	-4.684E-03	% P	2.890E-02 8.49E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	4.7303E-01						
		88.04	4.730E-01	%(P	1.127E+00	3.41E-01	G
SN-113	-9.4226E-03						
		391.71	-9.423E-03	%(P	4.075E-02	1.21E-02	G K
		255.04	4.445E-01	%	1.239E+00	3.73E-01	G
SB-125	7.4397E-02						
		427.95	6.200E-04	&(P	8.629E-02	2.51E-02	G K
		600.77	-3.850E-02	& P	1.435E-01	4.22E-02	G
		636.15	9.310E-02	& P	1.500E-01	4.64E-02	G
		463.51	2.928E-01	*(P	2.264E-01	7.35E-02	G
		176.29	-6.743E-03	& P	4.355E-01	1.29E-01	G
I-131	9.7441E-03						
		364.48	9.744E-03	%(	4.466E-02	1.33E-02	G K
		636.97	-5.886E-02	%	5.272E-01	1.54E-01	G
		284.29	-2.491E-02	%	5.655E-01	1.67E-01	G
CS-134	1.6030E-02						
		604.66	-1.232E-03	%(P	3.196E-02	9.30E-03	G K
		795.76	3.576E-02	*(P	3.458E-02	1.11E-02	G
		569.29	6.278E-02	&	1.425E-01	4.30E-02	G
		801.84	6.364E-02	% P	3.201E-01	9.38E-02	G
CS-137	-7.9494E-04						
		661.62	-7.949E-04	%(P	3.305E-02	9.43E-03	G
CE-139	4.3905E-03						
		165.85	4.390E-03	&(P	3.423E-02	1.02E-02	G
EU-152	-2.3095E-03						
		121.78	-2.309E-03	&(P	1.086E-01	3.24E-02	G K
		344.30	-1.424E-02	% P	9.475E-02	2.80E-02	G
		1408.08	4.400E-02	% P	1.082E-01	3.22E-02	G
		964.00	5.562E-02	& P	2.378E-01	7.02E-02	G
		1112.07	9.751E-02	% P	2.372E-01	7.12E-02	G
		778.90	-1.797E-02	% P	2.247E-01	6.48E-02	G
EU-154	1.8598E-03						
		123.10	1.860E-03	&(P	7.907E-02	2.36E-02	G K
		1274.80	1.844E-02	& P	8.917E-02	2.59E-02	G
		723.30	-1.526E-02	% P	1.103E-01	3.17E-02	G
		1004.80	-1.157E-02	& P	1.647E-01	4.71E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	7.5623E-02						
		86.45	7.562E-02	%(	1.367E-01	4.15E-02	G K
		105.31	6.572E-02	% P	1.535E-01	4.65E-02	G
HG-203	2.7899E-02						
		279.17	2.790E-02	*(P	3.041E-02	9.46E-03	G K
		72.87	-2.987E-01	% P	1.096E+00	3.31E-01	G
		70.83	-1.427E-01	%	1.795E+00	5.39E-01	G
		82.50	-4.531E-01	%	2.094E+00	6.30E-01	G
TL-208	2.5538E-01						
		583.14	2.554E-01	(P	3.823E-02	1.92E-02	G
		510.72	4.196E-01	+ P	1.498E-01	6.55E-02	G
PB-212	6.7681E-01						
		238.63	6.768E-01	(P	5.741E-02	2.57E-02	G K
							Energy duplication
		77.11	5.767E-01	}	2.091E-01	5.67E-02	G
		74.81	9.164E-01	+ P	3.962E-01	1.28E-01	G
PB-214	4.6276E-01						
		351.99	4.773E-01	*(P	6.448E-02	3.03E-02	G K
		295.22	4.128E-01	(P	1.305E-01	5.00E-02	G
							Energy duplication
		77.11	3.908E-01	} P	4.425E-01	1.27E-01	G
		241.92	5.189E-01	(P	3.863E-01	1.22E-01	G
BI-212	6.2600E-01						
		727.17	6.260E-01	*(P	2.774E-01	1.19E-01	G K
		1620.56	5.472E-01	% P	8.273E-01	2.61E-01	G
		785.42	4.249E-01	% P	1.489E+00	4.41E-01	G
BI-214	3.9491E-01						
		609.32	3.949E-01	@(P	6.845E-02	3.32E-02	G K
		1764.51	6.475E-01	+ P	1.076E-01	7.69E-02	G
		1120.28	6.396E-01	+ P	2.301E-01	1.07E-01	G
RA-224	7.3983E+00						
		241.00	7.398E+00	?(P	8.015E-01	3.20E-01	G
RA-226	1.7546E+00						
		185.99	1.755E+00	*(	9.085E-01	3.53E-01	G
AC-228	8.4966E-01						
		911.07	8.306E-01	*(P	1.140E-01	6.26E-02	G K
		968.90	1.174E+00	+ P	2.315E-01	1.23E-01	G
		338.40	8.956E-01	*(P	2.329E-01	1.00E-01	G

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

TH-227      -4.2612E-01
                          236.00-4.261E-01 ?(P 3.978E-01 1.23E-01 G K
                          256.25-7.189E-03 & P 3.645E-01 1.07E-01 G

PA-234       2.8136E-02
                           98.44 2.814E-02 %(  1.378E-01 4.14E-02 G K
                          946.00-2.484E-02 &   1.557E-01 4.54E-02 G
                          131.28 2.102E-02 &   1.617E-01 4.85E-02 G
                           94.67-1.216E-01 %   2.599E-01 7.88E-02 G
                          883.24-4.086E-02 %   2.360E-01 6.88E-02 G
                          926.70-4.264E-02 %   2.701E-01 7.86E-02 G
                          569.26 9.266E-02 &   2.107E-01 6.36E-02 G

TH-234       1.0204E+00
                           63.29 5.831E-01 %(P 1.782E+00 5.37E-01 G K
                           92.80 1.178E+00  (P 1.314E+00 4.02E-01 G
                           92.38 1.499E+00  (P 1.552E+00 4.77E-01 G

AM-241      -5.8202E-03
                           59.54-5.820E-03 %(P 2.388E-01 7.14E-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	5.0148E-02	5.2965E-02	2.2497E-01	2.2499E-01	2.400E-01
K-40		1.4584E+01	1.4584E+01	1.1088E+00	1.4040E+00	
MN-54	#A	1.2900E-02	1.3021E-02	2.9482E-02	2.9492E-02	3.241E-02
CO-57	#B	9.3671E-03	9.4689E-03	3.3294E-02	3.3298E-02	3.649E-02
CO-60	#B	-4.9175E-03	-4.9250E-03	1.1808E-01	1.1808E-01	2.889E-02
Sr-85	#A	-1.4990E-02	-1.5681E-02	3.3731E-02	3.3744E-02	3.558E-02
Kr-85	#A	-3.7579E+02	-3.7580E+02	8.7220E+02	8.7249E+02	8.254E+02
Y-88	#B	-1.3517E-03	-1.3892E-03	8.3670E-02	8.3670E-02	2.073E-02
NB-94	#B	6.5314E-03	6.5314E-03	2.1719E-02	2.1723E-02	2.463E-02
Ag-108M	#B	-2.0266E-02	-2.0267E-02	3.8858E-02	3.8876E-02	4.273E-02
CD-109	#A	4.6999E-01	4.7303E-01	1.0240E+00	1.0243E+00	1.120E+00
SN-113	#B	-9.1867E-03	-9.4226E-03	4.4749E-02	4.4752E-02	3.973E-02
SB-125	#B	7.4183E-02	7.4397E-02	5.6005E-02	5.6177E-02	8.604E-02
I-131	#B	6.7776E-03	9.7441E-03	3.9876E-02	3.9880E-02	3.106E-02
CS-134	#B	1.5968E-02	1.6030E-02	1.4927E-02	1.4957E-02	3.184E-02
CS-137	#A	-7.9473E-04	-7.9494E-04	6.0980E-02	6.0980E-02	3.304E-02
CE-139	#A	4.2983E-03	4.3905E-03	3.0684E-02	3.0685E-02	3.351E-02
EU-152	#B	-2.3080E-03	-2.3095E-03	1.0562E-01	1.0562E-01	1.085E-01
EU-154	#B	1.8580E-03	1.8598E-03	7.0808E-02	7.0808E-02	7.900E-02
EU-155	#B	7.5502E-02	7.5623E-02	1.2463E-01	1.2470E-01	1.364E-01
HG-203	#A	2.6205E-02	2.7899E-02	2.8388E-02	2.8435E-02	2.857E-02
TL-208		2.5538E-01	2.5538E-01	5.7424E-02	5.9372E-02	
PB-212		6.7681E-01	6.7681E-01	7.7125E-02	8.6869E-02	
PB-214		4.6276E-01	4.6276E-01	8.8038E-02	9.2183E-02	
BI-212	#	6.2600E-01	6.2600E-01	3.5716E-01	3.5907E-01	
BI-214	#	3.9491E-01	3.9491E-01	9.9449E-02	1.0215E-01	
RA-224	#	7.3983E+00	7.3983E+00	9.6073E-01	1.0554E+00	8.015E-01
RA-226	#	1.7546E+00	1.7546E+00	1.0594E+00	1.0644E+00	
AC-228	#	8.4966E-01	8.4966E-01	1.7169E-01	1.7887E-01	
TH-227	#A	-4.2612E-01	-4.2612E-01	3.6912E-01	3.6998E-01	3.978E-01
PA-234	#B	2.8136E-02	2.8136E-02	1.2417E-01	1.2418E-01	1.378E-01
TH-234	#B	1.0204E+00	1.0204E+00	9.7420E-01	9.7585E-01	1.782E+00
AM-241	#A	-5.8201E-03	-5.8202E-03	2.8669E-01	2.8669E-01	2.388E-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) 1.9604631E+01 pCi/gm
Total Decayed Activity (270.2 to 2000.1 keV) 1.9604639E+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_27JUN2006_1619.An1

Sample description
FSS-NOL-06-02-026-F-B

Spectrum Filename: C:\GammaVision\Spectra\107F_27JUN2006_1619.An1

Acquisition information
Start time: 27-Jun-2006 16:19:17
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: 1.8420E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8420E+03) =
5.4289E+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-Jun-2006 12:00:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1883

***** 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	284.	23.55	1.50	2.849E-02				
74.79	284.	23.55	1.50	2.849E-02	74.81	9.600	7.616E-01	PB212
77.08	538.	12.17	1.50	2.957E-02	77.11	17.500	7.625E-01	PB212
					77.11	10.700	1.236E+00	PB214
77.08	533.	12.17	1.50	2.957E-02	77.11	17.500	7.558E-01	PB212
					77.11	10.700	1.236E+00	PB214
87.26	182.	31.69	1.50	3.327E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
87.28	193.	31.09	1.50	3.284E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	1.129E+00	CD109
92.99	212.	24.93	1.50	3.438E-02	92.38	2.570	1.767E+00	TH234
					92.80	3.000	1.509E+00	TH234
92.99	222.	25.53	1.50	3.429E-02	92.38	2.570	1.851E+00	TH234
					92.80	3.000	PBC<MDA	TH234
129.51	141.	32.27	1.57	3.819E-02				
186.34	219.	18.32	1.79	3.608E-02	185.99	3.280	1.358E+00	RA226
209.33	206.	19.48	1.87	3.428E-02				
238.77	1433.	3.39	1.30	3.188E-02	238.63	43.100	7.565E-01	PB212
					241.00	3.900	8.491E+00	RA224
242.01	252.	14.79	1.30	3.162E-02	241.92	7.470	7.783E-01	PB214
270.59	161.	24.85	1.84	2.942E-02				
277.81	68.	39.32	1.54	2.889E-02				
295.37	287.	9.55	1.34	2.767E-02	295.22	19.200	3.894E-01	PB214
300.73	72.	31.15	1.34	2.731E-02				
328.49	81.	32.17	1.61	2.557E-02				
338.49	332.	12.80	1.46	2.500E-02	338.40	12.010	8.027E-01	AC228
351.98	585.	6.83	1.58	2.426E-02				

351.98	585.	6.83	1.58	2.426E-02	351.99	37.100	4.730E-01	PB214
463.22	125.	19.33	1.67	1.954E-02				
463.22	125.	19.33	1.67	1.954E-02	463.51	10.000	4.604E-01	SB125
510.77	222.	14.43	2.40	1.808E-02	510.72	22.500	3.404E-01	TL208
583.41	547.	6.80	1.84	1.628E-02	583.14	86.000	2.842E-01	TL208
609.68	480.	7.93	1.60	1.573E-02	609.32	46.090	4.806E-01	BI214
662.34	75.	32.25	1.44	1.476E-02	661.62	84.620	4.190E-02	CS137
726.91	165.	16.28	1.61	1.375E-02	723.30	19.700	4.440E-01	EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					727.17	11.800	7.397E-01	BI212
785.62	52.	29.93	1.29	1.297E-02	785.42	2.000	1.481E+00	BI212
795.50	51.	32.10	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
860.53	82.	18.83	1.63	1.211E-02				
911.44	302.	7.61	2.21	1.160E-02	911.07	29.000	6.489E-01	AC228
967.77	316.	9.14	1.94	1.110E-02	968.90	17.460	1.190E+00	AC228
1121.23	171.	13.66	1.64	9.964E-03	1120.28	15.040	8.323E-01	BI214
1461.25	1999.	2.33	2.21	8.189E-03	1460.75	10.700	1.670E+01	K40
1765.53	78.	12.74	2.18	7.084E-03	1764.51	15.920	5.094E-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
418.31	209.33	582.	206.	0.103	58.43	1.866	AC-228 s
477.16	238.81	461.	1433.	0.717	10.16	1.297	PB-212 D
483.65	242.05	569.	252.	0.126	44.36	1.299	PB-214 D
540.81	270.59	498.	161.	0.081	74.55	1.837	AC-228 s
600.90	300.64	382.	81.	0.040	122.03	1.080	PB-212
656.59	328.49	260.	81.	0.041	96.51	1.613	RH-106M
1720.63	860.53	64.	82.	0.041	56.50	1.635	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	149.26	74.79	2158.	284.	0.142	70.66	1.500s
PB-212	153.89	77.11	1872.	538.	0.269	36.50	1.500D
PB-214	153.89	77.11	1877.	533.	0.267	36.50	1.500D
EU-155	174.23	87.28	1705.	193.	0.097	93.27	1.500
CD-109	174.19	87.26	1586.	182.	0.091	95.08	1.500
TH-234	185.65	92.99	1621.	222.	0.111	76.59	1.500
TH-234	185.64	92.99	1576.	212.	0.106	74.79	1.500
RA-226	372.33	186.34	606.	219.	0.110	54.96	1.791s
TH-227	471.80	236.08	1443.	-164.	-0.082	101.02	1.500s
PB-212	477.17	238.77	1090.	1364.	0.682	12.91	1.500s
RA-224	477.22	238.79	695.	1395.	0.697	11.33	1.500s
PB-214	590.39	295.38	465.	285.	0.142	36.06	1.500s
AC-228	676.60	338.49	449.	329.	0.164	38.41	1.461s
PB-214	703.59	351.99	287.	545.	0.273	18.20	1.500D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-125	925.74	463.07	179.	78.	0.039	77.35	1.500s
TL-208	1021.14	510.77	271.	189.	0.094	43.30	2.402s
TL-208	1166.40	583.41	231.	543.	0.271	20.41	1.840s
BI-214	1218.95	609.68	235.	475.	0.238	23.80	1.596s
Ag-108M	1223.35	611.88	345.	-107.	-0.053	79.24	1.561s
CS-137	1324.25	662.34	158.	71.	0.036	96.75	1.441s
BI-212	1453.39	726.91	164.	164.	0.082	48.84	1.611s
BI-212	1570.81	785.62	80.	52.	0.026	89.80	1.287
CS-134	1590.56	795.50	114.	51.	0.026	96.30	1.684s
AC-228	1822.44	911.44	85.	298.	0.149	22.84	2.208s
AC-228	1935.11	967.77	118.	314.	0.157	27.41	1.939s
BI-214	2242.02	1121.23	105.	170.	0.085	40.97	1.641s
K-40	2922.09	1461.25	36.	1994.	0.997	6.98	2.212
BI-214	3530.70	1765.53	7.	78.	0.039	38.22	2.175s

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		-6.5303E-02						
			477.56	-6.530E-02	&(	2.605E-01	7.75E-02	G
K-40		1.6695E+01						
			1460.75	1.670E+01	(P	2.552E-01	3.90E-01	G
MN-54		1.7101E-02						
			834.81	1.710E-02	%(P	2.915E-02	8.94E-03	G
CO-57		-3.4260E-03						
			122.07	-3.426E-03	%(P	3.712E-02	1.11E-02	G K
			136.43	-6.284E-02	& P	2.976E-01	8.94E-02	G
CO-60		5.4527E-03						
			1332.51	5.453E-03	%(P	3.534E-02	1.01E-02	G K
			1173.23	1.048E-02	% P	4.428E-02	1.30E-02	G K
Sr-85		-1.6994E-02						
			514.00	-1.699E-02	%(	3.779E-02	1.14E-02	G
Kr-85		-4.0391E+02						
			513.99	-4.039E+02	%(P	8.378E+02	2.53E+02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	1.8664E-03						
		1836.01	1.866E-03	&(P	2.270E-02	6.07E-03	G K
		898.02	7.887E-04	% P	3.260E-02	9.32E-03	G
NB-94	5.8896E-03						
		871.10	5.890E-03	%(P	2.795E-02	8.20E-03	G K
		702.50	1.855E-03	% P	2.946E-02	8.56E-03	G K
Ag-108M	-1.7499E-02						
		722.95	-1.750E-02	%(	4.616E-02	1.39E-02	G K
		614.37	-5.545E-02	+	4.631E-02	1.46E-02	G
		433.93	2.445E-04	& P	2.838E-02	8.28E-03	G
CD-109	1.0682E+00						
		88.04	1.068E+00	(P	1.103E+00	3.39E-01	G
SN-113	8.8641E-05						
		391.71	8.864E-05	%(P	3.622E-02	1.05E-02	G K
		255.04	2.979E-01	%	1.294E+00	3.87E-01	G
SB-125	8.4126E-02						
		427.95	1.340E-02	&(P	7.687E-02	2.27E-02	G K
		600.77	-6.715E-04	% P	1.709E-01	4.97E-02	G
		636.15	6.456E-02	& P	1.998E-01	5.94E-02	G
		463.51	2.935E-01	*(P	2.451E-01	7.84E-02	G
		176.29	4.143E-04	% P	4.575E-01	1.36E-01	G
I-131	1.3293E-02						
		364.48	1.329E-02	&(	4.312E-02	1.29E-02	G K
		636.97	-5.318E-02	&	5.171E-01	1.51E-01	G
		284.29	-4.088E-02	%	5.258E-01	1.55E-01	G
CS-134	1.5475E-02						
		604.66	-1.243E-03	%(P	2.335E-02	6.71E-03	G K
		795.76	3.458E-02	*(P	3.522E-02	1.12E-02	G
		569.29	-1.051E-02	&	1.940E-01	5.68E-02	G
		801.84	-7.854E-02	% P	3.672E-01	1.08E-01	G
CS-137	4.1899E-02						
		661.62	4.190E-02	*(P	3.594E-02	1.42E-02	G
CE-139	-3.3282E-03						
		165.85	-3.328E-03	%(P	3.831E-02	1.15E-02	G
EU-152	1.3487E-03						
		121.78	1.349E-03	%(P	9.066E-02	2.70E-02	G K
		344.30	-8.395E-04	% P	8.378E-02	2.45E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1408.08	2.909E-02	% P	1.245E-01	3.59E-02	G
		964.00	-3.193E-02	& P	2.949E-01	8.66E-02	G
		1112.07	7.103E-02	% P	2.346E-01	6.95E-02	G
		778.90	-3.192E-02	% P	2.406E-01	7.02E-02	G
EU-154	-2.5836E-04						
		123.10	-2.584E-04	%(P	7.392E-02	2.20E-02	G K
		1274.80	-2.354E-02	& P	1.169E-01	3.43E-02	G
		723.30	-9.436E-02	% P	2.151E-01	6.50E-02	G
		1004.80	-4.063E-02	& P	1.952E-01	5.74E-02	G
EU-155	1.3197E-01						
		86.45	1.320E-01	(	1.334E-01	4.10E-02	G K
		105.31	2.352E-02	% P	1.567E-01	4.70E-02	G
HG-203	-9.8351E-04						
		279.17	-9.835E-04	&(P	2.867E-02	8.42E-03	G K
		72.87	-9.498E-02	% P	9.770E-01	2.93E-01	G
		70.83	-2.698E-02	%	2.041E+00	6.13E-01	G
		82.50	-6.839E-01	&	2.202E+00	6.65E-01	G
TL-208	2.9583E-01						
		583.14	2.842E-01	(P	3.854E-02	1.95E-02	G
		510.72	3.404E-01	*(P	1.433E-01	5.79E-02	G
PB-212	7.4126E-01						
		238.63	7.281E-01	*(P	8.354E-02	3.17E-02	G K
							Energy duplication
		77.11	7.625E-01	*(	2.897E-01	9.28E-02	G
		74.81	7.616E-01	&(P	5.878E-01	1.82E-01	G
PB-214	4.2699E-01						
							Energy duplication
		351.99	4.445E-01	*(P	6.661E-02	2.72E-02	G K
		295.22	3.931E-01	*(P	1.424E-01	4.80E-02	G
							Energy duplication
		77.11	1.236E+00	+ P	4.744E-01	1.52E-01	G
		241.92	2.439E-02	% P	5.767E-01	1.73E-01	G
BI-212	7.3973E-01						
		727.17	7.397E-01	*(P	2.826E-01	1.21E-01	G K
		1620.56	-8.865E-02	% P	1.013E+00	2.81E-01	G
		785.42	1.481E+00	+ P	1.253E+00	4.54E-01	G
BI-214	4.8797E-01						
		609.32	4.806E-01	*(P	7.493E-02	3.85E-02	G K
		1764.51	5.094E-01	@(P	9.608E-02	6.57E-02	G
		1120.28	8.323E-01	+ P	2.468E-01	1.14E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RA-224	8.2760E+00						
		241.00	8.276E+00	?(P	7.450E-01	3.13E-01	G
RA-226	1.3581E+00						
		185.99	1.358E+00	*(	7.274E-01	2.49E-01	G
AC-228	6.4894E-01						
		911.07	6.489E-01	(P	9.967E-02	5.01E-02	G K
		968.90	1.190E+00	+ P	2.018E-01	1.09E-01	G
		338.40	8.027E-01	+ P	2.480E-01	1.04E-01	G
TH-227	-3.3518E-01						
		236.00	-3.352E-01	?(P	3.667E-01	1.13E-01	G K
		256.25	1.003E-01	% P	3.691E-01	1.11E-01	G
PA-234	1.5575E-02						
		98.44	1.558E-02	&(	1.383E-01	4.15E-02	G K
		946.00	-3.786E-02	&	1.584E-01	4.67E-02	G
		131.28	-1.915E-02	&	1.647E-01	4.94E-02	G
		94.67	-9.547E-02	%	2.624E-01	7.93E-02	G
		883.24	4.485E-02	&	2.386E-01	6.98E-02	G
		926.70	-6.277E-02	%	2.731E-01	8.04E-02	G
		569.26	-1.556E-02	&	2.791E-01	8.16E-02	G
TH-234	1.2485E+00						
		63.29	6.511E-01	%(P	1.673E+00	5.05E-01	G K
		92.80	1.509E+00	(P	1.335E+00	4.11E-01	G
		92.38	1.851E+00	(P	1.584E+00	4.89E-01	G
AM-241	-2.6614E-02						
		59.54	-2.661E-02	%(P	2.273E-01	6.82E-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	-6.1854E-02	-6.5303E-02	2.3251E-01	2.3254E-01	2.468E-01
K-40		1.6695E+01	1.6695E+01	1.1686E+00	1.5290E+00	
MN-54	#A	1.6943E-02	1.7101E-02	2.6808E-02	2.6827E-02	2.888E-02
CO-57	#B	-3.3894E-03	-3.4260E-03	3.4578E-02	3.4579E-02	3.672E-02
CO-60	#B	5.4445E-03	5.4527E-03	3.0393E-02	3.0395E-02	3.528E-02
Sr-85	#A	-1.6252E-02	-1.6994E-02	3.4313E-02	3.4328E-02	3.613E-02
Kr-85	#A	-4.0389E+02	-4.0391E+02	8.7202E+02	8.7234E+02	8.378E+02
Y-88	#B	1.8164E-03	1.8664E-03	1.8202E-02	1.8203E-02	2.209E-02
NB-94	#B	5.8896E-03	5.8896E-03	2.4593E-02	2.4596E-02	2.795E-02
Ag-108M	#B	-1.7497E-02	-1.7499E-02	4.1702E-02	4.1714E-02	4.616E-02
CD-109	#A	1.0614E+00	1.0682E+00	1.0174E+00	1.0191E+00	1.096E+00
SN-113	#B	8.6437E-05	8.8641E-05	3.1614E-02	3.1614E-02	3.532E-02
SB-125	#F	8.3886E-02	8.4126E-02	6.7418E-02	6.7600E-02	7.665E-02
I-131	#B	9.2708E-03	1.3293E-02	3.8759E-02	3.8767E-02	3.007E-02
CS-134	#B	1.5415E-02	1.5475E-02	1.5054E-02	1.5082E-02	2.326E-02
CS-137	#	4.1888E-02	4.1899E-02	4.2542E-02	4.2614E-02	
CE-139	#A	-3.2588E-03	-3.3282E-03	3.6172E-02	3.6173E-02	3.751E-02
EU-152	#B	1.3479E-03	1.3487E-03	8.0950E-02	8.0950E-02	9.060E-02
EU-154	#B	-2.5812E-04	-2.5836E-04	7.1451E-02	7.1451E-02	7.385E-02
EU-155	#A	1.3175E-01	1.3197E-01	1.2309E-01	1.2330E-01	1.332E-01
HG-203	#B	-9.2421E-04	-9.8351E-04	6.4648E-02	6.4648E-02	2.694E-02
TL-208	#	2.9583E-01	2.9583E-01	6.0894E-02	6.3351E-02	
PB-212	#	7.4126E-01	7.4126E-01	9.6814E-02	1.0625E-01	8.354E-02
PB-214	#	4.2699E-01	4.2699E-01	7.8441E-02	8.2395E-02	6.661E-02
BI-212		7.3973E-01	7.3973E-01	3.6409E-01	3.6671E-01	
BI-214	#	4.8797E-01	4.8797E-01	1.1104E-01	1.1472E-01	
RA-224	#	8.2760E+00	8.2760E+00	9.3896E-01	1.0586E+00	7.450E-01
RA-226	#	1.3581E+00	1.3581E+00	7.4637E-01	7.5067E-01	
AC-228		6.4894E-01	6.4894E-01	1.5035E-01	1.5515E-01	
TH-227	#A	-3.3518E-01	-3.3518E-01	3.3915E-01	3.3973E-01	3.667E-01

PA-234 #B	1.5575E-02	1.5575E-02	1.2436E-01	1.2436E-01	1.383E-01

TH-234 #B	1.2485E+00	1.2485E+00	9.9054E-01	9.9295E-01	1.673E+00
AM-241 #A	-2.6614E-02	-2.6614E-02	2.1722E-01	2.1723E-01	2.273E-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) 2.0267464E+01 pCi/gm
Total Decayed Activity (270.2 to 2000.1 keV) 2.0267483E+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_27JUN2006_1658.An1

Sample description
FSS-NOL-06-02-023-F

Spectrum Filename: C:\GammaVision\Spectra\107F_27JUN2006_1658.An1

Acquisition information
Start time: 27-Jun-2006 16:58:51
Live time: 2000
Real time: 2002
Dead time: 0.09 %
Detector ID: 2

Detector system
Det 107- DSPE- 634

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

Energy Calibration
Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/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: 1.5000E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5000E+03) =
6.6667E+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-Mar-2005 12:00:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1756

***** 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	220.	22.58	1.50	2.849E-02	74.81	9.600	7.237E-01	PB212
77.10	333.	14.51	1.50	2.957E-02	77.11	10.700	9.492E-01	PB214
					77.11	17.500	5.804E-01	PB212
77.10	338.	14.51	1.50	2.957E-02	77.11	10.700	9.492E-01	PB214
					77.11	17.500	5.886E-01	PB212
87.29	150.	33.62	1.31	3.307E-02	86.45	32.740	1.508E-01	EU155
					88.04	3.790	2.193E+00	CD109
93.32	98.	39.16	1.41	3.449E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.70	106.	39.68	1.24	3.820E-02				
129.70	106.	39.68	1.24	3.820E-02	131.28	20.000	1.249E-01	PA234
185.85	163.	18.06	1.12	3.611E-02	185.99	3.280	1.244E+00	RA226
209.38	110.	32.98	1.34	3.428E-02				
238.83	668.	5.00	1.30	3.188E-02	238.63	43.100	4.275E-01	PB212
242.05	167.	16.30	1.30	3.163E-02	241.00	3.900	1.201E+00	RA224
					241.92	7.470	6.313E-01	PB214
295.36	259.	9.06	1.34	2.768E-02				
295.36	259.	9.06	1.34	2.768E-02	295.22	19.200	4.307E-01	PB214
300.49	54.	31.83	1.34	2.734E-02				
328.53	71.	29.49	1.20	2.557E-02				
338.32	212.	15.51	1.42	2.501E-02	338.40	12.010	6.270E-01	AC228
352.09	584.	6.26	1.52	2.425E-02	351.99	37.100	5.795E-01	PB214
462.67	103.	24.33	1.87	1.956E-02				
462.67	103.	24.33	1.87	1.956E-02	463.51	10.000	6.366E-01	SB125
510.86	126.	18.59	1.54	1.808E-02	510.72	22.500	2.049E-01	TL208
583.51	232.	9.95	1.86	1.628E-02	583.14	86.000	1.465E-01	TL208
609.53	435.	6.62	1.81	1.574E-02	609.32	46.090	5.345E-01	BI214

661.84	458.	5.57	1.56	1.477E-02	661.62	84.620	3.371E-01	CS137
727.97	121.	16.94	1.31	1.373E-02	727.17	11.800	6.651E-01	BI212
795.13	27.	36.10	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
911.27	206.	9.86	1.53	1.161E-02	911.07	29.000	5.386E-01	AC228
967.95	165.	12.21	1.76	1.110E-02	968.90	17.460	7.575E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.46	89.	21.47	1.76	9.969E-03	1120.28	15.040	5.294E-01	BI214
1172.99	137.	10.88	1.88	9.639E-03	1173.23	99.860	1.468E-01	CO60
1332.83	148.	11.43	1.79	8.771E-03	1332.51	99.980	1.758E-01	CO60
1461.22	305.	6.09	1.70	8.189E-03	1460.75	10.700	3.089E+00	K40
1765.19	79.	11.77	2.26	7.084E-03	1764.51	15.920	6.287E-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	
259.06	129.70	578.	122.	0.061	87.81	1.240	AC-228	s
418.40	209.38	414.	110.	0.055	98.93	1.338	AC-228	
477.29	238.78	224.	668.	0.334	15.00	1.297	PB-212	D
483.72	241.99	287.	167.	0.084	48.89	1.299	PB-214	D
600.61	300.24	121.	54.	0.027	95.48	1.341	PB-212	lD
656.67	328.53	147.	71.	0.036	88.48	1.196	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	149.51	74.92	1166.	220.	0.110	67.73	1.500s
PB-214	153.89	77.11	1039.	333.	0.167	43.53	1.500D
PB-212	153.89	77.11	1035.	338.	0.169	43.53	1.500D
EU-155	174.32	87.33	921.	134.	0.067	99.81	1.500
CD-109	174.25	87.29	871.	134.	0.067	96.85	1.500
TH-234	185.80	93.07	861.	115.	0.057	94.95	1.500s
RA-226	371.35	185.85	322.	163.	0.082	54.18	1.122
PB-212	477.26	238.81	540.	625.	0.313	19.24	1.500s
RA-224	483.59	241.98	619.	105.	0.053	102.10	1.500
PB-214	590.42	295.40	292.	237.	0.118	35.51	1.500s
AC-228	676.26	338.32	245.	209.	0.104	46.52	1.416s
PB-214	703.84	352.12	169.	543.	0.272	16.18	1.500s
SB-125	926.07	463.23	129.	53.	0.027	94.02	1.500s
TL-208	1021.31	510.86	158.	93.	0.046	55.78	1.542s
TL-208	1166.60	583.51	99.	228.	0.114	29.86	1.858s
BI-214	1218.63	609.53	114.	430.	0.215	19.85	1.808
CS-137	1323.26	661.84	72.	454.	0.227	16.70	1.563
BI-212	1455.64	728.03	70.	121.	0.061	51.17	1.327s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	1589.82	795.13	37.	27.	0.014	108.31	1.684
AC-228	1822.10	911.27	50.	201.	0.101	29.57	1.532s
AC-228	1935.47	967.95	61.	163.	0.081	36.64	1.758s
BI-214	2240.48	1120.46	70.	88.	0.044	64.40	1.759
CO-60	2345.55	1172.99	31.	133.	0.066	32.65	1.878s
CO-60	2665.25	1332.83	33.	145.	0.072	34.28	1.787s
K-40	2922.03	1461.22	16.	300.	0.150	18.26	1.695
BI-214	3530.03	1765.19	3.	79.	0.039	35.31	2.263

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		1.9639E+01					
			477.56	1.964E+01	%(	9.538E+01 2.80E+01	G
K-40		3.0886E+00					
			1460.75	3.089E+00	(P	2.166E-01 1.91E-01	G
MN-54		1.5209E-02					
			834.81	1.521E-02	%(P	7.214E-02 2.09E-02	G
CO-57		1.2855E-03					
			122.07	1.285E-03	&(P	1.022E-01 3.03E-02	G K
			136.43	3.807E-01	% P	8.503E-01 2.57E-01	G
CO-60		1.6129E-01					
			1332.51	1.758E-01	(P	3.600E-02 2.06E-02	G K
			1173.23	1.468E-01	(P	3.195E-02 1.65E-02	G K
Sr-85		-2.0726E+00					
			514.00	-2.073E+00	%(	4.953E+00 1.49E+00	G
Kr-85		-3.6028E+02					
			513.99	-3.603E+02	%(P	7.833E+02 2.35E+02	G
Y-88		4.3971E-02					
			1836.01	4.397E-02	%(P	4.172E-01 1.07E-01	G K
			898.02	6.261E-02	& P	5.079E-01 1.42E-01	G
NB-94		-1.5799E-03					
			871.10	-1.580E-03	%(P	2.258E-02 6.31E-03	G K
			702.50	3.533E-03	& P	2.644E-02 7.63E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.1730E-02						
		722.95	-1.173E-02	%(	3.605E-02	1.07E-02	G K
		614.37	-1.650E-02	%	3.663E-02	1.11E-02	G
		433.93	-4.721E-04	& P	2.604E-02	7.46E-03	G
CD-109	1.9537E+00						
		88.04	1.954E+00	(P	2.047E+00	6.32E-01	G
SN-113	-5.3865E-02						
		391.71	-5.387E-02	&(P	6.346E-01	1.84E-01	G K
		255.04	-2.406E+00	%	1.933E+01	5.72E+00	G
SB-125	7.7330E-02						
		427.95	-1.081E-02	%(P	1.150E-01	3.33E-02	G K
		600.77	-1.132E-03	% P	2.193E-01	6.28E-02	G
		636.15	-2.595E-02	% P	3.194E-01	9.14E-02	G
		463.51	3.382E-01	(P	3.536E-01	1.12E-01	G
		176.29	1.838E-01	% P	5.039E-01	1.52E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	%(	0.000E+00	0.00E+00	G K
		636.97	0.000E+00	%	0.000E+00	0.00E+00	G
		284.29	0.000E+00	%	0.000E+00	0.00E+00	G
CS-134	1.2500E-02						
		604.66	-6.680E-03	%(P	4.454E-02	1.30E-02	G K
		795.76	3.442E-02	(P	3.919E-02	1.27E-02	G
		569.29	3.386E-02	&	2.037E-01	5.89E-02	G
		801.84	-3.322E-03	& P	5.600E-01	1.59E-01	G
CS-137	3.3706E-01						
		661.62	3.371E-01	(P	3.135E-02	1.89E-02	G
CE-139	-4.5228E-02						
		165.85	-4.523E-02	%(P	3.444E-01	1.03E-01	G
EU-152	-2.2652E-04						
		121.78	-2.265E-04	&(P	9.762E-02	2.89E-02	G K
		344.30	-1.014E-02	% P	9.837E-02	2.88E-02	G
		1408.08	3.686E-02	% P	1.332E-01	3.84E-02	G
		964.00	9.048E-02	& P	3.202E-01	9.51E-02	G
		1112.07	-5.593E-03	& P	2.368E-01	6.57E-02	G
		778.90	7.215E-04	& P	1.631E-01	4.47E-02	G
EU-154	5.9696E-04						
		123.10	5.970E-04	%(P	6.982E-02	2.07E-02	G K
		1274.80	3.593E-03	& P	8.357E-02	2.30E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-1.017E-02 % P 2.778E-01 8.14E-02 G
                         1004.80-1.245E-03 & P 1.610E-01 4.44E-02 G

EU-155       1.3384E-01
                           86.45 1.338E-01  (  1.444E-01 4.45E-02 G K
                          105.31-2.400E-04 % P 1.644E-01 4.88E-02 G

HG-203       2.7267E+00
                          279.17 2.727E+00 %(P 3.065E+01 9.02E+00 G K
                           72.87-3.017E+02 % P 9.617E+02 2.90E+02 G
                           70.83-1.025E+03 %   1.588E+03 4.85E+02 G
                           82.50-7.478E+02 %   1.931E+03 5.84E+02 G

TL-208       1.4653E-01
                          583.14 1.465E-01  (P 3.158E-02 1.49E-02 G
                          510.72 2.049E-01 + P 1.359E-01 5.19E-02 G

PB-212       4.0982E-01
                          238.63 4.098E-01 @(P 7.274E-02 2.69E-02 G K
                                                          Energy duplication
                           77.11 5.886E-01 +   2.656E-01 8.54E-02 G
                           74.81 7.237E-01 + P 5.331E-01 1.66E-01 G

PB-214       5.4395E-01
                          351.99 5.440E-01 @(P 6.328E-02 2.96E-02 G K
                          295.22 4.016E-01 - P 1.396E-01 4.85E-02 G
                                                          Energy duplication
                           77.11 9.492E-01 + P 4.354E-01 1.40E-01 G
                          241.92 9.888E-02 & P 4.874E-01 1.46E-01 G

BI-212       6.7395E-01
                          727.17 6.739E-01 *(P 2.312E-01 1.16E-01 G K
                         1620.56-2.174E-02 % P 1.104E+00 2.96E-01 G
                          785.42 6.073E-01 % P 1.381E+00 4.15E-01 G

BI-214       5.5299E-01
                          609.32 5.345E-01  (P 6.502E-02 3.57E-02 G K
                         1764.51 6.287E-01  (P 8.924E-02 7.49E-02 G
                         1120.28 5.294E-01  (P 2.503E-01 1.15E-01 G

RA-224       7.6787E-01
                          241.00 7.679E-01 &(P 8.646E-01 2.67E-01 G

RA-226       1.2439E+00
                          185.99 1.244E+00  (  6.568E-01 2.25E-01 G

AC-228       5.6450E-01
                          911.07 5.386E-01 @(P 9.520E-02 5.42E-02 G K
                          968.90 7.575E-01 + P 1.821E-01 9.37E-02 G
                          338.40 6.270E-01 *(P 2.270E-01 9.87E-02 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.2832E-01
                          236.00-1.283E-01 %(P 3.050E-01 9.22E-02 G K
                          256.25 2.937E-03 % P 3.611E-01 1.06E-01 G

PA-234      -5.6615E-02
                           98.44-5.662E-02 &(  1.199E-01 3.64E-02 G K
                          946.00-2.302E-02 &   1.592E-01 4.60E-02 G
                          131.28-1.900E-02 &   1.435E-01 4.29E-02 G
                           94.67-4.043E-02 %   1.866E-01 5.59E-02 G
                          883.24-5.541E-02 %   2.170E-01 6.35E-02 G
                          926.70 3.567E-02 &   2.322E-01 6.65E-02 G
                          569.26 3.408E-02 &   2.032E-01 5.89E-02 G

TH-234       5.8036E-01
                           63.29 2.543E-01 &(P 1.595E+00 4.76E-01 G K
                           92.80 1.004E+00 *(P 1.218E+00 3.72E-01 G
                           92.38 1.607E-02 % P 1.374E+00 4.08E-01 G

AM-241      -9.8986E-04
                           59.54-9.899E-04 %(P 2.117E-01 6.29E-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	4.5640E-02	1.9639E+01	8.4069E+01	8.4077E+01	2.217E-01
K-40		3.0886E+00	3.0886E+00	5.7291E-01	6.0125E-01	
MN-54	#A	5.3901E-03	1.5209E-02	6.2763E-02	6.2769E-02	2.557E-02
CO-57	#B	3.8739E-04	1.2855E-03	9.0792E-02	9.0792E-02	3.079E-02
CO-60	#	1.3632E-01	1.6129E-01	3.9267E-02	4.0406E-02	
Sr-85	#A	-1.4042E-02	-2.0726E+00	4.4836E+00	4.4853E+00	3.356E-02
Kr-85	#A	-3.5904E+02	-3.6028E+02	8.5495E+02	8.5521E+02	7.806E+02
Y-88	#B	2.1077E-03	4.3971E-02	3.2029E-01	3.2030E-01	2.000E-02
NB-94	#B	-1.5799E-03	-1.5799E-03	2.1552E-02	2.1552E-02	2.258E-02
Ag-108M	#B	-1.1648E-02	-1.1730E-02	3.2242E-02	3.2250E-02	3.580E-02
CD-109	#A	9.5624E-01	1.9537E+00	1.8968E+00	1.8999E+00	1.002E+00
SN-113	#B	-3.2314E-03	-5.3865E-02	1.1536E+00	1.1536E+00	3.807E-02
SB-125	#B	5.6148E-02	7.7330E-02	7.6549E-02	7.6685E-02	8.349E-02
I-131	#B	-4.6485E-03	>12 Halflives	2.5364E-02	2.5365E-02	2.870E-02
CS-134	#B	8.1316E-03	1.2500E-02	1.3801E-02	1.3821E-02	2.897E-02
CS-137		3.2727E-01	3.3706E-01	5.6737E-02	6.0128E-02	
CE-139	#A	-4.2909E-03	-4.5228E-02	3.2281E-01	3.2282E-01	3.268E-02
EU-152	#B	-2.1125E-04	-2.2652E-04	2.8342E-01	2.8342E-01	9.104E-02
EU-154	#B	5.3783E-04	5.9696E-04	6.1972E-02	6.1972E-02	6.290E-02
EU-155	#A	1.1193E-01	1.3384E-01	1.3358E-01	1.3378E-01	1.207E-01
HG-203	#B	2.6115E-03	2.7267E+00	2.7063E+01	2.7064E+01	2.935E-02
TL-208		1.4653E-01	1.4653E-01	4.4628E-02	4.5459E-02	
PB-212	#	4.0982E-01	4.0982E-01	8.0816E-02	8.4362E-02	7.274E-02
PB-214	#	5.4395E-01	5.4395E-01	8.8857E-02	9.4486E-02	6.328E-02
BI-212	#	6.7395E-01	6.7395E-01	3.4850E-01	3.5077E-01	
BI-214		5.5299E-01	5.5299E-01	1.1089E-01	1.1560E-01	
RA-224	#A	7.6787E-01	7.6787E-01	8.0057E-01	8.0185E-01	8.646E-01
RA-226		1.2432E+00	1.2439E+00	6.7395E-01	6.7794E-01	
AC-228	#	5.6450E-01	5.6450E-01	1.5823E-01	1.6170E-01	
TH-227	#B	-1.2832E-01	-1.2832E-01	2.7969E-01	2.7979E-01	3.050E-01
PA-234	#B	-5.6615E-02	-5.6615E-02	1.0907E-01	1.0912E-01	1.199E-01
TH-234	#B	5.8036E-01	5.8036E-01	6.4557E-01	6.4637E-01	1.595E+00
AM-241	#A	-9.8783E-04	-9.8986E-04	2.3996E-01	2.3996E-01	2.113E-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) 6.7333188E+00 pCi/gm
Total Decayed Activity (294.7 to 2000.1 keV) 6.7687593E+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: 107F_27JUN2006_1738.An1

Sample description
FSS-NOL-06-02-029-F-B

Spectrum Filename: C:\GammaVision\Spectra\107F_27JUN2006_1738.An1

Acquisition information
Start time: 27-Jun-2006 17:38:53
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: 1.9320E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9320E+03) =
5.1760E+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-Jun-2006 11:00:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2239

***** 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	427.	11.49	1.18	2.849E-02	74.81	9.600	1.091E+00	PB212
77.03	606.	7.56	1.18	2.957E-02	77.11	10.700	1.566E+00	PB214
					77.11	17.500	9.638E-01	PB212
86.89	209.	20.00	1.19	3.290E-02	86.45	32.740	1.359E-01	EU155
90.22	183.	22.47	1.19	3.375E-02				
93.23	267.	15.83	1.19	3.442E-02	92.38	2.570	2.052E+00	TH234
					92.80	3.000	1.674E+00	TH234
186.19	284.	17.83	1.87	3.609E-02	185.99	3.280	1.676E+00	RA226
209.45	161.	20.59	1.42	3.427E-02				
239.21	2032.	3.33	1.49	3.185E-02	238.63	43.100	1.026E+00	PB212
240.70	153.	33.27	1.50	3.170E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
242.09	207.	19.20	1.30	3.163E-02	241.92	7.470	6.138E-01	PB214
269.91	203.	20.86	1.53	2.947E-02				
277.60	113.	33.06	1.72	2.891E-02				
295.34	305.	9.31	1.34	2.767E-02	295.22	19.200	3.957E-01	PB214
300.32	96.	25.39	1.34	2.734E-02				
327.92	137.	22.28	2.43	2.561E-02				
338.61	396.	12.80	1.36	2.499E-02	338.40	12.010	9.144E-01	AC228
352.11	710.	6.26	1.57	2.425E-02	351.99	37.100	5.478E-01	PB214
408.88	65.	35.16	0.89	2.157E-02				
463.26	138.	23.62	1.13	1.954E-02				
463.26	138.	23.62	1.13	1.954E-02	463.51	10.000	4.871E-01	SB125
510.98	295.	10.26	2.05	1.807E-02	510.72	22.500	4.500E-01	TL208
583.42	591.	5.43	1.37	1.628E-02	583.14	86.000	2.930E-01	TL208
609.59	509.	7.35	1.78	1.574E-02	609.32	46.090	4.862E-01	BI214
727.51	165.	15.12	1.69	1.374E-02	727.17	11.800	7.061E-01	BI212

785.22	59.	31.60	2.14	1.297E-02	785.42	2.000	1.579E+00	BI212
795.56	99.	28.87	1.30	1.284E-02				
795.56	99.	28.87	1.30	1.284E-02	795.76	85.400	6.332E-02	CS134
860.75	86.	18.10	1.64	1.211E-02				
911.49	485.	6.37	1.78	1.160E-02	911.07	29.000	9.992E-01	AC228
968.51	349.	7.75	1.83	1.110E-02	968.90	17.460	1.253E+00	AC228
1121.64	166.	16.89	2.24	9.961E-03	1120.28	15.040	7.693E-01	BI214
1461.29	2025.	2.25	2.31	8.189E-03	1460.75	10.700	1.612E+01	K40
1765.25	84.	13.69	1.98	7.081E-03	1764.51	15.920	5.123E-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	
173.45	86.66	765.	209.	0.104	60.01	1.187	BI-207	D
180.11	89.98	749.	183.	0.091	67.40	1.189	PB-214	D
186.13	92.99	756.	267.	0.133	47.48	1.191	TH-234	D
418.54	209.45	469.	161.	0.080	61.77	1.422	AC-228	
539.44	269.91	530.	203.	0.101	62.58	1.526	AC-228	s
554.82	277.60	472.	119.	0.060	82.10	1.719	NP-239	s
600.15	300.26	331.	89.	0.044	96.59	0.894	PB-212	M
655.46	327.92	318.	137.	0.068	66.85	2.429	AC-228	s
817.36	408.88	192.	65.	0.033	105.48	0.888	CS-138	s
1721.07	860.75	64.	86.	0.043	54.31	1.636	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	149.29	74.81	1012.	427.	0.213	34.46	1.178D
PB-212	153.89	77.11	1054.	606.	0.303	22.69	1.179A
EU-155	174.44	87.39	1890.	159.	0.080	118.11	1.500
TH-234	185.85	93.09	1830.	216.	0.108	83.27	1.500s
TH-234	185.79	93.06	1765.	223.	0.111	75.57	1.500s
RA-226	372.02	186.19	875.	284.	0.142	53.48	1.869s
TH-227	472.01	236.19	1904.	-234.	-0.117	81.49	1.500s
PB-212	476.89	238.63	455.	1609.	0.805	9.23	1.297D
RA-224	481.04	240.70	1264.	153.	0.077	99.80	1.500
PB-214	483.47	241.92	701.	207.	0.104	57.60	1.299D
PB-214	590.83	295.61	574.	419.	0.209	33.60	1.456s
AC-228	676.84	338.61	574.	393.	0.196	38.40	1.360s
PB-214	703.83	352.11	389.	705.	0.352	18.79	1.566s
SB-125	926.36	463.38	194.	107.	0.054	60.57	1.500
TL-208	1021.54	510.98	222.	262.	0.131	30.77	2.047s
TL-208	1166.42	583.42	161.	587.	0.293	16.28	1.370
BI-214	1218.77	609.59	245.	504.	0.252	22.05	1.780s
Ag-108M	1224.24	612.33	316.	-74.	-0.037	108.07	1.561s
BI-212	1454.58	727.51	144.	164.	0.082	45.37	1.690s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	1570.01	785.22	107.	59.	0.029	94.81	2.140s
CS-134	1590.48	795.45	137.	66.	0.033	82.56	1.684s
AC-228	1822.55	911.49	131.	481.	0.240	19.11	1.781
AC-228	1936.58	968.51	103.	347.	0.173	23.25	1.832s
BI-214	2242.85	1121.64	148.	165.	0.082	50.66	2.243s
K-40	2922.19	1461.29	20.	2020.	1.010	6.76	2.311
BI-214	3530.15	1765.25	11.	83.	0.041	41.08	1.982

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	%(	2.747E-01 8.03E-02	G
K-40		1.6123E+01					
			1460.75	1.612E+01	(P	1.868E-01 3.65E-01	G
MN-54		1.1341E-02					
			834.81	1.134E-02	%(P	2.820E-02 8.47E-03	G
CO-57		-5.0485E-03					
			122.07	-5.048E-03	%(P	3.738E-02 1.12E-02	G K
			136.43	-2.037E-02	% P	2.767E-01 8.27E-02	G
CO-60		1.3903E-02					
			1332.51	1.390E-02	%(P	3.200E-02 9.52E-03	G K
			1173.23	-2.193E-04	& P	4.658E-02 1.34E-02	G K
Sr-85		-2.7032E-02					
			514.00	-2.703E-02	%(	3.792E-02 1.17E-02	G
Kr-85		-6.2328E+02					
			513.99	-6.233E+02	%(P	8.396E+02 2.57E+02	G
Y-88		-3.0499E-03					
			1836.01	-3.050E-03	%(P	2.556E-02 6.93E-03	G K
			898.02	-3.266E-03	& P	3.517E-02 1.01E-02	G
NB-94		7.0686E-03					
			871.10	7.069E-03	%(P	2.934E-02 8.66E-03	G K
			702.50	9.569E-04	& P	2.938E-02 8.53E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.1511E-03						
		722.95	-1.151E-03	&(	3.977E-02	1.16E-02	G K
		614.37	-3.648E-02	+	4.232E-02	1.31E-02	G
		433.93	-5.537E-03	& P	2.928E-02	8.66E-03	G
CD-109	9.6906E-02						
		88.04	9.691E-02	&(P	9.817E-01	2.94E-01	G
SN-113	1.0895E-02						
		391.71	1.090E-02	&(P	3.201E-02	9.57E-03	G K
		255.04	1.662E-02	%	1.264E+00	3.75E-01	G
SB-125	9.1196E-02						
		427.95	-8.021E-03	%(P	8.001E-02	2.34E-02	G K
		600.77	8.916E-03	% P	1.536E-01	4.48E-02	G
		636.15	2.142E-03	% P	2.624E-01	7.62E-02	G
		463.51	3.849E-01	(P	2.430E-01	7.97E-02	G
		176.29	-4.585E-02	& P	4.805E-01	1.44E-01	G
I-131	5.9680E-03						
		364.48	5.968E-03	%(	4.235E-02	1.25E-02	G K
		636.97	-9.750E-02	%	5.239E-01	1.54E-01	G
		284.29	0.000E+00	%	6.863E-01	2.03E-01	G
CS-134	1.6011E-02						
		604.66	-7.197E-03	&(P	3.206E-02	9.51E-03	G K
		795.76	4.254E-02	*(P	3.664E-02	1.18E-02	G
		569.29	3.567E-02	%	1.633E-01	4.83E-02	G
		801.84	-4.868E-02	% P	3.808E-01	1.12E-01	G
CS-137	1.1479E-02						
		661.62	1.148E-02	%(P	3.866E-02	1.15E-02	G
CE-139	-5.8988E-04						
		165.85	-5.899E-04	%(P	3.749E-02	1.12E-02	G
EU-152	-1.1651E-02						
		121.78	-1.165E-02	&(P	1.104E-01	3.31E-02	G K
		344.30	-1.759E-02	% P	9.914E-02	2.95E-02	G
		1408.08	5.502E-02	& P	1.165E-01	3.52E-02	G
		964.00	-1.384E-01	% P	3.086E-01	9.33E-02	G
		1112.07	6.053E-02	% P	2.614E-01	7.71E-02	G
		778.90	-2.051E-02	% P	2.421E-01	7.05E-02	G
EU-154	-1.1660E-02						
		123.10	-1.166E-02	%(P	7.086E-02	2.12E-02	G K
		1274.80	-3.809E-03	& P	1.126E-01	3.25E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30 4.520E-03 & P 1.942E-01 5.69E-02 G
                         1004.80 4.884E-02 & P 1.795E-01 5.31E-02 G

EU-155       1.0389E-01
                           86.45 1.039E-01  (  1.338E-01 4.09E-02 G K
                          105.31 6.136E-02 % P 1.566E-01 4.74E-02 G

HG-203      -7.2587E-03
                          279.17-7.259E-03 %(P 3.114E-02 9.29E-03 G K
                           72.87-3.168E-01 % P 1.092E+00 3.30E-01 G
                           70.83-4.546E-02 %   1.817E+00 5.45E-01 G
                           82.50-9.054E-01 %   2.124E+00 6.43E-01 G

TL-208       2.9301E-01
                          583.14 2.930E-01  (P 3.089E-02 1.60E-02 G
                          510.72 4.500E-01 + P 1.241E-01 5.21E-02 G

PB-212       8.1892E-01
                          238.63 8.189E-01  (P 5.193E-02 2.55E-02 G K
                                                          Energy duplication
                           77.11 8.189E-01 }   2.081E-01 6.19E-02 G
                           74.81 1.091E+00 + P 3.860E-01 1.26E-01 G

PB-214       5.5650E-01
                          351.99 5.478E-01 *(P 7.356E-02 3.46E-02 G K
                          295.22 5.511E-01 *(P 1.506E-01 6.24E-02 G
                                                          Energy duplication
                           77.11 1.954E-01 } P 4.467E-01 1.30E-01 G
                          241.92 6.138E-01  (P 3.732E-01 1.19E-01 G

BI-212       7.0613E-01
                          727.17 7.061E-01 @(P 2.531E-01 1.08E-01 G K
                         1620.56 4.702E-01 % P 9.216E-01 2.81E-01 G
                          785.42 1.579E+00 + P 1.376E+00 5.10E-01 G

BI-214       4.9294E-01
                          609.32 4.862E-01  (P 7.288E-02 3.61E-02 G K
                         1764.51 5.123E-01  (P 1.144E-01 7.09E-02 G
                         1120.28 7.693E-01 + P 2.772E-01 1.31E-01 G

RA-224       8.6759E-01
                          241.00 8.676E-01 ?(P 9.526E-01 2.93E-01 G

RA-226       1.6764E+00
                          185.99 1.676E+00 *(  8.303E-01 2.99E-01 G

AC-228       9.7434E-01
                          911.07 9.992E-01  (P 1.165E-01 6.42E-02 G K
                          968.90 1.253E+00 + P 1.806E-01 9.77E-02 G
                          338.40 9.144E-01 @(P 2.665E-01 1.18E-01 G
```

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

TH-227      -4.5578E-01
                          236.00-4.558E-01 &(P 4.008E-01 1.24E-01 G K
                          256.25-3.874E-03 & P 4.023E-01 1.19E-01 G

PA-234      -9.2143E-04
                           98.44-9.214E-04 &(  1.281E-01 3.82E-02 G K
                          946.00 2.957E-02 %   1.627E-01 4.78E-02 G
                          131.28 1.098E-03 &   1.453E-01 4.34E-02 G
                           94.67-1.351E-01 %   2.691E-01 8.17E-02 G
                          883.24-1.106E-02 %   2.287E-01 6.58E-02 G
                          926.70-1.210E-02 %   2.653E-01 7.64E-02 G
                          569.26 5.273E-02 %   2.413E-01 7.14E-02 G

TH-234       1.2142E+00
                           63.29 6.558E-01 %(P 1.666E+00 5.03E-01 G K
                           92.80 1.511E+00 *(P 1.346E+00 4.14E-01 G
                           92.38 1.715E+00 *(P 1.604E+00 4.94E-01 G

AM-241      -1.4761E-03
                           59.54-1.476E-03 &(P 2.062E-01 6.16E-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	2.4080E-01	2.4080E-01	2.599E-01
K-40		1.6123E+01	1.6123E+01	1.0932E+00	1.4498E+00	
MN-54	#A	1.1233E-02	1.1341E-02	2.5413E-02	2.5421E-02	2.793E-02
CO-57	#B	-4.9933E-03	-5.0485E-03	3.4445E-02	3.4446E-02	3.697E-02
CO-60	#B	1.3882E-02	1.3903E-02	2.8567E-02	2.8579E-02	3.195E-02
Sr-85	#A	-2.5824E-02	-2.7032E-02	3.4970E-02	3.5006E-02	3.623E-02
Kr-85	#A	-6.2326E+02	-6.2328E+02	8.4125E+02	8.4205E+02	8.396E+02
Y-88	#B	-2.9663E-03	-3.0499E-03	3.7039E-02	3.7040E-02	2.486E-02
NB-94	#B	7.0686E-03	7.0686E-03	2.5986E-02	2.5990E-02	2.934E-02
Ag-108M	#B	-1.1511E-03	-1.1511E-03	3.4909E-02	3.4909E-02	3.977E-02
CD-109	#A	9.6274E-02	9.6906E-02	8.8269E-01	8.8271E-01	9.753E-01
SN-113	#B	1.0618E-02	1.0895E-02	2.8698E-02	2.8706E-02	3.119E-02
SB-125	#F	9.0929E-02	9.1196E-02	5.6688E-02	5.6944E-02	7.978E-02
I-131	#B	4.1275E-03	5.9680E-03	3.7637E-02	3.7639E-02	2.929E-02
CS-134	#B	1.5948E-02	1.6011E-02	1.3324E-02	1.3358E-02	3.194E-02
CS-137	#A	1.1475E-02	1.1479E-02	3.4514E-02	3.4520E-02	3.865E-02
CE-139	#A	-5.7730E-04	-5.8988E-04	4.4312E-02	4.4312E-02	3.669E-02
EU-152	#B	-1.1643E-02	-1.1651E-02	1.0081E-01	1.0081E-01	1.104E-01
EU-154	#B	-1.1649E-02	-1.1660E-02	6.6489E-02	6.6493E-02	7.079E-02
EU-155	#A	1.0372E-01	1.0389E-01	1.2270E-01	1.2284E-01	1.336E-01
HG-203	#B	-6.8112E-03	-7.2587E-03	3.1223E-02	3.1226E-02	2.922E-02
TL-208		2.9301E-01	2.9301E-01	4.8068E-02	5.1088E-02	
PB-212		8.1892E-01	8.1892E-01	7.6366E-02	9.0394E-02	
PB-214		5.5650E-01	5.5650E-01	1.0534E-01	1.1034E-01	
BI-212		7.0613E-01	7.0613E-01	3.2287E-01	3.2555E-01	
BI-214		4.9294E-01	4.9294E-01	1.0962E-01	1.1342E-01	
RA-224	#A	8.6759E-01	8.6759E-01	8.7847E-01	8.7996E-01	9.526E-01
RA-226	#	1.6764E+00	1.6764E+00	8.9649E-01	9.0194E-01	
AC-228		9.7434E-01	9.7434E-01	1.8781E-01	1.9643E-01	
TH-227	#A	-4.5578E-01	-4.5578E-01	3.7186E-01	3.7283E-01	4.008E-01
PA-234	#B	-9.2143E-04	-9.2143E-04	1.1468E-01	1.1468E-01	1.281E-01
TH-234	#B	1.2142E+00	1.2142E+00	9.9883E-01	1.0011E+00	1.666E+00
AM-241	#A	-1.4760E-03	-1.4761E-03	5.8447E-01	5.8447E-01	2.062E-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) 2.1641457E+01 pCi/gm
Total Decayed Activity (269.7 to 2000.1 keV) 2.1641466E+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_27JUN2006_1819.An1

Sample description
FSS-NOL-06-02-024-F-B

Spectrum Filename: C:\GammaVision\Spectra\107F_27JUN2006_1819.An1

Acquisition information

Start time:	27-Jun-2006 18:19:55
Live time:	2000
Real time:	2002
Dead time:	0.11 %
Detector ID:	2

Detector system
Det 107- DSPE- 634

Calibration

Filename:	D7_1LSa.Clb

Detector 107 Calibration for 1 Liter Sand Marinelli

Energy Calibration

Created:	29-Oct-2004 06:48:53
Zero offset:	0.157 keV
Gain:	0.500 keV/channel
Quadratic:	-1.676E-08 keV/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:	2.0230E+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	23-Jun-2006 10:25:00
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: 0.2093

***** 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	332.	12.90	1.18	2.849E-02	74.81	9.600	8.114E-01	PB212
77.03	200.	20.55	1.18	2.957E-02	77.11	17.500	5.115E-01	PB212
					77.11	10.700	8.265E-01	PB214
77.11	188.	25.74	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
87.18	156.	35.64	1.50	3.284E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
92.90	146.	32.82	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.91	153.	34.43	1.50	3.429E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.86	271.	19.98	2.56	3.611E-02	185.99	3.280	1.529E+00	RA226
209.36	107.	36.49	1.67	3.428E-02				
238.76	1027.	4.30	1.30	3.187E-02	238.63	43.100	4.914E-01	PB212
241.77	195.	17.95	1.30	3.163E-02	241.00	3.900	1.039E+00	RA224
					241.92	7.470	5.459E-01	PB214
270.24	96.	32.87	1.23	2.944E-02				
295.31	253.	14.74	1.35	2.767E-02	295.22	19.200	3.126E-01	PB214
338.67	282.	10.66	1.57	2.499E-02	338.40	12.010	6.190E-01	AC228
352.20	611.	6.47	1.57	2.425E-02	351.99	37.100	4.499E-01	PB214
463.66	101.	25.52	1.29	1.952E-02	463.51	10.000	3.369E-01	SB125
510.89	162.	14.54	2.05	1.808E-02	510.72	22.500	2.099E-01	TL208
583.49	390.	6.83	1.93	1.628E-02	583.14	86.000	1.836E-01	TL208
609.53	423.	6.80	2.09	1.574E-02	609.32	46.090	3.853E-01	BI214
727.62	90.	16.91	1.80	1.374E-02	727.17	11.800	3.663E-01	BI212
794.96	43.	31.28	1.68	1.284E-02	795.76	85.400	2.624E-02	CS134
834.82	59.	26.99	1.36	1.239E-02	834.81	99.978	3.168E-02	MN54

860.99	63.	21.21	2.21	1.211E-02				
911.49	281.	7.90	1.75	1.160E-02	911.07	29.000	5.488E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
968.32	280.	9.27	2.03	1.110E-02	968.90	17.460	9.597E-01	AC228
1120.76	127.	19.34	2.01	9.967E-03	1120.28	15.040	5.636E-01	BI214
1461.27	1947.	2.37	2.17	8.189E-03	1460.75	10.700	1.480E+01	K40
1588.46	41.	23.65	1.44	7.686E-03				
1765.01	85.	10.85	1.94	7.082E-03	1764.51	15.920	4.982E-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	
418.35	209.36	567.	107.	0.054	109.47	1.668	AC-228	s
540.10	270.24	360.	96.	0.048	98.62	1.228	AC-228	s
1721.55	860.99	49.	63.	0.031	63.62	2.211	TL-208	s
3176.53	1588.46	13.	41.	0.021	70.96	1.438	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	776.	332.	0.166	38.70	1.178D
PB-212	153.89	77.11	866.	200.	0.100	61.64	1.179A
PB-214	153.89	77.11	1376.	188.	0.094	77.22	1.500A
EU-155	174.03	87.18	1475.	156.	0.078	106.93	1.500
TH-234	185.49	92.91	1470.	153.	0.077	103.30	1.500s
TH-234	185.47	92.90	1425.	146.	0.073	98.47	1.500s
RA-226	371.00	185.68	836.	300.	0.150	53.73	2.591s
PB-212	476.89	238.63	409.	1005.	0.503	12.49	1.297D
PB-214	483.47	241.92	523.	184.	0.092	56.81	1.299D
PB-214	590.24	295.31	411.	249.	0.124	44.21	1.353s
AC-228	676.95	338.67	233.	278.	0.139	31.99	1.565s
PB-214	704.01	352.20	286.	606.	0.303	19.42	1.572s
SB-125	926.14	463.27	142.	70.	0.035	76.76	1.500s
TL-208	1021.37	510.89	178.	128.	0.064	43.63	2.049s
TL-208	1166.56	583.49	118.	385.	0.193	20.48	1.934s
BI-214	1218.64	609.53	135.	418.	0.209	20.40	2.089s
Ag-108M	1224.82	612.62	209.	-59.	-0.029	111.51	1.561s
BI-212	1454.82	727.62	66.	89.	0.044	50.74	1.800
CS-134	1589.49	794.96	71.	43.	0.021	93.83	1.684s
MN-54	1669.20	834.82	69.	58.	0.029	80.97	1.365
AC-228	1822.55	911.49	82.	277.	0.138	23.70	1.746

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1936.20	968.32	104.	278.	0.139	27.81	2.030s
BI-214	2241.09	1120.76	130.	127.	0.063	58.01	2.008
K-40	2922.13	1461.27	42.	1942.	0.971	7.12	2.169
BI-214	3529.67	1765.01	1.	84.	0.042	32.54	1.937

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		-6.4245E-02					
			477.56	-6.424E-02	%(	2.377E-01 7.08E-02 G	
K-40		1.4804E+01					
			1460.75	1.480E+01	(P	2.498E-01 3.52E-01 G	
MN-54		3.1680E-02					
			834.81	3.168E-02	(P	2.253E-02 8.61E-03 G	
CO-57		2.5067E-03					
			122.07	2.507E-03	%(P	3.074E-02 9.19E-03 G K	
			136.43	-3.903E-02	% P	2.543E-01 7.62E-02 G	
CO-60		4.3992E-03					
			1332.51	4.399E-03	%(P	2.609E-02 7.37E-03 G K	
			1173.23	-1.108E-02	% P	4.041E-02 1.18E-02 G K	
Sr-85		-1.1904E-02					
			514.00	-1.190E-02	&(	3.158E-02 9.51E-03 G	
Kr-85		-2.8815E+02					
			513.99	-2.882E+02	&(P	6.996E+02 2.10E+02 G	
Y-88		-3.4191E-03					
			1836.01	-3.419E-03	%(P	2.259E-02 6.11E-03 G K	
			898.02	-1.033E-02	% P	3.021E-02 8.92E-03 G	
NB-94		-3.0305E-03					
			871.10	-3.030E-03	&(P	2.276E-02 6.57E-03 G K	
			702.50	8.401E-03	% P	2.494E-02 7.44E-03 G K	
Ag-108M		1.4811E-03					
			722.95	1.481E-03	%(	2.798E-02 8.10E-03 G K	
			614.37	-2.778E-02	&	3.314E-02 1.03E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	-6.293E-04	% P	2.460E-02	7.14E-03	G
CD-109	4.0354E-01						
		88.04	4.035E-01	%(P	9.926E-01	3.00E-01	G
SN-113	1.5112E-04						
		391.71	1.511E-04	%(P	3.416E-02	9.96E-03	G K
		255.04	-4.083E-01	%	1.128E+00	3.40E-01	G
SB-125	6.9480E-02						
		427.95	1.127E-02	&(P	6.885E-02	2.03E-02	G K
		600.77	-7.139E-03	& P	1.062E-01	3.03E-02	G
		636.15	-3.966E-03	& P	1.880E-01	5.37E-02	G
		463.51	2.418E-01	*(P	1.998E-01	6.43E-02	G
		176.29	-5.595E-02	% P	3.801E-01	1.13E-01	G
I-131	-4.7288E-03						
		364.48	-4.729E-03	&(	3.737E-02	1.10E-02	G K
		636.97	-6.987E-03	%	4.374E-01	1.26E-01	G
		284.29	-1.512E-01	%	4.648E-01	1.40E-01	G
CS-134	1.2892E-02						
		604.66	1.209E-03	&(P	5.629E-02	1.67E-02	G K
		795.76	2.624E-02	(P	2.569E-02	8.31E-03	G
		569.29	-2.843E-03	&	1.564E-01	4.54E-02	G
		801.84	-5.776E-02	& P	2.888E-01	8.46E-02	G
CS-137	1.7999E-02						
		661.62	1.800E-02	%(P	3.134E-02	9.53E-03	G
CE-139	4.9150E-04						
		165.85	4.915E-04	%(P	2.938E-02	8.73E-03	G
EU-152	1.2485E-02						
		121.78	1.248E-02	%(P	9.158E-02	2.74E-02	G K
		344.30	-1.474E-02	& P	7.819E-02	2.32E-02	G
		1408.08	2.039E-02	% P	1.063E-01	3.03E-02	G
		964.00	-9.224E-02	& P	2.885E-01	8.64E-02	G
		1112.07	6.998E-02	% P	2.415E-01	7.16E-02	G
		778.90	-1.139E-02	% P	2.143E-01	6.19E-02	G
EU-154	8.2209E-03						
		123.10	8.221E-03	&(P	6.714E-02	2.01E-02	G K
		1274.80	-1.704E-03	& P	9.192E-02	2.62E-02	G
		723.30	-3.098E-02	% P	7.652E-02	2.28E-02	G
		1004.80	7.564E-02	& P	1.205E-01	3.74E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	9.7320E-02						
		86.45	9.732E-02	(	1.131E-01	3.47E-02	G K
		105.31	2.778E-02	& P	1.355E-01	4.07E-02	G
HG-203	-1.8120E-03						
		279.17	-1.812E-03	%(P	2.620E-02	7.71E-03	G K
		72.87	-3.123E-01	% P	8.931E-01	2.70E-01	G
		70.83	8.208E-03	%	1.768E+00	5.30E-01	G
		82.50	-6.076E-01	%	1.819E+00	5.49E-01	G
TL-208	1.8906E-01						
		583.14	1.836E-01	(P	2.542E-02	1.27E-02	G
		510.72	2.099E-01	*(P	1.066E-01	3.86E-02	G
PB-212	4.9518E-01						
		238.63	4.886E-01	(P	4.709E-02	2.07E-02	G K
							Energy duplication
		77.11	2.580E-01	}	1.805E-01	5.30E-02	G
		74.81	8.114E-01	+ P	3.236E-01	1.06E-01	G
PB-214	4.6149E-01						
		351.99	4.499E-01	*(P	6.050E-02	2.94E-02	G K
		295.22	3.126E-01	- P	1.222E-01	4.69E-02	G
							Energy duplication
		77.11	3.964E-01	} P	3.706E-01	1.02E-01	G
		241.92	5.193E-01	(P	3.090E-01	9.91E-02	G
BI-212	3.6625E-01						
		727.17	3.663E-01	(P	1.672E-01	6.29E-02	G K
		1620.56	8.349E-02	% P	6.790E-01	1.86E-01	G
		785.42	3.664E-01	% P	1.136E+00	3.36E-01	G
BI-214	3.8528E-01						
		609.32	3.853E-01	(P	5.226E-02	2.65E-02	G K
		1764.51	4.982E-01	+ P	4.366E-02	5.46E-02	G
		1120.28	5.636E-01	+ P	2.492E-01	1.10E-01	G
RA-224	2.8168E-01						
		241.00	2.817E-01	%(P	8.672E-01	2.62E-01	G
RA-226	1.6935E+00						
		185.99	1.693E+00	*(	7.753E-01	3.03E-01	G
AC-228	5.6937E-01						
		911.07	5.488E-01	(P	8.933E-02	4.40E-02	G K
		968.90	9.597E-01	+ P	1.731E-01	8.97E-02	G
		338.40	6.190E-01	*(P	1.642E-01	6.68E-02	G

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

TH-227      -5.0790E-04
                          236.00-5.079E-04 &(P 3.165E-01 9.45E-02 G K
                          256.25 4.884E-02 & P 2.742E-01 8.14E-02 G

PA-234       2.9795E-03
                           98.44 2.979E-03 &(  1.246E-01 3.72E-02 G K
                          946.00 4.252E-02 %   1.308E-01 3.89E-02 G
                          131.28 6.200E-03 %   1.391E-01 4.16E-02 G
                           94.67-8.338E-02 %   2.137E-01 6.46E-02 G
                          883.24 0.000E+00 %   2.206E-01 6.31E-02 G
                          926.70 1.734E-04 &   2.495E-01 7.14E-02 G
                          569.26-4.202E-03 &   2.310E-01 6.71E-02 G

TH-234       6.0125E-01
                           63.29-3.543E-02 &(P 1.410E+00 4.19E-01 G K
                           92.80 9.485E-01  (P 1.157E+00 3.53E-01 G
                           92.38 1.162E+00  (P 1.375E+00 4.21E-01 G

AM-241       4.5579E-02
                           59.54 4.558E-02 %(P 1.939E-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	-6.0734E-02	-6.4245E-02	2.1245E-01	2.1249E-01	2.247E-01
K-40		1.4804E+01	1.4804E+01	1.0566E+00	1.3714E+00	
MN-54		3.1377E-02	3.1680E-02	2.5839E-02	2.5907E-02	
CO-57	#B	2.4790E-03	2.5067E-03	2.7558E-02	2.7559E-02	3.040E-02
CO-60	#B	4.3923E-03	4.3992E-03	2.2111E-02	2.2113E-02	2.605E-02
Sr-85	#A	-1.1366E-02	-1.1904E-02	2.8529E-02	2.8537E-02	3.015E-02
Kr-85	#A	-2.8814E+02	-2.8815E+02	7.5264E+02	7.5283E+02	6.996E+02
Y-88	#B	-3.3241E-03	-3.4191E-03	2.9873E-02	2.9874E-02	2.197E-02
NB-94	#B	-3.0305E-03	-3.0305E-03	2.0719E-02	2.0720E-02	2.276E-02
Ag-108M	#B	1.4810E-03	1.4811E-03	2.4300E-02	2.4300E-02	2.798E-02
CD-109	#A	4.0088E-01	4.0354E-01	9.0131E-01	9.0159E-01	9.861E-01
SN-113	#B	1.4723E-04	1.5112E-04	2.9872E-02	2.9872E-02	3.329E-02
SB-125	#F	6.9274E-02	6.9480E-02	5.5462E-02	5.5613E-02	6.864E-02
I-131	#B	-3.2557E-03	-4.7288E-03	3.3098E-02	3.3099E-02	2.573E-02
CS-134	#B	1.2841E-02	1.2892E-02	1.2245E-02	1.2269E-02	5.607E-02
CS-137	#A	1.7994E-02	1.7999E-02	2.8600E-02	2.8620E-02	3.133E-02
CE-139	#A	4.8089E-04	4.9150E-04	2.6203E-02	2.6203E-02	2.875E-02
EU-152	#B	1.2476E-02	1.2485E-02	8.2296E-02	8.2299E-02	9.152E-02
EU-154	#B	8.2129E-03	8.2209E-03	6.0311E-02	6.0312E-02	6.707E-02
EU-155	#A	9.7158E-02	9.7320E-02	1.0407E-01	1.0421E-01	1.129E-01
HG-203	#B	-1.6990E-03	-1.8120E-03	3.5971E-02	3.5972E-02	2.457E-02
TL-208		1.8906E-01	1.8906E-01	3.9169E-02	4.0730E-02	
PB-212		4.9518E-01	4.9518E-01	6.2808E-02	6.9283E-02	
PB-214		4.6149E-01	4.6149E-01	9.0392E-02	9.4412E-02	
BI-212		3.6625E-01	3.6625E-01	1.8854E-01	1.8977E-01	
BI-214		3.8528E-01	3.8528E-01	7.9402E-02	8.2598E-02	
RA-224	#A	2.8168E-01	2.8168E-01	7.8458E-01	7.8476E-01	8.672E-01
RA-226	#	1.6935E+00	1.6935E+00	9.0998E-01	9.1546E-01	
AC-228		5.6937E-01	5.6937E-01	1.1480E-01	1.1962E-01	
TH-227	#B	-5.0790E-04	-5.0790E-04	1.5506E-01	1.5506E-01	3.165E-01
PA-234	#B	2.9795E-03	2.9795E-03	1.1168E-01	1.1168E-01	1.246E-01
TH-234	#B	6.0125E-01	6.0125E-01	6.5341E-01	6.5426E-01	1.410E+00
AM-241	#A	4.5579E-02	4.5579E-02	1.7502E-01	1.7504E-01	1.939E-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) 1.8995731E+01 pCi/gm
Total Decayed Activity (270.2 to 2000.1 keV) 1.8996044E+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_27JUN2006_1858.An1

Sample description
FSS-NOL-06-02-018-F-B

Spectrum Filename: C:\GammaVision\Spectra\107F_27JUN2006_1858.An1

Acquisition information
Start time: 27-Jun-2006 18:58:47
Live time: 2000
Real time: 2002
Dead time: 0.10 %
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: 1.4380E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.4380E+03) =
6.9541E+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-Jun-2006 08:13:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2494

***** 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	287.	13.99	1.18	2.849E-02	74.81	9.600	9.866E-01	PB212
77.12	437.	7.58	1.18	2.957E-02	77.11	10.700	1.328E+00	PB214
					77.11	17.500	8.207E-01	PB212
86.85	206.	28.17	1.46	3.295E-02	86.45	32.740	1.806E-01	EU155
					88.04	3.790	1.546E+00	CD109
92.97	176.	22.70	1.53	3.442E-02	92.38	2.570	1.795E+00	TH234
					92.80	3.000	PBC<MDA	TH234
185.83	224.	19.53	1.79	3.611E-02	185.99	3.280	1.779E+00	RA226
209.58	113.	29.25	1.17	3.426E-02				
238.87	1161.	3.78	1.30	3.186E-02	238.63	43.100	7.832E-01	PB212
241.59	209.	15.80	1.30	3.165E-02	241.00	3.900	1.573E+00	RA224
					241.92	7.470	8.265E-01	PB214
270.56	111.	22.13	1.07	2.942E-02				
295.37	284.	8.68	1.34	2.767E-02	295.22	19.200	4.939E-01	PB214
300.61	74.	27.02	1.34	2.732E-02				
328.36	66.	34.37	0.88	2.558E-02				
338.85	314.	10.45	1.51	2.498E-02	338.40	12.010	9.726E-01	AC228
352.05	477.	6.57	1.55	2.426E-02	351.99	37.100	4.927E-01	PB214
462.50	110.	22.96	1.87	1.956E-02				
462.50	110.	22.96	1.87	1.956E-02	463.51	10.000	5.174E-01	SB125
511.10	204.	13.65	2.41	1.807E-02	510.72	22.500	3.935E-01	TL208
583.26	437.	6.37	1.62	1.629E-02	583.14	86.000	2.904E-01	TL208
609.58	428.	6.72	1.69	1.574E-02	609.32	46.090	5.493E-01	BI214
727.84	119.	16.82	1.41	1.373E-02	727.17	11.800	6.804E-01	BI212
795.02	66.	24.39	0.80	1.285E-02				
795.02	66.	24.39	0.80	1.285E-02	795.76	85.400	5.591E-02	CS134
835.31	31.	40.56	1.71	1.239E-02	834.81	99.978	PBC<MDA	MN54

860.91	95.	19.83	2.00	1.211E-02				
911.51	290.	7.65	2.06	1.160E-02	911.07	29.000	7.975E-01	AC228
967.53	260.	9.84	1.99	1.110E-02	968.90	17.460	1.250E+00	AC228
1121.36	125.	15.06	1.65	9.963E-03	1120.28	15.040	7.766E-01	BI214
1461.16	1490.	2.67	2.25	8.189E-03	1460.75	10.700	1.593E+01	K40
1621.61	26.	26.72	1.23	7.569E-03	1620.56	2.750	1.187E+00	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.95	66.	14.10	0.99	7.084E-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
418.80	209.58	425.	113.	0.056	87.75	1.166	NP-239
540.75	270.56	226.	111.	0.056	66.39	1.067	AC-228 s
600.82	300.60	272.	68.	0.034	119.72	1.657	PB-212 s
656.35	328.36	198.	66.	0.033	103.12	0.885	RH-106M s
1721.38	860.91	77.	95.	0.048	59.48	1.995	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	149.29	74.81	688.	287.	0.144	41.98	1.178D
PB-212	153.89	77.11	739.	437.	0.219	22.75	1.179A
EU-155	174.01	87.17	1271.	140.	0.070	110.64	1.500s
TH-234	185.60	92.97	1129.	195.	0.098	73.02	1.500s
TH-234	185.56	92.95	1112.	181.	0.091	72.90	1.500s
RA-226	371.30	185.83	605.	224.	0.112	58.60	1.787s
TH-227	471.71	236.04	1138.	-142.	-0.071	104.21	1.500s
PB-212	476.89	238.63	346.	1145.	0.573	11.03	1.297D
PB-214	483.47	241.92	485.	195.	0.098	51.97	1.300D
PB-214	590.34	295.36	241.	269.	0.134	31.38	1.439
AC-228	677.31	338.85	257.	311.	0.155	31.34	1.513s
PB-214	703.72	352.05	192.	472.	0.236	19.71	1.554s
SB-125	925.73	463.07	127.	78.	0.039	67.24	1.500s
TL-208	1021.78	511.10	202.	170.	0.085	40.94	2.405s
TL-208	1166.11	583.26	110.	433.	0.216	19.10	1.620s
BI-214	1218.74	609.58	122.	424.	0.212	20.15	1.686s
BI-212	1455.25	727.84	92.	117.	0.059	50.46	1.410s
CS-134	1590.02	795.23	49.	44.	0.022	80.00	1.684s
MN-54	1670.20	835.31	67.	31.	0.016	121.69	1.710s
AC-228	1822.58	911.51	69.	286.	0.143	22.95	2.065
AC-228	1934.62	967.53	98.	258.	0.129	29.52	1.994s
BI-214	2242.28	1121.36	68.	124.	0.062	45.18	1.649s
K-40	2921.92	1461.16	30.	1485.	0.743	8.00	2.246

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3242.85	1621.61	8.	26.	0.013	80.16	1.233s
BI-214	3529.56	1764.95	7.	66.	0.033	42.31	0.986s

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		-2.8861E-03					
			477.56	-2.886E-03	&(	2.809E-01	8.12E-02 G
K-40		1.5926E+01					
			1460.75	1.593E+01	(P	3.015E-01	4.26E-01 G
MN-54		2.3981E-02					
			834.81	2.398E-02	*(P	3.138E-02	9.86E-03 G
CO-57		3.3908E-03					
			122.07	3.391E-03	%(P	4.097E-02	1.22E-02 G K
			136.43	-3.951E-02	& P	3.273E-01	9.79E-02 G
CO-60		1.6681E-02					
			1332.51	1.668E-02	%(P	3.845E-02	1.14E-02 G K
			1173.23	-8.486E-03	% P	4.847E-02	1.38E-02 G K
Sr-85		-2.0428E-02					
			514.00	-2.043E-02	%(	4.368E-02	1.32E-02 G
Kr-85		-4.8651E+02					
			513.99	-4.865E+02	%(P	9.669E+02	2.91E+02 G
Y-88		-1.1536E-03					
			1836.01	-1.154E-03	%(P	4.431E-02	1.21E-02 G K
			898.02	-1.232E-02	% P	4.111E-02	1.21E-02 G
NB-94		-2.0632E-04					
			871.10	-2.063E-04	%(P	2.868E-02	8.05E-03 G K
			702.50	1.245E-02	% P	2.962E-02	8.90E-03 G K
Ag-108M		-1.7185E-02					
			722.95	-1.719E-02	%(	4.664E-02	1.40E-02 G K
			614.37	-3.031E-02	%	4.515E-02	1.39E-02 G
			433.93	4.493E-03	& P	3.087E-02	9.05E-03 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.4139E-01						
		88.04	1.414E-01	%(P	1.347E+00	4.04E-01	G
SN-113	-1.2538E-02						
		391.71	-1.254E-02	&(P	4.974E-02	1.47E-02	G K
		255.04	-1.667E-02	%	1.443E+00	4.26E-01	G
SB-125	9.7180E-02						
		427.95	2.514E-03	%(P	9.097E-02	2.64E-02	G K
		600.77	-8.603E-04	% P	1.866E-01	5.38E-02	G
		636.15	4.423E-02	% P	2.517E-01	7.34E-02	G
		463.51	3.774E-01	*(P	2.667E-01	8.76E-02	G
		176.29	7.818E-02	& P	4.930E-01	1.47E-01	G
I-131	6.2649E-04						
		364.48	6.265E-04	&(	3.945E-02	1.14E-02	G K
		636.97	7.324E-02	%	5.440E-01	1.58E-01	G
		284.29	-1.049E-01	%	6.151E-01	1.82E-01	G
CS-134	1.8324E-02						
		604.66	1.027E-03	%(P	7.179E-02	2.13E-02	G K
		795.76	3.809E-02	(P	3.054E-02	1.03E-02	G
		569.29	-5.680E-03	&	1.967E-01	5.69E-02	G
		801.84	-8.248E-02	% P	3.364E-01	9.84E-02	G
CS-137	1.1232E-02						
		661.62	1.123E-02	%(P	3.022E-02	8.92E-03	G
CE-139	6.2421E-03						
		165.85	6.242E-03	%(P	3.041E-02	9.07E-03	G
EU-152	2.5438E-02						
		121.78	2.544E-02	%(P	1.100E-01	3.30E-02	G K
		344.30	-3.500E-02	% P	1.076E-01	3.22E-02	G
		1408.08	6.371E-02	% P	1.309E-01	3.96E-02	G
		964.00	-8.740E-02	& P	3.725E-01	1.11E-01	G
		1112.07	-6.921E-02	% P	2.482E-01	7.25E-02	G
		778.90	-2.847E-03	% P	2.828E-01	8.11E-02	G
EU-154	6.3354E-03						
		123.10	6.335E-03	&(P	8.842E-02	2.64E-02	G K
		1274.80	3.433E-02	& P	1.344E-01	3.96E-02	G
		723.30	-8.916E-02	% P	2.287E-01	6.87E-02	G
		1004.80	-1.233E-03	% P	2.003E-01	5.66E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.2297E-01						
		86.45	1.230E-01	(	1.479E-01	4.54E-02	G K
		105.31	6.873E-02	% P	1.675E-01	5.06E-02	G
HG-203	-3.7365E-03						
		279.17	-3.736E-03	&(P	3.986E-02	1.18E-02	G K
		72.87	-3.729E-01	% P	1.206E+00	3.64E-01	G
		70.83	1.742E-02	%	1.738E+00	5.19E-01	G
		82.50	-9.301E-01	%	2.439E+00	7.37E-01	G
TL-208	2.9036E-01						
		583.14	2.904E-01	@(P	3.462E-02	1.87E-02	G
		510.72	3.935E-01	+ P	1.591E-01	6.44E-02	G
PB-212	7.9380E-01						
		238.63	7.829E-01	(P	6.109E-02	2.92E-02	G K
							Energy duplication
		77.11	7.938E-01	}	2.350E-01	6.02E-02	G
		74.81	9.866E-01	+ P	4.292E-01	1.40E-01	G
PB-214	4.8686E-01						
		351.99	4.927E-01	*(P	7.027E-02	3.27E-02	G K
		295.22	4.755E-01	(P	1.328E-01	5.06E-02	G
							Energy duplication
		77.11	1.906E-02	} P	5.022E-01	1.45E-01	G
		241.92	7.772E-01	+ P	4.188E-01	1.36E-01	G
BI-212	6.8041E-01						
		727.17	6.804E-01	*(P	2.741E-01	1.16E-01	G K
		1620.56	1.187E+00	+ P	7.062E-01	3.23E-01	G
		785.42	1.018E+00	% P	1.438E+00	4.48E-01	G
BI-214	5.5010E-01						
		609.32	5.493E-01	*(P	7.016E-02	3.73E-02	G K
		1764.51	5.525E-01	(P	1.231E-01	7.90E-02	G
		1120.28	7.766E-01	+ P	2.580E-01	1.18E-01	G
RA-224	4.0768E-01						
		241.00	4.077E-01	%(P	1.142E+00	3.45E-01	G
RA-226	1.7793E+00						
		185.99	1.779E+00	*(	9.310E-01	3.47E-01	G
AC-228	8.4875E-01						
		911.07	7.975E-01	(P	1.159E-01	6.19E-02	G K
		968.90	1.250E+00	+ P	2.374E-01	1.24E-01	G
		338.40	9.726E-01	*(P	2.424E-01	1.03E-01	G

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

TH-227      -3.7060E-01
                          236.00-3.706E-01 ?(P 4.179E-01 1.28E-01 G K
                          256.25 4.637E-02 % P 4.317E-01 1.28E-01 G

PA-234       3.9919E-02
                           98.44 3.992E-02 %(  1.482E-01 4.46E-02 G K
                          946.00-1.088E-03 &   1.826E-01 5.20E-02 G
                          131.28 4.160E-02 %   1.798E-01 5.40E-02 G
                           94.67-1.371E-01 %   2.835E-01 8.60E-02 G
                          883.24 5.942E-02 %   2.302E-01 6.74E-02 G
                          926.70-1.341E-02 %   2.301E-01 6.45E-02 G
                          569.26-8.082E-03 &   2.906E-01 8.40E-02 G

TH-234       1.1952E+00
                           63.29 2.600E-01 &(P 1.985E+00 5.93E-01 G K
                           92.80 1.652E+00  (P 1.440E+00 4.45E-01 G
                           92.38 2.082E+00  (P 1.699E+00 5.27E-01 G

AM-241      -4.5183E-02
                           59.54-4.518E-02 %(P 1.943E-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	-2.7242E-03	-2.8861E-03	2.4350E-01	2.4350E-01	2.651E-01
K-40		1.5926E+01	1.5926E+01	1.2776E+00	1.5865E+00	
MN-54	#A	2.3745E-02	2.3981E-02	2.9582E-02	2.9616E-02	3.108E-02
CO-57	#B	3.3523E-03	3.3908E-03	3.6700E-02	3.6700E-02	4.051E-02
CO-60	#B	1.6654E-02	1.6681E-02	3.4193E-02	3.4207E-02	3.839E-02
Sr-85	#A	-1.9479E-02	-2.0428E-02	3.9707E-02	3.9725E-02	4.165E-02
Kr-85	#A	-4.8650E+02	-4.8651E+02	1.0154E+03	1.0158E+03	9.669E+02
Y-88	#B	-1.1207E-03	-1.1536E-03	5.9277E-02	5.9277E-02	4.305E-02
NB-94	#B	-2.0632E-04	-2.0632E-04	7.5724E-02	7.5724E-02	2.868E-02
Ag-108M	#B	-1.7184E-02	-1.7185E-02	4.2013E-02	4.2025E-02	4.663E-02
CD-109	#A	1.4043E-01	1.4139E-01	1.2122E+00	1.2122E+00	1.338E+00
SN-113	#B	-1.2207E-02	-1.2538E-02	5.3792E-02	5.3797E-02	4.843E-02
SB-125	#F	9.6884E-02	9.7180E-02	6.7697E-02	6.7939E-02	9.069E-02
I-131	#B	4.2693E-04	6.2649E-04	3.4199E-02	3.4199E-02	2.688E-02
CS-134	#B	1.8249E-02	1.8324E-02	1.4835E-02	1.4874E-02	7.150E-02
CS-137	#A	1.1229E-02	1.1232E-02	2.6765E-02	2.6774E-02	3.021E-02
CE-139	#A	6.1037E-03	6.2421E-03	2.7223E-02	2.7226E-02	2.974E-02
EU-152	#B	2.5421E-02	2.5438E-02	9.9012E-02	9.9022E-02	1.099E-01
EU-154	#B	6.3291E-03	6.3354E-03	7.9200E-02	7.9201E-02	8.833E-02
EU-155	#A	1.2276E-01	1.2297E-01	1.3606E-01	1.3623E-01	1.476E-01
HG-203	#B	-3.4972E-03	-3.7365E-03	4.7659E-02	4.7659E-02	3.731E-02
TL-208	#	2.9036E-01	2.9036E-01	5.6034E-02	5.8600E-02	
PB-212		7.9380E-01	7.9380E-01	8.8737E-02	1.0036E-01	
PB-214		4.8686E-01	4.8686E-01	9.1561E-02	9.5970E-02	
BI-212		6.8041E-01	6.8041E-01	3.4710E-01	3.4942E-01	
BI-214		5.5010E-01	5.5010E-01	1.1200E-01	1.1661E-01	
RA-224	#A	4.0768E-01	4.0768E-01	1.0338E+00	1.0341E+00	1.142E+00
RA-226	#	1.7793E+00	1.7793E+00	1.0426E+00	1.0479E+00	
AC-228		8.4875E-01	8.4875E-01	1.6680E-01	1.7417E-01	
TH-227	#A	-3.7060E-01	-3.7060E-01	3.8694E-01	3.8756E-01	4.179E-01
PA-234	#B	3.9919E-02	3.9919E-02	1.3372E-01	1.3374E-01	1.482E-01
TH-234	#B	1.1952E+00	1.1952E+00	9.0830E-01	9.1072E-01	1.985E+00
AM-241	#A	-4.5182E-02	-4.5183E-02	1.8282E-01	1.8284E-01	1.943E-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 (249.2 to 2000.1 keV) 2.1355179E+01 pCi/gm
Total Decayed Activity (249.2 to 2000.1 keV) 2.1355186E+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_27JUN2006_1935.An1

Sample description
FSS-NOL-06-02-014-F

Spectrum Filename: C:\GammaVision\Spectra\107F_27JUN2006_1935.An1

Acquisition information
Start time: 27-Jun-2006 19:35:30
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: 1.8640E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8640E+03) =
5.3648E+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-Jun-2006 07:58:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2386

***** 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	311.	14.05	1.18	2.842E-02	74.81	9.600	8.149E-01	PB212
77.01	494.	9.93	1.18	2.938E-02	77.11	17.500	6.917E-01	PB212
					77.11	10.700	1.120E+00	PB214
93.40	143.	35.17	1.15	3.451E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.96	195.	24.63	1.56	3.610E-02	185.99	3.280	1.194E+00	RA226
209.51	125.	39.00	1.42	3.427E-02				
238.79	1271.	3.66	1.30	3.186E-02	238.63	43.100	6.621E-01	PB212
241.67	221.	16.50	1.30	3.163E-02	241.00	3.900	1.283E+00	RA224
					241.92	7.470	6.739E-01	PB214
270.11	122.	25.02	2.26	2.945E-02				
276.60	70.	39.91	0.77	2.898E-02				
295.37	291.	9.02	1.34	2.766E-02	295.22	19.200	3.907E-01	PB214
300.75	66.	32.76	1.34	2.730E-02				
328.06	101.	29.14	1.74	2.560E-02				
338.56	311.	11.11	1.40	2.499E-02	338.40	12.010	7.431E-01	AC228
352.19	559.	7.03	1.64	2.425E-02	351.99	37.100	4.462E-01	PB214
463.79	107.	20.93	1.98	1.952E-02	463.51	10.000	3.865E-01	SB125
510.58	293.	11.60	2.35	1.809E-02	510.72	22.500	4.615E-01	TL208
583.53	484.	6.71	1.45	1.628E-02	583.14	86.000	2.483E-01	TL208
609.54	429.	8.67	1.65	1.574E-02	609.32	46.090	4.241E-01	BI214
703.23	37.	40.08	1.62	1.411E-02	702.50	100.000	PBC<MDA	NB94
727.92	88.	21.23	1.47	1.373E-02	723.30	19.700	2.340E-01	EU154
					727.17	11.800	3.881E-01	BI212
795.32	46.	32.42	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
911.67	324.	7.60	2.15	1.160E-02	911.07	29.000	6.887E-01	AC228
968.50	284.	9.17	1.58	1.110E-02	968.90	17.460	1.054E+00	AC228

1121.02	135.	14.53	2.18	9.965E-03	1120.28	15.040	6.489E-01	BI214
1461.26	1833.	2.41	2.27	8.189E-03	1460.75	10.700	1.512E+01	K40
1620.44	40.	24.51	1.13	7.569E-03	1620.56	2.750	1.411E+00	BI212
1764.65	102.	10.93	1.97	7.083E-03	1764.51	15.920	6.513E-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	
418.65	209.51	771.	125.	0.062	117.01	1.419	AC-228	
539.85	270.11	324.	122.	0.061	75.07	2.258	AC-228	sM
552.83	276.60	281.	89.	0.045	85.80	0.771	TL-208	sM
601.17	300.77	312.	78.	0.039	112.66	1.711	PB-212	s
655.73	328.06	282.	101.	0.050	87.42	1.737	AC-228	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	795.	317.	0.158	40.81	1.178D
PB-212	153.89	77.11	839.	319.	0.160	35.11	1.179A
PB-214	153.89	77.11	1403.	170.	0.085	88.18	1.500A
TH-234	185.78	93.06	1523.	184.	0.092	88.68	1.500
TH-234	185.79	93.07	1487.	174.	0.087	86.45	1.500
RA-226	371.56	185.96	782.	195.	0.097	73.88	1.561s
TH-227	472.22	236.30	1613.	-196.	-0.098	89.78	1.500s
PB-212	476.89	238.63	387.	1254.	0.627	10.60	1.297D
PB-214	483.47	241.92	564.	212.	0.106	51.37	1.299D
PB-214	590.06	295.22	212.	278.	0.139	28.07	1.338D
AC-228	676.73	338.56	297.	308.	0.154	33.32	1.404s
PB-214	704.00	352.19	313.	554.	0.277	21.09	1.640s
SB-125	926.37	463.39	179.	72.	0.036	82.69	1.500s
TL-208	1020.74	510.58	254.	259.	0.129	34.80	2.349s
TL-208	1166.65	583.53	163.	480.	0.240	20.12	1.448s
BI-214	1218.66	609.54	232.	424.	0.212	26.02	1.652
NB-94	1406.03	703.23	94.	37.	0.018	120.25	1.621s
BI-212	1455.41	727.92	98.	87.	0.043	63.68	1.466
CS-134	1590.20	795.32	92.	46.	0.023	97.27	1.684s
AC-228	1822.90	911.67	92.	320.	0.160	22.79	2.152s
AC-228	1936.56	968.50	111.	282.	0.141	27.50	1.583
BI-214	2241.60	1121.02	77.	134.	0.067	43.60	2.182s
K-40	2922.12	1461.26	31.	1828.	0.914	7.22	2.268
BI-212	3240.51	1620.44	13.	40.	0.020	73.54	1.131s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3528.96	1764.65	7.	101.	0.051	32.80	1.972s

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		8.9808E-02					
			477.56	8.981E-02	%(	2.302E-01 6.92E-02	G
K-40		1.5120E+01					
			1460.75	1.512E+01	(P	2.375E-01 3.65E-01	G
MN-54		-8.2364E-03					
			834.81	-8.236E-03	&(P	3.119E-02 9.22E-03	G
CO-57		1.1354E-02					
			122.07	1.135E-02	&(P	3.403E-02 1.03E-02	G K
			136.43	-1.564E-02	& P	2.657E-01 7.93E-02	G
CO-60		6.1413E-03					
			1332.51	6.141E-03	&(P	3.308E-02 9.49E-03	G K
			1173.23	1.341E-02	% P	4.008E-02 1.19E-02	G K
Sr-85		-1.4301E-02					
			514.00	-1.430E-02	%(	3.601E-02 1.09E-02	G
Kr-85		-3.4303E+02					
			513.99	-3.430E+02	%(P	7.961E+02 2.39E+02	G
Y-88		-3.2018E-03					
			1836.01	-3.202E-03	&(P	2.552E-02 6.89E-03	G K
			898.02	-1.025E-02	% P	3.707E-02 1.09E-02	G
NB-94		6.4398E-03					
			871.10	-6.003E-03	%(P	2.949E-02 8.66E-03	G K
			702.50	1.888E-02	(P	2.455E-02 7.68E-03	G K
Ag-108M		-4.5596E-03					
			722.95	-4.560E-03	&(	3.447E-02 1.01E-02	G K
			614.37	-2.868E-02	%	3.910E-02 1.21E-02	G
			433.93	1.095E-02	% P	2.384E-02 7.20E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.4221E-02						
		88.04	1.422E-02	%(P	1.099E+00	3.29E-01	G
SN-113	2.7087E-03						
		391.71	2.709E-03	&(P	3.843E-02	1.13E-02	G K
		255.04	-1.886E-01	%	1.228E+00	3.66E-01	G
SB-125	6.8241E-02						
		427.95	4.621E-04	&(P	6.948E-02	2.01E-02	G K
		600.77	-3.765E-02	% P	1.376E-01	4.06E-02	G
		636.15	-2.433E-02	% P	2.005E-01	5.80E-02	G
		463.51	2.689E-01	*(P	2.423E-01	7.70E-02	G
		176.29	7.792E-04	% P	4.397E-01	1.31E-01	G
I-131	1.1776E-02						
		364.48	1.178E-02	&(	3.607E-02	1.08E-02	G K
		636.97	-3.528E-02	%	4.863E-01	1.41E-01	G
		284.29	1.586E-01	%	5.482E-01	1.64E-01	G
CS-134	-1.8035E-02						
		604.66	-1.803E-02	%(P	3.373E-02	1.03E-02	G K
		795.76	3.074E-02	+ P	3.154E-02	1.01E-02	G
		569.29	-3.805E-02	%	1.794E-01	5.31E-02	G
		801.84	-5.165E-02	% P	3.459E-01	1.01E-01	G
CS-137	1.3260E-02						
		661.62	1.326E-02	%(P	3.270E-02	9.79E-03	G
CE-139	9.9988E-03						
		165.85	9.999E-03	%(P	3.303E-02	9.95E-03	G
EU-152	-4.0273E-03						
		121.78	-4.027E-03	&(P	1.002E-01	2.99E-02	G K
		344.30	-2.028E-02	% P	8.849E-02	2.63E-02	G
		1408.08	2.540E-02	% P	1.204E-01	3.46E-02	G
		964.00	-5.709E-02	& P	2.994E-01	8.86E-02	G
		1112.07	-5.060E-02	% P	2.644E-01	7.73E-02	G
		778.90	-2.197E-03	% P	2.537E-01	7.33E-02	G
EU-154	2.3885E-02						
		123.10	2.389E-02	%(P	7.360E-02	2.22E-02	G K
		1274.80	1.559E-02	& P	1.052E-01	3.06E-02	G
		723.30	3.579E-03	& P	1.780E-01	5.19E-02	G
		1004.80	-5.455E-03	& P	1.799E-01	5.16E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	7.3385E-02						
		86.45	7.339E-02	%(	1.285E-01	3.91E-02	G K
		105.31	5.936E-04	& P	1.410E-01	4.21E-02	G
HG-203	-1.0246E-02						
		279.17	-1.025E-02	%(P	3.472E-02	1.04E-02	G K
		72.87	-4.675E-01	% P	1.005E+00	3.05E-01	G
		70.83	3.631E-01	%	1.419E+00	4.27E-01	G
		82.50	-7.466E-01	%	2.036E+00	6.15E-01	G
TL-208	2.4832E-01						
		583.14	2.483E-01	*(P	3.220E-02	1.68E-02	G
		510.72	4.615E-01	+ P	1.372E-01	6.05E-02	G
PB-212	6.7142E-01						
		238.63	6.612E-01	(P	4.979E-02	2.37E-02	G K
							Energy duplication
		77.11	4.473E-01	}	1.929E-01	5.24E-02	G
		74.81	8.396E-01	+ P	3.554E-01	1.16E-01	G
PB-214	4.4618E-01						
		351.99	4.462E-01	*(P	6.861E-02	3.17E-02	G K
		295.22	3.790E-01	- P	9.632E-02	3.60E-02	G
							Energy duplication
		77.11	3.899E-01	} P	4.062E-01	1.15E-01	G
		241.92	6.511E-01	+ P	3.478E-01	1.12E-01	G
BI-212	3.8811E-01						
		727.17	3.881E-01	(P	2.185E-01	8.37E-02	G K
		1620.56	1.411E+00	+ P	6.683E-01	3.50E-01	G
		785.42	2.282E-02	& P	1.309E+00	3.74E-01	G
BI-214	4.2414E-01						
		609.32	4.241E-01	(P	7.356E-02	3.72E-02	G K
		1764.51	6.513E-01	+ P	9.494E-02	7.18E-02	G
		1120.28	6.489E-01	+ P	2.105E-01	9.50E-02	G
RA-224	5.5803E-01						
		241.00	5.580E-01	%(P	9.126E-01	2.78E-01	G
RA-226	1.1939E+00						
		185.99	1.194E+00	(	8.144E-01	2.94E-01	G
AC-228	7.0459E-01						
		911.07	6.887E-01	*(P	1.022E-01	5.30E-02	G K
		968.90	1.054E+00	+ P	1.943E-01	9.74E-02	G
		338.40	7.431E-01	*(P	2.005E-01	8.34E-02	G

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

TH-227      -3.9461E-01
                          236.00-3.946E-01 &(P 3.828E-01 1.18E-01 G K
                          256.25-7.189E-02 & P 3.449E-01 1.03E-01 G

PA-234      -4.1953E-02
                           98.44-4.195E-02 &(  1.218E-01 3.68E-02 G K
                          946.00 8.610E-03 &   1.668E-01 4.83E-02 G
                          131.28 2.499E-02 &   1.479E-01 4.44E-02 G
                           94.67-1.090E-01 %   2.365E-01 7.17E-02 G
                          883.24-4.642E-02 &   2.108E-01 6.17E-02 G
                          926.70-8.181E-02 %   2.681E-01 7.97E-02 G
                          569.26-5.623E-02 %   2.650E-01 7.85E-02 G

TH-234       1.0020E+00
                           63.29 4.927E-01 %(P 1.588E+00 4.78E-01 G K
                           92.80 1.226E+00  (P 1.282E+00 3.93E-01 G
                           92.38 1.514E+00  (P 1.518E+00 4.67E-01 G

AM-241       3.2003E-03
                           59.54 3.200E-03 &(P 2.112E-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	8.4730E-02	8.9808E-02	2.0767E-01	2.0774E-01	2.172E-01
K-40		1.5120E+01	1.5120E+01	1.0947E+00	1.4128E+00	
MN-54	#A	-8.1548E-03	-8.2364E-03	2.9428E-02	2.9432E-02	3.088E-02
CO-57	#B	1.1225E-02	1.1354E-02	3.0800E-02	3.0807E-02	3.364E-02
CO-60	#B	6.1314E-03	6.1413E-03	2.8469E-02	2.8472E-02	3.302E-02
Sr-85	#A	-1.3631E-02	-1.4301E-02	3.2583E-02	3.2594E-02	3.432E-02
Kr-85	#A	-3.4302E+02	-3.4303E+02	8.4473E+02	8.4497E+02	7.961E+02
Y-88	#B	-3.1097E-03	-3.2018E-03	3.6579E-02	3.6580E-02	2.479E-02
NB-94	#B	6.4398E-03	6.4398E-03	7.8562E-03	7.8654E-03	2.949E-02
Ag-108M	#B	-4.5593E-03	-4.5596E-03	3.0344E-02	3.0345E-02	3.447E-02
CD-109	#A	1.4124E-02	1.4221E-02	9.8663E-01	9.8663E-01	1.092E+00
SN-113	#B	2.6365E-03	2.7087E-03	3.3825E-02	3.3826E-02	3.740E-02
SB-125	#B	6.8031E-02	6.8241E-02	5.8630E-02	5.8768E-02	6.926E-02
I-131	#B	8.0002E-03	1.1776E-02	3.2389E-02	3.2396E-02	2.450E-02
CS-134	#B	-1.7961E-02	-1.8035E-02	3.1612E-02	3.1630E-02	3.359E-02
CS-137	#A	1.3256E-02	1.3260E-02	2.9355E-02	2.9365E-02	3.269E-02
CE-139	#A	9.7753E-03	9.9988E-03	2.9838E-02	2.9844E-02	3.230E-02
EU-152	#B	-4.0246E-03	-4.0273E-03	9.3822E-02	9.3822E-02	1.001E-01
EU-154	#B	2.3861E-02	2.3885E-02	6.6603E-02	6.6616E-02	7.353E-02
EU-155	#B	7.3259E-02	7.3385E-02	1.1723E-01	1.1730E-01	1.283E-01
HG-203	#B	-9.5845E-03	-1.0246E-02	3.3949E-02	3.3955E-02	3.248E-02
TL-208	#	2.4832E-01	2.4832E-01	5.0434E-02	5.2523E-02	
PB-212		6.7142E-01	6.7142E-01	7.2067E-02	8.2257E-02	
PB-214		4.4618E-01	4.4618E-01	9.4977E-02	9.8565E-02	
BI-212		3.8811E-01	3.8811E-01	2.5082E-01	2.5186E-01	
BI-214		4.2414E-01	4.2414E-01	1.1148E-01	1.1426E-01	
RA-224	#A	5.5803E-01	5.5803E-01	8.3381E-01	8.3447E-01	9.126E-01
RA-226	#	1.1939E+00	1.1939E+00	8.8209E-01	8.8490E-01	
AC-228		7.0459E-01	7.0459E-01	1.4382E-01	1.4972E-01	
TH-227	#A	-3.9461E-01	-3.9461E-01	3.5478E-01	3.5554E-01	3.828E-01
PA-234	#B	-4.1953E-02	-4.1953E-02	1.1030E-01	1.1033E-01	1.218E-01
TH-234	#B	1.0020E+00	1.0020E+00	9.2710E-01	9.2876E-01	1.588E+00
AM-241	#A	3.2003E-03	3.2003E-03	1.8927E-01	1.8927E-01	2.112E-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_27JUN2006_1935.An1

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

Total Activity (300.7 to 2000.1 keV) 1.9196531E+01 pCi/gm
Total Decayed Activity (300.7 to 2000.1 keV) 1.9196539E+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_27JUNE2006_1340.An1

Sample description
FSS-NOL-06-02-021-F

Spectrum Filename: C:\GammaVision\Spectra\107F_27JUNE2006_1340.An1

Acquisition information
Start time: 27-Jun-2006 13:41:38
Live time: 2000
Real time: 2001
Dead time: 0.05 %
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: 7.9700E+02
Activity scaling factor: 1.0000E+06/(1.0000E+00* 7.9700E+02) =
1.2547E+03
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	26-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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2819

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.88	123.	21.10	1.18	2.842E-02				
74.88	123.	21.10	1.18	2.842E-02	74.81	9.600	PBC<MDA	PB212
76.95	225.	13.58	1.18	2.941E-02				
76.95	225.	13.58	1.18	2.941E-02	77.11	17.500	7.363E-01	PB212
					77.11	10.700	1.179E+00	PB214
87.06	87.	39.90	1.50	3.284E-02	86.45	32.740	PBC<MDA	EU155
92.35	105.	32.68	1.91	3.429E-02				
92.35	105.	32.68	1.91	3.429E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.14	113.	30.18	1.70	3.609E-02	185.99	3.280	1.617E+00	RA226
209.97	49.	41.38	0.84	3.423E-02				
239.44	632.	5.93	1.68	3.183E-02	238.63	43.100	7.606E-01	PB212
					241.00	3.900	8.641E+00	RA224
295.44	106.	15.98	1.34	2.766E-02	295.22	19.200	3.243E-01	PB214
300.31	33.	36.67	1.34	2.734E-02				
338.52	168.	17.98	0.86	2.500E-02	338.40	12.010	9.304E-01	AC228
351.96	227.	10.62	1.09	2.426E-02				
351.96	227.	10.62	1.09	2.426E-02	351.99	37.100	4.180E-01	PB214
463.08	34.	35.34	1.50	1.953E-02	463.51	10.000	PBC<MDA	SB125
511.27	24.	27.61	1.50	1.808E-02	510.72	22.500	PBC<MDA	TL208
583.23	163.	12.13	1.51	1.629E-02	583.14	86.000	1.918E-01	TL208
609.57	138.	11.00	1.60	1.574E-02	609.32	46.090	3.135E-01	BI214
661.86	282.	8.15	1.79	1.477E-02	661.62	84.620	3.772E-01	CS137
728.26	69.	24.02	1.24	1.374E-02	727.17	11.800	7.184E-01	BI212
911.20	155.	11.20	1.68	1.161E-02	911.07	29.000	7.609E-01	AC228
968.53	119.	18.87	2.14	1.109E-02	968.90	17.460	1.041E+00	AC228
1121.15	64.	23.37	1.52	9.964E-03	1120.28	15.040	7.193E-01	BI214

1461.42	1097.	3.09	2.42	8.188E-03	1460.75	10.700	2.113E+01	K40
1765.14	28.	18.57	1.37	7.084E-03	1764.51	15.920	4.226E-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	
149.43	74.67	276.	123.	0.062	63.30	1.178	BI-207	D
153.57	76.74	353.	225.	0.112	40.74	1.179	PB-214	D
419.57	209.97	163.	49.	0.024	124.15	0.841	NP-239	s
478.51	239.44	658.	209.	0.104	56.14	1.680	PB-212	s
600.24	300.28	59.	33.	0.017	110.01	1.341	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	149.72	75.02	680.	106.	0.053	104.04	1.500s
PB-212	153.89	77.11	559.	235.	0.118	46.94	1.500D
PB-214	153.89	77.11	564.	230.	0.115	46.94	1.500D
EU-155	173.78	87.06	553.	87.	0.043	119.71	1.500s
TH-234	185.71	93.02	519.	93.	0.047	99.39	1.500s
TH-234	185.65	92.99	515.	80.	0.040	98.91	1.500s
RA-226	372.25	186.30	326.	74.	0.037	108.98	1.500s
PB-212	477.20	238.78	360.	408.	0.204	23.62	1.500s
PB-214	590.39	295.39	187.	93.	0.047	66.07	1.500s
AC-228	677.12	338.75	198.	150.	0.075	58.93	0.850s
PB-214	703.88	352.13	119.	197.	0.099	30.77	1.500s
SB-125	925.75	463.08	69.	34.	0.017	106.01	1.500s
TL-208	1166.46	583.44	47.	138.	0.069	31.78	1.540s
BI-214	1218.71	609.57	42.	134.	0.067	33.01	1.597
CS-137	1323.29	661.86	68.	278.	0.139	24.44	1.789s
BI-212	1456.09	728.26	57.	69.	0.034	72.07	1.241s
AC-228	1821.96	911.20	42.	151.	0.076	33.59	1.684s
AC-228	1936.63	968.53	84.	119.	0.059	56.62	2.137
BI-214	2241.86	1121.15	53.	64.	0.032	70.12	1.517
K-40	2922.43	1461.42	16.	1092.	0.546	9.27	2.416
BI-214	3529.92	1765.14	1.	28.	0.014	55.71	1.375s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.3442E-01					
			477.56	1.344E-01	&(	3.456E-01 1.04E-01	G
K-40		2.1129E+01					
			1460.75	2.113E+01	(P	4.111E-01 6.56E-01	G
MN-54		-1.2336E-03					
			834.81	-1.234E-03	%(P	4.623E-02 1.29E-02	G
CO-57		9.3388E-03					
			122.07	9.339E-03	%(P	4.741E-02 1.41E-02	G K
			136.43	-4.127E-02	% P	4.011E-01 1.19E-01	G
CO-60		8.2453E-03					
			1332.51	8.245E-03	%(P	5.483E-02 1.51E-02	G K
			1173.23	1.189E-02	% P	7.172E-02 2.05E-02	G K
Sr-85		-1.0404E-02					
			514.00	-1.040E-02	%(	5.116E-02 1.51E-02	G
Kr-85		-3.0527E+02					
			513.99	-3.053E+02	%(P	1.182E+03 3.44E+02	G
Y-88		-5.2246E-03					
			1836.01	-5.225E-03	%(P	3.471E-02 8.34E-03	G K
			898.02	1.596E-02	% P	4.847E-02 1.42E-02	G
NB-94		-2.9339E-03					
			871.10	-2.934E-03	%(P	4.066E-02 1.13E-02	G K
			702.50	7.972E-03	% P	2.661E-02 7.68E-03	G K
Ag-108M		-1.6646E-02					
			722.95	-1.665E-02	%(	5.701E-02 1.69E-02	G K
			614.37	-3.062E-02	%	5.563E-02 1.70E-02	G
			433.93	-8.066E-04	% P	4.491E-02 1.28E-02	G
CD-109		-7.3963E-02					
			88.04	-7.396E-02	%(P	1.559E+00 4.63E-01	G
SN-113		4.1427E-03					
			391.71	4.143E-03	&(P	6.399E-02 1.85E-02	G K
			255.04	-2.576E-02	&	1.535E+00 4.44E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.2739E-02						
		427.95	-2.957E-02	%(P	1.406E-01	4.10E-02	G K
		600.77	-4.857E-03	& P	2.424E-01	6.82E-02	G
		636.15	9.932E-02	& P	3.235E-01	9.50E-02	G
		463.51	2.964E-01	*(P	3.611E-01	1.13E-01	G
		176.29	1.525E-01	& P	4.839E-01	1.44E-01	G
I-131	1.4717E-02						
		364.48	1.472E-02	&(	4.494E-02	1.34E-02	G K
		636.97	0.000E+00	&	6.284E-01	1.77E-01	G
		284.29	-1.868E-01	%	6.535E-01	1.95E-01	G
CS-134	-1.7867E-03						
		604.66	-1.787E-03	%(P	8.143E-02	2.38E-02	G K
		795.76	3.119E-02	& P	4.540E-02	1.43E-02	G
		569.29	2.290E-02	&	2.263E-01	6.44E-02	G
		801.84	-8.390E-03	& P	4.846E-01	1.34E-01	G
CS-137	3.7723E-01						
		661.62	3.772E-01	*(P	5.578E-02	3.11E-02	G
CE-139	1.2069E-02						
		165.85	1.207E-02	%(P	4.791E-02	1.43E-02	G
EU-152	3.0056E-02						
		121.78	3.006E-02	%(P	1.412E-01	4.21E-02	G K
		344.30	-3.293E-02	& P	1.402E-01	4.13E-02	G
		1408.08	-1.075E-02	% P	2.397E-01	6.43E-02	G
		964.00	1.684E-01	% P	4.408E-01	1.32E-01	G
		1112.07	2.664E-02	% P	4.183E-01	1.18E-01	G
		778.90	-3.671E-02	% P	3.263E-01	9.20E-02	G
EU-154	-2.3269E-02						
		123.10	-2.327E-02	&(P	1.083E-01	3.23E-02	G K
		1274.80	-3.032E-03	% P	1.637E-01	4.52E-02	G
		723.30	-2.874E-02	% P	2.233E-01	6.36E-02	G
		1004.80	-5.207E-02	& P	3.293E-01	9.48E-02	G
EU-155	1.3653E-01						
		86.45	1.365E-01	(	1.772E-01	5.45E-02	G K
		105.31	1.710E-02	% P	1.956E-01	5.79E-02	G
HG-203	4.8569E-03						
		279.17	4.857E-03	%(P	3.902E-02	1.14E-02	G K
		72.87	-9.888E-01	% P	1.422E+00	4.34E-01	G
		70.83	5.721E-02	&	1.819E+00	5.38E-01	G
		82.50	-1.002E-02	%	2.747E+00	8.14E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.6679E-01						
		583.14	1.668E-01	(P	4.198E-02	1.83E-02	G
		510.72	9.994E-02	% P	2.340E-01	6.63E-02	G
PB-212	5.0321E-01						
		238.63	5.032E-01	*(P	1.125E-01	4.12E-02	G K
							Energy duplication
		77.11	7.703E-01	+	3.698E-01	1.21E-01	G
		74.81	6.596E-01	& P	7.700E-01	2.37E-01	G
PB-214	3.7174E-01						
		351.99	3.717E-01	(P	1.011E-01	3.91E-02	G K
		295.22	2.971E-01	- P	2.120E-01	6.86E-02	G
							Energy duplication
		77.11	1.234E+00	+ P	6.074E-01	1.97E-01	G
		241.92	1.509E-01	% P	7.585E-01	2.27E-01	G
BI-212	7.1844E-01						
		727.17	7.184E-01	*(P	3.971E-01	1.76E-01	G K
		1620.56	1.329E-01	% P	1.631E+00	4.37E-01	G
		785.42	-1.857E-02	% P	2.213E+00	6.13E-01	G
BI-214	3.1355E-01						
		609.32	3.135E-01	(P	7.677E-02	3.56E-02	G K
		1764.51	4.226E-01	+ P	1.108E-01	8.10E-02	G
		1120.28	7.193E-01	+ P	4.157E-01	1.71E-01	G
RA-224	-3.0613E-02						
		241.00	-3.061E-02	&(P	1.205E+00	3.53E-01	G
RA-226	1.0627E+00						
		185.99	1.063E+00	*(	1.244E+00	3.86E-01	G
AC-228	7.8689E-01						
		911.07	7.609E-01	*(P	1.656E-01	8.76E-02	G K
		968.90	1.041E+00	+ P	3.980E-01	2.00E-01	G
		338.40	8.497E-01	@(P	3.851E-01	1.71E-01	G
TH-227	-2.9365E-01						
		236.00	-2.937E-01	%(P	4.999E-01	1.52E-01	G K
		256.25	1.887E-01	% P	5.555E-01	1.66E-01	G
PA-234	2.3565E-03						
		98.44	2.357E-03	&(	1.744E-01	5.14E-02	G K
		946.00	0.000E+00	&	3.637E-01	1.04E-01	G
		131.28	0.000E+00	%	2.125E-01	6.27E-02	G
		94.67	-1.340E-02	%	3.418E-01	1.01E-01	G
		883.24	4.602E-02	&	3.244E-01	9.17E-02	G
		926.70	2.201E-02	&	3.945E-01	1.10E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 3.277E-02 &   3.361E-01 9.56E-02 G

TH-234       1.1603E+00
                           63.29 6.198E-01 %(P 2.318E+00 6.90E-01 G K
                           92.80 1.322E+00 @(P 1.782E+00 5.43E-01 G
                           92.38 1.792E+00 @(P 2.094E+00 6.44E-01 G

AM-241      -1.7629E-02
                           59.54-1.763E-02 &(P 3.113E-01 9.23E-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	1.3241E-01	1.3442E-01	3.1058E-01	3.1068E-01	3.404E-01
K-40		2.1129E+01	2.1129E+01	1.9674E+00	2.3298E+00	
MN-54	#A	-1.2304E-03	-1.2336E-03	1.0912E-01	1.0912E-01	4.611E-02
CO-57	#B	9.3110E-03	9.3388E-03	4.2389E-02	4.2392E-02	4.727E-02
CO-60	#B	8.2418E-03	8.2453E-03	4.5339E-02	4.5341E-02	5.481E-02

Sr-85	#A	-1.0276E-02	-1.0404E-02	4.5215E-02	4.5220E-02	5.053E-02
Kr-85	#A	-3.0527E+02	-3.0527E+02	1.5969E+03	1.5970E+03	1.182E+03
Y-88	#B	-5.1853E-03	-5.2246E-03	5.7021E-02	5.7022E-02	3.445E-02
NB-94	#B	-2.9339E-03	-2.9339E-03	3.8735E-02	3.8735E-02	4.066E-02
Ag-108M	#B	-1.6645E-02	-1.6646E-02	5.0604E-02	5.0613E-02	5.701E-02
CD-109	#A	-7.3832E-02	-7.3963E-02	1.5602E+00	1.5602E+00	1.556E+00
SN-113	#B	4.1139E-03	4.1427E-03	5.5507E-02	5.5508E-02	6.354E-02
SB-125	#B	5.2697E-02	5.2739E-02	6.0524E-02	6.0604E-02	1.405E-01
I-131	#B	1.3315E-02	1.4717E-02	4.0146E-02	4.0155E-02	4.066E-02
CS-134	#B	-1.7848E-03	-1.7867E-03	1.3927E-01	1.3927E-01	8.135E-02
CS-137	#	3.7720E-01	3.7723E-01	9.3369E-02	9.5990E-02	
CE-139	#A	1.1998E-02	1.2069E-02	4.2924E-02	4.2930E-02	4.763E-02
EU-152	#B	3.0050E-02	3.0056E-02	1.2644E-01	1.2645E-01	1.412E-01
EU-154	#B	-2.3263E-02	-2.3269E-02	1.0212E-01	1.0213E-01	1.083E-01
EU-155	#A	1.3647E-01	1.3653E-01	1.6344E-01	1.6361E-01	1.771E-01
HG-203	#B	4.7737E-03	4.8569E-03	3.4094E-02	3.4095E-02	3.835E-02
TL-208	#	1.6679E-01	1.6679E-01	5.4756E-02	5.5635E-02	4.198E-02
PB-212	#	5.0321E-01	5.0321E-01	1.2346E-01	1.2698E-01	1.125E-01
PB-214	#	3.7174E-01	3.7174E-01	1.1736E-01	1.1940E-01	1.011E-01
BI-212	#	7.1844E-01	7.1844E-01	5.2749E-01	5.2920E-01	
BI-214		3.1355E-01	3.1355E-01	1.0684E-01	1.0844E-01	
RA-224	#A	-3.0613E-02	-3.0613E-02	4.7305E+00	4.7305E+00	1.205E+00
RA-226	#A	1.0627E+00	1.0627E+00	1.1581E+00	1.1598E+00	1.244E+00
AC-228		7.8689E-01	7.8689E-01	2.7171E-01	2.7566E-01	
TH-227	#B	-2.9365E-01	-2.9365E-01	4.6121E-01	4.6153E-01	4.999E-01
PA-234	#B	2.3565E-03	2.3565E-03	1.5417E-01	1.5417E-01	1.744E-01
TH-234	#B	1.1603E+00	1.1603E+00	1.2519E+00	1.2535E+00	2.318E+00
AM-241	#A	-1.7629E-02	-1.7629E-02	3.4206E-01	3.4206E-01	3.113E-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 2000.1 keV) 2.3325226E+01 pCi/gm
Total Decayed Activity (86.7 to 2000.1 keV) 2.3325253E+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_27JUNE2006_1425.An1

Sample description
FSS-NOL-06-02-020-F

Spectrum Filename: C:\GammaVision\Spectra\107F_27JUNE2006_1425.An1

Acquisition information
Start time: 27-Jun-2006 14:26:46
Live time: 2000
Real time: 2002
Dead time: 0.11 %
Detector ID: 2

Detector system
Det 107- DSPE- 634

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

Energy Calibration
Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/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: 1.5990E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5990E+03) =
6.2539E+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-Jun-2006 08:20:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3072

***** 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	336.	12.92	1.18	2.849E-02	74.81	9.600	1.039E+00	PB212
77.10	265.	13.70	1.18	2.957E-02	77.11	17.500	7.081E-01	PB212
					77.11	10.700	1.145E+00	PB214
77.16	161.	30.41	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
87.17	186.	28.48	1.31	3.304E-02	86.45	32.740	1.464E-01	EU155
					88.04	3.790	1.253E+00	CD109
92.71	186.	27.25	1.09	3.437E-02				
92.71	186.	27.25	1.09	3.437E-02	92.80	3.000	PBC<MDA	TH234
186.02	204.	19.94	2.38	3.610E-02	185.99	3.280	1.452E+00	RA226
209.43	151.	19.98	1.85	3.427E-02				
238.79	1153.	3.93	1.30	3.187E-02	238.63	43.100	6.991E-01	PB212
241.75	200.	17.24	1.30	3.163E-02	241.00	3.900	1.349E+00	RA224
					241.92	7.470	7.088E-01	PB214
270.23	110.	29.81	1.38	2.945E-02				
277.37	72.	41.63	1.41	2.892E-02				
277.37	72.	41.63	1.41	2.892E-02	279.17	81.500	PBC<MDA	HG203
295.35	228.	11.20	1.34	2.768E-02	295.22	19.200	3.553E-01	PB214
301.01	72.	28.70	1.34	2.730E-02				
328.34	87.	33.27	1.47	2.558E-02				
338.53	257.	10.21	1.52	2.500E-02	338.40	12.010	7.137E-01	AC228
352.07	550.	6.73	1.67	2.425E-02	351.99	37.100	5.121E-01	PB214
402.47	49.	39.64	1.12	2.184E-02				
463.24	95.	28.55	1.58	1.954E-02				
463.24	95.	28.55	1.58	1.954E-02	463.51	10.000	3.993E-01	SB125
510.71	217.	12.28	2.46	1.808E-02	510.72	22.500	3.817E-01	TL208
583.52	464.	6.30	1.91	1.628E-02	583.14	86.000	2.772E-01	TL208

609.47	447.	7.17	2.02	1.574E-02	609.32	46.090	5.154E-01	BI214
662.23	100.	26.45	1.27	1.476E-02	661.62	84.620	6.524E-02	CS137
727.96	124.	16.57	2.16	1.373E-02	727.17	11.800	6.374E-01	BI212
794.90	72.	21.72	1.39	1.285E-02				
794.90	72.	21.72	1.39	1.285E-02	795.76	85.400	5.515E-02	CS134
911.58	358.	7.06	2.39	1.160E-02	911.07	29.000	8.881E-01	AC228
964.76	64.	20.12	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152
969.33	219.	8.45	1.80	1.109E-02	968.90	17.460	9.466E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1121.46	107.	19.89	1.25	9.970E-03	1120.28	15.040	6.009E-01	BI214
1461.29	1543.	2.62	2.32	8.189E-03	1460.75	10.700	1.483E+01	K40
1622.47	42.	25.90	0.77	7.569E-03	1620.56	2.750	1.693E+00	BI212
1765.47	65.	15.43	1.54	7.084E-03	1764.51	15.920	4.834E-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	
418.50	209.43	362.	151.	0.076	59.93	1.852	AC-228	s
540.09	270.23	373.	110.	0.055	89.44	1.380	AC-228	s
554.36	277.37	322.	72.	0.036	124.90	1.411	TL-208	l
601.28	300.83	272.	113.	0.056	76.03	1.318	PB-212	
656.30	328.34	275.	87.	0.043	99.81	1.467	RH-106M	
804.55	402.47	134.	49.	0.024	118.92	1.118	KR-87	s
1929.94	964.79	55.	59.	0.029	66.22	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	149.29	74.81	800.	336.	0.168	38.76	1.178D
PB-212	153.89	77.11	851.	265.	0.133	41.11	1.179A
PB-214	153.89	77.11	1297.	161.	0.081	91.24	1.500A
CD-109	174.24	87.29	1272.	157.	0.079	98.88	1.500s
TH-234	185.97	93.15	1296.	187.	0.093	76.24	1.500s
RA-226	371.93	186.14	680.	148.	0.074	78.52	1.500s
PB-212	476.89	238.63	398.	1133.	0.567	11.42	1.297D
PB-214	483.47	241.92	507.	185.	0.092	55.72	1.299D
PB-214	589.96	295.17	242.	298.	0.149	29.63	2.126s
AC-228	676.68	338.53	190.	254.	0.127	30.63	1.518s
PB-214	703.75	352.07	270.	545.	0.273	20.18	1.668s
SB-125	926.43	463.42	155.	60.	0.030	91.42	1.500s
TL-208	1021.02	510.71	193.	184.	0.092	36.83	2.456s
TL-208	1166.61	583.52	135.	459.	0.230	18.89	1.909s
BI-214	1218.51	609.47	166.	442.	0.221	21.52	2.019s
CS-137	1324.03	662.23	166.	96.	0.048	79.34	1.273
BI-212	1455.48	727.96	94.	122.	0.061	49.70	2.163s
CS-134	1589.61	795.02	65.	48.	0.024	82.14	1.684s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1822.72	911.58	84.	354.	0.177	21.17	2.393s
AC-228	1937.36	968.90	68.	217.	0.108	25.66	1.799D
BI-214	2242.48	1121.46	95.	107.	0.053	59.67	1.246s
K-40	2922.17	1461.29	26.	1538.	0.769	7.87	2.316
BI-212	3244.56	1622.47	14.	42.	0.021	77.71	0.770s
BI-214	3530.59	1765.47	8.	65.	0.032	46.30	1.536s

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		9.7107E-02					
			477.56	9.711E-02	%(	2.258E-01 6.81E-02	G
K-40		1.4833E+01					
			1460.75	1.483E+01	(P	2.541E-01 3.90E-01	G
MN-54		5.6251E-03					
			834.81	5.625E-03	%(P	3.035E-02 8.85E-03	G
CO-57		-4.9014E-04					
			122.07	-4.901E-04	%(P	3.537E-02 1.05E-02	G K
			136.43	2.295E-02	% P	3.092E-01 9.24E-02	G
CO-60		2.0502E-02					
			1332.51	2.050E-02	%(P	3.617E-02 1.10E-02	G K
			1173.23	1.842E-02	% P	4.697E-02 1.40E-02	G K
Sr-85		-2.1945E-02					
			514.00	-2.194E-02	%(	4.249E-02 1.29E-02	G
Kr-85		-5.1676E+02					
			513.99	-5.168E+02	%(P	9.416E+02 2.85E+02	G
Y-88		2.3530E-03					
			1836.01	2.353E-03	%(P	2.227E-02 5.86E-03	G K
			898.02	-9.561E-03	% P	3.641E-02 1.06E-02	G
NB-94		-4.4840E-03					
			871.10	-4.484E-03	%(P	2.586E-02 7.47E-03	G K
			702.50	-9.036E-03	% P	3.489E-02 1.03E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	7.8512E-04						
		722.95	7.851E-04	&(	5.991E-02	1.76E-02	G K
		614.37	-2.356E-02	&	4.388E-02	1.34E-02	G
		433.93	3.959E-03	& P	2.473E-02	7.23E-03	G
CD-109	1.0618E+00						
		88.04	1.062E+00	(P	1.140E+00	3.51E-01	G
SN-113	8.3325E-03						
		391.71	8.333E-03	%(P	3.842E-02	1.14E-02	G K
		255.04	3.339E-01	%	1.358E+00	4.07E-01	G
SB-125	4.9350E-02						
		427.95	-2.194E-02	%(P	9.368E-02	2.77E-02	G K
		600.77	3.861E-02	% P	1.484E-01	4.38E-02	G
		636.15	4.380E-02	% P	2.286E-01	6.68E-02	G
		463.51	2.604E-01	*(P	2.632E-01	8.31E-02	G
		176.29	-3.098E-02	% P	4.809E-01	1.43E-01	G
I-131	-2.9336E-03						
		364.48	-2.934E-03	&(	4.618E-02	1.36E-02	G K
		636.97	1.036E-01	%	5.183E-01	1.52E-01	G
		284.29	1.295E-01	%	5.649E-01	1.68E-01	G
CS-134	1.8241E-02						
		604.66	1.529E-03	%(P	7.432E-02	2.21E-02	G K
		795.76	3.734E-02	@(P	3.124E-02	1.03E-02	G
		569.29	3.238E-02	%	1.616E-01	4.75E-02	G
		801.84	-7.829E-02	% P	3.580E-01	1.05E-01	G
CS-137	6.5242E-02						
		661.62	6.524E-02	(P	4.238E-02	1.79E-02	G
CE-139	-8.4224E-03						
		165.85	-8.422E-03	%(P	3.812E-02	1.14E-02	G
EU-152	-7.1446E-03						
		121.78	-7.145E-03	%(P	7.991E-02	2.37E-02	G K
		344.30	-1.239E-02	% P	8.449E-02	2.48E-02	G
		1408.08	-3.357E-03	% P	1.340E-01	3.63E-02	G
		964.00	-4.605E-03	% P	3.635E-01	1.06E-01	G
		1112.07	4.425E-02	% P	2.625E-01	7.62E-02	G
		778.90	-6.781E-02	% P	2.484E-01	7.34E-02	G
EU-154	-5.3415E-03						
		123.10	-5.341E-03	%(P	7.840E-02	2.34E-02	G K
		1274.80	-2.177E-02	% P	1.121E-01	3.26E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	5.846E-03	% P	2.760E-01	8.13E-02	G
		1004.80	3.851E-02	& P	1.863E-01	5.44E-02	G
EU-155	1.0092E-01						
		86.45	1.009E-01	%(	1.400E-01	4.28E-02	G K
		105.31	2.080E-02	% P	1.614E-01	4.83E-02	G
HG-203	1.8856E-02						
		279.17	1.886E-02	&(P	3.208E-02	9.79E-03	G K
		72.87	-3.403E-01	% P	1.080E+00	3.26E-01	G
		70.83	-8.550E-01	&	1.832E+00	5.55E-01	G
		82.50	-8.011E-01	%	2.310E+00	6.98E-01	G
TL-208	2.7717E-01						
		583.14	2.772E-01	*(P	3.424E-02	1.76E-02	G
		510.72	3.817E-01	+ P	1.402E-01	5.54E-02	G
PB-212	7.0007E-01						
		238.63	6.968E-01	(P	5.879E-02	2.69E-02	G K
							Energy duplication
		77.11	4.331E-01	}	2.265E-01	5.93E-02	G
		74.81	1.039E+00	+ P	4.155E-01	1.36E-01	G
PB-214	4.9931E-01						
		351.99	5.121E-01	*(P	7.441E-02	3.48E-02	G K
		295.22	4.747E-01	*(P	1.195E-01	4.76E-02	G
							Energy duplication
		77.11	4.310E-01	} P	4.555E-01	1.31E-01	G
		241.92	6.613E-01	+ P	3.850E-01	1.24E-01	G
BI-212	6.3743E-01						
		727.17	6.374E-01	*(P	2.492E-01	1.07E-01	G K
		1620.56	1.693E+00	+ P	8.256E-01	4.44E-01	G
		785.42	3.211E-01	% P	1.651E+00	4.84E-01	G
BI-214	5.2547E-01						
		609.32	5.154E-01	*(P	7.299E-02	3.73E-02	G K
		1764.51	4.834E-01	@(P	1.221E-01	7.57E-02	G
		1120.28	6.009E-01	*(P	2.718E-01	1.21E-01	G
RA-224	5.6678E-01						
		241.00	5.668E-01	&(P	1.032E+00	3.14E-01	G
RA-226	1.0587E+00						
		185.99	1.059E+00	*(	8.864E-01	2.77E-01	G
AC-228	9.0990E-01						
		911.07	8.881E-01	(P	1.142E-01	6.34E-02	G K
		968.90	9.460E-01	(P	1.798E-01	8.17E-02	G
		338.40	7.137E-01	- P	1.886E-01	7.38E-02	G

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

TH-227       1.8591E-03
                          236.00 1.859E-03 %(P 4.031E-01 1.20E-01 G K
                          256.25 4.423E-02 % P 3.901E-01 1.16E-01 G

PA-234       2.2231E-03
                           98.44 2.223E-03 %(  1.349E-01 4.02E-02 G K
                          946.00-3.022E-04 %   1.750E-01 5.00E-02 G
                          131.28 1.247E-02 &   1.708E-01 5.11E-02 G
                           94.67-1.193E-01 %   2.674E-01 8.10E-02 G
                          883.24 4.282E-03 &   2.602E-01 7.43E-02 G
                          926.70 2.502E-02 &   2.957E-01 8.52E-02 G
                          569.26 5.018E-02 %   2.378E-01 6.99E-02 G

TH-234       7.4248E-01
                           63.29 1.354E-01 &(P 1.785E+00 5.33E-01 G K
                           92.80 1.532E+00  (P 1.396E+00 4.30E-01 G
                           92.38-3.558E-01 % P 1.549E+00 4.64E-01 G

AM-241       3.9337E-02
                           59.54 3.934E-02 %(P 2.253E-01 6.76E-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	9.1890E-02	9.7107E-02	2.0432E-01	2.0440E-01	2.137E-01
K-40		1.4833E+01	1.4833E+01	1.1706E+00	1.4621E+00	
MN-54	#A	5.5722E-03	5.6251E-03	2.6562E-02	2.6565E-02	3.007E-02
CO-57	#B	-4.8481E-04	-4.9014E-04	4.2530E-02	4.2530E-02	3.498E-02
CO-60	#B	2.0471E-02	2.0502E-02	3.2858E-02	3.2880E-02	3.611E-02
Sr-85	#A	-2.0969E-02	-2.1945E-02	3.8748E-02	3.8770E-02	4.060E-02
Kr-85	#A	-5.1674E+02	-5.1676E+02	9.7021E+02	9.7069E+02	9.416E+02
Y-88	#B	2.2888E-03	2.3530E-03	1.7566E-02	1.7566E-02	2.166E-02
NB-94	#B	-4.4840E-03	-4.4840E-03	2.3387E-02	2.3388E-02	2.586E-02
Ag-108M	#B	7.8507E-04	7.8512E-04	5.2924E-02	5.2924E-02	5.991E-02
CD-109	#A	1.0549E+00	1.0618E+00	1.0520E+00	1.0536E+00	1.132E+00
SN-113	#B	8.1217E-03	8.3325E-03	3.4071E-02	3.4075E-02	3.745E-02
SB-125	#B	4.9206E-02	4.9350E-02	4.7230E-02	4.7320E-02	9.341E-02
I-131	#B	-2.0328E-03	-2.9336E-03	4.0684E-02	4.0684E-02	3.200E-02
CS-134	#B	1.8169E-02	1.8241E-02	1.5147E-02	1.5185E-02	7.403E-02
CS-137		6.5225E-02	6.5242E-02	5.3658E-02	5.3796E-02	
CE-139	#A	-8.2437E-03	-8.4224E-03	3.5114E-02	3.5117E-02	3.731E-02
EU-152	#B	-7.1401E-03	-7.1446E-03	7.3332E-02	7.3333E-02	7.986E-02
EU-154	#B	-5.3364E-03	-5.3415E-03	7.8458E-02	7.8458E-02	7.832E-02
EU-155	#B	1.0076E-01	1.0092E-01	1.2836E-01	1.2848E-01	1.398E-01
HG-203	#B	1.7699E-02	1.8856E-02	2.9364E-02	2.9385E-02	3.012E-02
TL-208	#	2.7717E-01	2.7717E-01	5.2887E-02	5.5363E-02	
PB-212		7.0007E-01	7.0007E-01	8.1042E-02	9.0980E-02	
PB-214		4.9931E-01	4.9931E-01	9.0691E-02	9.5365E-02	
BI-212	#	6.3743E-01	6.3743E-01	3.2014E-01	3.2234E-01	
BI-214	#	5.2547E-01	5.2547E-01	1.1418E-01	1.1832E-01	
RA-224	#A	5.6678E-01	5.6678E-01	9.4065E-01	9.4124E-01	1.032E+00
RA-226	#	1.0587E+00	1.0587E+00	8.3134E-01	8.3368E-01	8.864E-01
AC-228		9.0990E-01	9.0990E-01	1.5299E-01	1.6215E-01	
TH-227	#B	1.8591E-03	1.8591E-03	3.6124E-01	3.6124E-01	4.031E-01
PA-234	#B	2.2231E-03	2.2231E-03	1.2059E-01	1.2059E-01	1.349E-01
TH-234	#B	7.4248E-01	7.4248E-01	6.2579E-01	6.2714E-01	1.785E+00
AM-241	#A	3.9337E-02	3.9337E-02	2.0275E-01	2.0276E-01	2.253E-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) 1.8447762E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.8447779E+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_29NOV2005_1521.An1

Sample description
NOL-06-03-005-F-S

Spectrum Filename: C:\GammaVision\Spectra\107_29NOV2005_1521.An1

Acquisition information
Start time: 29-Nov-2005 15:21:53
Live time: 2000
Real time: 2005
Dead time: 0.23 %
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: 2.3140E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.3140E+03) =
4.3215E+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	29-Nov-2005 00:59:00
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: 0.2175

***** 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
74.36	315.	15.72	1.18	2.842E-02				
74.36	315.	15.72	1.18	2.842E-02	74.81	9.600	6.647E-01	PB212
77.34	531.	9.54	1.18	2.980E-02	77.11	17.500	5.997E-01	PB212
					77.11	10.700	9.720E-01	PB214
185.50	174.	32.03	1.37	3.614E-02				
185.50	174.	32.03	1.37	3.614E-02	185.99	3.280	8.581E-01	RA226
209.45	162.	30.96	1.58	3.427E-02				
238.65	1319.	3.94	1.30	3.190E-02				
238.65	1319.	3.94	1.30	3.190E-02	238.63	43.100	5.537E-01	PB212
238.67	920.	6.47	1.50	3.163E-02				
238.67	920.	6.47	1.50	3.163E-02	238.63	43.100	PBC<MDA	PB212
241.77	237.	16.53	1.30	3.165E-02	241.00	3.900	1.110E+00	RA224
295.18	327.	10.07	1.34	2.768E-02				
295.18	327.	10.07	1.34	2.768E-02	295.22	19.200	3.546E-01	PB214
300.75	74.	38.74	1.34	2.731E-02				
338.24	278.	13.97	1.60	2.501E-02	338.40	12.010	5.344E-01	AC228
351.75	614.	8.72	1.50	2.427E-02				
351.75	614.	8.72	1.50	2.427E-02	351.99	37.100	3.950E-01	PB214
463.23	104.	30.03	1.92	1.954E-02				
463.23	104.	30.03	1.92	1.954E-02	463.51	10.000	3.036E-01	SB125
509.98	286.	14.13	2.39	1.810E-02	510.72	22.500	3.622E-01	TL208
583.11	537.	8.58	1.64	1.629E-02	583.14	86.000	2.219E-01	TL208
609.23	458.	6.76	1.75	1.574E-02	609.32	46.090	3.655E-01	BI214
661.59	628.	6.96	2.10	1.477E-02	661.62	84.620	2.920E-01	CS137
727.48	108.	27.25	2.01	1.374E-02	727.17	11.800	3.850E-01	BI212
794.74	96.	26.51	1.41	1.285E-02				
794.74	96.	26.51	1.41	1.285E-02	795.76	85.400	5.077E-02	CS134

835.03	114.	32.48	1.05	1.238E-02				
911.00	361.	9.06	2.48	1.161E-02	911.07	29.000	6.193E-01	AC228
943.42	90.	30.46	1.05	1.131E-02				
964.18	71.	30.16	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152
968.66	205.	12.21	1.80	1.109E-02	968.90	17.460	6.099E-01	AC228
1119.82	100.	21.74	1.17	9.973E-03	1120.28	15.040	3.852E-01	BI214
1172.72	2641.	2.26	2.10	9.640E-03	1173.23	99.860	1.600E+00	CO60
1273.37	40.	39.16	0.99	9.073E-03				
1331.93	2343.	2.21	2.18	8.776E-03	1332.51	99.980	1.558E+00	CO60
1460.25	1570.	2.72	2.31	8.193E-03	1460.75	10.700	1.043E+01	K40
1618.96	32.	31.05	1.77	7.569E-03	1620.56	2.750	9.118E-01	BI212
1763.93	91.	13.31	1.76	7.085E-03	1764.51	15.920	4.645E-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	
148.39	74.67	1072.	313.	0.157	47.50	1.177	BI-207	D
154.34	77.64	1024.	528.	0.264	28.81	1.180	PB-214	D
418.54	209.45	986.	162.	0.081	92.88	1.578	AC-228	s
476.94	238.60	690.	1319.	0.660	11.81	1.297	PB-212	D
483.17	241.71	650.	237.	0.119	49.59	1.299	PB-214	D
601.07	300.73	635.	105.	0.052	106.16	1.570	PB-212	s
1669.63	835.03	377.	100.	0.050	87.73	1.047	KR-88	s
1927.53	964.20	196.	67.	0.033	96.08	1.796	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	149.34	74.83	2654.	285.	0.142	77.65	1.500
PB-212	153.89	77.11	2264.	505.	0.252	42.16	1.500D
PB-214	153.89	77.11	2269.	500.	0.250	42.16	1.500D
RA-226	371.37	185.86	1347.	155.	0.078	103.31	1.500s
TH-227	470.72	235.54	1812.	-186.	-0.093	99.87	1.500s
PB-212	476.98	238.67	1362.	1273.	0.637	14.69	1.500s
PB-214	476.98	238.67	1319.	920.	0.460	19.42	1.500s
PB-214	590.08	295.23	774.	325.	0.162	39.39	1.500
AC-228	676.10	338.24	495.	275.	0.137	41.91	1.599s
PB-214	703.30	351.84	552.	543.	0.272	22.17	1.500s
SB-125	925.58	462.99	317.	81.	0.041	95.18	1.500s
TL-208	1019.55	509.98	430.	252.	0.126	42.38	2.393s
TL-208	1165.79	583.11	422.	532.	0.266	25.75	1.639s
CS-134	1212.78	606.60	505.	-91.	-0.046	109.56	1.555s
BI-214	1218.04	609.23	213.	454.	0.227	20.27	1.745
Ag-108M	1223.10	611.76	349.	-73.	-0.037	113.80	1.561s
CS-137	1322.76	661.59	371.	625.	0.312	20.89	2.103s
BI-212	1454.53	727.48	273.	107.	0.053	81.75	2.014s
CS-134	1589.25	794.84	250.	73.	0.036	98.02	1.684s
AC-228	1821.56	911.00	258.	357.	0.178	27.19	2.476s
AC-228	1937.36	968.90	212.	202.	0.101	36.67	1.799D
BI-214	2239.20	1119.82	162.	99.	0.049	65.21	1.169s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2345.01	1172.72	253.	2636.	1.318	6.78	2.099
CO-60	2663.43	1331.93	93.	2340.	1.170	6.63	2.177
K-40	2920.10	1460.25	54.	1565.	0.783	8.15	2.307
BI-212	3237.54	1618.96	19.	32.	0.016	93.15	1.772s
BI-214	3527.62	1763.99	18.	57.	0.028	49.75	2.291

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		-6.8146E-02					
			477.56	-6.815E-02	&(	2.780E-01 8.31E-02	G
K-40		1.0428E+01					
			1460.75	1.043E+01	(P	2.461E-01 2.84E-01	G
MN-54		6.6745E-03					
			834.81	6.674E-03	%(P	3.613E-02 1.07E-02	G
CO-57		1.4403E-03					
			122.07	1.440E-03	&(P	3.448E-02 1.03E-02	G K
			136.43	6.330E-02	% P	2.898E-01 8.73E-02	G
CO-60		1.5791E+00					
			1332.51	1.558E+00	(P	3.179E-02 3.45E-02	G K
			1173.23	1.600E+00	(P	4.659E-02 3.62E-02	G K
Sr-85		-1.8747E-02					
			514.00	-1.875E-02	%(	3.584E-02 1.09E-02	G
Kr-85		-4.5286E+02					
			513.99	-4.529E+02	%(P	8.243E+02 2.50E+02	G
Y-88		2.7696E-04					
			1836.01	2.770E-04	%(P	2.184E-02 5.89E-03	G K
			898.02	3.847E-03	& P	4.064E-02 1.20E-02	G
NB-94		2.7370E-03					
			871.10	2.737E-03	&(P	4.144E-02 1.22E-02	G K
			702.50	-6.637E-03	& P	3.746E-02 1.11E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-2.0535E-02						
		722.95	-2.054E-02	&(	4.474E-02	1.36E-02	G K
		614.37	-3.025E-02	+	3.709E-02	1.15E-02	G
		433.93	-1.014E-02	% P	3.072E-02	9.21E-03	G
CD-109	4.5482E-01						
		88.04	4.548E-01	&(P	9.884E-01	3.00E-01	G
SN-113	-5.5408E-03						
		391.71	-5.541E-03	&(P	4.297E-02	1.28E-02	G K
		255.04	-9.851E-03	&	1.302E+00	3.88E-01	G
SB-125	5.7589E-02						
		427.95	-5.163E-03	&(P	9.226E-02	2.72E-02	G K
		600.77	5.949E-03	% P	1.571E-01	4.61E-02	G
		636.15	-3.010E-02	& P	2.882E-01	8.51E-02	G
		463.51	2.433E-01	(P	2.564E-01	7.99E-02	G
		176.29	-1.559E-02	% P	4.637E-01	1.39E-01	G
I-131	6.3750E-03						
		364.48	6.375E-03	&(	3.200E-02	9.56E-03	G K
		636.97	-5.187E-02	&	4.427E-01	1.31E-01	G
		284.29	-1.449E-01	%	5.049E-01	1.52E-01	G
CS-134	-3.4532E-02						
		604.66	-3.453E-02	?(P	4.062E-02	1.25E-02	G K
		795.76	3.876E-02	+ P	4.074E-02	1.28E-02	G
		569.29	3.095E-02	%	1.899E-01	5.64E-02	G
		801.84	3.027E-02	% P	4.446E-01	1.31E-01	G
CS-137	2.9201E-01						
		661.62	2.920E-01	@(P	4.321E-02	2.04E-02	G
CE-139	8.8942E-03						
		165.85	8.894E-03	%(P	3.532E-02	1.06E-02	G
EU-152	4.0565E-03						
		121.78	4.057E-03	&(P	1.071E-01	3.21E-02	G K
		344.30	-8.517E-03	% P	1.034E-01	3.08E-02	G
		1408.08	-2.318E-03	% P	1.012E-01	2.78E-02	G
		964.00	1.258E-02	& P	4.144E-01	1.23E-01	G
		1112.07	2.765E-02	% P	3.353E-01	9.88E-02	G
		778.90	-1.035E-01	% P	2.890E-01	8.68E-02	G
EU-154	-6.3385E-03						
		123.10	-6.338E-03	%(P	7.760E-02	2.33E-02	G K
		1274.80	-3.177E-03	% P	1.259E-01	3.68E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-8.210E-02 & P 2.082E-01 6.28E-02 G
                         1004.80-3.996E-03 & P 2.153E-01 6.28E-02 G

EU-155       6.0886E-02
                           86.45 6.089E-02 %(  1.208E-01 3.67E-02 G K
                          105.31 2.944E-02 % P 1.508E-01 4.54E-02 G

HG-203      -4.3972E-03
                          279.17-4.397E-03 &(P 3.539E-02 1.06E-02 G K
                           72.87-5.090E-01 % P 8.656E-01 2.63E-01 G
                           70.83 4.687E-01 &   1.394E+00 4.21E-01 G
                           82.50 0.000E+00 %   1.916E+00 5.75E-01 G

TL-208       2.2188E-01
                          583.14 2.219E-01 *(P 4.102E-02 1.92E-02 G
                          510.72 3.622E-01 + P 1.425E-01 5.80E-02 G

PB-212       5.5724E-01
                          238.63 5.408E-01 *(P 7.420E-02 2.68E-02 G K
                                                          Energy duplication
                           77.11 5.696E-01 *(  2.533E-01 8.01E-02 G
                           74.81 6.084E-01 &(P 5.183E-01 1.60E-01 G

PB-214       3.5406E-01
                          351.99 3.526E-01 @(P 7.281E-02 2.63E-02 G K
                          295.22 3.569E-01  (P 1.455E-01 4.75E-02 G
                                                          Energy duplication
                           77.11 9.228E-01 + P 4.146E-01 1.31E-01 G
                          241.92 2.274E+00 + P 4.251E-01 1.47E-01 G

BI-212       3.8502E-01
                          727.17 3.850E-01 *(P 2.871E-01 1.06E-01 G K
                         1620.56 9.118E-01 + P 6.384E-01 2.87E-01 G
                          785.42 3.492E-01 % P 1.905E+00 5.66E-01 G

BI-214       3.7034E-01
                          609.32 3.655E-01  (P 5.691E-02 2.49E-02 G K
                         1764.51 2.930E-01 - P 1.152E-01 4.94E-02 G
                         1120.28 3.852E-01  (P 2.416E-01 8.45E-02 G

RA-224       1.9621E-02
                          241.00 1.962E-02 &(P 8.630E-01 2.58E-01 G

RA-226       7.6448E-01
                          185.99 7.645E-01  (  8.569E-01 2.63E-01 G

AC-228       5.9888E-01
                          911.07 6.193E-01 *(P 1.346E-01 5.68E-02 G K
                          968.90 6.094E-01  (P 2.127E-01 7.53E-02 G
                          338.40 5.344E-01 *(P 2.069E-01 7.55E-02 G
```

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

TH-227      -3.0157E-01
                          236.00-3.016E-01 ?(P 3.266E-01 1.00E-01 G K
                          256.25-3.235E-03 % P 4.193E-01 1.25E-01 G

PA-234       1.8656E-02
                           98.44 1.866E-02 %(  1.059E-01 3.18E-02 G K
                          946.00-6.971E-02 %   2.531E-01 7.59E-02 G
                          131.28 1.919E-02 &   1.566E-01 4.70E-02 G
                           94.67-2.307E-03 %   2.414E-01 7.24E-02 G
                          883.24 7.090E-02 %   3.320E-01 9.89E-02 G
                          926.70-2.489E-02 %   4.436E-01 1.31E-01 G
                          569.26 4.556E-02 %   2.816E-01 8.36E-02 G

TH-234       2.4153E-01
                           63.29 2.415E-01 %(P 1.516E+00 4.55E-01 G K
                           92.80 7.317E-01 % P 1.238E+00 3.76E-01 G
                           92.38 9.513E-01 % P 1.455E+00 4.43E-01 G

AM-241      -9.9794E-03
                           59.54-9.979E-03 %(P 1.954E-01 5.85E-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

- -

***** 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	-6.7618E-02	-6.8146E-02	2.4944E-01	2.4947E-01	2.759E-01
K-40		1.0428E+01	1.0428E+01	8.5296E-01	1.0521E+00	
MN-54	#A	6.6656E-03	6.6745E-03	3.2162E-02	3.2165E-02	3.609E-02
CO-57	#B	1.4381E-03	1.4403E-03	3.0981E-02	3.0981E-02	3.442E-02
CO-60		1.5788E+00	1.5791E+00	7.4995E-02	1.1968E-01	
Sr-85	#A	-1.8627E-02	-1.8747E-02	3.2675E-02	3.2694E-02	3.561E-02
Kr-85	#A	-4.5286E+02	-4.5286E+02	8.2824E+02	8.2867E+02	8.243E+02
Y-88	#B	2.7588E-04	2.7696E-04	1.7674E-02	1.7674E-02	2.176E-02
NB-94	#B	2.7370E-03	2.7370E-03	3.6684E-02	3.6684E-02	4.144E-02
Ag-108M	#B	-2.0535E-02	-2.0535E-02	4.0660E-02	4.0678E-02	4.474E-02
CD-109	#A	4.5441E-01	4.5482E-01	8.9899E-01	8.9934E-01	9.875E-01
SN-113	#B	-5.5208E-03	-5.5408E-03	5.0109E-02	5.0110E-02	4.281E-02
SB-125	#B	5.7566E-02	5.7589E-02	5.6712E-02	5.6814E-02	9.222E-02
I-131	#B	6.0540E-03	6.3750E-03	2.8666E-02	2.8669E-02	3.039E-02
CS-134	#A	-3.4513E-02	-3.4532E-02	3.8051E-02	3.8105E-02	4.060E-02
CS-137	#	2.9199E-01	2.9201E-01	6.1335E-02	6.3714E-02	
CE-139	#A	8.8674E-03	8.8942E-03	3.1922E-02	3.1926E-02	3.522E-02
EU-152	#B	4.0562E-03	4.0565E-03	9.6303E-02	9.6303E-02	1.071E-01
EU-154	#B	-6.3376E-03	-6.3385E-03	7.4532E-02	7.4533E-02	7.759E-02
EU-155	#B	6.0872E-02	6.0886E-02	1.1002E-01	1.1007E-01	1.208E-01
HG-203	#B	-4.3581E-03	-4.3972E-03	3.6786E-02	3.6787E-02	3.507E-02
TL-208	#	2.2188E-01	2.2188E-01	5.7610E-02	5.9081E-02	
PB-212	#	5.5724E-01	5.5724E-01	8.2849E-02	8.9147E-02	7.420E-02
PB-214	#	3.5406E-01	3.5406E-01	7.9223E-02	8.1936E-02	7.281E-02
BI-212	#	3.8502E-01	3.8502E-01	3.1852E-01	3.1933E-01	
BI-214		3.7034E-01	3.7034E-01	7.5774E-02	7.8867E-02	
RA-224	#A	1.9621E-02	1.9621E-02	7.7429E-01	7.7429E-01	8.630E-01
RA-226	#A	7.6448E-01	7.6448E-01	7.8978E-01	7.9107E-01	8.569E-01
AC-228		5.9888E-01	5.9888E-01	1.2513E-01	1.3003E-01	
TH-227	#A	-3.0157E-01	-3.0157E-01	3.0161E-01	3.0213E-01	3.266E-01
PA-234	#B	1.8656E-02	1.8656E-02	9.5368E-02	9.5373E-02	1.059E-01
TH-234	#B	2.4153E-01	2.4153E-01	1.3648E+00	1.3649E+00	1.516E+00
AM-241	#A	-9.9794E-03	-9.9794E-03	1.9973E-01	1.9973E-01	1.954E-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 (1120.2 to 2000.1 keV) 1.3875336E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.3875687E+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_29NOV2005_1442.An1

Sample description
NOL-06-03-013-F-S

Spectrum Filename: C:\GammaVision\Spectra\101_29NOV2005_1442.An1

Acquisition information
Start time: 29-Nov-2005 14:42:41
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: 2.2580E+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	29-Nov-2005 01:20:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0840

***** 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	255.	22.55	1.50	1.654E-02				
74.83	255.	22.55	1.50	1.654E-02	74.81	9.600	9.623E-01	PB212
77.07	407.	13.84	1.50	1.720E-02	77.11	10.700	1.323E+00	PB214
					77.11	17.500	8.089E-01	PB212
77.07	411.	13.84	1.50	1.720E-02	77.11	10.700	1.323E+00	PB214
					77.11	17.500	8.163E-01	PB212
90.19	126.	28.59	1.02	1.960E-02				
93.33	180.	19.17	1.02	1.995E-02	92.38	2.570	1.985E+00	TH234
					92.80	3.000	1.744E+00	TH234
186.33	142.	25.40	1.37	1.856E-02	185.99	3.280	1.393E+00	RA226
209.52	78.	35.21	0.90	1.720E-02				
238.78	1070.	3.63	1.12	1.557E-02	238.63	43.100	9.485E-01	PB212
241.56	155.	17.59	1.12	1.542E-02	241.00	3.900	1.532E+00	RA224
					241.92	7.470	8.024E-01	PB214
270.53	97.	27.39	1.90	1.399E-02				
277.53	69.	38.24	1.10	1.367E-02				
295.43	185.	11.09	1.16	1.291E-02	295.22	19.200	4.412E-01	PB214
300.28	76.	24.19	1.16	1.272E-02				
328.24	83.	33.80	1.37	1.169E-02				
338.43	203.	12.35	1.07	1.135E-02	338.40	12.010	8.799E-01	AC228
352.00	346.	8.46	1.25	1.092E-02	351.99	37.100	5.083E-01	PB214
463.13	46.	39.84	1.32	8.348E-03				
463.13	46.	39.84	1.32	8.348E-03	463.51	10.000	PBC<MDA	SB125
511.15	183.	13.56	2.51	7.584E-03	510.72	22.500	5.848E-01	TL208
					513.99	0.004	3.353E+03	Kr85
					514.00	99.270	1.470E-01	Sr85
583.30	357.	7.81	1.16	6.683E-03	583.14	86.000	3.692E-01	TL208

609.48	244.	9.51	1.30	6.411E-03	609.32	46.090	4.918E-01	BI214
727.30	80.	20.17	1.16	5.442E-03	727.17	11.800	7.410E-01	BI212
794.51	61.	28.36	1.87	5.023E-03				
794.51	61.	28.36	1.87	5.023E-03	795.76	85.400	8.510E-02	CS134
911.28	190.	11.49	1.80	4.446E-03	911.07	29.000	8.755E-01	AC228
968.69	143.	13.80	1.95	4.213E-03	968.90	17.460	1.158E+00	AC228
1119.73	82.	18.81	1.58	3.712E-03	1120.28	15.040	8.752E-01	BI214
1173.32	133.	18.67	1.95	3.564E-03	1173.23	99.860	2.241E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.78	101.	14.49	1.99	3.190E-03	1332.51	99.980	1.894E-01	CO60
1460.87	681.	4.02	1.84	2.942E-03	1460.75	10.700	1.289E+01	K40
1764.45	35.	18.43	0.79	2.481E-03	1764.51	15.920	5.342E-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	
179.95	90.20	582.	126.	0.063	85.77	1.016	PB-214	lD
418.72	209.52	326.	78.	0.039	105.64	0.901	AC-228	
477.25	238.79	218.	1070.	0.535	10.88	1.122	PB-212	D
482.82	241.57	294.	155.	0.077	52.78	1.124	PB-214	D
540.79	270.53	255.	97.	0.049	82.17	1.896	AC-228	s
554.79	277.53	262.	72.	0.036	101.77	1.100	NP-239	
600.37	300.31	258.	67.	0.034	119.48	0.984	PB-212	
656.26	328.24	260.	83.	0.041	101.40	1.365	AC-228	
926.16	463.13	114.	46.	0.023	119.53	1.318	AC-228	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	149.22	74.83	1601.	255.	0.128	67.64	1.499
PB-214	153.79	77.11	1414.	407.	0.203	41.53	1.499D
PB-212	153.79	77.11	1410.	411.	0.205	41.53	1.499D
TH-234	186.03	93.23	1250.	195.	0.097	75.69	1.499s
TH-234	186.02	93.22	1286.	204.	0.102	75.25	1.499s
RA-226	372.31	186.33	503.	142.	0.071	76.20	1.369s
PB-212	477.27	238.79	578.	831.	0.415	15.95	1.499
RA-224	482.65	241.47	726.	119.	0.059	99.64	1.499s
PB-214	590.54	295.40	286.	179.	0.089	45.50	1.499
AC-228	676.64	338.43	179.	200.	0.100	37.05	1.074
PB-214	703.78	351.99	201.	317.	0.158	25.19	1.499D
TL-208	1022.12	511.09	148.	158.	0.079	42.11	2.507s
TL-208	1166.62	583.30	122.	355.	0.177	23.42	1.161
BI-214	1219.00	609.48	99.	243.	0.121	28.52	1.301
BI-212	1454.76	727.30	65.	80.	0.040	60.51	1.160
CS-134	1590.62	795.20	61.	37.	0.019	99.58	1.502s
AC-228	1822.92	911.28	84.	189.	0.094	34.48	1.796

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1937.80	968.69	78.	142.	0.071	41.40	1.947s
BI-214	2240.05	1119.73	52.	82.	0.041	56.44	1.579s
CO-60	2347.29	1173.32	104.	133.	0.067	56.01	1.954
CO-60	2666.41	1332.78	29.	101.	0.050	43.46	1.987s
K-40	2922.76	1460.87	17.	678.	0.339	12.05	1.841
BI-214	3530.34	1764.45	3.	35.	0.018	55.29	0.790s

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		2.0791E-01					
			477.56	2.079E-01	%(	3.945E-01 1.20E-01 G	
K-40		1.2894E+01					
			1460.75	1.289E+01	(P	4.133E-01 5.20E-01 G	
MN-54		2.1002E-02					
			834.81	2.100E-02	%(P	4.935E-02 1.48E-02 G	
CO-57		-9.4936E-03					
			122.07	-9.494E-03	%(	5.330E-02 1.60E-02 G K	
			136.43	6.805E-03	%	3.763E-01 1.12E-01 G	
CO-60		2.0672E-01					
			1332.51	1.894E-01	(P	5.225E-02 2.75E-02 G K	
			1173.23	2.241E-01	(P	8.437E-02 4.19E-02 G K	
Sr-85		-3.3153E-02					
			514.00	-3.315E-02	&(	6.202E-02 1.89E-02 G	
Kr-85		-7.8250E+02					
			513.99	-7.825E+02	&(P	1.426E+03 4.33E+02 G	
Y-88		4.5565E-03					
			1836.01	4.556E-03	%(	3.961E-02 1.05E-02 G K	
			898.02	2.140E-03	% P	4.786E-02 1.35E-02 G	
NB-94		2.4728E-04					
			871.10	2.473E-04	%(P	4.256E-02 1.19E-02 G K	
			702.50	5.639E-03	% P	4.891E-02 1.42E-02 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	0.0000E+00						
		722.95	0.000E+00	%(	9.864E-02	2.89E-02	G K
		614.37	-4.479E-03	% P	5.114E-02	1.48E-02	G
		433.93	6.296E-03	&	4.077E-02	1.20E-02	G
CD-109	-5.0183E-02						
		88.04	-5.018E-02	%(P	1.530E+00	4.58E-01	G
SN-113	-8.2004E-03						
		391.71	-8.200E-03	&(	6.174E-02	1.82E-02	G K
		255.04	4.427E-01	% P	1.637E+00	4.90E-01	G
SB-125	3.5566E-02						
		427.95	3.557E-02	%(P	1.226E-01	3.65E-02	G K
		600.77	8.097E-03	& P	2.459E-01	7.08E-02	G
		636.15	8.930E-02	% P	3.464E-01	1.02E-01	G
		463.51	2.704E-01	% P	3.858E-01	1.19E-01	G
		176.29	-1.099E-02	% P	6.634E-01	1.97E-01	G
I-131	-5.6491E-03						
		364.48	-5.649E-03	&(	5.138E-02	1.51E-02	G K
		636.97	1.525E-02	%	6.669E-01	1.91E-01	G
		284.29	-2.003E-01	%	6.968E-01	2.09E-01	G
CS-134	2.5739E-02						
		604.66	2.446E-03	&(P	8.943E-02	2.64E-02	G K
		795.76	5.236E-02	(P	5.446E-02	1.76E-02	G
		569.29	-3.479E-02	% P	2.973E-01	8.65E-02	G
		801.84	-2.988E-02	%	5.704E-01	1.63E-01	G
CS-137	3.5739E-02						
		661.62	3.574E-02	%(P	5.293E-02	1.64E-02	G
CE-139	-4.2355E-05						
		165.85	-4.235E-05	%(P	4.274E-02	1.27E-02	G
EU-152	-2.9308E-02						
		121.78	-2.931E-02	%(P	1.563E-01	4.69E-02	G K
		344.30	4.038E-03	% P	1.453E-01	4.25E-02	G
		1408.08	4.710E-02	% P	1.402E-01	4.05E-02	G
		964.00	-4.953E-03	% P	3.582E-01	1.00E-01	G
		1112.07	-7.986E-02	& P	4.925E-01	1.43E-01	G
		778.90	1.888E-02	& P	3.607E-01	1.03E-01	G
EU-154	-1.9781E-02						
		123.10	-1.978E-02	&(P	1.059E-01	3.18E-02	G K
		1274.80	-2.721E-02	% P	1.828E-01	5.26E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-1.248E-01	% P	3.151E-01	9.46E-02	G
		1004.80	8.602E-02	& P	2.147E-01	6.41E-02	G
EU-155	-1.5288E-02						
		86.45	-1.529E-02	%(	1.836E-01	5.51E-02	G K
		105.31	4.964E-02	%	2.072E-01	6.23E-02	G
HG-203	-1.7172E-03						
		279.17	-1.717E-03	&(	4.875E-02	1.44E-02	G K
		72.87	-6.045E-01	% P	1.208E+00	3.66E-01	G
		70.83	2.084E-01	%	1.594E+00	4.77E-01	G
		82.50	-4.669E-02	%	2.638E+00	7.89E-01	G
TL-208	3.6919E-01						
		583.14	3.692E-01	(P	5.649E-02	2.90E-02	G
		510.72	5.536E-01	+ P	2.082E-01	8.56E-02	G
PB-212	7.6263E-01						
		238.63	7.408E-01	(P	1.023E-01	3.97E-02	G K
							Energy duplication
		77.11	8.163E-01	(	3.533E-01	1.13E-01	G
		74.81	9.623E-01	& P	7.129E-01	2.21E-01	G
PB-214	4.5526E-01						
							Energy duplication
		351.99	4.677E-01	*(P	1.015E-01	3.95E-02	G K
		295.22	4.313E-01	(P	1.968E-01	6.61E-02	G
							Energy duplication
		77.11	1.323E+00	+ P	5.785E-01	1.85E-01	G
		241.92	2.240E-02	% P	7.640E-01	2.28E-01	G
BI-212	7.4100E-01						
		727.17	7.410E-01	(P	3.766E-01	1.51E-01	G K
		1620.56	4.860E-01	%	1.552E+00	4.50E-01	G
		785.42	5.478E-01	& P	2.308E+00	6.76E-01	G
BI-214	5.0271E-01						
		609.32	4.918E-01	(P	9.943E-02	4.70E-02	G K
		1764.51	5.342E-01	(P	1.579E-01	9.97E-02	G
		1120.28	8.752E-01	+ P	3.907E-01	1.65E-01	G
RA-224	1.1776E+00						
		241.00	1.178E+00	(P	1.274E+00	3.93E-01	G
RA-226	1.3933E+00						
		185.99	1.393E+00	*(	1.053E+00	3.54E-01	G
AC-228	9.6071E-01						
		911.07	8.755E-01	(P	2.112E-01	1.02E-01	G K
		968.90	1.158E+00	(P	3.564E-01	1.61E-01	G
		338.40	8.799E-01	(P	2.853E-01	1.10E-01	G

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

TH-227      -2.5414E-01
                          236.00-2.541E-01 %(P 4.674E-01 1.42E-01 G K
                          256.25-2.980E-02 & P 5.927E-01 1.75E-01 G

PA-234      -3.2108E-02
                           98.44-3.211E-02 &(  1.803E-01 5.41E-02 G K
                          946.00-8.960E-03 %   2.182E-01 6.10E-02 G
                          131.28 2.760E-02 &   2.229E-01 6.68E-02 G
                           94.67-7.191E-02 %   3.421E-01 1.03E-01 G
                          883.24-1.209E-02 %   4.929E-01 1.41E-01 G
                          926.70-3.608E-02 %   4.603E-01 1.31E-01 G
                          569.26-8.363E-02 %   4.660E-01 1.37E-01 G

TH-234       1.5306E+00
                           63.29 6.423E-01 %(P 2.195E+00 6.60E-01 G K
                           92.80 2.042E+00  (P 1.703E+00 5.28E-01 G
                           92.38 2.282E+00  (P 1.965E+00 6.08E-01 G

AM-241      -4.2084E-02
                           59.54-4.208E-02 &(P 3.164E-01 9.48E-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	2.0642E-01	2.0791E-01	3.6057E-01	3.6077E-01	3.916E-01
K-40		1.2894E+01	1.2894E+01	1.5584E+00	1.7203E+00	
MN-54	#A	2.0976E-02	2.1002E-02	4.4517E-02	4.4533E-02	4.929E-02
CO-57	#B	-9.4800E-03	-9.4936E-03	4.8002E-02	4.8005E-02	5.322E-02
CO-60		2.0668E-01	2.0672E-01	7.3351E-02	7.4276E-02	
Sr-85	#A	-3.2957E-02	-3.3153E-02	5.6641E-02	5.6672E-02	6.165E-02
Kr-85	#A	-7.8249E+02	-7.8250E+02	1.3740E+03	1.3747E+03	1.426E+03
Y-88	#B	4.5400E-03	4.5565E-03	3.1517E-02	3.1518E-02	3.947E-02
NB-94	#B	2.4728E-04	2.4728E-04	3.5571E-02	3.5571E-02	4.256E-02
Ag-108M	#B	0.0000E+00	0.0000E+00	8.6825E-02	8.6826E-02	9.864E-02
CD-109	#A	-5.0140E-02	-5.0183E-02	1.6016E+00	1.6016E+00	1.529E+00
SN-113	#B	-8.1729E-03	-8.2004E-03	5.4508E-02	5.4510E-02	6.153E-02
SB-125	#B	3.5553E-02	3.5566E-02	1.0936E-01	1.0937E-01	1.226E-01
I-131	#B	-5.3840E-03	-5.6491E-03	4.5382E-02	4.5383E-02	4.897E-02
CS-134	#B	2.5725E-02	2.5739E-02	2.5916E-02	2.5957E-02	8.938E-02
CS-137	#A	3.5738E-02	3.5739E-02	4.9187E-02	4.9229E-02	5.293E-02
CE-139	#A	-4.2236E-05	-4.2355E-05	7.7089E-02	7.7089E-02	4.262E-02
EU-152	#B	-2.9305E-02	-2.9308E-02	1.4822E-01	1.4823E-01	1.563E-01
EU-154	#B	-1.9778E-02	-1.9781E-02	1.0162E-01	1.0163E-01	1.059E-01
EU-155	#B	-1.5285E-02	-1.5288E-02	1.6522E-01	1.6522E-01	1.836E-01
HG-203	#B	-1.7031E-03	-1.7172E-03	4.3138E-02	4.3138E-02	4.835E-02
TL-208		3.6919E-01	3.6919E-01	8.7058E-02	8.9523E-02	
PB-212	#	7.6263E-01	7.6263E-01	1.2255E-01	1.2991E-01	1.023E-01
PB-214	#	4.5526E-01	4.5526E-01	1.1538E-01	1.1821E-01	1.015E-01
BI-212		7.4100E-01	7.4100E-01	4.5217E-01	4.5410E-01	
BI-214		5.0271E-01	5.0271E-01	1.4402E-01	1.4679E-01	
RA-224	#A	1.1776E+00	1.1776E+00	1.1804E+00	1.1822E+00	1.274E+00
RA-226	#	1.3933E+00	1.3933E+00	1.0617E+00	1.0646E+00	
AC-228		9.6071E-01	9.6071E-01	2.1111E-01	2.1798E-01	
TH-227	#B	-2.5414E-01	-2.5414E-01	4.3122E-01	4.3146E-01	4.674E-01
PA-234	#B	-3.2108E-02	-3.2108E-02	1.6233E-01	1.6234E-01	1.803E-01
TH-234	#B	1.5306E+00	1.5306E+00	1.1868E+00	1.1898E+00	2.195E+00
AM-241	#A	-4.2084E-02	-4.2084E-02	3.0860E-01	3.0860E-01	3.164E-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) 1.7067482E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.7067524E+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_29NOV2005_1537.An1

Sample description
NOL-06-03-011-F-S

Spectrum Filename: C:\GammaVision\Spectra\101_29NOV2005_1537.An1

Acquisition information
Start time: 29-Nov-2005 15:37:44
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: 2.4850E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.4850E+03) =
4.0241E+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	29-Nov-2005 01:00:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0808

***** 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	160.	32.05	1.50	1.654E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.03	290.	17.89	1.50	1.720E-02	77.11	10.700	8.577E-01	PB214
					77.11	17.500	5.244E-01	PB212
77.03	294.	17.89	1.50	1.720E-02	77.11	10.700	8.577E-01	PB214
					77.11	17.500	5.311E-01	PB212
87.31	165.	19.70	1.01	1.923E-02	86.45	32.740	1.436E-01	EU155
89.79	119.	25.99	1.02	1.956E-02	88.04	3.790	PBC<MDA	CD109
93.09	160.	20.44	1.02	1.993E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.45	110.	28.46	0.91	1.856E-02	185.99	3.280	9.778E-01	RA226
209.24	81.	33.49	1.05	1.722E-02				
238.78	862.	4.10	1.12	1.557E-02	238.63	43.100	6.932E-01	PB212
241.72	112.	22.92	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
270.58	65.	40.31	0.86	1.399E-02				
295.21	191.	16.06	1.22	1.292E-02				
295.21	191.	16.06	1.22	1.292E-02	295.22	19.200	4.139E-01	PB214
300.24	74.	30.54	0.83	1.272E-02				
327.77	71.	26.12	1.05	1.170E-02				
338.59	156.	16.33	1.05	1.134E-02	338.40	12.010	6.152E-01	AC228
352.05	330.	9.45	1.09	1.092E-02	351.99	37.100	4.398E-01	PB214
463.15	44.	33.57	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125
510.86	125.	16.80	0.82	7.588E-03	510.72	22.500	3.460E-01	TL208
583.17	297.	8.51	1.20	6.684E-03	583.14	86.000	2.789E-01	TL208
609.47	198.	9.75	1.53	6.411E-03	609.32	46.090	3.632E-01	BI214
661.87	38.	31.24	1.13	5.935E-03	661.62	84.620	3.996E-02	CS137
727.31	43.	28.74	1.50	5.443E-03	727.17	11.800	3.608E-01	BI212

911.14	180.	9.09	1.69	4.446E-03	911.07	29.000	7.500E-01	AC228
967.90	137.	12.59	1.41	4.216E-03	968.90	17.460	1.011E+00	AC228
1120.00	64.	26.09	2.05	3.711E-03	1120.28	15.040	6.247E-01	BI214
1460.85	743.	3.74	1.91	2.942E-03	1460.75	10.700	1.280E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.60	39.	20.53	2.25	2.481E-03	1764.51	15.920	5.377E-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	
179.16	89.82	416.	119.	0.059	77.96	1.016	PB-214	lD
418.16	209.24	310.	81.	0.040	100.47	1.052	AC-228	
477.26	238.78	192.	862.	0.431	12.29	1.122	PB-212	D
483.15	241.72	274.	112.	0.056	68.76	1.124	PB-214	D
540.89	270.58	259.	65.	0.032	120.94	0.856	AC-228	
600.22	300.24	182.	74.	0.037	84.85	0.831	PB-212	
655.32	327.77	125.	71.	0.036	78.35	1.045	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	148.85	74.64	1324.	160.	0.080	96.14	1.499
PB-214	153.79	77.11	1240.	290.	0.145	53.66	1.499D
PB-212	153.79	77.11	1236.	294.	0.147	53.66	1.499D
EU-155	173.69	87.06	1244.	158.	0.079	97.48	1.499
TH-234	186.00	93.21	1215.	151.	0.075	94.13	1.499s
TH-234	185.97	93.20	1167.	158.	0.079	90.94	1.499s
RA-226	372.03	186.19	590.	97.	0.049	110.17	1.499
PB-212	477.32	238.81	475.	747.	0.374	16.37	1.499
PB-214	590.19	295.22	283.	162.	0.081	49.36	1.499D
AC-228	676.97	338.59	186.	154.	0.077	48.98	1.055s
PB-214	703.92	352.06	161.	282.	0.141	25.91	1.499
SB-125	926.20	463.15	96.	44.	0.022	100.71	1.499s
TL-208	1021.67	510.86	124.	109.	0.054	50.39	0.820s
TL-208	1166.34	583.17	103.	295.	0.147	25.53	1.200
BI-214	1218.97	609.47	72.	197.	0.099	29.26	1.531
CS-137	1323.84	661.87	45.	37.	0.018	93.72	1.128
BI-212	1454.76	727.31	56.	43.	0.021	86.21	1.499s
AC-228	1822.64	911.14	34.	178.	0.089	27.27	1.692s
AC-228	1936.20	967.90	51.	137.	0.068	37.77	1.406s
BI-214	2240.59	1120.00	63.	64.	0.032	78.28	2.046s
K-40	2922.72	1460.85	9.	741.	0.370	11.22	1.906

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3530.64	1764.60	8.	39.	0.020	61.58	2.254

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		9.4054E-02					
			477.56	9.405E-02	&(	3.194E-01	9.48E-02 G
K-40		1.2797E+01					
			1460.75	1.280E+01	(P	2.893E-01	4.80E-01 G
MN-54		-3.5020E-04					
			834.81	-3.502E-04	%(P	4.007E-02	1.12E-02 G
CO-57		2.4664E-04					
			122.07	2.466E-04	&(	4.278E-02	1.27E-02 G K
			136.43	5.823E-02	%	3.495E-01	1.05E-01 G
CO-60		1.4626E-02					
			1332.51	1.463E-02	%(P	4.095E-02	1.21E-02 G K
			1173.23	3.613E-02	% P	5.068E-02	1.59E-02 G K
Sr-85		-1.6560E-02					
			514.00	-1.656E-02	%(	4.783E-02	1.43E-02 G
Kr-85		-3.9970E+02					
			513.99	-3.997E+02	%(P	1.101E+03	3.29E+02 G
Y-88		5.2824E-05					
			1836.01	5.282E-05	&(	3.973E-02	1.02E-02 G K
			898.02	6.632E-03	& P	3.523E-02	1.01E-02 G
NB-94		1.6182E-02					
			871.10	1.618E-02	%(P	3.410E-02	1.03E-02 G K
			702.50	1.628E-02	% P	3.744E-02	1.13E-02 G K
Ag-108M		-1.8640E-02					
			722.95	-1.864E-02	%(	5.315E-02	1.59E-02 G K
			614.37	-1.249E-02	& P	4.971E-02	1.47E-02 G
			433.93	-3.528E-03	%	3.918E-02	1.14E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	2.1278E-01						
		88.04	2.128E-01	%(P	1.246E+00	3.74E-01	G
SN-113	-9.0124E-03						
		391.71	-9.012E-03	%(	4.803E-02	1.41E-02	G K
		255.04	3.380E-01	% P	1.582E+00	4.72E-01	G
SB-125	7.6936E-02						
		427.95	5.345E-03	%(P	9.455E-02	2.72E-02	G K
		600.77	-8.999E-03	& P	1.690E-01	4.78E-02	G
		636.15	1.941E-02	% P	2.920E-01	8.29E-02	G
		463.51	2.888E-01	*(P	3.161E-01	1.00E-01	G
		176.29	-7.284E-02	% P	5.088E-01	1.51E-01	G
I-131	5.1839E-03						
		364.48	5.184E-03	%(	3.833E-02	1.12E-02	G K
		636.97	6.324E-02	%	4.454E-01	1.28E-01	G
		284.29	4.604E-03	&	5.368E-01	1.57E-01	G
CS-134	-3.4045E-04						
		604.66	-3.405E-04	&(P	3.693E-02	1.05E-02	G K
		795.76	1.287E-02	% P	4.710E-02	1.38E-02	G
		569.29	4.085E-02	& P	2.579E-01	7.54E-02	G
		801.84	-8.373E-02	%	4.856E-01	1.41E-01	G
CS-137	3.9958E-02						
		661.62	3.996E-02	(P	3.680E-02	1.28E-02	G
CE-139	3.2466E-03						
		165.85	3.247E-03	&(P	4.350E-02	1.30E-02	G
EU-152	1.6683E-02						
		121.78	1.668E-02	&(P	1.170E-01	3.50E-02	G K
		344.30	-2.968E-02	% P	1.228E-01	3.64E-02	G
		1408.08	2.494E-02	& P	1.511E-01	4.14E-02	G
		964.00	2.006E-01	% P	4.051E-01	1.23E-01	G
		1112.07	-4.545E-02	& P	3.986E-01	1.14E-01	G
		778.90	2.145E-03	% P	2.817E-01	7.88E-02	G
EU-154	-5.7760E-03						
		123.10	-5.776E-03	&(P	9.087E-02	2.71E-02	G K
		1274.80	-1.325E-02	& P	1.576E-01	4.47E-02	G
		723.30	-2.634E-02	% P	2.211E-01	6.38E-02	G
		1004.80	-2.260E-02	% P	2.365E-01	6.67E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.3775E-01						
		86.45	1.378E-01	(	1.454E-01	4.48E-02	G K
		105.31	7.371E-02	%	1.796E-01	5.43E-02	G
HG-203	-2.3215E-04						
		279.17	-2.321E-04	%(	4.031E-02	1.18E-02	G K
		72.87	-6.891E-02	& P	1.024E+00	3.06E-01	G
		70.83	1.335E-02	&	1.709E+00	5.10E-01	G
		82.50	-3.578E-01	%	2.283E+00	6.86E-01	G
TL-208	2.9282E-01						
		583.14	2.789E-01	(P	4.734E-02	2.39E-02	G
		510.72	3.460E-01	*(P	1.741E-01	6.67E-02	G
PB-212	5.7907E-01						
		238.63	6.055E-01	(P	8.449E-02	3.33E-02	G K
							Energy duplication
		77.11	5.311E-01	(	3.009E-01	9.50E-02	G
		74.81	5.479E-01	&(P	5.901E-01	1.81E-01	G
PB-214	3.7060E-01						
		351.99	3.785E-01	(P	8.296E-02	3.29E-02	G K
							Energy duplication
		295.22	3.553E-01	(P	1.779E-01	5.91E-02	G
							Energy duplication
		77.11	8.577E-01	+ P	4.928E-01	1.55E-01	G
		241.92	1.512E-02	% P	5.043E-01	1.49E-01	G
BI-212	3.6080E-01						
		727.17	3.608E-01	*(P	3.193E-01	1.05E-01	G K
		1620.56	3.382E-01	%	1.336E+00	3.79E-01	G
		785.42	8.853E-01	% P	1.973E+00	5.95E-01	G
BI-214	3.6318E-01						
		609.32	3.632E-01	(P	7.754E-02	3.56E-02	G K
		1764.51	5.377E-01	+ P	2.180E-01	1.12E-01	G
		1120.28	6.247E-01	+ P	3.865E-01	1.64E-01	G
RA-224	7.7241E-01						
		241.00	7.724E-01	%(P	1.056E+00	3.24E-01	G
RA-226	8.6801E-01						
		185.99	8.680E-01	(	1.034E+00	3.19E-01	G
AC-228	7.4996E-01						
		911.07	7.500E-01	@(P	1.263E-01	6.89E-02	G K
		968.90	1.011E+00	+ P	2.669E-01	1.28E-01	G
		338.40	6.152E-01	- P	2.642E-01	1.02E-01	G

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

TH-227      -2.3085E-01
                          236.00-2.309E-01 %(P 4.143E-01 1.26E-01 G K
                          256.25-6.483E-03 % P 4.759E-01 1.40E-01 G

PA-234      -4.4019E-02
                           98.44-4.402E-02 &(  1.572E-01 4.73E-02 G K
                          946.00 1.300E-03 &   2.213E-01 6.20E-02 G
                          131.28 1.206E-02 %   1.932E-01 5.77E-02 G
                           94.67-8.600E-02 %   2.530E-01 7.63E-02 G
                          883.24-2.625E-03 %   3.593E-01 1.01E-01 G
                          926.70 9.295E-02 %   3.443E-01 1.01E-01 G
                          569.26 6.343E-02 &   3.818E-01 1.12E-01 G

TH-234       1.0071E+00
                           63.29 2.773E-01 %(P 1.774E+00 5.30E-01 G K
                           92.80 1.443E+00 *(P 1.475E+00 4.54E-01 G
                           92.38 1.606E+00 *(P 1.760E+00 5.40E-01 G

AM-241       2.9658E-02
                           59.54 2.966E-02 %(P 2.533E-01 7.58E-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	9.3313E-02	9.4054E-02	2.8450E-01	2.8455E-01	3.169E-01
K-40		1.2797E+01	1.2797E+01	1.4408E+00	1.6120E+00	
MN-54	#A	-3.4972E-04	-3.5020E-04	2.2413E-01	2.2413E-01	4.002E-02
CO-57	#B	2.4625E-04	2.4664E-04	3.8215E-02	3.8215E-02	4.271E-02
CO-60	#B	1.4623E-02	1.4626E-02	3.6280E-02	3.6289E-02	4.094E-02
Sr-85	#A	-1.6452E-02	-1.6560E-02	4.3031E-02	4.3041E-02	4.752E-02
Kr-85	#A	-3.9970E+02	-3.9970E+02	1.0894E+03	1.0897E+03	1.101E+03
Y-88	#B	5.2615E-05	5.2824E-05	3.0523E-02	3.0523E-02	3.958E-02
NB-94	#B	1.6182E-02	1.6182E-02	3.1015E-02	3.1029E-02	3.410E-02
Ag-108M	#B	-1.8640E-02	-1.8640E-02	4.7650E-02	4.7661E-02	5.314E-02
CD-109	#A	2.1258E-01	2.1278E-01	1.1227E+00	1.1227E+00	1.245E+00
SN-113	#B	-8.9794E-03	-9.0124E-03	4.2429E-02	4.2432E-02	4.785E-02
SB-125	#B	7.6904E-02	7.6936E-02	8.0011E-02	8.0129E-02	9.451E-02
I-131	#B	4.9186E-03	5.1839E-03	3.3715E-02	3.3716E-02	3.637E-02
CS-134	#B	-3.4026E-04	-3.4045E-04	1.4199E-01	1.4199E-01	3.691E-02
CS-137		3.9956E-02	3.9958E-02	3.8347E-02	3.8413E-02	
CE-139	#A	3.2366E-03	3.2466E-03	3.8874E-02	3.8874E-02	4.336E-02
EU-152	#B	1.6681E-02	1.6683E-02	1.0494E-01	1.0495E-01	1.170E-01
EU-154	#B	-5.7752E-03	-5.7760E-03	9.9462E-02	9.9463E-02	9.086E-02
EU-155	#A	1.3772E-01	1.3775E-01	1.3428E-01	1.3450E-01	1.453E-01
HG-203	#B	-2.3005E-04	-2.3215E-04	3.5490E-02	3.5490E-02	3.994E-02
TL-208		2.9282E-01	2.9282E-01	7.5373E-02	7.7168E-02	
PB-212	#	5.7907E-01	5.7907E-01	9.5596E-02	1.0104E-01	8.449E-02
PB-214	#	3.7060E-01	3.7060E-01	9.6703E-02	9.8945E-02	8.296E-02
BI-212	#	3.6080E-01	3.6080E-01	3.1598E-01	3.1664E-01	3.193E-01
BI-214		3.6318E-01	3.6318E-01	1.0685E-01	1.0881E-01	
RA-224	#A	7.7241E-01	7.7241E-01	9.7154E-01	9.7252E-01	1.056E+00
RA-226	#A	8.6800E-01	8.6801E-01	9.5632E-01	9.5758E-01	1.034E+00
AC-228	#	7.4996E-01	7.4996E-01	2.0669E-01	2.1099E-01	
TH-227	#B	-2.3085E-01	-2.3085E-01	3.8247E-01	3.8269E-01	4.143E-01
PA-234	#B	-4.4019E-02	-4.4019E-02	1.4198E-01	1.4201E-01	1.572E-01
TH-234	#B	1.0071E+00	1.0071E+00	9.5158E-01	9.5322E-01	1.774E+00
AM-241	#A	2.9658E-02	2.9658E-02	2.2729E-01	2.2730E-01	2.533E-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) 1.4243226E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.4243227E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-NOL-06-03-003-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1DEC2005_1016.An1

Acquisition information

Start time:	01-Dec-2005 10:25:06
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:	1.9970E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.9970E+03) = 5.0075E+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	29-Dec-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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1351

***** 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
77.04	215.	22.04	1.50	9.541E-03	77.11	10.700	1.422E+00	PB214
					77.11	17.500	8.697E-01	PB212
77.04	215.	22.04	1.50	9.541E-03	77.11	10.700	1.422E+00	PB214
					77.11	17.500	8.697E-01	PB212
93.13	110.	40.61	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.861E+00	TH234
186.12	115.	28.51	1.48	1.626E-02	185.99	3.280	1.402E+00	RA226
238.68	724.	4.39	1.21	1.380E-02	238.63	43.100	8.239E-01	PB212
241.79	126.	17.99	1.22	1.366E-02	241.00	3.900	1.588E+00	RA224
					241.92	7.470	8.391E-01	PB214
270.57	73.	31.55	1.55	1.241E-02				
295.23	144.	13.28	1.25	1.146E-02	295.22	19.200	4.427E-01	PB214
299.61	48.	35.76	1.26	1.130E-02				
338.72	161.	13.13	1.37	1.005E-02	338.40	12.010	9.017E-01	AC228
351.91	256.	9.86	1.40	9.681E-03				
351.91	256.	9.86	1.40	9.681E-03	351.99	37.100	4.815E-01	PB214
463.27	59.	23.30	1.55	7.368E-03				
463.27	59.	23.30	1.55	7.368E-03	463.51	10.000	5.206E-01	SB125
510.87	94.	21.60	1.56	6.693E-03	510.72	22.500	4.227E-01	TL208
583.20	213.	9.18	1.33	5.889E-03	583.14	86.000	2.845E-01	TL208
609.39	208.	11.13	1.75	5.649E-03	609.32	46.090	5.406E-01	BI214
661.54	84.	23.64	1.95	5.230E-03	661.62	84.620	1.275E-01	CS137
726.77	63.	23.02	1.23	4.796E-03	727.17	11.800	7.512E-01	BI212
795.13	22.	38.09	1.60	4.420E-03				
795.13	22.	38.09	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
911.12	137.	10.24	1.95	3.922E-03	911.07	29.000	8.161E-01	AC228
968.28	112.	14.94	1.79	3.720E-03	968.90	17.460	1.169E+00	AC228

1120.14	61.	24.23	1.42	3.283E-03	1120.28	15.040	8.360E-01	BI214
1173.16	73.	26.43	1.00	3.157E-03	1173.23	99.860	1.551E-01	CO60
1237.74	60.	28.20	1.46	3.017E-03				
1332.12	57.	20.64	1.29	2.834E-03	1332.51	99.980	1.341E-01	CO60
1460.78	548.	4.38	1.74	2.621E-03	1460.75	10.700	1.321E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.26	19.	27.94	2.24	2.225E-03	1764.51	15.920	3.535E-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	
476.98	238.67	143.	724.	0.362	13.16	1.215	PB-212	D
483.20	241.77	196.	126.	0.063	53.96	1.217	PB-214	D
540.79	270.57	192.	73.	0.037	94.66	1.551	AC-228	s
599.25	299.80	133.	48.	0.024	110.75	1.415	TH-227	
2476.04	1237.74	58.	60.	0.030	84.59	1.464	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-214	153.80	77.11	1011.	215.	0.107	66.12	1.500D
PB-212	153.80	77.11	1011.	215.	0.107	66.12	1.500D
TH-234	185.85	93.13	943.	110.	0.055	121.83	1.500s
RA-226	372.01	186.20	476.	89.	0.045	103.25	1.500s
PB-212	476.94	238.65	396.	671.	0.335	17.10	1.500
RA-224	483.96	242.16	499.	83.	0.041	117.23	1.500
PB-214	590.03	295.19	235.	138.	0.069	53.50	1.500
AC-228	677.12	338.72	119.	161.	0.080	39.38	1.375s
PB-214	703.65	351.98	121.	232.	0.116	28.14	1.500
SB-125	926.18	463.22	89.	68.	0.034	67.83	1.500
TL-208	1021.53	510.87	103.	94.	0.047	64.80	1.561
TL-208	1166.24	583.20	66.	213.	0.106	27.55	1.334s
BI-214	1218.63	609.39	91.	208.	0.104	33.38	1.751
CS-137	1322.98	661.54	88.	84.	0.042	70.93	1.951s
BI-212	1453.49	726.77	52.	63.	0.031	69.05	1.231
CS-134	1590.27	795.13	24.	22.	0.011	114.28	1.601s
AC-228	1822.38	911.12	22.	137.	0.069	30.71	1.947s
AC-228	1936.77	968.28	53.	112.	0.056	44.83	1.793
BI-214	2240.67	1120.14	45.	61.	0.031	72.70	1.421s
CO-60	2346.79	1173.16	68.	73.	0.036	79.28	0.999s
CO-60	2664.94	1332.12	19.	57.	0.028	61.92	1.291s
K-40	2922.47	1460.78	7.	547.	0.274	13.13	1.743
BI-214	3529.98	1764.26	4.	19.	0.009	83.83	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		9.3180E-02					
			477.56	9.318E-02	%(	2.849E-01 8.48E-02	G
K-40		1.3211E+01					
			1460.75	1.321E+01	(P	3.532E-01 5.78E-01	G
MN-54		-1.7406E-02					
			834.81	-1.741E-02	%(P	5.800E-02 1.71E-02	G
CO-57		7.2496E-03					
			122.07	7.250E-03	&(	5.612E-02 1.68E-02	G K
			136.43	-6.820E-04	%	4.377E-01 1.30E-01	G
CO-60		1.4462E-01					
			1332.51	1.341E-01	(P	5.478E-02 2.77E-02	G K
			1173.23	1.551E-01	(	8.742E-02 4.10E-02	G K
Sr-85		-3.7860E-03					
			514.00	-3.786E-03	%(	4.053E-02 1.18E-02	G
Kr-85		-1.1792E+02					
			513.99	-1.179E+02	%(	1.262E+03 3.67E+02	G
Y-88		-4.4857E-03					
			1836.01	-4.486E-03	%(P	5.042E-02 1.36E-02	G K
			898.02	6.431E-03	% P	4.077E-02 1.15E-02	G
NB-94		-5.5147E-05					
			871.10	-5.515E-05	%(	4.838E-02 1.33E-02	G K
			702.50	1.999E-02	%	4.753E-02 1.43E-02	G K
Ag-108M		-7.8524E-03					
			722.95	-7.852E-03	%(	5.899E-02 1.70E-02	G K
			614.37	-2.264E-02	% P	6.006E-02 1.80E-02	G
			433.93	1.515E-02	%	4.404E-02 1.31E-02	G
CD-109		8.9210E-03					
			88.04	8.921E-03	%(P	2.179E+00 6.50E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	7.0479E-03						
		391.71	7.048E-03	&(	5.641E-02	1.65E-02	G K
		255.04	3.921E-01	&	1.578E+00	4.70E-01	G
SB-125	1.3233E-01						
		427.95	-2.894E-02	%(P	1.590E-01	4.66E-02	G K
		600.77	-2.041E-02	% P	1.787E-01	5.02E-02	G
		636.15	-3.983E-02	& P	3.636E-01	1.03E-01	G
		463.51	6.097E-01	(P	4.214E-01	1.41E-01	G
		176.29	3.054E-02	% P	6.860E-01	2.03E-01	G
I-131	1.7892E-03						
		364.48	1.789E-03	%(	3.882E-03	1.18E-03	G K
		636.97	-1.262E-02	%	5.739E-02	1.67E-02	G
		284.29	0.000E+00	%	6.454E-02	1.89E-02	G
CS-134	8.3464E-03						
		604.66	-1.782E-02	%(	5.614E-02	1.67E-02	G K
		795.76	3.825E-02	(	4.448E-02	1.46E-02	G
		569.29	6.716E-02	%	2.955E-01	8.66E-02	G
		801.84	8.377E-02	% P	5.066E-01	1.45E-01	G
CS-137	1.2746E-01						
		661.62	1.275E-01	(	7.068E-02	3.01E-02	G
CE-139	2.0462E-04						
		165.85	2.046E-04	&(P	4.655E-02	1.38E-02	G
EU-152	2.6382E-02						
		121.78	2.638E-02	&(P	1.800E-01	5.38E-02	G K
		344.30	2.480E-03	&	1.641E-01	4.78E-02	G
		1408.08	2.426E-02	&	2.323E-01	6.31E-02	G
		964.00	-2.396E-03	% P	5.078E-01	1.44E-01	G
		1112.07	-1.073E-02	%	4.145E-01	1.14E-01	G
		778.90	-4.612E-02	% P	4.185E-01	1.20E-01	G
EU-154	-8.9981E-03						
		123.10	-8.998E-03	%(P	1.328E-01	3.96E-02	G K
		1274.80	0.000E+00	%	2.157E-01	6.02E-02	G
		723.30	-1.711E-02	& P	2.665E-01	7.56E-02	G
		1004.80	-5.797E-03	%	2.863E-01	7.85E-02	G
EU-155	6.1607E-02						
		86.45	6.161E-02	&(P	2.583E-01	7.76E-02	G K
		105.31	-6.012E-02	&	2.671E-01	8.02E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-3.5869E-04						
		279.17	-3.587E-04	&(P	2.919E-02	8.49E-03	G K
		72.87	-1.075E-01	%	1.433E+00	4.29E-01	G
		70.83	-4.124E-01	%	2.388E+00	7.16E-01	G
		82.50	-3.171E-01	%	2.679E+00	8.02E-01	G
TL-208	2.8454E-01						
		583.14	2.845E-01	*(P	5.420E-02	2.62E-02	G
		510.72	4.227E-01	+	2.245E-01	9.13E-02	G
PB-212	7.9388E-01						
		238.63	7.631E-01	(	1.085E-01	4.35E-02	G K
							Energy duplication
		77.11	8.697E-01	@(	6.115E-01	1.92E-01	G
		74.81	7.489E-01	& P	1.290E+00	3.92E-01	G
PB-214	4.3250E-01						
		351.99	4.363E-01	(P	1.017E-01	4.10E-02	G K
		295.22	4.252E-01	(	2.280E-01	7.58E-02	G
							Energy duplication
		77.11	1.422E+00	+	1.000E+00	3.13E-01	G
		241.92	3.043E-01	%	7.667E-01	2.32E-01	G
BI-212	7.5122E-01						
		727.17	7.512E-01	(	4.352E-01	1.73E-01	G K
		1620.56	7.886E-02	% P	1.830E+00	4.76E-01	G
		785.42	8.533E-01	% P	2.381E+00	7.08E-01	G
BI-214	5.4057E-01						
		609.32	5.406E-01	(	1.226E-01	6.02E-02	G K
		1764.51	3.535E-01	- P	2.361E-01	9.92E-02	G
		1120.28	8.360E-01	+	4.655E-01	2.03E-01	G
RA-224	1.0503E+00						
		241.00	1.050E+00	?(P	1.353E+00	4.16E-01	G
RA-226	1.1300E+00						
		185.99	1.130E+00	*(P	1.324E+00	4.08E-01	G
AC-228	8.4120E-01						
		911.07	8.161E-01	@(P	1.457E-01	8.37E-02	G K
		968.90	1.169E+00	+ P	3.813E-01	1.75E-01	G
		338.40	9.017E-01	*(	2.999E-01	1.18E-01	G
TH-227	-1.6533E-01						
		236.00	-1.653E-01	%(P	4.811E-01	1.45E-01	G K
		256.25	-5.037E-02	&	6.174E-01	1.82E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	-2.8103E-02						
		98.44	-2.810E-02	%(	2.723E-01	8.14E-02	G K
		946.00	-4.370E-02	%	3.077E-01	8.83E-02	G
		131.28	5.921E-03	&	2.540E-01	7.55E-02	G
		94.67	-1.380E-01	%	4.523E-01	1.36E-01	G
		883.24	8.753E-02	%	3.362E-01	9.71E-02	G
		926.70	1.583E-01	%	3.679E-01	1.11E-01	G
		569.26	1.023E-01	%	4.498E-01	1.32E-01	G
TH-234	1.5533E+00						
		63.29	1.316E+00	%(P	4.752E+00	1.43E+00	G K
		92.80	1.861E+00	(	2.467E+00	7.56E-01	G
		92.38	1.897E-02	% P	2.952E+00	8.79E-01	G
AM-241	1.4256E-02						
		59.54	1.426E-02	%(	6.949E-01	2.07E-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	

- -

***** 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	1.3406E-01	9.3180E-02	2.5441E-01	2.5446E-01	4.099E-01
K-40		1.3211E+01	1.3211E+01	1.7352E+00	1.8869E+00	
MN-54	#A	-1.8524E-02	-1.7406E-02	5.3239E-02	5.3248E-02	6.172E-02
CO-57	#B	7.7904E-03	7.2496E-03	5.0296E-02	5.0298E-02	6.030E-02
CO-60		1.4608E-01	1.4462E-01	7.2779E-02	7.3230E-02	
Sr-85	#A	-5.1084E-03	-3.7860E-03	3.5397E-02	3.5398E-02	5.469E-02
Kr-85	#A	-1.1795E+02	-1.1792E+02	1.1024E+03	1.1024E+03	1.263E+03
Y-88	#B	-5.3823E-03	-4.4857E-03	4.1015E-02	4.1016E-02	6.049E-02
NB-94	#B	-5.5147E-05	-5.5147E-05	3.9968E-02	3.9968E-02	4.838E-02
Ag-108M	#B	-7.8557E-03	-7.8524E-03	5.0969E-02	5.0971E-02	5.902E-02
CD-109	#A	9.3116E-03	8.9210E-03	1.9497E+00	1.9497E+00	2.275E+00
SN-113	#B	8.3436E-03	7.0479E-03	4.9493E-02	4.9494E-02	6.678E-02
SB-125	#B	1.3490E-01	1.3233E-01	9.1816E-02	9.2116E-02	1.621E-01
I-131	#B	2.0042E-02	1.7892E-03	3.5251E-03	3.5265E-03	4.349E-02
CS-134	#B	8.5645E-03	8.3464E-03	9.5379E-03	9.5494E-03	5.761E-02
CS-137		1.2769E-01	1.2746E-01	9.0408E-02	9.0690E-02	
CE-139	#A	2.3567E-04	2.0462E-04	4.1319E-02	4.1319E-02	5.362E-02
EU-152	#B	2.6493E-02	2.6382E-02	1.6143E-01	1.6144E-01	1.807E-01
EU-154	#B	-9.0546E-03	-8.9981E-03	1.2424E-01	1.2424E-01	1.336E-01
EU-155	#B	6.2271E-02	6.1607E-02	2.3276E-01	2.3278E-01	2.611E-01
HG-203	#B	-5.4424E-04	-3.5869E-04	3.2228E-02	3.2228E-02	4.428E-02
TL-208		2.8454E-01	2.8454E-01	7.8531E-02	8.0138E-02	
PB-212	#	7.9388E-01	7.9388E-01	1.3577E-01	1.4289E-01	1.085E-01
PB-214	#	4.3250E-01	4.3250E-01	1.2190E-01	1.2430E-01	1.017E-01
BI-212		7.5122E-01	7.5122E-01	5.1875E-01	5.2046E-01	
BI-214		5.4057E-01	5.4057E-01	1.8044E-01	1.8297E-01	
RA-224	#A	1.0503E+00	1.0503E+00	1.2485E+00	1.2499E+00	1.353E+00
RA-226	#A	1.1300E+00	1.1300E+00	1.2251E+00	1.2268E+00	1.324E+00
AC-228		8.4120E-01	8.4120E-01	2.1018E-01	2.1541E-01	
TH-227	#B	-1.6533E-01	-1.6533E-01	4.4118E-01	4.4128E-01	4.811E-01
PA-234	#B	-2.8103E-02	-2.8103E-02	2.4425E-01	2.4426E-01	2.723E-01
TH-234	#B	1.5533E+00	1.5533E+00	1.8923E+00	1.8942E+00	4.752E+00
AM-241	#A	1.4258E-02	1.4256E-02	6.1998E-01	6.1999E-01	6.950E-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) 1.5901919E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.5900228E+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_1DEC2005_1444.An1

Sample description
FSS-NOL-06-03-019-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_1DEC2005_1444.An1

Acquisition information
Start time: 01-Dec-2005 14:44:33
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: 1.8300E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8300E+03) =
5.4645E+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	29-Nov-2005 15:40:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0761

***** 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	155.	29.88	1.50	8.847E-03				
74.70	155.	29.88	1.50	8.847E-03	74.81	9.600	1.351E+00	PB212
77.23	201.	23.78	1.50	9.541E-03	77.11	10.700	1.455E+00	PB214
					77.11	17.500	8.899E-01	PB212
77.23	201.	23.78	1.50	9.541E-03	77.11	10.700	1.455E+00	PB214
					77.11	17.500	8.899E-01	PB212
185.36	112.	29.46	0.97	1.629E-02				
185.36	112.	29.46	0.97	1.629E-02	185.99	3.280	1.495E+00	RA226
209.70	105.	25.70	1.05	1.517E-02				
238.71	852.	3.98	1.21	1.380E-02	238.63	43.100	1.058E+00	PB212
241.71	139.	17.25	1.22	1.367E-02	241.00	3.900	1.909E+00	RA224
					241.92	7.470	1.008E+00	PB214
270.75	86.	26.31	2.00	1.241E-02				
295.13	175.	13.94	1.34	1.147E-02				
295.13	175.	13.94	1.34	1.147E-02	295.22	19.200	5.870E-01	PB214
300.68	62.	33.67	1.16	1.127E-02				
327.53	50.	40.07	1.07	1.038E-02				
338.49	174.	15.58	1.31	1.006E-02	338.40	12.010	1.065E+00	AC228
352.17	320.	9.92	1.39	9.674E-03	351.99	37.100	6.583E-01	PB214
409.19	40.	36.76	1.02	8.335E-03				
464.49	75.	25.02	1.60	7.349E-03	463.51	10.000	7.375E-01	SB125
511.02	127.	17.96	1.41	6.691E-03	510.72	22.500	6.216E-01	TL208
583.23	270.	10.71	1.28	5.889E-03	583.14	86.000	3.924E-01	TL208
609.29	170.	11.35	1.57	5.650E-03	609.32	46.090	4.818E-01	BI214
661.34	162.	15.00	1.95	5.232E-03	661.62	84.620	2.695E-01	CS137
727.43	90.	21.93	1.55	4.792E-03	727.17	11.800	1.175E+00	BI212
795.30	37.	26.67	1.60	4.420E-03	795.76	85.400	7.287E-02	CS134

860.67	33.	29.52	1.45	4.122E-03				
911.71	201.	9.42	1.54	3.920E-03	911.07	29.000	1.304E+00	AC228
968.61	116.	17.23	1.96	3.719E-03	968.90	17.460	1.317E+00	AC228
1120.34	67.	20.44	1.27	3.283E-03	1120.28	15.040	1.005E+00	BI214
1172.77	84.	22.84	1.58	3.158E-03	1173.23	99.860	1.978E-01	CO60
1332.60	74.	20.67	1.23	2.834E-03	1332.51	99.980	1.925E-01	CO60
1460.94	567.	4.24	1.88	2.620E-03	1460.75	10.700	1.493E+01	K40
1764.54	33.	17.41	1.50	2.225E-03	1764.51	15.920	6.860E-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	
419.03	209.70	286.	105.	0.053	77.10	1.046	NP-239	s
477.05	238.66	149.	852.	0.426	11.93	1.215	PB-212	D
483.04	241.66	219.	139.	0.070	51.74	1.217	PB-214	D
541.14	270.75	196.	86.	0.043	78.93	2.000	AC-228	s
601.02	300.68	157.	62.	0.031	93.57	1.156	PB-212	s
654.72	327.53	150.	50.	0.025	120.20	1.071	AC-228	s
818.10	409.19	79.	40.	0.020	110.28	1.017	AC-228	s
1454.81	727.43	127.	44.	0.022	117.06	1.554	J-132	
1721.43	860.67	27.	33.	0.017	88.57	1.454	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	148.98	74.70	1045.	155.	0.078	89.63	1.500
PB-214	153.80	77.11	1044.	201.	0.101	71.35	1.500D
PB-212	153.80	77.11	1044.	201.	0.101	71.35	1.500D
PB-212	477.08	238.73	495.	737.	0.368	16.92	1.500
PB-214	590.22	295.28	214.	155.	0.078	46.72	1.500
AC-228	676.65	338.49	194.	174.	0.087	46.73	1.313
PB-214	703.72	352.02	160.	273.	0.136	26.73	1.500s
SB-125	926.33	463.29	125.	42.	0.021	116.55	1.500s
TL-208	1021.82	511.02	115.	127.	0.063	53.87	1.409s
TL-208	1166.30	583.23	135.	269.	0.135	32.14	1.282
BI-214	1218.44	609.29	65.	170.	0.085	34.04	1.572
CS-137	1322.57	661.34	94.	162.	0.081	45.00	1.951s
BI-212	1455.32	727.68	68.	46.	0.023	88.18	1.554
CS-134	1590.61	795.30	31.	37.	0.019	80.00	1.601
AC-228	1823.56	911.71	45.	201.	0.100	28.26	1.535s
AC-228	1937.43	968.61	67.	116.	0.058	51.69	1.962
BI-214	2241.08	1120.34	37.	67.	0.034	61.32	1.269s
CO-60	2346.00	1172.77	76.	84.	0.042	68.53	1.580s
CO-60	2665.89	1332.60	30.	74.	0.037	62.02	1.225s
K-40	2922.78	1460.94	3.	567.	0.283	12.73	1.878
BI-214	3530.85	1764.69	3.	21.	0.010	73.68	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		1.9713E-01					
			477.56	1.971E-01	%(	5.234E-01 1.57E-01 G	
K-40		1.4927E+01					
			1460.75	1.493E+01	(P	2.892E-01 6.34E-01 G	
MN-54		1.3279E-02					
			834.81	1.328E-02	%(P	6.050E-02 1.76E-02 G	
CO-57		-3.2961E-03					
			122.07	-3.296E-03	%(	6.711E-02 2.00E-02 G K	
			136.43	2.410E-02	&	5.033E-01 1.50E-01 G	
CO-60		1.9519E-01					
			1332.51	1.925E-01	(P	7.384E-02 3.99E-02 G K	
			1173.23	1.978E-01	*(	1.013E-01 4.52E-02 G K	
Sr-85		-2.4266E-02					
			514.00	-2.427E-02	%(	7.248E-02 2.17E-02 G	
Kr-85		-5.4857E+02					
			513.99	-5.486E+02	%(	1.639E+03 4.91E+02 G	
Y-88		-2.2996E-05					
			1836.01	-2.300E-05	%(P	7.944E-02 2.12E-02 G K	
			898.02	-2.205E-02	% P	7.050E-02 2.07E-02 G	
NB-94		9.5197E-03					
			871.10	9.520E-03	%(	6.377E-02 1.83E-02 G K	
			702.50	-6.785E-03	%	5.639E-02 1.62E-02 G K	
Ag-108M		1.1415E-02					
			722.95	1.141E-02	%(	7.716E-02 2.25E-02 G K	
			614.37	-2.521E-03	& P	6.839E-02 1.96E-02 G	
			433.93	2.119E-02	%	5.147E-02 1.55E-02 G	
CD-109		1.0764E-01					
			88.04	1.076E-01	&(P	2.342E+00 6.99E-01 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-1.7644E-02						
		391.71	-1.764E-02	%(	8.179E-02	2.42E-02	G K
		255.04	-4.008E-01	%	2.409E+00	7.16E-01	G
SB-125	1.2991E-01						
		427.95	3.032E-02	%(P	1.425E-01	4.17E-02	G K
		600.77	-5.276E-02	% P	2.663E-01	7.73E-02	G
		636.15	-9.363E-02	% P	4.960E-01	1.44E-01	G
		463.51	4.247E-01	*(P	5.497E-01	1.71E-01	G
		176.29	1.332E-01	% P	7.449E-01	2.22E-01	G
I-131	-1.1371E-02						
		364.48	-1.137E-02	&(	7.212E-02	2.13E-02	G K
		636.97	1.768E-01	%	7.217E-01	2.10E-01	G
		284.29	2.152E-01	%	8.915E-01	2.66E-01	G
CS-134	3.4343E-02						
		604.66	6.300E-04	%(	5.424E-02	1.54E-02	G K
		795.76	7.287E-02	(	5.580E-02	1.94E-02	G
		569.29	-4.364E-02	&	3.554E-01	1.03E-01	G
		801.84	1.340E-01	% P	4.921E-01	1.43E-01	G
CS-137	2.6953E-01						
		661.62	2.695E-01	@(	8.013E-02	4.04E-02	G
CE-139	-1.2474E-03						
		165.85	-1.247E-03	%(P	6.395E-02	1.90E-02	G
EU-152	-4.8803E-03						
		121.78	-4.880E-03	%(P	1.748E-01	5.18E-02	G K
		344.30	-3.051E-02	%	1.701E-01	5.02E-02	G
		1408.08	4.404E-02	%	2.393E-01	6.65E-02	G
		964.00	3.089E-01	% P	4.966E-01	1.54E-01	G
		1112.07	2.120E-02	%	7.619E-01	2.18E-01	G
		778.90	-8.605E-02	% P	4.598E-01	1.33E-01	G
EU-154	-1.1791E-02						
		123.10	-1.179E-02	%(P	1.402E-01	4.18E-02	G K
		1274.80	-2.416E-02	&	2.124E-01	6.01E-02	G
		723.30	4.113E-02	% P	3.790E-01	1.10E-01	G
		1004.80	1.049E-01	&	2.737E-01	8.14E-02	G
EU-155	8.8479E-03						
		86.45	8.848E-03	&(P	3.088E-01	9.22E-02	G K
		105.31	5.387E-02	&	2.800E-01	8.39E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	1.2743E-03						
		279.17	1.274E-03	%(P	5.254E-02	1.53E-02	G K
		72.87	-6.137E-01	%	2.431E+00	7.32E-01	G
		70.83	7.105E-02	%	4.087E+00	1.22E+00	G
		82.50	-9.200E-01	%	4.620E+00	1.39E+00	G
TL-208	3.9244E-01						
		583.14	3.924E-01	(P	8.283E-02	4.21E-02	G
		510.72	6.216E-01	+	2.585E-01	1.12E-01	G
PB-212	9.0713E-01						
		238.63	9.141E-01	(	1.320E-01	5.16E-02	G K
							Energy duplication
		77.11	8.899E-01	(	6.780E-01	2.12E-01	G
		74.81	1.351E+00	& P	1.333E+00	4.12E-01	G
PB-214	5.4730E-01						
		351.99	5.612E-01	@(P	1.269E-01	5.01E-02	G K
		295.22	5.204E-01	(	2.379E-01	8.10E-02	G
							Energy duplication
		77.11	1.455E+00	+	1.109E+00	3.46E-01	G
		241.92	3.287E-01	%	9.072E-01	2.74E-01	G
BI-212	5.9756E-01						
		727.17	5.976E-01	(	5.356E-01	1.76E-01	G K
		1620.56	1.570E-01	% P	1.820E+00	4.74E-01	G
		785.42	1.055E+00	% P	3.088E+00	9.18E-01	G
BI-214	4.6891E-01						
		609.32	4.818E-01	(	1.143E-01	5.47E-02	G K
		1764.51	4.315E-01	?(P	2.169E-01	1.06E-01	G
		1120.28	1.005E+00	+	4.633E-01	2.05E-01	G
RA-224	1.0593E+00						
		241.00	1.059E+00	%(P	1.649E+00	5.04E-01	G
RA-226	1.0174E+00						
		185.99	1.017E+00	%(P	1.430E+00	4.38E-01	G
AC-228	1.3086E+00						
		911.07	1.304E+00	@(P	2.211E-01	1.23E-01	G K
		968.90	1.317E+00	(P	4.655E-01	2.27E-01	G
		338.40	1.065E+00	-	4.131E-01	1.66E-01	G
TH-227	-1.7595E-01						
		236.00	-1.759E-01	%(P	5.995E-01	1.80E-01	G K
		256.25	-1.072E-01	%	6.895E-01	2.05E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	6.7942E-02						
		98.44	6.794E-02	%(	3.016E-01	9.06E-02	G K
		946.00	7.036E-03	%	2.799E-01	7.74E-02	G
		131.28	-8.870E-03	%	2.795E-01	8.32E-02	G
		94.67	-4.555E-02	&	5.598E-01	1.67E-01	G
		883.24	1.121E-01	%	4.852E-01	1.41E-01	G
		926.70	2.774E-02	%	5.804E-01	1.63E-01	G
		569.26	-6.476E-02	&	5.263E-01	1.53E-01	G
TH-234	1.0528E+00						
		63.29	1.053E+00	%(P	5.490E+00	1.65E+00	G K
		92.80	1.445E+00	%	2.866E+00	8.70E-01	G
		92.38	1.797E+00	% P	3.361E+00	1.02E+00	G
AM-241	7.4959E-02						
		59.54	7.496E-02	&(	7.385E-01	2.20E-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	1.9217E-01	1.9713E-01	4.7094E-01	4.7107E-01	5.102E-01
K-40		1.4927E+01	1.4927E+01	1.9009E+00	2.0773E+00	
MN-54	#A	1.3221E-02	1.3279E-02	5.2728E-02	5.2733E-02	6.024E-02
CO-57	#B	-3.2796E-03	-3.2961E-03	5.9952E-02	5.9952E-02	6.677E-02
CO-60		1.9506E-01	1.9519E-01	9.0250E-02	9.0912E-02	
Sr-85	#A	-2.3763E-02	-2.4266E-02	6.5115E-02	6.5130E-02	7.098E-02
Kr-85	#A	-5.4856E+02	-5.4857E+02	1.4721E+03	1.4724E+03	1.639E+03
Y-88	#B	-2.2704E-05	-2.2996E-05	8.3573E-04	8.3574E-04	7.843E-02
NB-94	#B	9.5197E-03	9.5197E-03	5.5019E-02	5.5022E-02	6.377E-02
Ag-108M	#B	1.1414E-02	1.1415E-02	6.7377E-02	6.7380E-02	7.716E-02
CD-109	#A	1.0732E-01	1.0764E-01	2.0958E+00	2.0958E+00	2.335E+00
SN-113	#B	-1.7437E-02	-1.7644E-02	7.2639E-02	7.2645E-02	8.083E-02
SB-125	#B	1.2973E-01	1.2991E-01	1.5695E-01	1.5712E-01	1.424E-01
I-131	#B	-9.6021E-03	-1.1371E-02	6.3751E-02	6.3754E-02	6.090E-02
CS-134	#B	3.4281E-02	3.4343E-02	2.7475E-02	2.7543E-02	5.414E-02
CS-137	#	2.6950E-01	2.6953E-01	1.2128E-01	1.2222E-01	
CE-139	#A	-1.2352E-03	-1.2474E-03	8.3920E-02	8.3920E-02	6.332E-02
EU-152	#B	-4.8788E-03	-4.8803E-03	2.7053E-01	2.7053E-01	1.748E-01
EU-154	#B	-1.1786E-02	-1.1791E-02	1.3025E-01	1.3025E-01	1.402E-01
EU-155	#B	8.8413E-03	8.8479E-03	2.7651E-01	2.7651E-01	3.085E-01
HG-203	#B	1.2376E-03	1.2743E-03	4.6014E-02	4.6014E-02	5.102E-02
TL-208		3.9244E-01	3.9244E-01	1.2631E-01	1.2821E-01	
PB-212	#	9.0713E-01	9.0713E-01	1.5352E-01	1.6174E-01	1.320E-01
PB-214	#	5.4730E-01	5.4730E-01	1.4652E-01	1.4970E-01	1.269E-01
BI-212	#	5.9756E-01	5.9756E-01	5.2690E-01	5.2797E-01	5.356E-01
BI-214		4.6891E-01	4.6891E-01	1.5963E-01	1.6179E-01	
RA-224	#A	1.0593E+00	1.0593E+00	1.5109E+00	1.5121E+00	1.649E+00
RA-226	#A	1.0174E+00	1.0174E+00	1.3140E+00	1.3152E+00	1.430E+00
AC-228		1.3086E+00	1.3086E+00	3.7022E-01	3.7743E-01	
TH-227	#B	-1.7595E-01	-1.7595E-01	5.4934E-01	5.4943E-01	5.995E-01
PA-234	#B	6.7942E-02	6.7942E-02	2.7183E-01	2.7186E-01	3.016E-01
TH-234	#B	1.0528E+00	1.0528E+00	4.9395E+00	4.9398E+00	5.490E+00
AM-241	#A	7.4958E-02	7.4959E-02	6.6089E-01	6.6090E-01	7.385E-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) 1.7561512E+01 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.7561684E+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_1DEC2005_1521.An1

Sample description
FSS-NOL-06-03-021-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_1DEC2005_1521.An1

Acquisition information
Start time: 01-Dec-2005 15:21:33
Live time: 2000
Real time: 2024
Dead time: 1.20 %
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: 1.7380E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7380E+03) =
5.7537E+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	29-Nov-2005 15:48:00
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: 0.1496

***** 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
74.46	100.	31.70	1.10	8.817E-03				
74.46	100.	31.70	1.10	8.817E-03	74.81	9.600	PBC<MDA	PB212
77.17	260.	12.23	1.10	9.631E-03	77.11	10.700	1.978E+00	PB214
					77.11	17.500	1.210E+00	PB212
93.21	116.	40.17	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.255E+00	TH234
93.25	117.	38.62	1.50	1.325E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.22	115.	32.10	1.20	1.712E-02				
186.03	144.	21.32	1.47	1.626E-02	185.99	3.280	2.039E+00	RA226
209.69	121.	24.14	2.11	1.517E-02				
238.76	806.	4.15	1.21	1.380E-02	238.63	43.100	1.054E+00	PB212
242.01	118.	21.17	1.22	1.366E-02	241.00	3.900	1.706E+00	RA224
					241.92	7.470	9.023E-01	PB214
270.07	104.	22.95	1.15	1.244E-02				
295.35	130.	14.36	1.25	1.147E-02				
295.35	130.	14.36	1.25	1.147E-02	295.22	19.200	4.578E-01	PB214
328.31	59.	29.68	1.96	1.036E-02				
338.35	171.	13.15	1.46	1.006E-02	338.40	12.010	1.103E+00	AC228
351.95	262.	10.63	1.31	9.680E-03				
351.95	262.	10.63	1.31	9.680E-03	351.99	37.100	5.667E-01	PB214
462.89	78.	26.68	0.79	7.375E-03				
462.89	78.	26.68	0.79	7.375E-03	463.51	10.000	8.125E-01	SB125
510.18	147.	15.20	1.61	6.702E-03	510.72	22.500	7.577E-01	TL208
583.29	248.	9.03	1.44	5.889E-03	583.14	86.000	3.797E-01	TL208
609.76	155.	11.45	1.82	5.645E-03	609.32	46.090	4.641E-01	BI214
727.44	65.	20.00	1.67	4.792E-03	727.17	11.800	8.934E-01	BI212

795.54	28.	38.98	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
911.45	177.	10.12	1.25	3.920E-03	911.07	29.000	1.207E+00	AC228
964.92	49.	18.10	1.72	3.731E-03				
969.39	77.	14.98	1.72	3.717E-03	968.90	17.460	9.217E-01	AC228
1120.65	61.	26.16	0.60	3.283E-03	1120.28	15.040	9.668E-01	BI214
1461.02	605.	4.26	1.93	2.620E-03	1460.75	10.700	1.678E+01	K40
1764.89	34.	17.15	2.00	2.225E-03	1764.51	15.920	7.443E-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	
148.50	74.71	456.	100.	0.050	95.10	1.098	BI-207	D
153.91	77.42	374.	260.	0.130	36.68	1.100	PB-214	D
256.02	128.22	482.	157.	0.078	64.18	1.197	AC-228	s
418.99	209.69	317.	121.	0.060	72.42	2.111	NP-239	s
477.15	238.63	156.	806.	0.403	12.44	1.215	PB-212	D
483.64	241.88	255.	118.	0.059	63.50	1.217	PB-214	D
539.78	270.07	193.	104.	0.052	68.85	1.153	AC-228	s
656.29	328.31	119.	59.	0.030	89.03	1.956	RH-106M	s
1930.51	964.82	15.	49.	0.025	54.15	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	982.	238.	0.119	59.09	1.500D
PB-212	153.80	77.11	982.	238.	0.119	59.09	1.500D
TH-234	186.08	93.25	981.	117.	0.058	115.87	1.500
TH-234	186.00	93.21	1028.	116.	0.058	120.51	1.500
RA-226	371.67	186.03	339.	140.	0.070	63.95	1.469s
PB-212	476.89	238.63	425.	726.	0.363	16.41	1.500D
PB-214	590.39	295.37	212.	122.	0.061	57.64	1.500s
AC-228	676.37	338.35	130.	171.	0.086	39.46	1.464
PB-214	703.72	352.02	129.	242.	0.121	27.67	1.500
SB-125	926.16	463.21	62.	58.	0.029	67.36	1.500s
TL-208	1020.15	510.18	103.	147.	0.073	45.59	1.614s
TL-208	1166.41	583.29	80.	247.	0.124	27.10	1.439
BI-214	1219.37	609.76	58.	155.	0.078	34.35	1.821s
BI-212	1454.84	727.44	40.	65.	0.032	60.00	1.670
CS-134	1591.10	795.54	44.	28.	0.014	116.95	1.601
AC-228	1823.03	911.45	46.	177.	0.088	30.35	1.245
AC-228	1938.01	968.90	36.	77.	0.039	47.52	1.718D
BI-214	2241.70	1120.65	55.	61.	0.031	78.47	0.598s
K-40	2922.94	1461.02	14.	605.	0.303	12.78	1.931
BI-214	3531.23	1764.89	0.	34.	0.017	51.45	1.998

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		7.6479E-02					
			477.56	7.648E-02	&(	5.007E-01 1.46E-01	G
K-40		1.6782E+01					
			1460.75	1.678E+01	(P	5.543E-01 7.15E-01	G
MN-54		3.2208E-02					
			834.81	3.221E-02	%(P	5.895E-02 1.81E-02	G
CO-57		-9.2568E-03					
			122.07	-9.257E-03	%(	6.085E-02 1.82E-02	G K
			136.43	6.983E-02	&	4.437E-01 1.32E-01	G
CO-60		2.5956E-02					
			1332.51	2.596E-02	%(P	6.636E-02 1.98E-02	G K
			1173.23	1.738E-02	%	8.669E-02 2.51E-02	G K
Sr-85		-2.9963E-02					
			514.00	-2.996E-02	%(	7.766E-02 2.34E-02	G
Kr-85		-6.7717E+02					
			513.99	-6.772E+02	%(	1.755E+03 5.28E+02	G
Y-88		-2.4216E-05					
			1836.01	-2.422E-05	%(P	6.209E-02 1.58E-02	G K
			898.02	-1.838E-02	% P	7.148E-02 2.07E-02	G
NB-94		0.0000E+00					
			871.10	0.000E+00	&(	5.691E-02 1.57E-02	G K
			702.50	-1.715E-03	&	6.461E-02 1.84E-02	G K
Ag-108M		-1.4278E-02					
			722.95	-1.428E-02	%(	4.443E-02 1.30E-02	G K
			614.37	-2.563E-02	% P	7.224E-02 2.16E-02	G
			433.93	4.632E-04	%	5.658E-02 1.63E-02	G
CD-109		3.1449E-01					
			88.04	3.145E-01	%(P	2.596E+00 7.77E-01	G
SN-113		2.0745E-03					
			391.71	2.075E-03	&(	7.653E-02 2.21E-02	G K
			255.04	4.723E-01	%	2.362E+00 7.03E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.5419E-01						
		427.95	-2.579E-03	%(P	1.580E-01	4.50E-02	G K
		600.77	2.872E-02	% P	3.204E-01	9.23E-02	G
		636.15	1.953E-02	% P	4.767E-01	1.35E-01	G
		463.51	6.182E-01	(P	4.177E-01	1.42E-01	G
		176.29	-3.285E-02	& P	7.423E-01	2.19E-01	G
I-131	-2.5541E-02						
		364.48	-2.554E-02	%(	7.912E-02	2.37E-02	G K
		636.97	1.542E-01	%	7.998E-01	2.31E-01	G
		284.29	-1.645E-01	%	8.059E-01	2.38E-01	G
CS-134	1.4241E-02						
		604.66	-2.327E-02	%(	7.283E-02	2.17E-02	G K
		795.76	5.711E-02	(	6.964E-02	2.23E-02	G
		569.29	1.540E-01	&	2.618E-01	8.10E-02	G
		801.84	-1.175E-02	& P	7.754E-01	2.19E-01	G
CS-137	1.2868E-02						
		661.62	1.287E-02	%(	7.052E-02	2.05E-02	G
CE-139	1.5649E-02						
		165.85	1.565E-02	%(P	6.309E-02	1.89E-02	G
EU-152	3.6701E-03						
		121.78	3.670E-03	%(P	2.074E-01	6.17E-02	G K
		344.30	-2.082E-02	&	1.640E-01	4.80E-02	G
		1408.08	8.881E-03	%	3.299E-01	8.96E-02	G
		964.00	-3.689E-01	& P	7.015E-01	2.14E-01	G
		1112.07	-1.149E-03	&	6.833E-01	1.93E-01	G
		778.90	-7.354E-02	% P	4.374E-01	1.26E-01	G
EU-154	-4.2844E-02						
		123.10	-4.284E-02	%(P	1.496E-01	4.50E-02	G K
		1274.80	-4.519E-04	%	2.266E-01	6.27E-02	G
		723.30	7.190E-03	% P	5.602E-01	1.63E-01	G
		1004.80	7.142E-02	%	3.289E-01	9.45E-02	G
EU-155	-2.4449E-02						
		86.45	-2.445E-02	%(P	3.319E-01	9.91E-02	G K
		105.31	5.039E-02	&	3.162E-01	9.47E-02	G
HG-203	2.0695E-03						
		279.17	2.070E-03	%(P	5.465E-02	1.60E-02	G K
		72.87	-1.283E-01	&	2.498E+00	7.47E-01	G
		70.83	-7.881E-01	&	4.479E+00	1.34E+00	G
		82.50	-3.122E-01	%	4.464E+00	1.33E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.7975E-01						
		583.14	3.797E-01	(P	6.798E-02	3.44E-02	G
		510.72	7.577E-01	+	2.583E-01	1.15E-01	G
PB-212	9.9483E-01						
							Energy duplication
		238.63	9.483E-01	(	1.291E-01	5.19E-02	G K
							Energy duplication
		77.11	1.109E+00	(	6.925E-01	2.19E-01	G
		74.81	7.940E-01	& P	1.393E+00	4.24E-01	G
PB-214	5.2359E-01						
		351.99	5.236E-01	(P	1.204E-01	4.84E-02	G K
		295.22	4.295E-01	-	2.493E-01	8.25E-02	G
							Energy duplication
		77.11	1.814E+00	+	1.133E+00	3.57E-01	G
		241.92	4.531E-01	%	8.743E-01	2.66E-01	G
BI-212	8.9340E-01						
		727.17	8.934E-01	(	4.423E-01	1.79E-01	G K
		1620.56	-3.958E-02	% P	2.583E+00	6.80E-01	G
		785.42	2.473E-01	& P	3.463E+00	9.90E-01	G
BI-214	4.6405E-01						
		609.32	4.641E-01	@(	1.137E-01	5.32E-02	G K
		1764.51	7.443E-01	+ P	1.618E-01	1.28E-01	G
		1120.28	9.668E-01	+	5.849E-01	2.53E-01	G
RA-224	9.7716E-01						
		241.00	9.772E-01	%(P	1.675E+00	5.10E-01	G
RA-226	2.0394E+00						
		185.99	2.039E+00	*(P	1.290E+00	4.49E-01	G
AC-228	1.1766E+00						
		911.07	1.207E+00	(P	2.356E-01	1.22E-01	G K
		968.90	9.225E-01	- P	3.673E-01	1.46E-01	G
		338.40	1.103E+00	(	3.588E-01	1.45E-01	G
TH-227	-2.3895E-01						
		236.00	-2.390E-01	%(P	5.357E-01	1.62E-01	G K
		256.25	1.420E-01	%	6.895E-01	2.05E-01	G
PA-234	-8.9715E-02						
		98.44	-8.972E-02	%(	2.989E-01	9.00E-02	G K
		946.00	1.196E-01	&	3.098E-01	9.25E-02	G
		131.28	-7.347E-02	%	2.997E-01	9.00E-02	G
		94.67	-1.031E-02	%	4.751E-01	1.41E-01	G
		883.24	-3.403E-02	%	4.642E-01	1.30E-01	G
		926.70	-2.649E-03	%	6.019E-01	1.68E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 2.244E-01 &   3.891E-01 1.20E-01 G

TH-234       1.1196E+00
                           63.29-7.746E-01 &(P 5.677E+00 1.70E+00 G K
                           92.80 2.255E+00  (  2.957E+00 9.06E-01 G
                           92.38 2.668E+00  (P 3.395E+00 1.04E+00 G

AM-241       2.7592E-02
                           59.54 2.759E-02 %(  7.473E-01 2.22E-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	7.4537E-02	7.6479E-02	4.3770E-01	4.3772E-01	4.879E-01
K-40		1.6782E+01	1.6782E+01	2.1455E+00	2.3430E+00	
MN-54	#A	3.2067E-02	3.2208E-02	5.4226E-02	5.4256E-02	5.869E-02
CO-57	#B	-9.2098E-03	-9.2568E-03	5.4480E-02	5.4483E-02	6.054E-02
CO-60	#B	2.5938E-02	2.5956E-02	5.9274E-02	5.9292E-02	6.631E-02

Sr-85	#A	-2.9335E-02	-2.9963E-02	7.0086E-02	7.0106E-02	7.603E-02
Kr-85	#A	-6.7716E+02	-6.7717E+02	1.5840E+03	1.5845E+03	1.755E+03
Y-88	#B	-2.3906E-05	-2.4216E-05	6.2232E-04	6.2232E-04	6.130E-02
NB-94	#B	0.0000E+00	0.0000E+00	4.7107E-02	4.7107E-02	5.691E-02
Ag-108M	#B	-1.4278E-02	-1.4278E-02	3.9099E-02	3.9107E-02	4.443E-02
CD-109	#A	3.1354E-01	3.1449E-01	2.3317E+00	2.3317E+00	2.588E+00
SN-113	#B	2.0499E-03	2.0745E-03	6.6398E-02	6.6398E-02	7.562E-02
SB-125	#B	1.5398E-01	1.5419E-01	1.0661E-01	1.0696E-01	1.578E-01
I-131	#B	-2.1530E-02	-2.5541E-02	7.1033E-02	7.1048E-02	6.670E-02
CS-134	#B	1.4215E-02	1.4241E-02	1.6655E-02	1.6674E-02	7.269E-02
CS-137	#A	1.2866E-02	1.2868E-02	6.1549E-02	6.1553E-02	7.052E-02
CE-139	#A	1.5493E-02	1.5649E-02	5.6722E-02	5.6729E-02	6.246E-02
EU-152	#B	3.6690E-03	3.6701E-03	1.8500E-01	1.8500E-01	2.073E-01
EU-154	#B	-4.2825E-02	-4.2844E-02	1.3647E-01	1.3650E-01	1.495E-01
EU-155	#B	-2.4431E-02	-2.4449E-02	5.6390E-01	5.6390E-01	3.317E-01
HG-203	#B	2.0094E-03	2.0695E-03	4.7902E-02	4.7902E-02	5.306E-02
TL-208		3.7975E-01	3.7975E-01	1.0310E-01	1.0528E-01	
PB-212	#	9.9483E-01	9.9483E-01	1.6328E-01	1.7256E-01	1.291E-01
PB-214	#	5.2359E-01	5.2359E-01	1.4512E-01	1.4806E-01	1.204E-01
BI-212		8.9340E-01	8.9340E-01	5.3604E-01	5.3838E-01	
BI-214		4.6405E-01	4.6405E-01	1.5942E-01	1.6154E-01	
RA-224	#A	9.7716E-01	9.7716E-01	1.5304E+00	1.5314E+00	1.675E+00
RA-226	#	2.0394E+00	2.0394E+00	1.3457E+00	1.3506E+00	
AC-228		1.1766E+00	1.1766E+00	2.9305E-01	3.0039E-01	
TH-227	#B	-2.3895E-01	-2.3895E-01	4.9223E-01	4.9241E-01	5.357E-01
PA-234	#B	-8.9715E-02	-8.9715E-02	2.7000E-01	2.7005E-01	2.989E-01
TH-234	#B	1.1196E+00	1.1196E+00	1.3103E+00	1.3118E+00	5.677E+00
AM-241	#A	2.7591E-02	2.7592E-02	6.6627E-01	6.6627E-01	7.473E-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) 2.1735136E+01 pCi/gm
Total Decayed Activity (1119.8 to 1999.0 keV) 2.1735142E+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_1DEC2005_1558.An1

Sample description
FSS-NOL-06-03-020-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_1DEC2005_1558.An1

Acquisition information
Start time: 01-Dec-2005 15:59:01
Live time: 2000
Real time: 2027
Dead time: 1.34 %
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: 1.8180E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8180E+03) =
5.5005E+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	29-Nov-2005 15:30:00
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: 0.1541

***** 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	156.	20.66	1.10	8.817E-03				
74.74	156.	20.66	1.10	8.817E-03	74.81	9.600	PBC<MDA	PB212
77.03	240.	13.56	1.10	9.509E-03				
77.03	240.	13.56	1.10	9.509E-03	77.11	17.500	1.070E+00	PB212
					77.11	10.700	1.749E+00	PB214
186.14	150.	27.37	1.64	1.626E-02	185.99	3.280	2.022E+00	RA226
209.60	113.	24.60	1.52	1.518E-02				
238.74	748.	4.42	1.21	1.380E-02	238.63	43.100	9.349E-01	PB212
241.57	114.	28.02	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	8.323E-01	PB214
270.56	86.	36.23	0.95	1.242E-02				
277.84	75.	33.09	1.33	1.212E-02				
277.84	75.	33.09	1.33	1.212E-02	279.17	81.500	5.833E-02	HG203
295.21	128.	15.18	1.25	1.147E-02				
295.21	128.	15.18	1.25	1.147E-02	295.22	19.200	4.335E-01	PB214
300.42	40.	39.63	1.26	1.129E-02				
338.48	158.	11.78	1.29	1.006E-02	338.40	12.010	9.694E-01	AC228
352.02	220.	12.79	1.31	9.678E-03	351.99	37.100	4.550E-01	PB214
463.31	75.	20.55	1.21	7.368E-03				
463.31	75.	20.55	1.21	7.368E-03	463.51	10.000	7.404E-01	SB125
510.99	128.	14.03	1.77	6.691E-03	510.72	22.500	6.297E-01	TL208
583.38	235.	9.82	1.44	5.888E-03	583.14	86.000	3.437E-01	TL208
609.43	207.	12.55	1.53	5.648E-03	609.32	46.090	5.909E-01	BI214
661.53	138.	18.03	1.24	5.230E-03	661.62	84.620	2.322E-01	CS137
912.30	163.	11.89	2.37	3.917E-03	911.07	29.000	1.064E+00	AC228
968.00	121.	15.42	1.62	3.721E-03	968.90	17.460	1.381E+00	AC228
1120.67	89.	26.19	1.39	3.282E-03	1120.28	15.040	1.337E+00	BI214

1173.41	153.	12.45	1.91	3.156E-03	1173.23	99.860	3.610E-01	CO60
1332.66	137.	11.12	1.90	2.834E-03	1332.51	99.980	3.584E-01	CO60
1460.99	646.	3.97	2.01	2.620E-03	1460.75	10.700	1.712E+01	K40
1764.58	37.	16.44	0.87	2.225E-03	1764.51	15.920	7.745E-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	
149.06	74.71	444.	156.	0.078	61.99	1.098	BI-207	D
153.63	77.00	411.	240.	0.120	40.68	1.100	PB-214	D
418.81	209.60	300.	113.	0.056	73.81	1.520	NP-239	s
477.11	238.64	173.	748.	0.374	13.26	1.215	PB-212	D
482.78	241.47	455.	114.	0.057	84.05	1.217	PB-214	D
540.76	270.56	306.	86.	0.043	108.70	0.945	AC-228	s
555.33	277.84	208.	75.	0.038	99.26	1.331	NP-239	l
600.50	300.21	104.	40.	0.020	118.88	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	149.07	74.75	1084.	135.	0.068	104.05	1.500s
PB-212	153.80	77.11	985.	221.	0.111	63.44	1.500D
PB-214	153.80	77.11	985.	221.	0.111	63.44	1.500D
RA-226	371.59	185.99	532.	121.	0.061	82.11	1.500s
PB-212	477.09	238.73	485.	627.	0.314	19.11	1.500
PB-214	590.18	295.26	259.	111.	0.056	67.58	1.500s
AC-228	676.76	338.54	196.	176.	0.088	47.11	1.164
PB-214	703.77	352.04	146.	204.	0.102	32.62	1.500
SB-125	926.28	463.26	79.	66.	0.033	66.31	1.500s
TL-208	1021.77	510.99	71.	128.	0.064	42.08	1.769s
TL-208	1166.59	583.38	93.	234.	0.117	29.45	1.438
BI-214	1218.72	609.43	117.	207.	0.104	37.65	1.532
CS-137	1322.96	661.53	118.	138.	0.069	54.10	1.239
AC-228	1824.74	912.30	56.	163.	0.081	35.68	2.369s
AC-228	1936.20	968.00	70.	121.	0.060	46.26	1.622
BI-214	2241.73	1120.67	96.	89.	0.044	78.57	1.394s
CO-60	2347.28	1173.41	60.	153.	0.076	37.36	1.911s
CO-60	2666.01	1332.66	22.	137.	0.068	33.36	1.901s
K-40	2922.89	1460.99	3.	646.	0.323	11.91	2.013
BI-214	3530.61	1764.58	0.	37.	0.018	49.32	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	Code	MDA Value pCi/gm	COMMENTS
BE-7		-4.6774E-02					
			477.56	-4.677E-02	&(	4.936E-01 1.43E-01	G
K-40		1.7120E+01					
			1460.75	1.712E+01	(P	2.911E-01 6.80E-01	G
MN-54		-9.2535E-03					
			834.81	-9.253E-03	&(P	7.905E-02 2.29E-02	G
CO-57		-1.1045E-03					
			122.07	-1.104E-03	&(	7.000E-02 2.08E-02	G K
			136.43	-9.928E-04	%	5.360E-01 1.59E-01	G
CO-60		3.5973E-01					
			1332.51	3.584E-01	@(P	6.512E-02 3.99E-02	G K
			1173.23	3.610E-01	(	9.157E-02 4.50E-02	G K
Sr-85		-3.7635E-02					
			514.00	-3.764E-02	%(	7.256E-02 2.21E-02	G
Kr-85		-8.5001E+02					
			513.99	-8.500E+02	%(	1.639E+03 4.99E+02	G
Y-88		-3.6052E-04					
			1836.01	-3.605E-04	&(P	5.557E-02 1.40E-02	G K
			898.02	-1.467E-02	% P	7.908E-02 2.28E-02	G
NB-94		1.0214E-02					
			871.10	1.021E-02	%(	5.939E-02 1.71E-02	G K
			702.50	1.766E-02	&	6.325E-02 1.87E-02	G K
Ag-108M		-1.0158E-02					
			722.95	-1.016E-02	&(	7.481E-02 2.17E-02	G K
			614.37	4.710E-03	% P	5.232E-02 1.49E-02	G
			433.93	1.417E-02	%	5.747E-02 1.70E-02	G
CD-109		5.9686E-02					
			88.04	5.969E-02	&(P	2.338E+00 6.97E-01	G
SN-113		2.2711E-02					
			391.71	2.271E-02	&(	6.407E-02 1.92E-02	G K
			255.04	-7.613E-02	&	2.280E+00 6.71E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.9619E-01						
		427.95	3.739E-02	%(P	1.481E-01	4.36E-02	G K
		600.77	6.951E-02	% P	2.938E-01	8.62E-02	G
		636.15	-9.622E-05	% P	4.223E-01	1.18E-01	G
		463.51	6.662E-01	(P	4.460E-01	1.51E-01	G
		176.29	-2.099E-01	% P	7.903E-01	2.36E-01	G
I-131	-1.5714E-02						
		364.48	-1.571E-02	&(	7.655E-02	2.27E-02	G K
		636.97	-1.743E-01	%	8.537E-01	2.49E-01	G
		284.29	9.234E-02	%	7.112E-01	2.08E-01	G
CS-134	-1.4640E-02						
		604.66	-1.464E-02	&(	6.358E-02	1.87E-02	G K
		795.76	3.156E-02	%	7.527E-02	2.26E-02	G
		569.29	-1.524E-02	&	3.871E-01	1.11E-01	G
		801.84	-9.863E-04	% P	9.481E-01	2.72E-01	G
CS-137	2.3217E-01						
		661.62	2.322E-01	(	8.952E-02	4.19E-02	G
CE-139	-1.5835E-03						
		165.85	-1.583E-03	%(P	5.085E-02	1.50E-02	G
EU-152	4.0352E-02						
		121.78	4.035E-02	%(P	2.015E-01	6.04E-02	G K
		344.30	-2.275E-02	%	1.759E-01	5.17E-02	G
		1408.08	-2.900E-03	%	2.290E-01	5.92E-02	G
		964.00	4.474E-01	& P	6.630E-01	2.05E-01	G
		1112.07	-1.606E-01	%	7.398E-01	2.17E-01	G
		778.90	3.785E-02	& P	4.719E-01	1.35E-01	G
EU-154	-1.1870E-02						
		123.10	-1.187E-02	&(P	1.467E-01	4.38E-02	G K
		1274.80	2.319E-03	%	1.984E-01	5.45E-02	G
		723.30	-5.200E-02	& P	3.528E-01	1.02E-01	G
		1004.80	-8.050E-02	&	4.197E-01	1.22E-01	G
EU-155	1.4703E-01						
		86.45	1.470E-01	%(P	2.875E-01	8.72E-02	G K
		105.31	-4.744E-03	%	3.319E-01	9.89E-02	G
HG-203	3.6295E-02						
		279.17	3.629E-02	&(P	5.346E-02	1.65E-02	G K
		72.87	-1.842E-02	&	1.990E+00	5.92E-01	G
		70.83	3.356E-01	&	4.199E+00	1.25E+00	G
		82.50	-2.912E+00	&	4.373E+00	1.34E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.4367E-01						
		583.14	3.437E-01	(P	6.985E-02	3.38E-02	G
		510.72	6.297E-01	+	2.077E-01	8.84E-02	G
PB-212	7.8380E-01						
		238.63	7.838E-01	(	1.316E-01	4.99E-02	G K
							Energy duplication
		77.11	9.853E-01	+	6.630E-01	2.08E-01	G
		74.81	1.184E+00	& P	1.366E+00	4.20E-01	G
PB-214	4.0713E-01						
		351.99	4.231E-01	(P	1.221E-01	4.61E-02	G K
		295.22	3.763E-01	@(	2.626E-01	8.48E-02	G
							Energy duplication
		77.11	1.611E+00	+	1.084E+00	3.41E-01	G
		241.92	2.643E-01	%	8.963E-01	2.70E-01	G
BI-212	3.3376E-01						
		727.17	3.338E-01	%(	5.181E-01	1.61E-01	G K
		1620.56	-3.784E-02	% P	1.943E+00	4.88E-01	G
		785.42	5.147E-01	& P	2.721E+00	7.85E-01	G
BI-214	6.3807E-01						
		609.32	5.909E-01	(	1.516E-01	7.42E-02	G K
		1764.51	7.745E-01	(P	1.546E-01	1.28E-01	G
		1120.28	1.337E+00	+	7.288E-01	3.50E-01	G
RA-224	1.1024E+00						
		241.00	1.102E+00	%(P	1.599E+00	4.89E-01	G
RA-226	1.6861E+00						
		185.99	1.686E+00	@(P	1.535E+00	4.79E-01	G
AC-228	1.1623E+00						
		911.07	1.064E+00	*(P	2.461E-01	1.27E-01	G K
		968.90	1.381E+00	(P	4.789E-01	2.13E-01	G
		338.40	1.083E+00	(	4.180E-01	1.70E-01	G
TH-227	-3.7487E-01						
		236.00	-3.749E-01	%(P	6.168E-01	1.88E-01	G K
		256.25	5.430E-02	&	6.760E-01	1.99E-01	G
PA-234	7.5141E-03						
		98.44	7.514E-03	%(	2.279E-01	6.76E-02	G K
		946.00	1.288E-01	%	3.126E-01	9.38E-02	G
		131.28	-4.833E-02	%	2.843E-01	8.51E-02	G
		94.67	-1.654E-01	%	5.442E-01	1.64E-01	G
		883.24	-1.019E-01	%	5.843E-01	1.69E-01	G
		926.70	-8.615E-02	&	6.601E-01	1.90E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.667E-02 &   5.715E-01 1.64E-01 G

TH-234       1.1503E+00
                           63.29 1.150E+00 %(P 5.189E+00 1.56E+00 G K
                           92.80 1.595E+00 &   2.743E+00 8.35E-01 G
                           92.38 1.858E+00 & P 3.251E+00 9.89E-01 G

AM-241      -1.1524E-01
                           59.54-1.152E-01 &(  8.244E-01 2.47E-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	-4.5564E-02	-4.6774E-02	4.2892E-01	4.2893E-01	4.808E-01
K-40		1.7120E+01	1.7120E+01	2.0398E+00	2.2548E+00	
MN-54	#A	-9.2121E-03	-9.2535E-03	7.4375E-02	7.4377E-02	7.869E-02
CO-57	#B	-1.0988E-03	-1.1045E-03	6.2491E-02	6.2491E-02	6.964E-02
CO-60	#	3.5947E-01	3.5973E-01	9.0105E-02	9.2338E-02	

Sr-85	#A	-3.6831E-02	-3.7635E-02	6.6231E-02	6.6265E-02	7.101E-02
Kr-85	#A	-8.4999E+02	-8.5001E+02	1.4963E+03	1.4970E+03	1.639E+03
Y-88	#B	-3.5582E-04	-3.6052E-04	4.7768E-02	4.7768E-02	5.485E-02
NB-94	#B	1.0214E-02	1.0214E-02	5.1239E-02	5.1242E-02	5.939E-02
Ag-108M	#B	-1.0157E-02	-1.0158E-02	6.5110E-02	6.5113E-02	7.480E-02
CD-109	#A	5.9502E-02	5.9686E-02	2.0906E+00	2.0906E+00	2.331E+00
SN-113	#B	2.2437E-02	2.2711E-02	5.7453E-02	5.7468E-02	6.329E-02
SB-125	#F	1.9592E-01	1.9619E-01	1.3314E-01	1.3360E-01	1.479E-01
I-131	#B	-1.3202E-02	-1.5714E-02	6.8041E-02	6.8047E-02	6.431E-02
CS-134	#B	-1.4613E-02	-1.4640E-02	5.6175E-02	5.6181E-02	6.346E-02
CS-137		2.3214E-01	2.3217E-01	1.2561E-01	1.2629E-01	
CE-139	#A	-1.5674E-03	-1.5835E-03	6.1136E-02	6.1136E-02	5.033E-02
EU-152	#B	4.0340E-02	4.0352E-02	1.8119E-01	1.8120E-01	2.014E-01
EU-154	#B	-1.1865E-02	-1.1870E-02	1.3629E-01	1.3630E-01	1.466E-01
EU-155	#B	1.4692E-01	1.4703E-01	2.6168E-01	2.6181E-01	2.873E-01
HG-203	#B	3.5220E-02	3.6295E-02	4.9387E-02	4.9429E-02	5.187E-02
TL-208		3.4367E-01	3.4367E-01	1.0138E-01	1.0319E-01	
PB-212	#	7.8380E-01	7.8380E-01	1.4977E-01	1.5610E-01	1.316E-01
PB-214	#	4.0713E-01	4.0713E-01	1.3305E-01	1.3500E-01	1.221E-01
BI-212	#B	3.3376E-01	3.3376E-01	4.8211E-01	4.8248E-01	5.181E-01
BI-214		6.3807E-01	6.3807E-01	1.9825E-01	2.0146E-01	
RA-224	#A	1.1024E+00	1.1024E+00	1.4683E+00	1.4696E+00	1.599E+00
RA-226	#	1.6861E+00	1.6861E+00	1.4355E+00	1.4386E+00	1.535E+00
AC-228		1.1623E+00	1.1623E+00	2.9090E-01	2.9813E-01	
TH-227	#B	-3.7487E-01	-3.7487E-01	5.6818E-01	5.6857E-01	6.168E-01
PA-234	#B	7.5141E-03	7.5141E-03	2.0278E-01	2.0278E-01	2.279E-01
TH-234	#B	1.1503E+00	1.1503E+00	4.6703E+00	4.6707E+00	5.189E+00
AM-241	#A	-1.1524E-01	-1.1524E-01	7.4015E-01	7.4018E-01	8.244E-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 (270.2 to 1999.0 keV) 1.9855282E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.9855572E+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_11NOV2005_1157.An1

Sample description
FSS NOL-06-03-018-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_11NOV2005_1157.An1

Acquisition information
Start time: 19-Nov-2005 11:57:51
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: 1.9850E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9850E+03) =
5.0378E+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 11:15:00
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: 0.2018

***** 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	147.	22.26	1.10	8.817E-03				
74.65	147.	22.26	1.10	8.817E-03	74.81	9.600	PBC<MDA	PB212
77.15	236.	14.64	1.10	9.571E-03	77.11	10.700	1.575E+00	PB214
					77.11	17.500	9.628E-01	PB212
92.76	121.	39.29	1.50	1.325E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.78	132.	35.73	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.247E+00	TH234
128.61	97.	39.78	1.11	1.713E-02				
186.04	86.	37.43	1.49	1.626E-02	185.99	3.280	PBC<MDA	RA226
209.33	78.	36.99	1.46	1.519E-02				
238.46	474.	7.70	1.50	1.365E-02				
238.46	474.	7.70	1.50	1.365E-02	238.63	43.100	PBC<MDA	PB212
238.54	745.	4.35	1.21	1.381E-02				
238.54	745.	4.35	1.21	1.381E-02	238.63	43.100	8.528E-01	PB212
242.20	102.	22.03	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
269.72	100.	28.64	1.02	1.245E-02				
295.08	150.	13.31	1.25	1.148E-02				
295.08	150.	13.31	1.25	1.148E-02	295.22	19.200	4.637E-01	PB214
300.01	60.	28.22	1.26	1.130E-02				
338.40	163.	13.79	1.17	1.006E-02	338.40	12.010	9.173E-01	AC228
351.78	245.	11.30	1.26	9.684E-03				
351.78	245.	11.30	1.26	9.684E-03	351.99	37.100	4.630E-01	PB214
511.05	125.	16.50	1.81	6.691E-03	510.72	22.500	5.667E-01	TL208
582.95	200.	9.84	1.64	5.892E-03	583.14	86.000	2.687E-01	TL208
608.92	198.	10.65	1.23	5.653E-03	609.32	46.090	5.182E-01	BI214
661.37	96.	19.47	1.12	5.231E-03	661.62	84.620	1.479E-01	CS137

727.06	87.	17.76	1.90	4.794E-03	727.17	11.800	1.047E+00	BI212
911.02	163.	10.54	1.77	3.922E-03	911.07	29.000	9.743E-01	AC228
968.67	118.	13.35	1.26	3.719E-03	968.90	17.460	1.237E+00	AC228
1120.85	64.	25.75	2.10	3.283E-03	1120.28	15.040	8.865E-01	BI214
1161.01	41.	34.87	1.41	3.185E-03				
1460.14	651.	3.92	1.79	2.622E-03	1460.75	10.700	1.580E+01	K40
1763.59	38.	16.22	0.78	2.225E-03	1764.51	15.920	7.286E-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	
148.87	74.71	463.	147.	0.074	66.79	1.098	BI-207	D
153.87	77.21	480.	236.	0.118	43.93	1.100	PB-214	D
418.27	209.33	329.	78.	0.039	110.97	1.464	AC-228	s
476.73	238.53	153.	745.	0.372	13.05	1.215	PB-212	D
539.09	269.72	249.	100.	0.050	85.92	1.023	AC-228	s
599.69	299.84	112.	60.	0.030	84.67	1.258	TH-227	lD
2322.46	1161.01	51.	41.	0.021	86.53	1.407	-	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	149.40	74.91	1107.	123.	0.062	114.96	1.500s
PB-214	153.80	77.11	998.	217.	0.109	64.98	1.500D
PB-212	153.80	77.11	998.	217.	0.109	64.98	1.500D
TH-234	185.10	92.76	1085.	121.	0.060	117.88	1.500
TH-234	185.14	92.78	1046.	132.	0.066	107.18	1.500
RA-226	371.87	186.13	530.	88.	0.044	109.64	1.500s
PB-212	476.72	238.54	413.	652.	0.326	17.70	1.500
RA-224	481.63	241.00	638.	111.	0.056	99.22	1.216D
PB-214	476.54	238.46	430.	474.	0.237	23.10	1.500s
PB-214	589.88	295.11	235.	143.	0.071	52.02	1.500
AC-228	676.47	338.40	131.	163.	0.081	41.37	1.170
PB-214	703.38	351.85	159.	227.	0.113	30.81	1.500
TL-208	1021.88	511.05	95.	125.	0.063	49.50	1.807s
TL-208	1165.74	582.95	70.	200.	0.100	29.52	1.639
BI-214	1217.70	608.92	80.	198.	0.099	31.95	1.225
CS-137	1322.64	661.37	82.	96.	0.048	58.40	1.121
BI-212	1454.07	727.06	46.	87.	0.043	53.29	1.899s
AC-228	1822.18	911.02	44.	163.	0.081	31.61	1.772s
AC-228	1937.54	968.67	42.	118.	0.059	40.05	1.264
BI-214	2242.10	1120.85	57.	64.	0.032	77.24	2.104s
K-40	2921.19	1460.14	2.	645.	0.322	11.88	1.788
BI-214	3528.64	1763.59	0.	38.	0.019	48.67	0.785s

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		1.4064E-01					
			477.56	1.406E-01	%(	4.158E-01 1.24E-01	G
K-40		1.5648E+01					
			1460.75	1.565E+01	(P	2.429E-01 6.20E-01	G
MN-54		-8.0186E-04					
			834.81	-8.019E-04	%(P	5.162E-02 1.43E-02	G
CO-57		-1.7711E-02					
			122.07	-1.771E-02	%(	6.261E-02 1.88E-02	G K
			136.43	2.310E-02	%	4.839E-01 1.44E-01	G
CO-60		3.9164E-02					
			1332.51	3.916E-02	%(P	5.596E-02 1.79E-02	G K
			1173.23	4.203E-02	%	6.710E-02 2.09E-02	G K
Sr-85		-1.9115E-02					
			514.00	-1.911E-02	%(	6.400E-02 1.91E-02	G
Kr-85		-4.3181E+02					
			513.99	-4.318E+02	%(	1.446E+03 4.31E+02	G
Y-88		-2.1209E-05					
			1836.01	-2.121E-05	&(P	5.438E-02 1.38E-02	G K
			898.02	-4.332E-03	& P	5.825E-02 1.62E-02	G
NB-94		6.8058E-03					
			871.10	6.806E-03	&(	4.196E-02 1.19E-02	G K
			702.50	-6.629E-05	%	5.059E-02 1.42E-02	G K
Ag-108M		-2.9833E-02					
			722.95	-2.983E-02	%(	7.918E-02 2.37E-02	G K
			614.37	7.229E-03	% P	5.992E-02 1.74E-02	G
			433.93	-2.088E-03	%	5.153E-02 1.49E-02	G
CD-109		-7.8355E-01					
			88.04	-7.835E-01	%(P	2.062E+00 6.22E-01	G
SN-113		6.3306E-05					
			391.71	6.331E-05	%(	6.891E-02 1.99E-02	G K
			255.04	-3.406E-01	%	1.966E+00 5.83E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-5.3082E-03						
		427.95	-5.308E-03	%(P	1.367E-01	3.90E-02	G K
		600.77	-9.039E-04	% P	2.928E-01	8.35E-02	G
		636.15	1.397E-01	% P	3.035E-01	9.18E-02	G
		463.51	5.390E-03	% P	5.603E-01	1.62E-01	G
		176.29	2.383E-02	% P	7.293E-01	2.16E-01	G
I-131	2.1618E-04						
		364.48	2.162E-04	&(	5.084E-02	1.46E-02	G K
		636.97	-1.911E-01	%	8.618E-01	2.53E-01	G
		284.29	-1.638E-02	%	8.036E-01	2.35E-01	G
CS-134	-1.9185E-02						
		604.66	-1.919E-02	%(	6.739E-02	2.00E-02	G K
		795.76	2.693E-02	%	6.075E-02	1.83E-02	G
		569.29	-5.115E-02	%	3.450E-01	1.01E-01	G
		801.84	-1.102E-01	% P	6.498E-01	1.88E-01	G
CS-137	1.4786E-01						
		661.62	1.479E-01	(	6.906E-02	2.88E-02	G
CE-139	-1.1528E-02						
		165.85	-1.153E-02	%(P	5.479E-02	1.64E-02	G
EU-152	-4.8424E-02						
		121.78	-4.842E-02	%(P	1.876E-01	5.64E-02	G K
		344.30	-6.476E-02	%	1.619E-01	4.88E-02	G
		1408.08	-2.570E-03	%	2.630E-01	7.03E-02	G
		964.00	4.280E-02	& P	1.197E+00	3.54E-01	G
		1112.07	1.587E-01	%	4.586E-01	1.36E-01	G
		778.90	1.188E-01	% P	3.592E-01	1.06E-01	G
EU-154	-2.5609E-02						
		123.10	-2.561E-02	%(P	1.359E-01	4.07E-02	G K
		1274.80	-1.900E-03	%	1.859E-01	5.12E-02	G
		723.30	-1.320E-01	% P	3.548E-01	1.06E-01	G
		1004.80	-1.046E-01	%	3.591E-01	1.06E-01	G
EU-155	4.1257E-02						
		86.45	4.126E-02	%(P	2.386E-01	7.14E-02	G K
		105.31	6.687E-02	%	2.973E-01	8.93E-02	G
HG-203	2.7928E-02						
		279.17	2.793E-02	&(P	4.872E-02	1.49E-02	G K
		72.87	-7.043E-01	%	2.290E+00	6.91E-01	G
		70.83	2.509E-02	&	3.968E+00	1.18E+00	G
		82.50	-9.196E-01	%	4.265E+00	1.28E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.6865E-01						
		583.14	2.687E-01	(P	5.608E-02	2.65E-02	G
		510.72	5.667E-01	+	2.171E-01	9.35E-02	G
PB-212	7.4545E-01						
		238.63	7.455E-01	(	1.114E-01	4.40E-02	G K
							Energy duplication
		77.11	8.854E-01	&	6.111E-01	1.92E-01	G
		74.81	9.863E-01	& P	1.265E+00	3.87E-01	G
PB-214	4.3392E-01						
		351.99	4.298E-01	(P	1.165E-01	4.42E-02	G K
		295.22	4.419E-01	(	2.295E-01	7.66E-02	G
							Energy duplication
		77.11	1.448E+00	&	9.995E-01	3.14E-01	G
		241.92	3.166E+00	+	6.628E-01	2.44E-01	G
BI-212	1.0470E+00						
		727.17	1.047E+00	*(	4.130E-01	1.86E-01	G K
		1620.56	2.943E-01	% P	1.602E+00	4.33E-01	G
		785.42	9.155E-01	% P	2.496E+00	7.43E-01	G
BI-214	5.1822E-01						
		609.32	5.182E-01	(	1.159E-01	5.52E-02	G K
		1764.51	7.286E-01	+ P	1.416E-01	1.18E-01	G
		1120.28	8.865E-01	+	5.212E-01	2.28E-01	G
RA-224	1.4197E+00						
		241.00	1.420E+00	(P	1.534E+00	4.74E-01	G
RA-226	1.1234E+00						
		185.99	1.123E+00	(P	1.403E+00	4.31E-01	G
AC-228	1.0411E+00						
		911.07	9.743E-01	@(P	2.017E-01	1.03E-01	G K
		968.90	1.237E+00	(P	3.453E-01	1.65E-01	G
		338.40	9.173E-01	(	3.160E-01	1.26E-01	G
TH-227	-1.6369E-01						
		236.00	-1.637E-01	%(P	4.470E-01	1.35E-01	G K
		256.25	-1.078E-01	%	6.190E-01	1.84E-01	G
PA-234	0.0000E+00						
		98.44	0.000E+00	%(	2.866E-01	8.54E-02	G K
		946.00	-6.083E-03	%	2.448E-01	6.73E-02	G
		131.28	-1.447E-02	%	2.454E-01	7.30E-02	G
		94.67	-1.630E-01	%	5.155E-01	1.55E-01	G
		883.24	1.068E-01	&	3.818E-01	1.11E-01	G
		926.70	1.593E-01	%	4.612E-01	1.36E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-7.666E-02 %   5.110E-01 1.49E-01 G

TH-234       1.2218E+00
                           63.29-3.507E-01 &(P 4.714E+00 1.41E+00 G K
                           92.80 2.247E+00  (  2.612E+00 8.03E-01 G
                           92.38 2.411E+00  (P 3.123E+00 9.57E-01 G

AM-241       6.3568E-02
                           59.54 6.357E-02 &(  6.965E-01 2.08E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	1.3698E-01	1.4064E-01	3.7169E-01	3.7177E-01	4.050E-01
K-40		1.5648E+01	1.5648E+01	1.8601E+00	2.0570E+00	
MN-54	#A	-7.9825E-04	-8.0186E-04	1.0774E-01	1.0774E-01	5.139E-02
CO-57	#B	-1.7619E-02	-1.7711E-02	5.6505E-02	5.6514E-02	6.229E-02
CO-60	#B	3.9135E-02	3.9164E-02	5.3568E-02	5.3614E-02	5.592E-02

Sr-85	#A	-1.8704E-02	-1.9115E-02	5.7276E-02	5.7286E-02	6.263E-02
Kr-85	#A	-4.3180E+02	-4.3181E+02	1.2939E+03	1.2941E+03	1.446E+03
Y-88	#B	-2.0931E-05	-2.1209E-05	5.4505E-04	5.4505E-04	5.367E-02
NB-94	#B	6.8058E-03	6.8058E-03	3.5555E-02	3.5557E-02	4.196E-02
Ag-108M	#B	-2.9832E-02	-2.9833E-02	7.1246E-02	7.1266E-02	7.918E-02
CD-109	#A	-7.8112E-01	-7.8355E-01	1.9727E+00	1.9732E+00	2.055E+00
SN-113	#B	6.2536E-05	6.3306E-05	5.9698E-02	5.9698E-02	6.807E-02
SB-125	#B	-5.3009E-03	-5.3082E-03	3.9619E-01	3.9619E-01	1.365E-01
I-131	#B	1.8147E-04	2.1618E-04	4.3674E-02	4.3674E-02	4.268E-02
CS-134	#B	-1.9149E-02	-1.9185E-02	6.0111E-02	6.0121E-02	6.726E-02
CS-137		1.4784E-01	1.4786E-01	8.6354E-02	8.6752E-02	
CE-139	#A	-1.1410E-02	-1.1528E-02	5.1057E-02	5.1061E-02	5.423E-02
EU-152	#B	-4.8409E-02	-4.8424E-02	1.7778E-01	1.7780E-01	1.876E-01
EU-154	#B	-2.5598E-02	-2.5609E-02	1.2414E-01	1.2415E-01	1.358E-01
EU-155	#B	4.1225E-02	4.1257E-02	2.1420E-01	2.1421E-01	2.384E-01
HG-203	#B	2.7097E-02	2.7928E-02	4.4643E-02	4.4671E-02	4.727E-02
TL-208		2.6865E-01	2.6865E-01	7.9471E-02	8.0888E-02	
PB-212	#	7.4545E-01	7.4545E-01	1.3192E-01	1.3839E-01	1.114E-01
PB-214	#	4.3392E-01	4.3392E-01	1.3124E-01	1.3348E-01	1.165E-01
BI-212	#	1.0470E+00	1.0470E+00	5.5791E-01	5.6099E-01	
BI-214		5.1822E-01	5.1822E-01	1.6557E-01	1.6811E-01	
RA-224	A	1.4197E+00	1.4197E+00	1.4232E+00	1.4254E+00	
RA-226	#A	1.1234E+00	1.1234E+00	1.2940E+00	1.2955E+00	1.403E+00
AC-228		1.0411E+00	1.0411E+00	2.2805E-01	2.3541E-01	
TH-227	#B	-1.6369E-01	-1.6369E-01	4.1027E-01	4.1037E-01	4.470E-01
PA-234	#B	0.0000E+00	0.0000E+00	2.5625E-01	2.5625E-01	2.866E-01
TH-234	#B	1.2218E+00	1.2218E+00	1.3096E+00	1.3113E+00	4.714E+00
AM-241	#A	6.3568E-02	6.3568E-02	6.2327E-01	6.2328E-01	6.965E-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) 2.0090252E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 2.0090267E+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: 102F_18NOV2005_1603.An1

Sample description
FSS-NOL-06-03-013-F-S

Spectrum Filename: C:\GammaVision\Spectra\102F_18NOV2005_1603.An1

Acquisition information

Start time:	18-Nov-2005 16:03:19
Live time:	2000
Real time:	2029
Dead time:	1.41 %
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:	2.2410E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.2410E+03) = 4.4623E+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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1425

***** 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
74.45	152.	21.76	1.10	8.818E-03				
74.45	152.	21.76	1.10	8.818E-03	74.81	9.600	PBC<MDA	PB212
77.08	244.	14.25	1.10	9.611E-03	77.11	10.700	1.439E+00	PB214
					77.11	17.500	8.798E-01	PB212
184.86	104.	33.69	1.13	1.631E-02				
184.86	104.	33.69	1.13	1.631E-02	185.99	3.280	PBC<MDA	RA226
209.15	97.	29.55	1.16	1.520E-02				
238.62	690.	4.68	1.21	1.381E-02				
238.62	690.	4.68	1.21	1.381E-02	238.63	43.100	6.989E-01	PB212
241.62	118.	20.18	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.958E-01	PB214
295.21	128.	15.51	1.44	1.147E-02				
295.21	128.	15.51	1.44	1.147E-02	295.22	19.200	3.506E-01	PB214
338.37	184.	14.73	1.54	1.006E-02	338.40	12.010	9.174E-01	AC228
351.85	231.	9.82	1.36	9.683E-03				
351.85	231.	9.82	1.36	9.683E-03	351.99	37.100	3.879E-01	PB214
463.05	89.	27.35	1.31	7.372E-03				
463.05	89.	27.35	1.31	7.372E-03	463.51	10.000	7.183E-01	SB125
510.93	89.	19.15	1.59	6.692E-03	510.72	22.500	3.563E-01	TL208
583.05	222.	10.34	1.59	5.891E-03	583.14	86.000	2.642E-01	TL208
609.24	172.	14.96	1.31	5.650E-03	609.32	46.090	3.983E-01	BI214
661.48	180.	13.08	1.46	5.230E-03	661.62	84.620	2.453E-01	CS137
727.04	81.	24.09	1.73	4.795E-03	723.30	19.700	5.134E-01	EU154
					727.17	11.800	8.634E-01	BI212
795.23	32.	39.66	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
910.83	149.	15.15	1.64	3.923E-03	911.07	29.000	7.898E-01	AC228
968.74	66.	22.62	1.30	3.718E-03	968.90	17.460	6.146E-01	AC228

1120.26	75.	18.77	2.55	3.283E-03	1120.28	15.040	9.171E-01	BI214
1172.87	227.	9.57	1.93	3.158E-03	1173.23	99.860	4.344E-01	CO60
1332.15	212.	7.86	1.97	2.834E-03	1332.51	99.980	4.508E-01	CO60
1460.39	582.	4.21	2.00	2.621E-03	1460.75	10.700	1.251E+01	K40
1764.13	25.	20.00	0.73	2.225E-03	1764.51	15.920	4.241E-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	
148.48	74.72	473.	152.	0.076	65.29	1.098	BI-207	D
153.74	77.35	480.	244.	0.122	42.74	1.100	PB-214	D
369.33	184.86	466.	104.	0.052	101.06	1.131	U-235	l
417.93	209.15	326.	97.	0.048	88.64	1.160	AC-228	
476.86	238.57	176.	690.	0.345	14.04	1.215	PB-212	D
482.88	241.58	223.	118.	0.059	60.55	1.217	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	148.59	74.51	1067.	129.	0.064	108.10	1.500s
PB-214	153.80	77.11	1098.	213.	0.107	69.02	1.500D
PB-212	153.80	77.11	1098.	213.	0.107	69.02	1.500D
PB-212	476.92	238.65	423.	637.	0.319	18.14	1.500s
PB-214	590.15	295.25	222.	125.	0.063	57.10	1.500
AC-228	676.42	338.37	196.	184.	0.092	44.20	1.539s
PB-214	703.42	351.87	172.	237.	0.118	30.47	1.500
SB-125	925.86	463.06	115.	43.	0.022	110.77	1.500
TL-208	1021.64	510.93	84.	89.	0.045	57.46	1.594s
TL-208	1165.94	583.05	99.	222.	0.111	31.02	1.594
BI-214	1218.33	609.24	140.	172.	0.086	44.88	1.312
CS-137	1322.87	661.48	104.	180.	0.090	39.24	1.456
BI-212	1454.04	727.04	81.	81.	0.041	72.26	1.728s
CS-134	1590.48	795.23	65.	32.	0.016	118.98	1.601s
AC-228	1821.81	910.83	93.	149.	0.074	45.46	1.643
AC-228	1937.17	968.48	109.	108.	0.054	66.63	1.326
BI-214	2240.92	1120.26	40.	75.	0.038	56.32	2.555s
CO-60	2346.21	1172.87	72.	227.	0.113	28.71	1.925
CO-60	2665.00	1332.15	18.	212.	0.106	23.59	1.970
K-40	2921.68	1460.39	5.	582.	0.291	12.62	2.002
BI-214	3529.72	1764.13	0.	25.	0.012	60.00	0.729s

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		1.1885E-01					
			477.56	1.189E-01	&(	4.658E-01 1.38E-01	G
K-40		1.2512E+01					
			1460.75	1.251E+01	(P	2.857E-01 5.26E-01	G
MN-54		1.0751E-02					
			834.81	1.075E-02	&(P	6.381E-02 1.86E-02	G
CO-57		-4.9842E-03					
			122.07	-4.984E-03	&(	5.851E-02 1.75E-02	G K
			136.43	-8.410E-02	%	4.453E-01 1.33E-01	G
CO-60		4.4263E-01					
			1332.51	4.508E-01	(P	4.819E-02 3.55E-02	G K
			1173.23	4.344E-01	(	8.086E-02 4.16E-02	G K
Sr-85		-2.2291E-02					
			514.00	-2.229E-02	&(	5.889E-02 1.77E-02	G
Kr-85		-5.0794E+02					
			513.99	-5.079E+02	&(	1.342E+03 4.03E+02	G
Y-88		-5.9117E-03					
			1836.01	-5.912E-03	%(P	4.981E-02 1.34E-02	G K
			898.02	-5.879E-03	% P	5.855E-02 1.66E-02	G
NB-94		1.4228E-02					
			871.10	1.423E-02	%(	5.194E-02 1.53E-02	G K
			702.50	2.119E-02	%	4.723E-02 1.43E-02	G K
Ag-108M		3.3034E-03					
			722.95	3.303E-03	%(	4.842E-02 1.37E-02	G K
			614.37	6.559E-03	& P	6.039E-02 1.76E-02	G
			433.93	7.685E-03	%	3.918E-02 1.15E-02	G
CD-109		-1.7034E-01					
			88.04	-1.703E-01	%(P	2.199E+00 6.58E-01	G
SN-113		8.9308E-04					
			391.71	8.931E-04	%(	6.628E-02 1.92E-02	G K
			255.04	3.064E-02	%	2.023E+00 5.96E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.1265E-02						
		427.95	2.761E-03	%(P	1.092E-01	3.10E-02	G K
		600.77	8.643E-02	& P	2.561E-01	7.63E-02	G
		636.15	1.085E-01	% P	4.087E-01	1.20E-01	G
		463.51	3.532E-01	(P	4.319E-01	1.35E-01	G
		176.29	1.205E-01	% P	6.729E-01	2.01E-01	G
I-131	5.6508E-03						
		364.48	5.651E-03	%(	5.487E-02	1.61E-02	G K
		636.97	1.000E-01	%	6.935E-01	2.01E-01	G
		284.29	1.297E-01	&	7.821E-01	2.32E-01	G
CS-134	2.4657E-02						
		604.66	1.157E-03	%(	1.042E-01	3.07E-02	G K
		795.76	5.151E-02	(	6.464E-02	2.04E-02	G
		569.29	-2.422E-02	&	2.914E-01	8.40E-02	G
		801.84	-9.827E-02	% P	5.823E-01	1.68E-01	G
CS-137	2.4530E-01						
		661.62	2.453E-01	(	6.846E-02	3.21E-02	G
CE-139	1.0229E-02						
		165.85	1.023E-02	%(P	5.513E-02	1.65E-02	G
EU-152	-2.1011E-03						
		121.78	-2.101E-03	&(P	1.676E-01	4.98E-02	G K
		344.30	-2.552E-02	&	1.519E-01	4.49E-02	G
		1408.08	-2.574E-02	&	2.307E-01	6.35E-02	G
		964.00	1.492E-01	% P	4.963E-01	1.47E-01	G
		1112.07	4.502E-02	%	4.713E-01	1.34E-01	G
		778.90	7.867E-02	& P	3.836E-01	1.12E-01	G
EU-154	-1.4101E-02						
		123.10	-1.410E-02	%(P	1.160E-01	3.47E-02	G K
		1274.80	0.000E+00	%	1.889E-01	5.26E-02	G
		723.30	5.900E-02	% P	2.851E-01	8.35E-02	G
		1004.80	-7.383E-02	%	3.710E-01	1.08E-01	G
EU-155	6.7833E-04						
		86.45	6.783E-04	%(P	2.571E-01	7.67E-02	G K
		105.31	1.735E-02	%	2.784E-01	8.32E-02	G
HG-203	-1.0959E-02						
		279.17	-1.096E-02	%(P	5.714E-02	1.70E-02	G K
		72.87	1.076E-01	%	1.860E+00	5.56E-01	G
		70.83	-1.750E+00	%	3.619E+00	1.10E+00	G
		82.50	-9.983E-01	%	3.967E+00	1.19E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.6416E-01						
		583.14	2.642E-01	(P	5.845E-02	2.74E-02	G
		510.72	3.563E-01	+	1.818E-01	6.83E-02	G
PB-212	6.4565E-01						
		238.63	6.457E-01	@(	9.989E-02	3.90E-02	G K
							Energy duplication
		77.11	7.705E-01	+	5.674E-01	1.77E-01	G
		74.81	9.152E-01	+ P	1.100E+00	3.38E-01	G
PB-214	3.7930E-01						
		351.99	3.978E-01	(P	1.072E-01	4.05E-02	G K
		295.22	3.435E-01	(	1.976E-01	6.54E-02	G
							Energy duplication
		77.11	1.260E+00	+	9.280E-01	2.90E-01	G
		241.92	5.047E-02	%	7.726E-01	2.30E-01	G
BI-212	8.6343E-01						
		727.17	8.634E-01	*(	4.760E-01	2.08E-01	G K
		1620.56	1.950E-01	% P	1.122E+00	2.92E-01	G
		785.42	-4.166E-01	% P	3.060E+00	8.89E-01	G
BI-214	4.0494E-01						
		609.32	3.983E-01	(	1.340E-01	5.96E-02	G K
		1764.51	4.241E-01	(P	1.254E-01	8.51E-02	G
		1120.28	9.171E-01	+	3.926E-01	1.72E-01	G
RA-224	8.0463E-01						
		241.00	8.046E-01	%(P	1.327E+00	4.05E-01	G
RA-226	6.7466E-01						
		185.99	6.747E-01	%(P	1.330E+00	4.03E-01	G
AC-228	8.7993E-01						
		911.07	7.898E-01	(P	2.527E-01	1.20E-01	G K
		968.90	1.004E+00	(P	4.770E-01	2.23E-01	G
		338.40	9.174E-01	@(	3.393E-01	1.35E-01	G
TH-227	-2.8282E-01						
		236.00	-2.828E-01	%(P	5.214E-01	1.58E-01	G K
		256.25	1.155E-01	%	6.478E-01	1.93E-01	G
PA-234	-8.9453E-02						
		98.44	-8.945E-02	&(	2.596E-01	7.84E-02	G K
		946.00	-3.058E-04	%	2.707E-01	7.56E-02	G
		131.28	6.231E-02	&	2.351E-01	7.07E-02	G
		94.67	-1.691E-01	%	4.204E-01	1.27E-01	G
		883.24	0.000E+00	&	5.028E-01	1.42E-01	G
		926.70	1.448E-01	%	5.308E-01	1.56E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.469E-02 &   4.326E-01 1.25E-01 G

TH-234      -7.4331E-01
                           63.29-7.433E-01 %(P 4.645E+00 1.39E+00 G K
                           92.80 1.221E+00 %   2.433E+00 7.38E-01 G
                           92.38 1.325E+00 % P 2.897E+00 8.78E-01 G

AM-241       1.6819E-01
                           59.54 1.682E-01 %(  6.755E-01 2.03E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	1.1697E-01	1.1885E-01	4.1444E-01	4.1450E-01	4.584E-01
K-40		1.2512E+01	1.2512E+01	1.5795E+00	1.7286E+00	
MN-54	#A	1.0722E-02	1.0751E-02	5.5785E-02	5.5788E-02	6.363E-02
CO-57	#B	-4.9684E-03	-4.9842E-03	5.2412E-02	5.2412E-02	5.832E-02
CO-60		4.4243E-01	4.4263E-01	8.2239E-02	8.5908E-02	

Sr-85	#A	-2.1999E-02	-2.2291E-02	5.3110E-02	5.3125E-02	5.812E-02
Kr-85	#A	-5.0793E+02	-5.0794E+02	1.2101E+03	1.2104E+03	1.342E+03
Y-88	#B	-5.8646E-03	-5.9117E-03	4.0492E-02	4.0493E-02	4.942E-02
NB-94	#B	1.4228E-02	1.4228E-02	4.5754E-02	4.5761E-02	5.194E-02
Ag-108M	#B	3.3034E-03	3.3034E-03	4.1174E-02	4.1174E-02	4.842E-02
CD-109	#A	-1.7001E-01	-1.7034E-01	2.4739E+00	2.4739E+00	2.195E+00
SN-113	#B	8.8648E-04	8.9308E-04	5.7735E-02	5.7735E-02	6.579E-02
SB-125	#B	9.1188E-02	9.1265E-02	1.0472E-01	1.0484E-01	1.091E-01
I-131	#B	5.0816E-03	5.6508E-03	4.8245E-02	4.8246E-02	4.934E-02
CS-134	#B	2.4629E-02	2.4657E-02	2.9336E-02	2.9369E-02	1.041E-01
CS-137		2.4528E-01	2.4530E-01	9.6264E-02	9.7243E-02	
CE-139	#A	1.0166E-02	1.0229E-02	4.9501E-02	4.9504E-02	5.479E-02
EU-152	#B	-2.1007E-03	-2.1011E-03	4.6351E-01	4.6351E-01	1.676E-01
EU-154	#B	-1.4097E-02	-1.4101E-02	1.0670E-01	1.0670E-01	1.160E-01
EU-155	#B	6.7801E-04	6.7833E-04	2.3013E-01	2.3013E-01	2.570E-01
HG-203	#B	-1.0760E-02	-1.0959E-02	5.1622E-02	5.1626E-02	5.610E-02
TL-208		2.6416E-01	2.6416E-01	8.2085E-02	8.3413E-02	
PB-212	#	6.4565E-01	6.4565E-01	1.1709E-01	1.2257E-01	9.989E-02
PB-214	#	3.7930E-01	3.7930E-01	1.1575E-01	1.1769E-01	1.072E-01
BI-212	#	8.6343E-01	8.6343E-01	6.2396E-01	6.2583E-01	
BI-214		4.0494E-01	4.0494E-01	1.5204E-01	1.5373E-01	
RA-224	#A	8.0463E-01	8.0463E-01	1.2137E+00	1.2145E+00	1.327E+00
RA-226	#A	6.7466E-01	6.7466E-01	1.2095E+00	1.2101E+00	1.330E+00
AC-228		8.7993E-01	8.7993E-01	2.6991E-01	2.7439E-01	
TH-227	#B	-2.8282E-01	-2.8282E-01	4.7919E-01	4.7945E-01	5.214E-01
PA-234	#B	-8.9453E-02	-8.9453E-02	2.3512E-01	2.3517E-01	2.596E-01
TH-234	#B	-7.4331E-01	-7.4331E-01	4.2961E+00	4.2963E+00	4.645E+00
AM-241	#A	1.6819E-01	1.6819E-01	6.0914E-01	6.0921E-01	6.755E-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) 1.5612154E+01 pCi/gm
Total Decayed Activity (295.2 to 1999.0 keV) 1.5612370E+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_18NOV2005_1648.An1

Sample description
FSS-NOL-06-03-005-F-S

Spectrum Filename: C:\GammaVision\Spectra\102F_18NOV2005_1648.An1

Acquisition information

Start time:	18-Nov-2005 16:48:24
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:	2.0120E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.0120E+03) = 4.9702E+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	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: 0.1268

***** 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	144.	21.64	1.10	8.847E-03	74.81	9.600	1.136E+00	PB212
77.04	204.	13.30	1.10	9.541E-03	77.11	10.700	1.373E+00	PB214
					77.11	17.500	8.395E-01	PB212
185.48	121.	28.95	0.91	1.629E-02				
185.48	121.	28.95	0.91	1.629E-02	185.99	3.280	1.462E+00	RA226
209.56	102.	30.89	0.89	1.518E-02				
238.60	738.	4.31	1.21	1.381E-02	238.63	43.100	8.334E-01	PB212
241.73	89.	23.67	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.880E-01	PB214
270.63	95.	27.84	0.96	1.241E-02				
277.55	37.	40.18	1.05	1.213E-02				
295.33	119.	24.16	1.27	1.146E-02	295.22	19.200	3.625E-01	PB214
328.03	58.	41.52	0.89	1.037E-02				
338.10	161.	18.59	1.33	1.007E-02	338.40	12.010	8.950E-01	AC228
352.02	240.	11.73	1.27	9.678E-03	351.99	37.100	4.482E-01	PB214
409.44	28.	40.95	1.34	8.330E-03				
462.63	49.	31.32	1.10	7.379E-03				
462.63	49.	31.32	1.10	7.379E-03	463.51	10.000	4.295E-01	SB125
510.92	99.	27.90	1.01	6.692E-03	510.72	22.500	4.405E-01	TL208
582.99	207.	10.29	1.57	5.891E-03	583.14	86.000	2.739E-01	TL208
609.32	167.	10.66	1.74	5.649E-03	609.32	46.090	4.308E-01	BI214
727.07	47.	24.21	1.07	4.795E-03	727.17	11.800	5.580E-01	BI212
911.09	138.	11.41	1.61	3.922E-03	911.07	29.000	8.154E-01	AC228
964.54	25.	39.17	1.71	3.734E-03	964.00	14.580	PBC<MDA	EU152
968.17	112.	13.96	1.39	3.720E-03	968.90	17.460	1.154E+00	AC228
1119.84	47.	26.25	0.74	3.283E-03	1120.28	15.040	6.379E-01	BI214
1460.50	530.	4.41	1.83	2.621E-03	1460.75	10.700	1.268E+01	K40

1763.92	14.	35.87	2.24	2.225E-03	1764.51	15.920	2.562E-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	
418.73	209.56	352.	102.	0.051	92.66	0.889	AC-228	
540.90	270.63	230.	95.	0.047	83.52	0.961	AC-228	s
655.73	328.03	174.	58.	0.029	124.57	0.886	AC-228	
818.59	409.44	55.	28.	0.014	122.85	1.343	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	149.20	74.81	433.	144.	0.072	64.93	1.098D
PB-212	153.80	77.11	453.	204.	0.102	39.90	1.100A
RA-226	371.60	186.00	456.	90.	0.045	100.83	1.500s
PB-212	476.89	238.63	138.	738.	0.369	12.94	1.215D
PB-214	483.47	241.92	196.	85.	0.042	77.29	1.217D
PB-214	590.31	295.33	243.	119.	0.059	72.49	1.267
AC-228	675.88	338.10	210.	161.	0.080	55.78	1.327s
PB-214	703.73	352.02	184.	240.	0.120	35.18	1.273s
SB-125	925.68	462.97	69.	35.	0.018	107.46	1.500s
TL-208	1021.61	510.92	161.	99.	0.049	83.69	1.013
TL-208	1165.82	582.99	77.	207.	0.103	30.86	1.573
BI-214	1218.49	609.32	50.	167.	0.083	31.98	1.741
BI-212	1454.09	727.07	33.	47.	0.023	72.64	1.073
AC-228	1822.33	911.09	36.	138.	0.069	34.23	1.614
EU-152	1929.28	964.54	37.	25.	0.013	117.52	1.714
AC-228	1936.55	968.17	36.	112.	0.056	41.87	1.386
BI-214	2240.07	1119.84	36.	47.	0.023	78.76	0.744s
K-40	2921.90	1460.50	4.	529.	0.265	13.22	1.828
BI-214	3529.30	1763.92	5.	14.	0.007	107.62	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	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.8654E-02					
			477.56	1.865E-02	%(	4.033E-01 1.16E-01	G
K-40		1.2681E+01					
			1460.75	1.268E+01	(P	2.752E-01 5.59E-01	G
MN-54		1.4985E-03					
			834.81	1.499E-03	&(P	7.058E-02 2.02E-02	G
CO-57		1.3767E-03					
			122.07	1.377E-03	&(	5.947E-02 1.77E-02	G K
			136.43	-1.088E-01	%	4.526E-01 1.36E-01	G
CO-60		-1.8446E-04					
			1332.51	-1.845E-04	%(P	4.217E-02 1.08E-02	G K
			1173.23	1.603E-02	&	7.214E-02 2.10E-02	G K
Sr-85		-1.2750E-02					
			514.00	-1.275E-02	%(	5.807E-02 1.72E-02	G
Kr-85		-2.9298E+02					
			513.99	-2.930E+02	%(	1.323E+03 3.91E+02	G
Y-88		1.2704E-02					
			1836.01	1.270E-02	&(P	4.147E-02 1.18E-02	G K
			898.02	-6.862E-03	% P	4.456E-02 1.23E-02	G
NB-94		8.8289E-03					
			871.10	8.829E-03	%(	4.542E-02 1.30E-02	G K
			702.50	3.845E-03	&	4.202E-02 1.19E-02	G K
Ag-108M		-1.6743E-02					
			722.95	-1.674E-02	%(	5.781E-02 1.71E-02	G K
			614.37	-1.532E-02	% P	5.548E-02 1.63E-02	G
			433.93	4.822E-03	%	3.090E-02 8.86E-03	G
CD-109		-1.2850E-01					
			88.04	-1.285E-01	%(P	2.187E+00 6.52E-01	G
SN-113		-6.4873E-03					
			391.71	-6.487E-03	%(	6.828E-02 1.99E-02	G K
			255.04	-6.702E-02	%	1.994E+00 5.86E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.6690E-02						
		427.95	-5.651E-03	&(P	1.430E-01	4.09E-02	G K
		600.77	2.392E-02	& P	2.011E-01	5.71E-02	G
		636.15	8.932E-02	% P	4.136E-01	1.21E-01	G
		463.51	3.204E-01	@(P	3.791E-01	1.20E-01	G
		176.29	-2.846E-03	& P	6.953E-01	2.05E-01	G
I-131	1.3094E-03						
		364.48	1.309E-03	&(	4.835E-02	1.39E-02	G K
		636.97	1.485E-01	%	7.119E-01	2.07E-01	G
		284.29	1.197E-01	&	6.779E-01	2.00E-01	G
CS-134	-2.5443E-02						
		604.66	-2.544E-02	%(	5.877E-02	1.77E-02	G K
		795.76	3.813E-02	%	5.434E-02	1.71E-02	G
		569.29	2.846E-02	%	2.836E-01	8.14E-02	G
		801.84	-4.887E-02	% P	5.536E-01	1.56E-01	G
CS-137	3.6509E-02						
		661.62	3.651E-02	%(	5.069E-02	1.60E-02	G
CE-139	-2.2923E-04						
		165.85	-2.292E-04	%(P	5.159E-02	1.52E-02	G
EU-152	1.1045E-01						
		121.78	1.154E-02	&(P	1.640E-01	4.88E-02	G K
		344.30	9.674E-03	&	1.088E-01	3.14E-02	G
		1408.08	9.247E-02	%	2.014E-01	6.11E-02	G
		964.00	3.088E-01	&(P	3.811E-01	1.22E-01	G
		1112.07	3.328E-04	&	4.888E-01	1.36E-01	G
		778.90	9.495E-02	% P	2.963E-01	8.69E-02	G
EU-154	1.4630E-02						
		123.10	1.463E-02	%(P	1.200E-01	3.58E-02	G K
		1274.80	-7.592E-03	&	2.202E-01	6.19E-02	G
		723.30	-7.378E-02	% P	2.772E-01	8.14E-02	G
		1004.80	1.933E-02	%	3.303E-01	9.26E-02	G
EU-155	1.1996E-01						
		86.45	1.200E-01	%(P	2.461E-01	7.46E-02	G K
		105.31	3.265E-02	%	2.753E-01	8.23E-02	G
HG-203	-1.8463E-02						
		279.17	-1.846E-02	%(P	5.390E-02	1.62E-02	G K
		72.87	-5.235E-01	%	2.155E+00	6.49E-01	G
		70.83	-1.546E-01	&	3.286E+00	9.78E-01	G
		82.50	-8.883E-01	%	4.014E+00	1.21E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7393E-01						
		583.14	2.739E-01	(P	5.796E-02	2.82E-02	G
		510.72	4.405E-01	+	2.759E-01	1.23E-01	G
PB-212	8.3520E-01						
		238.63	8.334E-01	(	6.489E-02	3.60E-02	G K
							Energy duplication
		77.11	8.195E-01	}	4.100E-01	1.09E-01	G
		74.81	1.136E+00	+ P	7.886E-01	2.51E-01	G
PB-214	4.3529E-01						
		351.99	4.482E-01	@(P	1.234E-01	5.26E-02	G K
		295.22	3.625E-01	(	2.300E-01	8.76E-02	G
							Energy duplication
		77.11	0.000E+00	}	9.106E-01	0.00E+00	G
		241.92	5.584E-01	(	4.477E-01	1.44E-01	G
BI-212	5.5802E-01						
		727.17	5.580E-01	(	3.500E-01	1.35E-01	G K
		1620.56	4.233E-01	% P	1.242E+00	3.54E-01	G
		785.42	3.939E-01	% P	2.719E+00	7.82E-01	G
BI-214	4.3078E-01						
		609.32	4.308E-01	(	9.199E-02	4.59E-02	G K
		1764.51	2.562E-01	- P	2.526E-01	9.25E-02	G
		1120.28	6.379E-01	+	4.177E-01	1.67E-01	G
RA-224	7.9227E-01						
		241.00	7.923E-01	%(P	1.273E+00	3.89E-01	G
RA-226	1.1268E+00						
		185.99	1.127E+00	*(P	1.287E+00	3.98E-01	G
AC-228	8.3868E-01						
		911.07	8.154E-01	(P	1.810E-01	9.32E-02	G K
		968.90	1.154E+00	+ P	3.191E-01	1.61E-01	G
		338.40	8.950E-01	@(	3.905E-01	1.66E-01	G
TH-227	-1.2278E-01						
		236.00	-1.228E-01	%(P	4.491E-01	1.35E-01	G K
		256.25	-4.934E-02	%	6.065E-01	1.79E-01	G
PA-234	-5.7068E-02						
		98.44	-5.707E-02	%(	2.251E-01	6.76E-02	G K
		946.00	1.069E-02	&	3.368E-01	9.54E-02	G
		131.28	1.286E-02	&	2.399E-01	7.14E-02	G
		94.67	2.832E-01	%	3.890E-01	1.19E-01	G
		883.24	1.363E-01	%	3.748E-01	1.11E-01	G
		926.70	6.368E-02	%	4.846E-01	1.38E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 4.213E-02 %   4.202E-01 1.21E-01 G

TH-234       1.5471E+00
                           63.29 1.547E+00 &(P 4.423E+00 1.33E+00 G K
                           92.80 1.441E+00 %   2.372E+00 7.23E-01 G
                           92.38-8.614E-02 & P 2.833E+00 8.44E-01 G

AM-241      -1.1416E-02
                           59.54-1.142E-02 %(  6.597E-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	1.8353E-02	1.8654E-02	3.4657E-01	3.4657E-01	3.968E-01
K-40		1.2681E+01	1.2681E+01	1.6768E+00	1.8215E+00	
MN-54	#A	1.4944E-03	1.4985E-03	6.0468E-02	6.0468E-02	7.038E-02
CO-57	#B	1.3723E-03	1.3767E-03	5.3042E-02	5.3042E-02	5.928E-02
CO-60	#B	-1.8438E-04	-1.8446E-04	5.0427E-03	5.0427E-03	4.215E-02

Sr-85	#A	-1.2580E-02	-1.2750E-02	5.1486E-02	5.1491E-02	5.730E-02
Kr-85	#A	-2.9298E+02	-2.9298E+02	1.1733E+03	1.1735E+03	1.323E+03
Y-88	#B	1.2601E-02	1.2704E-02	3.5464E-02	3.5472E-02	4.113E-02
NB-94	#B	8.8289E-03	8.8289E-03	3.9006E-02	3.9009E-02	4.542E-02
Ag-108M	#B	-1.6743E-02	-1.6743E-02	5.1151E-02	5.1159E-02	5.781E-02
CD-109	#A	-1.2826E-01	-1.2850E-01	2.7376E+00	2.7376E+00	2.182E+00
SN-113	#B	-6.4385E-03	-6.4873E-03	5.9773E-02	5.9774E-02	6.777E-02
SB-125	#B	7.6624E-02	7.6690E-02	8.6041E-02	8.6148E-02	1.428E-01
I-131	#B	1.1754E-03	1.3094E-03	4.1732E-02	4.1732E-02	4.340E-02
CS-134	#B	-2.5413E-02	-2.5443E-02	5.3195E-02	5.3214E-02	5.871E-02
CS-137	#A	3.6506E-02	3.6509E-02	4.7927E-02	4.7971E-02	5.069E-02
CE-139	#A	-2.2779E-04	-2.2923E-04	1.6676E+00	1.6676E+00	5.127E-02
EU-152	#B	1.1043E-01	1.1045E-01	1.3099E-01	1.3114E-01	1.640E-01
EU-154	#B	1.4626E-02	1.4630E-02	1.0739E-01	1.0739E-01	1.199E-01
EU-155	#B	1.1990E-01	1.1996E-01	2.2377E-01	2.2387E-01	2.460E-01
HG-203	#B	-1.8122E-02	-1.8463E-02	4.8889E-02	4.8900E-02	5.291E-02
TL-208		2.7393E-01	2.7393E-01	8.4701E-02	8.6085E-02	
PB-212		8.3520E-01	8.3520E-01	1.0810E-01	1.1782E-01	
PB-214		4.3529E-01	4.3529E-01	1.5337E-01	1.5531E-01	
BI-212		5.5802E-01	5.5802E-01	4.0533E-01	4.0654E-01	
BI-214		4.3078E-01	4.3078E-01	1.3778E-01	1.3989E-01	
RA-224	#A	7.9227E-01	7.9227E-01	1.1659E+00	1.1668E+00	1.273E+00
RA-226	#A	1.1268E+00	1.1268E+00	1.1927E+00	1.1944E+00	1.287E+00
AC-228		8.3868E-01	8.3868E-01	2.7455E-01	2.7855E-01	
TH-227	#B	-1.2278E-01	-1.2278E-01	4.1213E-01	4.1219E-01	4.491E-01
PA-234	#B	-5.7068E-02	-5.7068E-02	2.0267E-01	2.0270E-01	2.251E-01
TH-234	#B	1.5471E+00	1.5471E+00	4.0008E+00	4.0018E+00	4.423E+00
AM-241	#A	-1.1416E-02	-1.1416E-02	5.8796E-01	5.8796E-01	6.597E-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) 1.6052917E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.6052917E+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_19NOV2005_1000.An1

Sample description
FSS NOL-06-03-022-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_19NOV2005_1000.An1

Acquisition information
Start time: 19-Nov-2005 10:00:28
Live time: 2000
Real time: 2182
Dead time: 8.33 %
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: 1.9220E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9220E+03) =
5.2029E+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 10:04:00
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. 9 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4351

***** 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
238.62	511.	15.85	1.08	1.381E-02				
238.62	511.	15.85	1.08	1.381E-02	238.63	43.100	6.039E-01	PB212
295.10	229.	26.73	1.48	1.147E-02				
295.10	229.	26.73	1.48	1.147E-02	295.22	19.200	7.314E-01	PB214
338.19	162.	34.30	0.86	1.007E-02				
338.19	162.	34.30	0.86	1.007E-02	338.40	12.010	9.457E-01	AC228
351.38	164.	36.55	1.15	9.695E-03				
351.38	164.	36.55	1.15	9.695E-03	351.99	37.100	PBC<MDA	PB214
510.70	214.	26.34	1.55	6.695E-03				
510.70	214.	26.34	1.55	6.695E-03	510.72	22.500	9.989E-01	TL208
582.57	249.	18.26	1.73	5.895E-03				
582.57	249.	18.26	1.73	5.895E-03	583.14	86.000	3.453E-01	TL208
608.90	177.	24.64	1.19	5.653E-03	609.32	46.090	4.780E-01	BI214
660.91	107.	37.48	1.51	5.235E-03				
660.91	107.	37.48	1.51	5.235E-03	661.62	84.620	1.702E-01	CS137
911.04	177.	31.71	1.16	3.922E-03				
911.04	177.	31.71	1.16	3.922E-03	911.07	29.000	1.093E+00	AC228
1172.49	7153.	1.29	1.90	3.158E-03	1173.23	99.860	1.597E+01	CO60
1331.66	6509.	1.28	1.90	2.835E-03	1332.51	99.980	1.616E+01	CO60
1459.83	513.	4.56	1.93	2.622E-03	1460.75	10.700	1.286E+01	K40
1763.16	38.	20.23	0.98	2.225E-03	1764.51	15.920	7.505E-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

676.06	338.19	1178.	162.	0.081	102.89	0.856	AC-228	l
1321.71	660.91	654.	107.	0.054	112.43	1.514	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	476.59	238.48	2430.	543.	0.272	40.59	1.500
PB-214	589.95	295.15	1635.	153.	0.077	114.44	1.500s
PB-214	703.13	351.72	1380.	182.	0.091	89.03	1.500
TL-208	1020.71	510.46	919.	110.	0.055	120.13	1.499s
TL-208	1165.52	582.84	777.	224.	0.112	56.46	1.499s
BI-214	1217.66	608.90	690.	177.	0.089	73.92	1.189
AC-228	1821.53	910.70	1146.	130.	0.065	113.69	1.679
CO-60	2345.44	1172.49	430.	7153.	3.576	3.88	1.903
CO-60	2664.02	1331.66	99.	6509.	3.254	3.84	1.899
K-40	2920.57	1459.83	10.	513.	0.256	13.69	1.935
BI-214	3527.77	1763.16	4.	38.	0.019	60.70	0.983s

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		1.8876E-01					
			477.56	1.888E-01	%(	1.425E+00 4.26E-01	G
K-40		1.2859E+01					
			1460.75	1.286E+01	(P	4.402E-01 5.87E-01	G
MN-54		3.7819E-02					
			834.81	3.782E-02	&(P	2.310E-01 6.92E-02	G
CO-57		-1.2806E-02					
			122.07	-1.281E-02	&(	1.389E-01 4.18E-02	G K
			136.43	-1.859E-01	%	1.094E+00 3.30E-01	G
CO-60		1.6065E+01					
			1332.51	1.616E+01	(P	1.220E-01 2.07E-01	G K
			1173.23	1.597E+01	(	2.218E-01 2.07E-01	G K
Sr-85		-3.4849E-02					
			514.00	-3.485E-02	%(	1.549E-01 4.65E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Kr-85	-7.8751E+02						
		513.99	-7.875E+02	%(	3.501E+03	1.05E+03	G
Y-88	3.2629E-03						
		1836.01	3.263E-03	&(P	4.647E-02	1.18E-02	G K
		898.02	-3.335E-02	& P	3.146E-01	9.42E-02	G
NB-94	3.0604E-02						
		871.10	3.060E-02	&(	2.688E-01	8.05E-02	G K
		702.50	-5.138E-02	%	1.940E-01	5.83E-02	G K
Ag-108M	2.5524E-02						
		722.95	2.552E-02	%(	2.192E-01	6.55E-02	G K
		614.37	-5.305E-03	% P	1.909E-01	5.69E-02	G
		433.93	1.267E-02	%	1.513E-01	4.52E-02	G
CD-109	-1.7027E-01						
		88.04	-1.703E-01	&(P	3.261E+00	9.78E-01	G
SN-113	-4.3718E-02						
		391.71	-4.372E-02	%(	2.086E-01	6.27E-02	G K
		255.04	2.800E-02	%	5.702E+00	1.71E+00	G
SB-125	-9.6940E-02						
		427.95	-9.694E-02	%(P	4.872E-01	1.46E-01	G K
		600.77	-9.335E-04	% P	8.832E-01	2.63E-01	G
		636.15	1.653E-02	% P	1.537E+00	4.57E-01	G
		463.51	1.849E-01	% P	1.354E+00	4.05E-01	G
		176.29	-2.927E-01	% P	1.595E+00	4.80E-01	G
I-131	-2.4866E-02						
		364.48	-2.487E-02	%(	1.853E-01	5.56E-02	G K
		636.97	-3.976E-01	%	2.915E+00	8.72E-01	G
		284.29	6.184E-01	&	2.372E+00	7.15E-01	G
CS-134	-8.9399E-02						
		604.66	-8.940E-02	&(	1.918E-01	5.82E-02	G K
		795.76	1.110E-02	%	2.704E-01	8.06E-02	G
		569.29	-1.874E-01	&	1.090E+00	3.27E-01	G
		801.84	5.021E-01	& P	2.437E+00	7.31E-01	G
CS-137	1.5888E-01						
		661.62	1.589E-01	%(	2.230E-01	6.82E-02	G
CE-139	-3.8443E-02						
		165.85	-3.844E-02	%(P	1.227E-01	3.71E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	-3.4438E-02						
		121.78	-3.444E-02	&(P	4.163E-01	1.25E-01	G K
		344.30	-5.975E-03	&	4.581E-01	1.37E-01	G
		1408.08	1.643E-02	%	2.945E-01	8.05E-02	G
		964.00	-6.571E-02	& P	1.950E+00	5.82E-01	G
		1112.07	3.572E-02	&	2.200E+00	6.55E-01	G
		778.90	2.602E-01	% P	1.756E+00	5.26E-01	G
EU-154	-3.0771E-02						
		123.10	-3.077E-02	%(P	2.831E-01	8.53E-02	G K
		1274.80	6.953E-02	&	3.325E-01	9.78E-02	G
		723.30	3.156E-02	% P	9.842E-01	2.93E-01	G
		1004.80	-1.812E-02	%	1.389E+00	4.13E-01	G
EU-155	1.7985E-01						
							Energy duplication
		86.45	1.799E-01	%(P	5.034E-01	1.52E-01	G K
		105.31	-4.487E-03	%	6.004E-01	1.81E-01	G
HG-203	4.0670E-02						
		279.17	4.067E-02	%(P	1.486E-01	4.48E-02	G K
		72.87	-5.382E-01	%	3.791E+00	1.14E+00	G
		70.83	-1.726E+00	&	7.340E+00	2.22E+00	G
		82.50	-2.842E+00	%	7.741E+00	2.34E+00	G
TL-208	3.1029E-01						
		583.14	3.103E-01	(P	1.840E-01	5.85E-02	G
		510.72	5.145E-01	+	6.720E-01	2.06E-01	G
PB-212	6.4203E-01						
		238.63	6.420E-01	(	2.746E-01	8.69E-02	G K
							Energy duplication
		77.11	5.806E-01	&	1.108E+00	3.37E-01	G
		74.81	1.102E+00	% P	2.166E+00	6.57E-01	G
PB-214	4.0242E-01						
		351.99	3.572E-01	(P	3.443E-01	1.06E-01	G K
		295.22	4.899E-01	*(	6.105E-01	1.87E-01	G
							Energy duplication
		77.11	9.496E-01	&	1.813E+00	5.50E-01	G
		241.92	-7.893E-01	%	1.652E+00	5.01E-01	G
BI-212	9.7720E-02						
		727.17	9.772E-02	%(	1.440E+00	4.28E-01	G K
		1620.56	-5.076E-01	% P	2.409E+00	6.76E-01	G
		785.42	4.264E-01	% P	1.042E+01	3.10E+00	G
BI-214	5.4791E-01						
		609.32	4.780E-01	(	3.379E-01	1.18E-01	G K
		1764.51	7.505E-01	(P	2.430E-01	1.52E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                         1120.28-4.247E-01 %   1.714E+00 5.14E-01 G

RA-224      -8.1122E-01
                          241.00-8.112E-01 &(P 3.189E+00 9.62E-01 G

RA-226       1.2176E+00
                          185.99 1.218E+00 %(P 3.201E+00 9.68E-01 G

AC-228       8.0122E-01
                          911.07 8.012E-01  (P 9.918E-01 3.04E-01 G K
                          968.90 5.840E-01 % P 1.616E+00 4.88E-01 G
                          338.40 7.620E-01 %   1.044E+00 3.19E-01 G

TH-227      -5.4751E-01
                          236.00-5.475E-01 %(P 1.179E+00 3.58E-01 G K
                          256.25 3.309E-01 %   1.652E+00 4.98E-01 G

PA-234       4.8135E-02
                           98.44 4.813E-02 %(  3.910E-01 1.17E-01 G K
                          946.00 2.029E-01 &   1.549E+00 4.65E-01 G
                          131.28 0.000E+00 %   5.873E-01 1.77E-01 G
                           94.67-4.588E-02 %   9.251E-01 2.78E-01 G
                          883.24 2.627E-03 %   2.336E+00 6.97E-01 G
                          926.70 1.188E-01 %   2.694E+00 8.05E-01 G
                          569.26-2.775E-01 &   1.614E+00 4.84E-01 G

TH-234       5.6682E-02
                           63.29 5.668E-02 &(P 8.978E+00 2.69E+00 G K
                           92.80 2.639E+00 %   4.921E+00 1.49E+00 G
                           92.38 3.259E+00 % P 5.610E+00 1.71E+00 G

AM-241      -1.1332E-02
                           59.54-1.133E-02 &(  1.361E+00 4.08E-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:
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	1.8393E-01	1.8876E-01	1.2795E+00	1.2795E+00	1.388E+00
K-40		1.2859E+01	1.2859E+01	1.7608E+00	1.9029E+00	
MN-54	#A	3.7652E-02	3.7819E-02	2.0752E-01	2.0754E-01	2.299E-01
CO-57	#B	-1.2740E-02	-1.2806E-02	1.2550E-01	1.2550E-01	1.382E-01
CO-60		1.6053E+01	1.6065E+01	4.3842E-01	1.0024E+00	
Sr-85	#A	-3.4113E-02	-3.4849E-02	1.3961E-01	1.3962E-01	1.517E-01
Kr-85	#A	-7.8750E+02	-7.8751E+02	3.1549E+03	3.1552E+03	3.501E+03
Y-88	#B	3.2208E-03	3.2629E-03	3.5471E-02	3.5471E-02	4.587E-02
NB-94	#B	3.0604E-02	3.0604E-02	2.4148E-01	2.4149E-01	2.688E-01
Ag-108M	#B	2.5523E-02	2.5524E-02	1.9658E-01	1.9658E-01	2.192E-01
CD-109	#A	-1.6975E-01	-1.7027E-01	3.8220E+00	3.8220E+00	3.251E+00
SN-113	#B	-4.3195E-02	-4.3718E-02	1.8814E-01	1.8815E-01	2.061E-01
SB-125	#B	-9.6808E-02	-9.6940E-02	4.6678E-01	4.6681E-01	4.865E-01
I-131	#B	-2.0932E-02	-2.4866E-02	1.6677E-01	1.6678E-01	1.560E-01
CS-134	#B	-8.9235E-02	-8.9399E-02	1.7448E-01	1.7455E-01	1.915E-01
CS-137	A	1.5886E-01	1.5888E-01	2.0470E-01	2.0490E-01	2.229E-01
CE-139	#A	-3.8058E-02	-3.8443E-02	1.1256E-01	1.1258E-01	1.215E-01
EU-152	#B	-3.4427E-02	-3.4438E-02	4.0441E-01	4.0441E-01	4.161E-01
EU-154	#B	-3.0757E-02	-3.0771E-02	2.5933E-01	2.5933E-01	2.830E-01
EU-155	#B	1.7972E-01	1.7985E-01	4.5695E-01	4.5706E-01	5.030E-01
HG-203	#B	3.9479E-02	4.0670E-02	1.3450E-01	1.3452E-01	1.443E-01
TL-208	#	3.1029E-01	3.1029E-01	1.7550E-01	1.7636E-01	1.840E-01
PB-212	#	6.4203E-01	6.4203E-01	2.6058E-01	2.6306E-01	2.746E-01
PB-214	#	4.0242E-01	4.0242E-01	2.9197E-01	2.9284E-01	3.443E-01
BI-212	#B	9.7720E-02	9.7720E-02	1.2845E+00	1.2845E+00	1.440E+00
BI-214		5.4791E-01	5.4791E-01	2.6228E-01	2.6408E-01	
RA-224	#A	-8.1122E-01	-8.1122E-01	2.9979E+00	2.9982E+00	3.189E+00
RA-226	#A	1.2176E+00	1.2176E+00	2.9055E+00	2.9063E+00	3.201E+00
AC-228	#A	8.0122E-01	8.0122E-01	9.1248E-01	9.1358E-01	9.918E-01

TH-227 #B	-5.4751E-01	-5.4751E-01	1.0777E+00	1.0781E+00	1.179E+00

PA-234	#B	4.8135E-02	4.8135E-02	3.5236E-01	3.5237E-01	3.910E-01
TH-234	#B	5.6682E-02	5.6682E-02	8.0837E+00	8.0837E+00	8.978E+00
AM-241	#A	-1.1332E-02	-1.1332E-02	1.2253E+00	1.2253E+00	1.361E+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 (50.2 to 1999.0 keV) 2.9459538E+01 pCi/gm
Total Decayed Activity (50.2 to 1999.0 keV) 2.9471085E+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: 102F_19NOV2005_1040.An1

Sample description
FSS NOL-06-03-005-F

Spectrum Filename: C:\GammaVision\Spectra\102F_19NOV2005_1040.An1

Acquisition information
Start time: 19-Nov-2005 10:40:58
Live time: 2000
Real time: 2024
Dead time: 1.20 %
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: 1.6990E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6990E+03) =
5.8858E+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	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: 0.2854

***** 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
74.49	112.	26.82	1.10	8.747E-03				
74.49	112.	26.82	1.10	8.747E-03	74.81	9.600	PBC<MDA	PB212
77.70	140.	23.64	1.10	9.713E-03	77.11	10.700	1.088E+00	PB214
					77.11	17.500	6.655E-01	PB212
177.16	62.	40.79	1.52	1.663E-02	176.29	6.300	PBC<MDA	SB125
185.91	115.	27.01	0.85	1.627E-02	185.99	3.280	1.642E+00	RA226
238.57	723.	4.53	1.21	1.381E-02				
238.57	723.	4.53	1.21	1.381E-02	238.63	43.100	9.663E-01	PB212
					241.00	3.900	1.075E+01	RA224
241.73	110.	19.78	1.22	1.367E-02				
241.73	110.	19.78	1.22	1.367E-02	241.92	7.470	8.549E-01	PB214
295.21	140.	14.29	1.24	1.147E-02				
295.21	140.	14.29	1.24	1.147E-02	295.22	19.200	5.066E-01	PB214
338.48	185.	13.11	1.19	1.006E-02	338.40	12.010	1.218E+00	AC228
351.61	278.	10.84	1.25	9.689E-03				
351.61	278.	10.84	1.25	9.689E-03	351.99	37.100	6.152E-01	PB214
462.93	57.	31.79	1.22	7.374E-03				
462.93	57.	31.79	1.22	7.374E-03	463.51	10.000	5.954E-01	SB125
511.02	113.	16.77	2.20	6.691E-03	510.72	22.500	5.967E-01	TL208
582.78	250.	8.84	1.34	5.893E-03	583.14	86.000	3.922E-01	TL208
608.63	186.	11.40	1.68	5.655E-03	609.32	46.090	5.697E-01	BI214
661.53	54.	24.50	1.91	5.230E-03	661.62	84.620	9.797E-02	CS137
727.12	76.	22.05	1.62	4.794E-03	727.17	11.800	1.066E+00	BI212
794.53	32.	31.46	1.60	4.420E-03				
794.53	32.	31.46	1.60	4.420E-03	795.76	85.400	6.773E-02	CS134
910.71	126.	13.13	1.71	3.923E-03	911.07	29.000	8.782E-01	AC228
963.86	40.	20.82	1.71	3.734E-03	964.00	14.580	5.789E-01	EU152

968.65	96.	12.25	1.72	3.718E-03	968.90	17.460	1.181E+00	AC228
1119.33	59.	32.17	1.92	3.283E-03	1120.28	15.040	9.455E-01	BI214
1459.98	613.	4.15	2.10	2.622E-03	1460.75	10.700	1.737E+01	K40
1763.87	23.	20.85	1.75	2.225E-03	1764.51	15.920	5.144E-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	
148.55	74.49	398.	112.	0.056	80.45	1.098	BI-207	D
154.97	77.70	475.	140.	0.070	70.91	1.100	PB-214	D
353.93	177.16	271.	66.	0.033	111.62	1.516	CS-136	s
476.77	238.50	175.	723.	0.361	13.59	1.215	PB-212	D
483.09	241.66	180.	110.	0.055	59.35	1.217	PB-214	D
1927.76	964.01	14.	39.	0.019	63.92	1.714	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-214	153.80	77.11	947.	187.	0.093	73.25	1.500D
PB-212	153.80	77.11	947.	187.	0.093	73.25	1.500D
RA-226	371.42	185.91	356.	110.	0.055	81.02	0.845
PB-212	476.67	238.52	380.	660.	0.330	17.12	1.500
RA-224	476.70	238.54	303.	616.	0.308	16.98	1.500
PB-214	590.03	295.19	178.	138.	0.069	48.36	1.500
AC-228	676.63	338.48	144.	185.	0.093	39.33	1.186s
PB-214	703.19	351.75	152.	240.	0.120	29.16	1.500s
SB-125	925.31	462.78	91.	42.	0.021	102.60	1.500
TL-208	1021.81	511.02	82.	113.	0.056	50.30	2.196s
TL-208	1165.40	582.78	75.	250.	0.125	26.53	1.343s
BI-214	1217.11	608.63	80.	186.	0.093	34.20	1.678s
CS-137	1322.97	661.53	50.	54.	0.027	73.49	1.909s
BI-212	1454.19	727.12	52.	76.	0.038	66.15	1.621s
CS-134	1589.07	794.53	35.	32.	0.016	94.39	1.601
AC-228	1821.56	910.71	43.	126.	0.063	39.38	1.711
EU-152	1928.11	963.96	53.	29.	0.014	120.29	1.714s
AC-228	1938.01	968.90	24.	96.	0.048	37.33	1.718D
BI-214	2239.05	1119.33	69.	59.	0.029	96.52	1.925
K-40	2920.87	1459.98	8.	612.	0.306	12.46	2.099
BI-214	3529.20	1763.87	0.	23.	0.011	62.55	1.748

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		1.0977E-01					
			477.56	1.098E-01	%(	4.313E-01 1.27E-01	G
K-40		1.7371E+01					
			1460.75	1.737E+01	(P	4.401E-01 7.21E-01	G
MN-54		1.9675E-02					
			834.81	1.968E-02	%(P	5.822E-02 1.72E-02	G
CO-57		1.5054E-03					
			122.07	1.505E-03	&(	7.105E-02 2.11E-02	G K
			136.43	9.704E-06	%	4.915E-01 1.46E-01	G
CO-60		1.9879E-02					
			1332.51	1.988E-02	%(P	7.165E-02 2.08E-02	G K
			1173.23	0.000E+00	%	9.971E-02 2.82E-02	G K
Sr-85		-1.8094E-02					
			514.00	-1.809E-02	%(	7.458E-02 2.21E-02	G
Kr-85		-4.1040E+02					
			513.99	-4.104E+02	%(	1.686E+03 5.00E+02	G
Y-88		-3.1641E-03					
			1836.01	-3.164E-03	&(P	5.808E-02 1.49E-02	G K
			898.02	-2.270E-03	& P	6.706E-02 1.85E-02	G
NB-94		9.6006E-03					
			871.10	9.601E-03	%(	6.020E-02 1.72E-02	G K
			702.50	1.702E-03	%	5.740E-02 1.62E-02	G K
Ag-108M		-2.0084E-03					
			722.95	-2.008E-03	%(	1.164E-01 3.39E-02	G K
			614.37	-7.496E-03	% P	5.693E-02 1.63E-02	G
			433.93	-1.055E-02	%	5.917E-02 1.74E-02	G
CD-109		-6.1143E-01					
			88.04	-6.114E-01	%(P	2.739E+00 8.23E-01	G
SN-113		-1.8930E-03					
			391.71	-1.893E-03	&(	7.146E-02 2.06E-02	G K
			255.04	2.903E-01	%	2.193E+00 6.48E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.1223E-01						
		427.95	-3.375E-03	%(P	1.792E-01	5.14E-02	G K
		600.77	6.258E-02	% P	2.888E-01	8.42E-02	G
		636.15	1.627E-02	% P	4.818E-01	1.36E-01	G
		463.51	4.544E-01	(P	5.094E-01	1.61E-01	G
		176.29	-5.183E-02	% P	8.104E-01	2.40E-01	G
I-131	-1.1096E-02						
		364.48	-1.110E-02	%(	7.585E-02	2.23E-02	G K
		636.97	-1.883E-01	%	9.559E-01	2.79E-01	G
		284.29	1.407E-01	%	9.171E-01	2.71E-01	G
CS-134	2.9976E-02						
		604.66	-3.054E-03	%(	1.480E-01	4.38E-02	G K
		795.76	6.773E-02	(	6.384E-02	2.13E-02	G
		569.29	-5.988E-02	&	3.608E-01	1.05E-01	G
		801.84	-5.052E-02	% P	6.823E-01	1.93E-01	G
CS-137	9.7971E-02						
		661.62	9.797E-02	(	6.381E-02	2.40E-02	G
CE-139	-8.4372E-03						
		165.85	-8.437E-03	%(P	6.519E-02	1.94E-02	G
EU-152	1.5872E-01						
		121.78	2.968E-02	&(P	2.042E-01	6.10E-02	G K
		344.30	-3.152E-02	%	1.981E-01	5.85E-02	G
		1408.08	3.282E-02	%	2.954E-01	8.11E-02	G
		964.00	4.175E-01	&(P	5.331E-01	1.69E-01	G
		1112.07	-4.911E-02	%	5.886E-01	1.67E-01	G
		778.90	-9.503E-02	% P	4.868E-01	1.41E-01	G
EU-154	-4.0609E-02						
		123.10	-4.061E-02	%(P	1.563E-01	4.70E-02	G K
		1274.80	2.487E-03	&	2.159E-01	5.94E-02	G
		723.30	-9.081E-02	% P	3.790E-01	1.11E-01	G
		1004.80	-8.304E-02	%	4.063E-01	1.18E-01	G
EU-155	7.7228E-02						
		86.45	7.723E-02	%(P	3.133E-01	9.42E-02	G K
		105.31	5.081E-02	&	3.274E-01	9.80E-02	G
HG-203	-6.5790E-03						
		279.17	-6.579E-03	&(P	6.309E-02	1.86E-02	G K
		72.87	-1.373E-01	%	2.404E+00	7.18E-01	G
		70.83	-1.163E-01	%	3.802E+00	1.13E+00	G
		82.50	9.485E-02	%	4.975E+00	1.48E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.9223E-01						
		583.14	3.922E-01	@(P	6.771E-02	3.47E-02	G
		510.72	5.967E-01	+	2.371E-01	1.00E-01	G
PB-212	8.8492E-01						
		238.63	8.828E-01	(	1.250E-01	5.04E-02	G K
							Energy duplication
		77.11	8.901E-01	(	6.961E-01	2.17E-01	G
		74.81	8.923E-01	% P	1.438E+00	4.38E-01	G
PB-214	5.1968E-01						
		351.99	5.306E-01	@(P	1.335E-01	5.17E-02	G K
		295.22	4.985E-01	(	2.347E-01	8.04E-02	G
							Energy duplication
		77.11	1.456E+00	+	1.139E+00	3.55E-01	G
		241.92	-2.676E-03	%	9.639E-01	2.86E-01	G
BI-212	1.0658E+00						
		727.17	1.066E+00	*(	5.115E-01	2.35E-01	G K
		1620.56	1.029E-01	& P	2.236E+00	5.86E-01	G
		785.42	1.847E+00	% P	3.233E+00	9.94E-01	G
BI-214	5.5552E-01						
		609.32	5.697E-01	@(	1.360E-01	6.49E-02	G K
		1764.51	5.144E-01	(P	1.655E-01	1.08E-01	G
		1120.28	9.455E-01	+	6.685E-01	3.04E-01	G
RA-224	9.1733E+00						
		241.00	9.173E+00	?(P	1.247E+00	5.20E-01	G
RA-226	1.6419E+00						
		185.99	1.642E+00	(P	1.351E+00	4.61E-01	G
AC-228	1.0381E+00						
		911.07	8.782E-01	(P	2.337E-01	1.15E-01	G K
		968.90	1.180E+00	(P	3.112E-01	1.47E-01	G
		338.40	1.218E+00	*(	3.860E-01	1.60E-01	G
TH-227	-3.3150E-01						
		236.00	-3.315E-01	%(P	6.027E-01	1.83E-01	G K
		256.25	9.630E-02	%	6.059E-01	1.79E-01	G
PA-234	1.5374E-03						
		98.44	1.537E-03	%(	2.975E-01	8.85E-02	G K
		946.00	9.414E-02	%	2.779E-01	8.20E-02	G
		131.28	-4.785E-02	%	2.811E-01	8.41E-02	G
		94.67	1.537E-03	%	5.706E-01	1.70E-01	G
		883.24	3.055E-02	&	4.466E-01	1.24E-01	G
		926.70	-3.486E-03	%	5.390E-01	1.48E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-8.819E-02 &   5.342E-01 1.55E-01 G

TH-234       5.5321E-01
                           63.29 5.532E-01 &(P 4.735E+00 1.41E+00 G K
                           92.80 1.926E+00 %   2.973E+00 9.07E-01 G
                           92.38 3.207E-01 % P 3.345E+00 9.99E-01 G

AM-241      -1.9034E-01
                           59.54-1.903E-01 %(  8.006E-01 2.40E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	1.0696E-01	1.0977E-01	3.8005E-01	3.8010E-01	4.203E-01
K-40		1.7371E+01	1.7371E+01	2.1650E+00	2.3744E+00	
MN-54	#A	1.9588E-02	1.9675E-02	5.1627E-02	5.1639E-02	5.797E-02
CO-57	#B	1.4977E-03	1.5054E-03	6.3374E-02	6.3375E-02	7.068E-02
CO-60	#B	1.9865E-02	1.9879E-02	6.2419E-02	6.2429E-02	7.160E-02

Sr-85	#A	-1.7712E-02	-1.8094E-02	6.6394E-02	6.6402E-02	7.301E-02
Kr-85	#A	-4.1040E+02	-4.1040E+02	1.5008E+03	1.5010E+03	1.686E+03
Y-88	#B	-3.1233E-03	-3.1641E-03	4.5464E-02	4.5464E-02	5.734E-02
NB-94	#B	9.6006E-03	9.6006E-03	5.1655E-02	5.1658E-02	6.020E-02
Ag-108M	#B	-2.0083E-03	-2.0084E-03	1.0160E-01	1.0160E-01	1.164E-01
CD-109	#A	-6.0957E-01	-6.1143E-01	2.6817E+00	2.6819E+00	2.731E+00
SN-113	#B	-1.8704E-03	-1.8930E-03	6.1704E-02	6.1704E-02	7.061E-02
SB-125	#B	1.1207E-01	1.1223E-01	1.1938E-01	1.1954E-01	1.790E-01
I-131	#B	-9.3410E-03	-1.1096E-02	6.6923E-02	6.6926E-02	6.385E-02
CS-134	#B	2.9921E-02	2.9976E-02	2.8294E-02	2.8344E-02	1.477E-01
CS-137		9.7958E-02	9.7971E-02	7.2000E-02	7.2210E-02	
CE-139	#A	-8.3527E-03	-8.4372E-03	6.1916E-02	6.1918E-02	6.453E-02
EU-152	#B	1.5868E-01	1.5872E-01	1.9247E-01	1.9267E-01	2.041E-01
EU-154	#B	-4.0591E-02	-4.0609E-02	1.4261E-01	1.4263E-01	1.563E-01
EU-155	#B	7.7169E-02	7.7228E-02	2.8247E-01	2.8251E-01	3.130E-01
HG-203	#B	-6.3864E-03	-6.5790E-03	5.7138E-02	5.7139E-02	6.124E-02
TL-208	#	3.9223E-01	3.9223E-01	1.0423E-01	1.0653E-01	
PB-212	#	8.8492E-01	8.8492E-01	1.5146E-01	1.5939E-01	1.250E-01
PB-214	#	5.1968E-01	5.1968E-01	1.4681E-01	1.4967E-01	1.335E-01
BI-212	#	1.0658E+00	1.0658E+00	7.0503E-01	7.0756E-01	
BI-214		5.5552E-01	5.5552E-01	1.9001E-01	1.9255E-01	
RA-224	#	9.1733E+00	9.1733E+00	1.5604E+00	1.6431E+00	1.247E+00
RA-226		1.6419E+00	1.6419E+00	1.3842E+00	1.3873E+00	
AC-228		1.0381E+00	1.0381E+00	2.3205E-01	2.3925E-01	
TH-227	#B	-3.3150E-01	-3.3150E-01	5.5485E-01	5.5516E-01	6.027E-01
PA-234	#B	1.5374E-03	1.5374E-03	2.6547E-01	2.6547E-01	2.975E-01
TH-234	#B	5.5321E-01	5.5321E-01	4.2313E+00	4.2314E+00	4.735E+00
AM-241	#A	-1.9034E-01	-1.9034E-01	7.2088E-01	7.2096E-01	8.006E-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) 2.2162830E+01 pCi/gm
Total Decayed Activity (1119.8 to 1999.0 keV) 2.2162846E+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: 102F_19NOV2005_1118.An1

Sample description
FSS NOL-06-03-021-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_19NOV2005_1118.An1

Acquisition information
Start time: 19-Nov-2005 11:18:08
Live time: 2000
Real time: 2224
Dead time: 10.06 %
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: 1.7170E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7170E+03) =
5.8241E+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 09:55:00
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. 9 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2833

***** 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
239.17	841.	10.14	1.18	1.378E-02	238.63	43.100	1.113E+00	PB212
295.06	170.	30.84	1.57	1.147E-02				
295.06	170.	30.84	1.57	1.147E-02	295.22	19.200	6.085E-01	PB214
338.41	130.	37.33	1.45	1.006E-02	338.40	12.010	8.495E-01	AC228
351.87	205.	23.04	1.09	9.682E-03				
351.87	205.	23.04	1.09	9.682E-03	351.99	37.100	4.489E-01	PB214
583.20	216.	21.28	1.13	5.889E-03	583.14	86.000	3.350E-01	TL208
609.08	204.	26.86	1.55	5.651E-03	609.32	46.090	6.154E-01	BI214
1172.74	9671.	1.21	1.76	3.158E-03	1173.23	99.860	2.416E+01	CO60
1331.95	8499.	1.14	1.93	2.835E-03	1332.51	99.980	2.363E+01	CO60
1460.13	591.	4.53	1.95	2.622E-03	1460.75	10.700	1.659E+01	K40
1763.79	19.	38.66	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	
676.50	338.41	1018.	130.	0.065	111.98	1.446	AC-228	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
TH-227	472.74	236.55	3609.	-244.	-0.122	106.17	1.500
PB-212	476.78	238.57	2755.	682.	0.341	34.59	1.500s
PB-214	589.36	294.85	1682.	179.	0.090	99.52	1.500s
PB-214	703.15	351.73	1329.	214.	0.107	75.10	1.500
TL-208	1165.97	583.07	855.	199.	0.100	65.72	1.499
BI-214	1218.01	609.08	961.	204.	0.102	80.59	1.549s
CO-60	2345.95	1172.74	873.	9671.	4.835	3.64	1.764
CO-60	2664.61	1331.95	155.	8499.	4.250	3.41	1.932
K-40	2921.17	1460.13	27.	591.	0.296	13.60	1.955
BI-214	3529.04	1763.79	19.	19.	0.010	115.97	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	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.4890E-01					
			477.56	1.489E-01	%(	1.667E+00 4.99E-01	G
K-40		1.6594E+01					
			1460.75	1.659E+01	(P	7.525E-01 7.52E-01	G
MN-54		-5.8309E-02					
			834.81	-5.831E-02	%(P	2.927E-01 8.79E-02	G
CO-57		2.9514E-02					
			122.07	2.951E-02	%(	1.432E-01 4.32E-02	G K
			136.43	9.165E-03	&	1.205E+00 3.62E-01	G
CO-60		2.3895E+01					
			1332.51	2.363E+01	(P	1.688E-01 2.68E-01	G K
			1173.23	2.416E+01	(	3.508E-01 2.93E-01	G K
Sr-85		-8.5406E-03					
			514.00	-8.541E-03	&(	1.860E-01 5.55E-02	G
Kr-85		-1.9677E+02					
			513.99	-1.968E+02	&(	4.200E+03 1.25E+03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	1.2730E-05						
		1836.01	1.273E-05	&(P	7.171E-02	1.87E-02	G K
		898.02	4.643E-02	& P	3.887E-01	1.17E-01	G
NB-94	8.0063E-03						
		871.10	8.006E-03	%(	3.279E-01	9.80E-02	G K
		702.50	-6.458E-02	&	2.157E-01	6.50E-02	G K
Ag-108M	5.9619E-03						
		722.95	5.962E-03	%(	2.830E-01	8.45E-02	G K
		614.37	-2.331E-02	& P	2.349E-01	7.03E-02	G
		433.93	1.103E-03	%	1.717E-01	5.12E-02	G
CD-109	2.2237E-01						
		88.04	2.224E-01	%(P	3.350E+00	1.00E+00	G
SN-113	-3.1922E-03						
		391.71	-3.192E-03	&(	1.954E-01	5.82E-02	G K
		255.04	-6.908E-02	%	6.676E+00	2.00E+00	G
SB-125	-3.4747E-02						
		427.95	-3.475E-02	%(P	5.382E-01	1.61E-01	G K
		600.77	3.018E-01	% P	1.061E+00	3.19E-01	G
		636.15	-3.724E-01	% P	1.943E+00	5.83E-01	G
		463.51	1.955E-01	% P	1.616E+00	4.84E-01	G
		176.29	-4.260E-02	% P	1.380E+00	4.12E-01	G
I-131	-3.2223E-02						
		364.48	-3.222E-02	&(	1.991E-01	5.98E-02	G K
		636.97	-5.637E-01	%	3.658E+00	1.10E+00	G
		284.29	-9.671E-01	%	2.857E+00	8.64E-01	G
CS-134	-8.7537E-02						
		604.66	-8.754E-02	%(	2.231E-01	6.75E-02	G K
		795.76	5.027E-02	%	3.167E-01	9.50E-02	G
		569.29	-2.192E-03	%	1.219E+00	3.63E-01	G
		801.84	6.518E-02	& P	3.368E+00	1.01E+00	G
CS-137	1.3344E-01						
		661.62	1.334E-01	%(	2.479E-01	7.54E-02	G
CE-139	1.6092E-03						
		165.85	1.609E-03	&(P	1.562E-01	4.69E-02	G
EU-152	9.5996E-02						
		121.78	9.600E-02	%(P	4.286E-01	1.29E-01	G K
		344.30	9.333E-02	%	5.090E-01	1.53E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1408.08	1.958E-02	%	5.518E-01	1.57E-01	G
		964.00	-8.553E-01	% P	2.474E+00	7.47E-01	G
		1112.07	3.162E-01	&	2.448E+00	7.32E-01	G
		778.90	2.801E-01	% P	1.963E+00	5.88E-01	G
EU-154	6.2591E-03						
		123.10	6.259E-03	&(P	3.026E-01	9.09E-02	G K
		1274.80	-1.024E-01	%	4.788E-01	1.42E-01	G
		723.30	-3.678E-01	% P	1.270E+00	3.82E-01	G
		1004.80	-2.223E-01	&	2.030E+00	6.08E-01	G
EU-155	8.9449E-02						
		86.45	8.945E-02	&(P	4.871E-01	1.47E-01	G K
		105.31	1.520E-01	%	6.115E-01	1.85E-01	G
HG-203	-2.1294E-02						
		279.17	-2.129E-02	&(P	1.847E-01	5.55E-02	G K
		72.87	-1.631E+00	%	4.314E+00	1.31E+00	G
		70.83	-3.120E+00	%	7.665E+00	2.32E+00	G
		82.50	-3.015E+00	%	8.848E+00	2.68E+00	G
TL-208	3.0926E-01						
		583.14	3.093E-01	(P	2.159E-01	6.79E-02	G
		510.72	4.790E-01	%	8.054E-01	2.45E-01	G
PB-212	9.0276E-01						
		238.63	9.028E-01	*(	3.271E-01	1.04E-01	G K
						Energy duplication	
		77.11	8.208E-01	&	1.248E+00	3.80E-01	G
		74.81	1.324E+00	% P	2.533E+00	7.69E-01	G
PB-214	5.2735E-01						
		351.99	4.683E-01	(P	3.782E-01	1.17E-01	G K
		295.22	6.415E-01	(	6.929E-01	2.13E-01	G
						Energy duplication	
		77.11	1.342E+00	&	2.040E+00	6.21E-01	G
		241.92	-2.919E-01	&	2.097E+00	6.32E-01	G
BI-212	6.9268E-01						
		727.17	6.927E-01	%(	2.020E+00	6.10E-01	G K
		1620.56	-4.006E-02	% P	3.970E+00	1.10E+00	G
		785.42	2.586E+00	& P	1.319E+01	3.96E+00	G
BI-214	5.6831E-01						
		609.32	6.154E-01	*(	4.449E-01	1.65E-01	G K
		1764.51	4.319E-01	?(P	5.093E-01	1.68E-01	G
		1120.28	1.201E-01	%	2.154E+00	6.42E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RA-224	1.0721E-01						
		241.00	1.072E-01	&(P	3.955E+00	1.19E+00	G
RA-226	1.6806E+00						
		185.99	1.681E+00	%(P	3.596E+00	1.09E+00	G
AC-228	8.8024E-01						
		911.07	8.802E-01	%(P	1.265E+00	3.86E-01	G K
		968.90	2.648E-01	& P	2.090E+00	6.27E-01	G
		338.40	8.375E-01	%	1.200E+00	3.66E-01	G
TH-227	-1.2332E+00						
		236.00	-1.233E+00	&(P	1.426E+00	4.36E-01	G K
		256.25	-1.195E-02	%	1.851E+00	5.54E-01	G
PA-234	1.3463E-01						
		98.44	1.346E-01	%(	5.490E-01	1.66E-01	G K
		946.00	2.728E-01	&	1.980E+00	5.95E-01	G
		131.28	1.499E-01	%	6.401E-01	1.93E-01	G
		94.67	-3.160E-02	&	1.024E+00	3.08E-01	G
		883.24	-1.004E+00	%	2.901E+00	8.76E-01	G
		926.70	-3.235E-02	%	2.670E+00	7.95E-01	G
		569.26	1.611E-03	%	1.631E+00	4.85E-01	G
TH-234	1.2616E+00						
		63.29	1.262E+00	%(P	1.027E+01	3.09E+00	G K
		92.80	2.573E+00	%	5.520E+00	1.67E+00	G
		92.38	3.049E+00	% P	6.487E+00	1.97E+00	G
AM-241	-2.4253E-01						
		59.54	-2.425E-01	%(	1.493E+00	4.50E-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	1.4498E-01	1.4890E-01	1.4959E+00	1.4959E+00	1.623E+00
K-40		1.6594E+01	1.6594E+01	2.2579E+00	2.4424E+00	
MN-54	#A	-5.8043E-02	-5.8309E-02	2.6734E-01	2.6736E-01	2.914E-01
CO-57	#B	2.9359E-02	2.9514E-02	1.2962E-01	1.2964E-01	1.425E-01
CO-60		2.3877E+01	2.3895E+01	5.9579E-01	1.4673E+00	
Sr-85	#A	-8.3548E-03	-8.5406E-03	1.6658E-01	1.6658E-01	1.819E-01
Kr-85	#A	-1.9676E+02	-1.9677E+02	3.7624E+03	3.7624E+03	4.200E+03
Y-88	#B	1.2561E-05	1.2730E-05	5.6060E-02	5.6060E-02	7.075E-02
NB-94	#B	8.0063E-03	8.0063E-03	2.9402E-01	2.9402E-01	3.279E-01
Ag-108M	#B	5.9618E-03	5.9619E-03	2.5344E-01	2.5344E-01	2.830E-01
CD-109	#A	2.2167E-01	2.2237E-01	3.0133E+00	3.0134E+00	3.339E+00
SN-113	#B	-3.1529E-03	-3.1922E-03	1.7452E-01	1.7452E-01	1.930E-01
SB-125	#B	-3.4698E-02	-3.4747E-02	5.8512E-01	5.8512E-01	5.374E-01
I-131	#B	-2.6985E-02	-3.2223E-02	1.7925E-01	1.7926E-01	1.668E-01
CS-134	#B	-8.7371E-02	-8.7537E-02	2.0237E-01	2.0243E-01	2.226E-01
CS-137	A	1.3342E-01	1.3344E-01	2.2608E-01	2.2621E-01	2.479E-01
CE-139	#A	1.5926E-03	1.6092E-03	1.4081E-01	1.4081E-01	1.546E-01
EU-152	#B	9.5967E-02	9.5996E-02	3.8802E-01	3.8806E-01	4.285E-01
EU-154	#B	6.2562E-03	6.2591E-03	2.7275E-01	2.7275E-01	3.024E-01
EU-155	#B	8.9379E-02	8.9449E-02	4.4022E-01	4.4025E-01	4.867E-01
HG-203	#B	-2.0652E-02	-2.1294E-02	1.6781E-01	1.6782E-01	1.792E-01
TL-208	#	3.0926E-01	3.0926E-01	2.0366E-01	2.0440E-01	2.159E-01
PB-212	#	9.0276E-01	9.0276E-01	3.1226E-01	3.1634E-01	3.271E-01
PB-214	#	5.2735E-01	5.2735E-01	3.2895E-01	3.3028E-01	3.782E-01
BI-212	#B	6.9268E-01	6.9268E-01	1.8290E+00	1.8294E+00	2.020E+00
BI-214	#	5.6831E-01	5.6831E-01	4.0250E-01	4.0376E-01	
RA-224	#A	1.0721E-01	1.0721E-01	3.5660E+00	3.5660E+00	3.955E+00
RA-226	#A	1.6806E+00	1.6806E+00	3.2709E+00	3.2722E+00	3.596E+00
AC-228	#B	8.8024E-01	8.8024E-01	1.1588E+00	1.1598E+00	1.265E+00
TH-227	#A	-1.2332E+00	-1.2332E+00	1.3108E+00	1.3126E+00	1.426E+00

PA-234 #B	1.3463E-01	1.3463E-01	4.9712E-01	4.9718E-01	5.490E-01

TH-234 #B	1.2616E+00	1.2616E+00	9.2756E+00	9.2759E+00	1.027E+01
AM-241 #A	-2.4253E-01	-2.4253E-01	1.3489E+00	1.3490E+00	1.493E+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 (50.2 to 1999.0 keV) 4.1039772E+01 pCi/gm
Total Decayed Activity (50.2 to 1999.0 keV) 4.1057465E+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: 102F_19NOV2005_1304.An1

Sample description
FSS NOL-06-03-017-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_19NOV2005_1304.An1

Acquisition information
Start time: 19-Nov-2005 13:04:10
Live time: 2000
Real time: 2026
Dead time: 1.27 %
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: 1.8080E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8080E+03) =
5.5310E+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 11:05:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2299

***** 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	120.	38.27	1.50	8.847E-03	70.83	3.520	3.483E+00	HG203
					74.81	9.600	PBC<MDA	PB212
76.99	242.	18.74	1.50	9.541E-03	77.11	10.700	1.773E+00	PB214
					77.11	17.500	1.084E+00	PB212
76.99	242.	18.74	1.50	9.541E-03	77.11	10.700	1.773E+00	PB214
					77.11	17.500	1.084E+00	PB212
86.98	78.	36.36	1.11	1.211E-02	86.45	32.740	PBC<MDA	EU155
93.59	82.	38.77	1.11	1.348E-02	92.80	3.000	1.536E+00	TH234
128.44	129.	33.32	1.47	1.713E-02				
185.69	96.	29.97	1.46	1.628E-02				
185.69	96.	29.97	1.46	1.628E-02	185.99	3.280	PBC<MDA	RA226
209.03	95.	28.88	1.12	1.520E-02				
238.57	745.	4.37	1.21	1.381E-02				
238.57	745.	4.37	1.21	1.381E-02	238.63	43.100	9.357E-01	PB212
241.55	112.	24.89	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	8.173E-01	PB214
270.01	67.	33.24	1.04	1.244E-02				
295.15	154.	16.61	1.20	1.147E-02				
295.15	154.	16.61	1.20	1.147E-02	295.22	19.200	5.242E-01	PB214
300.58	57.	37.25	1.36	1.127E-02				
327.81	39.	40.13	1.03	1.038E-02				
338.30	159.	14.27	1.28	1.006E-02	338.40	12.010	9.861E-01	AC228
351.76	267.	10.07	1.29	9.685E-03				
351.76	267.	10.07	1.29	9.685E-03	351.99	37.100	5.550E-01	PB214
462.95	57.	26.14	0.76	7.374E-03				
462.95	57.	26.14	0.76	7.374E-03	463.51	10.000	5.636E-01	SB125
510.33	162.	12.66	1.49	6.700E-03	510.72	22.500	8.028E-01	TL208

582.91	214.	8.76	1.39	5.892E-03	583.14	86.000	3.152E-01	TL208
609.09	187.	10.55	1.13	5.651E-03	609.32	46.090	5.365E-01	BI214
661.20	68.	26.73	1.17	5.233E-03	661.62	84.620	1.149E-01	CS137
726.71	46.	38.78	1.42	4.794E-03	727.17	11.800	6.131E-01	BI212
910.65	174.	11.18	1.93	3.923E-03	911.07	29.000	1.141E+00	AC228
967.96	139.	13.12	1.49	3.721E-03	968.90	17.460	1.597E+00	AC228
1118.78	70.	27.28	1.20	3.283E-03	1120.28	15.040	1.067E+00	BI214
1460.04	607.	4.09	1.90	2.622E-03	1460.75	10.700	1.618E+01	K40
1763.79	28.	18.90	1.50	2.225E-03	1764.51	15.920	5.889E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
173.53	86.99	368.	78.	0.039	109.09	1.107	BI-207	lD
186.76	93.61	467.	82.	0.041	116.30	1.112	U-235	lD
256.48	128.44	598.	163.	0.082	67.73	1.468	AC-228	s
417.67	209.03	289.	95.	0.048	86.65	1.121	AC-228	s
476.78	238.51	158.	745.	0.372	13.13	1.215	PB-212	D
539.66	270.01	176.	67.	0.033	99.71	1.042	AC-228	
600.81	300.58	167.	57.	0.029	103.30	1.360	PB-212	
655.28	327.81	103.	39.	0.020	120.40	1.029	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	149.20	74.81	1054.	120.	0.060	114.80	1.500D
PB-214	153.80	77.11	909.	242.	0.121	56.23	1.500D
PB-212	153.80	77.11	909.	242.	0.121	56.23	1.500D
RA-226	371.35	185.87	483.	83.	0.041	110.85	1.500s
PB-212	476.75	238.56	370.	626.	0.313	17.70	1.500
RA-224	481.63	241.00	624.	110.	0.055	99.39	1.216D
PB-214	590.00	295.17	200.	152.	0.076	46.27	1.500
AC-228	676.28	338.30	133.	159.	0.080	42.81	1.276
PB-214	703.11	351.71	113.	248.	0.124	26.27	1.500
SB-125	925.95	463.10	76.	43.	0.021	93.94	1.500s
TL-208	1020.45	510.33	78.	162.	0.081	37.99	1.494s
TL-208	1165.66	582.91	51.	214.	0.107	26.29	1.391
BI-214	1218.02	609.09	65.	187.	0.093	31.65	1.129
CS-137	1322.14	661.12	74.	60.	0.030	86.50	1.162s
BI-212	1453.37	726.71	82.	46.	0.023	116.35	1.424
AC-228	1821.44	910.65	52.	174.	0.087	33.53	1.929
AC-228	1936.13	967.96	49.	139.	0.069	39.35	1.487s
BI-214	2237.95	1118.78	66.	70.	0.035	81.83	1.200s
K-40	2920.98	1460.04	3.	607.	0.304	12.27	1.900
BI-214	3529.04	1763.79	0.	28.	0.014	56.69	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		8.2703E-02					
			477.56	8.270E-02	%(	4.711E-01 1.38E-01	G
K-40		1.6183E+01					
			1460.75	1.618E+01	(P	2.820E-01 6.62E-01	G
MN-54		3.9704E-02					
			834.81	3.970E-02	%(P	5.250E-02 1.67E-02	G
CO-57		-5.5538E-04					
			122.07	-5.554E-04	%(	6.940E-02 2.06E-02	G K
			136.43	4.352E-03	&	4.986E-01 1.48E-01	G
CO-60		2.7480E-03					
			1332.51	2.748E-03	%(P	7.557E-02 2.09E-02	G K
			1173.23	3.028E-02	%	7.747E-02 2.32E-02	G K
Sr-85		-2.4419E-02					
			514.00	-2.442E-02	%(	6.646E-02 1.99E-02	G
Kr-85		-5.5060E+02					
			513.99	-5.506E+02	%(	1.500E+03 4.50E+02	G
Y-88		5.5602E-03					
			1836.01	5.560E-03	&(P	5.819E-02 1.54E-02	G K
			898.02	-1.634E-02	% P	6.905E-02 1.99E-02	G
NB-94		1.6677E-03					
			871.10	1.668E-03	%(	5.514E-02 1.53E-02	G K
			702.50	-8.986E-03	%	4.545E-02 1.31E-02	G K
Ag-108M		1.1793E-03					
			722.95	1.179E-03	%(	6.290E-02 1.77E-02	G K
			614.37	-1.997E-02	% P	6.737E-02 2.00E-02	G
			433.93	5.944E-03	%	5.242E-02 1.52E-02	G
CD-109		-4.4981E-02					
			88.04	-4.498E-02	&(P	2.485E+00 7.41E-01	G
SN-113		1.5687E-02					
			391.71	1.569E-02	&(	7.617E-02 2.25E-02	G K
			255.04	-7.519E-02	&	2.196E+00 6.45E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3367E-01						
		427.95	3.209E-02	&(P	1.519E-01	4.45E-02	G K
		600.77	-4.199E-02	& P	3.012E-01	8.72E-02	G
		636.15	-1.396E-02	& P	5.961E-01	1.71E-01	G
		463.51	4.343E-01	*(P	4.392E-01	1.41E-01	G
		176.29	-1.076E-02	& P	7.695E-01	2.27E-01	G
I-131	6.8197E-03						
		364.48	6.820E-03	&(	5.249E-02	1.52E-02	G K
		636.97	6.893E-03	&	8.528E-01	2.40E-01	G
		284.29	2.698E-01	%	8.398E-01	2.51E-01	G
CS-134	2.8705E-03						
		604.66	2.871E-03	%(	1.379E-01	4.08E-02	G K
		795.76	2.917E-02	%	5.653E-02	1.73E-02	G
		569.29	1.136E-02	&	3.583E-01	1.03E-01	G
		801.84	-7.097E-03	% P	6.822E-01	1.91E-01	G
CS-137	1.0203E-01						
		661.62	1.020E-01	@(	7.211E-02	2.94E-02	G
CE-139	1.1933E-02						
		165.85	1.193E-02	&(P	6.072E-02	1.81E-02	G
EU-152	-1.4546E-03						
		121.78	-1.455E-03	%(P	2.007E-01	5.96E-02	G K
		344.30	-2.802E-02	&	1.696E-01	5.00E-02	G
		1408.08	4.530E-02	%	2.127E-01	5.91E-02	G
		964.00	1.417E-01	% P	5.680E-01	1.67E-01	G
		1112.07	-1.084E-01	%	6.030E-01	1.75E-01	G
		778.90	2.229E-02	% P	4.531E-01	1.28E-01	G
EU-154	-2.3571E-02						
		123.10	-2.357E-02	%(P	1.421E-01	4.25E-02	G K
		1274.80	-5.024E-02	%	2.132E-01	6.18E-02	G
		723.30	-1.045E-02	% P	4.211E-01	1.21E-01	G
		1004.80	-5.081E-02	&	3.658E-01	1.04E-01	G
EU-155	5.9129E-02						
		86.45	5.913E-02	%(P	2.858E-01	8.58E-02	G K
		105.31	3.242E-02	&	3.166E-01	9.46E-02	G
HG-203	8.0529E-04						
		279.17	8.053E-04	&(P	5.588E-02	1.63E-02	G K
		72.87	5.476E-02	&	1.499E+00	4.44E-01	G
		70.83	1.177E-01	%	3.625E+00	1.08E+00	G
		82.50	-9.373E-01	%	4.160E+00	1.25E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.1517E-01						
		583.14	3.152E-01	(P	5.330E-02	2.77E-02	G
		510.72	8.028E-01	+	2.179E-01	1.02E-01	G
PB-212	7.8679E-01						
		238.63	7.868E-01	(	1.160E-01	4.64E-02	G K
							Energy duplication
		77.11	1.084E+00	+	6.411E-01	2.03E-01	G
							Energy duplication
		74.81	1.058E+00	& P	1.355E+00	4.15E-01	G
PB-214	5.1687E-01						
		351.99	5.167E-01	(P	1.088E-01	4.53E-02	G K
		295.22	5.171E-01	(	2.328E-01	7.98E-02	G
							Energy duplication
		77.11	1.773E+00	+	1.049E+00	3.32E-01	G
		241.92	2.913E-01	%	8.409E-01	2.53E-01	G
BI-212	6.1306E-01						
		727.17	6.131E-01	(	5.920E-01	2.38E-01	G K
		1620.56	1.300E+00	% P	1.804E+00	5.91E-01	G
		785.42	7.489E-01	% P	3.029E+00	8.86E-01	G
BI-214	5.4996E-01						
		609.32	5.365E-01	(	1.157E-01	5.66E-02	G K
		1764.51	5.889E-01	(P	1.555E-01	1.12E-01	G
		1120.28	1.067E+00	+	6.162E-01	2.91E-01	G
RA-224	1.5396E+00						
		241.00	1.540E+00	(P	1.667E+00	5.15E-01	G
RA-226	1.1627E+00						
		185.99	1.163E+00	(P	1.472E+00	4.53E-01	G
AC-228	1.0954E+00						
		911.07	1.141E+00	(P	2.395E-01	1.28E-01	G K
		968.90	1.597E+00	+ P	4.081E-01	2.09E-01	G
		338.40	9.861E-01	(	3.487E-01	1.41E-01	G
TH-227	-2.3636E-01						
		236.00	-2.364E-01	%(P	5.406E-01	1.64E-01	G K
		256.25	6.992E-04	%	5.703E-01	1.66E-01	G
PA-234	4.7538E-03						
		98.44	4.754E-03	%(	2.688E-01	7.99E-02	G K
		946.00	8.581E-02	%	3.005E-01	8.80E-02	G
		131.28	-7.391E-02	%	2.836E-01	8.52E-02	G
		94.67	1.186E-03	%	5.372E-01	1.60E-01	G
		883.24	7.535E-02	%	4.961E-01	1.42E-01	G
		926.70	-1.380E-01	&	7.191E-01	2.10E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.748E-02 &   5.303E-01 1.52E-01 G

TH-234       6.6058E-01
                           63.29 6.606E-01 %(P 5.076E+00 1.52E+00 G K
                           92.80 1.802E+00 %   2.801E+00 8.55E-01 G
                           92.38-1.426E-01 & P 3.311E+00 9.88E-01 G

AM-241       3.8353E-02
                           59.54 3.835E-02 %(  6.415E-01 1.90E-01 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      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	8.0497E-02	8.2703E-02	4.1265E-01	4.1268E-01	4.585E-01
K-40		1.6183E+01	1.6183E+01	1.9867E+00	2.1844E+00	
MN-54	#A	3.9520E-02	3.9704E-02	5.0131E-02	5.0181E-02	5.226E-02
CO-57	#B	-5.5242E-04	-5.5538E-04	6.1921E-02	6.1921E-02	6.903E-02
CO-60	#B	2.7460E-03	2.7480E-03	6.2768E-02	6.2768E-02	7.551E-02

Sr-85	#A	-2.3882E-02	-2.4419E-02	5.9817E-02	5.9832E-02	6.500E-02
Kr-85	#A	-5.5059E+02	-5.5060E+02	1.3504E+03	1.3507E+03	1.500E+03
Y-88	#B	5.4854E-03	5.5602E-03	4.6181E-02	4.6182E-02	5.741E-02
NB-94	#B	1.6677E-03	1.6677E-03	4.5981E-02	4.5981E-02	5.514E-02
Ag-108M	#B	1.1793E-03	1.1793E-03	5.3211E-02	5.3211E-02	6.290E-02
CD-109	#A	-4.4838E-02	-4.4981E-02	7.2130E+00	7.2130E+00	2.477E+00
SN-113	#B	1.5492E-02	1.5687E-02	6.7438E-02	6.7444E-02	7.522E-02
SB-125	#B	1.3348E-01	1.3367E-01	1.3011E-01	1.3033E-01	1.517E-01
I-131	#B	5.6988E-03	6.8197E-03	4.5682E-02	4.5684E-02	4.386E-02
CS-134	#B	2.8651E-03	2.8705E-03	1.2239E-01	1.2239E-01	1.377E-01
CS-137	#	1.0202E-01	1.0203E-01	8.8255E-02	8.8441E-02	
CE-139	#A	1.1808E-02	1.1933E-02	5.4448E-02	5.4452E-02	6.008E-02
EU-152	#B	-1.4541E-03	-1.4546E-03	4.1377E+00	4.1377E+00	2.007E-01
EU-154	#B	-2.3560E-02	-2.3571E-02	1.3001E-01	1.3002E-01	1.420E-01
EU-155	#B	5.9081E-02	5.9129E-02	2.5728E-01	2.5730E-01	2.856E-01
HG-203	#B	7.8072E-04	8.0529E-04	4.8994E-02	4.8994E-02	5.417E-02
TL-208		3.1517E-01	3.1517E-01	8.3017E-02	8.4880E-02	
PB-212	#	7.8679E-01	7.8679E-01	1.3927E-01	1.4610E-01	1.160E-01
PB-214	#	5.1687E-01	5.1687E-01	1.3601E-01	1.3907E-01	1.088E-01
BI-212		6.1306E-01	6.1306E-01	7.1330E-01	7.1413E-01	
BI-214		5.4996E-01	5.4996E-01	1.7404E-01	1.7676E-01	
RA-224	A	1.5396E+00	1.5396E+00	1.5463E+00	1.5487E+00	
RA-226	#A	1.1627E+00	1.1627E+00	1.3581E+00	1.3597E+00	1.472E+00
AC-228		1.0954E+00	1.0954E+00	2.9799E-01	3.0426E-01	
TH-227	#B	-2.3636E-01	-2.3636E-01	4.9634E-01	4.9652E-01	5.406E-01
PA-234	#B	4.7538E-03	4.7538E-03	2.3975E-01	2.3975E-01	2.688E-01
TH-234	#B	6.6058E-01	6.6058E-01	4.5497E+00	4.5498E+00	5.076E+00
AM-241	#A	3.8353E-02	3.8353E-02	5.7121E-01	5.7121E-01	6.415E-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) 2.0398058E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 2.0398073E+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: 102F_19NOV2005_1342.An1

Sample description
FSS NOL-06-03-024-F-I

Spectrum Filename: C:\GammaVision\Spectra\102F_19NOV2005_1342.An1

Acquisition information
Start time: 19-Nov-2005 13:42:12
Live time: 2000
Real time: 2029
Dead time: 1.44 %
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: 1.8710E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8710E+03) =
5.3447E+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 10:22:00
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: 0.2711

***** 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	161.	31.94	1.50	8.847E-03	72.87	6.400	2.273E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.10	317.	15.89	1.50	9.541E-03	77.11	10.700	2.242E+00	PB214
					77.11	17.500	1.371E+00	PB212
77.10	317.	15.89	1.50	9.541E-03	77.11	10.700	2.242E+00	PB214
					77.11	17.500	1.371E+00	PB212
185.86	155.	20.62	1.60	1.627E-02				
185.86	155.	20.62	1.60	1.627E-02	185.99	3.280	2.041E+00	RA226
209.40	118.	35.79	1.17	1.519E-02				
238.57	1087.	3.55	1.21	1.381E-02				
238.57	1087.	3.55	1.21	1.381E-02	238.63	43.100	1.320E+00	PB212
241.79	125.	20.43	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	8.870E-01	PB214
270.26	83.	22.62	1.24	1.243E-02				
295.08	178.	12.12	1.25	1.148E-02				
295.08	178.	12.12	1.25	1.148E-02	295.22	19.200	5.824E-01	PB214
300.12	62.	29.80	1.26	1.130E-02				
327.70	70.	36.41	1.17	1.038E-02				
338.36	219.	12.28	1.37	1.006E-02	338.40	12.010	1.309E+00	AC228
351.77	307.	9.22	1.20	9.685E-03				
351.77	307.	9.22	1.20	9.685E-03	351.99	37.100	6.175E-01	PB214
462.86	91.	27.66	1.36	7.375E-03				
462.86	91.	27.66	1.36	7.375E-03	463.51	10.000	8.786E-01	SB125
510.76	144.	14.39	1.33	6.694E-03	510.72	22.500	6.924E-01	TL208
582.91	330.	7.62	1.19	5.892E-03	583.14	86.000	4.705E-01	TL208
609.06	259.	12.11	1.36	5.652E-03	609.32	46.090	7.190E-01	BI214
660.90	107.	19.70	1.24	5.235E-03	661.62	84.620	1.740E-01	CS137

726.37	102.	18.65	1.46	4.799E-03	727.17	11.800	1.305E+00	BI212
794.37	35.	39.29	1.12	4.426E-03				
860.52	48.	26.86	1.50	4.123E-03				
911.00	190.	8.81	1.81	3.922E-03	911.07	29.000	1.205E+00	AC228
964.14	54.	18.77	1.71	3.733E-03	964.00	14.580	7.188E-01	EU152
968.68	132.	10.10	1.72	3.718E-03	968.90	17.460	1.465E+00	AC228
1119.28	80.	24.75	1.83	3.286E-03	1120.28	15.040	1.170E+00	BI214
1172.46	78.	28.86	1.01	3.159E-03	1173.23	99.860	1.800E-01	CO60
1331.34	57.	20.09	1.13	2.836E-03	1332.51	99.980	1.457E-01	CO60
1460.14	708.	3.84	1.86	2.622E-03	1460.75	10.700	1.822E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1763.99	25.	20.00	0.87	2.225E-03	1764.51	15.920	5.079E-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	
418.41	209.40	580.	118.	0.059	107.38	1.172	AC-228	s
476.78	238.54	200.	1087.	0.544	10.64	1.215	PB-212	D
483.22	241.76	265.	125.	0.063	61.29	1.217	PB-214	D
540.17	270.13	133.	83.	0.041	67.86	1.237	AC-228	D
599.45	299.90	213.	71.	0.036	93.93	1.294	TH-227	
655.07	327.70	226.	70.	0.035	109.22	1.167	AC-228	
1588.76	794.37	60.	33.	0.016	112.72	1.122	AC-228	
1721.13	860.52	41.	48.	0.024	80.59	1.501	TL-208	s
1928.25	964.23	26.	54.	0.027	57.23	1.714	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	149.26	74.84	1287.	161.	0.080	95.81	1.500s
PB-214	153.80	77.11	1110.	317.	0.158	47.68	1.500D
PB-212	153.80	77.11	1110.	317.	0.158	47.68	1.500D
RA-226	371.55	185.97	564.	158.	0.079	66.10	1.500s
PB-212	476.81	238.59	539.	892.	0.446	14.93	1.500
PB-214	589.76	295.05	286.	167.	0.083	48.92	1.500
AC-228	676.39	338.36	180.	219.	0.109	36.83	1.373
PB-214	703.30	351.81	194.	274.	0.137	28.12	1.500
SB-125	925.74	462.99	117.	51.	0.025	96.32	1.500s
TL-208	1021.31	510.76	103.	144.	0.072	43.17	1.327s
TL-208	1165.66	582.91	95.	330.	0.165	22.85	1.186
BI-214	1217.98	609.06	173.	259.	0.130	36.32	1.356
CS-137	1321.71	660.90	98.	107.	0.053	59.11	1.244s
BI-212	1452.69	726.37	77.	102.	0.051	55.95	1.459s
AC-228	1822.14	911.00	36.	190.	0.095	26.42	1.808s
EU-152	1928.28	964.04	66.	38.	0.019	101.66	1.714
AC-228	1938.01	968.90	26.	132.	0.066	30.83	1.718D
BI-214	2238.95	1119.28	78.	80.	0.040	74.25	1.829s
CO-60	2345.38	1172.46	92.	78.	0.039	86.58	1.008s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2663.39	1331.34	21.	57.	0.029	60.28	1.134s
K-40	2921.19	1460.14	9.	707.	0.354	11.53	1.856
BI-214	3529.44	1763.99	0.	25.	0.012	60.00	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	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.5017E-01					
			477.56	1.502E-01	%(	4.884E-01 1.45E-01	G
K-40		1.8221E+01					
			1460.75	1.822E+01	(P	4.208E-01 7.00E-01	G
MN-54		3.9234E-02					
			834.81	3.923E-02	%(P	6.087E-02 1.89E-02	G
CO-57		-1.6417E-02					
			122.07	-1.642E-02	%(	6.897E-02 2.07E-02	G K
			136.43	4.643E-02	&	5.456E-01 1.63E-01	G
CO-60		1.6285E-01					
			1332.51	1.457E-01	(P	6.124E-02 2.93E-02	G K
			1173.23	1.800E-01	(	1.090E-01 5.19E-02	G K
Sr-85		-3.0233E-02					
			514.00	-3.023E-02	%(	7.601E-02 2.29E-02	G
Kr-85		-6.8215E+02					
			513.99	-6.822E+02	%(	1.715E+03 5.17E+02	G
Y-88		3.3198E-04					
			1836.01	3.320E-04	&(P	6.358E-02 1.65E-02	G K
			898.02	-2.330E-03	% P	6.952E-02 1.94E-02	G
NB-94		7.0609E-03					
			871.10	7.061E-03	%(	6.813E-02 1.95E-02	G K
			702.50	3.765E-03	%	6.162E-02 1.77E-02	G K
Ag-108M		-9.7011E-03					
			722.95	-9.701E-03	%(	8.532E-02 2.49E-02	G K
			614.37	-2.704E-03	% P	7.850E-02 2.27E-02	G
			433.93	1.034E-02	&	6.176E-02 1.82E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.7278E+00						
		88.04	1.728E+00	%(P	2.444E+00	7.47E-01	G
SN-113	-9.7667E-03						
		391.71	-9.767E-03	&(	7.911E-02	2.32E-02	G K
		255.04	1.593E-02	&	2.419E+00	7.12E-01	G
SB-125	1.4599E-01						
		427.95	2.669E-02	&(P	1.710E-01	5.01E-02	G K
		600.77	-8.268E-03	& P	3.624E-01	1.04E-01	G
		636.15	5.397E-02	% P	4.485E-01	1.29E-01	G
		463.51	4.991E-01	*(P	5.210E-01	1.65E-01	G
		176.29	6.737E-02	% P	8.345E-01	2.48E-01	G
I-131	-3.3726E-03						
		364.48	-3.373E-03	&(	7.408E-02	2.16E-02	G K
		636.97	2.167E-01	%	8.491E-01	2.49E-01	G
		284.29	1.114E-01	%	9.703E-01	2.87E-01	G
CS-134	4.1611E-03						
		604.66	4.161E-03	%(	1.552E-01	4.61E-02	G K
		795.76	4.359E-03	%	8.425E-02	2.42E-02	G
		569.29	-1.113E-01	%	4.200E-01	1.25E-01	G
		801.84	8.102E-02	% P	7.374E-01	2.12E-01	G
CS-137	1.7401E-01						
		661.62	1.740E-01	(	7.988E-02	3.43E-02	G
CE-139	-1.6291E-03						
		165.85	-1.629E-03	&(P	6.466E-02	1.92E-02	G
EU-152	1.8450E-01						
		121.78	2.328E-02	%(P	2.006E-01	5.99E-02	G K
		344.30	-1.757E-02	%	1.865E-01	5.48E-02	G
		1408.08	-1.708E-02	&	3.164E-01	8.69E-02	G
		964.00	5.078E-01	&(P	5.386E-01	1.73E-01	G
		1112.07	-6.155E-02	&	6.795E-01	1.96E-01	G
		778.90	1.487E-01	% P	4.438E-01	1.32E-01	G
EU-154	1.2738E-02						
		123.10	1.274E-02	%(P	1.499E-01	4.48E-02	G K
		1274.80	4.032E-02	%	2.140E-01	6.16E-02	G
		723.30	-2.780E-02	& P	3.786E-01	1.09E-01	G
		1004.80	-2.616E-03	&	3.771E-01	1.05E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.8098E-01						
		86.45	1.810E-01	%(P	2.999E-01	9.13E-02	G K
		105.31	8.151E-02	%	3.348E-01	1.01E-01	G
HG-203	2.2350E-03						
		279.17	2.235E-03	&(P	6.150E-02	1.81E-02	G K
		72.87	-6.200E-01	%	2.607E+00	7.85E-01	G
		70.83	-2.983E-02	&	5.356E+00	1.60E+00	G
		82.50	-3.005E-01	%	4.711E+00	1.41E+00	G
TL-208	4.7053E-01						
		583.14	4.705E-01	(P	6.863E-02	3.59E-02	G
		510.72	6.924E-01	+	2.393E-01	9.96E-02	G
PB-212	1.0827E+00						
		238.63	1.083E+00	(	1.346E-01	5.39E-02	G K
							Energy duplication
		77.11	1.371E+00	+	6.832E-01	2.18E-01	G
		74.81	1.366E+00	& P	1.445E+00	4.45E-01	G
PB-214	5.4963E-01						
		351.99	5.509E-01	(P	1.360E-01	5.17E-02	G K
		295.22	5.471E-01	(	2.676E-01	8.92E-02	G
							Energy duplication
		77.11	2.242E+00	+	1.117E+00	3.56E-01	G
		241.92	-3.616E-03	%	1.026E+00	3.06E-01	G
BI-212	1.3048E+00						
		727.17	1.305E+00	*(	5.560E-01	2.43E-01	G K
		1620.56	6.759E-01	% P	1.835E+00	5.37E-01	G
		785.42	-1.306E-01	& P	2.975E+00	8.42E-01	G
BI-214	7.1900E-01						
		609.32	7.190E-01	(	1.774E-01	8.70E-02	G K
		1764.51	5.079E-01	- P	1.503E-01	1.02E-01	G
		1120.28	1.170E+00	+	6.416E-01	2.89E-01	G
RA-224	1.0386E+00						
		241.00	1.039E+00	%(P	1.696E+00	5.17E-01	G
RA-226	2.1394E+00						
		185.99	2.139E+00	(P	1.535E+00	4.85E-01	G
AC-228	1.3040E+00						
		911.07	1.205E+00	@(P	1.953E-01	1.06E-01	G K
		968.90	1.465E+00	(P	2.932E-01	1.51E-01	G
		338.40	1.309E+00	(	3.900E-01	1.61E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.8642E-01						
		236.00	-3.864E-01	%(P	6.710E-01	2.04E-01	G K
		256.25	-1.562E-01	%	7.506E-01	2.24E-01	G
PA-234	8.8993E-03						
		98.44	8.899E-03	&(	2.989E-01	8.91E-02	G K
		946.00	9.430E-02	&	3.659E-01	1.07E-01	G
		131.28	2.669E-02	&	3.087E-01	9.23E-02	G
		94.67	-1.976E-01	%	5.367E-01	1.62E-01	G
		883.24	1.106E-01	&	4.919E-01	1.43E-01	G
		926.70	-6.478E-04	&	6.298E-01	1.77E-01	G
		569.26	-1.647E-01	%	6.218E-01	1.84E-01	G
TH-234	1.4824E+00						
		63.29	1.482E+00	%(P	5.377E+00	1.62E+00	G K
		92.80	1.860E+00	%	2.916E+00	8.89E-01	G
		92.38	2.095E+00	% P	3.488E+00	1.06E+00	G
AM-241	-1.4893E-01						
		59.54	-1.489E-01	%(	8.113E-01	2.43E-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	1.4606E-01	1.5017E-01	4.3570E-01	4.3579E-01	4.750E-01
K-40		1.8221E+01	1.8221E+01	2.1013E+00	2.3368E+00	
MN-54	#A	3.9048E-02	3.9234E-02	5.6744E-02	5.6787E-02	6.058E-02
CO-57	#B	-1.6327E-02	-1.6417E-02	6.2152E-02	6.2159E-02	6.859E-02
CO-60		1.6273E-01	1.6285E-01	8.5940E-02	8.6424E-02	
Sr-85	#A	-2.9550E-02	-3.0233E-02	6.8691E-02	6.8712E-02	7.429E-02
Kr-85	#A	-6.8214E+02	-6.8215E+02	1.5499E+03	1.5504E+03	1.715E+03
Y-88	#B	3.2740E-04	3.3198E-04	4.9517E-02	4.9517E-02	6.270E-02
NB-94	#B	7.0609E-03	7.0609E-03	5.8630E-02	5.8631E-02	6.813E-02
Ag-108M	#B	-9.7008E-03	-9.7011E-03	7.4569E-02	7.4571E-02	8.532E-02
CD-109	#A	1.7221E+00	1.7278E+00	2.2403E+00	2.2423E+00	2.436E+00
SN-113	#B	-9.6417E-03	-9.7667E-03	6.9628E-02	6.9630E-02	7.810E-02
SB-125	#B	1.4577E-01	1.4599E-01	1.4490E-01	1.4513E-01	1.707E-01
I-131	#B	-2.8046E-03	-3.3726E-03	6.4888E-02	6.4889E-02	6.160E-02
CS-134	#B	4.1529E-03	4.1611E-03	1.3830E-01	1.3830E-01	1.549E-01
CS-137	#	1.7399E-01	1.7401E-01	1.0286E-01	1.0332E-01	
CE-139	#A	-1.6116E-03	-1.6291E-03	7.6935E-02	7.6935E-02	6.396E-02
EU-152	#B	1.8444E-01	1.8450E-01	1.8869E-01	1.8897E-01	2.005E-01
EU-154	#B	1.2732E-02	1.2738E-02	1.3432E-01	1.3432E-01	1.498E-01
EU-155	#B	1.8083E-01	1.8098E-01	2.7377E-01	2.7395E-01	2.996E-01
HG-203	#B	2.1650E-03	2.2350E-03	5.4262E-02	5.4262E-02	5.958E-02
TL-208		4.7053E-01	4.7053E-01	1.0763E-01	1.1082E-01	
PB-212	#	1.0827E+00	1.0827E+00	1.6162E-01	1.7266E-01	1.346E-01
PB-214	#	5.4963E-01	5.4963E-01	1.5480E-01	1.5784E-01	1.360E-01
BI-212	#	1.3048E+00	1.3048E+00	7.3009E-01	7.3375E-01	
BI-214		7.1900E-01	7.1900E-01	2.6117E-01	2.6427E-01	
RA-224	#A	1.0386E+00	1.0386E+00	1.5512E+00	1.5523E+00	1.696E+00
RA-226	#	2.1394E+00	2.1394E+00	1.4541E+00	1.4590E+00	1.535E+00
AC-228		1.3040E+00	1.3040E+00	2.3836E-01	2.4934E-01	
TH-227	#B	-3.8642E-01	-3.8642E-01	6.1682E-01	6.1720E-01	6.710E-01
PA-234	#B	8.8993E-03	8.8993E-03	2.6745E-01	2.6745E-01	2.989E-01
TH-234	#B	1.4824E+00	1.4824E+00	4.8537E+00	4.8544E+00	5.377E+00
AM-241	#A	-1.4893E-01	-1.4893E-01	7.2973E-01	7.2978E-01	8.113E-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) 2.2356379E+01 pCi/gm
Total Decayed Activity (1119.8 to 1999.0 keV) 2.2356527E+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: 102F_30N0V2005_1734.An1

Sample description
FSS-NOL-06-03-015-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30N0V2005_1734.An1

Acquisition information

Start time:	30-Nov-2005 18:07:42
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:	2.0780E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.0780E+03) = 4.8123E+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	29-Nov-2005 01:22:00
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: 0.1903

***** 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	117.	38.69	1.50	8.847E-03				
74.90	117.	38.69	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.01	187.	24.34	1.50	9.541E-03	77.11	17.500	7.298E-01	PB212
					77.11	10.700	1.194E+00	PB214
77.01	187.	24.34	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.194E+00	PB214
128.97	91.	33.31	1.35	1.715E-02				
186.15	102.	29.68	1.36	1.626E-02	185.99	3.280	PBC<MDA	RA226
209.26	102.	30.13	1.21	1.519E-02				
238.72	713.	4.49	1.21	1.380E-02	238.63	43.100	7.789E-01	PB212
242.02	111.	21.93	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.070E-01	PB214
278.42	64.	38.16	1.14	1.210E-02				
295.46	171.	11.84	1.31	1.146E-02	295.22	19.200	5.043E-01	PB214
300.85	48.	37.87	0.88	1.126E-02				
327.85	44.	34.33	0.77	1.037E-02				
338.62	189.	12.93	1.24	1.005E-02	338.40	12.010	1.017E+00	AC228
352.25	262.	11.97	1.23	9.672E-03	351.99	37.100	4.734E-01	PB214
463.03	48.	34.72	1.84	7.372E-03				
463.03	48.	34.72	1.84	7.372E-03	463.51	10.000	4.124E-01	SB125
511.06	136.	16.50	1.26	6.690E-03	510.72	22.500	5.871E-01	TL208
583.28	221.	10.50	1.63	5.889E-03	583.14	86.000	2.829E-01	TL208
600.95	36.	22.38	1.50	5.690E-03	600.77	18.400	2.211E-01	SB125
					604.66	97.600	4.212E-02	CS134
609.22	184.	11.03	1.57	5.650E-03	609.32	46.090	4.596E-01	BI214
727.42	75.	19.79	0.83	4.793E-03	727.17	11.800	8.576E-01	BI212
770.97	43.	40.45	0.71	4.547E-03				

795.32	32.	29.52	0.93	4.422E-03				
795.32	32.	29.52	0.93	4.422E-03	795.76	85.400	5.453E-02	CS134
911.39	146.	10.12	1.54	3.921E-03	911.07	29.000	8.323E-01	AC228
968.64	113.	16.21	1.80	3.719E-03	968.90	17.460	1.134E+00	AC228
1121.01	38.	34.48	0.65	3.283E-03	1120.28	15.040	5.071E-01	BI214
1461.08	690.	3.92	1.70	2.620E-03	1460.75	10.700	1.600E+01	K40
1765.02	30.	21.24	2.24	2.225E-03	1764.51	15.920	5.462E-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	209.26	340.	102.	0.051	90.39	1.209	AC-228	s
477.07	238.67	156.	713.	0.356	13.48	1.215	PB-212	D
483.67	241.97	240.	111.	0.055	65.78	1.217	PB-214	D
556.48	278.42	213.	64.	0.032	114.48	1.140	SB-126	l
601.35	300.85	127.	48.	0.024	113.60	0.877	PB-212	
655.38	327.85	94.	44.	0.022	103.00	0.769	AC-228	s
1541.93	770.97	66.	50.	0.025	80.77	0.710	AC-228	sM
1590.66	795.32	30.	28.	0.014	99.70	0.933	CS-134	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	149.38	74.90	1028.	117.	0.059	116.07	1.500s
PB-212	153.80	77.11	946.	187.	0.094	73.01	1.500D
PB-214	153.80	77.11	946.	187.	0.094	73.01	1.500D
RA-226	372.11	186.25	501.	90.	0.045	104.40	1.500s
PB-212	477.07	238.72	479.	640.	0.320	18.74	1.500
PB-214	590.38	295.36	173.	171.	0.085	39.94	1.500s
AC-228	676.92	338.62	136.	189.	0.094	38.78	1.245
PB-214	703.89	352.10	143.	230.	0.115	29.59	1.500s
SB-125	925.81	463.03	71.	36.	0.018	106.11	1.500s
TL-208	1021.91	511.06	105.	136.	0.068	49.50	1.261s
TL-208	1166.39	583.28	82.	220.	0.110	31.50	1.634
CS-134	1201.75	600.95	14.	36.	0.018	67.15	1.499
BI-214	1218.29	609.22	76.	184.	0.092	33.09	1.573s
BI-212	1454.79	727.42	49.	75.	0.037	59.36	0.835s
AC-228	1822.93	911.39	31.	146.	0.073	30.35	1.536
AC-228	1937.49	968.64	59.	113.	0.057	48.62	1.799
BI-214	2242.41	1121.01	48.	38.	0.019	103.45	0.653s
K-40	2923.07	1461.08	11.	690.	0.345	11.75	1.696
BI-214	3531.50	1765.02	5.	30.	0.015	63.73	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	MDA Value pCi/gm	COMMENTS
BE-7		-1.5091E-02					
			477.56	-1.509E-02	%(	3.730E-01 1.06E-01	G
K-40		1.6003E+01					
			1460.75	1.600E+01	(P	4.205E-01 6.27E-01	G
MN-54		-1.2606E-02					
			834.81	-1.261E-02	%(P	5.702E-02 1.66E-02	G
CO-57		-3.5041E-04					
			122.07	-3.504E-04	%(	4.805E-02 1.42E-02	G K
			136.43	9.331E-02	%	4.303E-01 1.29E-01	G
CO-60		1.0898E-02					
			1332.51	1.090E-02	%(P	5.876E-02 1.67E-02	G K
			1173.23	4.730E-03	&	6.520E-02 1.84E-02	G K
Sr-85		-2.0249E-02					
			514.00	-2.025E-02	&(	6.117E-02 1.83E-02	G
Kr-85		-4.5905E+02					
			513.99	-4.591E+02	&(	1.387E+03 4.15E+02	G
Y-88		-5.7988E-03					
			1836.01	-5.799E-03	%(P	4.405E-02 1.16E-02	G K
			898.02	-8.903E-03	% P	6.454E-02 1.84E-02	G
NB-94		2.1250E-03					
			871.10	2.125E-03	%(	5.084E-02 1.42E-02	G K
			702.50	1.730E-02	%	4.044E-02 1.22E-02	G K
Ag-108M		1.1617E-02					
			722.95	1.162E-02	%(	3.571E-02 1.05E-02	G K
			614.37	-3.185E-03	% P	4.828E-02 1.37E-02	G
			433.93	7.722E-03	&	4.318E-02 1.26E-02	G
CD-109		-1.6900E-01					
			88.04	-1.690E-01	%(P	2.258E+00 6.75E-01	G
SN-113		2.1246E-02					
			391.71	2.125E-02	%(	6.258E-02 1.87E-02	G K
			255.04	-2.424E-01	%	2.004E+00 5.93E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0422E-01						
		427.95	3.172E-02	&(P	1.235E-01	3.63E-02	G K
		600.77	1.243E-01	% P	2.079E-01	6.42E-02	G
		636.15	-1.310E-01	% P	4.960E-01	1.47E-01	G
		463.51	3.188E-01	(P	3.717E-01	1.18E-01	G
		176.29	2.614E-02	& P	6.247E-01	1.85E-01	G
I-131	-5.9208E-03						
		364.48	-5.921E-03	%(	5.594E-02	1.63E-02	G K
		636.97	2.365E-01	%	6.434E-01	1.92E-01	G
		284.29	-5.352E-02	%	6.987E-01	2.05E-01	G
CS-134	4.2116E-02						
		604.66	4.212E-02	&(	2.388E-02	9.43E-03	G K
		795.76	5.884E-03	%	7.093E-02	2.04E-02	G
		569.29	0.000E+00	&	3.157E-01	9.00E-02	G
		801.84	-1.376E-01	% P	6.052E-01	1.76E-01	G
CS-137	2.6183E-03						
		661.62	2.618E-03	%(	6.140E-02	1.75E-02	G
CE-139	-9.0082E-03						
		165.85	-9.008E-03	&(P	5.552E-02	1.66E-02	G
EU-152	1.7949E-02						
		121.78	1.795E-02	%(P	1.615E-01	4.82E-02	G K
		344.30	-3.661E-02	%	1.521E-01	4.51E-02	G
		1408.08	1.576E-01	%	2.583E-01	8.10E-02	G
		964.00	1.594E-01	& P	5.320E-01	1.58E-01	G
		1112.07	1.094E-02	&	5.018E-01	1.41E-01	G
		778.90	-8.050E-02	% P	4.355E-01	1.27E-01	G
EU-154	-1.9565E-04						
		123.10	-1.956E-04	%(P	1.198E-01	3.56E-02	G K
		1274.80	-2.932E-02	&	2.228E-01	6.39E-02	G
		723.30	-1.537E-03	& P	4.638E-01	1.35E-01	G
		1004.80	-2.095E-02	%	3.200E-01	8.99E-02	G
EU-155	1.5661E-01						
		86.45	1.566E-01	%(P	2.456E-01	7.49E-02	G K
		105.31	-4.893E-03	%	2.840E-01	8.46E-02	G
HG-203	8.0364E-03						
		279.17	8.036E-03	%(P	5.515E-02	1.63E-02	G K
		72.87	-1.347E-02	%	2.335E+00	6.98E-01	G
		70.83	-1.363E-02	&	3.611E+00	1.08E+00	G
		82.50	-9.803E-01	%	3.878E+00	1.17E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8295E-01						
		583.14	2.829E-01	(P	5.752E-02	2.98E-02	G
		510.72	5.871E-01	+	2.178E-01	9.69E-02	G
PB-212	7.0829E-01						
		238.63	6.995E-01	(	1.145E-01	4.37E-02	G K
							Energy duplication
		77.11	7.298E-01	*(	5.689E-01	1.78E-01	G
		74.81	8.986E-01	& P	1.165E+00	3.57E-01	G
PB-214	4.4622E-01						
		351.99	4.160E-01	@(P	1.058E-01	4.11E-02	G K
		295.22	5.046E-01	@(	1.892E-01	6.72E-02	G
							Energy duplication
		77.11	1.194E+00	+	9.304E-01	2.91E-01	G
		241.92	3.583E-01	%	7.368E-01	2.24E-01	G
BI-212	8.5758E-01						
		727.17	8.576E-01	(	4.077E-01	1.70E-01	G K
		1620.56	2.752E-01	% P	1.547E+00	4.18E-01	G
		785.42	-1.243E-01	% P	2.622E+00	7.42E-01	G
BI-214	4.8674E-01						
		609.32	4.596E-01	@(	1.082E-01	5.07E-02	G K
		1764.51	5.462E-01	?(P	2.459E-01	1.16E-01	G
		1120.28	5.071E-01	(	4.587E-01	1.75E-01	G
RA-224	9.2369E-01						
		241.00	9.237E-01	%(P	1.362E+00	4.17E-01	G
RA-226	1.1010E+00						
		185.99	1.101E+00	@(P	1.305E+00	4.02E-01	G
AC-228	8.8651E-01						
		911.07	8.323E-01	(P	1.649E-01	8.44E-02	G K
		968.90	1.134E+00	+ P	3.852E-01	1.84E-01	G
		338.40	1.017E+00	(	3.071E-01	1.32E-01	G
TH-227	-1.7594E-01						
		236.00	-1.759E-01	%(P	5.252E-01	1.58E-01	G K
		256.25	9.603E-02	&	5.837E-01	1.73E-01	G
PA-234	1.1040E-01						
		98.44	1.104E-01	%(	2.544E-01	7.70E-02	G K
		946.00	-4.087E-03	%	2.112E-01	5.74E-02	G
		131.28	-4.093E-02	%	2.466E-01	7.38E-02	G
		94.67	-1.589E-01	%	4.706E-01	1.42E-01	G
		883.24	-7.098E-02	%	4.691E-01	1.35E-01	G
		926.70	-1.120E-01	%	5.425E-01	1.58E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 0.000E+00 &   4.676E-01 1.33E-01 G

TH-234       1.1045E+00
                           63.29 1.104E+00 %(P 4.612E+00 1.38E+00 G K
                           92.80 1.398E+00 %   2.430E+00 7.40E-01 G
                           92.38 1.581E+00 % P 2.893E+00 8.79E-01 G

AM-241       2.5149E-03
                           59.54 2.515E-03 %(  6.607E-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	-1.4762E-02	-1.5091E-02	3.1926E-01	3.1926E-01	3.649E-01
K-40		1.6003E+01	1.6003E+01	1.8799E+00	2.0834E+00	
MN-54	#A	-1.2558E-02	-1.2606E-02	5.2421E-02	5.2426E-02	5.680E-02
CO-57	#B	-3.4888E-04	-3.5041E-04	4.2643E-02	4.2643E-02	4.784E-02
CO-60	#B	1.0891E-02	1.0898E-02	5.0090E-02	5.0094E-02	5.872E-02

Sr-85	#A	-1.9885E-02	-2.0249E-02	5.4907E-02	5.4919E-02	6.007E-02
Kr-85	#A	-4.5905E+02	-4.5905E+02	1.2448E+03	1.2450E+03	1.387E+03
Y-88	#B	-5.7351E-03	-5.7988E-03	3.5113E-02	3.5114E-02	4.357E-02
NB-94	#B	2.1250E-03	2.1250E-03	4.2710E-02	4.2711E-02	5.084E-02
Ag-108M	#B	1.1616E-02	1.1617E-02	3.1417E-02	3.1424E-02	3.571E-02
CD-109	#A	-1.6856E-01	-1.6900E-01	2.5894E+00	2.5894E+00	2.252E+00
SN-113	#B	2.1030E-02	2.1246E-02	5.6117E-02	5.6130E-02	6.195E-02
SB-125	#B	1.0410E-01	1.0422E-01	1.1534E-01	1.1548E-01	1.234E-01
I-131	#B	-5.1144E-03	-5.9208E-03	4.9022E-02	4.9024E-02	4.832E-02
CS-134	#	4.2050E-02	4.2116E-02	2.8279E-02	2.8378E-02	2.384E-02
CS-137	#A	2.6181E-03	2.6183E-03	5.2607E-02	5.2607E-02	6.140E-02
CE-139	#A	-8.9314E-03	-9.0082E-03	5.2109E-02	5.2111E-02	5.505E-02
EU-152	#B	1.7944E-02	1.7949E-02	1.4445E-01	1.4446E-01	1.614E-01
EU-154	#B	-1.9557E-04	-1.9565E-04	4.3836E-02	4.3836E-02	1.197E-01
EU-155	#B	1.5651E-01	1.5661E-01	2.2460E-01	2.2477E-01	2.455E-01
HG-203	#B	7.8358E-03	8.0364E-03	4.9039E-02	4.9041E-02	5.378E-02
TL-208		2.8295E-01	2.8295E-01	8.9292E-02	9.0693E-02	
PB-212	#	7.0829E-01	7.0829E-01	1.3274E-01	1.3856E-01	1.145E-01
PB-214	#	4.4622E-01	4.4622E-01	1.1097E-01	1.1376E-01	1.058E-01
BI-212		8.5758E-01	8.5758E-01	5.0903E-01	5.1130E-01	
BI-214		4.8674E-01	4.8674E-01	1.6108E-01	1.6338E-01	
RA-224	#A	9.2369E-01	9.2369E-01	1.2506E+00	1.2517E+00	1.362E+00
RA-226	#A	1.1010E+00	1.1010E+00	1.2062E+00	1.2078E+00	1.305E+00
AC-228		8.8651E-01	8.8651E-01	2.1842E-01	2.2401E-01	
TH-227	#B	-1.7594E-01	-1.7594E-01	4.8117E-01	4.8127E-01	5.252E-01
PA-234	#B	1.1040E-01	1.1040E-01	2.3108E-01	2.3116E-01	2.544E-01
TH-234	#B	1.1045E+00	1.1045E+00	4.1548E+00	4.1552E+00	4.612E+00
AM-241	#A	2.5149E-03	2.5149E-03	5.8891E-01	5.8891E-01	6.607E-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 (278.2 to 1999.0 keV) 1.8516436E+01 pCi/gm
Total Decayed Activity (278.2 to 1999.0 keV) 1.8516436E+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_30NOV2005_1505.An1

Sample description
FSS-NOL-06-03-013-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30NOV2005_1505.An1

Acquisition information

Start time:	30-Nov-2005 15:05:07
Live time:	2000
Real time:	2027
Dead time:	1.34 %
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	29-Nov-2005 01:20:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1383

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.87	135.	38.89	1.50	8.847E-03				
74.87	135.	38.89	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.12	251.	20.37	1.50	9.541E-03	77.11	17.500	1.029E+00	PB212
					77.11	10.700	1.683E+00	PB214
77.12	251.	20.37	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.683E+00	PB214
93.06	138.	36.93	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.364E+00	TH234
186.38	113.	31.74	1.34	1.625E-02	185.99	3.280	PBC<MDA	RA226
209.65	98.	34.23	0.90	1.518E-02				
238.70	935.	3.89	1.21	1.380E-02	238.63	43.100	1.077E+00	PB212
241.24	133.	25.05	1.22	1.369E-02	241.00	3.900	1.686E+00	RA224
					241.92	7.470	8.908E-01	PB214
270.38	130.	25.96	1.29	1.242E-02				
294.96	197.	14.35	1.02	1.147E-02				
294.96	197.	14.35	1.02	1.147E-02	295.22	19.200	6.123E-01	PB214
300.46	84.	30.71	1.10	1.128E-02				
328.05	44.	35.93	1.40	1.037E-02				
338.38	185.	14.77	1.14	1.006E-02	338.40	12.010	1.052E+00	AC228
352.02	288.	11.52	1.29	9.678E-03	351.99	37.100	5.490E-01	PB214
463.54	50.	36.02	1.53	7.364E-03	463.51	10.000	4.488E-01	SB125
511.05	151.	14.52	1.46	6.691E-03	510.72	22.500	6.873E-01	TL208
583.27	329.	7.96	1.60	5.889E-03	583.14	86.000	4.446E-01	TL208
609.44	181.	10.23	1.32	5.648E-03	609.32	46.090	4.761E-01	BI214
661.85	48.	33.12	0.62	5.229E-03	661.62	84.620	7.469E-02	CS137
727.69	58.	21.83	1.53	4.791E-03	723.30	19.700	4.212E-01	EU154
					727.17	11.800	7.090E-01	BI212

795.04	40.	29.74	1.60	4.420E-03	795.76	85.400	7.210E-02	CS134
911.29	196.	8.66	1.56	3.921E-03	911.07	29.000	1.179E+00	AC228
964.92	45.	19.25	1.72	3.730E-03	964.00	14.580	PBC<MDA	EU152
969.11	102.	12.86	1.72	3.716E-03	968.90	17.460	1.077E+00	AC228
1120.21	78.	21.37	1.66	3.283E-03	1120.28	15.040	1.080E+00	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.47	20.	39.31	1.96	2.834E-03	1332.51	99.980	PBC<MDA	CO60
1460.98	652.	4.00	2.02	2.620E-03	1460.75	10.700	1.594E+01	K40
1764.60	30.	20.54	0.89	2.225E-03	1764.51	15.920	5.886E-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	
418.92	209.65	411.	98.	0.049	102.70	0.895	NP-239	s
477.03	238.70	193.	935.	0.468	11.66	1.215	PB-212	D
482.11	241.24	484.	133.	0.066	75.14	1.217	RA-224	D
540.41	270.38	323.	130.	0.065	77.89	1.290	AC-228	s
600.57	300.46	216.	84.	0.042	81.02	1.100	PB-212	
655.77	328.05	109.	44.	0.022	107.78	1.404	AC-228	
1930.70	965.14	15.	45.	0.023	57.55	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	149.32	74.87	1373.	135.	0.067	116.68	1.500s
PB-212	153.80	77.11	1179.	251.	0.125	61.12	1.500D
PB-214	153.80	77.11	1179.	251.	0.125	61.12	1.500D
TH-234	185.70	93.06	1228.	138.	0.069	110.80	1.500
RA-226	371.96	186.18	588.	112.	0.056	92.28	1.500
PB-212	477.05	238.71	547.	856.	0.428	15.47	1.500
PB-214	590.16	295.25	262.	171.	0.085	46.31	1.500
AC-228	676.44	338.38	202.	185.	0.093	44.31	1.143
PB-214	703.70	352.01	189.	256.	0.128	29.45	1.500
SB-125	925.83	463.04	91.	43.	0.022	100.29	1.500s
TL-208	1021.88	511.05	110.	151.	0.075	43.57	1.459s
TL-208	1166.37	583.27	109.	328.	0.164	23.88	1.604
BI-214	1218.74	609.44	67.	181.	0.090	30.69	1.318
CS-137	1323.60	661.85	74.	48.	0.024	99.36	0.620s
BI-212	1455.34	727.69	46.	58.	0.029	65.50	1.529
CS-134	1590.11	795.04	50.	40.	0.020	89.21	1.601s
AC-228	1822.71	911.29	35.	196.	0.098	25.97	1.560
AC-228	1938.01	968.90	39.	102.	0.051	39.46	1.718D
BI-214	2240.82	1120.21	46.	78.	0.039	64.11	1.657s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2665.64	1332.47	21.	20.	0.010	117.92	1.959s
K-40	2922.87	1460.98	7.	652.	0.326	12.01	2.024
BI-214	3530.66	1764.60	3.	30.	0.015	61.62	0.887s

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		2.4201E-01					
			477.56	2.420E-01	%(	4.460E-01 1.36E-01 G	
K-40		1.5942E+01					
			1460.75	1.594E+01	(P	3.666E-01 6.39E-01 G	
MN-54		3.2491E-02					
			834.81	3.249E-02	%(P	5.196E-02 1.61E-02 G	
CO-57		-2.2190E-02					
			122.07	-2.219E-02	%(	6.940E-02 2.09E-02 G K	
			136.43	4.080E-02	&	4.985E-01 1.49E-01 G	
CO-60		4.7982E-02					
			1332.51	4.798E-02	(P	5.791E-02 1.89E-02 G K	
			1173.23	5.047E-02	%	8.718E-02 2.68E-02 G K	
Sr-85		-3.3217E-02					
			514.00	-3.322E-02	%(	7.242E-02 2.19E-02 G	
Kr-85		-7.5409E+02					
			513.99	-7.541E+02	%(	1.644E+03 4.98E+02 G	
Y-88		-2.1297E-05					
			1836.01	-2.130E-05	%(P	2.392E-02 3.24E-03 G K	
			898.02	-8.439E-03	& P	5.970E-02 1.69E-02 G	
NB-94		3.6252E-03					
			871.10	3.625E-03	%(	5.375E-02 1.51E-02 G K	
			702.50	-8.363E-03	&	6.687E-02 1.95E-02 G K	
Ag-108M		2.1203E-02					
			722.95	2.120E-02	%(	4.919E-02 1.48E-02 G K	
			614.37	2.244E-03	% P	7.057E-02 2.04E-02 G	
			433.93	6.803E-04	%	5.206E-02 1.50E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.7448E-01						
		88.04	1.745E-01	%(P	2.644E+00	7.92E-01	G
SN-113	2.5224E-02						
		391.71	2.522E-02	%(	7.299E-02	2.19E-02	G K
		255.04	4.448E-01	&	2.320E+00	6.91E-01	G
SB-125	1.0751E-01						
		427.95	7.994E-03	&(P	1.569E-01	4.54E-02	G K
		600.77	4.488E-02	% P	2.858E-01	8.31E-02	G
		636.15	-3.875E-02	% P	4.735E-01	1.36E-01	G
		463.51	4.021E-01	@(P	4.391E-01	1.39E-01	G
		176.29	-3.012E-01	% P	7.662E-01	2.31E-01	G
I-131	1.7851E-02						
		364.48	1.785E-02	%(	6.047E-02	1.80E-02	G K
		636.97	-1.245E-01	%	8.753E-01	2.54E-01	G
		284.29	0.000E+00	%	9.120E-01	2.68E-01	G
CS-134	2.8772E-02						
		604.66	-9.138E-03	%(	6.328E-02	1.85E-02	G K
		795.76	7.210E-02	*(	6.466E-02	2.14E-02	G
		569.29	-1.499E-01	%	4.063E-01	1.22E-01	G
		801.84	7.555E-02	% P	6.367E-01	1.82E-01	G
CS-137	7.4686E-02						
		661.62	7.469E-02	(	6.623E-02	2.47E-02	G
CE-139	9.4707E-03						
		165.85	9.471E-03	%(P	6.022E-02	1.80E-02	G
EU-152	-8.2051E-02						
		121.78	-8.205E-02	%(P	1.975E-01	5.97E-02	G K
		344.30	-1.504E-02	%	1.625E-01	4.76E-02	G
		1408.08	7.667E-02	&	2.530E-01	7.35E-02	G
		964.00	2.994E-02	% P	6.153E-01	1.77E-01	G
		1112.07	-1.894E-01	%	6.256E-01	1.85E-01	G
		778.90	-9.773E-02	% P	4.439E-01	1.29E-01	G
EU-154	-5.1069E-02						
		123.10	-5.107E-02	%(P	1.486E-01	4.48E-02	G K
		1274.80	2.849E-02	&	2.109E-01	6.02E-02	G
		723.30	1.029E-01	& P	3.391E-01	1.01E-01	G
		1004.80	-3.237E-04	&	3.750E-01	1.05E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-1.9695E-02						
		86.45	-1.970E-02	%(P	3.223E-01	9.64E-02	G K
		105.31	9.032E-02	%	3.181E-01	9.58E-02	G
HG-203	3.0966E-02						
		279.17	3.097E-02	&(P	5.068E-02	1.55E-02	G K
		72.87	-5.406E-01	%	2.461E+00	7.41E-01	G
		70.83	9.284E-01	&	3.436E+00	1.03E+00	G
		82.50	-2.925E-01	%	4.662E+00	1.39E+00	G
TL-208	4.4463E-01						
		583.14	4.446E-01	(P	6.937E-02	3.54E-02	G
		510.72	6.873E-01	+	2.348E-01	9.99E-02	G
PB-212	1.0114E+00						
		238.63	9.868E-01	(	1.287E-01	5.09E-02	G K
							Energy duplication
		77.11	1.029E+00	*(	6.681E-01	2.10E-01	G
		74.81	1.089E+00	*(P	1.416E+00	4.33E-01	G
PB-214	5.0330E-01						
		351.99	4.885E-01	(P	1.273E-01	4.80E-02	G K
		295.22	5.319E-01	(	2.434E-01	8.21E-02	G
							Energy duplication
		77.11	1.683E+00	+	1.093E+00	3.43E-01	G
		241.92	2.218E-02	%	9.332E-01	2.78E-01	G
BI-212	7.0901E-01						
		727.17	7.090E-01	(	4.138E-01	1.55E-01	G K
		1620.56	1.816E-01	% P	1.498E+00	3.89E-01	G
		785.42	1.479E+00	% P	2.787E+00	8.52E-01	G
BI-214	5.0496E-01						
		609.32	4.761E-01	(	1.077E-01	4.87E-02	G K
		1764.51	5.886E-01	(P	1.975E-01	1.21E-01	G
		1120.28	1.080E+00	+	4.774E-01	2.31E-01	G
RA-224	7.7977E-01						
		241.00	7.798E-01	%(P	1.635E+00	4.96E-01	G
RA-226	1.4396E+00						
		185.99	1.440E+00	(P	1.487E+00	4.60E-01	G
AC-228	1.1224E+00						
		911.07	1.179E+00	(P	1.835E-01	1.02E-01	G K
		968.90	1.077E+00	(P	3.361E-01	1.42E-01	G
		338.40	1.052E+00	(	3.908E-01	1.55E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.0400E-01						
		236.00	-3.040E-01	&(P	6.127E-01	1.86E-01	G K
		256.25	1.420E-01	%	6.781E-01	2.02E-01	G
PA-234	3.1082E-02						
		98.44	3.108E-02	&(	3.059E-01	9.16E-02	G K
		946.00	-3.093E-02	%	3.058E-01	8.70E-02	G
		131.28	-3.291E-03	&	2.869E-01	8.55E-02	G
		94.67	-7.591E-02	%	5.541E-01	1.66E-01	G
		883.24	6.781E-02	%	3.971E-01	1.13E-01	G
		926.70	2.059E-02	&	3.707E-01	1.01E-01	G
		569.26	-2.221E-01	%	6.018E-01	1.81E-01	G
TH-234	9.4987E-01						
		63.29	-1.378E-01	&(P	5.102E+00	1.52E+00	G K
		92.80	2.364E+00	(	2.846E+00	8.73E-01	G
		92.38	2.335E-01	& P	3.350E+00	1.00E+00	G
AM-241	1.2996E-01						
		59.54	1.300E-01	%(	7.640E-01	2.29E-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	2.3712E-01	2.4201E-01	4.0874E-01	4.0896E-01	4.370E-01
K-40		1.5942E+01	1.5942E+01	1.9157E+00	2.1143E+00	
MN-54	#A	3.2377E-02	3.2491E-02	4.8426E-02	4.8460E-02	5.178E-02
CO-57	#B	-2.2100E-02	-2.2190E-02	6.2771E-02	6.2783E-02	6.912E-02
CO-60	#B	4.7955E-02	4.7982E-02	5.6804E-02	5.6868E-02	5.787E-02
Sr-85	#A	-3.2663E-02	-3.3217E-02	6.5772E-02	6.5798E-02	7.121E-02
Kr-85	#A	-7.5408E+02	-7.5409E+02	1.4931E+03	1.4937E+03	1.644E+03
Y-88	#B	-2.1080E-05	-2.1297E-05	1.2778E-04	1.2779E-04	2.367E-02
NB-94	#B	3.6252E-03	3.6252E-03	4.5399E-02	4.5399E-02	5.375E-02
Ag-108M	#B	2.1202E-02	2.1203E-02	4.4420E-02	4.4436E-02	4.919E-02
CD-109	#A	1.7406E-01	1.7448E-01	2.3756E+00	2.3757E+00	2.638E+00
SN-113	#B	2.4986E-02	2.5224E-02	6.5574E-02	6.5589E-02	7.230E-02
SB-125	#B	1.0740E-01	1.0751E-01	1.1170E-01	1.1186E-01	1.567E-01
I-131	#B	1.5587E-02	1.7851E-02	5.4063E-02	5.4072E-02	5.280E-02
CS-134	#B	2.8731E-02	2.8772E-02	2.5669E-02	2.5720E-02	6.319E-02
CS-137		7.4679E-02	7.4686E-02	7.4208E-02	7.4326E-02	
CE-139	#A	9.3959E-03	9.4707E-03	5.3963E-02	5.3966E-02	5.974E-02
EU-152	#B	-8.2032E-02	-8.2051E-02	1.8453E-01	1.8459E-01	1.974E-01
EU-154	#B	-5.1051E-02	-5.1069E-02	1.3561E-01	1.3564E-01	1.486E-01
EU-155	#B	-1.9683E-02	-1.9695E-02	5.8522E-01	5.8522E-01	3.221E-01
HG-203	#B	3.0249E-02	3.0966E-02	4.6565E-02	4.6597E-02	4.951E-02
TL-208		4.4463E-01	4.4463E-01	1.0633E-01	1.0921E-01	
PB-212	#	1.0114E+00	1.0114E+00	1.5648E-01	1.6645E-01	1.287E-01
PB-214	#	5.0330E-01	5.0330E-01	1.3816E-01	1.4102E-01	1.273E-01
BI-212		7.0901E-01	7.0901E-01	4.6442E-01	4.6612E-01	
BI-214		5.0496E-01	5.0496E-01	1.5497E-01	1.5754E-01	
RA-224	#A	7.7977E-01	7.7977E-01	1.4871E+00	1.4877E+00	1.635E+00
RA-226	#A	1.4396E+00	1.4396E+00	1.3814E+00	1.3838E+00	1.487E+00
AC-228		1.1224E+00	1.1224E+00	2.4241E-01	2.5046E-01	
TH-227	#B	-3.0400E-01	-3.0400E-01	5.6237E-01	5.6263E-01	6.127E-01
PA-234	#B	3.1082E-02	3.1082E-02	2.7477E-01	2.7478E-01	3.059E-01
TH-234	#B	9.4987E-01	9.4987E-01	1.0525E+00	1.0538E+00	5.102E+00
AM-241	#A	1.2996E-01	1.2996E-01	6.8676E-01	6.8680E-01	7.640E-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) 1.8798006E+01 pCi/gm
Total Decayed Activity (1119.8 to 1999.0 keV) 1.8798014E+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_30NOV2005_1542.An1

Sample description
FSS-NOL-06-03-006-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30NOV2005_1542.An1

Acquisition information

Start time:	30-Nov-2005 15:42:39
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:	2.0580E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.0580E+03) = 4.8591E+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	29-Nov-2005 00:33:00
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: 0.1306

***** 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
77.24	191.	24.52	1.50	9.541E-03	77.11	10.700	1.229E+00	PB214
					77.11	17.500	7.513E-01	PB212
77.24	191.	24.52	1.50	9.541E-03	77.11	10.700	1.229E+00	PB214
					77.11	17.500	7.513E-01	PB212
185.97	94.	28.81	1.63	1.627E-02				
185.97	94.	28.81	1.63	1.627E-02	185.99	3.280	PBC<MDA	RA226
238.74	759.	4.31	1.21	1.380E-02	238.63	43.100	8.380E-01	PB212
241.72	119.	19.92	1.22	1.366E-02	241.00	3.900	1.447E+00	RA224
					241.92	7.470	7.654E-01	PB214
270.53	90.	33.57	1.41	1.242E-02				
295.34	138.	13.43	1.25	1.146E-02	295.22	19.200	4.129E-01	PB214
300.23	56.	27.87	1.26	1.129E-02				
338.38	189.	16.33	1.38	1.006E-02	338.40	12.010	1.029E+00	AC228
352.03	260.	9.47	1.27	9.677E-03	351.99	37.100	4.738E-01	PB214
462.55	73.	23.53	1.18	7.380E-03				
462.55	73.	23.53	1.18	7.380E-03	463.51	10.000	6.378E-01	SB125
511.25	122.	16.63	1.44	6.688E-03	510.72	22.500	5.309E-01	TL208
583.26	233.	9.86	1.44	5.889E-03	583.14	86.000	3.010E-01	TL208
609.47	171.	10.35	1.39	5.648E-03	609.32	46.090	4.302E-01	BI214
727.49	54.	30.44	1.51	4.792E-03	727.17	11.800	6.222E-01	BI212
793.62	52.	24.93	1.36	4.430E-03				
795.11	28.	37.44	1.60	4.420E-03				
795.11	28.	37.44	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
911.14	185.	9.74	1.79	3.922E-03	911.07	29.000	1.068E+00	AC228
967.70	161.	13.09	1.09	3.722E-03	968.90	17.460	1.626E+00	AC228
1121.21	75.	18.11	2.45	3.283E-03	1120.28	15.040	1.001E+00	BI214
1460.99	631.	4.02	2.18	2.620E-03	1460.75	10.700	1.477E+01	K40

1620.91	11.	30.15	0.58	2.397E-03	1620.56	2.750	1.062E+00	BI212
1764.90	44.	15.08	0.69	2.225E-03	1764.51	15.920	8.139E-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	
477.11	238.71	157.	759.	0.380	12.94	1.215	PB-212	D
483.07	241.69	221.	119.	0.059	59.77	1.217	PB-214	D
540.71	270.53	283.	90.	0.045	100.72	1.408	AC-228	s
600.12	300.23	182.	62.	0.031	112.73	1.231	PB-212	s
1587.27	793.62	38.	52.	0.026	74.80	1.358	PA-234	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-214	153.80	77.11	1001.	191.	0.096	73.55	1.500D
PB-212	153.80	77.11	1001.	191.	0.096	73.55	1.500D
RA-226	371.52	185.96	465.	92.	0.046	98.84	1.500s
PB-212	477.16	238.76	436.	679.	0.339	17.40	1.500
PB-214	590.26	295.30	210.	141.	0.070	50.44	1.500s
AC-228	676.43	338.38	226.	189.	0.095	48.99	1.381
PB-214	703.55	351.94	120.	247.	0.123	26.76	1.500
SB-125	926.20	463.23	86.	37.	0.018	112.48	1.500s
TL-208	1022.27	511.25	90.	122.	0.061	49.90	1.437s
TL-208	1166.35	583.26	87.	232.	0.116	29.59	1.445s
BI-214	1218.80	609.47	54.	171.	0.085	31.06	1.387
BI-212	1454.94	727.49	73.	56.	0.028	96.53	1.517
CS-134	1590.25	795.11	42.	28.	0.014	112.31	1.601s
AC-228	1822.41	911.14	38.	185.	0.092	29.21	1.788s
AC-228	1935.61	967.70	67.	161.	0.080	39.27	1.090s
BI-214	2242.82	1121.21	36.	75.	0.038	54.33	2.452s
K-40	2922.88	1460.99	3.	631.	0.315	12.06	2.177
BI-212	3243.00	1620.91	0.	11.	0.005	90.45	0.583s
BI-214	3531.26	1764.90	0.	44.	0.022	45.23	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	Peak MDA Value pCi/gm	COMMENTS
BE-7		-1.9985E-02					
			477.56	-1.999E-02	%(	3.598E-01 1.03E-01	G
K-40		1.4772E+01					
			1460.75	1.477E+01	(P	2.572E-01 5.94E-01	G
MN-54		-7.7238E-03					
			834.81	-7.724E-03	&(P	6.016E-02 1.73E-02	G
CO-57		-1.6432E-02					
			122.07	-1.643E-02	%(	6.335E-02 1.90E-02	G K
			136.43	-4.581E-02	&	4.559E-01 1.36E-01	G
CO-60		1.9772E-02					
			1332.51	1.977E-02	%(P	5.126E-02 1.52E-02	G K
			1173.23	2.185E-02	%	8.221E-02 2.42E-02	G K
Sr-85		-2.8548E-02					
			514.00	-2.855E-02	&(	6.512E-02 1.97E-02	G
Kr-85		-6.4766E+02					
			513.99	-6.477E+02	&(	1.477E+03 4.46E+02	G
Y-88		-2.0404E-05					
			1836.01	-2.040E-05	%(P	7.049E-02 1.88E-02	G K
			898.02	-6.708E-03	% P	5.348E-02 1.50E-02	G
NB-94		-3.7106E-03					
			871.10	-3.711E-03	%(	4.528E-02 1.27E-02	G K
			702.50	1.085E-02	%	3.806E-02 1.11E-02	G K
Ag-108M		-1.2259E-02					
			722.95	-1.226E-02	%(	6.720E-02 1.96E-02	G K
			614.37	-3.357E-02	% P	5.882E-02 1.80E-02	G
			433.93	1.270E-02	%	4.664E-02 1.38E-02	G
CD-109		-1.1073E-01					
			88.04	-1.107E-01	%(P	2.304E+00 6.88E-01	G
SN-113		2.3217E-03					
			391.71	2.322E-03	%(	6.931E-02 2.01E-02	G K
			255.04	-6.387E-01	%	2.204E+00 6.61E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.2496E-02						
		427.95	-1.401E-02	%(P	1.387E-01	4.00E-02	G K
		600.77	5.653E-02	% P	2.383E-01	6.97E-02	G
		636.15	-2.914E-02	% P	4.269E-01	1.22E-01	G
		463.51	3.286E-01	*(P	4.094E-01	1.28E-01	G
		176.29	-6.009E-02	& P	7.068E-01	2.10E-01	G
I-131	1.0899E-02						
		364.48	1.090E-02	%(	5.628E-02	1.66E-02	G K
		636.97	1.620E-01	%	7.026E-01	2.05E-01	G
		284.29	7.574E-02	&	7.594E-01	2.24E-01	G
CS-134	1.4480E-02						
		604.66	-1.584E-02	%(	5.755E-02	1.71E-02	G K
		795.76	4.913E-02	&(	5.710E-02	1.84E-02	G
		569.29	-5.498E-02	%	2.909E-01	8.48E-02	G
		801.84	2.576E-02	% P	4.242E-01	1.16E-01	G
CS-137	1.2907E-02						
		661.62	1.291E-02	&(	5.783E-02	1.69E-02	G
CE-139	2.3369E-03						
		165.85	2.337E-03	%(P	5.474E-02	1.62E-02	G
EU-152	-5.5773E-02						
		121.78	-5.577E-02	%(P	1.850E-01	5.57E-02	G K
		344.30	-9.627E-03	&	1.568E-01	4.58E-02	G
		1408.08	1.278E-02	%	2.134E-01	5.66E-02	G
		964.00	-9.301E-04	& P	6.214E-01	1.79E-01	G
		1112.07	2.668E-02	&	4.602E-01	1.29E-01	G
		778.90	-2.183E-02	& P	3.538E-01	9.92E-02	G
EU-154	-1.2212E-03						
		123.10	-1.221E-03	%(P	1.291E-01	3.84E-02	G K
		1274.80	6.969E-02	%	1.690E-01	5.06E-02	G
		723.30	6.071E-03	% P	4.301E-01	1.25E-01	G
		1004.80	-2.438E-04	%	3.020E-01	8.31E-02	G
EU-155	1.0383E-01						
		86.45	1.038E-01	&(P	2.519E-01	7.61E-02	G K
		105.31	3.808E-02	&	2.855E-01	8.55E-02	G
HG-203	-1.5193E-03						
		279.17	-1.519E-03	%(P	5.023E-02	1.47E-02	G K
		72.87	2.647E-03	%	1.980E+00	5.90E-01	G
		70.83	-5.185E-01	&	3.871E+00	1.16E+00	G
		82.50	-1.236E+00	%	3.917E+00	1.18E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.0100E-01						
		583.14	3.010E-01	@(P	5.980E-02	2.97E-02	G
		510.72	5.309E-01	+	2.047E-01	8.84E-02	G
PB-212	7.4972E-01						
		238.63	7.491E-01	(	1.103E-01	4.34E-02	G K
							Energy duplication
		77.11	7.513E-01	(	5.906E-01	1.84E-01	G
		74.81	6.589E-01	& P	1.222E+00	3.71E-01	G
PB-214	4.4040E-01						
		351.99	4.509E-01	(P	9.812E-02	4.03E-02	G K
		295.22	4.201E-01	(	2.095E-01	7.06E-02	G
							Energy duplication
		77.11	1.229E+00	+	9.659E-01	3.01E-01	G
		241.92	3.418E-01	%	7.320E-01	2.22E-01	G
BI-212	7.2888E-01						
		727.17	6.512E-01	(	4.933E-01	2.10E-01	G K
		1620.56	1.062E+00	(P	7.341E-01	3.30E-01	G
		785.42	1.127E+00	% P	2.339E+00	7.10E-01	G
BI-214	4.3023E-01						
		609.32	4.302E-01	(	9.351E-02	4.46E-02	G K
		1764.51	8.139E-01	+ P	1.366E-01	1.23E-01	G
		1120.28	1.001E+00	+	4.063E-01	1.81E-01	G
RA-224	9.7792E-01						
		241.00	9.779E-01	%(P	1.357E+00	4.16E-01	G
RA-226	1.1363E+00						
		185.99	1.136E+00	(P	1.269E+00	3.92E-01	G
AC-228	1.0566E+00						
		911.07	1.068E+00	@(P	1.816E-01	1.04E-01	G K
		968.90	1.626E+00	+ P	4.139E-01	2.13E-01	G
		338.40	1.029E+00	(	3.951E-01	1.68E-01	G
TH-227	-3.1748E-01						
		236.00	-3.175E-01	%(P	5.399E-01	1.64E-01	G K
		256.25	-1.615E-01	%	6.289E-01	1.88E-01	G
PA-234	1.2980E-01						
		98.44	1.298E-01	%(	2.659E-01	8.07E-02	G K
		946.00	7.508E-03	&	2.719E-01	7.58E-02	G
		131.28	-4.861E-02	%	2.522E-01	7.56E-02	G
		94.67	-3.225E-02	%	3.899E-01	1.16E-01	G
		883.24	3.693E-02	&	4.167E-01	1.17E-01	G
		926.70	-2.714E-02	%	4.548E-01	1.27E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-7.987E-02 %   4.305E-01 1.25E-01 G

TH-234       1.4377E+00
                           63.29 1.438E+00 %(P 4.496E+00 1.35E+00 G K
                           92.80 1.790E+00 %   2.486E+00 7.61E-01 G
                           92.38-2.689E-01 % P 2.979E+00 8.91E-01 G

AM-241      -5.4593E-02
                           59.54-5.459E-02 %(  5.378E-01 1.60E-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	-1.9566E-02	-1.9985E-02	3.0775E-01	3.0775E-01	3.522E-01
K-40		1.4772E+01	1.4772E+01	1.7813E+00	1.9647E+00	
MN-54	#A	-7.6959E-03	-7.7238E-03	5.6508E-02	5.6510E-02	5.994E-02
CO-57	#B	-1.6363E-02	-1.6432E-02	5.7142E-02	5.7150E-02	6.309E-02
CO-60	#B	1.9760E-02	1.9772E-02	4.5666E-02	4.5680E-02	5.123E-02

Sr-85	#A	-2.8055E-02	-2.8548E-02	5.9035E-02	5.9056E-02	6.399E-02
Kr-85	#A	-6.4765E+02	-6.4766E+02	1.3393E+03	1.3398E+03	1.477E+03
Y-88	#B	-2.0189E-05	-2.0404E-05	7.4155E-04	7.4155E-04	6.974E-02
NB-94	#B	-3.7106E-03	-3.7106E-03	3.7971E-02	3.7972E-02	4.528E-02
Ag-108M	#B	-1.2259E-02	-1.2259E-02	5.8891E-02	5.8895E-02	6.719E-02
CD-109	#A	-1.1045E-01	-1.1073E-01	3.0242E+00	3.0242E+00	2.298E+00
SN-113	#B	2.2990E-03	2.3217E-03	6.0384E-02	6.0384E-02	6.864E-02
SB-125	#B	7.2415E-02	7.2496E-02	8.4970E-02	8.5068E-02	1.385E-01
I-131	#B	9.4690E-03	1.0899E-02	4.9779E-02	4.9783E-02	4.890E-02
CS-134	#B	1.4458E-02	1.4480E-02	1.6262E-02	1.6282E-02	5.747E-02
CS-137	#A	1.2906E-02	1.2907E-02	5.0721E-02	5.0727E-02	5.783E-02
CE-139	#A	2.3177E-03	2.3369E-03	4.8733E-02	4.8733E-02	5.429E-02
EU-152	#B	-5.5759E-02	-5.5773E-02	1.7423E-01	1.7425E-01	1.850E-01
EU-154	#B	-1.2207E-03	-1.2212E-03	1.5962E-01	1.5962E-01	1.290E-01
EU-155	#B	1.0377E-01	1.0383E-01	2.2844E-01	2.2851E-01	2.517E-01
HG-203	#B	-1.4828E-03	-1.5193E-03	4.7979E-02	4.7979E-02	4.903E-02
TL-208	#	3.0100E-01	3.0100E-01	8.9222E-02	9.0807E-02	
PB-212	#	7.4972E-01	7.4972E-01	1.3046E-01	1.3707E-01	1.103E-01
PB-214	#	4.4040E-01	4.4040E-01	1.1803E-01	1.2059E-01	9.812E-02
BI-212		7.2888E-01	7.2888E-01	4.8926E-01	4.9096E-01	
BI-214		4.3023E-01	4.3023E-01	1.3364E-01	1.3581E-01	
RA-224	#A	9.7792E-01	9.7792E-01	1.2488E+00	1.2500E+00	1.357E+00
RA-226	#A	1.1363E+00	1.1363E+00	1.1774E+00	1.1792E+00	1.269E+00
AC-228		1.0566E+00	1.0566E+00	3.0140E-01	3.0717E-01	
TH-227	#B	-3.1748E-01	-3.1748E-01	4.9712E-01	4.9744E-01	5.399E-01
PA-234	#B	1.2980E-01	1.2980E-01	2.4203E-01	2.4214E-01	2.659E-01
TH-234	#B	1.4377E+00	1.4377E+00	4.0633E+00	4.0640E+00	4.496E+00
AM-241	#A	-5.4593E-02	-5.4593E-02	4.7941E-01	4.7942E-01	5.378E-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) 1.7288671E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.7288671E+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_30NOV2005_1619.An1

Sample description
FSS-NOL-06-03-007-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30NOV2005_1619.An1

Acquisition information

Start time:	30-Nov-2005 16:19:57
Live time:	2000
Real time:	2027
Dead time:	1.34 %
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:	2.0380E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.0380E+03) = 4.9068E+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	29-Nov-2005 00:39:00
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: 0.1633

***** 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	165.	30.93	1.50	8.847E-03				
74.78	165.	30.93	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.12	268.	18.98	1.50	9.541E-03	77.11	17.500	1.066E+00	PB212
					77.11	10.700	1.743E+00	PB214
77.12	268.	18.98	1.50	9.541E-03	77.11	17.500	1.066E+00	PB212
					77.11	10.700	1.743E+00	PB214
129.89	121.	34.89	1.09	1.718E-02				
129.89	121.	34.89	1.09	1.718E-02	131.28	20.000	2.322E-01	PA234
185.51	92.	34.76	1.48	1.629E-02				
185.51	92.	34.76	1.48	1.629E-02	185.99	3.280	PBC<MDA	RA226
209.56	100.	35.00	1.04	1.518E-02				
238.75	978.	3.76	1.21	1.380E-02	238.63	43.100	1.090E+00	PB212
241.70	126.	19.57	1.22	1.366E-02	241.00	3.900	1.545E+00	RA224
					241.92	7.470	8.168E-01	PB214
270.80	83.	32.67	1.37	1.241E-02				
295.25	161.	12.18	1.25	1.147E-02				
295.25	161.	12.18	1.25	1.147E-02	295.22	19.200	4.841E-01	PB214
300.51	68.	25.10	1.26	1.128E-02				
328.30	45.	37.38	1.39	1.036E-02				
338.72	240.	10.59	1.34	1.005E-02	338.40	12.010	1.320E+00	AC228
351.93	290.	9.28	1.20	9.680E-03				
351.93	290.	9.28	1.20	9.680E-03	351.99	37.100	5.357E-01	PB214
463.38	43.	30.76	1.64	7.367E-03				
463.38	43.	30.76	1.64	7.367E-03	463.51	10.000	PBC<MDA	SB125
510.86	174.	17.33	1.30	6.693E-03	510.72	22.500	7.668E-01	TL208
583.34	310.	7.75	1.46	5.888E-03	583.14	86.000	4.051E-01	TL208
609.38	193.	11.47	1.45	5.649E-03	609.32	46.090	4.905E-01	BI214

661.73	130.	19.06	1.23	5.229E-03	661.62	84.620	1.953E-01	CS137
727.46	40.	31.08	1.37	4.792E-03	727.17	11.800	4.724E-01	BI212
794.93	63.	20.31	1.68	4.424E-03				
794.93	63.	20.31	1.68	4.424E-03	795.76	85.400	1.108E-01	CS134
859.98	75.	22.74	1.68	4.125E-03				
911.35	201.	8.92	1.54	3.921E-03	911.07	29.000	1.172E+00	AC228
968.51	136.	13.46	1.32	3.719E-03	968.90	17.460	1.394E+00	AC228
1120.50	60.	27.39	1.63	3.283E-03	1120.28	15.040	8.057E-01	BI214
1332.55	22.	38.59	1.96	2.834E-03	1332.51	99.980	PBC<MDA	CO60
1460.98	586.	4.24	1.95	2.620E-03	1460.75	10.700	1.385E+01	K40
1765.41	29.	20.79	2.60	2.225E-03	1764.51	15.920	5.374E-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	
259.37	129.89	687.	121.	0.060	104.67	1.091	AC-228	l
418.73	209.56	450.	100.	0.050	105.00	1.039	AC-228	
477.13	238.74	187.	978.	0.489	11.28	1.215	PB-212	D
483.03	241.68	239.	126.	0.063	58.70	1.217	PB-214	D
541.25	270.80	261.	83.	0.041	98.02	1.372	AC-228	s
600.36	300.35	136.	60.	0.030	91.11	1.324	PB-212	
656.27	328.30	119.	45.	0.023	112.15	1.394	RH-106M	
1720.05	859.98	54.	75.	0.038	68.23	1.684	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	149.14	74.78	1266.	165.	0.082	92.78	1.500s
PB-212	153.80	77.11	1164.	268.	0.134	56.94	1.500D
PB-214	153.80	77.11	1164.	268.	0.134	56.94	1.500D
RA-226	371.67	186.03	608.	96.	0.048	107.57	1.500s
PB-212	477.05	238.71	485.	797.	0.398	15.83	1.500
RA-224	483.07	241.72	608.	93.	0.047	115.19	1.500
PB-214	590.07	295.21	261.	123.	0.061	62.02	1.500
AC-228	677.11	338.72	164.	240.	0.120	31.78	1.342s
PB-214	703.83	352.07	164.	270.	0.135	27.09	1.500
SB-125	926.22	463.23	117.	45.	0.023	106.96	1.500
TL-208	1021.49	510.86	180.	174.	0.087	51.99	1.302s
TL-208	1166.51	583.34	87.	309.	0.155	23.25	1.456
BI-214	1218.61	609.38	92.	193.	0.096	34.42	1.453
CS-137	1323.35	661.73	125.	130.	0.065	57.17	1.235
BI-212	1454.88	727.46	51.	40.	0.020	93.25	1.371
CS-134	1590.38	795.18	33.	45.	0.023	70.25	1.601
AC-228	1822.84	911.35	42.	201.	0.100	26.77	1.541
AC-228	1937.22	968.51	58.	136.	0.068	40.39	1.316
BI-214	2241.40	1120.50	60.	60.	0.030	82.16	1.633
CO-60	2665.80	1332.55	24.	22.	0.011	115.78	1.959s
K-40	2922.87	1460.98	9.	586.	0.293	12.71	1.950
BI-214	3532.29	1765.41	2.	29.	0.014	62.36	2.603

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		1.8249E-01					
			477.56	1.825E-01	%(	3.970E-01 1.20E-01	G
K-40		1.3848E+01					
			1460.75	1.385E+01	(P	4.010E-01 5.87E-01	G
MN-54		3.4182E-02					
			834.81	3.418E-02	%(P	5.441E-02 1.69E-02	G
CO-57		-5.3037E-03					
			122.07	-5.304E-03	&(	6.851E-02 2.05E-02	G K
			136.43	-7.642E-02	%	4.881E-01 1.46E-01	G
CO-60		5.0454E-02					
			1332.51	5.045E-02	(P	5.990E-02 1.95E-02	G K
			1173.23	5.616E-02	%	7.692E-02 2.42E-02	G K
Sr-85		-3.4946E-02					
			514.00	-3.495E-02	%(	7.188E-02 2.18E-02	G
Kr-85		-7.9261E+02					
			513.99	-7.926E+02	%(	1.630E+03 4.95E+02	G
Y-88		-3.0350E-03					
			1836.01	-3.035E-03	%(P	5.807E-02 1.53E-02	G K
			898.02	-1.836E-02	% P	6.779E-02 1.98E-02	G
NB-94		1.9233E-02					
			871.10	1.923E-02	&(	4.964E-02 1.48E-02	G K
			702.50	7.379E-03	&	4.599E-02 1.32E-02	G K
Ag-108M		-2.5362E-03					
			722.95	-2.536E-03	&(	6.287E-02 1.79E-02	G K
			614.37	-4.394E-02	% P	7.185E-02 2.21E-02	G
			433.93	1.507E-02	%	5.005E-02 1.49E-02	G
CD-109		-8.1577E-02					
			88.04	-8.158E-02	%(P	2.414E+00 7.21E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	5.6712E-03						
		391.71	5.671E-03	&(	6.786E-02	1.98E-02	G K
		255.04	-2.751E-01	&	2.275E+00	6.75E-01	G
SB-125	9.8497E-02						
		427.95	-5.808E-03	%(P	1.599E-01	4.61E-02	G K
		600.77	-2.988E-03	& P	2.340E-01	6.58E-02	G
		636.15	1.066E-01	& P	4.743E-01	1.39E-01	G
		463.51	4.072E-01	(P	4.787E-01	1.50E-01	G
		176.29	1.851E-01	% P	7.221E-01	2.16E-01	G
I-131	-1.2437E-02						
		364.48	-1.244E-02	%(	6.683E-02	1.98E-02	G K
		636.97	2.693E-02	%	8.079E-01	2.30E-01	G
		284.29	-1.944E-01	%	9.094E-01	2.71E-01	G
CS-134	3.9041E-02						
		604.66	3.818E-03	&(	1.126E-01	3.33E-02	G K
		795.76	7.929E-02	(	5.198E-02	1.86E-02	G
		569.29	1.123E-01	&	3.078E-01	9.20E-02	G
		801.84	1.359E-01	% P	5.127E-01	1.49E-01	G
CS-137	1.9526E-01						
		661.62	1.953E-01	(	8.204E-02	3.72E-02	G
CE-139	3.0788E-04						
		165.85	3.079E-04	%(P	6.253E-02	1.86E-02	G
EU-152	-3.4954E-03						
		121.78	-3.495E-03	&(P	1.848E-01	5.50E-02	G K
		344.30	5.287E-03	%	1.947E-01	5.72E-02	G
		1408.08	0.000E+00	%	2.001E-01	5.12E-02	G
		964.00	2.038E-01	& P	5.300E-01	1.59E-01	G
		1112.07	1.246E-01	%	4.866E-01	1.42E-01	G
		778.90	6.217E-02	& P	3.925E-01	1.13E-01	G
EU-154	-4.3534E-03						
		123.10	-4.353E-03	&(P	1.312E-01	3.91E-02	G K
		1274.80	6.961E-03	%	1.368E-01	3.69E-02	G
		723.30	4.163E-03	& P	2.946E-01	8.38E-02	G
		1004.80	-1.094E-03	%	3.397E-01	9.45E-02	G
EU-155	1.7553E-01						
		86.45	1.755E-01	%(P	2.830E-01	8.62E-02	G K
		105.31	7.363E-02	%	3.001E-01	9.03E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	7.9380E-03						
		279.17	7.938E-03	%(P	6.228E-02	1.85E-02	G K
		72.87	-1.068E+00	%	2.287E+00	6.93E-01	G
		70.83	-1.301E+00	&	4.272E+00	1.29E+00	G
		82.50	-3.660E-02	%	4.560E+00	1.36E+00	G
TL-208	4.0514E-01						
		583.14	4.051E-01	(P	6.028E-02	3.14E-02	G
		510.72	7.668E-01	+	2.870E-01	1.33E-01	G
PB-212	8.8774E-01						
		238.63	8.877E-01	(	1.174E-01	4.69E-02	G K
							Energy duplication
		77.11	1.066E+00	+	6.420E-01	2.02E-01	G
		74.81	1.287E+00	& P	1.316E+00	4.05E-01	G
PB-214	4.9926E-01						
		351.99	4.993E-01	(P	1.152E-01	4.52E-02	G K
		295.22	3.698E-01	-	2.348E-01	7.64E-02	G
							Energy duplication
		77.11	1.743E+00	+	1.050E+00	3.31E-01	G
		241.92	3.271E-01	%	8.332E-01	2.52E-01	G
BI-212	4.7237E-01						
		727.17	4.724E-01	(	4.207E-01	1.47E-01	G K
		1620.56	8.154E-02	% P	1.688E+00	4.35E-01	G
		785.42	1.157E+00	& P	2.279E+00	6.95E-01	G
BI-214	5.0253E-01						
		609.32	4.905E-01	(	1.210E-01	5.63E-02	G K
		1764.51	5.374E-01	(P	1.826E-01	1.12E-01	G
		1120.28	8.057E-01	+	5.211E-01	2.21E-01	G
RA-224	1.1553E+00						
		241.00	1.155E+00	(P	1.461E+00	4.49E-01	G
RA-226	1.1976E+00						
		185.99	1.198E+00	(P	1.461E+00	4.49E-01	G
AC-228	1.2685E+00						
		911.07	1.172E+00	(P	1.919E-01	1.05E-01	G K
		968.90	1.394E+00	(P	3.887E-01	1.88E-01	G
		338.40	1.320E+00	@(	3.419E-01	1.40E-01	G
TH-227	-2.3514E-01						
		236.00	-2.351E-01	%(P	5.501E-01	1.66E-01	G K
		256.25	0.000E+00	%	6.828E-01	2.01E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	-8.4081E-02						
		98.44	-8.408E-02	%(	2.376E-01	7.17E-02	G K
		946.00	-1.019E-03	&	2.968E-01	8.29E-02	G
		131.28	1.633E-01	&	2.375E-01	7.27E-02	G
		94.67	-1.467E-01	%	5.258E-01	1.58E-01	G
		883.24	-3.749E-02	&	4.534E-01	1.28E-01	G
		926.70	1.583E-01	&	4.801E-01	1.42E-01	G
		569.26	1.662E-01	&	4.560E-01	1.36E-01	G
TH-234	1.0618E+00						
		63.29	1.062E+00	%(P	5.040E+00	1.51E+00	G K
		92.80	1.951E+00	%	2.688E+00	8.22E-01	G
		92.38	2.215E+00	% P	3.201E+00	9.78E-01	G
AM-241	-1.6642E-01						
		59.54	-1.664E-01	&(	7.426E-01	2.23E-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	

- -

***** 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	1.7861E-01	1.8249E-01	3.6033E-01	3.6047E-01	3.885E-01
K-40		1.3848E+01	1.3848E+01	1.7608E+00	1.9247E+00	
MN-54	#A	3.4057E-02	3.4182E-02	5.0633E-02	5.0670E-02	5.421E-02
CO-57	#B	-5.2812E-03	-5.3037E-03	6.1413E-02	6.1414E-02	6.822E-02
CO-60	#B	5.0424E-02	5.0454E-02	5.8626E-02	5.8694E-02	5.987E-02
Sr-85	#A	-3.4333E-02	-3.4946E-02	6.5429E-02	6.5459E-02	7.063E-02
Kr-85	#A	-7.9260E+02	-7.9261E+02	1.4840E+03	1.4847E+03	1.630E+03
Y-88	#B	-3.0026E-03	-3.0350E-03	4.6669E-02	4.6670E-02	5.744E-02
NB-94	#B	1.9233E-02	1.9233E-02	4.4466E-02	4.4479E-02	4.964E-02
Ag-108M	#B	-2.5361E-03	-2.5362E-03	5.3814E-02	5.3814E-02	6.287E-02
CD-109	#A	-8.1371E-02	-8.1577E-02	3.6729E+00	3.6729E+00	2.408E+00
SN-113	#B	5.6150E-03	5.6712E-03	5.9339E-02	5.9340E-02	6.718E-02
SB-125	#B	9.8385E-02	9.8497E-02	1.0896E-01	1.0910E-01	1.597E-01
I-131	#B	-1.0784E-02	-1.2437E-02	5.9322E-02	5.9326E-02	5.796E-02
CS-134	#B	3.8981E-02	3.9041E-02	2.7426E-02	2.7513E-02	1.124E-01
CS-137		1.9524E-01	1.9526E-01	1.1164E-01	1.1217E-01	
CE-139	#A	3.0532E-04	3.0788E-04	5.5725E-02	5.5725E-02	6.201E-02
EU-152	#B	-3.4946E-03	-3.4954E-03	3.3367E-01	3.3367E-01	1.847E-01
EU-154	#B	-4.3518E-03	-4.3534E-03	1.2843E-01	1.2843E-01	1.311E-01
EU-155	#B	1.7542E-01	1.7553E-01	2.5847E-01	2.5865E-01	2.828E-01
HG-203	#B	7.7451E-03	7.9380E-03	5.5442E-02	5.5444E-02	6.077E-02
TL-208		4.0514E-01	4.0514E-01	9.4317E-02	9.7018E-02	
PB-212	#	8.8774E-01	8.8774E-01	1.4056E-01	1.4913E-01	1.174E-01
PB-214	#	4.9926E-01	4.9926E-01	1.3546E-01	1.3832E-01	1.152E-01
BI-212		4.7237E-01	4.7237E-01	4.4048E-01	4.4128E-01	
BI-214		5.0253E-01	5.0253E-01	1.7297E-01	1.7525E-01	
RA-224	#A	1.1553E+00	1.1553E+00	1.3474E+00	1.3489E+00	1.461E+00
RA-226	#A	1.1976E+00	1.1976E+00	1.3479E+00	1.3496E+00	1.461E+00
AC-228		1.2685E+00	1.2685E+00	2.4513E-01	2.5526E-01	
TH-227	#B	-2.3514E-01	-2.3514E-01	5.0449E-01	5.0466E-01	5.501E-01
PA-234	#B	-8.4081E-02	-8.4081E-02	2.1500E-01	2.1505E-01	2.376E-01
TH-234	#B	1.0618E+00	1.0618E+00	4.5385E+00	4.5389E+00	5.040E+00
AM-241	#A	-1.6642E-01	-1.6642E-01	6.6901E-01	6.6907E-01	7.426E-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) 1.6691893E+01 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.6691914E+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_30NOV2005_1657.An1

Sample description
FSS-NOL-06-03-010-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30NOV2005_1657.An1

Acquisition information
Start time: 30-Nov-2005 16:57:10
Live time: 2000
Real time: 2027
Dead time: 1.34 %
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: 1.8730E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8730E+03) =
5.3390E+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	29-Nov-2005 00:54:00
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: 0.1328

***** 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	165.	29.29	1.50	8.847E-03				
74.82	165.	29.29	1.50	8.847E-03	74.81	9.600	1.404E+00	PB212
77.24	184.	27.08	1.50	9.541E-03	77.11	10.700	1.298E+00	PB214
					77.11	17.500	7.937E-01	PB212
77.24	184.	27.08	1.50	9.541E-03	77.11	10.700	1.298E+00	PB214
					77.11	17.500	7.937E-01	PB212
92.95	132.	35.87	1.50	1.325E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.95	138.	34.29	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.492E+00	TH234
185.73	95.	36.07	1.33	1.628E-02				
185.73	95.	36.07	1.33	1.628E-02	185.99	3.280	PBC<MDA	RA226
238.77	850.	4.11	1.21	1.380E-02	238.63	43.100	1.031E+00	PB212
242.24	98.	21.95	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.915E-01	PB214
270.47	60.	40.84	1.19	1.242E-02				
295.31	140.	12.84	1.25	1.147E-02				
295.31	140.	12.84	1.25	1.147E-02	295.22	19.200	4.580E-01	PB214
300.44	61.	28.38	1.26	1.128E-02				
338.19	229.	13.66	1.46	1.007E-02	338.40	12.010	1.369E+00	AC228
352.08	308.	8.21	1.24	9.676E-03	351.99	37.100	6.185E-01	PB214
463.38	60.	37.06	1.29	7.367E-03				
463.38	60.	37.06	1.29	7.367E-03	463.51	10.000	5.772E-01	SB125
510.85	94.	19.79	1.29	6.693E-03	510.72	22.500	4.502E-01	TL208
583.45	248.	8.34	1.49	5.887E-03	583.14	86.000	3.522E-01	TL208
609.51	170.	11.66	1.66	5.648E-03	609.32	46.090	4.700E-01	BI214
661.73	46.	26.35	1.68	5.229E-03	661.62	84.620	7.452E-02	CS137

727.05	60.	25.42	1.09	4.795E-03	727.17	11.800	7.627E-01	BI212
795.01	33.	34.08	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
860.05	39.	32.20	1.30	4.125E-03				
911.33	178.	12.27	1.34	3.921E-03	911.07	29.000	1.128E+00	AC228
968.97	123.	14.51	2.00	3.718E-03	968.90	17.460	1.371E+00	AC228
1120.18	59.	26.10	1.49	3.283E-03	1120.28	15.040	8.650E-01	BI214
1173.16	47.	32.99	1.24	3.157E-03				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1173.16	47.	32.99	1.24	3.157E-03	1173.23	99.860	1.086E-01	CO60
1461.06	702.	3.88	2.17	2.620E-03	1460.75	10.700	1.807E+01	K40
1764.65	34.	17.15	1.62	2.225E-03	1764.51	15.920	6.907E-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	
371.06	185.73	454.	95.	0.048	108.21	1.326	U-235	l
477.16	238.71	184.	850.	0.425	12.32	1.215	PB-212	D
484.11	242.18	181.	98.	0.049	65.84	1.217	PB-214	D
540.59	270.47	227.	60.	0.030	122.53	1.189	AC-228	
600.23	300.29	134.	83.	0.041	68.12	1.984	PB-212	s
1720.19	860.05	41.	39.	0.019	96.61	1.296	TL-208	s
2346.79	1173.16	62.	47.	0.024	98.97	1.238	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	149.22	74.82	1134.	165.	0.083	87.86	1.500
PB-214	153.80	77.11	1145.	184.	0.092	81.24	1.500D
PB-212	153.80	77.11	1145.	184.	0.092	81.24	1.500D
TH-234	185.48	92.95	1082.	132.	0.066	107.60	1.500s
TH-234	185.49	92.95	1053.	138.	0.069	102.88	1.500s
PB-212	477.11	238.74	485.	754.	0.377	16.52	1.500
PB-214	590.26	295.30	227.	129.	0.064	56.26	1.500
AC-228	676.06	338.19	221.	229.	0.115	40.97	1.464s
PB-214	703.72	352.02	117.	282.	0.141	24.12	1.500
SB-125	925.95	463.10	95.	36.	0.018	118.57	1.500s
TL-208	1021.47	510.85	90.	94.	0.047	59.37	1.289s
TL-208	1166.73	583.45	67.	247.	0.124	25.02	1.489
BI-214	1218.87	609.51	71.	170.	0.085	34.97	1.660
CS-137	1323.74	661.92	78.	68.	0.034	76.67	1.724
BI-212	1454.05	727.05	61.	60.	0.030	76.27	1.088s
CS-134	1590.04	795.01	46.	33.	0.016	102.25	1.601s
AC-228	1822.81	911.33	68.	178.	0.089	36.82	1.342s
AC-228	1938.15	968.97	62.	123.	0.062	43.52	1.998
BI-214	2240.76	1120.18	53.	59.	0.030	78.30	1.489s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2923.02	1461.06	10.	702.	0.351	11.64	2.166
BI-214	3530.77	1764.65	0.	34.	0.017	51.45	1.623

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		7.3203E-02					
			477.56	7.320E-02	%(	4.743E-01 1.38E-01	G
K-40		1.8068E+01					
			1460.75	1.807E+01	(P	4.441E-01 7.01E-01	G
MN-54		2.9916E-02					
			834.81	2.992E-02	%(P	6.566E-02 1.98E-02	G
CO-57		8.2145E-03					
			122.07	8.214E-03	%(	6.904E-02 2.06E-02	G K
			136.43	-4.331E-03	&	4.157E-01 1.23E-01	G
CO-60		2.4849E-02					
			1332.51	2.485E-02	%(P	7.087E-02 2.10E-02	G K
			1173.23	6.700E-02	%	9.096E-02 2.85E-02	G K
Sr-85		-2.2964E-02					
			514.00	-2.296E-02	%(	6.439E-02 1.93E-02	G
Kr-85		-5.2087E+02					
			513.99	-5.209E+02	%(	1.460E+03 4.38E+02	G
Y-88		1.2680E-02					
			1836.01	1.268E-02	%(P	4.004E-02 1.14E-02	G K
			898.02	-1.509E-02	% P	6.273E-02 1.81E-02	G
NB-94		-1.8845E-03					
			871.10	-1.885E-03	%(	6.877E-02 1.95E-02	G K
			702.50	-2.903E-03	%	6.087E-02 1.74E-02	G K
Ag-108M		-2.5680E-02					
			722.95	-2.568E-02	%(	8.085E-02 2.41E-02	G K
			614.37	-1.549E-02	& P	5.902E-02 1.74E-02	G
			433.93	1.637E-02	%	5.338E-02 1.59E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-4.5719E-02						
		88.04	-4.572E-02	&(P	2.301E+00	6.85E-01	G
SN-113	8.8941E-03						
		391.71	8.894E-03	%(	7.441E-02	2.18E-02	G K
		255.04	1.753E-01	%	2.091E+00	6.16E-01	G
SB-125	6.6397E-02						
		427.95	-3.179E-02	&(P	1.564E-01	4.57E-02	G K
		600.77	2.610E-02	% P	2.644E-01	7.57E-02	G
		636.15	-6.729E-02	% P	4.297E-01	1.24E-01	G
		463.51	3.570E-01	*(P	4.722E-01	1.47E-01	G
		176.29	-9.100E-02	% P	7.818E-01	2.32E-01	G
I-131	7.2799E-04						
		364.48	7.280E-04	%(	6.297E-02	1.82E-02	G K
		636.97	-1.303E-01	%	7.427E-01	2.15E-01	G
		284.29	6.539E-02	%	8.345E-01	2.45E-01	G
CS-134	2.7668E-02						
		604.66	-3.134E-03	%(	5.193E-02	1.48E-02	G K
		795.76	6.287E-02	@(	6.584E-02	2.14E-02	G
		569.29	6.227E-02	%	3.587E-01	1.05E-01	G
		801.84	-5.755E-02	& P	7.547E-01	2.16E-01	G
CS-137	1.1088E-01						
		661.62	1.109E-01	(	7.153E-02	2.83E-02	G
CE-139	-1.2541E-02						
		165.85	-1.254E-02	%(P	6.248E-02	1.87E-02	G
EU-152	3.4015E-03						
		121.78	3.401E-03	%(P	2.183E-01	6.51E-02	G K
		344.30	5.411E-02	%	1.557E-01	4.66E-02	G
		1408.08	9.850E-02	%	2.326E-01	6.98E-02	G
		964.00	-3.049E-03	& P	9.964E-01	2.91E-01	G
		1112.07	-9.941E-02	%	6.356E-01	1.84E-01	G
		778.90	-1.100E-01	% P	5.110E-01	1.49E-01	G
EU-154	1.6799E-02						
		123.10	1.680E-02	&(P	1.392E-01	4.16E-02	G K
		1274.80	3.134E-02	%	1.891E-01	5.37E-02	G
		723.30	-1.706E-03	& P	5.291E-01	1.54E-01	G
		1004.80	9.120E-02	&	3.128E-01	9.14E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.2560E-02						
		86.45	1.256E-02	%(P	2.999E-01	8.96E-02	G K
		105.31	0.000E+00	&	3.219E-01	9.59E-02	G
HG-203	2.6638E-03						
		279.17	2.664E-03	&(P	6.126E-02	1.80E-02	G K
		72.87	1.441E-01	%	2.268E+00	6.78E-01	G
		70.83	2.558E+00	%	3.587E+00	1.10E+00	G
		82.50	-2.301E-02	%	4.637E+00	1.38E+00	G
TL-208	3.5223E-01						
		583.14	3.522E-01	(P	5.807E-02	2.94E-02	G
		510.72	4.502E-01	+	2.247E-01	8.91E-02	G
PB-212	9.1452E-01						
		238.63	9.145E-01	(	1.278E-01	5.04E-02	G K
							Energy duplication
		77.11	7.937E-01	-	6.932E-01	2.15E-01	G
		74.81	1.404E+00	& P	1.356E+00	4.19E-01	G
PB-214	5.6620E-01						
		351.99	5.662E-01	(P	1.066E-01	4.56E-02	G K
		295.22	4.222E-01	-	2.392E-01	7.92E-02	G
							Energy duplication
		77.11	1.298E+00	+	1.134E+00	3.52E-01	G
		241.92	1.070E-01	%	8.898E-01	2.66E-01	G
BI-212	7.6269E-01						
		727.17	7.627E-01	(	4.995E-01	1.94E-01	G K
		1620.56	6.451E-01	% P	1.155E+00	3.67E-01	G
		785.42	1.611E+00	% P	2.522E+00	7.86E-01	G
BI-214	4.6995E-01						
		609.32	4.700E-01	(	1.166E-01	5.48E-02	G K
		1764.51	6.907E-01	+ P	1.501E-01	1.19E-01	G
		1120.28	8.650E-01	+	5.344E-01	2.26E-01	G
RA-224	-5.0221E-01						
		241.00	-5.022E-01	%(P	1.488E+00	4.47E-01	G
RA-226	9.2627E-01						
		185.99	9.263E-01	%(P	1.529E+00	4.66E-01	G
AC-228	1.2499E+00						
		911.07	1.128E+00	@(P	2.614E-01	1.39E-01	G K
		968.90	1.371E+00	(P	4.367E-01	1.99E-01	G
		338.40	1.369E+00	@(	4.297E-01	1.87E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.0098E-01						
		236.00	-3.010E-01	&(P	5.789E-01	1.76E-01	G K
		256.25	1.215E-01	%	6.924E-01	2.06E-01	G
PA-234	6.4066E-03						
		98.44	6.407E-03	&(	3.136E-01	9.36E-02	G K
		946.00	-2.284E-02	&	3.115E-01	8.80E-02	G
		131.28	-1.278E-02	%	2.957E-01	8.82E-02	G
		94.67	-1.358E-01	%	5.546E-01	1.67E-01	G
		883.24	-6.211E-02	%	4.959E-01	1.42E-01	G
		926.70	2.799E-01	%	4.961E-01	1.53E-01	G
		569.26	9.138E-02	%	5.316E-01	1.55E-01	G
TH-234	1.9272E+00						
		63.29	9.141E-01	%(P	5.312E+00	1.59E+00	G K
		92.80	2.492E+00	(	2.777E+00	8.55E-01	G
		92.38	2.805E+00	(P	3.305E+00	1.01E+00	G
AM-241	1.0066E-01						
		59.54	1.007E-01	%(	7.609E-01	2.27E-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	7.1634E-02	7.3203E-02	4.1511E-01	4.1513E-01	4.641E-01
K-40		1.8068E+01	1.8068E+01	2.1036E+00	2.3352E+00	
MN-54	#A	2.9806E-02	2.9916E-02	5.9513E-02	5.9537E-02	6.542E-02
CO-57	#B	8.1793E-03	8.2145E-03	6.1921E-02	6.1923E-02	6.875E-02
CO-60	#B	2.4834E-02	2.4849E-02	6.2901E-02	6.2916E-02	7.083E-02
Sr-85	#A	-2.2558E-02	-2.2964E-02	5.7903E-02	5.7917E-02	6.326E-02
Kr-85	#A	-5.2086E+02	-5.2087E+02	1.3131E+03	1.3135E+03	1.460E+03
Y-88	#B	1.2543E-02	1.2680E-02	3.4269E-02	3.4276E-02	3.960E-02
NB-94	#B	-1.8845E-03	-1.8845E-03	5.8506E-02	5.8506E-02	6.877E-02
Ag-108M	#B	-2.5679E-02	-2.5680E-02	7.2224E-02	7.2238E-02	8.085E-02
CD-109	#A	-4.5602E-02	-4.5719E-02	6.2012E+00	6.2012E+00	2.295E+00
SN-113	#B	8.8051E-03	8.8941E-03	6.5332E-02	6.5334E-02	7.367E-02
SB-125	#B	6.6321E-02	6.6397E-02	8.2070E-02	8.2154E-02	1.562E-01
I-131	#B	6.3043E-04	7.2799E-04	5.4690E-02	5.4690E-02	5.453E-02
CS-134	#B	2.7626E-02	2.7668E-02	2.8290E-02	2.8333E-02	5.185E-02
CS-137		1.1087E-01	1.1088E-01	8.5010E-02	8.5237E-02	
CE-139	#A	-1.2436E-02	-1.2541E-02	5.8204E-02	5.8208E-02	6.196E-02
EU-152	#B	3.4007E-03	3.4015E-03	1.9523E-01	1.9523E-01	2.183E-01
EU-154	#B	1.6793E-02	1.6799E-02	1.2477E-01	1.2477E-01	1.392E-01
EU-155	#B	1.2552E-02	1.2560E-02	2.6867E-01	2.6868E-01	2.997E-01
HG-203	#B	2.5985E-03	2.6638E-03	5.4084E-02	5.4084E-02	5.976E-02
TL-208		3.5223E-01	3.5223E-01	8.8269E-02	9.0455E-02	
PB-212	#	9.1452E-01	9.1452E-01	1.5109E-01	1.5957E-01	1.278E-01
PB-214	#	5.6620E-01	5.6620E-01	1.3675E-01	1.4039E-01	1.066E-01
BI-212	#	7.6269E-01	7.6269E-01	5.8173E-01	5.8330E-01	
BI-214		4.6995E-01	4.6995E-01	1.6436E-01	1.6647E-01	
RA-224	#A	-5.0221E-01	-5.0221E-01	1.4289E+00	1.4292E+00	1.488E+00
RA-226	#A	9.2627E-01	9.2627E-01	1.3973E+00	1.3983E+00	1.529E+00
AC-228		1.2499E+00	1.2499E+00	2.9263E-01	3.0092E-01	
TH-227	#B	-3.0098E-01	-3.0098E-01	5.3210E-01	5.3237E-01	5.789E-01
PA-234	#B	6.4066E-03	6.4066E-03	2.8074E-01	2.8074E-01	3.136E-01
TH-234	#B	1.9272E+00	1.9272E+00	1.9826E+00	1.9855E+00	5.312E+00
AM-241	#A	1.0066E-01	1.0066E-01	6.8243E-01	6.8246E-01	7.609E-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) 2.1013687E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 2.1013699E+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_30NOV2005_1846.An1

Sample description
FSS-NOL-06-03-012-F

Spectrum Filename: C:\GammaVision\Spectra\102F_30NOV2005_1846.An1

Acquisition information

Start time:	30-Nov-2005 18:46:57
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:	1.7630E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.7630E+03) = 5.6721E+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	29-Nov-2005 01:15:00
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: 0.1657

***** 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	126.	35.07	1.50	8.847E-03				
74.76	126.	35.07	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.00	201.	22.20	1.50	9.541E-03	77.11	10.700	1.512E+00	PB214
					77.11	17.500	9.244E-01	PB212
77.00	201.	22.20	1.50	9.541E-03	77.11	10.700	1.512E+00	PB214
					77.11	17.500	9.244E-01	PB212
129.43	72.	41.61	1.10	1.716E-02				
185.93	133.	27.32	1.08	1.627E-02				
185.93	133.	27.32	1.08	1.627E-02	185.99	3.280	1.852E+00	RA226
238.74	649.	4.74	1.21	1.380E-02	238.63	43.100	8.366E-01	PB212
241.46	93.	30.86	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.019E-01	PB214
269.75	62.	28.21	1.49	1.245E-02				
295.36	171.	11.29	1.25	1.146E-02	295.22	19.200	5.942E-01	PB214
300.53	38.	40.25	1.26	1.128E-02				
327.63	38.	40.39	1.19	1.038E-02				
338.07	139.	18.90	1.30	1.007E-02	338.40	12.010	8.819E-01	AC228
352.10	259.	11.13	1.39	9.676E-03	351.99	37.100	5.525E-01	PB214
463.02	61.	32.17	0.70	7.372E-03				
463.02	61.	32.17	0.70	7.372E-03	463.51	10.000	6.195E-01	SB125
510.45	98.	15.76	1.39	6.698E-03	510.72	22.500	4.961E-01	TL208
583.31	200.	10.36	1.39	5.888E-03	583.14	86.000	3.013E-01	TL208
609.54	182.	10.93	1.63	5.647E-03	609.32	46.090	5.346E-01	BI214
662.51	107.	16.37	1.62	5.223E-03	661.62	84.620	1.854E-01	CS137
727.46	46.	34.37	1.76	4.792E-03	727.17	11.800	6.233E-01	BI212
795.42	38.	33.38	1.53	4.421E-03				
795.42	38.	33.38	1.53	4.421E-03	795.76	85.400	7.750E-02	CS134

835.85	24.	38.13	1.63	4.235E-03	834.81	99.978	PBC<MDA	MN54
911.30	127.	11.09	1.88	3.921E-03	911.07	29.000	8.517E-01	AC228
967.42	115.	14.62	1.30	3.723E-03	964.00	14.580	1.619E+00	EU152
					968.90	17.460	1.360E+00	AC228
1120.11	81.	23.16	1.36	3.284E-03	1120.28	15.040	1.254E+00	BI214
1173.24	50.	34.95	1.55	3.157E-03	1173.23	99.860	1.204E-01	CO60
1332.62	21.	38.57	1.96	2.834E-03	1332.51	99.980	PBC<MDA	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.05	518.	4.45	2.02	2.620E-03	1460.75	10.700	1.415E+01	K40
1765.09	25.	20.00	0.87	2.225E-03	1764.51	15.920	5.390E-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	
477.10	238.78	150.	649.	0.325	14.23	1.215	PB-212	D
482.55	241.50	369.	93.	0.047	92.57	1.217	PB-214	D
539.14	269.75	122.	62.	0.031	84.64	1.489	AC-228	s
600.72	300.43	97.	38.	0.019	120.74	1.258	PB-212	lD
654.93	327.63	96.	38.	0.019	121.16	1.185	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	149.10	74.76	964.	126.	0.063	105.22	1.500
PB-214	153.80	77.11	899.	201.	0.101	66.60	1.500D
PB-212	153.80	77.11	899.	201.	0.101	66.60	1.500D
RA-226	371.59	185.99	420.	91.	0.046	95.30	1.500s
PB-212	477.03	238.70	372.	564.	0.282	19.23	1.500
PB-214	590.31	295.33	230.	173.	0.086	43.68	1.500s
AC-228	675.81	338.07	190.	139.	0.069	56.69	1.299
PB-214	703.88	352.10	144.	249.	0.125	27.85	1.500
SB-125	925.99	463.12	94.	43.	0.021	102.11	1.500s
TL-208	1020.69	510.45	56.	98.	0.049	47.29	1.388s
TL-208	1166.44	583.31	74.	199.	0.100	31.09	1.388
BI-214	1218.93	609.54	62.	182.	0.091	32.78	1.627
CS-137	1324.92	662.51	54.	107.	0.054	49.11	1.624s
BI-212	1455.22	727.63	41.	35.	0.017	92.78	1.554
CS-134	1590.10	795.04	25.	31.	0.015	87.34	1.601
MN-54	1671.77	835.85	31.	24.	0.012	114.40	1.627s
AC-228	1822.74	911.30	30.	126.	0.063	33.27	1.879
AC-228	1935.05	967.42	47.	115.	0.058	43.86	1.304s
BI-214	2240.61	1120.11	61.	81.	0.040	69.47	1.363
CO-60	2346.72	1173.13	53.	32.	0.016	109.37	1.854s
CO-60	2665.94	1332.62	23.	21.	0.011	115.70	1.959
K-40	2923.01	1461.05	4.	518.	0.259	13.35	2.018

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3531.64	1765.09	0.	25.	0.012	60.00	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	Peak COMMENTS
BE-7		7.1300E-02					
			477.56	7.130E-02	%(	3.550E-01	1.03E-01 G
K-40		1.4149E+01					
			1460.75	1.415E+01	(P	3.398E-01	6.30E-01 G
MN-54		4.4022E-02					
			834.81	4.402E-02	(P	5.239E-02	1.69E-02 G
CO-57		7.0819E-04					
			122.07	7.082E-04	&(	6.917E-02	2.06E-02 G K
			136.43	-4.709E-04	&	4.922E-01	1.46E-01 G
CO-60		6.7938E-02					
			1332.51	5.724E-02	(P	6.779E-02	2.22E-02 G K
			1173.23	7.864E-02	@(	8.934E-02	2.87E-02 G K
Sr-85		-2.1459E-02					
			514.00	-2.146E-02	%(	6.087E-02	1.82E-02 G
Kr-85		-4.8630E+02					
			513.99	-4.863E+02	%(	1.380E+03	4.13E+02 G
Y-88		-2.3834E-05					
			1836.01	-2.383E-05	%(P	6.111E-02	1.56E-02 G K
			898.02	-2.822E-03	& P	5.720E-02	1.56E-02 G
NB-94		-3.2729E-03					
			871.10	-3.273E-03	%(	6.100E-02	1.71E-02 G K
			702.50	1.539E-02	%	4.511E-02	1.33E-02 G K
Ag-108M		2.5117E-03					
			722.95	2.512E-03	&(	6.066E-02	1.71E-02 G K
			614.37	3.486E-03	% P	5.446E-02	1.54E-02 G
			433.93	-1.884E-04	%	5.349E-02	1.53E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	2.3672E-01						
		88.04	2.367E-01	%(P	2.472E+00	7.39E-01	G
SN-113	6.1689E-04						
		391.71	6.169E-04	%(	6.900E-02	1.98E-02	G K
		255.04	-9.867E-02	%	2.233E+00	6.56E-01	G
SB-125	9.2529E-02						
		427.95	-2.731E-02	%(P	1.796E-01	5.24E-02	G K
		600.77	-5.277E-02	% P	2.897E-01	8.41E-02	G
		636.15	1.062E-01	% P	4.768E-01	1.39E-01	G
		463.51	4.473E-01	(P	4.986E-01	1.58E-01	G
		176.29	-2.421E-02	& P	7.853E-01	2.32E-01	G
I-131	1.1690E-02						
		364.48	1.169E-02	%(	6.221E-02	1.83E-02	G K
		636.97	2.099E-01	%	7.972E-01	2.34E-01	G
		284.29	8.258E-02	%	8.417E-01	2.47E-01	G
CS-134	2.9414E-02						
		604.66	9.537E-05	%(	5.624E-02	1.59E-02	G K
		795.76	6.292E-02	(	5.298E-02	1.83E-02	G
		569.29	1.132E-01	%	2.387E-01	7.24E-02	G
		801.84	8.035E-03	% P	5.011E-01	1.36E-01	G
CS-137	1.8536E-01						
		661.62	1.854E-01	@(	6.402E-02	3.04E-02	G
CE-139	7.5037E-03						
		165.85	7.504E-03	%(P	5.649E-02	1.68E-02	G
EU-152	-7.7913E-03						
		121.78	-7.791E-03	&(P	1.908E-01	5.67E-02	G K
		344.30	5.479E-02	%	1.625E-01	4.86E-02	G
		1408.08	6.447E-02	%	2.054E-01	5.92E-02	G
		964.00	-3.211E-01	& P	7.119E-01	2.15E-01	G
		1112.07	-4.259E-02	%	5.640E-01	1.59E-01	G
		778.90	6.111E-03	% P	4.962E-01	1.40E-01	G
EU-154	-1.2340E-03						
		123.10	-1.234E-03	&(P	1.471E-01	4.37E-02	G K
		1274.80	2.485E-02	%	1.869E-01	5.25E-02	G
		723.30	4.750E-02	& P	2.860E-01	8.24E-02	G
		1004.80	9.237E-03	&	3.434E-01	9.49E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.6405E-01						
		86.45	1.640E-01	%(P	2.867E-01	8.72E-02	G K
		105.31	8.450E-02	%	3.081E-01	9.27E-02	G
HG-203	-8.9811E-03						
		279.17	-8.981E-03	&(P	5.948E-02	1.76E-02	G K
		72.87	-1.101E+00	&	2.371E+00	7.19E-01	G
		70.83	1.409E+00	%	3.519E+00	1.06E+00	G
		82.50	-1.598E+00	%	4.674E+00	1.41E+00	G
TL-208	3.0127E-01						
		583.14	3.013E-01	(P	6.472E-02	3.13E-02	G
		510.72	4.961E-01	+	1.904E-01	7.82E-02	G
PB-212	7.2669E-01						
		238.63	7.267E-01	(	1.193E-01	4.66E-02	G K
							Energy duplication
		77.11	9.244E-01	+	6.537E-01	2.05E-01	G
		74.81	1.138E+00	& P	1.330E+00	4.09E-01	G
PB-214	5.5580E-01						
		351.99	5.320E-01	(P	1.252E-01	4.95E-02	G K
		295.22	6.018E-01	(	2.556E-01	8.76E-02	G
							Energy duplication
		77.11	1.512E+00	+	1.069E+00	3.36E-01	G
		241.92	4.527E-01	%	7.787E-01	2.37E-01	G
BI-212	4.7146E-01						
		727.17	4.715E-01	(	4.386E-01	1.46E-01	G K
		1620.56	-2.907E-01	& P	2.423E+00	6.55E-01	G
		785.42	-5.844E-03	% P	3.086E+00	8.66E-01	G
BI-214	5.3574E-01						
		609.32	5.346E-01	(	1.163E-01	5.84E-02	G K
		1764.51	5.390E-01	(P	1.595E-01	1.08E-01	G
		1120.28	1.254E+00	+	6.080E-01	2.90E-01	G
RA-224	7.0640E-01						
		241.00	7.064E-01	%(P	1.452E+00	4.40E-01	G
RA-226	1.3133E+00						
		185.99	1.313E+00	(P	1.412E+00	4.38E-01	G
AC-228	8.6050E-01						
		911.07	8.517E-01	(P	1.892E-01	9.47E-02	G K
		968.90	1.360E+00	+ P	4.086E-01	1.99E-01	G
		338.40	8.819E-01	(	4.247E-01	1.67E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	1.9523E-02						
		236.00	1.952E-02	&(P	5.205E-01	1.54E-01	G K
		256.25	-1.000E-01	%	6.900E-01	2.04E-01	G
PA-234	3.5156E-02						
		98.44	3.516E-02	%(	2.961E-01	8.85E-02	G K
		946.00	-2.936E-02	%	3.042E-01	8.58E-02	G
		131.28	-6.674E-02	%	2.787E-01	8.36E-02	G
		94.67	-6.134E-02	%	5.511E-01	1.65E-01	G
		883.24	3.513E-02	%	4.845E-01	1.36E-01	G
		926.70	2.717E-02	%	5.927E-01	1.67E-01	G
		569.26	1.675E-01	%	3.537E-01	1.07E-01	G
TH-234	8.3938E-01						
		63.29	8.394E-01	%(P	5.249E+00	1.57E+00	G K
		92.80	1.236E+00	%	2.867E+00	8.68E-01	G
		92.38	1.311E+00	% P	3.433E+00	1.04E+00	G
AM-241	1.2713E-01						
		59.54	1.271E-01	%(	7.783E-01	2.33E-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	6.9716E-02	7.1300E-02	3.0824E-01	3.0827E-01	3.471E-01
K-40		1.4149E+01	1.4149E+01	1.8893E+00	2.0494E+00	
MN-54	#A	4.3853E-02	4.4022E-02	5.0805E-02	5.0865E-02	5.219E-02
CO-57	#B	7.0506E-04	7.0819E-04	6.1682E-02	6.1682E-02	6.886E-02
CO-60	#	6.7896E-02	6.7938E-02	5.4188E-02	5.4322E-02	6.775E-02
Sr-85	#A	-2.1066E-02	-2.1459E-02	5.4637E-02	5.4650E-02	5.976E-02
Kr-85	#A	-4.8630E+02	-4.8630E+02	1.2382E+03	1.2385E+03	1.380E+03
Y-88	#B	-2.3567E-05	-2.3834E-05	6.1249E-04	6.1249E-04	6.043E-02
NB-94	#B	-3.2729E-03	-3.2729E-03	5.1445E-02	5.1446E-02	6.100E-02
Ag-108M	#B	2.5116E-03	2.5117E-03	5.1278E-02	5.1278E-02	6.066E-02
CD-109	#A	2.3610E-01	2.3672E-01	2.2167E+00	2.2168E+00	2.465E+00
SN-113	#B	6.1049E-04	6.1689E-04	5.9463E-02	5.9463E-02	6.828E-02
SB-125	#B	9.2419E-02	9.2529E-02	9.7882E-02	9.8019E-02	1.794E-01
I-131	#B	1.0070E-02	1.1690E-02	5.4879E-02	5.4883E-02	5.358E-02
CS-134	#B	2.9367E-02	2.9414E-02	2.5689E-02	2.5742E-02	5.615E-02
CS-137	#	1.8534E-01	1.8536E-01	9.1029E-02	9.1622E-02	
CE-139	#A	7.4386E-03	7.5037E-03	5.0400E-02	5.0401E-02	5.600E-02
EU-152	#B	-7.7893E-03	-7.7913E-03	2.4246E-01	2.4246E-01	1.908E-01
EU-154	#B	-1.2335E-03	-1.2340E-03	1.9147E-01	1.9147E-01	1.470E-01
EU-155	#B	1.6394E-01	1.6405E-01	2.6153E-01	2.6169E-01	2.865E-01
HG-203	#B	-8.7528E-03	-8.9811E-03	5.3659E-02	5.3661E-02	5.797E-02
TL-208		3.0127E-01	3.0127E-01	9.3846E-02	9.5357E-02	
PB-212	#	7.2669E-01	7.2669E-01	1.3977E-01	1.4560E-01	1.193E-01
PB-214	#	5.5580E-01	5.5580E-01	1.4403E-01	1.4737E-01	1.252E-01
BI-212	#	4.7146E-01	4.7146E-01	4.3744E-01	4.3824E-01	4.386E-01
BI-214		5.3574E-01	5.3574E-01	1.7562E-01	1.7817E-01	
RA-224	#A	7.0640E-01	7.0640E-01	1.3207E+00	1.3213E+00	1.452E+00
RA-226	#A	1.3133E+00	1.3133E+00	1.3127E+00	1.3148E+00	1.412E+00
AC-228		8.6050E-01	8.6050E-01	2.8296E-01	2.8705E-01	
TH-227	#B	1.9523E-02	1.9523E-02	4.6262E-01	4.6262E-01	5.205E-01
PA-234	#B	3.5156E-02	3.5156E-02	2.6562E-01	2.6562E-01	2.961E-01
TH-234	#B	8.3938E-01	8.3938E-01	4.7114E+00	4.7116E+00	5.249E+00
AM-241	#A	1.2713E-01	1.2713E-01	6.9854E-01	6.9857E-01	7.783E-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) 1.6032343E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 1.6032364E+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_30NOV2005_1924.An1

Sample description
FSS-NOL-06-03-015-F-(RC)

Spectrum Filename: C:\GammaVision\Spectra\102F_30NOV2005_1924.An1

Acquisition information

Start time:	30-Nov-2005 19:24:18
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:	2.0780E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.0780E+03) = 4.8123E+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	29-Nov-2005 01:22:00
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: 0.1336

***** 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	149.	21.85	1.10	8.847E-03	74.81	9.600	1.140E+00	PB212
77.10	209.	13.75	1.10	9.541E-03	77.11	17.500	8.420E-01	PB212
87.42	100.	31.03	1.11	1.226E-02				
89.47	81.	38.64	1.11	1.271E-02	88.04	3.790	PBC<MDA	CD109
93.08	148.	21.61	1.11	1.343E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.414E+00	TH234
186.01	123.	25.62	1.45	1.627E-02	185.99	3.280	1.442E+00	RA226
238.72	779.	4.23	1.21	1.380E-02	238.63	43.100	8.509E-01	PB212
242.12	110.	19.19	1.22	1.365E-02	241.00	3.900	1.320E+00	RA224
					241.92	7.470	6.989E-01	PB214
270.75	59.	31.30	0.67	1.241E-02				
295.33	147.	14.65	1.06	1.146E-02	295.22	19.200	4.343E-01	PB214
328.34	62.	28.73	1.54	1.036E-02				
338.41	150.	18.51	1.40	1.006E-02	338.40	12.010	8.095E-01	AC228
352.00	266.	9.60	1.36	9.678E-03	351.99	37.100	4.818E-01	PB214
463.26	34.	37.79	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
510.87	99.	18.82	1.04	6.693E-03	510.72	22.500	4.265E-01	TL208
583.43	202.	9.26	1.61	5.887E-03	583.14	86.000	2.583E-01	TL208
609.55	166.	13.30	1.39	5.647E-03	609.32	46.090	4.136E-01	BI214
726.48	74.	21.37	1.63	4.798E-03	727.17	11.800	8.507E-01	BI212
795.18	28.	36.18	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
911.78	143.	10.81	1.80	3.919E-03	911.07	29.000	8.163E-01	AC228
968.13	132.	14.77	2.19	3.720E-03	968.90	17.460	1.324E+00	AC228
1120.12	62.	31.54	1.69	3.283E-03	1120.28	15.040	8.192E-01	BI214
1461.03	702.	3.92	2.01	2.620E-03	1460.75	10.700	1.627E+01	K40
1765.05	38.	16.22	0.82	2.225E-03	1764.51	15.920	6.959E-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
174.42	87.67	435.	100.	0.050	93.08	1.107	PB-214 lD
178.51	89.71	454.	81.	0.041	115.93	1.109	PB-214 lD
541.14	270.75	141.	59.	0.030	93.90	0.667	AC-228 s
656.36	328.34	115.	62.	0.031	86.19	1.538	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	149.20	74.81	478.	149.	0.074	65.55	1.098D
PB-212	153.80	77.11	478.	209.	0.104	41.25	1.100A
TH-234	185.76	93.09	1013.	147.	0.074	94.17	1.500s
TH-234	185.73	93.08	986.	154.	0.077	89.93	1.500s
RA-226	371.88	186.14	429.	118.	0.059	76.40	1.500s
PB-212	476.89	238.63	152.	779.	0.389	12.68	1.215D
PB-214	483.47	241.92	236.	114.	0.057	63.69	1.217D
PB-214	590.32	295.33	144.	147.	0.073	43.95	1.056
AC-228	676.51	338.41	202.	150.	0.075	55.54	1.397s
PB-214	703.69	352.00	139.	266.	0.133	28.81	1.361
SB-125	926.27	463.26	76.	34.	0.017	113.37	1.500s
TL-208	1021.51	510.87	88.	99.	0.049	56.46	1.038s
TL-208	1166.69	583.43	55.	201.	0.101	27.78	1.608
BI-214	1218.95	609.55	86.	166.	0.083	39.91	1.389s
BI-212	1452.90	726.48	55.	74.	0.037	64.10	1.631s
CS-134	1590.38	795.18	37.	28.	0.014	108.55	1.601s
AC-228	1823.71	911.78	32.	143.	0.071	32.43	1.796s
AC-228	1936.47	968.13	64.	132.	0.066	44.30	2.192s
BI-214	2240.63	1120.12	77.	62.	0.031	94.61	1.693s
K-40	2922.97	1461.03	12.	701.	0.351	11.76	2.007
BI-214	3531.56	1765.05	0.	38.	0.019	48.67	0.824s

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		6.3268E-02					
			477.56	6.327E-02	%(	4.382E-01 1.28E-01	G
K-40		1.6267E+01					
			1460.75	1.627E+01	(P	4.301E-01 6.38E-01	G
MN-54		-1.7884E-04					
			834.81	-1.788E-04	%(P	6.316E-02 1.79E-02	G
CO-57		-4.9527E-04					
			122.07	-4.953E-04	&(	5.821E-02 1.73E-02	G K
			136.43	-6.748E-02	%	4.423E-01 1.32E-01	G
CO-60		-3.3840E-03					
			1332.51	-3.384E-03	%(P	5.566E-02 1.52E-02	G K
			1173.23	0.000E+00	%	9.086E-02 2.59E-02	G K
Sr-85		-1.2780E-02					
			514.00	-1.278E-02	%(	6.041E-02 1.79E-02	G
Kr-85		-2.9001E+02					
			513.99	-2.900E+02	%(	1.369E+03 4.05E+02	G
Y-88		2.9413E-04					
			1836.01	2.941E-04	%(P	4.350E-02 1.07E-02	G K
			898.02	-1.045E-02	% P	6.197E-02 1.77E-02	G
NB-94		2.8011E-03					
			871.10	2.801E-03	%(	4.349E-02 1.21E-02	G K
			702.50	8.691E-03	%	4.862E-02 1.41E-02	G K
Ag-108M		-5.3319E-04					
			722.95	-5.332E-04	%(	5.998E-02 1.70E-02	G K
			614.37	-1.367E-02	% P	5.739E-02 1.69E-02	G
			433.93	-9.963E-03	%	4.739E-02 1.40E-02	G
CD-109		-1.2422E-01					
			88.04	-1.242E-01	%(P	2.253E+00 6.73E-01	G
SN-113		-2.8418E-04					
			391.71	-2.842E-04	%(	5.814E-02 1.67E-02	G K
			255.04	-6.224E-01	%	2.018E+00 6.05E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0143E-01						
		427.95	3.314E-02	%(P	1.337E-01	3.94E-02	G K
		600.77	-2.029E-02	% P	2.392E-01	6.83E-02	G
		636.15	2.599E-02	% P	3.458E-01	9.75E-02	G
		463.51	3.036E-01	(P	3.820E-01	1.20E-01	G
		176.29	6.549E-02	& P	6.795E-01	2.02E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	%(	6.065E-02	1.76E-02	G K
		636.97	1.131E-01	%	6.212E-01	1.79E-01	G
		284.29	-7.680E-02	%	7.352E-01	2.16E-01	G
CS-134	1.6200E-02						
		604.66	-1.178E-02	%(	5.708E-02	1.68E-02	G K
		795.76	4.817E-02	*(	5.363E-02	1.74E-02	G
		569.29	7.456E-03	&	3.480E-01	1.00E-01	G
		801.84	1.922E-01	% P	4.114E-01	1.25E-01	G
CS-137	1.4485E-02						
		661.62	1.448E-02	%(	5.813E-02	1.71E-02	G
CE-139	1.5416E-02						
		165.85	1.542E-02	%(P	5.368E-02	1.61E-02	G
EU-152	9.7633E-03						
		121.78	9.763E-03	&(P	1.706E-01	5.08E-02	G K
		344.30	5.164E-03	&	1.509E-01	4.39E-02	G
		1408.08	3.872E-02	%	1.936E-01	5.37E-02	G
		964.00	8.838E-02	& P	4.004E-01	1.16E-01	G
		1112.07	-3.383E-03	%	4.568E-01	1.27E-01	G
		778.90	9.153E-03	% P	3.870E-01	1.09E-01	G
EU-154	-1.2468E-02						
		123.10	-1.247E-02	&(P	1.243E-01	3.71E-02	G K
		1274.80	-4.910E-03	%	2.155E-01	6.05E-02	G
		723.30	-1.095E-01	& P	3.579E-01	1.06E-01	G
		1004.80	-8.212E-02	%	3.690E-01	1.08E-01	G
EU-155	-1.6660E-02						
		86.45	-1.666E-02	&(P	2.125E-01	6.31E-02	G K
		105.31	7.289E-02	%	2.848E-01	8.57E-02	G
HG-203	2.7802E-02						
		279.17	2.780E-02	&(P	4.349E-02	1.34E-02	G K
		72.87	-5.676E-01	&	2.205E+00	6.64E-01	G
		70.83	-1.845E+00	&	3.873E+00	1.17E+00	G
		82.50	-2.877E-02	&	4.320E+00	1.29E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5830E-01						
		583.14	2.583E-01	(P	4.777E-02	2.40E-02	G
		510.72	4.265E-01	+	2.006E-01	8.03E-02	G
PB-212	8.4835E-01						
		238.63	8.509E-01	(	6.585E-02	3.60E-02	G K
							Energy duplication
		77.11	8.136E-01	}	4.073E-01	1.12E-01	G
		74.81	1.140E+00	+ P	8.009E-01	2.54E-01	G
PB-214	4.6557E-01						
		351.99	4.818E-01	(P	1.044E-01	4.63E-02	G K
		295.22	4.343E-01	(	1.732E-01	6.36E-02	G
							Energy duplication
		77.11	1.784E-01	}	7.680E-01	1.97E-01	G
		241.92	7.269E-01	+	4.737E-01	1.54E-01	G
BI-212	8.5069E-01						
		727.17	8.507E-01	*(	4.284E-01	1.82E-01	G K
		1620.56	-3.310E-02	% P	2.160E+00	5.69E-01	G
		785.42	-2.586E-03	& P	2.991E+00	8.48E-01	G
BI-214	4.1360E-01						
		609.32	4.136E-01	*(	1.150E-01	5.50E-02	G K
		1764.51	6.959E-01	+ P	1.353E-01	1.13E-01	G
		1120.28	8.192E-01	+	5.735E-01	2.58E-01	G
RA-224	9.0083E-01						
		241.00	9.008E-01	%(P	1.305E+00	4.00E-01	G
RA-226	1.4373E+00						
		185.99	1.437E+00	(P	1.209E+00	3.80E-01	G
AC-228	8.1434E-01						
		911.07	8.163E-01	@(P	1.668E-01	8.85E-02	G K
		968.90	1.324E+00	+ P	4.001E-01	1.95E-01	G
		338.40	8.095E-01	@(	3.707E-01	1.50E-01	G
TH-227	-1.1896E-03						
		236.00	-1.190E-03	%(P	4.795E-01	1.42E-01	G K
		256.25	5.145E-02	%	4.478E-01	1.31E-01	G
PA-234	1.4736E-01						
		98.44	1.474E-01	%(	2.556E-01	7.78E-02	G K
		946.00	-5.032E-02	%	2.880E-01	8.30E-02	G
		131.28	-8.809E-03	&	2.451E-01	7.29E-02	G
		94.67	-5.542E-02	%	4.839E-01	1.45E-01	G
		883.24	-5.926E-02	&	4.642E-01	1.33E-01	G
		926.70	-1.473E-01	%	5.364E-01	1.58E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.104E-02 &   5.155E-01 1.48E-01 G

TH-234       2.1870E+00
                           63.29 1.533E+00 %(P 4.560E+00 1.37E+00 G K
                           92.80 2.501E+00 *(  2.423E+00 7.50E-01 G
                           92.38 2.813E+00 *(P 2.884E+00 8.90E-01 G

AM-241      -1.8011E-01
                           59.54-1.801E-01 &(  5.327E-01 1.60E-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	6.1846E-02	6.3268E-02	3.8344E-01	3.8346E-01	4.284E-01
K-40		1.6267E+01	1.6267E+01	1.9133E+00	2.1199E+00	
MN-54	#A	-1.7815E-04	-1.7884E-04	1.8145E-01	1.8145E-01	6.291E-02
CO-57	#B	-4.9305E-04	-4.9527E-04	5.1901E-02	5.1901E-02	5.795E-02
CO-60	#B	-3.3819E-03	-3.3840E-03	5.0743E-02	5.0743E-02	5.562E-02

Sr-85	#A	-1.2543E-02	-1.2780E-02	5.3611E-02	5.3616E-02	5.929E-02
Kr-85	#A	-2.9001E+02	-2.9001E+02	1.2147E+03	1.2148E+03	1.369E+03
Y-88	#B	2.9080E-04	2.9413E-04	3.2122E-02	3.2122E-02	4.301E-02
NB-94	#B	2.8011E-03	2.8011E-03	3.6217E-02	3.6218E-02	4.349E-02
Ag-108M	#B	-5.3318E-04	-5.3319E-04	5.0995E-02	5.0996E-02	5.997E-02
CD-109	#A	-1.2389E-01	-1.2422E-01	2.8254E+00	2.8254E+00	2.247E+00
SN-113	#B	-2.8119E-04	-2.8418E-04	5.0058E-02	5.0058E-02	5.753E-02
SB-125	#B	1.0131E-01	1.0143E-01	1.2017E-01	1.2030E-01	1.336E-01
I-131	#B	0.0000E+00	0.0000E+00	5.2759E-02	5.2759E-02	5.215E-02
CS-134	#B	1.6174E-02	1.6200E-02	1.7585E-02	1.7608E-02	5.699E-02
CS-137	#A	1.4483E-02	1.4485E-02	5.1202E-02	5.1209E-02	5.812E-02
CE-139	#A	1.5280E-02	1.5416E-02	4.8366E-02	4.8373E-02	5.320E-02
EU-152	#B	9.7608E-03	9.7633E-03	1.5239E-01	1.5239E-01	1.706E-01
EU-154	#B	-1.2463E-02	-1.2468E-02	1.1487E-01	1.1487E-01	1.243E-01
EU-155	#B	-1.6649E-02	-1.6660E-02	4.2105E-01	4.2105E-01	2.123E-01
HG-203	#B	2.7087E-02	2.7802E-02	4.0095E-02	4.0126E-02	4.237E-02
TL-208		2.5830E-01	2.5830E-01	7.1899E-02	7.3345E-02	
PB-212		8.4835E-01	8.4835E-01	1.0760E-01	1.1766E-01	
PB-214		4.6557E-01	4.6557E-01	1.2239E-01	1.2514E-01	
BI-212	#	8.5069E-01	8.5069E-01	5.4529E-01	5.4738E-01	
BI-214		4.1360E-01	4.1360E-01	1.6506E-01	1.6668E-01	
RA-224	#A	9.0083E-01	9.0083E-01	1.1993E+00	1.2003E+00	1.305E+00
RA-226	#	1.4373E+00	1.4373E+00	1.1396E+00	1.1425E+00	1.209E+00
AC-228	#	8.1434E-01	8.1434E-01	2.6199E-01	2.6595E-01	
TH-227	#B	-1.1896E-03	-1.1896E-03	2.4315E-01	2.4315E-01	4.795E-01
PA-234	#B	1.4736E-01	1.4736E-01	2.3347E-01	2.3361E-01	2.556E-01
TH-234	#B	2.1870E+00	2.1870E+00	1.9668E+00	1.9705E+00	4.560E+00
AM-241	#A	-1.8010E-01	-1.8011E-01	4.8102E-01	4.8113E-01	5.327E-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) 1.9917879E+01 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.9917879E+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_1DEC2005_1009.An1

Sample description
FSS-NOL-06-03-008-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1DEC2005_1009.An1

Acquisition information
Start time: 01-Dec-2005 10:12:17
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: 1.9240E+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	29-Nov-2005 00:44:00
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: 0.1100

***** 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	127.	23.26	0.99	9.052E-03	74.81	9.600	1.027E+00	PB212
77.25	201.	12.53	0.99	1.011E-02	77.11	17.500	9.357E-01	PB212
					77.11	10.700	1.530E+00	PB214
93.12	133.	31.33	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.13	138.	30.44	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.17	178.	24.91	1.08	2.566E-02	185.99	3.280	1.377E+00	RA226
209.70	95.	34.15	1.27	2.469E-02				
238.80	1205.	3.42	1.09	2.320E-02	238.63	43.100	8.378E-01	PB212
241.40	216.	15.22	1.09	2.306E-02	241.00	3.900	1.687E+00	RA224
					241.92	7.470	8.825E-01	PB214
269.64	113.	28.59	0.98	2.154E-02				
295.22	277.	11.26	1.08	2.025E-02	295.22	19.200	4.933E-01	PB214
300.36	83.	31.92	1.08	2.000E-02				
328.77	92.	30.89	1.31	1.871E-02				
338.35	210.	14.90	1.01	1.830E-02	338.40	12.010	6.676E-01	AC228
351.84	487.	7.93	1.18	1.776E-02	351.99	37.100	5.129E-01	PB214
409.27	58.	39.15	0.93	1.575E-02				
462.33	81.	25.71	0.97	1.428E-02				
462.33	81.	25.71	0.97	1.428E-02	463.51	10.000	3.937E-01	SB125
510.95	196.	11.85	1.67	1.317E-02	510.72	22.500	4.001E-01	TL208
583.21	374.	7.70	1.32	1.184E-02	583.14	86.000	2.549E-01	TL208
609.27	381.	6.24	1.30	1.144E-02	609.32	46.090	4.989E-01	BI214
661.66	264.	12.25	1.31	1.072E-02	661.62	84.620	2.032E-01	CS137
727.53	98.	18.07	1.33	9.961E-03	727.17	11.800	5.818E-01	BI212
768.28	33.	36.75	1.42	9.553E-03				

772.51	29.	41.29	1.42	9.513E-03				
794.77	43.	32.55	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
911.09	292.	7.90	1.54	8.401E-03	911.07	29.000	8.329E-01	AC228
964.20	63.	19.80	1.54	8.054E-03	964.00	14.580	3.750E-01	EU152
968.81	179.	9.04	1.54	8.026E-03	968.90	17.460	8.955E-01	AC228
1120.21	86.	18.47	1.37	7.212E-03	1120.28	15.040	5.479E-01	BI214
1172.97	85.	29.59	1.71	6.973E-03	1173.23	99.860	8.427E-02	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.87	64.	20.93	2.43	6.349E-03	1332.51	99.980	7.060E-02	CO60
1460.56	1251.	2.93	1.79	5.933E-03	1460.75	10.700	1.363E+01	K40
1589.83	49.	18.70	1.37	5.568E-03				
1764.07	80.	12.83	1.56	5.143E-03	1764.51	15.920	6.627E-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	209.70	433.	95.	0.047	102.44	1.272	NP-239	
538.43	269.64	391.	113.	0.057	85.76	0.980	AC-228	s
599.86	300.36	278.	83.	0.041	95.75	1.076	PB-212	
656.69	328.77	290.	92.	0.046	92.66	1.309	LA-140	s
817.68	409.27	183.	58.	0.029	117.44	0.932	AC-228	
923.79	462.33	147.	81.	0.041	77.14	0.974	CS-138	l
1535.63	768.29	58.	33.	0.017	110.24	1.417	BI-214	D
1544.08	772.51	59.	29.	0.015	123.87	1.420	J-132	D
3178.48	1589.83	10.	49.	0.024	56.11	1.374	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	396.	127.	0.064	69.77	0.993D
PB-212	153.39	77.11	395.	201.	0.101	37.58	0.995A
TH-234	185.44	93.13	1057.	138.	0.069	91.32	1.500s
TH-234	185.42	93.12	1050.	133.	0.066	93.98	1.500s
RA-226	371.62	186.23	781.	162.	0.081	71.08	1.500
PB-212	476.42	238.63	256.	1196.	0.598	10.23	1.093D
RA-224	481.16	241.00	1068.	146.	0.073	98.96	1.095D
PB-214	483.00	241.92	404.	123.	0.062	56.82	1.095A
PB-214	589.58	295.22	307.	273.	0.137	33.78	1.080
AC-228	675.84	338.35	297.	209.	0.104	44.71	1.005
PB-214	702.83	351.84	329.	481.	0.240	23.79	1.175
TL-208	1021.02	510.95	163.	169.	0.084	35.55	1.670s
TL-208	1165.53	583.21	142.	370.	0.185	23.10	1.320s
BI-214	1217.64	609.27	90.	375.	0.187	18.73	1.300
CS-137	1322.41	661.66	201.	263.	0.131	36.74	1.313
BI-212	1454.12	727.53	75.	97.	0.049	54.20	1.330
CS-134	1588.59	794.77	76.	43.	0.021	97.64	1.500s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1821.22	911.09	81.	289.	0.144	23.70	1.540
EU-152	1927.70	964.34	92.	57.	0.028	81.24	1.538
AC-228	1936.59	968.79	125.	254.	0.127	32.93	1.701
BI-214	2239.39	1120.21	69.	85.	0.042	55.41	1.365
CO-60	2344.91	1172.97	148.	83.	0.042	88.78	1.705
CO-60	2664.65	1332.87	42.	64.	0.032	62.79	2.425s
K-40	2919.99	1460.56	44.	1232.	0.616	8.80	1.790
BI-214	3526.90	1764.07	11.	77.	0.039	38.50	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	MDA Value pCi/gm	COMMENTS
BE-7		7.5220E-02					
			477.56	7.522E-02	%(	3.393E-01 1.01E-01	G
K-40		1.3634E+01					
			1460.75	1.363E+01	(P	3.717E-01 4.06E-01	G
MN-54		5.5643E-04					
			834.81	5.564E-04	%(P	3.853E-02 1.11E-02	G
CO-57		8.3800E-04					
			122.07	8.380E-04	&(P	4.418E-02 1.31E-02	G K
			136.43	-6.806E-02	%	4.135E-01 1.24E-01	G
CO-60		7.7429E-02					
			1332.51	7.060E-02	(P	3.654E-02 1.54E-02	G K
			1173.23	8.427E-02	(P	5.989E-02 2.55E-02	G K
Sr-85		-1.9763E-02					
			514.00	-1.976E-02	%(	4.671E-02 1.41E-02	G
Kr-85		-4.4458E+02					
			513.99	-4.446E+02	%(	1.051E+03 3.18E+02	G
Y-88		7.9631E-04					
			1836.01	7.963E-04	%(P	2.495E-02 6.47E-03	G K
			898.02	-2.384E-03	& P	3.760E-02 1.07E-02	G
NB-94		4.7487E-04					
			871.10	4.749E-04	%(	3.358E-02 9.55E-03	G K
			702.50	2.317E-04	%	2.666E-02 7.54E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	1.1055E-02						
		722.95	1.105E-02	%(	3.515E-02	1.04E-02	G K
		614.37	5.876E-03	% P	3.113E-02	9.10E-03	G
		433.93	1.062E-02	%	3.636E-02	1.09E-02	G
CD-109	1.3449E-02						
		88.04	1.345E-02	%(	2.088E+00	6.23E-01	G
SN-113	-1.0292E-03						
		391.71	-1.029E-03	%(	5.118E-02	1.50E-02	G K
		255.04	5.444E-02	%	1.415E+00	4.18E-01	G
SB-125	-1.0229E-02						
		427.95	-1.023E-02	%(P	1.100E-01	3.24E-02	G K
		600.77	3.617E-02	% P	1.782E-01	5.25E-02	G
		636.15	-1.853E-02	% P	2.966E-01	8.56E-02	G
		463.51	2.093E-01	% P	3.377E-01	1.03E-01	G
		176.29	1.090E-01	&	5.722E-01	1.71E-01	G
I-131	8.8410E-03						
		364.48	8.841E-03	%(P	4.571E-02	1.36E-02	G K
		636.97	1.054E-01	%	3.893E-01	1.14E-01	G
		284.29	1.033E-01	% P	6.530E-01	1.94E-01	G
CS-134	1.9514E-02						
		604.66	3.335E-03	%(	8.429E-02	2.51E-02	G K
		795.76	3.800E-02	*(P	3.850E-02	1.24E-02	G
		569.29	1.590E-02	& P	2.048E-01	5.94E-02	G
		801.84	-6.845E-02	& P	3.997E-01	1.15E-01	G
CS-137	2.0325E-01						
		661.62	2.032E-01	(P	5.331E-02	2.50E-02	G
CE-139	-9.4172E-03						
		165.85	-9.417E-03	%(	5.000E-02	1.50E-02	G
EU-152	1.2113E-01						
		121.78	1.238E-02	&(P	1.389E-01	4.15E-02	G K
		344.30	9.190E-03	% P	1.238E-01	3.66E-02	G
		1408.08	-2.021E-03	&	1.334E-01	3.62E-02	G
		964.00	3.392E-01	&(P	2.837E-01	9.27E-02	G
		1112.07	3.268E-02	%	3.486E-01	1.01E-01	G
		778.90	-4.491E-02	%	2.820E-01	8.24E-02	G
EU-154	-1.2484E-02						
		123.10	-1.248E-02	&(	1.166E-01	3.49E-02	G K
		1274.80	4.567E-02	%	9.474E-02	2.88E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30 4.530E-02 &   1.604E-01 4.75E-02 G
                         1004.80 4.538E-02 %   2.024E-01 5.92E-02 G

EU-155      -1.6836E-02
                           86.45-1.684E-02 %(  2.420E-01 7.24E-02 G K
                          105.31 9.794E-02 %   2.331E-01 7.06E-02 G

HG-203      -4.6797E-04
                          279.17-4.680E-04 &(P 4.305E-02 1.27E-02 G K
                           72.87-7.475E-01 % P 2.376E+00 7.17E-01 G
                           70.83-1.334E+00 &   4.429E+00 1.34E+00 G
                           82.50-5.336E-01 &   3.875E+00 1.16E+00 G

TL-208       2.5491E-01
                          583.14 2.549E-01 @(P 4.020E-02 1.99E-02 G
                          510.72 4.001E-01 + P 1.475E-01 5.49E-02 G

PB-212       8.6762E-01
                          238.63 8.400E-01  (P 5.429E-02 2.89E-02 G K
                                                          Energy duplication
                           77.11 7.982E-01 } P 3.783E-01 1.00E-01 G
                           74.81 1.027E+00 + P 7.714E-01 2.45E-01 G

PB-214       5.0413E-01
                          351.99 5.129E-01  (P 9.303E-02 4.11E-02 G K
                          295.22 4.933E-01  (P 1.524E-01 5.64E-02 G
                                                          Energy duplication
                           77.11 1.147E-02 } P 8.920E-01 2.19E-01 G
                          241.92 5.041E-01 }   3.938E-01 9.55E-02 G

BI-212       5.8183E-01
                          727.17 5.818E-01  (P 2.566E-01 1.06E-01 G K
                         1620.56 1.240E-01 % P 9.260E-01 2.54E-01 G
                          785.42 1.086E-01 %   1.868E+00 5.40E-01 G

BI-214       5.1097E-01
                          609.32 4.989E-01  (P 6.266E-02 3.17E-02 G K
                         1764.51 6.627E-01 + P 1.545E-01 8.86E-02 G
                         1120.28 5.479E-01  (P 2.689E-01 1.03E-01 G

RA-224       1.1428E+00
                                                          Derived Ave Activity
                          241.00 1.143E+00 }(  1.210E+00 3.86E-01 G

RA-226       1.3481E+00
                          185.99 1.348E+00  (P 1.109E+00 3.45E-01 G

AC-228       8.3295E-01
                          911.07 8.329E-01  (P 1.288E-01 6.66E-02 G K
                          968.90 1.273E+00 + P 2.747E-01 1.40E-01 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          338.40 6.676E-01 - P 2.653E-01 1.00E-01 G

TH-227      -2.2881E-02
                          236.00-2.288E-02 %(  4.460E-01 1.33E-01 G K
                          256.25 7.985E-02 % P 4.906E-01 1.46E-01 G

PA-234      -2.8371E-02
                           98.44-2.837E-02 %(P 2.235E-01 6.68E-02 G K
                          946.00-5.898E-02 % P 2.010E-01 5.96E-02 G
                          131.28 1.151E-03 % P 2.049E-01 6.10E-02 G
                           94.67-1.432E-01 % P 4.287E-01 1.29E-01 G
                          883.24-2.981E-02 &   2.987E-01 8.62E-02 G
                          926.70 4.616E-02 %   2.971E-01 8.59E-02 G
                          569.26 2.356E-02 & P 3.032E-01 8.79E-02 G

TH-234       1.6103E+00
                           63.29 9.388E-01 &(P 6.640E+00 1.98E+00 G K
                           92.80 1.887E+00  (P 2.188E+00 6.70E-01 G
                           92.38 2.307E+00  (P 2.585E+00 7.92E-01 G

AM-241       7.3980E-02
                           59.54 7.398E-02 &(P 1.124E+00 3.35E-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	7.2918E-02	7.5220E-02	3.0212E-01	3.0215E-01	3.289E-01
K-40		1.3634E+01	1.3634E+01	1.2182E+00	1.4528E+00	
MN-54	#A	5.5348E-04	5.5643E-04	3.3167E-02	3.3167E-02	3.833E-02
CO-57	#B	8.3286E-04	8.3800E-04	3.9381E-02	3.9381E-02	4.391E-02
CO-60		7.7362E-02	7.7429E-02	4.3336E-02	4.3568E-02	
Sr-85	#A	-1.9264E-02	-1.9763E-02	4.2339E-02	4.2354E-02	4.553E-02
Kr-85	#A	-4.4457E+02	-4.4458E+02	9.5267E+02	9.5302E+02	1.051E+03
Y-88	#B	7.8401E-04	7.9631E-04	1.9397E-02	1.9398E-02	2.456E-02
NB-94	#B	4.7487E-04	4.7487E-04	2.8640E-02	2.8640E-02	3.358E-02
Ag-108M	#B	1.1054E-02	1.1055E-02	3.1347E-02	3.1354E-02	3.515E-02
CD-109	#A	1.3400E-02	1.3449E-02	1.8702E+00	1.8702E+00	2.080E+00
SN-113	#B	-1.0144E-03	-1.0292E-03	4.4991E-02	4.4991E-02	5.045E-02
SB-125	#B	-1.0212E-02	-1.0229E-02	9.8169E-02	9.8171E-02	1.099E-01
I-131	#B	7.1919E-03	8.8410E-03	4.0674E-02	4.0678E-02	3.718E-02
CS-134	#B	1.9471E-02	1.9514E-02	1.9092E-02	1.9126E-02	8.411E-02
CS-137		2.0321E-01	2.0325E-01	7.5059E-02	7.5981E-02	
CE-139	#A	-9.3042E-03	-9.4172E-03	4.5001E-02	4.5005E-02	4.940E-02
EU-152	#B	1.2109E-01	1.2113E-01	9.9346E-02	9.9573E-02	1.389E-01
EU-154	#B	-1.2477E-02	-1.2484E-02	1.0474E-01	1.0474E-01	1.165E-01
EU-155	#B	-1.6820E-02	-1.6836E-02	2.1707E-01	2.1707E-01	2.417E-01
HG-203	#B	-4.5159E-04	-4.6797E-04	4.0931E-02	4.0931E-02	4.154E-02
TL-208	#	2.5491E-01	2.5491E-01	5.9572E-02	6.1383E-02	
PB-212		8.6762E-01	8.6762E-01	8.9644E-02	1.0283E-01	
PB-214		5.0413E-01	5.0413E-01	1.2135E-01	1.2483E-01	
BI-212		5.8183E-01	5.8183E-01	3.1693E-01	3.1872E-01	
BI-214		5.1097E-01	5.1097E-01	9.7357E-02	1.0178E-01	
RA-224	A	1.1428E+00	1.1428E+00	1.1309E+00	1.1328E+00	
RA-226	#	1.3481E+00	1.3481E+00	1.0350E+00	1.0380E+00	1.109E+00
AC-228		8.3295E-01	8.3295E-01	1.9970E-01	2.0547E-01	
TH-227	#B	-2.2881E-02	-2.2881E-02	4.0008E-01	4.0008E-01	4.460E-01
PA-234	#B	-2.8371E-02	-2.8371E-02	2.2313E-01	2.2314E-01	2.235E-01
TH-234	#B	1.6103E+00	1.6103E+00	1.6592E+00	1.6616E+00	6.640E+00
AM-241	#A	7.3979E-02	7.3980E-02	1.0048E+00	1.0048E+00	1.124E+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 (785.0 to 2000.7 keV) 1.8609535E+01 pCi/gm
Total Decayed Activity (785.0 to 2000.7 keV) 1.8609632E+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_1DEC2005_1440.An1

Sample description
FSS-NOL-06-03-022-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_1DEC2005_1440.An1

Acquisition information
Start time: 01-Dec-2005 14:40:59
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: 1.6570E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6570E+03) =
6.0350E+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	29-Nov-2005 16:00:00
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. 22 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0842

***** 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	143.	21.13	0.99	9.052E-03	74.81	9.600	1.345E+00	PB212
77.26	189.	16.82	0.99	1.011E-02	77.11	17.500	1.138E+00	PB212
					77.11	10.700	1.861E+00	PB214
93.22	99.	41.32	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
99.94	83.	37.45	0.88	1.872E-02				
129.07	88.	40.21	1.06	2.437E-02				
186.41	232.	19.60	1.12	2.565E-02	185.99	3.280	2.117E+00	RA226
209.59	139.	23.37	1.14	2.470E-02				
238.89	1418.	3.16	1.09	2.319E-02	238.63	43.100	1.146E+00	PB212
241.70	189.	15.11	1.09	2.304E-02	241.00	3.900	1.712E+00	RA224
					241.92	7.470	8.959E-01	PB214
270.81	154.	22.65	0.97	2.148E-02				
277.29	74.	34.39	0.68	2.115E-02				
295.20	294.	11.83	1.06	2.025E-02	295.22	19.200	6.082E-01	PB214
300.18	112.	26.50	1.10	2.001E-02				
327.76	70.	36.72	1.06	1.875E-02				
338.48	334.	11.26	1.18	1.830E-02	338.40	12.010	1.235E+00	AC228
352.03	453.	7.49	1.07	1.775E-02	351.99	37.100	5.534E-01	PB214
408.97	65.	36.65	1.62	1.576E-02				
462.87	100.	22.64	1.04	1.426E-02				
462.87	100.	22.64	1.04	1.426E-02	463.51	10.000	5.659E-01	SB125
510.90	232.	10.68	1.63	1.317E-02	510.72	22.500	5.647E-01	TL208
583.21	508.	6.42	1.31	1.184E-02	583.14	86.000	4.031E-01	TL208
609.38	344.	6.89	1.27	1.144E-02	609.32	46.090	5.223E-01	BI214
661.79	217.	11.41	1.39	1.072E-02	661.62	84.620	1.938E-01	CS137

726.88	127.	16.94	1.97	9.968E-03	723.30	19.700	5.257E-01	EU154
					727.17	11.800	8.774E-01	BI212
794.83	59.	23.16	1.50	9.301E-03	795.76	85.400	6.042E-02	CS134
861.24	56.	34.26	0.99	8.762E-03				
911.14	375.	7.21	1.65	8.401E-03	911.07	29.000	1.244E+00	AC228
964.49	58.	21.99	1.54	8.053E-03	964.00	14.580	4.004E-01	EU152
969.05	182.	9.29	1.54	8.024E-03	968.90	17.460	1.056E+00	AC228
1120.39	98.	22.01	1.35	7.211E-03	1120.28	15.040	7.226E-01	BI214
1173.47	110.	16.15	1.34	6.971E-03	1173.23	99.860	1.269E-01	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.72	110.	13.82	1.77	6.349E-03	1332.51	99.980	1.375E-01	CO60
1408.57	20.	38.31	1.81	6.096E-03	1408.08	21.210	PBC<MDA	EU152
1460.84	1358.	2.80	1.75	5.932E-03	1460.75	10.700	1.721E+01	K40
1620.88	22.	32.89	0.70	5.488E-03	1620.56	2.750	1.181E+00	BI212
1764.65	77.	12.25	1.92	5.141E-03	1764.51	15.920	7.346E-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	
418.33	209.59	433.	139.	0.069	70.10	1.142	NP-239	
540.77	270.81	406.	154.	0.077	67.95	0.973	AC-228	s
553.72	277.29	268.	80.	0.040	93.02	0.680	TL-208	s
599.51	300.18	310.	112.	0.056	79.50	1.100	PB-212	
654.67	327.76	256.	70.	0.035	110.17	1.056	AC-228	s
817.07	408.97	201.	65.	0.032	109.95	1.623	CS-138	s
1721.53	861.24	104.	56.	0.028	102.77	0.988	TL-208	
1928.40	964.56	50.	61.	0.031	62.45	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	409.	143.	0.072	63.38	0.993D
PB-212	153.39	77.11	441.	189.	0.094	50.46	0.995A
RA-226	371.63	186.23	893.	199.	0.099	62.86	1.500s
PB-212	476.42	238.63	271.	1407.	0.704	9.30	1.093D
PB-214	483.00	241.92	421.	120.	0.060	59.84	1.095A
PB-214	589.54	295.20	356.	290.	0.145	35.48	1.061s
AC-228	676.10	338.48	361.	333.	0.166	33.78	1.180s
PB-214	703.20	352.03	264.	447.	0.223	22.48	1.074
SB-125	925.00	462.94	183.	75.	0.037	82.47	1.500
TL-208	1020.91	510.90	168.	205.	0.103	32.03	1.629s
TL-208	1165.51	583.21	168.	503.	0.252	19.26	1.312
BI-214	1217.86	609.38	101.	338.	0.169	20.68	1.273
CS-137	1322.67	661.79	133.	216.	0.108	34.23	1.386s
BI-212	1452.84	726.88	112.	127.	0.063	50.83	1.969s
CS-134	1588.72	794.83	64.	59.	0.029	69.49	1.500s
AC-228	1821.31	911.14	111.	372.	0.186	21.64	1.649s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	1928.34	964.66	113.	41.	0.021	117.16	1.538
AC-228	1936.81	968.90	52.	181.	0.091	27.86	1.541D
BI-214	2239.75	1120.39	110.	96.	0.048	66.03	1.346
CO-60	2345.89	1173.47	76.	108.	0.054	48.46	1.337s
CO-60	2664.35	1332.72	35.	107.	0.053	41.47	1.766
EU-152	2816.02	1408.57	19.	20.	0.010	114.94	1.812
K-40	2920.54	1460.84	37.	1339.	0.670	8.39	1.750
BI-212	3240.56	1620.88	8.	22.	0.011	98.66	0.698s
BI-214	3528.06	1764.65	6.	74.	0.037	36.76	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	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.0634E-01					
			477.56	1.063E-01	&(	4.126E-01 1.23E-01 G	
K-40		1.7208E+01					
			1460.75	1.721E+01	(P	3.976E-01 4.88E-01 G	
MN-54		2.2040E-02					
			834.81	2.204E-02	%(P	4.090E-02 1.25E-02 G	
CO-57		1.2092E-02					
			122.07	1.209E-02	&(P	5.838E-02 1.75E-02 G K	
			136.43	-1.037E-01	%	4.732E-01 1.42E-01 G	
CO-60		1.3220E-01					
			1332.51	1.375E-01	(P	3.895E-02 1.95E-02 G K	
			1173.23	1.269E-01	(P	5.072E-02 2.09E-02 G K	
Sr-85		-2.8506E-02					
			514.00	-2.851E-02	%(	5.635E-02 1.71E-02 G	
Kr-85		-6.4446E+02					
			513.99	-6.445E+02	%(	1.274E+03 3.87E+02 G	
Y-88		2.8206E-03					
			1836.01	2.821E-03	%(P	2.671E-02 7.06E-03 G K	
			898.02	-5.632E-03	% P	4.716E-02 1.36E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	1.0777E-02						
		871.10	1.078E-02	%(	4.207E-02	1.24E-02	G K
		702.50	-1.271E-03	%	4.714E-02	1.37E-02	G K
Ag-108M	-1.3690E-02						
		722.95	-1.369E-02	&(	5.872E-02	1.74E-02	G K
		614.37	-4.006E-04	% P	4.794E-02	1.39E-02	G
		433.93	1.536E-02	%	3.830E-02	1.15E-02	G
CD-109	-1.8726E-01						
		88.04	-1.873E-01	%(	2.432E+00	7.28E-01	G
SN-113	0.0000E+00						
		391.71	0.000E+00	&(	6.309E-02	1.85E-02	G K
		255.04	2.451E-01	&	1.880E+00	5.60E-01	G
SB-125	1.1804E-01						
		427.95	1.278E-02	&(P	1.145E-01	3.36E-02	G K
		600.77	9.160E-02	& P	2.200E-01	6.63E-02	G
		636.15	1.953E-02	% P	3.641E-01	1.06E-01	G
		463.51	4.296E-01	(P	3.766E-01	1.20E-01	G
		176.29	4.353E-02	%	6.668E-01	1.99E-01	G
I-131	6.9320E-03						
		364.48	6.932E-03	&(P	5.172E-02	1.53E-02	G K
		636.97	2.517E-03	&	6.740E-01	1.95E-01	G
		284.29	5.516E-02	& P	7.182E-01	2.13E-01	G
CS-134	2.6131E-02						
		604.66	-3.871E-03	%(	8.730E-02	2.59E-02	G K
		795.76	6.042E-02	*(P	4.099E-02	1.40E-02	G
		569.29	-8.466E-03	% P	2.599E-01	7.49E-02	G
		801.84	9.040E-02	& P	4.462E-01	1.30E-01	G
CS-137	1.9383E-01						
		661.62	1.938E-01	@(P	5.082E-02	2.23E-02	G
CE-139	-6.6945E-03						
		165.85	-6.695E-03	%(	5.727E-02	1.71E-02	G
EU-152	1.2035E-01						
		121.78	3.401E-02	&(P	1.705E-01	5.12E-02	G K
		344.30	-1.182E-02	% P	1.407E-01	4.16E-02	G
		1408.08	1.247E-01	(	1.446E-01	4.78E-02	G
		964.00	2.872E-01	&(P	3.635E-01	1.14E-01	G
		1112.07	-3.004E-02	&	4.183E-01	1.21E-01	G
		778.90	-9.051E-02	%	3.465E-01	1.03E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	2.7684E-02						
		123.10	2.768E-02	%(	1.304E-01	3.92E-02	G K
		1274.80	-1.448E-03	%	1.177E-01	3.29E-02	G
		723.30	-1.099E-01	&	2.868E-01	8.63E-02	G
		1004.80	-1.872E-02	%	2.687E-01	7.74E-02	G
EU-155	-9.4064E-03						
		86.45	-9.406E-03	%(	2.998E-01	8.96E-02	G K
		105.31	6.302E-02	%	2.782E-01	8.36E-02	G
HG-203	-2.9282E-03						
		279.17	-2.928E-03	&(P	4.996E-02	1.48E-02	G K
		72.87	-3.772E-01	% P	2.756E+00	8.27E-01	G
		70.83	-2.341E+00	%	4.892E+00	1.48E+00	G
		82.50	-7.356E-01	%	4.703E+00	1.41E+00	G
TL-208	4.0310E-01						
		583.14	4.031E-01	(P	5.046E-02	2.61E-02	G
		510.72	5.647E-01	+ P	1.735E-01	6.81E-02	G
PB-212	1.1448E+00						
		238.63	1.148E+00	(P	6.476E-02	3.59E-02	G K
							Energy duplication
		77.11	8.694E-01	} P	4.634E-01	1.46E-01	G
		74.81	1.345E+00	+ P	9.095E-01	2.90E-01	G
PB-214	5.7045E-01						
		351.99	5.534E-01	(P	9.712E-02	4.20E-02	G K
		295.22	6.082E-01	@(P	1.901E-01	7.29E-02	G
							Energy duplication
		77.11	3.776E-01	} P	1.112E+00	2.67E-01	G
		241.92	5.704E-01	}	4.665E-01	1.14E-01	G
BI-212	9.3482E-01						
		727.17	8.774E-01	@(P	3.616E-01	1.49E-01	G K
		1620.56	1.181E+00	*(P	8.652E-01	3.89E-01	G
		785.42	3.245E-01	%	2.202E+00	6.44E-01	G
BI-214	5.2225E-01						
		609.32	5.223E-01	(P	7.677E-02	3.67E-02	G K
		1764.51	7.346E-01	+ P	1.433E-01	9.40E-02	G
		1120.28	7.226E-01	+ P	3.877E-01	1.62E-01	G
RA-224	1.1153E+00						
							Derived Ave Activity
		241.00	1.115E+00	}(	1.559E+00	4.91E-01	G

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

RA-226       1.9272E+00
                          185.99 1.927E+00 @(P 1.375E+00 4.30E-01 G

AC-228       1.1859E+00
                          911.07 1.244E+00 @(P 1.738E-01 9.06E-02 G K
                          968.90 1.056E+00  (P 2.105E-01 9.81E-02 G
                          338.40 1.235E+00 @(P 3.386E-01 1.40E-01 G

TH-227      -1.8104E-01
                          236.00-1.810E-01 %(  4.661E-01 1.41E-01 G K
                          256.25-7.477E-02 & P 5.980E-01 1.78E-01 G

PA-234      -7.6252E-02
                           98.44-7.625E-02 &(P 2.629E-01 7.91E-02 G K
                          946.00-2.790E-02 % P 2.384E-01 6.93E-02 G
                          131.28-3.973E-02 & P 2.604E-01 7.81E-02 G
                           94.67-7.607E-03 % P 4.824E-01 1.44E-01 G
                          883.24-4.062E-02 %   3.438E-01 9.95E-02 G
                          926.70-7.209E-02 %   3.595E-01 1.05E-01 G
                          569.26-1.267E-02 % P 3.849E-01 1.11E-01 G

TH-234       1.1272E+00
                           63.29 1.127E+00 %(P 7.566E+00 2.26E+00 G K
                           92.80 1.641E+00 % P 2.630E+00 7.99E-01 G
                           92.38 1.806E+00 & P 3.126E+00 9.48E-01 G

AM-241      -1.1619E-01
                           59.54-1.162E-01 &(P 1.358E+00 4.05E-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	1.0369E-01	1.0634E-01	3.6893E-01	3.6898E-01	4.023E-01
K-40		1.7208E+01	1.7208E+01	1.4631E+00	1.7717E+00	
MN-54	#A	2.1945E-02	2.2040E-02	3.7445E-02	3.7467E-02	4.072E-02
CO-57	#B	1.2031E-02	1.2092E-02	5.2567E-02	5.2571E-02	5.809E-02
CO-60		1.3211E-01	1.3220E-01	4.3037E-02	4.3716E-02	
Sr-85	#A	-2.7919E-02	-2.8506E-02	5.1351E-02	5.1378E-02	5.519E-02
Kr-85	#A	-6.4445E+02	-6.4446E+02	1.1611E+03	1.1617E+03	1.274E+03
Y-88	#B	2.7851E-03	2.8206E-03	2.1192E-02	2.1192E-02	2.638E-02
NB-94	#B	1.0777E-02	1.0777E-02	3.7232E-02	3.7237E-02	4.207E-02
Ag-108M	#B	-1.3689E-02	-1.3690E-02	5.2312E-02	5.2318E-02	5.872E-02
CD-109	#A	-1.8671E-01	-1.8726E-01	2.1839E+00	2.1839E+00	2.425E+00
SN-113	#B	0.0000E+00	0.0000E+00	5.5498E-02	5.5498E-02	6.236E-02
SB-125	#F	1.1788E-01	1.1804E-01	9.9003E-02	9.9240E-02	1.144E-01
I-131	#B	5.8618E-03	6.9320E-03	4.5834E-02	4.5836E-02	4.374E-02
CS-134	#B	2.6084E-02	2.6131E-02	1.8187E-02	1.8250E-02	8.714E-02
CS-137	#	1.9380E-01	1.9383E-01	6.6772E-02	6.7713E-02	
CE-139	#A	-6.6292E-03	-6.6945E-03	5.1398E-02	5.1400E-02	5.671E-02
EU-152	#B	1.2032E-01	1.2035E-01	1.3834E-01	1.3850E-01	1.705E-01
EU-154	#B	2.7672E-02	2.7684E-02	1.1749E-01	1.1750E-01	1.303E-01
EU-155	#B	-9.3994E-03	-9.4064E-03	2.6887E-01	2.6887E-01	2.996E-01
HG-203	#B	-2.8447E-03	-2.9282E-03	4.4995E-02	4.4995E-02	4.853E-02
TL-208		4.0310E-01	4.0310E-01	7.8297E-02	8.1720E-02	
PB-212		1.1448E+00	1.1448E+00	1.0742E-01	1.2632E-01	
PB-214		5.7045E-01	5.7045E-01	1.2986E-01	1.3402E-01	
BI-212	#	9.3482E-01	9.3482E-01	4.7701E-01	4.8009E-01	
BI-214		5.2225E-01	5.2225E-01	1.1005E-01	1.1415E-01	
RA-224	A	1.1153E+00	1.1153E+00	1.4434E+00	1.4449E+00	
RA-226	#	1.9272E+00	1.9272E+00	1.2903E+00	1.2951E+00	1.375E+00
AC-228		1.1859E+00	1.1859E+00	1.9376E-01	2.0563E-01	
TH-227	#B	-1.8104E-01	-1.8104E-01	4.2271E-01	4.2284E-01	4.661E-01
PA-234	#B	-7.6252E-02	-7.6252E-02	2.4861E-01	2.4865E-01	2.629E-01
TH-234	#B	1.1272E+00	1.1272E+00	6.7813E+00	6.7816E+00	7.566E+00

AM-241 #A	-1.1619E-01	-1.1619E-01	1.2579E+00	1.2579E+00	1.358E+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) 2.3410582E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.3410696E+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_1DEC2005_1517.An1

Sample description
FSS-NOL-06-03-017-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_1DEC2005_1517.An1

Acquisition information
Start time: 01-Dec-2005 15:17:37
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: 1.9620E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9620E+03) =
5.0968E+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	29-Nov-2005 15:27:00
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: 0.1010

***** 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	179.	17.73	0.99	9.052E-03	74.81	9.600	1.418E+00	PB212
77.23	196.	17.08	0.99	1.011E-02	77.11	17.500	9.028E-01	PB212
					77.11	10.700	1.477E+00	PB214
89.99	97.	34.23	1.00	1.542E-02				
93.31	156.	20.96	1.00	1.660E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.77	113.	37.16	1.08	2.445E-02				
186.49	188.	19.46	1.00	2.565E-02	185.99	3.280	1.428E+00	RA226
210.07	158.	24.80	1.17	2.468E-02				
238.87	1496.	3.04	1.09	2.319E-02	238.63	43.100	1.022E+00	PB212
241.35	197.	19.21	1.09	2.306E-02	241.00	3.900	1.511E+00	RA224
					241.92	7.470	7.904E-01	PB214
270.33	150.	21.29	0.92	2.151E-02				
295.09	278.	11.47	1.17	2.025E-02	295.22	19.200	4.853E-01	PB214
300.10	102.	24.34	1.07	2.001E-02				
328.19	60.	35.28	1.12	1.873E-02				
338.52	307.	9.56	1.23	1.830E-02	338.40	12.010	9.586E-01	AC228
351.93	457.	8.80	1.23	1.776E-02	351.99	37.100	4.721E-01	PB214
409.95	64.	36.46	0.94	1.573E-02				
462.51	121.	20.40	1.24	1.427E-02				
462.51	121.	20.40	1.24	1.427E-02	463.51	10.000	5.786E-01	SB125
510.98	243.	12.87	1.23	1.317E-02	510.72	22.500	5.027E-01	TL208
583.26	462.	7.32	1.35	1.184E-02	583.14	86.000	3.095E-01	TL208
609.40	386.	7.07	1.11	1.144E-02	609.32	46.090	4.951E-01	BI214
727.21	95.	18.94	1.57	9.964E-03	727.17	11.800	5.536E-01	BI212
767.78	78.	29.53	1.81	9.558E-03				
795.20	105.	20.45	1.68	9.306E-03				

795.20	105.	20.45	1.68	9.306E-03	795.76	85.400	9.148E-02	CS134
860.80	81.	29.04	0.84	8.766E-03				
911.30	353.	6.86	1.55	8.400E-03	911.07	29.000	9.884E-01	AC228
964.64	64.	20.11	1.54	8.052E-03	964.00	14.580	PBC<MDA	EU152
969.04	187.	8.62	1.54	8.025E-03	968.90	17.460	9.197E-01	AC228
1120.22	102.	18.66	1.49	7.212E-03	1120.28	15.040	6.357E-01	BI214
1377.66	33.	30.15	1.08	6.195E-03				
1460.85	1488.	2.72	1.86	5.932E-03	1460.75	10.700	1.594E+01	K40
1620.71	23.	34.29	1.10	5.488E-03	1620.56	2.750	1.029E+00	BI212
1764.36	73.	12.69	1.54	5.142E-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	
179.16	89.91	498.	97.	0.048	102.68	1.002	PB-214	lD
258.71	129.77	753.	110.	0.055	109.99	1.077	AC-228	s
419.30	210.07	574.	158.	0.079	74.41	1.168	NP-239	s
539.80	270.33	361.	150.	0.075	63.86	0.917	AC-228	s
599.35	300.10	248.	102.	0.051	73.01	1.074	PB-212	
655.52	328.19	194.	60.	0.030	105.83	1.122	AC-228	
819.03	409.95	182.	64.	0.032	109.39	0.938	AC-228	
1534.63	767.78	128.	78.	0.039	88.59	1.813	BI-214	s
1589.45	795.20	158.	53.	0.026	109.06	1.680	AC-228	s
1720.65	860.80	122.	81.	0.041	66.40	0.839	TL-208	s
1928.56	964.65	50.	66.	0.033	58.35	1.538	AC-228	D
2754.21	1377.66	22.	33.	0.016	90.45	1.081	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	433.	179.	0.089	53.19	0.993D
PB-212	153.39	77.11	427.	196.	0.098	51.23	0.995A
TH-234	185.54	93.18	1180.	148.	0.074	90.15	1.500s
TH-234	185.52	93.18	1149.	153.	0.076	86.90	1.500s
RA-226	372.15	186.49	557.	175.	0.087	58.37	0.998s
PB-212	476.42	238.63	262.	1491.	0.746	8.93	1.093D
RA-224	481.16	241.00	1329.	142.	0.071	113.05	1.095D
PB-214	483.00	241.92	434.	118.	0.059	61.59	1.095A
PB-214	589.33	295.09	312.	274.	0.137	34.42	1.173s
AC-228	676.19	338.52	232.	306.	0.153	28.68	1.234
PB-214	702.99	351.93	358.	451.	0.226	26.40	1.228
SB-125	925.26	463.07	189.	95.	0.048	67.50	1.500
TL-208	1021.08	510.98	243.	216.	0.108	38.60	1.225s
TL-208	1165.61	583.26	199.	458.	0.229	21.97	1.346s
BI-214	1217.90	609.40	130.	379.	0.190	21.22	1.107
BI-212	1453.49	727.21	88.	95.	0.047	56.82	1.568
CS-134	1589.16	795.05	102.	52.	0.026	91.33	1.500s
AC-228	1821.62	911.30	81.	350.	0.175	20.59	1.555

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1936.81	968.90	37.	187.	0.094	25.86	1.541D
BI-214	2239.41	1120.22	86.	100.	0.050	55.99	1.488s
K-40	2920.57	1460.85	51.	1469.	0.734	8.16	1.860
BI-212	3240.23	1620.71	10.	23.	0.011	102.86	1.100s
BI-214	3527.47	1764.36	7.	73.	0.037	38.06	1.539s

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		5.0775E-02					
			477.56	5.077E-02	&(	2.641E-01 7.77E-02	G
K-40		1.5939E+01					
			1460.75	1.594E+01	(P	3.910E-01 4.39E-01	G
MN-54		-1.0971E-03					
			834.81	-1.097E-03	%(P	4.138E-02 1.19E-02	G
CO-57		-1.4866E-04					
			122.07	-1.487E-04	&(P	5.557E-02 1.66E-02	G K
			136.43	-7.467E-02	%	4.161E-01 1.25E-01	G
CO-60		1.0377E-02					
			1332.51	1.038E-02	%(P	3.507E-02 1.02E-02	G K
			1173.23	3.000E-03	% P	4.705E-02 1.35E-02	G K
Sr-85		-1.5064E-02					
			514.00	-1.506E-02	%(	4.586E-02 1.38E-02	G
Kr-85		-3.4066E+02					
			513.99	-3.407E+02	%(	1.036E+03 3.11E+02	G
Y-88		-8.8703E-05					
			1836.01	-8.870E-05	&(P	1.038E-02 1.41E-03	G K
			898.02	-1.071E-03	% P	3.608E-02 1.02E-02	G
NB-94		-5.0491E-03					
			871.10	-5.049E-03	%(	3.128E-02 9.06E-03	G K
			702.50	1.810E-02	%	3.038E-02 9.34E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.5546E-02						
		722.95	-1.555E-02	%(	3.849E-02	1.16E-02	G K
		614.37	-1.273E-02	% P	3.903E-02	1.17E-02	G
		433.93	3.069E-03	%	3.670E-02	1.08E-02	G
CD-109	1.3577E+00						
		88.04	1.358E+00	&(	1.919E+00	5.87E-01	G
SN-113	5.9806E-05						
		391.71	5.981E-05	%(	4.233E-02	1.23E-02	G K
		255.04	2.498E-02	&	1.697E+00	5.03E-01	G
SB-125	1.2270E-01						
		427.95	8.188E-03	%(P	1.053E-01	3.09E-02	G K
		600.77	3.403E-03	& P	1.674E-01	4.82E-02	G
		636.15	-9.148E-03	% P	3.356E-01	9.73E-02	G
		463.51	4.616E-01	(P	3.235E-01	1.05E-01	G
		176.29	9.823E-02	%	5.584E-01	1.67E-01	G
I-131	6.8109E-03						
		364.48	6.811E-03	%(P	4.426E-02	1.31E-02	G K
		636.97	-1.123E-01	&	5.718E-01	1.69E-01	G
		284.29	-8.341E-02	% P	6.774E-01	2.01E-01	G
CS-134	1.2520E-02						
		604.66	-1.640E-02	%(	4.117E-02	1.24E-02	G K
		795.76	4.557E-02	*(P	4.319E-02	1.39E-02	G
		569.29	-6.257E-03	& P	2.126E-01	6.11E-02	G
		801.84	-2.424E-02	% P	4.063E-01	1.16E-01	G
CS-137	1.1442E-02						
		661.62	1.144E-02	&(P	3.976E-02	1.18E-02	G
CE-139	5.5424E-03						
		165.85	5.542E-03	%(	4.849E-02	1.45E-02	G
EU-152	-9.6133E-04						
		121.78	-9.613E-04	%(P	1.571E-01	4.68E-02	G K
		344.30	2.992E-02	% P	1.106E-01	3.30E-02	G
		1408.08	7.073E-02	%	1.351E-01	4.14E-02	G
		964.00	-9.597E-03	& P	5.361E-01	1.58E-01	G
		1112.07	-6.695E-02	%	3.069E-01	9.00E-02	G
		778.90	0.000E+00	%	3.530E-01	1.03E-01	G
EU-154	2.3395E-02						
		123.10	2.339E-02	&(	1.032E-01	3.10E-02	G K
		1274.80	2.689E-02	&	9.614E-02	2.82E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-7.802E-02	%	1.971E-01	5.93E-02	G
		1004.80	5.123E-02	&	1.535E-01	4.54E-02	G
EU-155	1.7146E-01						
							Energy duplication
		86.45	1.715E-01	%(	2.415E-01	7.38E-02	G K
		105.31	6.560E-02	%	2.415E-01	7.27E-02	G
HG-203	-1.3662E-03						
		279.17	-1.366E-03	&(P	4.497E-02	1.33E-02	G K
		72.87	-4.320E-01	% P	2.407E+00	7.23E-01	G
		70.83	1.005E-01	&	4.317E+00	1.29E+00	G
		82.50	-5.900E-01	%	4.081E+00	1.22E+00	G
TL-208	3.0947E-01						
		583.14	3.095E-01	@(P	4.632E-02	2.29E-02	G
		510.72	5.027E-01	+ P	1.750E-01	7.27E-02	G
PB-212	1.0271E+00						
		238.63	1.027E+00	(P	5.384E-02	3.08E-02	G K
							Energy duplication
		77.11	7.632E-01	} P	3.852E-01	1.30E-01	G
		74.81	1.418E+00	+ P	7.901E-01	2.56E-01	G
PB-214	4.7081E-01						
		351.99	4.721E-01	(P	9.498E-02	4.21E-02	G K
		295.22	4.853E-01	@(P	1.506E-01	5.65E-02	G
							Energy duplication
		77.11	6.653E-02	} P	9.265E-01	2.47E-01	G
		241.92	4.708E-01	}	3.998E-01	9.67E-02	G
BI-212	5.5358E-01						
		727.17	5.536E-01	(P	2.727E-01	1.05E-01	G K
		1620.56	1.029E+00	+ P	8.111E-01	3.54E-01	G
		785.42	-2.037E-01	%	1.311E+00	3.78E-01	G
BI-214	4.9515E-01						
		609.32	4.951E-01	(P	7.294E-02	3.56E-02	G K
		1764.51	6.145E-01	+ P	1.263E-01	8.14E-02	G
		1120.28	6.357E-01	+ P	2.915E-01	1.21E-01	G
RA-224	1.0853E+00						
							Derived Ave Activity
		241.00	1.085E+00	}(	1.321E+00	4.18E-01	G
RA-226	1.4280E+00						
		185.99	1.428E+00	@(P	9.223E-01	2.99E-01	G
AC-228	9.6185E-01						
		911.07	9.884E-01	(P	1.265E-01	6.85E-02	G K
		968.90	9.200E-01	(P	1.523E-01	7.94E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          338.40 9.586E-01  (P 2.310E-01 9.20E-02 G

TH-227      -1.7052E-01
                          236.00-1.705E-01 %(  3.618E-01 1.10E-01 G K
                          256.25-2.762E-02 % P 5.028E-01 1.49E-01 G

PA-234      -1.2713E-02
                           98.44-1.271E-02 %(P 1.918E-01 5.71E-02 G K
                          946.00-2.914E-02 & P 2.025E-01 5.90E-02 G
                          131.28 3.587E-03 & P 2.136E-01 6.37E-02 G
                           94.67-1.863E-01 % P 4.391E-01 1.33E-01 G
                          883.24-3.940E-02 %   2.721E-01 7.88E-02 G
                          926.70 6.917E-02 &   3.083E-01 9.03E-02 G
                          569.26-9.266E-03 & P 3.148E-01 9.05E-02 G

TH-234       1.5263E+00
                           63.29 4.600E-01 &(P 6.594E+00 1.96E+00 G K
                           92.80 2.130E+00 *(P 2.242E+00 6.88E-01 G
                           92.38 2.439E+00 *(P 2.675E+00 8.20E-01 G

AM-241      -1.4859E-01
                           59.54-1.486E-01 &(P 1.194E+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
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	4.9478E-02	5.0775E-02	2.3313E-01	2.3315E-01	2.573E-01
K-40		1.5939E+01	1.5939E+01	1.3170E+00	1.6096E+00	
MN-54	#A	-1.0923E-03	-1.0971E-03	5.9865E-02	5.9865E-02	4.120E-02
CO-57	#B	-1.4791E-04	-1.4866E-04	4.2906E-02	4.2906E-02	5.529E-02
CO-60	#B	1.0370E-02	1.0377E-02	3.0481E-02	3.0487E-02	3.505E-02
Sr-85	#A	-1.4747E-02	-1.5064E-02	4.1311E-02	4.1321E-02	4.489E-02
Kr-85	#A	-3.4065E+02	-3.4066E+02	9.3364E+02	9.3385E+02	1.036E+03
Y-88	#B	-8.7561E-05	-8.8703E-05	5.3222E-04	5.3224E-04	1.025E-02
NB-94	#B	-5.0491E-03	-5.0491E-03	2.7192E-02	2.7194E-02	3.128E-02
Ag-108M	#B	-1.5546E-02	-1.5546E-02	3.4730E-02	3.4742E-02	3.848E-02
CD-109	#A	1.3536E+00	1.3577E+00	1.7603E+00	1.7620E+00	1.913E+00
SN-113	#B	5.9093E-05	5.9806E-05	3.6900E-02	3.6900E-02	4.182E-02
SB-125	#F	1.2253E-01	1.2270E-01	8.3921E-02	8.4223E-02	1.052E-01
I-131	#B	5.7354E-03	6.8109E-03	3.9285E-02	3.9287E-02	3.727E-02
CS-134	#B	1.2497E-02	1.2520E-02	1.1453E-02	1.1476E-02	4.110E-02
CS-137	#A	1.1441E-02	1.1442E-02	3.5344E-02	3.5350E-02	3.975E-02
CE-139	#A	5.4870E-03	5.5424E-03	4.3517E-02	4.3519E-02	4.801E-02
EU-152	#B	-9.6104E-04	-9.6133E-04	2.6850E-01	2.6850E-01	1.570E-01
EU-154	#B	2.3384E-02	2.3395E-02	9.2997E-02	9.3006E-02	1.032E-01
EU-155	#B	1.7133E-01	1.7146E-01	2.2143E-01	2.2163E-01	2.413E-01
HG-203	#B	-1.3263E-03	-1.3662E-03	4.0928E-02	4.0928E-02	4.366E-02
TL-208	#	3.0947E-01	3.0947E-01	6.8624E-02	7.0937E-02	
PB-212		1.0271E+00	1.0271E+00	9.2495E-02	1.1005E-01	
PB-214		4.7081E-01	4.7081E-01	1.2586E-01	1.2879E-01	
BI-212		5.5358E-01	5.5358E-01	3.1621E-01	3.1784E-01	
BI-214		4.9515E-01	4.9515E-01	1.0687E-01	1.1067E-01	
RA-224	A	1.0853E+00	1.0853E+00	1.2270E+00	1.2286E+00	
RA-226	#	1.4280E+00	1.4280E+00	8.9543E-01	8.9926E-01	
AC-228		9.6185E-01	9.6185E-01	1.4087E-01	1.5153E-01	
TH-227	#B	-1.7052E-01	-1.7052E-01	3.2907E-01	3.2922E-01	3.618E-01
PA-234	#B	-1.2713E-02	-1.2713E-02	2.1657E-01	2.1657E-01	1.918E-01
TH-234	#B	1.5263E+00	1.5263E+00	1.4797E+00	1.4821E+00	6.594E+00
AM-241	#A	-1.4859E-01	-1.4859E-01	1.0955E+00	1.0955E+00	1.194E+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) 2.2270668E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.2270670E+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_1DEC2005_1554.An1

Sample description
FSS-NOL-06-03-016-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_1DEC2005_1554.An1

Acquisition information
Start time: 01-Dec-2005 15:55:59
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: 1.8500E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8500E+03) =
5.4054E+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	29-Nov-2005 15:25:00
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: 0.1011

***** 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	147.	21.01	0.99	9.052E-03	74.81	9.600	1.239E+00	PB212
77.30	213.	14.81	0.99	1.011E-02	77.11	17.500	1.057E+00	PB212
					77.11	10.700	1.729E+00	PB214
89.96	108.	30.76	1.00	1.542E-02	86.45	32.740	1.713E-01	EU155
93.61	146.	22.41	1.00	1.671E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.16	195.	21.18	0.92	2.566E-02	185.99	3.280	1.578E+00	RA226
209.57	186.	14.92	1.08	2.470E-02				
238.87	1401.	3.15	1.09	2.319E-02	238.63	43.100	1.015E+00	PB212
241.79	210.	13.91	1.09	2.303E-02	241.00	3.900	1.707E+00	RA224
					241.92	7.470	8.932E-01	PB214
270.21	62.	37.51	0.97	2.151E-02				
277.46	68.	40.07	0.87	2.114E-02				
295.22	290.	10.74	1.21	2.025E-02	295.22	19.200	5.371E-01	PB214
300.30	100.	27.53	1.07	2.000E-02				
328.09	110.	23.51	1.66	1.874E-02				
338.18	324.	13.56	1.13	1.831E-02	338.40	12.010	1.074E+00	AC228
352.01	433.	6.80	1.08	1.775E-02	351.99	37.100	4.742E-01	PB214
409.65	59.	29.40	1.20	1.574E-02				
463.09	76.	29.89	1.05	1.426E-02				
463.09	76.	29.89	1.05	1.426E-02	463.51	10.000	3.862E-01	SB125
510.97	226.	12.44	1.35	1.317E-02	510.72	22.500	4.913E-01	TL208
583.27	516.	5.68	1.37	1.184E-02	583.14	86.000	3.668E-01	TL208
609.36	377.	9.33	1.07	1.144E-02	609.32	46.090	5.136E-01	BI214
661.66	156.	19.73	1.49	1.072E-02	661.62	84.620	1.245E-01	CS137
727.52	144.	13.08	1.32	9.961E-03	723.30	19.700	5.354E-01	EU154
					727.17	11.800	8.940E-01	BI212

768.23	31.	39.64	1.09	9.554E-03				
795.22	63.	29.83	1.59	9.306E-03				
795.22	63.	29.83	1.59	9.306E-03	795.76	85.400	5.787E-02	CS134
861.66	128.	16.66	1.98	8.759E-03				
911.23	393.	7.31	1.51	8.400E-03	911.07	29.000	1.168E+00	AC228
964.97	79.	17.46	1.54	8.050E-03	964.00	14.580	4.887E-01	EU152
969.05	211.	8.51	1.54	8.024E-03	968.90	17.460	1.097E+00	AC228
1120.05	123.	20.67	2.11	7.213E-03	1120.28	15.040	8.142E-01	BI214
1173.10	156.	12.72	1.90	6.972E-03	1173.23	99.860	HL>Cutoff	CO60
1238.63	66.	32.52	0.87	6.700E-03				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1332.64	194.	9.66	1.65	6.349E-03	1332.51	99.980	HL>Cutoff	CO60
1460.87	1492.	2.76	1.71	5.932E-03	1460.75	10.700	1.696E+01	K40
1621.78	27.	21.93	1.74	5.488E-03	1620.56	2.750	1.290E+00	BI212
1764.56	75.	12.44	1.57	5.142E-03	1764.51	15.920	6.401E-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	
179.09	89.91	500.	108.	0.054	92.29	1.002	PB-214	lD
418.29	209.56	563.	219.	0.110	54.23	1.030	AC-228	s
539.58	270.21	251.	62.	0.031	112.52	0.975	AC-228	
554.07	277.46	309.	79.	0.040	100.16	0.868	TL-208	
599.74	300.30	286.	100.	0.050	82.58	1.069	PB-212	
655.32	328.09	240.	110.	0.055	70.53	1.659	AC-228	s
818.41	409.64	192.	71.	0.036	99.18	1.093	AC-228	
1535.53	768.23	60.	31.	0.015	118.92	1.095	BI-214	M
1589.49	795.22	107.	63.	0.031	79.39	1.593	AC-228	
1722.37	861.66	92.	128.	0.064	41.51	1.978	TL-208	s
1929.36	965.04	58.	77.	0.038	54.27	1.538	AC-228	D
2476.19	1238.63	118.	66.	0.033	97.56	0.872	CO-56	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	428.	147.	0.074	63.02	0.993D
PB-212	153.39	77.11	447.	213.	0.107	44.42	0.995A
TH-234	185.49	93.16	1151.	160.	0.080	83.43	1.500s
TH-234	185.43	93.13	1135.	158.	0.079	84.01	1.500s
RA-226	371.47	186.16	906.	178.	0.089	69.77	1.500
PB-212	476.42	238.63	288.	1392.	0.696	9.45	1.093D
RA-224	481.16	241.00	1311.	131.	0.066	121.29	1.095D
PB-214	483.00	241.92	432.	118.	0.059	62.87	1.095A
PB-214	589.59	295.22	299.	286.	0.143	32.21	1.205s
AC-228	675.50	338.18	474.	323.	0.162	40.67	1.126
PB-214	703.15	352.01	212.	428.	0.214	20.40	1.076
SB-125	925.32	463.10	191.	78.	0.039	80.73	1.500

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1021.06	510.97	215.	199.	0.100	37.31	1.348s
TL-208	1165.64	583.27	136.	511.	0.256	17.03	1.372
BI-214	1217.81	609.36	233.	371.	0.185	28.00	1.074s
Ag-108M	1221.88	611.39	198.	-65.	-0.033	98.96	1.500s
CS-137	1322.41	661.66	204.	155.	0.077	59.20	1.489
EU-154	1453.58	727.26	47.	140.	0.070	32.66	1.500s
BI-212	1454.12	727.52	82.	144.	0.072	39.23	1.318s
AC-228	1821.50	911.23	131.	389.	0.195	21.94	1.508
AC-228	1936.81	968.90	56.	210.	0.105	25.55	1.541D
BI-214	2239.08	1120.05	139.	121.	0.060	62.00	2.108s
CO-60	2345.16	1173.10	93.	154.	0.077	38.17	1.905
CO-60	2664.19	1332.64	48.	191.	0.096	28.99	1.650
K-40	2920.61	1460.87	57.	1474.	0.737	8.28	1.710
BI-212	3242.36	1621.78	2.	27.	0.013	65.80	1.736s
BI-214	3527.88	1764.56	7.	72.	0.036	37.31	1.570

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		2.3562E-01					
			477.56	2.356E-01	%(	3.439E-01 1.06E-01 G	
K-40		1.6958E+01					
			1460.75	1.696E+01	(P	4.376E-01 4.74E-01 G	
MN-54		3.8036E-03					
			834.81	3.804E-03	%(P	4.136E-02 1.20E-02 G	
CO-57		1.0873E-02					
			122.07	1.087E-02	%(P	5.737E-02 1.72E-02 G K	
			136.43	4.927E-02	&	4.352E-01 1.30E-01 G	
CO-60		2.2035E-01					
			1332.51	2.203E-01	(P	4.016E-02 2.16E-02 G K	
			1173.23	1.615E-01	- P	5.007E-02 2.08E-02 G K	
Sr-85		-1.3554E-02					
			514.00	-1.355E-02	%(	4.743E-02 1.42E-02 G	
Kr-85		-3.0617E+02					
			513.99	-3.062E+02	%(	1.071E+03 3.21E+02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	-3.0271E-03						
		1836.01	-3.027E-03	&(P	3.321E-02	9.08E-03	G K
		898.02	-1.913E-03	% P	4.479E-02	1.28E-02	G
NB-94	-3.8906E-03						
		871.10	-3.891E-03	%(	3.902E-02	1.13E-02	G K
		702.50	1.066E-02	%	4.151E-02	1.23E-02	G K
Ag-108M	-2.5752E-03						
		722.95	-2.575E-03	&(	8.123E-02	2.40E-02	G K
		614.37	-4.641E-02	& P	4.861E-02	1.53E-02	G
		433.93	1.994E-02	%	3.983E-02	1.21E-02	G
CD-109	6.3182E-01						
		88.04	6.318E-01	&(	2.093E+00	6.31E-01	G
SN-113	2.8165E-04						
		391.71	2.816E-04	%(	5.417E-02	1.59E-02	G K
		255.04	2.815E-01	%	1.324E+00	3.94E-01	G
SB-125	1.1978E-01						
		427.95	2.436E-02	%(P	1.120E-01	3.32E-02	G K
		600.77	-1.580E-03	% P	1.972E-01	5.71E-02	G
		636.15	1.893E-02	% P	3.307E-01	9.60E-02	G
		463.51	4.022E-01	(P	3.445E-01	1.10E-01	G
		176.29	-2.208E-02	%	6.179E-01	1.84E-01	G
I-131	8.7499E-03						
		364.48	8.750E-03	&(P	4.903E-02	1.45E-02	G K
		636.97	-8.239E-03	%	5.830E-01	1.68E-01	G
		284.29	2.725E-03	% P	7.399E-01	2.19E-01	G
CS-134	2.7740E-03						
		604.66	2.774E-03	%(	7.457E-02	2.21E-02	G K
		795.76	-8.035E-05	% P	4.976E-02	1.43E-02	G
		569.29	-6.077E-02	% P	2.624E-01	7.74E-02	G
		801.84	-7.575E-02	% P	4.640E-01	1.34E-01	G
CS-137	1.2449E-01						
		661.62	1.245E-01	(P	5.582E-02	2.48E-02	G
CE-139	-1.6786E-02						
		165.85	-1.679E-02	%(	5.287E-02	1.59E-02	G
EU-152	3.0158E-02						
		121.78	3.016E-02	%(P	1.675E-01	5.03E-02	G K
		344.30	-1.959E-02	% P	1.379E-01	4.10E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1408.08	7.702E-02	%	1.418E-01	4.37E-02	G
		964.00	2.069E-01	& P	3.998E-01	1.22E-01	G
		1112.07	1.117E-01	&	3.443E-01	1.03E-01	G
		778.90	2.146E-02	%	2.411E-01	6.92E-02	G
EU-154	1.8690E-01						
		123.10	2.455E-02	%(	1.133E-01	3.40E-02	G K
		1274.80	3.501E-02	&	1.213E-01	3.58E-02	G
		723.30	5.203E-01	?(	1.279E-01	5.66E-02	G
		1004.80	-4.860E-02	&	2.579E-01	7.56E-02	G
EU-155	1.3530E-02						
		86.45	1.353E-02	&(	2.230E-01	6.65E-02	G K
		105.31	1.232E-01	%	2.690E-01	8.15E-02	G
HG-203	-5.1117E-03						
		279.17	-5.112E-03	&(P	4.962E-02	1.48E-02	G K
		72.87	-4.440E-03	% P	1.729E+00	5.13E-01	G
		70.83	6.346E-02	&	5.043E+00	1.51E+00	G
		82.50	-3.573E-01	&	4.399E+00	1.32E+00	G
TL-208	3.6679E-01						
		583.14	3.668E-01	(P	4.084E-02	2.10E-02	G
		510.72	4.913E-01	+ P	1.750E-01	6.93E-02	G
PB-212	1.0287E+00						
		238.63	1.017E+00	(P	5.972E-02	3.23E-02	G K
							Energy duplication
		77.11	8.799E-01	} P	4.177E-01	1.30E-01	G
		74.81	1.239E+00	+ P	8.328E-01	2.66E-01	G
PB-214	5.0216E-01						
		351.99	4.742E-01	(P	7.833E-02	3.27E-02	G K
		295.22	5.371E-01	*(P	1.565E-01	5.85E-02	G
							Energy duplication
		77.11	5.694E-02	} P	9.873E-01	2.44E-01	G
		241.92	5.022E-01	}	4.230E-01	1.05E-01	G
BI-212	8.9398E-01						
		727.17	8.940E-01	*(P	2.791E-01	1.17E-01	G K
		1620.56	1.290E+00	+ P	4.766E-01	2.84E-01	G
		785.42	6.546E-01	%	2.105E+00	6.27E-01	G
BI-214	5.4609E-01						
		609.32	5.136E-01	@(P	1.024E-01	4.88E-02	G K
		1764.51	6.401E-01	(P	1.363E-01	8.32E-02	G
		1120.28	8.142E-01	+ P	3.884E-01	1.71E-01	G

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

RA-224       1.0643E+00
                                                          Derived Ave Activity
                          241.00 1.064E+00 }(  1.392E+00 4.40E-01 G

RA-226       1.5469E+00
                          185.99 1.547E+00  (P 1.241E+00 3.86E-01 G

AC-228       1.1271E+00
                          911.07 1.168E+00  (P 1.678E-01 8.61E-02 G K
                          968.90 1.097E+00  (P 1.953E-01 9.35E-02 G
                          338.40 1.074E+00  (P 3.461E-01 1.46E-01 G

TH-227       1.0357E-01
                          236.00 1.036E-01 &(  2.996E-01 9.02E-02 G K
                          256.25 2.441E-02 % P 5.059E-01 1.50E-01 G

PA-234      -1.2957E-01
                           98.44-1.296E-01 %(P 2.173E-01 6.61E-02 G K
                          946.00 1.295E-02 & P 2.138E-01 6.17E-02 G
                          131.28-3.658E-02 % P 2.159E-01 6.47E-02 G
                           94.67-2.702E-01 % P 4.788E-01 1.46E-01 G
                          883.24 9.043E-02 %   2.941E-01 8.72E-02 G
                          926.70 5.880E-02 %   3.580E-01 1.04E-01 G
                          569.26-8.998E-02 % P 3.886E-01 1.15E-01 G

TH-234       1.2379E+00
                           63.29-6.283E-01 &(P 7.046E+00 2.10E+00 G K
                           92.80 2.333E+00 *(P 2.364E+00 7.27E-01 G
                           92.38 2.791E+00 *(P 2.803E+00 8.62E-01 G

AM-241       3.2934E-02
                           59.54 3.293E-02 %(P 1.025E+00 3.04E-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	2.2951E-01	2.3562E-01	3.1814E-01	3.1843E-01	3.350E-01
K-40		1.6958E+01	1.6958E+01	1.4224E+00	1.7299E+00	
MN-54	#A	3.7865E-03	3.8036E-03	3.5994E-02	3.5995E-02	4.117E-02
CO-57	#B	1.0817E-02	1.0873E-02	5.1671E-02	5.1674E-02	5.707E-02
CO-60	#H	2.2019E-01	2.2035E-01	6.4767E-02	6.6019E-02	
Sr-85	#A	-1.3265E-02	-1.3554E-02	4.2597E-02	4.2604E-02	4.642E-02
Kr-85	#A	-3.0617E+02	-3.0617E+02	9.6223E+02	9.6239E+02	1.071E+03
Y-88	#B	-2.9875E-03	-3.0271E-03	2.8985E-02	2.8986E-02	3.278E-02
NB-94	#B	-3.8906E-03	-3.8906E-03	3.3884E-02	3.3885E-02	3.902E-02
Ag-108M	#B	-2.5751E-03	-2.5752E-03	7.2091E-02	7.2091E-02	8.122E-02
CD-109	#A	6.2987E-01	6.3182E-01	1.8928E+00	1.8932E+00	2.086E+00
SN-113	#B	2.7824E-04	2.8165E-04	4.7595E-02	4.7595E-02	5.351E-02
SB-125	#F	1.1961E-01	1.1978E-01	9.8264E-02	9.8509E-02	1.118E-01
I-131	#B	7.3505E-03	8.7499E-03	4.3644E-02	4.3647E-02	4.119E-02
CS-134	#B	2.7689E-03	2.7740E-03	6.6405E-02	6.6405E-02	7.443E-02
CS-137		1.2448E-01	1.2449E-01	7.4362E-02	7.4712E-02	
CE-139	#A	-1.6616E-02	-1.6786E-02	4.7823E-02	4.7833E-02	5.233E-02
EU-152	#B	3.0149E-02	3.0158E-02	1.5082E-01	1.5083E-01	1.675E-01
EU-154	#F	1.8681E-01	1.8690E-01	6.1033E-02	6.1907E-02	1.132E-01
EU-155	#B	1.3520E-02	1.3530E-02	1.9960E-01	1.9960E-01	2.228E-01
HG-203	#B	-4.9603E-03	-5.1117E-03	4.4610E-02	4.4611E-02	4.815E-02
TL-208		3.6679E-01	3.6679E-01	6.2974E-02	6.6477E-02	
PB-212		1.0287E+00	1.0287E+00	9.8026E-02	1.1479E-01	
PB-214		5.0216E-01	5.0216E-01	1.0378E-01	1.0779E-01	
BI-212	#	8.9398E-01	8.9398E-01	3.5191E-01	3.5572E-01	
BI-214		5.4609E-01	5.4609E-01	1.3189E-01	1.3565E-01	
RA-224	A	1.0643E+00	1.0643E+00	1.2909E+00	1.2924E+00	
RA-226	#	1.5469E+00	1.5469E+00	1.1577E+00	1.1612E+00	1.241E+00
AC-228		1.1271E+00	1.1271E+00	1.9912E-01	2.0960E-01	

TH-227 #B	1.0357E-01	1.0357E-01	2.7072E-01	2.7079E-01	2.996E-01

PA-234 #B	-1.2957E-01	-1.2957E-01	2.0332E-01	2.0344E-01	2.173E-01
TH-234 #B	1.2379E+00	1.2379E+00	1.1466E+00	1.1487E+00	7.046E+00
AM-241 #A	3.2934E-02	3.2934E-02	9.1282E-01	9.1283E-01	1.025E+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) 2.2832211E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.2832386E+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_1DEC2005_1633.An1

Sample description
FSS-NOL-06-03-018-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_1DEC2005_1633.An1

Acquisition information

Start time:	01-Dec-2005 16:33:19
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:	1.8550E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8550E+03) = 5.3908E+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	29-Nov-2005 15:30:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0724

***** 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	167.	18.47	0.99	9.052E-03	74.81	9.600	1.397E+00	PB212
77.20	191.	13.45	0.99	1.011E-02	77.11	17.500	1.011E+00	PB212
					77.11	10.700	1.654E+00	PB214
87.43	143.	22.08	1.00	1.456E-02				
87.43	143.	22.08	1.00	1.456E-02	88.04	3.790	1.869E+00	CD109
89.79	105.	28.76	1.00	1.544E-02				
93.69	106.	30.20	1.00	1.682E-02	92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
186.10	146.	24.15	1.19	2.566E-02	185.99	3.280	PBC<MDA	RA226
209.24	156.	24.71	1.13	2.472E-02				
238.89	1447.	3.12	1.09	2.319E-02	238.63	43.100	1.046E+00	PB212
242.00	181.	16.15	1.10	2.302E-02	241.00	3.900	1.464E+00	RA224
					241.92	7.470	7.660E-01	PB214
269.94	134.	26.21	0.98	2.153E-02				
277.15	74.	39.94	1.71	2.115E-02				
295.27	272.	11.02	0.96	2.025E-02	295.22	19.200	5.028E-01	PB214
300.08	123.	23.75	1.31	2.001E-02				
328.05	94.	23.50	1.12	1.874E-02				
338.47	310.	10.78	1.18	1.830E-02	338.40	12.010	1.022E+00	AC228
351.97	450.	6.55	0.99	1.775E-02	351.99	37.100	4.914E-01	PB214
409.33	46.	38.00	0.96	1.575E-02				
462.97	108.	20.03	1.09	1.426E-02				
462.97	108.	20.03	1.09	1.426E-02	463.51	10.000	5.439E-01	SB125
511.23	212.	14.11	1.93	1.316E-02	510.72	22.500	4.555E-01	TL208
562.08	51.	36.79	0.72	1.220E-02				
583.13	466.	5.92	1.31	1.184E-02	583.14	86.000	3.305E-01	TL208
609.41	361.	7.82	1.40	1.144E-02	609.32	46.090	4.897E-01	BI214

727.20	133.	18.83	1.24	9.964E-03	727.17	11.800	8.222E-01	BI212
795.02	91.	25.24	1.18	9.308E-03				
795.02	91.	25.24	1.18	9.308E-03	795.76	85.400	8.390E-02	CS134
860.51	84.	16.81	1.79	8.768E-03				
911.16	376.	7.50	1.55	8.401E-03	911.07	29.000	1.114E+00	AC228
965.13	70.	18.60	1.54	8.049E-03	964.00	14.580	4.293E-01	EU152
969.07	198.	8.38	1.54	8.025E-03	968.90	17.460	1.029E+00	AC228
1120.48	103.	19.45	1.16	7.211E-03	1120.28	15.040	6.764E-01	BI214
1362.95	29.	26.40	0.67	6.244E-03				
1460.89	1510.	2.62	1.86	5.932E-03	1460.75	10.700	1.711E+01	K40
1764.77	76.	12.11	1.45	5.141E-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	
178.75	89.97	400.	105.	0.052	86.28	1.002	PB-214	lD
417.64	209.24	556.	156.	0.078	74.14	1.127	AC-228	s
539.03	269.94	426.	134.	0.067	78.63	0.982	AC-228	s
599.30	300.08	307.	123.	0.062	71.26	1.312	PB-212	
655.25	328.05	197.	94.	0.047	70.50	1.121	AC-228	
817.79	409.33	126.	46.	0.023	113.99	0.963	AC-228	
1123.27	562.08	117.	51.	0.026	110.38	0.719	AS-76	s
1720.06	860.51	53.	84.	0.042	50.43	1.791	TL-208	s
1929.51	965.08	51.	68.	0.034	57.56	1.538	AC-228	D
2724.79	1362.95	11.	29.	0.015	79.21	0.674	-	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	409.	167.	0.083	55.40	0.993D
PB-212	153.39	77.11	386.	191.	0.095	40.35	0.995A
CD-109	174.15	87.49	1113.	131.	0.066	110.96	1.500s
PA-234	185.50	93.16	820.	134.	0.067	94.32	1.500
RA-226	371.65	186.24	813.	185.	0.092	64.37	1.500
PB-212	476.99	238.92	838.	1390.	0.695	12.90	0.989
RA-224	482.61	241.73	922.	147.	0.074	90.89	1.500
PB-214	589.69	295.27	290.	268.	0.134	33.05	0.955
AC-228	676.09	338.47	299.	308.	0.154	32.33	1.176
PB-214	703.14	352.00	299.	481.	0.240	22.30	1.001
SB-125	925.23	463.05	146.	103.	0.051	57.14	1.500s
TL-208	1021.57	511.23	222.	185.	0.093	42.32	1.927s
TL-208	1165.37	583.13	118.	462.	0.231	17.75	1.305
BI-214	1217.92	609.41	157.	354.	0.177	23.46	1.404
BI-212	1453.46	727.20	138.	133.	0.066	56.50	1.244
CS-134	1588.94	794.94	79.	72.	0.036	62.99	1.500
AC-228	1821.35	911.16	123.	373.	0.186	22.51	1.552
EU-152	1928.90	964.94	100.	49.	0.025	94.96	1.538
AC-228	1936.81	968.90	39.	198.	0.099	25.17	1.541D
BI-214	2239.93	1120.48	94.	101.	0.050	58.35	1.159

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2920.64	1460.89	31.	1491.	0.745	7.85	1.856
BI-214	3528.30	1764.77	6.	72.	0.036	36.32	1.446s

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		9.5482E-02					
			477.56	9.548E-02	&(	3.005E-01 8.97E-02	G
K-40		1.7111E+01					
			1460.75	1.711E+01	(P	3.295E-01 4.53E-01	G
MN-54		1.0057E-02					
			834.81	1.006E-02	%(P	3.797E-02 1.12E-02	G
CO-57		4.5631E-03					
			122.07	4.563E-03	&(P	5.536E-02 1.65E-02	G K
			136.43	-3.863E-02	&	4.253E-01 1.27E-01	G
CO-60		3.3263E-03					
			1332.51	3.326E-03	%(P	3.691E-02 1.03E-02	G K
			1173.23	2.391E-02	% P	4.680E-02 1.42E-02	G K
Sr-85		-1.2531E-02					
			514.00	-1.253E-02	%(	4.548E-02 1.36E-02	G
Kr-85		-2.8318E+02					
			513.99	-2.832E+02	%(	1.027E+03 3.07E+02	G
Y-88		2.9180E-03					
			1836.01	2.918E-03	%(P	2.384E-02 6.35E-03	G K
			898.02	3.987E-03	& P	3.847E-02 1.11E-02	G
NB-94		-4.0485E-04					
			871.10	-4.049E-04	&(	3.470E-02 9.86E-03	G K
			702.50	5.053E-03	&	3.401E-02 9.92E-03	G K
Ag-108M		-1.9333E-02					
			722.95	-1.933E-02	%(	4.995E-02 1.50E-02	G K
			614.37	-3.068E-03	& P	4.091E-02 1.19E-02	G
			433.93	3.780E-03	%	3.565E-02 1.05E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.7195E+00						
		88.04	1.719E+00	(	2.072E+00	6.36E-01	G
SN-113	-4.4167E-04						
		391.71	-4.417E-04	&(	4.708E-02	1.37E-02	G K
		255.04	3.399E-02	%	1.790E+00	5.31E-01	G
SB-125	1.3287E-01						
		427.95	-6.054E-05	%(P	1.172E-01	3.42E-02	G K
		600.77	4.637E-02	% P	1.447E-01	4.30E-02	G
		636.15	9.595E-02	% P	2.415E-01	7.23E-02	G
		463.51	5.263E-01	*(P	3.019E-01	1.01E-01	G
		176.29	-4.755E-03	%	6.099E-01	1.81E-01	G
I-131	6.5370E-03						
		364.48	6.537E-03	&(P	4.922E-02	1.46E-02	G K
		636.97	-2.397E-01	%	6.446E-01	1.94E-01	G
		284.29	-1.198E-01	% P	7.268E-01	2.17E-01	G
CS-134	2.9805E-02						
		604.66	-2.233E-03	%(	4.063E-02	1.19E-02	G K
		795.76	6.642E-02	(P	4.064E-02	1.40E-02	G
		569.29	-4.683E-03	% P	2.017E-01	5.76E-02	G
		801.84	-1.709E-02	% P	4.450E-01	1.27E-01	G
CS-137	1.7229E-02						
		661.62	1.723E-02	%(P	4.570E-02	1.37E-02	G
CE-139	5.5327E-03						
		165.85	5.533E-03	%(	5.041E-02	1.51E-02	G
EU-152	1.1011E-01						
		121.78	1.256E-02	&(P	1.616E-01	4.83E-02	G K
		344.30	-6.157E-03	% P	1.287E-01	3.79E-02	G
		1408.08	6.780E-02	%	1.278E-01	3.93E-02	G
		964.00	3.057E-01	&(P	3.059E-01	9.78E-02	G
		1112.07	9.099E-02	&	3.317E-01	9.81E-02	G
		778.90	1.895E-02	%	3.446E-01	1.00E-01	G
EU-154	3.8639E-03						
		123.10	3.864E-03	%(	1.194E-01	3.57E-02	G K
		1274.80	-1.538E-02	&	1.387E-01	4.01E-02	G
		723.30	-5.604E-02	%	2.246E-01	6.67E-02	G
		1004.80	4.172E-02	%	2.208E-01	6.44E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.7246E-02						
		86.45	1.725E-02	&(	2.241E-01	6.69E-02	G K
		105.31	9.310E-02	%	2.590E-01	7.82E-02	G
HG-203	-5.2122E-03						
		279.17	-5.212E-03	&(P	4.596E-02	1.37E-02	G K
		72.87	4.952E-03	% P	2.705E+00	8.09E-01	G
		70.83	-6.331E-02	%	5.113E+00	1.53E+00	G
		82.50	-7.082E-01	%	3.720E+00	1.12E+00	G
TL-208	3.3047E-01						
		583.14	3.305E-01	(P	3.813E-02	1.97E-02	G
		510.72	4.555E-01	+ P	1.772E-01	7.35E-02	G
PB-212	1.0122E+00						
		238.63	1.013E+00	(P	1.003E-01	4.39E-02	G K
							Energy duplication
		77.11	7.857E-01	} P	3.881E-01	1.06E-01	G
		74.81	1.397E+00	+ P	8.132E-01	2.63E-01	G
PB-214	5.2204E-01						
		351.99	5.320E-01	(P	9.213E-02	4.00E-02	G K
		295.22	5.028E-01	(P	1.537E-01	5.62E-02	G
							Energy duplication
		77.11	1.302E-01	} P	1.006E+00	2.35E-01	G
		241.92	3.081E-01	%	6.432E-01	1.95E-01	G
BI-212	8.2218E-01						
		727.17	8.222E-01	(P	3.563E-01	1.55E-01	G K
		1620.56	3.406E-01	& P	1.018E+00	2.98E-01	G
		785.42	7.855E-01	&	1.442E+00	4.42E-01	G
BI-214	4.8972E-01						
		609.32	4.897E-01	(P	8.431E-02	3.90E-02	G K
		1764.51	6.437E-01	+ P	1.229E-01	8.15E-02	G
		1120.28	6.764E-01	+ P	3.221E-01	1.34E-01	G
RA-224	1.1925E+00						
		241.00	1.192E+00	(	1.168E+00	3.61E-01	G
RA-226	1.5982E+00						
		185.99	1.598E+00	(P	1.173E+00	3.67E-01	G
AC-228	1.0698E+00						
		911.07	1.114E+00	(P	1.629E-01	8.44E-02	G K
		968.90	1.029E+00	(P	1.656E-01	8.64E-02	G
		338.40	1.022E+00	(P	2.759E-01	1.11E-01	G

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

TH-227      -1.7799E-02
                          236.00-1.780E-02 &(  5.544E-01 1.66E-01 G K
                          256.25-2.596E-02 % P 4.694E-01 1.39E-01 G

PA-234       1.6121E-01
                           98.44 3.378E-02 %(P 1.833E-01 5.48E-02 G K
                          946.00 4.485E-02 & P 1.710E-01 5.03E-02 G
                          131.28-4.084E-03 % P 2.278E-01 6.79E-02 G
                           94.67 3.676E-01 ?(P 3.746E-01 1.16E-01 G
                          883.24 2.973E-02 %   3.219E-01 9.30E-02 G
                          926.70-1.305E-03 %   3.204E-01 9.07E-02 G
                          569.26-7.004E-03 % P 2.987E-01 8.53E-02 G

TH-234       8.8438E-01
                           63.29 8.844E-01 %(P 7.097E+00 2.12E+00 G K
                           92.80 1.537E+00 & P 2.350E+00 7.14E-01 G
                           92.38-1.217E-01 & P 2.788E+00 8.27E-01 G

AM-241      -2.1577E-01
                           59.54-2.158E-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	9.2982E-02	9.5482E-02	2.6916E-01	2.6921E-01	2.926E-01
K-40		1.7111E+01	1.7111E+01	1.3601E+00	1.6843E+00	
MN-54	#A	1.0012E-02	1.0057E-02	3.3639E-02	3.3644E-02	3.780E-02
CO-57	#B	4.5393E-03	4.5631E-03	4.9646E-02	4.9647E-02	5.507E-02
CO-60	#B	3.3238E-03	3.3263E-03	3.0820E-02	3.0820E-02	3.688E-02
Sr-85	#A	-1.2260E-02	-1.2531E-02	4.0789E-02	4.0796E-02	4.449E-02
Kr-85	#A	-2.8318E+02	-2.8318E+02	9.2134E+02	9.2149E+02	1.027E+03
Y-88	#B	2.8795E-03	2.9180E-03	1.9049E-02	1.9050E-02	2.352E-02
NB-94	#B	-4.0485E-04	-4.0485E-04	2.9573E-02	2.9573E-02	3.470E-02
Ag-108M	#B	-1.9332E-02	-1.9333E-02	4.5074E-02	4.5088E-02	4.995E-02
CD-109	#A	1.7141E+00	1.7195E+00	1.9079E+00	1.9103E+00	2.065E+00
SN-113	#B	-4.3627E-04	-4.4167E-04	4.1159E-02	4.1159E-02	4.650E-02
SB-125	#F	1.3268E-01	1.3287E-01	7.6864E-02	7.7250E-02	1.171E-01
I-131	#B	5.4808E-03	6.5370E-03	4.3677E-02	4.3679E-02	4.127E-02
CS-134	#B	2.9749E-02	2.9805E-02	1.8797E-02	1.8877E-02	4.055E-02
CS-137	#A	1.7227E-02	1.7229E-02	4.1066E-02	4.1078E-02	4.569E-02
CE-139	#A	5.4759E-03	5.5327E-03	4.5221E-02	4.5222E-02	4.990E-02
EU-152	#B	1.1007E-01	1.1011E-01	1.0572E-01	1.0589E-01	1.616E-01
EU-154	#B	3.8621E-03	3.8639E-03	1.0697E-01	1.0697E-01	1.194E-01
EU-155	#B	1.7233E-02	1.7246E-02	2.0074E-01	2.0074E-01	2.239E-01
HG-203	#B	-5.0561E-03	-5.2122E-03	4.1281E-02	4.1282E-02	4.459E-02
TL-208		3.3047E-01	3.3047E-01	5.9215E-02	6.2246E-02	
PB-212		1.0122E+00	1.0122E+00	1.3169E-01	1.4420E-01	
PB-214		5.2204E-01	5.2204E-01	1.0553E-01	1.0980E-01	
BI-212		8.2218E-01	8.2218E-01	4.6625E-01	4.6869E-01	
BI-214		4.8972E-01	4.8972E-01	1.1696E-01	1.2037E-01	
RA-224	#	1.1925E+00	1.1925E+00	1.0839E+00	1.0861E+00	1.168E+00
RA-226	#	1.5982E+00	1.5982E+00	1.1009E+00	1.1048E+00	1.173E+00
AC-228		1.0698E+00	1.0698E+00	1.6738E-01	1.7853E-01	
TH-227	#B	-1.7799E-02	-1.7799E-02	4.9833E-01	4.9833E-01	5.544E-01
PA-234	#B	1.6121E-01	1.6121E-01	1.5244E-01	1.5270E-01	1.833E-01
TH-234	#B	8.8438E-01	8.8438E-01	6.3601E+00	6.3603E+00	7.097E+00
AM-241	#A	-2.1577E-01	-2.1577E-01	9.6415E-01	9.6423E-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 (1120.0 to 2000.7 keV) 2.1357649E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.1357649E+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_19NOV2005_0957.An1

Sample description
FSS NOL-06-03-015-F

Spectrum Filename: C:\GammaVision\Spectra\103F_19NOV2005_0957.An1

Acquisition information
Start time: 19-Nov-2005 09:57:35
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	17-Nov-2005 08:03:00
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: 0.6100

***** 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
74.48	135.	21.27	0.99	9.100E-03	74.81	9.600	1.014E+00	PB212
77.37	183.	17.31	0.99	1.043E-02	77.11	17.500	6.800E-01	PB212
					77.11	10.700	1.112E+00	PB214
129.09	125.	29.52	1.25	2.437E-02				
129.09	125.	29.52	1.25	2.437E-02	131.28	20.000	PBC<MDA	PA234
185.56	245.	19.20	1.24	2.568E-02	185.99	3.280	1.839E+00	RA226
209.38	117.	25.99	1.14	2.471E-02				
238.35	1365.	3.14	1.09	2.322E-02	238.63	43.100	9.032E-01	PB212
240.99	194.	18.03	1.09	2.308E-02	241.00	3.900	1.442E+00	RA224
					241.92	7.470	7.546E-01	PB214
269.94	175.	18.87	1.49	2.153E-02				
276.95	111.	31.17	0.86	2.116E-02				
294.72	232.	13.73	1.15	2.027E-02	295.22	19.200	3.922E-01	PB214
299.67	111.	26.07	1.18	2.003E-02				
327.48	101.	23.67	1.11	1.876E-02				
337.73	315.	13.02	0.82	1.833E-02	338.40	12.010	9.535E-01	AC228
351.36	477.	8.27	0.95	1.778E-02	351.99	37.100	4.782E-01	PB214
408.88	63.	40.81	1.52	1.576E-02				
462.27	111.	26.28	1.50	1.428E-02				
462.27	111.	26.28	1.50	1.428E-02	463.51	10.000	5.135E-01	SB125
509.90	217.	14.02	1.48	1.319E-02	510.72	22.500	4.292E-01	TL208
582.13	403.	7.20	1.34	1.186E-02	583.14	86.000	2.613E-01	TL208
608.23	292.	8.41	1.33	1.146E-02	609.32	46.090	3.621E-01	BI214
726.07	121.	18.13	1.31	9.976E-03	727.17	11.800	6.843E-01	BI212
754.11	38.	40.17	1.05	9.690E-03				
793.41	75.	22.47	1.51	9.322E-03				
834.14	33.	39.86	1.50	8.970E-03	834.81	99.978	PBC<MDA	MN54

859.46	96.	26.48	1.28	8.776E-03				
909.79	347.	6.99	1.73	8.410E-03	911.07	29.000	9.428E-01	AC228
962.88	58.	21.17	1.54	8.063E-03				
967.51	222.	7.87	1.54	8.034E-03	964.00	14.580	1.260E+00	EU152
					968.90	17.460	1.058E+00	AC228
1458.55	1530.	2.63	1.85	5.939E-03				
1458.55	1530.	2.63	1.85	5.939E-03	1460.75	10.700	1.590E+01	K40
1761.67	48.	15.08	2.03	5.142E-03	1764.51	15.920	3.941E-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	
417.93	209.38	404.	117.	0.058	77.98	1.139	AC-228	
539.03	269.94	366.	175.	0.087	56.60	1.493	AC-228	s
553.05	276.95	395.	119.	0.060	75.77	0.863	TL-208	s
598.48	299.67	304.	111.	0.056	78.21	1.179	TH-227	sM
654.10	327.48	215.	101.	0.051	71.01	1.105	AC-228	
816.90	408.88	219.	63.	0.031	122.44	1.522	CS-138	s
1507.29	754.11	78.	38.	0.019	120.51	1.054	PA-234	M
1585.88	793.41	75.	76.	0.038	58.93	1.509	PA-234	
1717.97	859.46	133.	96.	0.048	79.44	1.278	TL-208	
1924.77	962.87	45.	58.	0.029	63.51	1.537	TB-160	lD
2235.90	1118.46	74.	62.	0.031	76.59	1.916	BI-214	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	402.	149.	0.074	60.95	0.993D
PB-212	153.39	77.11	401.	149.	0.074	51.56	0.995A
RA-226	370.29	185.56	768.	232.	0.116	57.59	1.239s
PB-212	476.42	238.63	243.	1352.	0.676	9.40	1.093D
RA-224	481.16	241.00	557.	112.	0.056	95.54	1.094D
PB-214	483.00	241.92	367.	123.	0.062	53.40	1.095A
PB-214	588.60	294.72	332.	228.	0.114	41.20	1.155s
AC-228	674.59	337.73	415.	314.	0.157	39.05	0.819
PB-214	701.85	351.36	354.	472.	0.236	24.80	0.954
SB-125	923.95	462.41	164.	94.	0.047	64.33	1.500s
TL-208	1018.91	509.90	235.	191.	0.095	42.06	1.477s
TL-208	1163.35	582.13	150.	399.	0.199	21.59	1.336s
BI-214	1215.55	608.23	122.	286.	0.143	25.23	1.333
BI-212	1451.20	726.07	120.	121.	0.060	54.38	1.311s
MN-54	1668.67	834.81	70.	33.	0.016	119.57	1.500D
AC-228	1818.62	909.79	87.	344.	0.172	20.97	1.726
EU-152	1933.94	967.46	190.	111.	0.056	59.41	1.538
K-40	2915.99	1458.56	58.	1471.	0.736	7.97	1.845

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3522.10	1761.67	8.	48.	0.024	45.24	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	Peak COMMENTS
BE-7		-7.8144E-02					
			477.56	-7.814E-02	&(	3.405E-01 1.01E-01	G
K-40		1.5476E+01					
			1460.75	1.548E+01	(P	4.015E-01 4.17E-01	G
MN-54		2.4423E-02					
							Energy duplication
			834.81	2.442E-02	(P	3.127E-02 9.84E-03	G
CO-57		9.2849E-03					
			122.07	9.285E-03	%(P	5.210E-02 1.56E-02	G K
			136.43	1.696E-01	&	3.553E-01 1.08E-01	G
CO-60		9.1712E-03					
			1332.51	9.171E-03	&(P	3.381E-02 9.75E-03	G K
			1173.23	1.484E-02	& P	4.440E-02 1.32E-02	G K
Sr-85		-1.1331E-02					
			514.00	-1.133E-02	%(	3.993E-02 1.19E-02	G
Kr-85		-2.5578E+02					
			513.99	-2.558E+02	%(	9.015E+02 2.70E+02	G
Y-88		-2.9563E-03					
			1836.01	-2.956E-03	%(P	2.320E-02 6.22E-03	G K
			898.02	3.197E-03	& P	2.731E-02 7.74E-03	G
NB-94		8.1805E-04					
			871.10	8.181E-04	&(	3.491E-02 9.99E-03	G K
			702.50	-1.510E-03	&	3.033E-02 8.72E-03	G K
Ag-108M		-1.0863E-02					
			722.95	-1.086E-02	&(	4.729E-02 1.40E-02	G K
			614.37	8.311E-04	% P	3.655E-02 1.06E-02	G
			433.93	2.417E-03	%	3.195E-02 9.35E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.2778E-02						
		88.04	1.278E-02	&(	2.019E+00	6.03E-01	G
SN-113	-8.5353E-03						
		391.71	-8.535E-03	&(	4.942E-02	1.47E-02	G K
		255.04	1.127E-01	%	1.612E+00	4.79E-01	G
SB-125	1.1131E-01						
		427.95	-8.639E-04	%(P	1.043E-01	3.05E-02	G K
		600.77	4.198E-04	& P	1.527E-01	4.38E-02	G
		636.15	1.361E-02	& P	2.452E-01	7.04E-02	G
		463.51	4.433E-01	(P	2.929E-01	9.64E-02	G
		176.29	5.236E-02	&	5.905E-01	1.76E-01	G
I-131	9.2783E-03						
		364.48	9.278E-03	%(P	4.286E-02	1.27E-02	G K
		636.97	-9.828E-02	&	5.700E-01	1.68E-01	G
		284.29	1.133E-02	& P	5.671E-01	1.67E-01	G
CS-134	0.0000E+00						
		604.66	0.000E+00	%(	8.918E-02	2.66E-02	G K
		795.76	-9.699E-04	% P	4.410E-02	1.27E-02	G
		569.29	6.512E-02	& P	2.013E-01	5.99E-02	G
		801.84	-7.030E-02	% P	3.889E-01	1.12E-01	G
CS-137	-6.5125E-03						
		661.62	-6.512E-03	&(P	4.627E-02	1.35E-02	G
CE-139	-1.1111E-03						
		165.85	-1.111E-03	&(	3.715E-02	1.10E-02	G
EU-152	2.2835E-01						
		121.78	2.640E-02	%(P	1.520E-01	4.56E-02	G K
		344.30	2.156E-02	% P	8.439E-02	2.51E-02	G
		1408.08	-9.109E-03	%	1.541E-01	4.31E-02	G
		964.00	6.334E-01	(P	3.809E-01	1.26E-01	G
		1112.07	-3.507E-02	%	2.689E-01	7.76E-02	G
		778.90	1.575E-02	%	2.064E-01	5.89E-02	G
EU-154	1.6706E-03						
		123.10	1.671E-03	%(	9.759E-02	2.91E-02	G K
		1274.80	1.739E-02	&	1.146E-01	3.32E-02	G
		723.30	-9.524E-04	&	2.045E-01	5.93E-02	G
		1004.80	-4.244E-03	%	1.901E-01	5.39E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.4342E-01						
		86.45	1.434E-01	%(	2.368E-01	7.21E-02	G K
		105.31	1.051E-01	%	2.339E-01	7.09E-02	G
HG-203	-6.6131E-03						
		279.17	-6.613E-03	&(P	3.885E-02	1.16E-02	G K
		72.87	-6.784E-01	% P	2.258E+00	6.81E-01	G
		70.83	-9.158E-01	%	4.161E+00	1.25E+00	G
		82.50	-7.608E-01	&	3.894E+00	1.17E+00	G
TL-208	2.6132E-01						
		583.14	2.613E-01	@(P	3.922E-02	1.90E-02	G
		510.72	4.292E-01	+ P	1.672E-01	6.85E-02	G
PB-212	9.0306E-01						
		238.63	9.031E-01	(P	5.030E-02	2.85E-02	G K
							Energy duplication
		77.11	5.617E-01	} P	3.622E-01	9.65E-02	G
		74.81	1.141E+00	+ P	7.383E-01	2.37E-01	G
PB-214	4.7823E-01						
		351.99	4.782E-01	(P	9.166E-02	4.00E-02	G K
		295.22	3.922E-01	- P	1.504E-01	5.47E-02	G
							Energy duplication
		77.11	3.881E-01	} P	9.610E-01	2.08E-01	G
		241.92	4.782E-01	}	3.572E-01	8.51E-02	G
BI-212	6.8425E-01						
		727.17	6.843E-01	@(P	3.058E-01	1.24E-01	G K
		1620.56	-6.707E-02	& P	9.777E-01	2.65E-01	G
		785.42	5.495E-01	%	1.582E+00	4.72E-01	G
BI-214	3.7030E-01						
		609.32	3.621E-01	(P	6.863E-02	3.11E-02	G K
		1764.51	3.941E-01	?(P	1.278E-01	6.35E-02	G
		1120.28	-9.762E-02	& P	3.602E-01	1.06E-01	G
RA-224	8.3072E-01						
							Derived Ave Activity
		241.00	8.307E-01	}(	8.362E-01	2.75E-01	G
RA-226	1.8387E+00						
		185.99	1.839E+00	*(P	1.046E+00	3.73E-01	G
AC-228	9.4594E-01						
		911.07	9.428E-01	(P	1.265E-01	6.65E-02	G K
		968.90	2.014E-02	& P	2.458E-01	7.13E-02	G
		338.40	9.535E-01	(P	2.966E-01	1.24E-01	G

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

TH-227      -2.4358E-02
                          236.00-2.436E-02 %(  2.692E-01 8.00E-02 G K
                          256.25 5.968E-02 & P 4.859E-01 1.45E-01 G

PA-234       5.8899E-02
                           98.44 5.890E-02 %(P 2.205E-01 6.64E-02 G K
                          946.00 1.139E-02 & P 1.801E-01 5.17E-02 G
                          131.28-4.965E-02 % P 2.050E-01 6.16E-02 G
                           94.67-1.290E-01 % P 4.193E-01 1.26E-01 G
                          883.24-5.802E-02 %   2.627E-01 7.69E-02 G
                          926.70-5.741E-02 %   2.869E-01 8.36E-02 G
                          569.26 9.722E-02 & P 2.979E-01 8.87E-02 G

TH-234       1.6884E+00
                           63.29 1.688E+00 %(P 6.573E+00 1.97E+00 G K
                           92.80 1.260E+00 & P 2.092E+00 6.35E-01 G
                           92.38 1.466E+00 & P 2.541E+00 7.70E-01 G

AM-241      -2.6516E-01
                           59.54-2.652E-01 &(P 1.108E+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	-7.6063E-02	-7.8144E-02	3.0383E-01	3.0386E-01	3.315E-01
K-40		1.5476E+01	1.5476E+01	1.2497E+00	1.5392E+00	4.015E-01
MN-54	#A	2.4310E-02	2.4423E-02	2.9522E-02	2.9556E-02	3.113E-02
CO-57	#B	9.2355E-03	9.2849E-03	4.6906E-02	4.6909E-02	5.183E-02
CO-60	#B	9.1643E-03	9.1712E-03	2.9241E-02	2.9246E-02	3.379E-02
Sr-85	#A	-1.1082E-02	-1.1331E-02	3.5813E-02	3.5819E-02	3.905E-02
Kr-85	#A	-2.5578E+02	-2.5578E+02	8.0859E+02	8.0873E+02	9.015E+02
Y-88	#B	-2.9166E-03	-2.9563E-03	1.9782E-02	1.9783E-02	2.289E-02
NB-94	#B	8.1805E-04	8.1805E-04	2.9978E-02	2.9978E-02	3.491E-02
Ag-108M	#B	-1.0862E-02	-1.0863E-02	4.2103E-02	4.2107E-02	4.729E-02
CD-109	#A	1.2738E-02	1.2778E-02	1.8094E+00	1.8094E+00	2.013E+00
SN-113	#B	-8.4290E-03	-8.5353E-03	4.3971E-02	4.3974E-02	4.881E-02
SB-125	#F	1.1115E-01	1.1131E-01	7.2575E-02	7.2863E-02	1.042E-01
I-131	#B	7.7554E-03	9.2783E-03	3.8220E-02	3.8224E-02	3.583E-02
CS-134	#B	0.0000E+00	0.0000E+00	7.9724E-02	7.9724E-02	8.901E-02
CS-137	#A	-6.5116E-03	-6.5125E-03	5.5690E-02	5.5691E-02	4.626E-02
CE-139	#A	-1.0995E-03	-1.1111E-03	3.3070E-02	3.3070E-02	3.676E-02
EU-152	#F	2.2828E-01	2.2835E-01	1.3633E-01	1.3692E-01	1.520E-01
EU-154	#B	1.6698E-03	1.6706E-03	8.7182E-02	8.7182E-02	9.754E-02
EU-155	#B	1.4330E-01	1.4342E-01	2.1637E-01	2.1652E-01	2.366E-01
HG-203	#B	-6.4116E-03	-6.6131E-03	3.4888E-02	3.4890E-02	3.767E-02
TL-208	#	2.6132E-01	2.6132E-01	5.7023E-02	5.9007E-02	
PB-212		9.0306E-01	9.0306E-01	8.5605E-02	1.0038E-01	
PB-214		4.7823E-01	4.7823E-01	1.2004E-01	1.2321E-01	
BI-212	#	6.8425E-01	6.8425E-01	3.7360E-01	3.7570E-01	
BI-214		3.7030E-01	3.7030E-01	9.5526E-02	9.7915E-02	
RA-224	A	8.3072E-01	8.3072E-01	7.9367E-01	7.9513E-01	
RA-226	#	1.8387E+00	1.8387E+00	1.1181E+00	1.1232E+00	
AC-228		9.4594E-01	9.4594E-01	2.0033E-01	2.0772E-01	
TH-227	#B	-2.4358E-02	-2.4358E-02	2.3992E-01	2.3993E-01	2.692E-01
PA-234	#B	5.8899E-02	5.8899E-02	1.9905E-01	1.9908E-01	2.205E-01
TH-234	#B	1.6884E+00	1.6884E+00	5.9218E+00	5.9225E+00	6.573E+00
AM-241	#A	-2.6516E-01	-2.6516E-01	1.0110E+00	1.0111E+00	1.108E+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 (259.4 to 2000.7 keV) 2.1788788E+01 pCi/gm
Total Decayed Activity (259.4 to 2000.7 keV) 2.1788794E+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: 103F_19NOV2005_1036.An1

Sample description
FSS NOL-06-03-019-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_19NOV2005_1036.An1

Acquisition information
Start time: 19-Nov-2005 10:36:33
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: 1.8140E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8140E+03) =
5.5127E+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 11:30:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5856

***** 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	172.	18.04	0.99	9.100E-03	74.81	9.600	1.444E+00	PB212
77.25	258.	12.91	0.99	1.029E-02	77.11	17.500	1.072E+00	PB212
86.76	90.	36.75	1.00	1.410E-02				
86.76	90.	36.75	1.00	1.410E-02	86.45	32.740	1.448E-01	EU155
89.68	88.	37.87	1.00	1.522E-02				
93.43	129.	25.82	1.00	1.655E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.25	156.	26.55	1.32	2.566E-02	185.99	3.280	PBC<MDA	RA226
208.76	157.	26.04	1.16	2.474E-02				
238.39	1543.	3.04	1.09	2.321E-02	238.63	43.100	1.141E+00	PB212
241.35	168.	17.84	1.09	2.305E-02	241.00	3.900	1.392E+00	RA224
					241.92	7.470	7.282E-01	PB214
270.03	117.	26.91	1.34	2.152E-02				
276.89	82.	38.00	1.07	2.117E-02				
294.89	254.	11.31	1.06	2.026E-02	295.22	19.200	4.793E-01	PB214
300.06	106.	22.28	1.02	2.001E-02				
327.43	64.	36.74	0.90	1.877E-02				
337.73	319.	12.22	0.90	1.833E-02	338.40	12.010	1.077E+00	AC228
351.44	511.	5.98	0.99	1.777E-02	351.99	37.100	5.716E-01	PB214
462.42	109.	19.84	1.25	1.427E-02				
462.42	109.	19.84	1.25	1.427E-02	463.51	10.000	5.641E-01	SB125
477.04	57.	33.11	1.50	1.391E-02	477.56	10.300	PBC<MDA	BE7
509.99	179.	13.98	1.37	1.319E-02	510.72	22.500	3.839E-01	TL208
582.30	516.	6.85	1.18	1.186E-02	583.14	86.000	3.742E-01	TL208
608.49	429.	8.55	1.18	1.145E-02	609.32	46.090	5.972E-01	BI214
660.59	256.	12.45	1.36	1.074E-02	661.62	84.620	2.088E-01	CS137
726.14	102.	15.29	1.24	9.976E-03	727.17	11.800	6.425E-01	BI212

767.13	34.	34.38	1.01	9.564E-03				
793.52	69.	22.45	1.42	9.321E-03				
859.36	87.	22.30	1.68	8.777E-03				
909.86	342.	8.16	1.46	8.410E-03	911.07	29.000	1.035E+00	AC228
932.39	46.	32.00	0.89	8.258E-03				
962.91	43.	28.95	1.54	8.062E-03				
962.91	43.	28.95	1.54	8.062E-03	964.00	14.580	PBC<MDA	EU152
967.53	237.	7.92	1.54	8.034E-03	968.90	17.460	1.262E+00	AC228
1118.60	99.	20.81	1.42	7.220E-03	1120.28	15.040	6.676E-01	BI214
1171.39	278.	11.45	1.72	6.980E-03				
1171.39	278.	11.45	1.72	6.980E-03	1173.23	99.860	2.958E-01	CO60
1330.53	215.	7.99	1.91	6.356E-03				
1458.67	1344.	2.86	1.86	5.938E-03				
1458.67	1344.	2.86	1.86	5.938E-03	1460.75	10.700	1.556E+01	K40
1762.18	91.	10.98	2.18	5.147E-03	1764.51	15.920	8.020E-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	
172.69	86.43	498.	90.	0.045	110.25	1.001	BI-207	lD
178.54	89.35	505.	88.	0.044	113.62	1.002	PB-214	lD
416.69	208.76	633.	157.	0.079	78.13	1.156	LU-177	s
539.22	270.03	381.	117.	0.059	80.74	1.337	AC-228	s
599.26	300.06	226.	106.	0.053	66.85	1.025	PB-212	
654.00	327.43	232.	64.	0.032	110.23	0.896	AC-228	s
1533.32	767.13	54.	34.	0.017	103.13	1.006	J-134	sM
1586.11	793.52	63.	80.	0.040	53.53	1.422	PA-234	
1717.77	859.36	92.	87.	0.043	66.91	1.681	TL-208	s
1924.83	962.97	57.	43.	0.022	86.86	1.537	TB-160	lD
2659.96	1330.53	29.	215.	0.108	23.02	1.912	CO-60	sM
3523.11	1762.18	3.	91.	0.046	32.95	2.180	BI-214	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	456.	184.	0.092	53.13	0.993D
PB-212	153.39	77.11	447.	258.	0.129	30.07	0.995A
TH-234	185.71	93.27	1202.	140.	0.070	95.72	1.500s
RA-226	371.12	185.98	963.	166.	0.083	76.58	1.500s
PB-212	476.42	238.63	301.	1534.	0.767	8.94	1.093D
PB-214	483.00	241.92	390.	132.	0.066	54.09	1.095A
PB-214	588.93	294.89	277.	250.	0.125	33.94	1.056
AC-228	674.61	337.73	401.	318.	0.159	36.65	0.896
PB-214	702.02	351.44	198.	505.	0.253	17.94	0.991s
SB-125	923.86	462.37	164.	104.	0.052	58.84	1.500
BE-7	953.20	477.04	149.	57.	0.028	99.32	1.500s
TL-208	1019.10	509.99	193.	153.	0.076	41.95	1.369s
TL-208	1163.71	582.30	214.	512.	0.256	20.56	1.178
BI-214	1216.07	608.49	241.	423.	0.211	25.64	1.176
CS-137	1320.27	660.59	196.	254.	0.127	37.35	1.358
BI-212	1451.35	726.14	68.	101.	0.051	45.88	1.242
AC-228	1818.76	909.86	128.	339.	0.169	24.49	1.455

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1934.04	967.51	88.	232.	0.116	26.14	1.541
BI-214	2236.38	1118.70	67.	81.	0.040	52.84	1.634
CO-60	2341.78	1171.41	128.	209.	0.104	30.58	1.667
K-40	2916.20	1458.67	46.	1301.	0.651	8.42	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	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		3.0348E-01					
			477.56	3.035E-01	*(	3.178E-01 1.00E-01	G
K-40		1.5274E+01					
			1460.75	1.527E+01	(P	4.015E-01 4.35E-01	G
MN-54		1.0899E-02					
			834.81	1.090E-02	&(P	4.277E-02 1.26E-02	G
CO-57		8.1583E-03					
			122.07	8.158E-03	%(P	6.023E-02 1.81E-02	G K
			136.43	-5.997E-03	%	4.654E-01 1.39E-01	G
CO-60		1.0647E-01					
			1332.51	-1.068E-02	%(P	3.721E-02 1.04E-02	G K
			1173.23	2.238E-01	(P	5.925E-02 2.30E-02	G K
Sr-85		-2.1111E-02					
			514.00	-2.111E-02	%(	4.695E-02 1.42E-02	G
Kr-85		-4.7741E+02					
			513.99	-4.774E+02	%(	1.061E+03 3.21E+02	G
Y-88		2.4311E-03					
			1836.01	2.431E-03	&(P	1.987E-02 5.13E-03	G K
			898.02	1.079E-02	% P	3.724E-02 1.10E-02	G
NB-94		7.5736E-03					
			871.10	7.574E-03	&(	4.145E-02 1.21E-02	G K
			702.50	6.938E-05	&	3.296E-02 9.41E-03	G K
Ag-108M		2.4314E-03					
			722.95	2.431E-03	&(	5.577E-02 1.63E-02	G K
			614.37	2.497E-03	% P	3.537E-02 1.02E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	5.553E-03	%	4.245E-02	1.26E-02	G
CD-109	2.0406E-01						
		88.04	2.041E-01	%(	1.839E+00	5.50E-01	G
SN-113	-8.2452E-03						
		391.71	-8.245E-03	%(	5.827E-02	1.73E-02	G K
		255.04	-4.947E-01	%	1.898E+00	5.70E-01	G
SB-125	1.2673E-01						
		427.95	-1.530E-02	&(P	1.332E-01	3.94E-02	G K
		600.77	4.172E-02	% P	1.890E-01	5.58E-02	G
		636.15	2.930E-03	% P	3.633E-01	1.05E-01	G
		463.51	5.471E-01	(P	3.263E-01	1.09E-01	G
		176.29	-1.384E-01	%	6.777E-01	2.03E-01	G
I-131	7.5113E-03						
		364.48	7.511E-03	&(P	5.345E-02	1.58E-02	G K
		636.97	-4.774E-02	%	6.334E-01	1.85E-01	G
		284.29	-1.904E-03	% P	6.780E-01	2.00E-01	G
CS-134	8.4868E-03						
		604.66	8.487E-03	%(	1.163E-01	3.48E-02	G K
		795.76	-1.115E-02	% P	5.176E-02	1.53E-02	G
		569.29	-2.503E-03	% P	2.900E-01	8.45E-02	G
		801.84	-5.392E-03	& P	4.631E-01	1.32E-01	G
CS-137	2.0883E-01						
		661.62	2.088E-01	(P	5.576E-02	2.61E-02	G
CE-139	-6.8776E-04						
		165.85	-6.878E-04	%(	5.182E-02	1.54E-02	G
EU-152	2.3012E-02						
		121.78	2.301E-02	%(P	1.759E-01	5.27E-02	G K
		344.30	-3.211E-02	& P	1.321E-01	3.95E-02	G
		1408.08	3.714E-02	%	1.492E-01	4.31E-02	G
		964.00	1.035E-03	% P	4.073E-01	1.18E-01	G
		1112.07	-8.747E-03	&	4.089E-01	1.18E-01	G
		778.90	-4.399E-02	%	3.253E-01	9.51E-02	G
EU-154	2.7666E-02						
		123.10	2.767E-02	&(	1.250E-01	3.76E-02	G K
		1274.80	-2.982E-02	%	1.430E-01	4.19E-02	G
		723.30	-4.152E-02	%	2.396E-01	7.07E-02	G
		1004.80	5.685E-02	%	2.159E-01	6.36E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.8073E-01						
		86.45	1.807E-01	%(	2.710E-01	8.27E-02	G K
		105.31	8.729E-02	%	2.590E-01	7.81E-02	G
HG-203	5.6060E-04						
		279.17	5.606E-04	&(P	4.810E-02	1.42E-02	G K
		72.87	-3.347E-01	% P	2.464E+00	7.39E-01	G
		70.83	1.828E+00	&	4.162E+00	1.26E+00	G
		82.50	-5.847E-01	%	4.606E+00	1.38E+00	G
TL-208	3.7622E-01						
		583.14	3.742E-01	(P	5.187E-02	2.58E-02	G
		510.72	3.839E-01	@(P	1.696E-01	6.30E-02	G
PB-212	1.1321E+00						
		238.63	1.143E+00	(P	6.225E-02	3.43E-02	G K
							Energy duplication
		77.11	1.088E+00	} P	4.261E-01	1.09E-01	G
		74.81	1.574E+00	+ P	8.767E-01	2.83E-01	G
PB-214	5.7160E-01						
		351.99	5.716E-01	@(P	7.716E-02	3.45E-02	G K
		295.22	4.793E-01	- P	1.538E-01	5.51E-02	G
							Energy duplication
		77.11	2.067E-02	} P	7.885E-01	1.03E-01	G
		241.92	5.716E-01	}	4.102E-01	1.03E-01	G
BI-212	6.4246E-01						
		727.17	6.425E-01	(P	2.599E-01	9.86E-02	G K
		1620.56	-3.000E-01	& P	1.295E+00	3.72E-01	G
		785.42	7.956E-01	%	2.231E+00	6.69E-01	G
BI-214	5.8697E-01						
		609.32	5.972E-01	(P	1.061E-01	5.18E-02	G K
		1764.51	-2.535E-02	& P	2.229E-01	5.58E-02	G
		1120.28	5.558E-01	&(P	2.803E-01	1.00E-01	G
RA-224	7.6135E-01						
							Derived Ave Activity
		241.00	7.613E-01	}(	1.064E+00	3.44E-01	G
RA-226	1.4662E+00						
		185.99	1.466E+00	(P	1.304E+00	4.04E-01	G
AC-228	1.1024E+00						
		911.07	1.035E+00	(P	1.697E-01	8.53E-02	G K
		968.90	1.231E+00	&(P	2.468E-01	1.07E-01	G
		338.40	1.077E+00	(P	3.255E-01	1.32E-01	G

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

TH-227      -1.8720E-01
                          236.00-1.872E-01 %(  4.674E-01 1.41E-01 G K
                          256.25-1.584E-04 & P 5.261E-01 1.56E-01 G

PA-234       1.5988E-03
                           98.44 1.599E-03 %(P 2.449E-01 7.30E-02 G K
                          946.00-5.740E-02 & P 2.505E-01 7.40E-02 G
                          131.28 5.852E-02 & P 2.445E-01 7.35E-02 G
                           94.67 2.001E-02 % P 4.322E-01 1.29E-01 G
                          883.24-1.912E-03 %   2.970E-01 8.43E-02 G
                          926.70-8.108E-02 %   3.960E-01 1.16E-01 G
                          569.26-3.707E-03 % P 4.295E-01 1.25E-01 G

TH-234       1.4300E+00
                           63.29 9.057E-01 %(P 7.226E+00 2.16E+00 G K
                           92.80 2.112E+00 *(P 2.480E+00 7.59E-01 G
                           92.38 1.857E+00 % P 2.969E+00 9.02E-01 G

AM-241      -5.2567E-02
                           59.54-5.257E-02 &(P 1.231E+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	2.9585E-01	3.0348E-01	3.0143E-01	3.0194E-01	3.098E-01
K-40		1.5274E+01	1.5274E+01	1.3052E+00	1.5779E+00	4.015E-01
MN-54	#A	1.0852E-02	1.0899E-02	3.7945E-02	3.7951E-02	4.258E-02
CO-57	#B	8.1173E-03	8.1583E-03	5.4161E-02	5.4163E-02	5.992E-02
CO-60	F	1.0639E-01	1.0647E-01	3.2856E-02	3.3432E-02	3.718E-02
Sr-85	#A	-2.0672E-02	-2.1111E-02	4.2626E-02	4.2643E-02	4.597E-02
Kr-85	#A	-4.7741E+02	-4.7741E+02	9.6366E+02	9.6406E+02	1.061E+03
Y-88	#B	2.4003E-03	2.4311E-03	1.5405E-02	1.5405E-02	1.961E-02
NB-94	#B	7.5736E-03	7.5736E-03	3.6434E-02	3.6437E-02	4.145E-02
Ag-108M	#B	2.4313E-03	2.4314E-03	4.8927E-02	4.8927E-02	5.576E-02
CD-109	#A	2.0345E-01	2.0406E-01	1.6488E+00	1.6488E+00	1.834E+00
SN-113	#B	-8.1483E-03	-8.2452E-03	5.1790E-02	5.1792E-02	5.758E-02
SB-125	#B	1.2656E-01	1.2673E-01	7.5481E-02	7.5839E-02	1.331E-01
I-131	#B	6.3419E-03	7.5113E-03	4.7536E-02	4.7538E-02	4.513E-02
CS-134	#B	8.4715E-03	8.4868E-03	1.0447E-01	1.0447E-01	1.161E-01
CS-137		2.0880E-01	2.0883E-01	7.8425E-02	7.9357E-02	
CE-139	#A	-6.8098E-04	-6.8776E-04	4.6317E-02	4.6317E-02	5.131E-02
EU-152	#B	2.3005E-02	2.3012E-02	1.5810E-01	1.5811E-01	1.758E-01
EU-154	#B	2.7654E-02	2.7666E-02	1.1273E-01	1.1274E-01	1.249E-01
EU-155	#B	1.8059E-01	1.8073E-01	2.4805E-01	2.4826E-01	2.707E-01
HG-203	#B	5.4447E-04	5.6060E-04	4.2718E-02	4.2718E-02	4.672E-02
TL-208		3.7622E-01	3.7622E-01	7.8015E-02	8.1015E-02	
PB-212		1.1321E+00	1.1321E+00	1.0205E-01	1.2139E-01	
PB-214		5.7160E-01	5.7160E-01	1.0367E-01	1.0885E-01	
BI-212		6.4246E-01	6.4246E-01	2.9617E-01	2.9851E-01	
BI-214		5.8697E-01	5.8697E-01	1.5282E-01	1.5657E-01	
RA-224	A	7.6135E-01	7.6135E-01	9.9462E-01	9.9561E-01	
RA-226	#	1.4662E+00	1.4662E+00	1.2106E+00	1.2135E+00	1.304E+00
AC-228		1.1024E+00	1.1024E+00	1.8912E-01	1.9965E-01	
TH-227	#B	-1.8720E-01	-1.8720E-01	4.2417E-01	4.2431E-01	4.674E-01
PA-234	#B	1.5988E-03	1.5988E-03	2.1892E-01	2.1892E-01	2.449E-01
TH-234	#B	1.4300E+00	1.4300E+00	1.5415E+00	1.5435E+00	7.226E+00
AM-241	#A	-5.2566E-02	-5.2567E-02	1.1786E+00	1.1786E+00	1.231E+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) 2.0762739E+01 pCi/gm
Total Decayed Activity (269.9 to 2000.7 keV) 2.0762840E+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: 103F_19NOV2005_1115.An1

Sample description
FSS NOL-06-03-023-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_19NOV2005_1115.An1

Acquisition information
Start time: 19-Nov-2005 11:15:19
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: 1.9290E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9290E+03) =
5.1840E+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 10:12:00
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: 0.5984

***** 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	132.	21.88	0.99	9.100E-03	74.81	9.600	1.036E+00	PB212
77.12	266.	12.35	0.99	1.019E-02	77.11	17.500	1.041E+00	PB212
					77.11	10.700	1.703E+00	PB214
87.56	92.	33.19	1.00	1.466E-02	86.45	32.740	1.401E-01	EU155
89.80	74.	40.65	1.00	1.550E-02				
92.84	145.	21.76	1.00	1.658E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.85	163.	21.81	1.49	2.567E-02				
185.85	163.	21.81	1.49	2.567E-02	185.99	3.280	1.250E+00	RA226
209.05	167.	26.51	1.21	2.472E-02				
238.38	1426.	3.10	1.09	2.322E-02	238.63	43.100	9.906E-01	PB212
241.23	165.	16.80	1.09	2.306E-02	241.00	3.900	1.285E+00	RA224
					241.92	7.470	6.725E-01	PB214
269.58	142.	23.73	0.85	2.155E-02				
276.35	94.	34.65	1.16	2.119E-02				
294.67	326.	11.34	0.99	2.028E-02	295.22	19.200	5.809E-01	PB214
299.76	94.	23.79	1.01	2.003E-02				
327.53	106.	25.30	1.67	1.876E-02				
337.78	285.	12.12	1.02	1.833E-02	338.40	12.010	9.049E-01	AC228
351.44	452.	6.76	0.94	1.777E-02	351.99	37.100	4.744E-01	PB214
462.36	71.	24.60	1.15	1.428E-02				
462.36	71.	24.60	1.15	1.428E-02	463.51	10.000	PBC<MDA	SB125
510.05	175.	13.53	1.27	1.319E-02	510.72	22.500	3.511E-01	TL208
582.35	480.	7.63	1.13	1.186E-02	583.14	86.000	3.273E-01	TL208
608.33	347.	7.60	1.17	1.145E-02	609.32	46.090	4.522E-01	BI214
661.74	104.	20.97	1.47	1.072E-02	661.62	84.620	7.901E-02	CS137
726.45	134.	16.75	1.67	9.972E-03	727.17	11.800	7.972E-01	BI212

793.46	95.	24.39	2.02	9.322E-03				
859.65	56.	27.78	1.09	8.775E-03				
909.82	325.	8.61	1.51	8.410E-03	911.07	29.000	9.237E-01	AC228
963.07	63.	19.33	1.54	8.061E-03				
963.07	63.	19.33	1.54	8.061E-03	964.00	14.580	3.755E-01	EU152
967.58	202.	8.35	1.54	8.033E-03	968.90	17.460	1.011E+00	AC228
1119.02	84.	30.02	1.98	7.218E-03	1120.28	15.040	5.303E-01	BI214
1330.77	36.	25.25	1.77	6.349E-03	1332.51	99.980	3.999E-02	CO60
1458.65	1479.	2.68	1.89	5.938E-03				
1458.65	1479.	2.68	1.89	5.938E-03	1460.75	10.700	1.611E+01	K40
1762.22	81.	12.76	1.19	5.147E-03				
1762.22	81.	12.76	1.19	5.147E-03	1764.51	15.920	6.635E-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	
174.30	87.88	423.	92.	0.046	99.58	1.001	PB-214	lD
178.78	90.12	411.	74.	0.037	121.95	1.002	PB-214	lD
417.27	209.05	686.	167.	0.083	79.54	1.213	AC-228	s
481.62	241.18	302.	165.	0.083	50.39	1.095	RA-224	lD
538.31	269.58	394.	142.	0.071	71.20	0.846	AC-228	s
551.86	276.35	367.	109.	0.054	80.16	1.159	ND-147	
598.68	299.76	203.	94.	0.047	71.36	1.006	TH-227	
654.21	327.53	253.	106.	0.053	75.90	1.672	AC-228	s
923.85	462.36	116.	72.	0.036	72.61	1.151	CS-138	
1585.98	793.46	111.	106.	0.053	51.13	2.017	PA-234	s
1718.33	859.65	70.	56.	0.028	83.35	1.088	TL-208	
1925.16	963.16	44.	63.	0.032	57.98	1.537	TB-160	lD
1934.17	967.66	42.	202.	0.101	25.04	1.540	SB-124	lD
3523.07	1762.22	3.	71.	0.035	37.02	2.032	BI-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	148.79	74.81	416.	130.	0.065	69.90	0.993D
PB-212	153.39	77.11	410.	232.	0.116	36.34	0.995A
TH-234	185.02	92.92	1130.	132.	0.066	97.65	1.500s
TH-234	185.05	92.94	1120.	130.	0.065	98.26	1.500s
RA-226	371.06	185.95	873.	158.	0.079	76.52	1.500s
PB-212	475.93	238.39	789.	1615.	0.807	11.94	0.931
PB-214	588.49	294.67	377.	322.	0.161	34.02	0.993s
AC-228	674.71	337.78	325.	284.	0.142	36.35	1.017
PB-214	702.02	351.44	215.	446.	0.223	20.29	0.943
TL-208	1019.21	510.05	175.	149.	0.074	40.60	1.270s
TL-208	1163.80	582.35	231.	476.	0.238	22.89	1.129
BI-214	1215.76	608.33	131.	340.	0.170	22.80	1.166
CS-137	1322.57	661.74	129.	102.	0.051	62.91	1.473s
BI-212	1451.96	726.45	113.	134.	0.067	50.26	1.667s
AC-228	1818.66	909.82	138.	321.	0.161	25.84	1.508
BI-214	2237.01	1119.02	140.	82.	0.041	90.07	1.981s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2660.45	1330.77	31.	36.	0.018	75.75	1.765
K-40	2916.22	1458.68	67.	1420.	0.710	8.17	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	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		8.4956E-02					
			477.56	8.496E-02	%(	3.137E-01 9.34E-02	G
K-40		1.5667E+01					
			1460.75	1.567E+01	(P	4.505E-01 4.32E-01	G
MN-54		1.1747E-02					
			834.81	1.175E-02	%(P	3.418E-02 1.02E-02	G
CO-57		8.8635E-03					
			122.07	8.864E-03	&(P	5.507E-02 1.65E-02	G K
			136.43	-4.488E-02	&	4.023E-01 1.20E-01	G
CO-60		3.9986E-02					
			1332.51	3.999E-02	&(P	3.181E-02 1.08E-02	G K
			1173.23	-2.275E-03	& P	5.868E-02 1.69E-02	G K
Sr-85		-2.3712E-02					
			514.00	-2.371E-02	%(	4.528E-02 1.38E-02	G
Kr-85		-5.3590E+02					
			513.99	-5.359E+02	%(	1.023E+03 3.11E+02	G
Y-88		5.3599E-03					
			1836.01	5.360E-03	%(P	2.560E-02 7.14E-03	G K
			898.02	3.135E-03	% P	3.658E-02 1.05E-02	G
NB-94		9.0746E-03					
			871.10	9.075E-03	%(	3.480E-02 1.03E-02	G K
			702.50	5.808E-03	%	3.990E-02 1.17E-02	G K
Ag-108M		-1.8928E-02					
			722.95	-1.893E-02	%(	5.089E-02 1.53E-02	G K
			614.37	3.076E-03	& P	3.390E-02 9.83E-03	G
			433.93	6.628E-03	%	3.556E-02 1.05E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-3.3606E-01						
		88.04	-3.361E-01	%(	1.833E+00	5.50E-01	G
SN-113	2.2125E-02						
		391.71	2.213E-02	&(	4.704E-02	1.43E-02	G K
		255.04	-4.903E-02	%	1.645E+00	4.87E-01	G
SB-125	-2.0889E-02						
		427.95	-2.089E-02	%(P	1.093E-01	3.24E-02	G K
		600.77	-6.420E-03	% P	1.920E-01	5.58E-02	G
		636.15	-5.885E-02	% P	3.057E-01	8.97E-02	G
		463.51	-1.152E-02	% P	3.559E-01	1.04E-01	G
		176.29	-2.753E-02	%	4.623E-01	1.37E-01	G
I-131	-5.6576E-03						
		364.48	-5.658E-03	%(P	4.684E-02	1.38E-02	G K
		636.97	-4.186E-03	%	4.077E-01	1.15E-01	G
		284.29	1.725E-01	% P	6.796E-01	2.04E-01	G
CS-134	-3.3428E-02						
		604.66	-3.343E-02	%(	5.308E-02	1.63E-02	G K
		795.76	-1.178E-02	& P	5.233E-02	1.55E-02	G
		569.29	-2.706E-02	& P	2.388E-01	6.96E-02	G
		801.84	4.276E-02	& P	4.084E-01	1.18E-01	G
CS-137	7.9006E-02						
		661.62	7.901E-02	@(P	4.291E-02	1.68E-02	G
CE-139	-5.4458E-03						
		165.85	-5.446E-03	%(	4.704E-02	1.41E-02	G
EU-152	2.4401E-02						
		121.78	2.440E-02	%(P	1.608E-01	4.82E-02	G K
		344.30	-9.394E-04	& P	1.203E-01	3.53E-02	G
		1408.08	0.000E+00	&	1.332E-01	3.60E-02	G
		964.00	2.287E-01	& P	3.600E-01	1.11E-01	G
		1112.07	7.847E-02	%	2.692E-01	7.94E-02	G
		778.90	-6.049E-02	&	2.728E-01	8.03E-02	G
EU-154	-5.1498E-03						
		123.10	-5.150E-03	&(	9.562E-02	2.85E-02	G K
		1274.80	-3.049E-02	%	1.255E-01	3.69E-02	G
		723.30	-7.179E-02	%	2.297E-01	6.87E-02	G
		1004.80	3.188E-02	&	1.883E-01	5.45E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.0034E-01						
		86.45	1.003E-01	%(	2.395E-01	7.25E-02	G K
		105.31	6.546E-02	%	2.415E-01	7.27E-02	G
HG-203	-7.1094E-03						
		279.17	-7.109E-03	%(P	4.520E-02	1.35E-02	G K
		72.87	-1.105E+00	% P	2.453E+00	7.43E-01	G
		70.83	-8.448E-01	%	4.286E+00	1.29E+00	G
		82.50	-1.277E+00	&	3.966E+00	1.20E+00	G
TL-208	3.3221E-01						
		583.14	3.273E-01	(P	5.058E-02	2.52E-02	G
		510.72	3.511E-01	*(P	1.523E-01	5.60E-02	G
PB-212	1.0974E+00						
		238.63	1.131E+00	(P	9.363E-02	4.53E-02	G K
							Energy duplication
		77.11	9.193E-01	} P	3.841E-01	1.11E-01	G
		74.81	1.047E+00	(P	7.883E-01	2.50E-01	G
PB-214	4.7445E-01						
		351.99	4.744E-01	(P	7.555E-02	3.25E-02	G K
		295.22	5.809E-01	+ P	1.679E-01	6.66E-02	G
							Energy duplication
		77.11	1.069E-02	} P	8.936E-01	2.26E-01	G
		241.92	1.932E-02	%	6.444E-01	1.92E-01	G
BI-212	7.9719E-01						
		727.17	7.972E-01	(P	3.115E-01	1.34E-01	G K
		1620.56	1.466E-01	& P	1.105E+00	3.08E-01	G
		785.42	6.794E-02	&	1.555E+00	4.44E-01	G
BI-214	4.7141E-01						
		609.32	4.522E-01	(P	7.438E-02	3.50E-02	G K
		1764.51	-9.159E-02	% P	1.025E-01	2.54E-02	G
		1120.28	5.303E-01	(P	3.735E-01	1.63E-01	G
RA-224	7.6614E-01						
		241.00	7.661E-01	%(	1.143E+00	3.49E-01	G
RA-226	1.3111E+00						
		185.99	1.311E+00	*(P	1.169E+00	3.62E-01	G
AC-228	9.1816E-01						
		911.07	9.237E-01	(P	1.651E-01	8.03E-02	G K
		968.90	2.113E-02	& P	1.931E-01	5.54E-02	G
		338.40	9.049E-01	(P	2.764E-01	1.10E-01	G

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

TH-227      -1.6527E-01
                          236.00-1.653E-01 %(  4.300E-01 1.30E-01 G K
                          256.25 4.890E-02 % P 3.562E-01 1.05E-01 G

PA-234       8.3756E-02
                           98.44 8.376E-02 %(P 2.199E-01 6.64E-02 G K
                          946.00-5.243E-02 & P 2.104E-01 6.22E-02 G
                          131.28 3.649E-03 % P 2.140E-01 6.38E-02 G
                           94.67-1.073E-01 & P 4.394E-01 1.32E-01 G
                          883.24 4.114E-02 &   3.167E-01 9.21E-02 G
                          926.70 0.000E+00 %   3.246E-01 9.22E-02 G
                          569.26-3.631E-02 & P 3.531E-01 1.03E-01 G

TH-234       1.7849E+00
                           63.29 1.454E+00 %(P 6.688E+00 2.00E+00 G K
                           92.80 1.852E+00  (P 2.253E+00 6.89E-01 G
                           92.38 2.208E+00  (P 2.664E+00 8.15E-01 G

AM-241       1.5320E-01
                           59.54 1.532E-01 %(P 1.140E+00 3.41E-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

- -

***** 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	8.2731E-02	8.4956E-02	2.8011E-01	2.8015E-01	3.054E-01
K-40		1.5667E+01	1.5667E+01	1.2970E+00	1.5842E+00	4.505E-01
MN-54	#A	1.1694E-02	1.1747E-02	3.0536E-02	3.0544E-02	3.402E-02
CO-57	#B	8.8171E-03	8.8635E-03	4.9554E-02	4.9556E-02	5.478E-02
CO-60	#F	3.9957E-02	3.9986E-02	3.2506E-02	3.2588E-02	3.178E-02
Sr-85	#A	-2.3200E-02	-2.3712E-02	4.1316E-02	4.1339E-02	4.430E-02
Kr-85	#A	-5.3589E+02	-5.3590E+02	9.3328E+02	9.3379E+02	1.023E+03
Y-88	#B	5.2891E-03	5.3599E-03	2.1420E-02	2.1422E-02	2.526E-02
NB-94	#B	9.0746E-03	9.0746E-03	3.0784E-02	3.0789E-02	3.480E-02
Ag-108M	#B	-1.8928E-02	-1.8928E-02	4.5882E-02	4.5895E-02	5.089E-02
CD-109	#A	-3.3501E-01	-3.3606E-01	1.6492E+00	1.6493E+00	1.827E+00
SN-113	#B	2.1855E-02	2.2125E-02	4.2766E-02	4.2785E-02	4.647E-02
SB-125	#B	-2.0859E-02	-2.0889E-02	9.7746E-02	9.7754E-02	1.092E-01
I-131	#B	-4.7435E-03	-5.6576E-03	4.7898E-02	4.7899E-02	3.927E-02
CS-134	#B	-3.3365E-02	-3.3428E-02	4.8752E-02	4.8790E-02	5.298E-02
CS-137	#	7.8996E-02	7.9006E-02	5.0376E-02	5.0585E-02	
CE-139	#A	-5.3900E-03	-5.4458E-03	4.2191E-02	4.2192E-02	4.656E-02
EU-152	#B	2.4394E-02	2.4401E-02	1.4466E-01	1.4466E-01	1.608E-01
EU-154	#B	-5.1475E-03	-5.1498E-03	8.5443E-02	8.5443E-02	9.557E-02
EU-155	#B	1.0026E-01	1.0034E-01	2.1747E-01	2.1754E-01	2.393E-01
HG-203	#B	-6.8965E-03	-7.1094E-03	4.0635E-02	4.0637E-02	4.385E-02
TL-208		3.3221E-01	3.3221E-01	7.6721E-02	7.9108E-02	
PB-212		1.0974E+00	1.0974E+00	1.3201E-01	1.4658E-01	
PB-214		4.7445E-01	4.7445E-01	9.7471E-02	1.0129E-01	
BI-212	#	7.9719E-01	7.9719E-01	4.0214E-01	4.0479E-01	
BI-214		4.7141E-01	4.7141E-01	1.0952E-01	1.1289E-01	
RA-224	#A	7.6614E-01	7.6614E-01	1.0476E+00	1.0485E+00	1.143E+00
RA-226	#	1.3111E+00	1.3111E+00	1.0857E+00	1.0884E+00	1.169E+00
AC-228		9.1816E-01	9.1816E-01	2.0597E-01	2.1275E-01	
TH-227	#B	-1.6527E-01	-1.6527E-01	3.8999E-01	3.9011E-01	4.300E-01
PA-234	#B	8.3756E-02	8.3756E-02	1.9929E-01	1.9934E-01	2.199E-01
TH-234	#B	1.7849E+00	1.7849E+00	1.9756E+00	1.9781E+00	6.688E+00
AM-241	#A	1.5320E-01	1.5320E-01	1.0227E+00	1.0227E+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

YAEC Chemistry Lab Spectrum name: 103F_19NOV2005_1115.An1

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

Total Activity (1764.1 to 2000.7 keV) 1.9836935E+01 pCi/gm
Total Decayed Activity (1764.1 to 2000.7 keV) 1.9836945E+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: 103F_19NOV2005_1150.An1

Sample description
FSS NOL-06-03-016-F-I

Spectrum Filename: C:\GammaVision\Spectra\103F_19NOV2005_1150.An1

Acquisition information
Start time: 19-Nov-2005 11:50:58
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: 1.7770E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7770E+03) =
5.6275E+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 10:54:00
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: 0.4716

***** 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
74.50	121.	25.16	0.99	9.095E-03	74.81	9.600	1.028E+00	PB212
77.38	205.	15.61	0.99	1.042E-02	77.11	17.500	8.681E-01	PB212
					77.11	10.700	1.420E+00	PB214
87.01	82.	37.50	1.00	1.441E-02	86.45	32.740	1.352E-01	EU155
					88.04	3.790	1.121E+00	CD109
90.20	80.	40.35	1.00	1.561E-02				
93.13	136.	23.04	1.00	1.663E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.71	120.	34.59	1.07	2.444E-02				
129.71	120.	34.59	1.07	2.444E-02	131.28	20.000	PBC<MDA	PA234
185.76	253.	18.78	1.32	2.567E-02				
185.76	253.	18.78	1.32	2.567E-02	185.99	3.280	2.169E+00	RA226
209.42	135.	31.18	0.90	2.471E-02				
238.37	1385.	3.11	1.09	2.322E-02	238.63	43.100	1.044E+00	PB212
241.51	208.	14.30	1.09	2.305E-02	241.00	3.900	1.760E+00	RA224
					241.92	7.470	9.207E-01	PB214
269.97	181.	20.45	0.86	2.152E-02				
277.34	62.	38.14	0.67	2.114E-02				
294.62	246.	13.61	1.25	2.028E-02	295.22	19.200	4.741E-01	PB214
299.57	84.	28.31	1.02	2.004E-02				
337.90	303.	9.97	0.90	1.832E-02	338.40	12.010	1.043E+00	AC228
351.43	424.	7.81	1.15	1.777E-02	351.99	37.100	4.826E-01	PB214
408.37	72.	32.19	1.30	1.578E-02				
462.58	94.	25.02	1.41	1.427E-02				
462.58	94.	25.02	1.41	1.427E-02	463.51	10.000	4.956E-01	SB125
509.72	219.	12.48	1.45	1.319E-02	510.72	22.500	4.935E-01	TL208
582.32	479.	5.15	1.30	1.186E-02	583.14	86.000	3.543E-01	TL208

608.43	321.	8.34	1.32	1.145E-02	609.32	46.090	4.537E-01	BI214
726.31	108.	16.87	1.22	9.974E-03	727.17	11.800	6.966E-01	BI212
766.02	46.	41.50	1.20	9.575E-03				
793.73	55.	36.77	1.49	9.319E-03				
859.07	59.	26.40	1.26	8.779E-03				
909.88	352.	6.74	1.80	8.409E-03	911.07	29.000	1.088E+00	AC228
963.12	58.	20.02	1.54	8.061E-03				
963.12	58.	20.02	1.54	8.061E-03	964.00	14.580	3.734E-01	EU152
967.59	194.	8.33	1.54	8.034E-03	968.90	17.460	1.053E+00	AC228
1119.10	109.	21.45	2.04	7.212E-03	1120.28	15.040	7.650E-01	BI214
1458.64	1549.	2.57	1.73	5.938E-03				
1458.64	1549.	2.57	1.73	5.938E-03	1460.75	10.700	1.833E+01	K40
1618.92	24.	29.88	1.27	5.488E-03	1620.56	2.750	1.217E+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	
173.19	87.22	432.	82.	0.041	112.50	1.001	PB-214	lD
179.58	90.41	484.	80.	0.040	121.05	1.003	PB-214	lD
185.32	93.33	440.	119.	0.060	79.65	1.004	U-235	D
418.00	209.42	634.	135.	0.068	93.55	0.901	AC-228	s
539.09	269.97	427.	181.	0.091	61.34	0.857	AC-228	s
553.82	277.34	235.	61.	0.031	112.90	0.666	TL-208	s
598.30	299.57	230.	84.	0.042	84.93	1.024	TH-227	M
815.87	408.37	186.	72.	0.036	96.56	1.302	CS-138	s
1531.10	766.02	108.	46.	0.023	124.51	1.204	NB-95	M
1586.51	793.73	116.	57.	0.028	90.08	1.486	PA-234	
1717.17	859.07	67.	59.	0.030	79.19	1.256	TL-208	
1925.25	963.12	67.	36.	0.018	107.02	1.837	TB-160	M
3523.30	1762.27	3.	57.	0.029	42.70	1.418	BI-214	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	393.	141.	0.070	63.33	0.993D
PB-212	153.39	77.11	397.	172.	0.086	50.74	0.995A
TH-234	185.42	93.12	1109.	139.	0.069	92.76	1.500s
TH-234	185.42	93.12	1099.	136.	0.068	94.09	1.500s
PA-234	257.26	129.05	717.	94.	0.047	123.62	1.500s
RA-226	371.02	185.93	849.	168.	0.084	71.32	1.500s
PB-212	476.42	238.63	245.	1373.	0.686	9.32	1.093D
RA-224	481.16	241.00	628.	159.	0.079	72.46	1.094D
PB-214	483.00	241.92	384.	110.	0.055	65.85	1.095A
PB-214	588.38	294.62	342.	242.	0.121	40.82	1.252
AC-228	674.94	337.90	254.	302.	0.151	29.92	0.904
PB-214	702.00	351.43	245.	418.	0.209	23.42	1.147
SB-125	923.95	462.42	142.	83.	0.041	68.24	1.500s
TL-208	1018.56	509.72	192.	192.	0.096	37.44	1.449s
TL-208	1165.38	583.14	261.	271.	0.136	30.60	1.304D
BI-214	1215.96	608.43	138.	315.	0.157	25.03	1.323s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	1451.70	726.31	94.	108.	0.054	50.62	1.218
AC-228	1818.79	909.88	69.	349.	0.174	20.23	1.798s
AC-228	1934.07	967.53	59.	178.	0.089	28.93	1.541s
BI-214	2237.17	1119.10	116.	109.	0.055	64.36	2.036s
K-40	2916.22	1458.68	41.	1487.	0.744	7.84	1.845
BI-212	3236.66	1618.92	8.	24.	0.012	89.63	1.267s

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		1.6700E-02					
			477.56	1.670E-02	&(	3.668E-01 1.07E-01	G
K-40		1.7820E+01					
			1460.75	1.782E+01	(P	3.885E-01 4.72E-01	G
MN-54		1.9379E-02					
			834.81	1.938E-02	%(P	3.938E-02 1.20E-02	G
CO-57		6.4602E-04					
			122.07	6.460E-04	&(P	5.778E-02 1.72E-02	G K
			136.43	-1.037E-02	%	4.248E-01 1.27E-01	G
CO-60		-4.8212E-03					
			1332.51	-4.821E-03	&(P	4.345E-02 1.20E-02	G K
			1173.23	-4.137E-03	& P	4.825E-02 1.37E-02	G K
Sr-85		-2.3502E-02					
			514.00	-2.350E-02	%(	4.615E-02 1.40E-02	G
Kr-85		-5.3214E+02					
			513.99	-5.321E+02	%(	1.043E+03 3.17E+02	G
Y-88		-9.7967E-05					
			1836.01	-9.797E-05	%(P	1.147E-02 1.56E-03	G K
			898.02	9.513E-03	% P	3.588E-02 1.05E-02	G
NB-94		6.5460E-03					
			871.10	6.546E-03	%(	3.568E-02 1.04E-02	G K
			702.50	7.910E-04	&	4.031E-02 1.16E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-2.3696E-02						
		722.95	-2.370E-02	%(	5.872E-02	1.77E-02	G K
		614.37	-1.698E-02	& P	4.401E-02	1.32E-02	G
		433.93	-1.855E-03	%	4.002E-02	1.17E-02	G
CD-109	1.1896E+00						
		88.04	1.190E+00	%(	2.082E+00	6.33E-01	G
SN-113	-3.8631E-03						
		391.71	-3.863E-03	%(	5.717E-02	1.68E-02	G K
		255.04	2.944E-01	%	1.624E+00	4.84E-01	G
SB-125	1.3912E-01						
		427.95	3.647E-02	&(P	1.046E-01	3.14E-02	G K
		600.77	-7.558E-02	% P	2.089E-01	6.26E-02	G
		636.15	-3.555E-03	% P	3.831E-01	1.11E-01	G
		463.51	4.430E-01	@(P	3.117E-01	1.02E-01	G
		176.29	3.764E-02	&	6.315E-01	1.88E-01	G
I-131	1.3364E-04						
		364.48	1.336E-04	&(P	4.761E-02	1.39E-02	G K
		636.97	2.008E-02	%	5.386E-01	1.55E-01	G
		284.29	1.501E-01	% P	7.003E-01	2.09E-01	G
CS-134	3.6100E-03						
		604.66	3.610E-03	%(	1.036E-01	3.09E-02	G K
		795.76	-1.667E-03	& P	5.171E-02	1.50E-02	G
		569.29	-4.028E-02	& P	2.388E-01	6.97E-02	G
		801.84	1.194E-01	% P	4.217E-01	1.24E-01	G
CS-137	2.2157E-02						
		661.62	2.216E-02	&(P	4.138E-02	1.26E-02	G
CE-139	-7.4791E-03						
		165.85	-7.479E-03	&(	5.198E-02	1.56E-02	G
EU-152	1.3030E-03						
		121.78	1.303E-03	&(P	1.640E-01	4.88E-02	G K
		344.30	-1.236E-02	% P	1.267E-01	3.74E-02	G
		1408.08	2.433E-02	%	1.434E-01	4.05E-02	G
		964.00	1.398E-02	& P	3.718E-01	1.08E-01	G
		1112.07	-9.614E-02	&	3.672E-01	1.09E-01	G
		778.90	4.876E-02	&	2.819E-01	8.23E-02	G
EU-154	1.9538E-02						
		123.10	1.954E-02	%(	1.177E-01	3.53E-02	G K
		1274.80	0.000E+00	%	1.508E-01	4.31E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-8.557E-02 %   2.634E-01 7.89E-02 G
                         1004.80-1.307E-03 &   2.351E-01 6.68E-02 G

EU-155       1.4029E-01
                           86.45 1.403E-01 &(  2.640E-01 8.02E-02 G K
                          105.31 1.031E-01 %   2.473E-01 7.48E-02 G

HG-203       2.1517E-04
                          279.17 2.152E-04 &(P 4.592E-02 1.36E-02 G K
                           72.87-4.411E-01 & P 2.559E+00 7.68E-01 G
                           70.83-1.307E-01 %   4.037E+00 1.20E+00 G
                           82.50-8.708E-01 &   4.414E+00 1.33E+00 G

TL-208       2.0236E-01
                          583.14 2.024E-01  (P 5.822E-02 2.10E-02 G
                          510.72 4.935E-01 + P 1.725E-01 7.00E-02 G

PB-212       1.0265E+00
                          238.63 1.044E+00  (P 5.756E-02 3.27E-02 G K
                                                          Energy duplication
                           77.11 7.404E-01 } P 4.106E-01 1.25E-01 G
                           74.81 1.233E+00 + P 8.320E-01 2.66E-01 G

PB-214       4.8832E-01
                          351.99 4.826E-01  (P 8.735E-02 3.81E-02 G K
                          295.22 4.741E-01  (P 1.738E-01 6.55E-02 G
                                                          Energy duplication
                           77.11 3.758E-01 } P 1.018E+00 2.43E-01 G
                          241.92 4.883E-01 }   4.157E-01 1.07E-01 G

BI-212       6.9658E-01
                          727.17 6.966E-01  (P 3.102E-01 1.18E-01 G K
                         1620.56 1.217E+00 + P 7.943E-01 3.64E-01 G
                          785.42 6.997E-02 %   1.943E+00 5.59E-01 G

BI-214       4.5367E-01
                          609.32 4.537E-01 @(P 8.300E-02 3.86E-02 G K
                         1764.51-5.040E-02 % P 2.549E-01 6.70E-02 G
                         1120.28 7.650E-01 + P 3.707E-01 1.67E-01 G

RA-224       1.3414E+00
                                                          Derived Ave Activity
                          241.00 1.341E+00 }(  1.010E+00 3.37E-01 G

RA-226       1.5190E+00
                          185.99 1.519E+00 *(P 1.251E+00 3.89E-01 G

AC-228       1.0433E+00
                          911.07 1.088E+00 @(P 1.296E-01 7.40E-02 G K
                          968.90 9.687E-01 &(P 2.093E-01 9.35E-02 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          338.40 1.043E+00  (P 2.666E-01 1.04E-01 G

TH-227      -2.2302E-01
                          236.00-2.230E-01 %(  4.644E-01 1.41E-01 G K
                          256.25 1.264E-01 % P 4.782E-01 1.43E-01 G

PA-234       5.9701E-02
                           98.44-8.702E-03 %(P 2.473E-01 7.37E-02 G K
                          946.00 6.571E-03 % P 2.014E-01 5.76E-02 G
                          131.28 1.455E-01 &(P 1.969E-01 6.04E-02 G
                           94.67-1.478E-01 % P 4.706E-01 1.42E-01 G
                          883.24-1.840E-02 &   3.266E-01 9.38E-02 G
                          926.70 8.457E-02 %   3.217E-01 9.46E-02 G
                          569.26-5.967E-02 & P 3.536E-01 1.03E-01 G

TH-234       1.9718E+00
                           63.29 1.519E+00 %(P 7.056E+00 2.11E+00 G K
                           92.80 2.092E+00  (P 2.422E+00 7.41E-01 G
                           92.38 2.518E+00  (P 2.865E+00 8.78E-01 G

AM-241      -1.8513E-03
                           59.54-1.851E-03 &(P 1.302E+00 3.88E-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	1.6264E-02	1.6700E-02	3.2174E-01	3.2174E-01	3.572E-01
K-40		1.7820E+01	1.7820E+01	1.4151E+00	1.7529E+00	3.885E-01
MN-54	#A	1.9292E-02	1.9379E-02	3.5856E-02	3.5874E-02	3.921E-02
CO-57	#B	6.4264E-04	6.4602E-04	5.1683E-02	5.1683E-02	5.748E-02
CO-60	#B	-4.8176E-03	-4.8212E-03	1.7411E-01	1.7411E-01	4.342E-02
Sr-85	#A	-2.2995E-02	-2.3502E-02	4.2074E-02	4.2096E-02	4.516E-02
Kr-85	#A	-5.3213E+02	-5.3214E+02	9.5063E+02	9.5113E+02	1.043E+03
Y-88	#B	-9.6677E-05	-9.7967E-05	5.8780E-04	5.8783E-04	1.131E-02
NB-94	#B	6.5460E-03	6.5460E-03	3.1161E-02	3.1163E-02	3.568E-02
Ag-108M	#B	-2.3695E-02	-2.3696E-02	5.3107E-02	5.3125E-02	5.872E-02
CD-109	#A	1.1859E+00	1.1896E+00	1.9003E+00	1.9014E+00	2.075E+00
SN-113	#B	-3.8160E-03	-3.8631E-03	5.0486E-02	5.0487E-02	5.647E-02
SB-125	#F	1.3893E-01	1.3912E-01	9.6403E-02	9.6741E-02	1.045E-01
I-131	#B	1.1209E-04	1.3364E-04	4.1727E-02	4.1727E-02	3.993E-02
CS-134	#B	3.6033E-03	3.6100E-03	9.2800E-02	9.2800E-02	1.034E-01
CS-137	#A	2.2154E-02	2.2157E-02	3.7768E-02	3.7790E-02	4.138E-02
CE-139	#A	-7.4026E-03	-7.4791E-03	4.6677E-02	4.6679E-02	5.144E-02
EU-152	#B	1.3026E-03	1.3030E-03	1.4655E-01	1.4655E-01	1.639E-01
EU-154	#B	1.9529E-02	1.9538E-02	1.0584E-01	1.0585E-01	1.176E-01
EU-155	#B	1.4018E-01	1.4029E-01	2.4063E-01	2.4076E-01	2.638E-01
HG-203	#B	2.0874E-04	2.1517E-04	4.0689E-02	4.0689E-02	4.455E-02
TL-208		2.0236E-01	2.0236E-01	6.2895E-02	6.3983E-02	
PB-212		1.0265E+00	1.0265E+00	9.6527E-02	1.1344E-01	
PB-214		4.8832E-01	4.8832E-01	1.1593E-01	1.1934E-01	
BI-212		6.9658E-01	6.9658E-01	3.5423E-01	3.5653E-01	
BI-214	#	4.5367E-01	4.5367E-01	1.1587E-01	1.1882E-01	
RA-224		1.3414E+00	1.3414E+00	9.7195E-01	9.7506E-01	
RA-226	#	1.5190E+00	1.5190E+00	1.1668E+00	1.1701E+00	1.251E+00
AC-228		1.0433E+00	1.0433E+00	1.6151E-01	1.7249E-01	
TH-227	#B	-2.2302E-01	-2.2302E-01	4.2258E-01	4.2278E-01	4.644E-01
PA-234	#B	5.9701E-02	5.9701E-02	7.4295E-02	7.4368E-02	2.473E-01
TH-234	#B	1.9718E+00	1.9718E+00	2.0616E+00	2.0645E+00	7.056E+00
AM-241	#A	-1.8513E-03	-1.8513E-03	4.6219E-01	4.6219E-01	1.302E+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 (609.0 to 2000.7 keV) 2.3072115E+01 pCi/gm
Total Decayed Activity (609.0 to 2000.7 keV) 2.3072115E+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: 103F_19NOV2005_1301.An1

Sample description
FSS NOL-06-03-013-F

Spectrum Filename: C:\GammaVision\Spectra\103F_19NOV2005_1301.An1

Acquisition information
Start time: 19-Nov-2005 13:01:43
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: 1.8430E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8430E+03) =
5.4259E+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	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: 0.5217

***** 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
74.43	125.	25.21	0.99	9.051E-03	74.81	9.600	1.033E+00	PB212
77.30	227.	14.08	0.99	1.038E-02	77.11	17.500	9.295E-01	PB212
93.11	105.	38.36	1.50	1.645E-02				
93.11	105.	38.36	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.12	107.	37.79	1.50	1.631E-02				
93.12	107.	37.79	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.90	185.	20.54	1.39	2.567E-02	185.99	3.280	1.497E+00	RA226
209.39	138.	25.79	0.95	2.471E-02				
238.36	1152.	3.59	1.09	2.322E-02	238.63	43.100	8.362E-01	PB212
241.21	188.	14.91	1.09	2.307E-02	241.00	3.900	1.536E+00	RA224
					241.92	7.470	8.037E-01	PB214
269.91	117.	32.55	1.36	2.153E-02				
294.78	240.	10.70	1.13	2.027E-02	295.22	19.200	4.442E-01	PB214
299.55	73.	30.09	1.13	2.004E-02				
327.66	103.	29.60	1.14	1.876E-02				
337.84	299.	13.35	0.88	1.832E-02	338.40	12.010	9.945E-01	AC228
351.34	426.	8.48	1.16	1.778E-02	351.99	37.100	4.678E-01	PB214
462.30	99.	28.77	0.95	1.428E-02				
462.30	99.	28.77	0.95	1.428E-02	463.51	10.000	5.032E-01	SB125
510.10	195.	16.37	1.41	1.319E-02	510.72	22.500	4.172E-01	TL208
561.61	46.	37.70	0.86	1.221E-02				
582.30	390.	9.03	1.36	1.186E-02	583.14	86.000	2.773E-01	TL208
608.25	355.	8.08	1.41	1.146E-02	609.32	46.090	4.847E-01	BI214
660.72	400.	7.84	1.33	1.073E-02	661.62	84.620	3.225E-01	CS137
725.75	140.	19.47	1.28	9.980E-03	723.30	19.700	5.195E-01	EU154

					727.17	11.800	8.674E-01	BI212
767.22	59.	33.44	1.06	9.564E-03				
793.00	89.	20.42	1.87	9.326E-03				
859.15	64.	27.22	1.11	8.778E-03				
909.83	266.	10.10	1.42	8.410E-03	911.07	29.000	7.904E-01	AC228
931.95	42.	36.85	1.19	8.261E-03				
1118.92	76.	24.48	1.63	7.218E-03	1120.28	15.040	5.010E-01	BI214
1171.48	562.	5.79	1.65	6.979E-03				
1171.48	562.	5.79	1.65	6.979E-03	1173.23	99.860	5.907E-01	CO60
1330.53	464.	5.41	1.87	6.356E-03				
1330.53	464.	5.41	1.87	6.356E-03	1332.51	99.980	5.339E-01	CO60
1458.65	1348.	2.80	1.78	5.938E-03				
1458.65	1348.	2.80	1.78	5.938E-03	1460.75	10.700	1.536E+01	K40
1762.16	59.	15.07	1.21	5.147E-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
417.95	209.39	515.	138.	0.069	77.38	0.952	AC-228
538.96	269.91	491.	117.	0.058	97.66	1.359	AC-228 s
598.25	299.55	251.	75.	0.038	96.08	1.526	TH-227 sM
654.46	327.66	304.	103.	0.051	88.81	1.136	AC-228
1122.32	561.61	112.	46.	0.023	113.10	0.861	AS-76 s
1533.50	767.22	119.	59.	0.030	100.31	1.062	J-134 M
1585.05	793.00	75.	102.	0.051	46.51	1.866	RH-106M s
1717.33	859.15	93.	64.	0.032	81.67	1.106	TL-208 s
1862.92	931.95	67.	52.	0.026	78.81	1.185	BI-214
1933.71	967.35	180.	220.	0.110	41.36	1.474	SB-124 l
3523.07	1762.16	6.	59.	0.029	43.15	1.215	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	416.	147.	0.073	62.46	0.993D
PB-212	153.39	77.11	394.	202.	0.101	41.62	0.995A
RA-226	370.96	185.90	584.	172.	0.086	61.63	1.389s
PB-212	476.42	238.63	289.	1139.	0.570	10.76	1.093D
RA-224	481.16	241.00	597.	114.	0.057	97.06	1.094D
PB-214	483.00	241.92	395.	107.	0.053	68.19	1.095A
PB-214	588.70	294.78	288.	228.	0.114	37.18	1.077
AC-228	674.82	337.84	390.	297.	0.149	38.96	0.882
PB-214	701.82	351.34	319.	420.	0.210	25.43	1.157
SB-125	924.16	462.52	211.	78.	0.039	84.05	1.500
TL-208	1019.31	510.10	277.	169.	0.084	49.12	1.411s
TL-208	1163.70	582.30	247.	385.	0.193	27.10	1.358
CS-134	1212.48	606.69	511.	-116.	-0.058	87.15	1.500s
BI-214	1215.60	608.25	162.	349.	0.174	24.24	1.408
CS-137	1320.54	660.73	206.	407.	0.203	24.67	1.331
EU-154	1451.43	726.18	126.	79.	0.039	69.34	1.500s
BI-212	1451.49	726.21	115.	93.	0.047	57.35	1.500s
AC-228	1818.69	909.83	141.	263.	0.131	30.29	1.425

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2236.82	1118.92	92.	74.	0.037	73.43	1.632s
CO-60	2341.98	1171.51	82.	516.	0.258	15.08	1.667
CO-60	2660.08	1330.59	56.	436.	0.218	15.97	1.765
K-40	2916.21	1458.67	38.	1292.	0.646	8.41	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	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.0425E-01					
			477.56	1.042E-01	%(	3.217E-01 9.62E-02	G
K-40		1.4923E+01					
			1460.75	1.492E+01	(P	3.611E-01 4.24E-01	G
MN-54		1.2945E-02					
			834.81	1.294E-02	%(P	4.686E-02 1.39E-02	G
CO-57		7.9330E-04					
			122.07	7.933E-04	&(P	5.629E-02 1.68E-02	G K
			136.43	3.266E-02	%	4.159E-01 1.24E-01	G
CO-60		5.2426E-01					
			1332.51	5.042E-01	(P	4.353E-02 2.70E-02	G K
			1173.23	5.443E-01	(P	4.738E-02 2.75E-02	G K
Sr-85		-1.7736E-02					
			514.00	-1.774E-02	%(	4.651E-02 1.40E-02	G
Kr-85		-4.0101E+02					
			513.99	-4.010E+02	%(	1.050E+03 3.16E+02	G
Y-88		2.2975E-03					
			1836.01	2.298E-03	%(P	2.298E-02 6.02E-03	G K
			898.02	-1.703E-02	% P	5.500E-02 1.64E-02	G
NB-94		1.6281E-02					
			871.10	1.628E-02	%(	4.221E-02 1.27E-02	G K
			702.50	1.420E-04	%	4.027E-02 1.16E-02	G K
Ag-108M		7.5477E-03					
			722.95	7.548E-03	&(	4.656E-02 1.37E-02	G K
			614.37	-6.300E-03	& P	4.188E-02 1.23E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	-6.913E-03	%	4.190E-02	1.24E-02	G
CD-109	9.7742E-01						
		88.04	9.774E-01	&(	1.986E+00	6.03E-01	G
SN-113	-5.5899E-03						
		391.71	-5.590E-03	%(	5.366E-02	1.58E-02	G K
		255.04	3.489E-01	%	1.760E+00	5.26E-01	G
SB-125	9.2767E-02						
		427.95	-1.254E-02	&(P	1.286E-01	3.80E-02	G K
		600.77	-8.005E-02	% P	2.254E-01	6.76E-02	G
		636.15	-4.867E-02	& P	3.552E-01	1.04E-01	G
		463.51	4.045E-01	(P	3.629E-01	1.15E-01	G
		176.29	0.000E+00	%	6.241E-01	1.86E-01	G
I-131	1.0981E-02						
		364.48	1.098E-02	&(P	5.182E-02	1.54E-02	G K
		636.97	3.059E-01	%	5.856E-01	1.78E-01	G
		284.29	-1.610E-01	% P	7.090E-01	2.12E-01	G
CS-134	-7.5978E-02						
		604.66	-7.598E-02	?(	7.069E-02	2.21E-02	G K
		795.76	-1.990E-02	% P	5.903E-02	1.77E-02	G
		569.29	-6.357E-02	& P	2.250E-01	6.64E-02	G
		801.84	4.700E-02	& P	4.723E-01	1.37E-01	G
CS-137	3.2864E-01						
		661.62	3.286E-01	(P	5.630E-02	2.71E-02	G
CE-139	-1.5942E-02						
		165.85	-1.594E-02	%(	4.759E-02	1.44E-02	G
EU-152	-2.0945E-03						
		121.78	-2.095E-03	&(P	1.646E-01	4.91E-02	G K
		344.30	-1.988E-02	% P	1.335E-01	3.96E-02	G
		1408.08	5.368E-02	&	1.203E-01	3.63E-02	G
		964.00	1.162E-01	& P	3.963E-01	1.18E-01	G
		1112.07	2.622E-02	&	3.473E-01	1.00E-01	G
		778.90	3.080E-03	&	3.086E-01	8.88E-02	G
EU-154	7.7580E-02						
		123.10	-2.741E-02	%(	1.215E-01	3.65E-02	G K
		1274.80	-3.882E-03	%	1.206E-01	3.42E-02	G
		723.30	2.932E-01	?(	2.051E-01	6.78E-02	G
		1004.80	5.492E-02	&	2.156E-01	6.34E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	9.5953E-03						
		86.45	9.595E-03	%(	2.516E-01	7.51E-02	G K
		105.31	4.210E-02	%	2.486E-01	7.45E-02	G
HG-203	-1.7414E-03						
		279.17	-1.741E-03	&(P	4.345E-02	1.29E-02	G K
		72.87	-4.132E-01	% P	1.986E+00	5.96E-01	G
		70.83	-1.671E+00	&	4.860E+00	1.47E+00	G
		82.50	-4.115E-02	%	4.074E+00	1.21E+00	G
TL-208	2.7727E-01						
		583.14	2.773E-01	(P	5.465E-02	2.53E-02	G
		510.72	4.172E-01	+ P	1.987E-01	7.91E-02	G
PB-212	8.3529E-01						
		238.63	8.353E-01	(P	6.010E-02	3.03E-02	G K
							Energy duplication
		77.11	8.353E-01	} P	3.942E-01	1.16E-01	G
		74.81	1.240E+00	+ P	8.249E-01	2.64E-01	G
PB-214	4.5602E-01						
		351.99	4.678E-01	(P	9.565E-02	4.01E-02	G K
		295.22	4.303E-01	(P	1.542E-01	5.42E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.368E-01	0.00E+00	G
		241.92	4.560E-01	}	4.065E-01	1.04E-01	G
BI-212	5.8228E-01						
		727.17	5.823E-01	&(P	3.279E-01	1.12E-01	G K
		1620.56	-1.675E-01	% P	1.232E+00	3.45E-01	G
		785.42	0.000E+00	%	2.300E+00	6.66E-01	G
BI-214	4.8870E-01						
		609.32	4.847E-01	(P	8.638E-02	3.98E-02	G K
		1764.51	-2.931E-02	% P	2.091E-01	5.12E-02	G
		1120.28	5.010E-01	*(P	3.203E-01	1.26E-01	G
RA-224	9.2949E-01						
							Derived Ave Activity
		241.00	9.295E-01	}(	9.498E-01	3.14E-01	G
RA-226	1.4967E+00						
		185.99	1.497E+00	(P	1.005E+00	3.31E-01	G
AC-228	8.4948E-01						
		911.07	7.904E-01	(P	1.749E-01	8.08E-02	G K
		968.90	1.068E-02	& P	2.582E-01	7.44E-02	G
		338.40	9.921E-01	(P	3.159E-01	1.29E-01	G

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

TH-227      -8.4419E-02
                          236.00-8.442E-02 %(  3.732E-01 1.12E-01 G K
                          256.25-7.425E-02 % P 5.618E-01 1.68E-01 G

PA-234       1.0369E-01
                           98.44 1.037E-01 %(P 2.415E-01 7.31E-02 G K
                          946.00 4.805E-02 % P 2.601E-01 7.66E-02 G
                          131.28 6.579E-02 % P 2.059E-01 6.21E-02 G
                           94.67-2.756E-01 % P 4.684E-01 1.43E-01 G
                          883.24-3.513E-02 %   3.771E-01 1.10E-01 G
                          926.70-8.559E-02 %   4.131E-01 1.22E-01 G
                          569.26-9.842E-02 & P 3.349E-01 9.89E-02 G

TH-234       1.2419E+00
                           63.29 1.242E+00 %(P 7.027E+00 2.10E+00 G K
                           92.80 1.554E+00 % P 2.290E+00 6.97E-01 G
                           92.38 1.868E+00 % P 2.703E+00 8.23E-01 G

AM-241      -2.6107E-01
                           59.54-2.611E-01 %(P 1.138E+00 3.41E-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

- -

***** 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	1.0144E-01	1.0425E-01	2.8862E-01	2.8869E-01	3.131E-01
K-40		1.4923E+01	1.4923E+01	1.2725E+00	1.5394E+00	3.611E-01
MN-54	#A	1.2884E-02	1.2945E-02	4.1771E-02	4.1778E-02	4.664E-02
CO-57	#B	7.8902E-04	7.9330E-04	5.0364E-02	5.0364E-02	5.599E-02
CO-60		5.2387E-01	5.2426E-01	5.7868E-02	6.5385E-02	4.350E-02
Sr-85	#A	-1.7341E-02	-1.7736E-02	4.2031E-02	4.2044E-02	4.547E-02
Kr-85	#A	-4.0101E+02	-4.0101E+02	9.4881E+02	9.4910E+02	1.050E+03
Y-88	#B	2.2663E-03	2.2975E-03	1.8059E-02	1.8059E-02	2.266E-02
NB-94	#B	1.6281E-02	1.6281E-02	3.8006E-02	3.8018E-02	4.221E-02
Ag-108M	#B	7.5474E-03	7.5477E-03	4.1071E-02	4.1073E-02	4.656E-02
CD-109	#A	9.7428E-01	9.7742E-01	1.8082E+00	1.8090E+00	1.980E+00
SN-113	#B	-5.5194E-03	-5.5899E-03	4.7480E-02	4.7481E-02	5.298E-02
SB-125	#B	9.2633E-02	9.2767E-02	7.9237E-02	7.9420E-02	1.285E-01
I-131	#B	9.1583E-03	1.0981E-02	4.6284E-02	4.6288E-02	4.322E-02
CS-134	#A	-7.5831E-02	-7.5978E-02	6.6217E-02	6.6364E-02	7.056E-02
CS-137		3.2860E-01	3.2864E-01	8.1346E-02	8.3554E-02	
CE-139	#A	-1.5774E-02	-1.5942E-02	4.3050E-02	4.3060E-02	4.709E-02
EU-152	#B	-2.0939E-03	-2.0945E-03	4.2849E-01	4.2849E-01	1.646E-01
EU-154	#B	7.7543E-02	7.7580E-02	5.3797E-02	5.3969E-02	1.214E-01
EU-155	#B	9.5876E-03	9.5953E-03	2.2542E-01	2.2542E-01	2.514E-01
HG-203	#B	-1.6877E-03	-1.7414E-03	3.9322E-02	3.9322E-02	4.211E-02
TL-208		2.7727E-01	2.7727E-01	7.5988E-02	7.7674E-02	
PB-212		8.3529E-01	8.3529E-01	9.0852E-02	1.0298E-01	
PB-214		4.5602E-01	4.5602E-01	1.1752E-01	1.2047E-01	
BI-212	#	5.8228E-01	5.8228E-01	3.3571E-01	3.3740E-01	3.279E-01
BI-214		4.8870E-01	4.8870E-01	1.2068E-01	1.2397E-01	
RA-224	A	9.2949E-01	9.2949E-01	9.0220E-01	9.0382E-01	
RA-226		1.4967E+00	1.4967E+00	9.9203E-01	9.9583E-01	
AC-228		8.4948E-01	8.4948E-01	2.1111E-01	2.1680E-01	
TH-227	#B	-8.4419E-02	-8.4419E-02	3.3606E-01	3.3609E-01	3.732E-01
PA-234	#B	1.0369E-01	1.0369E-01	2.1932E-01	2.1940E-01	2.415E-01
TH-234	#B	1.2419E+00	1.2419E+00	6.3082E+00	6.3086E+00	7.027E+00
AM-241	#A	-2.6106E-01	-2.6107E-01	1.0385E+00	1.0386E+00	1.138E+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 (1764.1 to 2000.7 keV) 2.1690443E+01 pCi/gm
Total Decayed Activity (1764.1 to 2000.7 keV) 2.1690887E+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: 103F_30NOV2005_1459.An1

Sample description
FSS-NOL-06-03-009-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30NOV2005_1459.An1

Acquisition information
Start time: 30-Nov-2005 14:59:54
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: 2.0380E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0380E+03) =
4.9068E+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	29-Nov-2005 01:06:00
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: 0.1329

***** 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
74.92	136.	24.81	0.99	9.052E-03	74.81	9.600	1.038E+00	PB212
77.22	174.	16.05	0.99	1.011E-02	77.11	17.500	8.576E-01	PB212
					77.11	10.700	1.403E+00	PB214
93.35	152.	32.09	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.36	131.	36.42	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.00	182.	22.83	1.02	2.567E-02	185.99	3.280	1.328E+00	RA226
209.34	159.	29.54	0.84	2.471E-02				
238.94	1183.	3.90	1.09	2.319E-02	238.63	43.100	7.763E-01	PB212
241.89	141.	23.96	1.10	2.303E-02	241.00	3.900	1.038E+00	RA224
					241.92	7.470	5.431E-01	PB214
270.52	98.	30.34	1.43	2.150E-02				
277.60	136.	32.02	1.15	2.113E-02				
295.23	225.	18.77	0.94	2.025E-02	295.22	19.200	3.775E-01	PB214
300.22	88.	39.24	0.84	2.001E-02				
338.36	230.	13.75	1.13	1.830E-02	338.40	12.010	6.900E-01	AC228
351.97	492.	9.27	1.24	1.775E-02	351.99	37.100	4.896E-01	PB214
463.32	123.	27.12	1.63	1.425E-02				
463.32	123.	27.12	1.63	1.425E-02	463.51	10.000	5.672E-01	SB125
511.07	223.	15.95	1.37	1.317E-02	510.72	22.500	4.392E-01	TL208
583.28	419.	9.15	1.43	1.184E-02	583.14	86.000	2.697E-01	TL208
609.36	378.	11.53	1.18	1.144E-02	609.32	46.090	4.679E-01	BI214
661.66	457.	8.59	1.47	1.072E-02	661.62	84.620	3.333E-01	CS137
728.07	87.	33.01	1.56	9.955E-03	727.17	11.800	4.878E-01	BI212
796.21	111.	25.98	1.29	9.297E-03	795.76	85.400	9.255E-02	CS134
861.09	109.	26.48	1.13	8.763E-03				

911.49	299.	12.36	1.81	8.398E-03	911.07	29.000	8.046E-01	AC228
969.15	152.	12.53	1.54	8.022E-03	968.90	17.460	7.163E-01	AC228
1000.95	50.	40.45	1.42	7.835E-03				
1120.35	131.	24.33	1.48	7.211E-03	1120.28	15.040	7.880E-01	BI214
1173.36	1485.	3.18	1.70	6.971E-03	1173.23	99.860	1.413E+00	CO60
1332.66	1258.	3.18	1.76	6.349E-03	1332.51	99.980	1.312E+00	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.99	1388.	2.74	1.70	5.931E-03	1460.75	10.700	1.431E+01	K40
1621.33	28.	27.95	0.77	5.488E-03	1620.56	2.750	1.211E+00	BI212
1764.85	81.	11.36	1.56	5.141E-03	1764.51	15.920	6.329E-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	
417.84	209.34	848.	159.	0.079	88.62	0.839	AC-228	s
482.93	241.82	499.	141.	0.070	71.88	1.095	PB-214	lD
540.18	270.52	393.	98.	0.049	91.02	1.433	AC-228	s
554.35	277.60	658.	129.	0.065	88.05	1.152	NP-239	s
599.58	300.22	474.	88.	0.044	117.72	0.839	PB-212	
1591.48	796.21	243.	79.	0.039	90.87	1.288	PA-234	s
1721.22	861.09	224.	109.	0.054	79.43	1.130	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	530.	136.	0.068	74.44	0.993D
PB-212	153.39	77.11	533.	174.	0.087	48.14	0.995A
TH-234	185.87	93.35	1415.	152.	0.076	96.26	1.500
TH-234	185.89	93.36	1411.	131.	0.066	109.27	1.500
RA-226	371.16	186.00	744.	169.	0.084	68.50	1.019s
PB-212	477.01	238.93	1132.	1155.	0.577	16.65	0.911
PB-214	589.62	295.23	606.	221.	0.111	56.30	0.944
AC-228	675.87	338.36	350.	229.	0.114	41.24	1.128
PB-214	703.07	351.97	536.	486.	0.243	27.82	1.238
SB-125	925.01	462.94	297.	86.	0.043	89.93	1.500s
TL-208	1021.25	511.07	363.	196.	0.098	47.84	1.373s
TL-208	1165.66	583.28	322.	414.	0.207	27.44	1.429
BI-214	1217.82	609.36	398.	372.	0.186	34.60	1.176s
CS-137	1322.41	661.66	303.	456.	0.228	25.77	1.467s
BI-212	1452.98	726.95	171.	53.	0.027	117.90	1.506s
CS-134	1589.42	795.18	186.	54.	0.027	115.24	1.500s
AC-228	1822.01	911.49	308.	296.	0.148	37.09	1.805
AC-228	1935.49	968.24	286.	247.	0.124	44.27	0.986s
BI-214	2239.67	1120.35	228.	129.	0.064	73.00	1.478s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2345.68	1173.36	193.	1483.	0.741	9.54	1.697
CO-60	2664.23	1332.66	86.	1256.	0.628	9.54	1.763
K-40	2920.85	1460.99	34.	1370.	0.685	8.21	1.697
BI-212	3241.48	1621.33	8.	28.	0.014	83.86	0.772s
BI-214	3528.46	1764.85	5.	78.	0.039	34.09	1.557

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		3.4934E-03					
			477.56	3.493E-03	%(	3.857E-01 1.13E-01	G
K-40		1.4309E+01					
			1460.75	1.431E+01	(P	3.135E-01 3.97E-01	G
MN-54		1.8181E-04					
			834.81	1.818E-04	%(P	5.762E-02 1.69E-02	G
CO-57		1.4857E-02					
			122.07	1.486E-02	&(P	5.432E-02 1.64E-02	G K
			136.43	-1.032E-01	%	4.457E-01 1.34E-01	G
CO-60		1.3626E+00					
			1332.51	1.312E+00	(P	4.809E-02 4.18E-02	G K
			1173.23	1.413E+00	(P	6.433E-02 4.50E-02	G K
Sr-85		-1.6517E-02					
			514.00	-1.652E-02	%(	5.196E-02 1.56E-02	G
Kr-85		-3.7557E+02					
			513.99	-3.756E+02	%(	1.180E+03 3.55E+02	G
Y-88		-3.1348E-03					
			1836.01	-3.135E-03	%(P	2.322E-02 6.25E-03	G K
			898.02	-7.178E-03	% P	6.315E-02 1.86E-02	G
NB-94		-1.2983E-02					
			871.10	-1.298E-02	%(	5.281E-02 1.57E-02	G K
			702.50	-7.591E-03	&	4.747E-02 1.40E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.0392E-02						
		722.95	-1.039E-02	&(	5.649E-02	1.68E-02	G K
		614.37	-3.683E-02	& P	5.041E-02	1.55E-02	G
		433.93	-9.164E-03	%	4.606E-02	1.37E-02	G
CD-109	9.1653E-01						
		88.04	9.165E-01	%(	2.068E+00	6.27E-01	G
SN-113	-9.7328E-03						
		391.71	-9.733E-03	%(	6.142E-02	1.83E-02	G K
		255.04	9.010E-02	%	1.543E+00	4.58E-01	G
SB-125	9.7168E-02						
		427.95	-4.768E-03	%(P	1.460E-01	4.32E-02	G K
		600.77	-8.218E-04	& P	2.312E-01	6.76E-02	G
		636.15	-1.482E-02	% P	3.553E-01	1.04E-01	G
		463.51	3.989E-01	*(P	3.868E-01	1.21E-01	G
		176.29	-1.307E-01	%	6.823E-01	2.05E-01	G
I-131	1.5399E-02						
		364.48	1.540E-02	&(P	5.044E-02	1.51E-02	G K
		636.97	-5.721E-04	&	7.078E-01	2.07E-01	G
		284.29	-1.853E-01	% P	7.081E-01	2.12E-01	G
CS-134	2.1866E-02						
		604.66	1.816E-03	%(	4.832E-02	1.42E-02	G K
		795.76	4.478E-02	*(P	5.535E-02	1.72E-02	G
		569.29	2.159E-02	& P	2.840E-01	8.36E-02	G
		801.84	-2.241E-01	% P	5.919E-01	1.77E-01	G
CS-137	3.3329E-01						
		661.62	3.333E-01	@(P	6.127E-02	2.87E-02	G
CE-139	-5.1931E-03						
		165.85	-5.193E-03	&(	5.595E-02	1.68E-02	G
EU-152	-3.5937E-02						
		121.78	-3.594E-02	&(P	1.577E-01	4.74E-02	G K
		344.30	8.454E-03	& P	1.430E-01	4.24E-02	G
		1408.08	-1.121E-05	&	1.656E-01	4.60E-02	G
		964.00	2.140E-01	% P	4.404E-01	1.34E-01	G
		1112.07	-7.785E-03	&	4.442E-01	1.29E-01	G
		778.90	3.430E-02	%	3.437E-01	1.01E-01	G
EU-154	2.4825E-02						
		123.10	2.482E-02	%(	1.256E-01	3.78E-02	G K
		1274.80	5.755E-02	%	1.076E-01	3.29E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-8.605E-02 &   2.858E-01 8.57E-02 G
                         1004.80-3.657E-02 &   3.470E-01 1.02E-01 G

EU-155       9.6907E-02
                           86.45 9.691E-02 %(  2.653E-01 8.02E-02 G K
                          105.31 8.353E-02 %   2.677E-01 8.08E-02 G

HG-203       2.5348E-03
                          279.17 2.535E-03 &(P 4.935E-02 1.47E-02 G K
                           72.87-7.585E-01 % P 2.409E+00 7.27E-01 G
                           70.83-1.091E+00 %   4.811E+00 1.45E+00 G
                           82.50-1.266E-01 %   4.085E+00 1.22E+00 G

TL-208       2.6968E-01
                          583.14 2.697E-01  (P 5.617E-02 2.49E-02 G
                          510.72 4.392E-01 + P 2.046E-01 7.96E-02 G

PB-212       7.9231E-01
                          238.63 7.658E-01  (P 1.058E-01 4.30E-02 G K
                                                          Energy duplication
                           77.11 6.505E-01 } P 4.132E-01 1.04E-01 G
                           74.81 1.038E+00 + P 8.392E-01 2.64E-01 G

PB-214       4.8964E-01
                          351.99 4.896E-01  (P 1.113E-01 4.59E-02 G K
                          295.22 3.775E-01 - P 2.002E-01 7.22E-02 G
                                                          Energy duplication
                           77.11 2.229E-01 } P 1.020E+00 2.31E-01 G
                          241.92 1.839E-01 %   6.729E-01 2.03E-01 G

BI-212       4.7217E-01
                          727.17 3.000E-01 @(P 3.587E-01 1.19E-01 G K
                         1620.56 1.211E+00 *(P 7.141E-01 3.39E-01 G
                          785.42 1.541E+00 %   2.327E+00 7.16E-01 G

BI-214       4.6788E-01
                          609.32 4.679E-01 @(P 1.203E-01 5.49E-02 G K
                         1764.51 6.329E-01 + P 1.053E-01 7.49E-02 G
                         1120.28 7.880E-01 + P 4.468E-01 1.95E-01 G

RA-224       4.9631E-01
                          241.00 4.963E-01 %(  1.248E+00 3.77E-01 G

RA-226       1.3275E+00
                          185.99 1.328E+00  (P 1.023E+00 3.26E-01 G

AC-228       7.7102E-01
                          911.07 8.046E-01  (P 2.301E-01 1.01E-01 G K
                          968.90 1.170E+00 + P 3.856E-01 1.73E-01 G
                          338.40 6.900E-01  (P 2.713E-01 9.53E-02 G
```

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -7.2448E-02
                          236.00-7.245E-02 %(  4.546E-01 1.37E-01 G K
                          256.25 9.664E-02 % P 5.923E-01 1.77E-01 G

PA-234       9.3407E-03
                           98.44 9.341E-03 %(P 2.614E-01 7.82E-02 G K
                          946.00 6.132E-03 & P 2.946E-01 8.62E-02 G
                          131.28-4.790E-02 & P 2.431E-01 7.31E-02 G
                           94.67-1.662E-01 % P 4.667E-01 1.41E-01 G
                          883.24-1.906E-05 %   4.356E-01 1.27E-01 G
                          926.70 1.622E-01 %   4.738E-01 1.42E-01 G
                          569.26 3.187E-02 & P 4.207E-01 1.24E-01 G

TH-234       1.1265E+00
                           63.29-2.052E-01 %(P 6.604E+00 1.96E+00 G K
                           92.80 1.762E+00  (P 2.389E+00 7.28E-01 G
                           92.38 2.406E+00 &(P 2.817E+00 8.62E-01 G

AM-241       2.4524E-01
                           59.54 2.452E-01 %(P 1.285E+00 3.86E-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	3.4225E-03	3.4934E-03	3.3971E-01	3.3971E-01	3.779E-01
K-40		1.4309E+01	1.4309E+01	1.1912E+00	1.4522E+00	
MN-54	#A	1.8117E-04	1.8181E-04	5.0624E-02	5.0624E-02	5.742E-02
CO-57	#B	1.4797E-02	1.4857E-02	4.9087E-02	4.9094E-02	5.410E-02
CO-60		1.3618E+00	1.3626E+00	9.2104E-02	1.2141E-01	
Sr-85	#A	-1.6241E-02	-1.6517E-02	4.6856E-02	4.6866E-02	5.109E-02
Kr-85	#A	-3.7557E+02	-3.7557E+02	1.0637E+03	1.0639E+03	1.180E+03
Y-88	#B	-3.1028E-03	-3.1348E-03	1.9811E-02	1.9812E-02	2.298E-02
NB-94	#B	-1.2983E-02	-1.2983E-02	4.7153E-02	4.7159E-02	5.281E-02
Ag-108M	#B	-1.0392E-02	-1.0392E-02	5.0306E-02	5.0310E-02	5.648E-02
CD-109	#A	9.1432E-01	9.1653E-01	1.8798E+00	1.8805E+00	2.063E+00
SN-113	#B	-9.6407E-03	-9.7328E-03	5.4855E-02	5.4857E-02	6.084E-02
SB-125	#B	9.7063E-02	9.7168E-02	8.8688E-02	8.8867E-02	1.459E-01
I-131	#B	1.3439E-02	1.5399E-02	4.5397E-02	4.5405E-02	4.402E-02
CS-134	#B	2.1834E-02	2.1866E-02	2.5240E-02	2.5272E-02	4.825E-02
CS-137	#	3.3326E-01	3.3329E-01	8.6134E-02	8.8281E-02	
CE-139	#A	-5.1520E-03	-5.1931E-03	5.0301E-02	5.0302E-02	5.551E-02
EU-152	#B	-3.5929E-02	-3.5937E-02	1.4968E-01	1.4969E-01	1.576E-01
EU-154	#B	2.4816E-02	2.4825E-02	1.1332E-01	1.1333E-01	1.256E-01
EU-155	#B	9.6848E-02	9.6907E-02	2.4061E-01	2.4067E-01	2.651E-01
HG-203	#B	2.4759E-03	2.5348E-03	4.4053E-02	4.4053E-02	4.820E-02
TL-208		2.6968E-01	2.6968E-01	7.4771E-02	7.6392E-02	
PB-212		7.9231E-01	7.9231E-01	1.3327E-01	1.4098E-01	
PB-214		4.8964E-01	4.8964E-01	1.3781E-01	1.4071E-01	
BI-212	#	4.7217E-01	4.7217E-01	3.4386E-01	3.4496E-01	
BI-214		4.6788E-01	4.6788E-01	1.6469E-01	1.6692E-01	
RA-224	#A	4.9631E-01	4.9631E-01	1.1324E+00	1.1328E+00	1.248E+00
RA-226	#	1.3275E+00	1.3275E+00	9.7930E-01	9.8232E-01	
AC-228		7.7102E-01	7.7102E-01	2.1549E-01	2.2009E-01	
TH-227	#B	-7.2448E-02	-7.2448E-02	4.0967E-01	4.0969E-01	4.546E-01
PA-234	#B	9.3407E-03	9.3407E-03	2.3463E-01	2.3463E-01	2.614E-01
TH-234	#B	1.1265E+00	1.1265E+00	1.2102E+00	1.2118E+00	6.604E+00
AM-241	#A	2.4524E-01	2.4524E-01	1.1579E+00	1.1580E+00	1.285E+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) 2.0593927E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 2.0594736E+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_30NOV2005_1539.An1

Sample description
FSS-NOL-06-03-002-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30NOV2005_1539.An1

Acquisition information
Start time: 30-Nov-2005 15:39:28
Live time: 2000
Real time: 2003
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: 1.6130E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6130E+03) =
6.1996E+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	29-Nov-2005 00:48:00
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: 0.1871

***** 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	64.	41.62	0.99	9.052E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.37	97.	31.23	0.90	1.023E-02	77.11	17.500	4.459E-01	PB212
					77.11	10.700	PBC<MDA	PB214
92.27	119.	33.20	0.81	1.627E-02				
92.27	119.	33.20	0.81	1.627E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.58	159.	24.22	1.42	2.565E-02	185.99	3.280	1.451E+00	RA226
209.38	101.	32.50	1.43	2.471E-02				
238.99	858.	4.24	1.09	2.318E-02	238.63	43.100	7.085E-01	PB212
241.88	162.	16.76	1.10	2.302E-02	241.00	3.900	1.506E+00	RA224
					241.92	7.470	7.877E-01	PB214
269.71	94.	32.51	2.08	2.154E-02				
295.40	206.	11.32	1.13	2.024E-02	295.22	19.200	4.360E-01	PB214
300.11	70.	29.01	1.13	2.001E-02				
338.44	155.	17.64	1.12	1.830E-02	338.40	12.010	5.866E-01	AC228
352.07	369.	9.37	1.06	1.775E-02	351.99	37.100	4.622E-01	PB214
462.25	103.	22.55	0.99	1.428E-02				
462.25	103.	22.55	0.99	1.428E-02	463.51	10.000	5.965E-01	SB125
510.80	135.	16.40	1.43	1.317E-02	510.72	22.500	3.073E-01	TL208
583.37	314.	8.85	1.22	1.184E-02	583.14	86.000	2.547E-01	TL208
609.30	283.	8.91	1.36	1.144E-02	609.32	46.090	4.396E-01	BI214
661.73	652.	4.99	1.30	1.072E-02	661.62	84.620	6.008E-01	CS137
727.81	83.	21.33	1.60	9.958E-03	727.17	11.800	5.893E-01	BI212
911.21	218.	14.27	1.87	8.400E-03	911.07	29.000	7.384E-01	AC228
965.10	39.	30.53	1.54	8.049E-03				
969.14	111.	13.20	1.54	8.024E-03	968.90	17.460	6.633E-01	AC228

1120.21	103.	23.07	1.05	7.212E-03	1120.28	15.040	7.794E-01	BI214
1173.49	694.	4.47	1.77	6.970E-03	1173.23	99.860	8.331E-01	CO60
1332.72	649.	4.40	1.83	6.349E-03	1332.51	99.980	8.531E-01	CO60
1461.05	892.	3.46	1.90	5.931E-03	1460.75	10.700	1.153E+01	K40
1764.54	58.	13.54	1.16	5.142E-03	1764.51	15.920	5.642E-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	
183.71	92.27	628.	119.	0.060	99.59	0.807	NP-237	l
417.93	209.38	448.	101.	0.051	97.50	1.434	AC-228	s
538.58	269.71	336.	94.	0.047	97.54	2.085	AC-228	s
599.29	300.07	251.	77.	0.039	97.46	1.291	PB-212	
1929.65	965.11	52.	37.	0.019	95.45	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	153.39	77.11	303.	114.	0.057	74.45	0.995A
RA-226	371.73	186.28	712.	125.	0.062	85.48	1.500s
PB-212	477.12	238.98	643.	959.	0.480	16.35	1.011
RA-224	483.11	241.98	648.	147.	0.074	77.36	1.500
PB-214	482.89	241.87	323.	91.	0.045	85.68	0.696
PB-214	589.86	295.36	398.	192.	0.096	54.45	0.844
AC-228	676.02	338.44	238.	154.	0.077	52.92	1.116
PB-214	703.28	352.07	291.	363.	0.182	28.11	1.056
SB-125	925.27	463.07	190.	58.	0.029	105.49	1.500
TL-208	1021.05	510.97	184.	87.	0.043	54.84	1.500s
TL-208	1165.78	583.34	100.	280.	0.140	23.01	1.500
BI-214	1217.70	609.30	137.	277.	0.138	26.74	1.365s
CS-137	1322.55	661.73	137.	651.	0.325	14.98	1.301
BI-212	1454.69	727.81	83.	83.	0.041	64.00	1.596s
AC-228	1821.46	911.21	186.	215.	0.107	42.80	1.869s
AC-228	1936.81	968.90	52.	111.	0.055	39.63	1.541D
BI-214	2239.40	1120.21	126.	101.	0.050	69.20	1.050s
CO-60	2345.94	1173.49	81.	692.	0.346	13.42	1.771
CO-60	2664.34	1332.72	43.	646.	0.323	13.19	1.827
K-40	2920.97	1461.05	32.	874.	0.437	10.37	1.905
BI-214	3527.83	1764.54	5.	55.	0.028	40.63	1.155s

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		7.3732E-02					
			477.56	7.373E-02	&(	4.171E-01 1.23E-01	G
K-40		1.1532E+01					
			1460.75	1.153E+01	(P	3.854E-01 4.07E-01	G
MN-54		-1.3334E-03					
			834.81	-1.333E-03	&(P	5.056E-02 1.46E-02	G
CO-57		8.8883E-03					
			122.07	8.888E-03	%(P	5.875E-02 1.76E-02	G K
			136.43	6.195E-02	&	4.427E-01 1.32E-01	G
CO-60		8.4310E-01					
			1332.51	8.531E-01	(P	4.391E-02 3.77E-02	G K
			1173.23	8.331E-01	(P	5.381E-02 3.74E-02	G K
Sr-85		-1.8633E-02					
			514.00	-1.863E-02	%(	5.032E-02 1.51E-02	G
Kr-85		-4.2278E+02					
			513.99	-4.228E+02	%(	1.142E+03 3.44E+02	G
Y-88		-3.7968E-03					
			1836.01	-3.797E-03	&(P	3.133E-02 8.46E-03	G K
			898.02	-6.699E-04	& P	5.743E-02 1.65E-02	G
NB-94		1.0265E-03					
			871.10	1.026E-03	&(	5.386E-02 1.56E-02	G K
			702.50	1.794E-03	%	4.399E-02 1.27E-02	G K
Ag-108M		9.8451E-04					
			722.95	9.845E-04	&(	7.078E-02 2.07E-02	G K
			614.37	-2.679E-02	% P	4.987E-02 1.52E-02	G
			433.93	1.088E-02	%	4.231E-02 1.26E-02	G
CD-109		1.3946E-01					
			88.04	1.395E-01	%(	1.715E+00 5.10E-01	G
SN-113		-2.1845E-02					
			391.71	-2.185E-02	&(	5.629E-02 1.69E-02	G K
			255.04	-1.938E-02	%	1.827E+00 5.40E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.6594E-02						
		427.95	2.346E-04	&(P	1.237E-01	3.60E-02	G K
		600.77	4.867E-02	& P	2.101E-01	6.21E-02	G
		636.15	-5.667E-03	% P	3.843E-01	1.11E-01	G
		463.51	3.422E-01	(P	3.939E-01	1.23E-01	G
		176.29	1.611E-01	%	5.822E-01	1.75E-01	G
I-131	-8.9159E-03						
		364.48	-8.916E-03	&(P	5.497E-02	1.63E-02	G K
		636.97	-1.731E-01	%	6.239E-01	1.85E-01	G
		284.29	-1.204E-01	% P	7.609E-01	2.27E-01	G
CS-134	7.9511E-04						
		604.66	7.951E-04	%(	7.752E-02	2.29E-02	G K
		795.76	3.800E-02	% P	5.088E-02	1.59E-02	G
		569.29	4.291E-02	% P	2.467E-01	7.23E-02	G
		801.84	1.114E-01	% P	4.705E-01	1.38E-01	G
CS-137	6.0082E-01						
		661.62	6.008E-01	(P	5.294E-02	3.01E-02	G
CE-139	-9.5148E-03						
		165.85	-9.515E-03	%(	5.412E-02	1.62E-02	G
EU-152	2.4380E-02						
		121.78	2.438E-02	%(P	1.718E-01	5.14E-02	G K
		344.30	-2.948E-02	% P	1.314E-01	3.91E-02	G
		1408.08	4.163E-03	&	1.505E-01	4.07E-02	G
		964.00	7.802E-02	% P	3.639E-01	1.07E-01	G
		1112.07	0.000E+00	&	5.099E-01	1.48E-01	G
		778.90	5.845E-02	%	2.828E-01	8.27E-02	G
EU-154	1.8673E-03						
		123.10	1.867E-03	%(	1.310E-01	3.91E-02	G K
		1274.80	3.543E-03	%	1.147E-01	3.20E-02	G
		723.30	-1.169E-01	&	2.697E-01	8.15E-02	G
		1004.80	-8.195E-02	&	3.196E-01	9.47E-02	G
EU-155	1.1371E-01						
		86.45	1.137E-01	%(	2.556E-01	7.74E-02	G K
		105.31	7.268E-02	%	2.594E-01	7.81E-02	G
HG-203	-3.3458E-03						
		279.17	-3.346E-03	&(P	5.144E-02	1.53E-02	G K
		72.87	1.693E-01	% P	2.418E+00	7.22E-01	G
		70.83	3.287E-01	%	4.619E+00	1.38E+00	G
		82.50	4.664E-01	&	4.064E+00	1.21E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.3340E-01						
		583.14	2.304E-01	(P	4.058E-02	1.79E-02	G
		510.72	2.448E-01	*(P	1.866E-01	5.85E-02	G
PB-212	7.9491E-01						
		238.63	8.037E-01	(P	1.013E-01	4.44E-02	G K
							Energy duplication
		77.11	5.388E-01	} P	3.968E-01	1.34E-01	G
		74.81	6.159E-01	% P	8.763E-01	2.69E-01	G
PB-214	4.4499E-01						
		351.99	4.622E-01	(P	1.045E-01	4.40E-02	G K
		295.22	4.128E-01	(P	2.063E-01	7.65E-02	G
							Energy duplication
		77.11	3.261E-01	} P	1.027E+00	2.28E-01	G
		241.92	4.423E-01	(	4.213E-01	1.26E-01	G
BI-212	5.8928E-01						
		727.17	5.893E-01	(P	3.223E-01	1.27E-01	G K
		1620.56	5.768E-01	% P	7.047E-01	2.45E-01	G
		785.42	3.033E-01	&	2.135E+00	6.22E-01	G
BI-214	4.3957E-01						
		609.32	4.396E-01	@(P	9.110E-02	4.01E-02	G K
		1764.51	5.642E-01	+ P	1.330E-01	8.10E-02	G
		1120.28	7.794E-01	+ P	4.251E-01	1.83E-01	G
RA-224	1.3723E+00						
		241.00	1.372E+00	(	1.130E+00	3.54E-01	G
RA-226	1.2393E+00						
		185.99	1.239E+00	*(P	1.264E+00	3.90E-01	G
AC-228	6.8462E-01						
		911.07	7.384E-01	(P	2.280E-01	1.07E-01	G K
		968.90	6.627E-01	(P	2.174E-01	8.77E-02	G
		338.40	5.866E-01	(P	2.844E-01	1.04E-01	G
TH-227	2.1565E-03						
		236.00	2.157E-03	&(	3.170E-01	9.36E-02	G K
		256.25	1.327E-01	% P	5.408E-01	1.62E-01	G
PA-234	-5.2494E-02						
		98.44	-5.249E-02	%(P	2.434E-01	7.30E-02	G K
		946.00	1.043E-01	& P	2.824E-01	8.47E-02	G
		131.28	-1.540E-02	% P	2.343E-01	6.99E-02	G
		94.67	-5.762E-02	% P	4.443E-01	1.33E-01	G
		883.24	1.074E-01	%	3.655E-01	1.08E-01	G
		926.70	-9.868E-03	&	4.995E-01	1.44E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 6.223E-02 % P 3.657E-01 1.07E-01 G

TH-234      -9.2375E-01
                           63.29-9.237E-01 %(P 6.400E+00 1.90E+00 G K
                           92.80 1.177E+00 % P 2.339E+00 7.06E-01 G
                           92.38 1.380E+00 % P 2.838E+00 8.57E-01 G

AM-241       1.3819E-01
                           59.54 1.382E-01 &(P 1.257E+00 3.75E-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	7.2199E-02	7.3732E-02	3.7037E-01	3.7039E-01	4.084E-01
K-40		1.1532E+01	1.1532E+01	1.2219E+00	1.3933E+00	
MN-54	#A	-1.3286E-03	-1.3334E-03	7.3164E-02	7.3164E-02	5.038E-02
CO-57	#B	8.8514E-03	8.8883E-03	5.2771E-02	5.2773E-02	5.851E-02
CO-60		8.4261E-01	8.4310E-01	7.9604E-02	9.3449E-02	

Sr-85	#A	-1.8313E-02	-1.8633E-02	4.5426E-02	4.5439E-02	4.946E-02
Kr-85	#A	-4.2278E+02	-4.2278E+02	1.0307E+03	1.0310E+03	1.142E+03
Y-88	#B	-3.7570E-03	-3.7968E-03	2.6860E-02	2.6861E-02	3.100E-02
NB-94	#B	1.0265E-03	1.0265E-03	4.6752E-02	4.6753E-02	5.386E-02
Ag-108M	#B	9.8449E-04	9.8451E-04	6.2226E-02	6.2226E-02	7.078E-02
CD-109	#A	1.3912E-01	1.3946E-01	1.5304E+00	1.5304E+00	1.711E+00
SN-113	#B	-2.1633E-02	-2.1845E-02	5.0841E-02	5.0857E-02	5.574E-02
SB-125	#B	8.6498E-02	8.6594E-02	9.3354E-02	9.3489E-02	1.235E-01
I-131	#B	-7.7544E-03	-8.9159E-03	5.4262E-02	5.4265E-02	4.781E-02
CS-134	#B	7.9393E-04	7.9511E-04	6.8774E-02	6.8774E-02	7.741E-02
CS-137		6.0076E-01	6.0082E-01	9.0198E-02	9.6708E-02	
CE-139	#A	-9.4375E-03	-9.5148E-03	4.8635E-02	4.8638E-02	5.368E-02
EU-152	#B	2.4374E-02	2.4380E-02	1.5420E-01	1.5421E-01	1.717E-01
EU-154	#B	1.8667E-03	1.8673E-03	1.1717E-01	1.1717E-01	1.310E-01
EU-155	#B	1.1363E-01	1.1371E-01	2.3225E-01	2.3234E-01	2.554E-01
HG-203	#B	-3.2662E-03	-3.3458E-03	4.6294E-02	4.6294E-02	5.022E-02
TL-208	#	2.3340E-01	2.3340E-01	5.4535E-02	5.6193E-02	4.058E-02
PB-212		7.9491E-01	7.9491E-01	1.3156E-01	1.3942E-01	
PB-214		4.4499E-01	4.4499E-01	1.2703E-01	1.2963E-01	
BI-212	#	5.8928E-01	5.8928E-01	3.7939E-01	3.8093E-01	
BI-214		4.3957E-01	4.3957E-01	1.2027E-01	1.2295E-01	
RA-224		1.3723E+00	1.3723E+00	1.0616E+00	1.0645E+00	1.130E+00
RA-226	#A	1.2393E+00	1.2393E+00	1.1695E+00	1.1717E+00	1.264E+00
AC-228		6.8462E-01	6.8462E-01	1.8120E-01	1.8551E-01	
TH-227	#B	2.1565E-03	2.1565E-03	2.8083E-01	2.8083E-01	3.170E-01
PA-234	#B	-5.2494E-02	-5.2494E-02	2.3450E-01	2.3452E-01	2.434E-01
TH-234	#B	-9.2375E-01	-9.2375E-01	1.0895E+01	1.0895E+01	6.400E+00
AM-241	#A	1.3819E-01	1.3819E-01	1.1251E+00	1.1251E+00	1.257E+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) 1.7300882E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.7301435E+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_30NOV2005_1616.An1

Sample description
FSS-NOL-06-03-001-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30NOV2005_1616.An1

Acquisition information
Start time: 30-Nov-2005 16:16:54
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: 1.8040E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8040E+03) =
5.5432E+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	29-Nov-2005 00:23:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2014

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.88	102.	26.46	0.99	9.052E-03	74.81	9.600	8.829E-01	PB212
77.18	171.	13.81	0.99	1.011E-02	77.11	17.500	8.962E-01	PB212
					77.11	10.700	1.466E+00	PB214
87.34	103.	28.49	1.00	1.441E-02	86.45	32.740	1.665E-01	EU155
					88.04	3.790	1.380E+00	CD109
93.07	114.	25.53	1.00	1.650E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.27	133.	23.02	1.32	2.566E-02	185.99	3.280	PBC<MDA	RA226
209.72	145.	24.26	0.99	2.469E-02				
238.96	1181.	3.40	1.09	2.318E-02	238.63	43.100	8.760E-01	PB212
241.98	194.	14.53	1.10	2.302E-02	241.00	3.900	1.616E+00	RA224
					241.92	7.470	8.456E-01	PB214
270.29	64.	35.29	1.07	2.151E-02				
277.42	84.	36.19	0.84	2.114E-02				
295.30	260.	11.80	1.07	2.024E-02	295.22	19.200	4.922E-01	PB214
300.45	56.	38.79	0.90	2.000E-02				
328.33	87.	25.69	0.99	1.873E-02				
338.32	262.	12.56	0.88	1.830E-02	338.40	12.010	8.888E-01	AC228
352.05	388.	7.24	1.19	1.775E-02	351.99	37.100	4.346E-01	PB214
462.87	101.	22.09	1.17	1.426E-02				
462.87	101.	22.09	1.17	1.426E-02	463.51	10.000	5.228E-01	SB125
510.91	157.	18.11	1.37	1.317E-02	510.72	22.500	3.304E-01	TL208
583.26	372.	7.98	1.39	1.184E-02	583.14	86.000	2.703E-01	TL208
609.42	323.	8.02	1.33	1.144E-02	609.32	46.090	4.497E-01	BI214
727.35	72.	20.67	1.54	9.963E-03	727.17	11.800	4.555E-01	BI212
795.14	43.	30.19	1.50	9.301E-03	795.76	85.400	4.021E-02	CS134
859.95	46.	31.74	1.04	8.772E-03				

911.39	321.	7.55	1.69	8.399E-03	911.07	29.000	9.766E-01	AC228
968.45	208.	10.34	1.59	8.029E-03	968.90	17.460	1.109E+00	AC228
1120.14	105.	16.90	1.28	7.212E-03	1120.28	15.040	7.121E-01	BI214
1461.06	1185.	3.03	1.91	5.931E-03	1460.75	10.700	1.376E+01	K40
1764.66	75.	11.55	1.28	5.141E-03	1764.51	15.920	6.564E-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	
173.86	87.22	376.	103.	0.051	85.48	1.001	PB-214	lD
418.60	209.72	455.	145.	0.072	72.77	0.994	NP-239	s
539.74	270.29	223.	64.	0.032	105.86	1.067	AC-228	
553.99	277.42	327.	82.	0.041	99.16	0.837	TL-208	s
600.05	300.45	198.	56.	0.028	116.36	0.901	PB-212	
655.81	328.33	181.	87.	0.044	77.06	0.991	RH-106M	
1718.93	859.95	66.	46.	0.023	95.23	1.036	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	340.	102.	0.051	79.39	0.993D
PB-212	153.39	77.11	345.	171.	0.086	41.44	0.995A
TH-234	185.43	93.13	945.	112.	0.056	103.45	1.500
TH-234	185.45	93.14	923.	117.	0.059	98.22	1.500
RA-226	371.60	186.22	742.	130.	0.065	84.20	1.500s
PB-212	477.15	239.00	583.	1277.	0.638	12.39	0.927
RA-224	483.13	241.99	681.	181.	0.090	65.16	1.500
PB-214	483.06	241.95	352.	97.	0.049	83.60	1.612s
PB-214	589.75	295.30	276.	255.	0.128	35.41	1.072
AC-228	675.79	338.32	284.	261.	0.130	37.69	0.882
PB-214	703.24	352.05	180.	382.	0.191	21.72	1.185
SB-125	925.23	463.05	124.	90.	0.045	60.21	1.500s
TL-208	1020.94	510.91	231.	131.	0.065	54.32	1.367s
TL-208	1165.62	583.26	158.	368.	0.184	23.94	1.393
BI-214	1217.94	609.42	122.	317.	0.158	24.06	1.325
BI-212	1453.76	727.35	65.	72.	0.036	62.01	1.543
CS-134	1589.34	795.14	62.	43.	0.021	90.56	1.500s
AC-228	1821.82	911.39	73.	318.	0.159	22.64	1.687
AC-228	1935.91	968.45	75.	207.	0.104	31.01	1.590s
BI-214	2239.25	1120.14	72.	103.	0.052	50.71	1.279s
K-40	2920.98	1461.06	45.	1166.	0.583	9.08	1.908
BI-214	3528.08	1764.66	3.	72.	0.036	34.64	1.278s

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		-9.7792E-02					
			477.56	-9.779E-02	%(	2.985E-01 8.92E-02	G
K-40		1.3763E+01					
			1460.75	1.376E+01	(P	4.002E-01 4.23E-01	G
MN-54		1.6763E-02					
			834.81	1.676E-02	%(P	3.450E-02 1.05E-02	G
CO-57		-2.4832E-04					
			122.07	-2.483E-04	&(P	4.838E-02 1.44E-02	G K
			136.43	6.306E-02	&	3.616E-01 1.08E-01	G
CO-60		1.8477E-02					
			1332.51	1.848E-02	%(P	3.684E-02 1.11E-02	G K
			1173.23	2.476E-02	% P	4.644E-02 1.41E-02	G K
Sr-85		-1.0272E-02					
			514.00	-1.027E-02	%(	4.420E-02 1.32E-02	G
Kr-85		-2.3358E+02					
			513.99	-2.336E+02	%(	1.003E+03 2.99E+02	G
Y-88		-3.6577E-03					
			1836.01	-3.658E-03	&(P	2.971E-02 8.08E-03	G K
			898.02	-8.478E-03	% P	4.577E-02 1.34E-02	G
NB-94		1.0599E-03					
			871.10	1.060E-03	%(	2.947E-02 8.29E-03	G K
			702.50	1.501E-02	%	3.407E-02 1.03E-02	G K
Ag-108M		-6.0109E-03					
			722.95	-6.011E-03	&(	4.160E-02 1.22E-02	G K
			614.37	-1.556E-02	& P	4.285E-02 1.28E-02	G
			433.93	7.688E-03	%	2.993E-02 8.87E-03	G
CD-109		1.0846E+00					
			88.04	1.085E+00	%(	1.897E+00 5.78E-01	G
SN-113		-6.7353E-03					
			391.71	-6.735E-03	%(	5.328E-02 1.57E-02	G K
			255.04	-1.800E-01	%	1.687E+00 5.01E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3794E-01						
		427.95	2.390E-02	%(P	9.941E-02	2.95E-02	G K
		600.77	-2.288E-04	% P	1.636E-01	4.68E-02	G
		636.15	-3.687E-03	& P	2.715E-01	7.72E-02	G
		463.51	4.755E-01	(P	2.879E-01	9.68E-02	G
		176.29	1.181E-01	&	5.912E-01	1.77E-01	G
I-131	1.0185E-02						
		364.48	1.018E-02	&(P	4.402E-02	1.31E-02	G K
		636.97	-4.018E-02	%	5.277E-01	1.53E-01	G
		284.29	-1.403E-01	% P	6.164E-01	1.84E-01	G
CS-134	1.2299E-02						
		604.66	-1.213E-02	&(	3.730E-02	1.11E-02	G K
		795.76	4.021E-02	(P	3.713E-02	1.22E-02	G
		569.29	6.164E-02	& P	1.634E-01	4.86E-02	G
		801.84	3.947E-02	% P	3.852E-01	1.10E-01	G
CS-137	4.3490E-03						
		661.62	4.349E-03	%(P	3.820E-02	1.10E-02	G
CE-139	1.6371E-02						
		165.85	1.637E-02	&(	4.662E-02	1.41E-02	G
EU-152	5.5479E-03						
		121.78	5.548E-03	&(P	1.500E-01	4.47E-02	G K
		344.30	4.844E-03	% P	1.069E-01	3.13E-02	G
		1408.08	2.677E-02	%	1.342E-01	3.81E-02	G
		964.00	1.890E-01	% P	2.634E-01	8.22E-02	G
		1112.07	1.210E-02	&	2.968E-01	8.44E-02	G
		778.90	6.791E-02	%	2.210E-01	6.53E-02	G
EU-154	-8.3306E-03						
		123.10	-8.331E-03	%(	1.080E-01	3.22E-02	G K
		1274.80	-2.614E-02	%	1.386E-01	4.05E-02	G
		723.30	-1.013E-01	%	2.272E-01	6.87E-02	G
		1004.80	-4.266E-02	%	2.187E-01	6.37E-02	G
EU-155	1.0367E-02						
		86.45	1.037E-02	%(	2.477E-01	7.40E-02	G K
		105.31	7.964E-02	&	2.410E-01	7.27E-02	G
HG-203	9.3562E-04						
		279.17	9.356E-04	&(P	4.302E-02	1.27E-02	G K
		72.87	-4.095E-01	% P	2.321E+00	6.96E-01	G
		70.83	-1.491E-01	&	3.399E+00	1.01E+00	G
		82.50	-8.107E-01	%	3.912E+00	1.17E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8278E-01						
		583.14	2.703E-01	(P	4.512E-02	2.18E-02	G
		510.72	3.304E-01	*(P	1.860E-01	7.21E-02	G
PB-212	9.3146E-01						
		238.63	9.566E-01	(P	8.634E-02	3.99E-02	G K
							Energy duplication
		77.11	7.254E-01	} P	3.779E-01	1.00E-01	G
		74.81	8.829E-01	(P	7.643E-01	2.41E-01	G
PB-214	4.5055E-01						
		351.99	4.346E-01	(P	7.416E-02	3.19E-02	G K
		295.22	4.922E-01	(P	1.543E-01	5.90E-02	G
							Energy duplication
		77.11	3.814E-02	} P	9.509E-01	2.26E-01	G
		241.92	4.225E-01	(	3.926E-01	1.18E-01	G
BI-212	4.5554E-01						
		727.17	4.555E-01	(P	2.575E-01	9.48E-02	G K
		1620.56	4.376E-01	% P	8.423E-01	2.60E-01	G
		785.42	5.778E-01	%	1.581E+00	4.72E-01	G
BI-214	4.4972E-01						
		609.32	4.497E-01	(P	7.712E-02	3.68E-02	G K
		1764.51	6.564E-01	+ P	1.019E-01	7.93E-02	G
		1120.28	7.121E-01	+ P	2.916E-01	1.23E-01	G
RA-224	1.5056E+00						
		241.00	1.506E+00	(	1.035E+00	3.27E-01	G
RA-226	1.1531E+00						
		185.99	1.153E+00	(P	1.154E+00	3.56E-01	G
AC-228	9.9810E-01						
		911.07	9.766E-01	(P	1.311E-01	7.45E-02	G K
		968.90	1.109E+00	(P	2.296E-01	1.15E-01	G
		338.40	8.888E-01	(P	2.770E-01	1.12E-01	G
TH-227	-1.3760E-01						
		236.00	-1.376E-01	%(	4.105E-01	1.24E-01	G K
		256.25	-9.719E-03	% P	4.350E-01	1.28E-01	G
PA-234	-2.1874E-03						
		98.44	-2.187E-03	%(P	2.182E-01	6.49E-02	G K
		946.00	-4.613E-02	& P	1.844E-01	5.42E-02	G
		131.28	-1.291E-02	& P	2.288E-01	6.83E-02	G
		94.67	-1.614E-01	& P	4.327E-01	1.31E-01	G
		883.24	4.063E-02	&	2.512E-01	7.23E-02	G
		926.70	8.150E-02	%	2.782E-01	8.19E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 8.805E-02 & P 2.525E-01 7.49E-02 G

TH-234       1.9767E+00
                           63.29 2.119E+00 %(P 6.623E+00 1.99E+00 G K
                           92.80 1.777E+00  (P 2.191E+00 6.70E-01 G
                           92.38 1.994E+00  (P 2.610E+00 7.96E-01 G

AM-241       1.6278E-01
                           59.54 1.628E-01 %(P 1.124E+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
   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	-9.5705E-02	-9.7792E-02	2.6748E-01	2.6754E-01	2.921E-01
K-40		1.3763E+01	1.3763E+01	1.2700E+00	1.5005E+00	
MN-54	#A	1.6701E-02	1.6763E-02	3.1388E-02	3.1403E-02	3.437E-02
CO-57	#B	-2.4726E-04	-2.4832E-04	2.0363E-01	2.0363E-01	4.817E-02
CO-60	#B	1.8466E-02	1.8477E-02	3.3181E-02	3.3198E-02	3.681E-02

Sr-85	#A	-1.0091E-02	-1.0272E-02	3.9489E-02	3.9494E-02	4.342E-02
Kr-85	#A	-2.3357E+02	-2.3358E+02	8.9573E+02	8.9583E+02	1.003E+03
Y-88	#B	-3.6184E-03	-3.6577E-03	2.5565E-02	2.5566E-02	2.939E-02
NB-94	#B	1.0599E-03	1.0599E-03	2.4869E-02	2.4869E-02	2.947E-02
Ag-108M	#B	-6.0108E-03	-6.0109E-03	3.6451E-02	3.6452E-02	4.160E-02
CD-109	#A	1.0819E+00	1.0846E+00	1.7327E+00	1.7337E+00	1.893E+00
SN-113	#B	-6.6682E-03	-6.7353E-03	4.7191E-02	4.7192E-02	5.275E-02
SB-125	#F	1.3778E-01	1.3794E-01	8.4218E-02	8.4598E-02	9.930E-02
I-131	#B	8.8248E-03	1.0185E-02	3.9252E-02	3.9256E-02	3.814E-02
CS-134	#B	1.2280E-02	1.2299E-02	1.1161E-02	1.1184E-02	3.725E-02
CS-137	#A	4.3485E-03	4.3490E-03	3.3102E-02	3.3103E-02	3.819E-02
CE-139	#A	1.6234E-02	1.6371E-02	4.2188E-02	4.2199E-02	4.623E-02
EU-152	#B	5.5465E-03	5.5479E-03	1.3405E-01	1.3405E-01	1.500E-01
EU-154	#B	-8.3275E-03	-8.3306E-03	9.6726E-02	9.6727E-02	1.080E-01
EU-155	#B	1.0360E-02	1.0367E-02	2.2186E-01	2.2186E-01	2.475E-01
HG-203	#B	9.1276E-04	9.3562E-04	3.8108E-02	3.8108E-02	4.197E-02
TL-208		2.8278E-01	2.8278E-01	6.8477E-02	7.0418E-02	
PB-212		9.3146E-01	9.3146E-01	1.1645E-01	1.2839E-01	
PB-214		4.5055E-01	4.5055E-01	9.9314E-02	1.0270E-01	
BI-212		4.5554E-01	4.5554E-01	2.8444E-01	2.8567E-01	
BI-214		4.4972E-01	4.4972E-01	1.1041E-01	1.1346E-01	
RA-224		1.5056E+00	1.5056E+00	9.8109E-01	9.8497E-01	1.035E+00
RA-226	#A	1.1531E+00	1.1531E+00	1.0679E+00	1.0700E+00	1.154E+00
AC-228		9.9810E-01	9.9810E-01	1.7977E-01	1.8888E-01	
TH-227	#B	-1.3760E-01	-1.3760E-01	3.7150E-01	3.7158E-01	4.105E-01
PA-234	#B	-2.1874E-03	-2.1874E-03	1.2989E+00	1.2989E+00	2.182E-01
TH-234	#B	1.9767E+00	1.9767E+00	2.1521E+00	2.1549E+00	6.623E+00
AM-241	#A	1.6277E-01	1.6278E-01	1.0077E+00	1.0077E+00	1.124E+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) 1.8836725E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 1.8836725E+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_30NOV2005_1653.An1

Sample description
FSS-NOL-06-03-004-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30NOV2005_1653.An1

Acquisition information
Start time: 30-Nov-2005 16:53:37
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: 1.8700E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8700E+03) =
5.3476E+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	29-Nov-2005 00:31:00
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: 0.1082

***** 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
74.63	141.	19.49	0.99	9.100E-03	74.81	9.600	1.148E+00	PB212
77.37	188.	15.62	0.99	1.036E-02	77.11	17.500	7.565E-01	PB212
					77.11	10.700	1.237E+00	PB214
92.74	102.	37.35	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.03	110.	34.54	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
174.92	53.	39.86	0.00	2.595E-02				
186.06	204.	22.47	1.25	2.566E-02	185.99	3.280	1.642E+00	RA226
209.42	118.	31.65	0.96	2.471E-02				
238.97	1130.	3.58	1.09	2.318E-02	238.63	43.100	8.083E-01	PB212
241.89	169.	16.60	1.10	2.302E-02	241.00	3.900	1.354E+00	RA224
					241.92	7.470	7.083E-01	PB214
270.17	97.	34.05	1.25	2.151E-02				
295.32	196.	14.22	1.19	2.024E-02	295.22	19.200	3.568E-01	PB214
300.48	64.	39.05	1.07	1.999E-02				
338.35	244.	12.10	1.19	1.830E-02	338.40	12.010	7.990E-01	AC228
352.00	415.	7.42	1.11	1.775E-02	351.99	37.100	4.491E-01	PB214
462.70	115.	21.80	1.10	1.427E-02				
462.70	115.	21.80	1.10	1.427E-02	463.51	10.000	5.780E-01	SB125
511.09	192.	14.53	1.50	1.317E-02	510.72	22.500	4.031E-01	TL208
583.33	404.	7.57	1.26	1.184E-02	583.14	86.000	2.836E-01	TL208
609.33	318.	7.13	1.22	1.144E-02	609.32	46.090	4.267E-01	BI214
727.25	135.	17.67	0.92	9.964E-03	727.17	11.800	8.254E-01	BI212
795.30	38.	33.35	1.17	9.305E-03				
795.30	38.	33.35	1.17	9.305E-03	795.76	85.400	3.491E-02	CS134
860.60	40.	30.57	1.09	8.767E-03				

911.31	262.	7.63	1.61	8.400E-03	911.07	29.000	7.686E-01	AC228
964.74	51.	23.18	1.54	8.051E-03	964.00	14.580	3.098E-01	EU152
969.18	173.	9.15	1.54	8.024E-03	968.90	17.460	8.897E-01	AC228
1119.92	86.	22.83	1.36	7.213E-03	1120.28	15.040	5.630E-01	BI214
1461.11	1387.	2.72	1.73	5.931E-03	1460.75	10.700	1.557E+01	K40
1620.99	19.	29.65	1.94	5.488E-03	1620.56	2.750	9.031E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.89	66.	12.85	2.37	5.142E-03	1764.51	15.920	5.829E-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	
418.01	209.42	532.	118.	0.059	94.95	0.959	AC-228	
539.49	270.17	386.	97.	0.049	102.15	1.252	AC-228	
600.11	300.48	253.	64.	0.032	117.16	1.071	PB-212	
1720.24	860.60	49.	40.	0.020	91.71	1.094	TL-208	
1929.04	964.75	45.	50.	0.025	70.92	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	364.	155.	0.077	56.42	0.993D
PB-212	153.39	77.11	352.	183.	0.091	38.43	0.995A
TH-234	185.23	93.03	929.	110.	0.055	103.61	1.500
RA-226	371.28	186.06	717.	191.	0.096	67.40	1.253s
PB-212	477.07	238.95	700.	1204.	0.602	13.98	0.988
RA-224	483.19	242.02	711.	154.	0.077	77.15	1.500
PB-214	482.90	241.87	388.	92.	0.046	93.79	1.141
PB-214	589.79	295.32	268.	192.	0.096	42.66	1.189
AC-228	675.84	338.35	234.	243.	0.122	36.31	1.192
PB-214	703.14	352.00	219.	409.	0.205	22.25	1.115
SB-125	925.20	463.04	149.	76.	0.038	74.92	1.500s
TL-208	1021.29	511.09	216.	165.	0.083	43.58	1.497s
TL-208	1165.77	583.33	165.	400.	0.200	22.71	1.264
BI-214	1217.76	609.33	82.	311.	0.156	21.39	1.222
BI-212	1453.58	727.25	128.	134.	0.067	53.01	0.921
CS-134	1589.43	795.18	53.	50.	0.025	74.44	1.500
AC-228	1821.65	911.31	59.	259.	0.130	22.89	1.612
AC-228	1936.81	968.90	36.	172.	0.086	27.11	1.541D
BI-214	2238.81	1119.92	96.	85.	0.042	68.49	1.362s
K-40	2921.09	1461.11	32.	1368.	0.684	8.17	1.732
BI-212	3240.79	1620.99	6.	19.	0.009	88.95	1.944
BI-214	3528.52	1764.89	6.	66.	0.033	38.55	2.373s

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		7.1945E-02					
			477.56	7.194E-02	%(	3.033E-01 8.99E-02	G
K-40		1.5575E+01					
			1460.75	1.557E+01	(P	3.311E-01 4.30E-01	G
MN-54		-2.0353E-03					
			834.81	-2.035E-03	%(P	3.512E-02 1.00E-02	G
CO-57		-1.1423E-02					
			122.07	-1.142E-02	&(P	4.951E-02 1.49E-02	G K
			136.43	-4.938E-02	%	4.009E-01 1.20E-01	G
CO-60		3.3066E-03					
			1332.51	3.307E-03	%(P	3.662E-02 1.02E-02	G K
			1173.23	7.864E-03	% P	5.076E-02 1.48E-02	G K
Sr-85		-1.4901E-02					
			514.00	-1.490E-02	%(	4.628E-02 1.39E-02	G
Kr-85		-3.3764E+02					
			513.99	-3.376E+02	%(	1.049E+03 3.15E+02	G
Y-88		-7.5325E-05					
			1836.01	-7.533E-05	&(P	2.555E-02 6.52E-03	G K
			898.02	-4.811E-04	% P	3.432E-02 9.61E-03	G
NB-94		5.4349E-03					
			871.10	5.435E-03	%(	3.537E-02 1.03E-02	G K
			702.50	1.105E-02	&	3.557E-02 1.06E-02	G K
Ag-108M		-4.9942E-03					
			722.95	-4.994E-03	&(	4.274E-02 1.25E-02	G K
			614.37	1.135E-02	% P	3.254E-02 9.71E-03	G
			433.93	1.025E-02	%	3.136E-02 9.37E-03	G
CD-109		9.6755E-02					
			88.04	9.676E-02	%(	1.976E+00 5.90E-01	G
SN-113		-7.1822E-03					
			391.71	-7.182E-03	%(	4.899E-02 1.45E-02	G K
			255.04	1.590E-02	%	1.651E+00 4.88E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.9847E-02						
		427.95	-2.363E-02	%(P	1.016E-01	3.01E-02	G K
		600.77	-4.019E-02	% P	1.658E-01	4.89E-02	G
		636.15	8.185E-02	% P	2.890E-01	8.56E-02	G
		463.51	3.861E-01	@(P	3.026E-01	9.81E-02	G
		176.29	-1.851E-01	%	5.946E-01	1.79E-01	G
I-131	5.6004E-03						
		364.48	5.600E-03	&(P	4.119E-02	1.21E-02	G K
		636.97	-2.215E-02	%	5.920E-01	1.72E-01	G
		284.29	3.047E-01	& P	4.668E-01	1.43E-01	G
CS-134	2.1330E-02						
		604.66	1.565E-05	&(	2.202E-02	6.15E-03	G K
		795.76	4.569E-02	(P	3.328E-02	1.14E-02	G
		569.29	-2.174E-02	& P	2.076E-01	5.99E-02	G
		801.84	-5.028E-02	% P	4.614E-01	1.33E-01	G
CS-137	9.5896E-03						
		661.62	9.590E-03	%(P	4.247E-02	1.25E-02	G
CE-139	-7.4982E-03						
		165.85	-7.498E-03	%(	4.892E-02	1.46E-02	G
EU-152	-3.3884E-02						
		121.78	-3.388E-02	&(P	1.446E-01	4.34E-02	G K
		344.30	-1.975E-02	% P	1.250E-01	3.71E-02	G
		1408.08	0.000E+00	&	1.880E-01	5.24E-02	G
		964.00	1.942E-01	% P	3.070E-01	9.45E-02	G
		1112.07	-2.866E-02	&	3.398E-01	9.82E-02	G
		778.90	-3.720E-02	%	2.805E-01	8.17E-02	G
EU-154	-2.9398E-03						
		123.10	-2.940E-03	%(	9.810E-02	2.92E-02	G K
		1274.80	4.314E-02	&	1.082E-01	3.24E-02	G
		723.30	0.000E+00	%	3.639E-01	1.07E-01	G
		1004.80	0.000E+00	%	2.863E-01	8.26E-02	G
EU-155	1.1668E-02						
		86.45	1.167E-02	&(	2.576E-01	7.70E-02	G K
		105.31	5.857E-02	%	2.278E-01	6.85E-02	G
HG-203	1.2794E-03						
		279.17	1.279E-03	%(P	3.477E-02	1.02E-02	G K
		72.87	2.807E-01	& P	1.508E+00	4.50E-01	G
		70.83	-4.845E-01	&	4.402E+00	1.32E+00	G
		82.50	-5.638E-02	&	4.123E+00	1.23E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8355E-01						
		583.14	2.836E-01	(P	4.443E-02	2.17E-02	G
		510.72	4.031E-01	+ P	1.735E-01	6.80E-02	G
PB-212	8.5908E-01						
		238.63	8.704E-01	(P	9.105E-02	4.10E-02	G K
							Energy duplication
		77.11	7.456E-01	} P	3.682E-01	9.55E-02	G
		74.81	1.285E+00	+ P	7.617E-01	2.47E-01	G
PB-214	4.3873E-01						
		351.99	4.491E-01	(P	7.858E-02	3.38E-02	G K
		295.22	3.568E-01	- P	1.469E-01	5.18E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.966E-01	0.00E+00	G
		241.92	3.870E-01	(	3.971E-01	1.21E-01	G
BI-212	8.4009E-01						
		727.17	8.254E-01	(P	3.403E-01	1.46E-01	G K
		1620.56	9.031E-01	?(P	6.899E-01	2.68E-01	G
		785.42	4.421E-01	%	1.588E+00	4.69E-01	G
BI-214	4.2672E-01						
		609.32	4.267E-01	(P	6.144E-02	3.11E-02	G K
		1764.51	5.829E-01	+ P	1.245E-01	7.86E-02	G
		1120.28	5.630E-01	+ P	3.230E-01	1.31E-01	G
RA-224	1.2400E+00						
		241.00	1.240E+00	(	1.020E+00	3.19E-01	G
RA-226	1.6416E+00						
		185.99	1.642E+00	(P	1.094E+00	3.94E-01	G
AC-228	8.1096E-01						
		911.07	7.686E-01	(P	1.141E-01	5.94E-02	G K
		968.90	8.896E-01	(P	1.572E-01	8.04E-02	G
		338.40	7.990E-01	(P	2.433E-01	9.71E-02	G
TH-227	1.4713E-02						
		236.00	1.471E-02	%(	5.232E-01	1.57E-01	G K
		256.25	-3.585E-02	& P	4.831E-01	1.43E-01	G
PA-234	1.3988E-02						
		98.44	1.399E-02	%(P	2.252E-01	6.72E-02	G K
		946.00	2.210E-02	& P	1.393E-01	3.99E-02	G
		131.28	-1.524E-02	& P	2.029E-01	6.05E-02	G
		94.67	-9.754E-02	% P	4.177E-01	1.26E-01	G
		883.24	-1.149E-02	%	2.632E-01	7.47E-02	G
		926.70	-7.433E-02	%	3.759E-01	1.10E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.189E-02 & P 3.074E-01 8.87E-02 G

TH-234       9.2266E-01
                           63.29 3.911E-01 %(P 6.437E+00 1.91E+00 G K
                           92.80 1.614E+00  (P 2.119E+00 6.47E-01 G
                           92.38 1.751E+00 % P 2.522E+00 7.67E-01 G

AM-241       9.4710E-02
                           59.54 9.471E-02 %(P 1.055E+00 3.14E-01 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      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	7.0391E-02	7.1945E-02	2.6967E-01	2.6970E-01	2.967E-01
K-40		1.5575E+01	1.5575E+01	1.2895E+00	1.5749E+00	
MN-54	#A	-2.0278E-03	-2.0353E-03	4.0107E-02	4.0107E-02	3.499E-02
CO-57	#B	-1.1373E-02	-1.1423E-02	4.5816E-02	4.5820E-02	4.929E-02
CO-60	#B	3.3046E-03	3.3066E-03	3.0577E-02	3.0578E-02	3.660E-02

Sr-85	#A	-1.4635E-02	-1.4901E-02	4.1657E-02	4.1666E-02	4.545E-02
Kr-85	#A	-3.3764E+02	-3.3764E+02	9.4450E+02	9.4471E+02	1.049E+03
Y-88	#B	-7.4506E-05	-7.5325E-05	1.8752E-01	1.8752E-01	2.528E-02
NB-94	#B	5.4349E-03	5.4349E-03	3.0821E-02	3.0823E-02	3.537E-02
Ag-108M	#B	-4.9940E-03	-4.9942E-03	3.7423E-02	3.7424E-02	4.274E-02
CD-109	#A	9.6507E-02	9.6755E-02	1.7699E+00	1.7699E+00	1.971E+00
SN-113	#B	-7.1098E-03	-7.1822E-03	4.3406E-02	4.3408E-02	4.850E-02
SB-125	#B	7.9756E-02	7.9847E-02	6.0827E-02	6.1004E-02	1.015E-01
I-131	#B	4.8443E-03	5.6004E-03	3.6412E-02	3.6414E-02	3.563E-02
CS-134	#B	2.1297E-02	2.1330E-02	1.5906E-02	1.5954E-02	2.199E-02
CS-137	#A	9.5886E-03	9.5896E-03	3.7516E-02	3.7520E-02	4.246E-02
CE-139	#A	-7.4349E-03	-7.4982E-03	4.3949E-02	4.3951E-02	4.851E-02
EU-152	#B	-3.3875E-02	-3.3884E-02	1.3821E-01	1.3822E-01	1.446E-01
EU-154	#B	-2.9387E-03	-2.9398E-03	8.7565E-02	8.7565E-02	9.807E-02
EU-155	#B	1.1660E-02	1.1668E-02	2.3098E-01	2.3098E-01	2.574E-01
HG-203	#B	1.2477E-03	1.2794E-03	3.0666E-02	3.0666E-02	3.391E-02
TL-208		2.8355E-01	2.8355E-01	6.5088E-02	6.7137E-02	
PB-212		8.5908E-01	8.5908E-01	1.2127E-01	1.3113E-01	
PB-214		4.3873E-01	4.3873E-01	9.8971E-02	1.0220E-01	
BI-212		8.4009E-01	8.4009E-01	4.3614E-01	4.3885E-01	
BI-214		4.2672E-01	4.2672E-01	9.3162E-02	9.6400E-02	
RA-224		1.2400E+00	1.2400E+00	9.5662E-01	9.5932E-01	1.020E+00
RA-226	#	1.6416E+00	1.6416E+00	1.1814E+00	1.1852E+00	
AC-228		8.1096E-01	8.1096E-01	1.3795E-01	1.4576E-01	
TH-227	#B	1.4713E-02	1.4713E-02	4.6991E-01	4.6991E-01	5.232E-01
PA-234	#B	1.3988E-02	1.3988E-02	2.0161E-01	2.0161E-01	2.252E-01
TH-234	#B	9.2266E-01	9.2266E-01	1.1091E+00	1.1103E+00	6.437E+00
AM-241	#A	9.4709E-02	9.4710E-02	9.4241E-01	9.4243E-01	1.055E+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) 2.2115486E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.2115488E+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_30NOV2005_1730.An1

Sample description
FSS-NOL-06-03-005-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30NOV2005_1730.An1

Acquisition information
Start time: 30-Nov-2005 17:30:08
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: 1.8910E+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	29-Nov-2005 00:59:00
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: 0.1487

***** 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	138.	20.57	0.99	9.052E-03	74.81	9.600	1.136E+00	PB212
77.21	186.	16.30	0.99	1.031E-02	77.11	17.500	7.407E-01	PB212
					77.11	10.700	1.211E+00	PB214
186.33	116.	32.50	0.88	2.566E-02	185.99	3.280	PBC<MDA	RA226
209.34	94.	35.68	0.98	2.471E-02				
238.91	942.	4.08	1.09	2.318E-02	238.63	43.100	6.646E-01	PB212
242.01	162.	17.54	1.10	2.302E-02	241.00	3.900	1.287E+00	RA224
					241.92	7.470	6.735E-01	PB214
270.59	126.	29.00	1.60	2.149E-02				
295.45	232.	10.96	1.20	2.024E-02	295.22	19.200	4.190E-01	PB214
300.55	87.	32.22	1.10	1.999E-02				
327.96	89.	26.61	0.98	1.874E-02				
338.65	211.	15.87	1.20	1.829E-02	338.40	12.010	6.831E-01	AC228
352.01	356.	10.06	1.00	1.775E-02	351.99	37.100	3.799E-01	PB214
463.17	70.	32.47	1.19	1.425E-02				
463.17	70.	32.47	1.19	1.425E-02	463.51	10.000	3.461E-01	SB125
510.85	205.	13.83	1.46	1.317E-02	510.72	22.500	4.300E-01	TL208
583.36	298.	8.62	1.14	1.184E-02	583.14	86.000	2.059E-01	TL208
609.49	272.	8.17	0.97	1.144E-02	609.32	46.090	3.596E-01	BI214
661.79	499.	5.93	1.30	1.072E-02	661.62	84.620	3.921E-01	CS137
727.34	76.	27.47	1.68	9.963E-03	727.17	11.800	4.589E-01	BI212
768.70	73.	25.23	1.30	9.549E-03				
795.70	68.	26.03	1.31	9.302E-03				
795.70	68.	26.03	1.31	9.302E-03	795.76	85.400	6.083E-02	CS134
911.38	243.	9.91	1.43	8.399E-03	911.07	29.000	7.041E-01	AC228
964.67	48.	26.62	1.54	8.052E-03	964.00	14.580	PBC<MDA	EU152
969.19	134.	11.84	1.54	8.024E-03	968.90	17.460	6.807E-01	AC228

1120.56	93.	19.27	1.74	7.210E-03	1120.28	15.040	6.003E-01	BI214
1173.41	282.	7.83	1.54	6.971E-03	1173.23	99.860	2.882E-01	CO60
1332.76	284.	7.42	1.60	6.348E-03	1332.51	99.980	3.167E-01	CO60
1461.12	1122.	3.03	1.73	5.931E-03	1460.75	10.700	1.243E+01	K40
1765.03	59.	13.99	2.01	5.142E-03	1764.51	15.920	5.179E-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	
417.84	209.34	464.	94.	0.047	107.04	0.984	AC-228	s
540.33	270.59	447.	126.	0.063	87.00	1.602	AC-228	s
600.24	300.55	288.	87.	0.043	96.67	1.098	PB-212	
655.06	327.96	207.	89.	0.045	79.83	0.980	AC-228	s
1536.46	768.70	91.	73.	0.036	75.68	1.302	BI-214	M
1928.94	964.72	56.	49.	0.024	78.11	1.538	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	148.79	74.81	355.	138.	0.069	61.72	0.993D
PB-212	153.39	77.11	384.	139.	0.069	52.97	0.995A
RA-226	371.61	186.22	778.	125.	0.062	88.82	1.500
PB-212	477.02	238.93	750.	881.	0.441	17.80	0.887
RA-224	482.98	241.91	775.	143.	0.072	86.28	1.500
PB-214	483.14	241.99	369.	89.	0.045	92.29	0.669s
PB-214	590.06	295.45	211.	228.	0.114	32.87	1.198s
AC-228	676.45	338.65	327.	210.	0.105	47.61	1.204s
PB-214	703.15	352.01	325.	350.	0.175	30.18	1.002
SB-125	925.55	463.21	180.	66.	0.033	92.31	1.500
TL-208	1020.81	510.85	214.	178.	0.089	41.48	1.457s
TL-208	1165.82	583.36	144.	293.	0.147	25.87	1.144
BI-214	1218.07	609.49	103.	265.	0.133	24.51	0.970
CS-137	1322.67	661.79	123.	498.	0.249	17.79	1.300
BI-212	1453.75	727.34	120.	76.	0.038	82.42	1.683s
CS-134	1589.06	795.00	83.	49.	0.025	89.26	1.500s
AC-228	1821.79	911.38	109.	240.	0.120	29.72	1.428
AC-228	1936.81	968.90	53.	134.	0.067	34.72	1.541D
BI-214	2240.09	1120.56	78.	91.	0.046	57.80	1.736
CO-60	2345.77	1173.41	78.	281.	0.140	23.48	1.544
CO-60	2664.43	1332.76	47.	281.	0.141	22.25	1.601
K-40	2921.12	1461.12	31.	1104.	0.552	9.09	1.732
BI-214	3528.82	1765.03	8.	59.	0.030	41.97	2.007

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		1.1132E-01						
			477.56	1.113E-01	%(	3.422E-01	1.02E-01	G
K-40		1.2426E+01						
			1460.75	1.243E+01	(P	3.241E-01	3.83E-01	G
MN-54		1.2798E-03						
			834.81	1.280E-03	%(P	4.526E-02	1.31E-02	G
CO-57		6.0652E-04						
			122.07	6.065E-04	&(P	5.267E-02	1.57E-02	G K
			136.43	1.129E-02	%	3.958E-01	1.18E-01	G
CO-60		3.0244E-01						
			1332.51	3.167E-01	(P	3.898E-02	2.37E-02	G K
			1173.23	2.882E-01	(P	4.518E-02	2.27E-02	G K
Sr-85		-1.8621E-02						
			514.00	-1.862E-02	%(	4.583E-02	1.38E-02	G
Kr-85		-4.2219E+02						
			513.99	-4.222E+02	%(	1.039E+03	3.14E+02	G
Y-88		-9.1851E-05						
			1836.01	-9.185E-05	%(P	1.075E-02	1.46E-03	G K
			898.02	7.081E-03	% P	3.903E-02	1.14E-02	G
NB-94		-4.9858E-03						
			871.10	-4.986E-03	&(	3.584E-02	1.04E-02	G K
			702.50	-5.270E-04	%	3.385E-02	9.72E-03	G K
Ag-108M		8.3978E-04						
			722.95	8.398E-04	&(	6.241E-02	1.83E-02	G K
			614.37	-2.040E-02	& P	4.190E-02	1.27E-02	G
			433.93	1.143E-02	&	3.175E-02	9.52E-03	G
CD-109		1.0448E+00						
			88.04	1.045E+00	%(	1.883E+00	5.73E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-1.1666E-02						
		391.71	-1.167E-02	%(	5.679E-02	1.69E-02	G K
		255.04	-4.063E-01	&	1.771E+00	5.31E-01	G
SB-125	1.1780E-01						
		427.95	4.612E-02	%(P	9.955E-02	3.01E-02	G K
		600.77	2.217E-03	& P	1.766E-01	5.09E-02	G
		636.15	-3.510E-02	% P	2.951E-01	8.57E-02	G
		463.51	3.300E-01	(P	3.277E-01	1.04E-01	G
		176.29	9.968E-02	%	5.284E-01	1.58E-01	G
I-131	-7.0008E-03						
		364.48	-7.001E-03	&(P	4.827E-02	1.43E-02	G K
		636.97	-1.080E-02	%	4.681E-01	1.34E-01	G
		284.29	-1.952E-01	% P	6.447E-01	1.93E-01	G
CS-134	1.1328E-02						
		604.66	-1.754E-02	%(	4.226E-02	1.27E-02	G K
		795.76	4.432E-02	*(P	4.068E-02	1.32E-02	G
		569.29	2.246E-02	& P	2.042E-01	5.93E-02	G
		801.84	-5.493E-03	& P	3.972E-01	1.12E-01	G
CS-137	3.9213E-01						
		661.62	3.921E-01	(P	4.288E-02	2.33E-02	G
CE-139	-3.2037E-03						
		165.85	-3.204E-03	&(	4.826E-02	1.44E-02	G
EU-152	1.2244E-03						
		121.78	1.224E-03	&(P	1.494E-01	4.45E-02	G K
		344.30	-1.306E-02	% P	1.251E-01	3.70E-02	G
		1408.08	8.071E-02	%	1.161E-01	3.72E-02	G
		964.00	1.554E-01	% P	3.360E-01	1.02E-01	G
		1112.07	1.162E-02	%	3.158E-01	9.03E-02	G
		778.90	-5.432E-03	&	3.178E-01	9.18E-02	G
EU-154	7.0423E-03						
		123.10	7.042E-03	%(	8.804E-02	2.62E-02	G K
		1274.80	6.339E-03	%	9.274E-02	2.60E-02	G
		723.30	-1.335E-01	&	2.397E-01	7.31E-02	G
		1004.80	4.252E-02	%	2.242E-01	6.55E-02	G
EU-155	0.0000E+00						
		86.45	0.000E+00	&(	2.416E-01	7.20E-02	G K
		105.31	3.717E-02	%	2.300E-01	6.89E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	1.8876E-02						
		279.17	1.888E-02	%(P	3.912E-02	1.19E-02	G K
		72.87	-3.661E-01	% P	2.135E+00	6.40E-01	G
		70.83	-1.076E+00	%	3.877E+00	1.17E+00	G
		82.50	-7.936E-01	%	3.957E+00	1.19E+00	G
TL-208	2.0590E-01						
		583.14	2.059E-01	(P	4.106E-02	1.80E-02	G
		510.72	4.300E-01	+ P	1.708E-01	6.84E-02	G
PB-212	6.6184E-01						
		238.63	6.300E-01	(P	9.312E-02	3.79E-02	G K
							Energy duplication
		77.11	5.606E-01	} P	3.794E-01	9.90E-02	G
		74.81	1.136E+00	+ P	7.442E-01	2.39E-01	G
PB-214	3.9061E-01						
		351.99	3.799E-01	(P	9.407E-02	3.88E-02	G K
		295.22	4.190E-01	@(P	1.294E-01	4.67E-02	G
							Energy duplication
		77.11	2.632E-01	} P	9.314E-01	2.16E-01	G
		241.92	3.707E-01	(	3.831E-01	1.14E-01	G
BI-212	4.5889E-01						
		727.17	4.589E-01	(P	3.274E-01	1.27E-01	G K
		1620.56	1.850E-01	& P	1.158E+00	3.26E-01	G
		785.42	5.637E-01	%	2.037E+00	6.05E-01	G
BI-214	3.5963E-01						
		609.32	3.596E-01	(P	6.767E-02	3.01E-02	G K
		1764.51	5.179E-01	+ P	1.363E-01	7.65E-02	G
		1120.28	6.003E-01	+ P	2.888E-01	1.18E-01	G
RA-224	1.1361E+00						
		241.00	1.136E+00	(	1.052E+00	3.27E-01	G
RA-226	1.0607E+00						
		185.99	1.061E+00	(P	1.126E+00	3.47E-01	G
AC-228	6.9291E-01						
		911.07	7.041E-01	(P	1.506E-01	7.07E-02	G K
		968.90	6.811E-01	(P	1.868E-01	7.89E-02	G
		338.40	6.831E-01	*(P	2.827E-01	1.09E-01	G
TH-227	-2.9352E-01						
		236.00	-2.935E-01	%(	4.169E-01	1.27E-01	G K
		256.25	-3.915E-02	& P	5.164E-01	1.53E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	3.0446E-02						
		98.44	3.045E-02	%(P	2.183E-01	6.53E-02	G K
		946.00	-3.976E-02	% P	2.295E-01	6.74E-02	G
		131.28	8.195E-03	% P	2.162E-01	6.45E-02	G
		94.67	-1.156E-01	% P	4.171E-01	1.26E-01	G
		883.24	5.952E-02	%	2.481E-01	7.25E-02	G
		926.70	7.478E-02	&	3.206E-01	9.40E-02	G
		569.26	3.274E-02	& P	3.025E-01	8.79E-02	G
TH-234	5.0933E-01						
		63.29	5.093E-01	%(P	6.560E+00	1.95E+00	G K
		92.80	1.293E+00	% P	2.144E+00	6.50E-01	G
		92.38	-3.009E-01	% P	2.528E+00	7.46E-01	G
AM-241	6.6148E-02						
		59.54	6.615E-02	%(P	1.132E+00	3.37E-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	1.0890E-01	1.1132E-01	3.0736E-01	3.0743E-01	3.347E-01
K-40		1.2426E+01	1.2426E+01	1.1492E+00	1.3569E+00	
MN-54	#A	1.2750E-03	1.2798E-03	3.9328E-02	3.9328E-02	4.510E-02
CO-57	#B	6.0390E-04	6.0652E-04	4.7085E-02	4.7085E-02	5.244E-02
CO-60		3.0225E-01	3.0244E-01	4.9314E-02	5.2347E-02	
Sr-85	#A	-1.8288E-02	-1.8621E-02	4.1491E-02	4.1505E-02	4.501E-02
Kr-85	#A	-4.2219E+02	-4.2219E+02	9.4072E+02	9.4104E+02	1.039E+03
Y-88	#B	-9.0848E-05	-9.1851E-05	5.5111E-04	5.5113E-04	1.063E-02
NB-94	#B	-4.9858E-03	-4.9858E-03	3.1195E-02	3.1197E-02	3.584E-02
Ag-108M	#B	8.3975E-04	8.3978E-04	5.4931E-02	5.4931E-02	6.241E-02
CD-109	#A	1.0421E+00	1.0448E+00	1.7179E+00	1.7189E+00	1.878E+00
SN-113	#B	-1.1548E-02	-1.1666E-02	5.0719E-02	5.0724E-02	5.621E-02
SB-125	#F	1.1766E-01	1.1780E-01	1.1085E-01	1.1106E-01	9.944E-02
I-131	#B	-6.0525E-03	-7.0008E-03	4.8093E-02	4.8095E-02	4.174E-02
CS-134	#B	1.1311E-02	1.1328E-02	1.0130E-02	1.0151E-02	4.219E-02
CS-137		3.9209E-01	3.9213E-01	6.9973E-02	7.3584E-02	
CE-139	#A	-3.1766E-03	-3.2037E-03	4.3202E-02	4.3202E-02	4.785E-02
EU-152	#B	1.2241E-03	1.2244E-03	1.3343E-01	1.3343E-01	1.493E-01
EU-154	#B	7.0397E-03	7.0423E-03	7.8609E-02	7.8610E-02	8.800E-02
EU-155	#B	0.0000E+00	0.0000E+00	2.1613E-01	2.1613E-01	2.414E-01
HG-203	#B	1.8408E-02	1.8876E-02	3.5598E-02	3.5615E-02	3.815E-02
TL-208		2.0590E-01	2.0590E-01	5.4057E-02	5.5363E-02	
PB-212		6.6184E-01	6.6184E-01	1.1943E-01	1.2546E-01	
PB-214		3.9061E-01	3.9061E-01	1.1980E-01	1.2193E-01	
BI-212		4.5889E-01	4.5889E-01	3.8071E-01	3.8164E-01	
BI-214		3.5963E-01	3.5963E-01	9.0291E-02	9.2673E-02	
RA-224		1.1361E+00	1.1361E+00	9.8026E-01	9.8248E-01	1.052E+00
RA-226	#A	1.0606E+00	1.0607E+00	1.0398E+00	1.0416E+00	1.126E+00
AC-228		6.9291E-01	6.9291E-01	1.5332E-01	1.5851E-01	
TH-227	#B	-2.9352E-01	-2.9352E-01	3.8240E-01	3.8278E-01	4.169E-01
PA-234	#B	3.0446E-02	3.0446E-02	1.9598E-01	1.9599E-01	2.183E-01
TH-234	#B	5.0933E-01	5.0933E-01	5.8608E+00	5.8609E+00	6.560E+00
AM-241	#A	6.6148E-02	6.6148E-02	1.0116E+00	1.0117E+00	1.132E+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) 1.7026340E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.7026566E+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_30NOV2005_1806.An1

Sample description
FSS-NOL-06-03-014-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30NOV2005_1806.An1

Acquisition information
Start time: 30-Nov-2005 18:06:43
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: 2.0360E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0360E+03) =
4.9116E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	29-Nov-2005 01:30:00
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. 22 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1271

***** 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	190.	17.37	0.99	9.052E-03	74.81	9.600	1.451E+00	PB212
77.15	223.	13.44	0.99	1.011E-02	77.11	17.500	1.002E+00	PB212
					77.11	10.700	1.639E+00	PB214
87.00	118.	26.74	1.00	1.431E-02				
89.93	120.	28.01	1.00	1.542E-02				
93.69	125.	27.54	1.00	1.675E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.19	198.	18.30	0.83	2.566E-02	185.99	3.280	1.463E+00	RA226
209.95	143.	28.61	1.18	2.468E-02				
238.94	1540.	3.05	1.09	2.319E-02	238.63	43.100	1.014E+00	PB212
241.66	188.	21.18	1.09	2.304E-02	241.00	3.900	1.389E+00	RA224
					241.92	7.470	7.267E-01	PB214
270.20	89.	33.11	1.30	2.151E-02				
277.69	95.	34.55	1.56	2.113E-02				
277.69	95.	34.55	1.56	2.113E-02	279.17	81.500	3.768E-02	HG203
295.20	295.	12.49	0.86	2.025E-02	295.22	19.200	4.974E-01	PB214
300.65	149.	22.64	0.95	1.999E-02				
327.94	84.	24.00	1.40	1.874E-02				
338.44	360.	10.97	1.15	1.830E-02	338.40	12.010	1.085E+00	AC228
351.97	514.	7.09	1.26	1.775E-02	351.99	37.100	5.127E-01	PB214
409.69	62.	37.44	1.11	1.574E-02				
463.48	86.	28.98	1.04	1.425E-02				
463.48	86.	28.98	1.04	1.425E-02	463.51	10.000	3.942E-01	SB125
511.01	181.	14.65	1.30	1.317E-02	510.72	22.500	3.447E-01	TL208
583.28	531.	6.48	1.39	1.184E-02	583.14	86.000	3.434E-01	TL208
609.36	416.	8.46	1.31	1.144E-02	609.32	46.090	5.150E-01	BI214
661.38	40.	37.19	1.56	1.073E-02				

661.38	40.	37.19	1.56	1.073E-02	661.62	84.620	PBC<MDA	CS137
726.51	137.	19.90	1.55	9.972E-03	723.30	19.700	4.625E-01	EU154
					727.17	11.800	7.722E-01	BI212
795.05	76.	27.75	1.26	9.308E-03				
795.05	76.	27.75	1.26	9.308E-03	795.76	85.400	6.378E-02	CS134
860.68	94.	22.10	1.18	8.767E-03				
911.45	383.	6.95	1.45	8.399E-03	911.07	29.000	1.034E+00	AC228
964.64	52.	26.12	1.54	8.052E-03	964.00	14.580	2.919E-01	EU152
969.32	207.	8.39	1.54	8.023E-03	968.90	17.460	9.809E-01	AC228
1119.89	138.	18.37	1.66	7.214E-03	1120.28	15.040	8.359E-01	BI214
1239.62	72.	25.00	0.98	6.696E-03				
1461.14	1503.	2.63	1.95	5.931E-03	1460.75	10.700	1.552E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.79	80.	10.98	2.43	5.142E-03	1764.51	15.920	6.465E-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	
179.04	89.91	502.	120.	0.060	84.03	1.002	PB-214	lD
419.07	209.95	640.	143.	0.072	85.84	1.177	NP-239	s
539.56	270.20	358.	89.	0.045	99.33	1.300	AC-228	
600.44	300.65	379.	149.	0.074	67.91	0.951	PB-212	s
655.03	327.94	168.	84.	0.042	71.99	1.398	AC-228	s
818.51	409.69	188.	62.	0.031	112.33	1.114	AC-228	
1321.84	661.38	81.	40.	0.020	111.58	1.563	CS-137	l
1720.40	860.68	104.	94.	0.047	55.12	1.185	TL-208	s
1929.22	964.70	62.	57.	0.028	71.24	1.538	AC-228	D
2478.18	1239.62	84.	72.	0.036	75.00	0.977	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	469.	190.	0.095	52.12	0.993D
PB-212	153.39	77.11	465.	223.	0.112	40.33	0.995A
TH-234	185.44	93.13	1211.	170.	0.085	81.13	1.500s
TH-234	185.42	93.12	1206.	166.	0.083	82.46	1.500s
RA-226	371.55	186.19	546.	186.	0.093	54.89	0.831s
PB-212	476.42	238.63	305.	1536.	0.768	8.95	1.093D
PB-214	483.00	241.92	441.	131.	0.066	55.16	1.095A
HG-203	553.94	277.40	363.	93.	0.047	92.01	1.500s
PB-214	589.54	295.20	414.	291.	0.146	37.46	0.859
AC-228	676.03	338.44	390.	359.	0.180	32.92	1.147
PB-214	703.07	351.97	297.	509.	0.254	21.28	1.264
SB-125	925.57	463.23	202.	82.	0.041	79.45	1.500
TL-208	1021.13	511.01	212.	154.	0.077	43.94	1.303s
TL-208	1165.67	583.28	209.	527.	0.264	19.44	1.388
BI-214	1217.82	609.36	228.	409.	0.205	25.37	1.310
BI-212	1452.82	726.87	163.	149.	0.075	55.53	1.555s
CS-134	1589.42	795.18	89.	49.	0.025	91.86	1.500s
AC-228	1821.92	911.45	99.	380.	0.190	20.86	1.451

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	1929.13	965.06	94.	52.	0.026	88.81	1.538
AC-228	1936.81	968.90	48.	207.	0.104	25.18	1.541D
BI-214	2238.76	1119.89	132.	137.	0.068	55.12	1.663s
K-40	2921.15	1461.14	39.	1484.	0.742	7.88	1.950
BI-214	3528.33	1764.79	3.	80.	0.040	32.93	2.429s

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		-5.4131E-03					
			477.56	-5.413E-03	%(	3.197E-01 9.33E-02 G	
K-40		1.5517E+01					
			1460.75	1.552E+01	(P	3.331E-01 4.13E-01 G	
MN-54		1.6914E-02					
			834.81	1.691E-02	%(P	3.093E-02 9.46E-03 G	
CO-57		-8.6828E-03					
			122.07	-8.683E-03	%(P	5.058E-02 1.52E-02 G K	
			136.43	-1.192E-01	%	4.264E-01 1.28E-01 G	
CO-60		1.4784E-02					
			1332.51	1.478E-02	%(P	3.523E-02 1.05E-02 G K	
			1173.23	2.921E-03	& P	4.618E-02 1.33E-02 G K	
Sr-85		-1.1599E-02					
			514.00	-1.160E-02	%(	4.255E-02 1.27E-02 G	
Kr-85		-2.6291E+02					
			513.99	-2.629E+02	%(	9.646E+02 2.88E+02 G	
Y-88		5.0175E-03					
			1836.01	5.017E-03	&(P	2.157E-02 6.02E-03 G K	
			898.02	-7.278E-03	% P	3.940E-02 1.15E-02 G	
NB-94		-9.8417E-03					
			871.10	-9.842E-03	%(	3.450E-02 1.02E-02 G K	
			702.50	-1.287E-02	&	3.282E-02 9.86E-03 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-4.0835E-04						
		722.95	-4.084E-04	%(	4.481E-02	1.30E-02	G K
		614.37	-2.157E-02	% P	4.117E-02	1.25E-02	G
		433.93	5.381E-03	%	3.439E-02	1.02E-02	G
CD-109	-1.2695E-01						
		88.04	-1.270E-01	&(	2.136E+00	6.40E-01	G
SN-113	6.0653E-03						
		391.71	6.065E-03	&(	4.768E-02	1.41E-02	G K
		255.04	4.981E-01	%	1.543E+00	4.64E-01	G
SB-125	1.2491E-01						
		427.95	3.820E-02	%(P	9.301E-02	2.80E-02	G K
		600.77	1.627E-02	& P	1.769E-01	5.16E-02	G
		636.15	-5.062E-02	% P	3.081E-01	9.03E-02	G
		463.51	3.816E-01	(P	3.214E-01	1.03E-01	G
		176.29	-1.169E-01	%	6.239E-01	1.87E-01	G
I-131	1.0951E-02						
		364.48	1.095E-02	&(P	4.353E-02	1.30E-02	G K
		636.97	-4.491E-02	%	5.136E-01	1.49E-01	G
		284.29	-6.243E-02	% P	6.120E-01	1.82E-01	G
CS-134	1.9404E-02						
		604.66	3.876E-04	%(	4.278E-02	1.25E-02	G K
		795.76	4.114E-02	*(P	3.909E-02	1.26E-02	G
		569.29	8.013E-03	% P	2.141E-01	6.21E-02	G
		801.84	-9.859E-02	% P	4.072E-01	1.19E-01	G
CS-137	2.7346E-02						
		661.62	2.735E-02	%(P	3.835E-02	1.19E-02	G
CE-139	-7.5876E-03						
		165.85	-7.588E-03	%(	4.950E-02	1.48E-02	G
EU-152	8.0202E-02						
		121.78	-2.561E-02	%(P	1.477E-01	4.43E-02	G K
		344.30	-2.476E-02	% P	1.190E-01	3.55E-02	G
		1408.08	6.180E-02	&	1.344E-01	4.07E-02	G
		964.00	2.924E-01	(P	2.709E-01	8.75E-02	G
		1112.07	5.396E-02	%	2.937E-01	8.57E-02	G
		778.90	8.384E-04	%	2.973E-01	8.58E-02	G
EU-154	-1.9512E-02						
		123.10	-1.951E-02	&(	9.896E-02	2.97E-02	G K
		1274.80	-2.425E-02	%	1.176E-01	3.44E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-6.251E-02 %   2.277E-01 6.79E-02 G
                         1004.80 1.412E-02 &   1.914E-01 5.48E-02 G

EU-155      -7.5798E-02
                           86.45-7.580E-02 %(  2.163E-01 6.53E-02 G K
                          105.31 2.367E-02 &   2.454E-01 7.35E-02 G

HG-203       3.6989E-02
                          279.17 3.699E-02 &(P 3.628E-02 1.13E-02 G K
                           72.87-1.697E-01 % P 1.951E+00 5.83E-01 G
                           70.83 5.738E-02 %   4.859E+00 1.45E+00 G
                           82.50-8.587E-01 %   3.977E+00 1.20E+00 G

TL-208       3.4371E-01
                          583.14 3.434E-01  (P 4.565E-02 2.24E-02 G
                          510.72 3.447E-01 *(P 1.580E-01 5.93E-02 G

PB-212       1.0147E+00
                          238.63 1.020E+00  (P 5.578E-02 3.07E-02 G K
                                                          Energy duplication
                           77.11 8.379E-01 } P 3.869E-01 1.13E-01 G
                           74.81 1.451E+00 + P 7.916E-01 2.56E-01 G

PB-214       5.0748E-01
                          351.99 5.127E-01  (P 8.369E-02 3.68E-02 G K
                          295.22 4.974E-01  (P 1.664E-01 6.30E-02 G
                                                          Energy duplication
                           77.11 3.601E-02 } P 9.772E-01 2.29E-01 G
                          241.92 5.075E-01 }   3.881E-01 9.33E-02 G

BI-212       8.4166E-01
                          727.17 8.417E-01 *(P 3.510E-01 1.56E-01 G K
                         1620.56 9.198E-02 % P 8.370E-01 2.27E-01 G
                          785.42 1.066E+00 %   1.789E+00 5.49E-01 G

BI-214       5.1505E-01
                          609.32 5.150E-01  (P 9.197E-02 4.42E-02 G K
                         1764.51 6.465E-01 + P 9.032E-02 7.39E-02 G
                         1120.28 8.359E-01 + P 3.447E-01 1.56E-01 G

RA-224       8.2368E-01
                                                          Derived Ave Activity
                          241.00 8.237E-01 }(  1.328E+00 4.16E-01 G

RA-226       1.4629E+00
                          185.99 1.463E+00 @(P 8.802E-01 2.86E-01 G

AC-228       1.0288E+00
                          911.07 1.034E+00  (P 1.339E-01 7.26E-02 G K
                          968.90 9.810E-01  (P 1.656E-01 8.24E-02 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          338.40 1.085E+00  (P 2.859E-01 1.19E-01 G

TH-227      -1.4600E-01
                          236.00-1.460E-01 &(  3.830E-01 1.16E-01 G K
                          256.25 1.677E-01 % P 4.814E-01 1.45E-01 G

PA-234       8.6479E-02
                           98.44 8.648E-02 %(P 2.330E-01 7.04E-02 G K
                          946.00-2.283E-02 % P 1.903E-01 5.52E-02 G
                          131.28-3.341E-02 & P 2.294E-01 6.88E-02 G
                           94.67-3.898E-03 % P 4.054E-01 1.21E-01 G
                          883.24 6.735E-02 %   2.140E-01 6.32E-02 G
                          926.70 1.086E-01 &   2.763E-01 8.28E-02 G
                          569.26 1.225E-02 % P 3.171E-01 9.20E-02 G

TH-234       1.6409E+00
                           63.29 4.888E-01 &(P 6.568E+00 1.96E+00 G K
                           92.80 2.238E+00  (P 2.213E+00 6.80E-01 G
                           92.38 2.692E+00 &(P 2.611E+00 8.04E-01 G

AM-241       2.8910E-01
                           59.54 2.891E-01 %(P 1.127E+00 3.39E-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	-5.2955E-03	-5.4131E-03	2.7975E-01	2.7975E-01	3.127E-01
K-40		1.5517E+01	1.5517E+01	1.2381E+00	1.5312E+00	
MN-54	#A	1.6851E-02	1.6914E-02	2.8365E-02	2.8382E-02	3.082E-02
CO-57	#B	-8.6452E-03	-8.6828E-03	4.7029E-02	4.7032E-02	5.036E-02
CO-60	#B	1.4775E-02	1.4784E-02	3.1352E-02	3.1364E-02	3.521E-02
Sr-85	#A	-1.1391E-02	-1.1599E-02	3.8170E-02	3.8176E-02	4.178E-02
Kr-85	#A	-2.6290E+02	-2.6291E+02	8.6538E+02	8.6551E+02	9.646E+02
Y-88	#B	4.9626E-03	5.0175E-03	1.8050E-02	1.8053E-02	2.134E-02
NB-94	#B	-9.8417E-03	-9.8417E-03	3.0653E-02	3.0658E-02	3.450E-02
Ag-108M	#B	-4.0834E-04	-4.0835E-04	3.9020E-02	3.9020E-02	4.481E-02
CD-109	#A	-1.2663E-01	-1.2695E-01	1.9189E+00	1.9189E+00	2.131E+00
SN-113	#B	6.0038E-03	6.0653E-03	4.2248E-02	4.2249E-02	4.720E-02
SB-125	#F	1.2477E-01	1.2491E-01	1.0078E-01	1.0104E-01	9.290E-02
I-131	#B	9.4641E-03	1.0951E-02	3.8953E-02	3.8958E-02	3.762E-02
CS-134	#B	1.9373E-02	1.9404E-02	1.7856E-02	1.7891E-02	4.271E-02
CS-137	#A	2.7343E-02	2.7346E-02	3.5631E-02	3.5666E-02	3.834E-02
CE-139	#A	-7.5231E-03	-7.5876E-03	4.4521E-02	4.4524E-02	4.908E-02
EU-152	#B	8.0182E-02	8.0202E-02	7.1977E-02	7.2114E-02	1.477E-01
EU-154	#B	-1.9505E-02	-1.9512E-02	8.9066E-02	8.9073E-02	9.892E-02
EU-155	#B	-7.5749E-02	-7.5798E-02	1.9586E-01	1.9590E-01	2.161E-01
HG-203	#	3.6070E-02	3.6989E-02	3.4049E-02	3.4116E-02	3.538E-02
TL-208		3.4371E-01	3.4371E-01	6.7373E-02	7.0266E-02	
PB-212		1.0147E+00	1.0147E+00	9.1517E-02	1.0884E-01	
PB-214		5.0748E-01	5.0748E-01	1.0917E-01	1.1307E-01	
BI-212	#	8.4166E-01	8.4166E-01	4.6890E-01	4.7144E-01	
BI-214		5.1505E-01	5.1505E-01	1.3271E-01	1.3604E-01	
RA-224	A	8.2368E-01	8.2368E-01	1.2248E+00	1.2258E+00	
RA-226	#	1.4629E+00	1.4629E+00	8.5896E-01	8.6314E-01	
AC-228		1.0288E+00	1.0288E+00	1.5970E-01	1.7050E-01	
TH-227	#B	-1.4600E-01	-1.4600E-01	3.4730E-01	3.4741E-01	3.830E-01
PA-234	#B	8.6479E-02	8.6479E-02	2.1123E-01	2.1128E-01	2.330E-01
TH-234	#B	1.6409E+00	1.6409E+00	1.4695E+00	1.4723E+00	6.568E+00
AM-241	#A	2.8910E-01	2.8910E-01	1.0161E+00	1.0162E+00	1.127E+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) 2.2054766E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.2054770E+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_30NOV2005_1843.An1

Sample description
FSS-NOL-06-03-001-F-(RC)

Spectrum Filename: C:\GammaVision\Spectra\103F_30NOV2005_1843.An1

Acquisition information

Start time:	30-Nov-2005 18:43:37
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:	1.8040E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8040E+03) = 5.5432E+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	29-Nov-2005 00:23:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2495

***** 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
74.60	94.	28.69	0.99	9.100E-03	74.81	9.600	7.849E-01	PB212
77.40	213.	13.87	0.99	1.039E-02	77.11	17.500	8.881E-01	PB212
					77.11	10.700	1.452E+00	PB214
93.18	99.	38.04	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.47	189.	20.44	1.01	2.565E-02	185.99	3.280	1.563E+00	RA226
209.96	152.	23.70	0.86	2.468E-02				
238.92	1170.	3.42	1.09	2.318E-02	238.63	43.100	8.677E-01	PB212
241.75	162.	15.99	1.09	2.303E-02	241.00	3.900	1.351E+00	RA224
					241.92	7.470	7.069E-01	PB214
270.39	122.	23.34	1.68	2.150E-02				
295.33	225.	11.59	1.22	2.024E-02	295.22	19.200	4.265E-01	PB214
300.27	82.	33.16	0.99	2.000E-02				
328.26	68.	29.26	1.29	1.873E-02				
338.41	269.	11.59	1.11	1.830E-02	338.40	12.010	9.127E-01	AC228
352.00	425.	8.84	1.04	1.775E-02	351.99	37.100	4.770E-01	PB214
462.85	93.	23.50	1.32	1.426E-02				
462.85	93.	23.50	1.32	1.426E-02	463.51	10.000	4.818E-01	SB125
510.31	177.	13.46	1.98	1.318E-02	510.72	22.500	3.802E-01	TL208
583.31	409.	6.82	1.44	1.184E-02	583.14	86.000	2.973E-01	TL208
609.37	338.	9.06	1.20	1.144E-02	609.32	46.090	4.710E-01	BI214
727.21	90.	22.14	1.56	9.964E-03	727.17	11.800	5.670E-01	BI212
768.59	47.	37.11	0.95	9.550E-03				
795.32	65.	22.32	1.53	9.305E-03				
795.32	65.	22.32	1.53	9.305E-03	795.76	85.400	6.094E-02	CS134
859.86	68.	24.19	1.45	8.773E-03				
911.35	238.	9.20	1.48	8.399E-03	911.07	29.000	7.226E-01	AC228

964.37	42.	27.47	1.54	8.054E-03	964.00	14.580	PBC<MDA	EU152
969.19	161.	9.85	1.54	8.024E-03	968.90	17.460	8.620E-01	AC228
1120.39	90.	22.01	1.82	7.211E-03	1120.28	15.040	6.119E-01	BI214
1461.15	1271.	2.88	2.07	5.931E-03	1460.75	10.700	1.478E+01	K40
1621.24	19.	30.00	0.70	5.488E-03	1620.56	2.750	9.310E-01	BI212
1764.64	74.	11.62	1.63	5.141E-03	1764.51	15.920	6.472E-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
419.07	209.96	479.	152.	0.076	71.10	0.858	NP-239 s
539.93	270.39	287.	122.	0.061	70.02	1.683	AC-228 s
599.69	300.27	260.	82.	0.041	99.47	0.993	PB-212
655.67	328.26	164.	68.	0.034	87.79	1.286	RH-106M
1536.25	768.59	94.	47.	0.024	111.34	0.954	BI-214
1718.76	859.86	65.	68.	0.034	72.56	1.449	TL-208 s
1928.19	964.31	42.	47.	0.024	72.54	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	348.	116.	0.058	71.74	0.993D
PB-212	153.39	77.11	352.	181.	0.091	46.76	0.995A
RA-226	371.77	186.30	712.	151.	0.076	72.15	1.500s
PB-212	477.03	238.94	651.	1176.	0.588	13.78	0.878
RA-224	482.58	241.71	714.	143.	0.071	83.28	1.500
PB-214	589.81	295.33	212.	221.	0.111	34.76	1.216s
AC-228	675.96	338.41	261.	268.	0.134	34.77	1.113s
PB-214	703.14	352.00	314.	419.	0.210	26.51	1.035s
SB-125	925.54	463.21	154.	80.	0.040	72.77	1.500s
TL-208	1019.74	510.31	162.	150.	0.075	40.38	1.981s
TL-208	1165.72	583.31	136.	404.	0.202	20.46	1.439
BI-214	1217.83	609.37	168.	332.	0.166	27.17	1.196
BI-212	1453.49	727.21	105.	89.	0.045	66.41	1.565
CS-134	1589.25	795.10	45.	49.	0.024	72.45	1.500s
AC-228	1821.73	911.35	87.	235.	0.118	27.59	1.479
EU-152	1928.68	964.83	80.	40.	0.020	105.42	1.538s
AC-228	1936.81	968.90	46.	161.	0.081	29.58	1.541D
BI-214	2239.76	1120.39	89.	89.	0.044	66.03	1.819
K-40	2921.17	1461.15	37.	1252.	0.626	8.65	2.069
BI-212	3241.29	1621.24	4.	19.	0.009	90.01	0.698s
BI-214	3528.03	1764.64	3.	71.	0.035	34.87	1.625

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		-5.7365E-02					
			477.56	-5.736E-02	%(	2.950E-01 8.69E-02	G
K-40		1.4779E+01					
			1460.75	1.478E+01	(P	3.652E-01 4.33E-01	G
MN-54		-7.8384E-03					
			834.81	-7.838E-03	%(P	3.816E-02 1.12E-02	G
CO-57		-2.0485E-03					
			122.07	-2.049E-03	&(P	4.596E-02 1.37E-02	G K
			136.43	4.112E-02	%	3.808E-01 1.14E-01	G
CO-60		1.4381E-02					
			1332.51	1.438E-02	%(P	3.564E-02 1.05E-02	G K
			1173.23	1.418E-02	% P	4.970E-02 1.46E-02	G K
Sr-85		-2.4096E-02					
			514.00	-2.410E-02	&(	4.395E-02 1.34E-02	G
Kr-85		-5.4595E+02					
			513.99	-5.459E+02	&(	9.958E+02 3.03E+02	G
Y-88		-6.4322E-04					
			1836.01	-6.432E-04	&(P	2.885E-02 7.53E-03	G K
			898.02	3.261E-03	& P	3.628E-02 1.04E-02	G
NB-94		4.7316E-03					
			871.10	4.732E-03	%(	2.535E-02 7.27E-03	G K
			702.50	7.792E-04	&	3.935E-02 1.14E-02	G K
Ag-108M		-2.1028E-02					
			722.95	-2.103E-02	%(	5.017E-02 1.51E-02	G K
			614.37	-1.656E-04	% P	3.618E-02 1.04E-02	G
			433.93	8.371E-03	%	3.325E-02 9.87E-03	G
CD-109		6.4373E-01					
			88.04	6.437E-01	%(	1.952E+00 5.89E-01	G
SN-113		2.8374E-03					
			391.71	2.837E-03	%(	5.091E-02 1.49E-02	G K
			255.04	-2.963E-01	&	1.579E+00 4.71E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.1962E-01						
		427.95	1.804E-02	%(P	1.053E-01	3.11E-02	G K
		600.77	6.255E-02	% P	1.481E-01	4.46E-02	G
		636.15	3.753E-02	& P	2.725E-01	7.90E-02	G
		463.51	4.203E-01	*(P	3.190E-01	1.04E-01	G
		176.29	-2.933E-02	%	5.820E-01	1.73E-01	G
I-131	-8.8553E-03						
		364.48	-8.855E-03	%(P	4.678E-02	1.39E-02	G K
		636.97	0.000E+00	%	5.691E-01	1.64E-01	G
		284.29	1.397E-01	% P	5.979E-01	1.78E-01	G
CS-134	1.5555E-02						
		604.66	-1.102E-02	%(	3.958E-02	1.18E-02	G K
		795.76	4.593E-02	@(P	3.206E-02	1.11E-02	G
		569.29	2.719E-02	& P	2.174E-01	6.33E-02	G
		801.84	-5.376E-02	% P	3.501E-01	9.90E-02	G
CS-137	1.0063E-02						
		661.62	1.006E-02	%(P	4.430E-02	1.30E-02	G
CE-139	-4.5275E-03						
		165.85	-4.528E-03	&(	4.564E-02	1.36E-02	G
EU-152	7.7711E-02						
		121.78	-9.250E-03	&(P	1.438E-01	4.28E-02	G K
		344.30	-1.626E-03	& P	1.133E-01	3.31E-02	G
		1408.08	2.249E-02	%	1.310E-01	3.68E-02	G
		964.00	2.521E-01	(P	2.826E-01	8.98E-02	G
		1112.07	1.585E-02	&	2.916E-01	8.30E-02	G
		778.90	6.495E-03	&	3.081E-01	8.87E-02	G
EU-154	9.1790E-04						
		123.10	9.179E-04	&(	1.044E-01	3.10E-02	G K
		1274.80	1.694E-02	&	1.193E-01	3.44E-02	G
		723.30	-1.081E-01	%	2.461E-01	7.44E-02	G
		1004.80	-1.854E-02	%	2.105E-01	6.03E-02	G
EU-155	1.6924E-02						
		86.45	1.692E-02	%(	2.068E-01	6.16E-02	G K
		105.31	3.599E-02	%	2.405E-01	7.20E-02	G
HG-203	2.0132E-02						
		279.17	2.013E-02	&(P	3.858E-02	1.17E-02	G K
		72.87	-5.778E-02	% P	2.600E+00	7.77E-01	G
		70.83	-1.147E+00	&	4.406E+00	1.33E+00	G
		82.50	2.926E-02	&	4.076E+00	1.21E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9731E-01						
		583.14	2.973E-01	(P	4.191E-02	2.05E-02	G
		510.72	3.802E-01	+ P	1.566E-01	6.03E-02	G
PB-212	9.0491E-01						
		238.63	8.811E-01	(P	9.111E-02	4.09E-02	G K
							Energy duplication
		77.11	7.673E-01	} P	3.817E-01	1.20E-01	G
		74.81	9.987E-01	(P	7.729E-01	2.45E-01	G
PB-214	4.5974E-01						
		351.99	4.770E-01	@(P	9.694E-02	4.27E-02	G K
		295.22	4.265E-01	(P	1.359E-01	5.03E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.319E-01	0.00E+00	G
		241.92	4.030E-01	%	5.832E-01	1.78E-01	G
BI-212	6.3581E-01						
		727.17	5.670E-01	(P	3.215E-01	1.26E-01	G K
		1620.56	9.310E-01	(P	6.111E-01	2.80E-01	G
		785.42	-5.793E-02	%	1.814E+00	5.20E-01	G
BI-214	4.7103E-01						
		609.32	4.710E-01	(P	8.979E-02	4.35E-02	G K
		1764.51	6.472E-01	+ P	1.019E-01	7.87E-02	G
		1120.28	6.119E-01	+ P	3.230E-01	1.38E-01	G
RA-224	1.1886E+00						
		241.00	1.189E+00	(	1.059E+00	3.30E-01	G
RA-226	1.3473E+00						
		185.99	1.347E+00	@(P	1.131E+00	3.52E-01	G
AC-228	8.0302E-01						
		911.07	7.226E-01	(P	1.419E-01	6.74E-02	G K
		968.90	8.611E-01	(P	1.833E-01	8.50E-02	G
		338.40	9.127E-01	@(P	2.659E-01	1.06E-01	G
TH-227	-1.2201E-02						
		236.00	-1.220E-02	%(	5.198E-01	1.55E-01	G K
		256.25	4.640E-02	% P	4.425E-01	1.31E-01	G
PA-234	3.5981E-03						
		98.44	3.598E-03	%(P	2.352E-01	7.01E-02	G K
		946.00	5.689E-03	% P	1.559E-01	4.38E-02	G
		131.28	1.758E-02	& P	2.211E-01	6.60E-02	G
		94.67	-1.066E-01	& P	3.786E-01	1.14E-01	G
		883.24	6.058E-03	&	2.865E-01	8.12E-02	G
		926.70	-6.744E-03	&	2.603E-01	7.26E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 4.029E-02 & P 3.219E-01 9.38E-02 G

TH-234       9.7974E-01
                           63.29 9.797E-01 %(P 6.264E+00 1.87E+00 G K
                           92.80 1.496E+00 % P 2.207E+00 6.71E-01 G
                           92.38 1.596E+00 & P 2.659E+00 8.06E-01 G

AM-241       3.0283E-03
                           59.54 3.028E-03 &(P 9.666E-01 2.86E-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	-5.6066E-02	-5.7365E-02	2.6070E-01	2.6072E-01	2.883E-01
K-40		1.4779E+01	1.4779E+01	1.2975E+00	1.5555E+00	
MN-54	#A	-7.8078E-03	-7.8384E-03	3.6124E-02	3.6127E-02	3.801E-02
CO-57	#B	-2.0392E-03	-2.0485E-03	4.8000E-02	4.8000E-02	4.575E-02
CO-60	#B	1.4372E-02	1.4381E-02	3.1495E-02	3.1506E-02	3.562E-02

Sr-85	#A	-2.3646E-02	-2.4096E-02	4.0185E-02	4.0210E-02	4.313E-02
Kr-85	#A	-5.4594E+02	-5.4595E+02	9.1040E+02	9.1095E+02	9.958E+02
Y-88	#B	-6.3588E-04	-6.4322E-04	3.0560E-02	3.0560E-02	2.852E-02
NB-94	#B	4.7316E-03	4.7316E-03	2.1812E-02	2.1814E-02	2.535E-02
Ag-108M	#B	-2.1028E-02	-2.1028E-02	4.5396E-02	4.5413E-02	5.017E-02
CD-109	#A	6.4199E-01	6.4373E-01	1.7660E+00	1.7663E+00	1.947E+00
SN-113	#B	2.8074E-03	2.8374E-03	4.4773E-02	4.4773E-02	5.037E-02
SB-125	#F	1.1948E-01	1.1962E-01	8.8438E-02	8.8710E-02	1.051E-01
I-131	#B	-7.6058E-03	-8.8553E-03	4.5762E-02	4.5765E-02	4.018E-02
CS-134	#B	1.5529E-02	1.5555E-02	1.1289E-02	1.1325E-02	3.952E-02
CS-137	#A	1.0062E-02	1.0063E-02	3.9148E-02	3.9153E-02	4.429E-02
CE-139	#A	-4.4874E-03	-4.5275E-03	4.0836E-02	4.0837E-02	4.523E-02
EU-152	#B	7.7691E-02	7.7711E-02	8.3057E-02	8.3169E-02	1.438E-01
EU-154	#B	9.1754E-04	9.1790E-04	9.3134E-02	9.3134E-02	1.043E-01
EU-155	#B	1.6913E-02	1.6924E-02	1.8495E-01	1.8495E-01	2.067E-01
HG-203	#B	1.9611E-02	2.0132E-02	3.5188E-02	3.5208E-02	3.758E-02
TL-208		2.9731E-01	2.9731E-01	6.1476E-02	6.3853E-02	
PB-212		9.0491E-01	9.0491E-01	1.2595E-01	1.3647E-01	
PB-214	#	4.5974E-01	4.5974E-01	1.0216E-01	1.0559E-01	
BI-212		6.3581E-01	6.3581E-01	3.5686E-01	3.5877E-01	
BI-214		4.7103E-01	4.7103E-01	1.3050E-01	1.3333E-01	
RA-224		1.1886E+00	1.1886E+00	9.8981E-01	9.9221E-01	1.059E+00
RA-226	#	1.3473E+00	1.3473E+00	1.0553E+00	1.0582E+00	1.131E+00
AC-228		8.0302E-01	8.0302E-01	1.4362E-01	1.5100E-01	
TH-227	#B	-1.2201E-02	-1.2201E-02	4.6648E-01	4.6648E-01	5.198E-01
PA-234	#B	3.5981E-03	3.5981E-03	2.1017E-01	2.1017E-01	2.352E-01
TH-234	#B	9.7974E-01	9.7974E-01	5.6059E+00	5.6061E+00	6.264E+00
AM-241	#A	3.0282E-03	3.0283E-03	8.5749E-01	8.5749E-01	9.666E-01

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

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

Total Activity (1120.0 to 2000.7 keV) 1.9539469E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.9539469E+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_30NOV2005_1920.An1

Sample description
FSS-NOL-06-03-011-F

Spectrum Filename: C:\GammaVision\Spectra\103F_30NOV2005_1920.An1

Acquisition information
Start time: 30-Nov-2005 19:20:43
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: 2.0910E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0910E+03) =
4.7824E+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	29-Nov-2005 01:00:00
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: 0.1432

***** 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
75.14	137.	22.94	0.99	9.233E-03	74.81	9.600	9.964E-01	PB212
77.17	237.	13.69	0.99	1.017E-02	77.11	17.500	8.530E-01	PB212
93.05	88.	37.36	0.88	1.654E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.70	205.	21.30	1.24	2.564E-02	185.99	3.280	1.474E+00	RA226
209.65	128.	25.43	0.93	2.470E-02				
238.92	1258.	3.41	1.09	2.319E-02	238.63	43.100	8.055E-01	PB212
242.06	175.	16.80	1.10	2.302E-02	241.00	3.900	1.260E+00	RA224
					241.92	7.470	6.594E-01	PB214
270.53	119.	22.98	1.53	2.150E-02				
277.09	89.	33.11	0.74	2.116E-02				
295.41	251.	12.68	1.13	2.024E-02	295.22	19.200	4.108E-01	PB214
300.38	103.	28.62	1.04	2.000E-02				
328.43	88.	32.55	0.87	1.872E-02				
338.51	293.	9.94	1.08	1.830E-02	338.40	12.010	8.583E-01	AC228
351.92	466.	8.25	1.17	1.776E-02	351.99	37.100	4.521E-01	PB214
463.00	97.	27.33	1.25	1.426E-02				
463.00	97.	27.33	1.25	1.426E-02	463.51	10.000	4.348E-01	SB125
510.91	212.	15.27	1.32	1.317E-02	510.72	22.500	4.030E-01	TL208
583.33	417.	6.47	1.11	1.184E-02	583.14	86.000	2.618E-01	TL208
609.33	368.	8.46	1.37	1.144E-02	609.32	46.090	4.438E-01	BI214
661.62	88.	23.95	1.84	1.072E-02	661.62	84.620	6.184E-02	CS137
726.98	121.	19.07	1.24	9.967E-03	727.17	11.800	6.612E-01	BI212
794.83	83.	22.64	1.23	9.310E-03				
794.83	83.	22.64	1.23	9.310E-03	795.76	85.400	6.757E-02	CS134
860.76	77.	29.35	1.25	8.766E-03				
911.37	313.	7.55	1.85	8.399E-03	911.07	29.000	8.213E-01	AC228

964.69	69.	18.81	1.54	8.051E-03	964.00	14.580	3.791E-01	EU152
969.20	186.	8.89	1.54	8.023E-03	968.90	17.460	8.553E-01	AC228
1120.97	95.	16.15	1.72	7.209E-03	1120.28	15.040	5.559E-01	BI214
1332.63	28.	27.28	1.77	6.349E-03	1332.51	99.980	2.883E-02	CO60
1461.12	1448.	2.76	1.91	5.931E-03	1460.75	10.700	1.455E+01	K40
1764.82	68.	12.41	2.05	5.141E-03	1764.51	15.920	5.150E-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
185.28	93.05	546.	88.	0.044	112.08	0.881	TH-234 l
418.45	209.65	442.	128.	0.064	76.30	0.934	NP-239
540.21	270.53	287.	119.	0.060	68.93	1.532	AC-228 s
599.90	300.38	316.	103.	0.051	85.85	1.037	PB-212 s
656.01	328.43	290.	88.	0.044	97.65	0.872	RH-106M
1720.57	860.76	115.	77.	0.039	68.07	1.249	TL-208
1929.13	964.80	50.	70.	0.035	55.72	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	417.	144.	0.072	63.51	0.993D
PB-212	153.39	77.11	407.	207.	0.104	36.43	0.995A
RA-226	371.79	186.31	845.	179.	0.089	67.35	1.500s
PB-212	476.94	238.89	852.	1182.	0.591	14.78	0.955
RA-224	482.90	241.87	861.	159.	0.080	81.68	1.500
PB-214	589.97	295.41	322.	247.	0.124	38.03	1.128
AC-228	676.15	338.51	232.	292.	0.146	29.81	1.078
PB-214	702.99	351.92	333.	461.	0.230	24.76	1.166s
SB-125	925.03	462.96	183.	65.	0.033	93.43	1.500
TL-208	1020.93	510.91	264.	185.	0.092	45.80	1.322s
TL-208	1165.77	583.33	124.	413.	0.206	19.42	1.114
BI-214	1217.75	609.33	179.	362.	0.181	25.38	1.373s
CS-137	1322.32	661.62	129.	87.	0.043	71.84	1.841s
BI-212	1453.03	726.98	125.	120.	0.060	57.21	1.239s
CS-134	1589.23	795.09	70.	67.	0.033	64.34	1.500s
AC-228	1821.77	911.37	85.	310.	0.155	22.66	1.850s
EU-152	1928.72	964.85	106.	57.	0.029	85.27	1.538
AC-228	1936.81	968.90	47.	185.	0.093	26.96	1.541D
BI-214	2240.91	1120.97	61.	93.	0.047	48.44	1.721s
CO-60	2664.16	1332.63	23.	28.	0.014	81.85	1.765s
K-40	2921.11	1461.12	54.	1429.	0.715	8.28	1.911
BI-214	3528.39	1764.82	5.	65.	0.033	37.23	2.049

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		8.9439E-02					
			477.56	8.944E-02	%(	2.969E-01 8.87E-02	G
K-40		1.4551E+01					
			1460.75	1.455E+01	(P	3.760E-01 4.07E-01	G
MN-54		9.1726E-03					
			834.81	9.173E-03	&(P	3.083E-02 9.12E-03	G
CO-57		1.4880E-02					
			122.07	1.488E-02	%(P	4.347E-02 1.31E-02	G K
			136.43	1.341E-01	%	3.697E-01 1.12E-01	G
CO-60		2.8835E-02					
			1332.51	2.883E-02	(P	2.544E-02 8.60E-03	G K
			1173.23	-1.952E-03	% P	5.064E-02 1.45E-02	G K
Sr-85		-8.7409E-03					
			514.00	-8.741E-03	%(	4.093E-02 1.22E-02	G
Kr-85		-1.9795E+02					
			513.99	-1.980E+02	%(	9.273E+02 2.76E+02	G
Y-88		-1.0490E-03					
			1836.01	-1.049E-03	%(P	2.158E-02 5.56E-03	G K
			898.02	1.662E-02	% P	2.580E-02 8.02E-03	G
NB-94		6.9072E-03					
			871.10	6.907E-03	%(	2.919E-02 8.55E-03	G K
			702.50	7.173E-03	%	3.326E-02 9.81E-03	G K
Ag-108M		-7.5945E-04					
			722.95	-7.595E-04	%(	6.355E-02 1.87E-02	G K
			614.37	1.002E-04	% P	3.477E-02 1.00E-02	G
			433.93	6.315E-03	%	3.334E-02 9.88E-03	G
CD-109		1.1838E+00					
			88.04	1.184E+00	%(	1.820E+00 5.55E-01	G
SN-113		-8.2363E-04					
			391.71	-8.236E-04	&(	4.799E-02 1.41E-02	G K
			255.04	-3.810E-01	%	1.504E+00 4.51E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.9047E-02						
		427.95	3.222E-02	%(P	9.767E-02	2.93E-02	G K
		600.77	-1.176E-02	% P	1.705E-01	4.96E-02	G
		636.15	-3.021E-03	% P	3.059E-01	8.84E-02	G
		463.51	2.969E-01	(P	2.989E-01	9.43E-02	G
		176.29	-1.904E-02	&	5.304E-01	1.58E-01	G
I-131	-3.3236E-03						
		364.48	-3.324E-03	%(P	4.146E-02	1.22E-02	G K
		636.97	1.468E-01	%	4.665E-01	1.39E-01	G
		284.29	1.471E-01	% P	5.783E-01	1.73E-01	G
CS-134	2.8981E-02						
		604.66	6.663E-03	&(	2.449E-02	7.23E-03	G K
		795.76	5.449E-02	*(P	3.391E-02	1.17E-02	G
		569.29	-4.775E-03	% P	2.161E-01	6.24E-02	G
		801.84	3.838E-02	& P	3.582E-01	1.03E-01	G
CS-137	6.1842E-02						
		661.62	6.184E-02	(P	3.966E-02	1.50E-02	G
CE-139	3.0668E-03						
		165.85	3.067E-03	%(	4.518E-02	1.35E-02	G
EU-152	1.2962E-01						
		121.78	3.720E-02	&(P	1.406E-01	4.23E-02	G K
		344.30	-1.357E-04	& P	1.094E-01	3.21E-02	G
		1408.08	8.340E-02	%	1.073E-01	3.50E-02	G
		964.00	3.150E-01	&(P	2.796E-01	9.04E-02	G
		1112.07	4.432E-02	%	2.785E-01	8.09E-02	G
		778.90	-2.750E-02	&	2.221E-01	6.42E-02	G
EU-154	2.4273E-02						
		123.10	2.427E-02	%(	1.046E-01	3.14E-02	G K
		1274.80	3.850E-02	%	1.029E-01	3.07E-02	G
		723.30	-7.222E-02	%	2.136E-01	6.40E-02	G
		1004.80	-3.516E-02	%	2.101E-01	6.13E-02	G
EU-155	1.4541E-01						
		86.45	1.454E-01	%(	2.278E-01	6.95E-02	G K
		105.31	3.507E-02	%	1.682E-01	5.03E-02	G
HG-203	-3.9701E-03						
		279.17	-3.970E-03	%(P	4.032E-02	1.20E-02	G K
		72.87	-1.169E-01	% P	2.198E+00	6.58E-01	G
		70.83	-9.415E-01	&	4.114E+00	1.24E+00	G
		82.50	-8.441E-01	%	3.650E+00	1.10E+00	G

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

TL-208       2.6183E-01
                          583.14 2.618E-01  (P 3.468E-02 1.71E-02 G
                          510.72 4.030E-01 + P 1.711E-01 7.04E-02 G

PB-212       7.9202E-01
                          238.63 7.641E-01  (P 8.966E-02 3.81E-02 G K
                                                          Energy duplication
                           77.11 7.563E-01 } P 3.533E-01 9.19E-02 G
                           74.81 1.074E+00 + P 7.275E-01 2.32E-01 G

PB-214       4.3804E-01
                          351.99 4.521E-01 @(P 8.613E-02 3.78E-02 G K
                          295.22 4.108E-01  (P 1.435E-01 5.30E-02 G
                                                          Energy duplication
                           77.11 0.000E+00 } P 8.805E-01 0.00E+00 G
                          241.92 3.859E-01 %   5.465E-01 1.67E-01 G

BI-212       6.6123E-01
                          727.17 6.612E-01 @(P 3.009E-01 1.27E-01 G K
                         1620.56 3.116E-01 % P 7.958E-01 2.36E-01 G
                          785.42 1.107E+00 %   1.488E+00 4.66E-01 G

BI-214       4.8038E-01
                          609.32 4.438E-01 @(P 7.974E-02 3.82E-02 G K
                         1764.51 5.150E-01  (P 1.018E-01 6.71E-02 G
                         1120.28 5.559E-01 *(P 2.325E-01 9.16E-02 G

RA-224       1.1442E+00
                          241.00 1.144E+00 &(  1.002E+00 3.12E-01 G

RA-226       1.3735E+00
                          185.99 1.373E+00 *(P 1.060E+00 3.31E-01 G

AC-228       8.3913E-01
                          911.07 8.213E-01  (P 1.214E-01 6.27E-02 G K
                          968.90 8.555E-01  (P 1.591E-01 7.69E-02 G
                          338.40 8.583E-01  (P 2.167E-01 8.56E-02 G

TH-227      -1.6908E-01
                          236.00-1.691E-01 &(  3.577E-01 1.08E-01 G K
                          256.25-7.202E-02 % P 4.652E-01 1.39E-01 G

PA-234       2.6651E-02
                           98.44 2.665E-02 &(P 1.846E-01 5.52E-02 G K
                          946.00 2.269E-02 % P 1.784E-01 5.17E-02 G
                          131.28-2.391E-03 % P 1.877E-01 5.59E-02 G
                           94.67-1.288E-01 % P 4.104E-01 1.24E-01 G
                          883.24 2.721E-02 &   2.373E-01 6.81E-02 G
                          926.70 6.289E-02 &   2.293E-01 6.72E-02 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.092E-02 % P 3.108E-01 8.97E-02 G

TH-234       3.3033E-01
                           63.29 3.303E-01 &(P 6.203E+00 1.85E+00 G K
                           92.80 1.284E+00 % P 2.087E+00 6.34E-01 G
                           92.38 1.474E+00 % P 2.547E+00 7.72E-01 G

AM-241      -1.0785E-01
                           59.54-1.078E-01 %(P 1.088E+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	8.7414E-02	8.9439E-02	2.6598E-01	2.6603E-01	2.902E-01
K-40		1.4551E+01	1.4551E+01	1.2202E+00	1.4841E+00	
MN-54	#A	9.1367E-03	9.1726E-03	2.7369E-02	2.7374E-02	3.071E-02
CO-57	#B	1.4813E-02	1.4880E-02	3.9325E-02	3.9334E-02	4.327E-02
CO-60	#F	2.8817E-02	2.8835E-02	2.5807E-02	2.5861E-02	2.542E-02

Sr-85	#A	-8.5776E-03	-8.7409E-03	3.6567E-02	3.6571E-02	4.017E-02
Kr-85	#A	-1.9795E+02	-1.9795E+02	8.2841E+02	8.2849E+02	9.273E+02
Y-88	#B	-1.0370E-03	-1.0490E-03	1.9549E-02	1.9549E-02	2.133E-02
NB-94	#B	6.9072E-03	6.9072E-03	2.5660E-02	2.5663E-02	2.919E-02
Ag-108M	#B	-7.5943E-04	-7.5945E-04	5.6142E-02	5.6142E-02	6.355E-02
CD-109	#A	1.1806E+00	1.1838E+00	1.6663E+00	1.6675E+00	1.815E+00
SN-113	#B	-8.1492E-04	-8.2363E-04	4.2206E-02	4.2206E-02	4.748E-02
SB-125	#F	9.8928E-02	9.9047E-02	9.4345E-02	9.4520E-02	9.755E-02
I-131	#B	-2.8546E-03	-3.3236E-03	4.5650E-02	4.5651E-02	3.561E-02
CS-134	#F	2.8934E-02	2.8981E-02	1.8670E-02	1.8745E-02	2.445E-02
CS-137		6.1835E-02	6.1842E-02	4.5135E-02	4.5278E-02	
CE-139	#A	3.0396E-03	3.0668E-03	4.0466E-02	4.0466E-02	4.478E-02
EU-152	#B	1.2959E-01	1.2962E-01	1.1158E-01	1.1181E-01	1.405E-01
EU-154	#B	2.4263E-02	2.4273E-02	9.4309E-02	9.4318E-02	1.045E-01
EU-155	#B	1.4531E-01	1.4541E-01	2.0837E-01	2.0852E-01	2.276E-01
HG-203	#B	-3.8673E-03	-3.9701E-03	3.6216E-02	3.6217E-02	3.928E-02
TL-208		2.6183E-01	2.6183E-01	5.1390E-02	5.3591E-02	
PB-212		7.9202E-01	7.9202E-01	1.1825E-01	1.2687E-01	
PB-214		4.3804E-01	4.3804E-01	1.0090E-01	1.0405E-01	
BI-212	#	6.6123E-01	6.6123E-01	3.7984E-01	3.8177E-01	
BI-214		4.8038E-01	4.8038E-01	1.0906E-01	1.1257E-01	
RA-224	#	1.1442E+00	1.1442E+00	9.3457E-01	9.3693E-01	1.002E+00
RA-226	#	1.3735E+00	1.3735E+00	9.9195E-01	9.9515E-01	1.060E+00
AC-228		8.3913E-01	8.3913E-01	1.2963E-01	1.3848E-01	
TH-227	#B	-1.6908E-01	-1.6908E-01	3.2542E-01	3.2557E-01	3.577E-01
PA-234	#B	2.6651E-02	2.6651E-02	1.6552E-01	1.6553E-01	1.846E-01
TH-234	#B	3.3033E-01	3.3033E-01	5.5417E+00	5.5417E+00	6.203E+00
AM-241	#A	-1.0785E-01	-1.0785E-01	1.0038E+00	1.0038E+00	1.088E+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) 1.8085199E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.8085207E+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_29NOV2005_1437.An1

Sample description
NOL-06-03-006-F-S

Spectrum Filename: C:\GammaVision\Spectra\107_29NOV2005_1437.An1

Acquisition information
Start time: 29-Nov-2005 14:37:47
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: 2.3000E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.3000E+03) =
4.3478E+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	29-Nov-2005 00:33:00
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: 0.2038

***** 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	349.	20.04	1.50	2.849E-02				
74.90	349.	20.04	1.50	2.849E-02	74.81	9.600	7.487E-01	PB212
77.03	582.	11.64	1.50	2.957E-02	77.11	10.700	1.082E+00	PB214
					77.11	17.500	6.613E-01	PB212
77.03	587.	11.64	1.50	2.957E-02	77.11	10.700	1.082E+00	PB214
					77.11	17.500	6.667E-01	PB212
93.53	145.	33.73	0.76	3.454E-02	92.80	3.000	PBC<MDA	TH234
128.83	135.	37.34	1.04	3.818E-02				
128.83	135.	37.34	1.04	3.818E-02	131.28	20.000	1.035E-01	PA234
186.19	324.	16.47	1.63	3.609E-02	185.99	3.280	1.610E+00	RA226
209.36	169.	24.02	1.30	3.428E-02				
239.02	1995.	3.91	1.55	3.186E-02	238.63	43.100	8.459E-01	PB212
					241.00	3.900	9.468E+00	RA224
269.95	169.	22.58	1.75	2.947E-02				
295.30	302.	9.62	1.34	2.767E-02	295.22	19.200	3.290E-01	PB214
300.44	81.	29.99	1.34	2.733E-02				
327.72	128.	26.17	1.64	2.562E-02				
338.32	361.	10.61	1.13	2.501E-02	338.40	12.010	7.002E-01	AC228
351.87	687.	7.53	1.63	2.426E-02				
351.87	687.	7.53	1.63	2.426E-02	351.99	37.100	4.452E-01	PB214
463.03	116.	20.65	2.30	1.954E-02				
463.03	116.	20.65	2.30	1.954E-02	463.51	10.000	3.407E-01	SB125
510.73	238.	10.84	1.73	1.808E-02	510.72	22.500	2.950E-01	TL208
583.01	582.	6.41	1.89	1.629E-02	583.14	86.000	2.423E-01	TL208
609.10	513.	7.12	1.86	1.575E-02	609.32	46.090	4.116E-01	BI214
727.02	171.	13.17	1.79	1.374E-02	727.17	11.800	6.149E-01	BI212
768.94	108.	23.62	1.33	1.317E-02				

784.81	65.	34.38	1.10	1.297E-02	785.42	2.000	1.467E+00	BI212
794.68	95.	20.28	1.56	1.285E-02				
794.68	95.	20.28	1.56	1.285E-02	795.76	85.400	5.065E-02	CS134
860.25	104.	20.60	1.82	1.211E-02				
910.95	365.	7.34	1.90	1.161E-02	911.07	29.000	6.297E-01	AC228
967.84	357.	9.23	2.12	1.110E-02	964.00	14.580	1.292E+00	EU152
					968.90	17.460	1.076E+00	AC228
1011.19	27.	41.00	1.54	1.075E-02				
1120.11	148.	18.16	1.99	9.971E-03	1120.28	15.040	5.780E-01	BI214
1460.22	2055.	2.27	2.25	8.193E-03	1460.75	10.700	1.374E+01	K40
1763.77	68.	13.64	2.07	7.086E-03	1764.51	15.920	3.507E-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	
418.35	209.36	645.	169.	0.085	72.07	1.304	AC-228	s
539.52	269.95	498.	169.	0.085	67.74	1.753	AC-228	s
600.36	300.37	335.	82.	0.041	104.43	1.465	PB-212	s
655.06	327.72	369.	128.	0.064	78.52	1.643	AC-228	s
703.35	351.87	1066.	119.	0.059	119.69	1.630	PB-214	s
1537.46	768.94	155.	108.	0.054	56.79	1.328	BI-214	s
1720.06	860.25	102.	104.	0.052	61.79	1.824	TL-208	s
2021.95	1011.19	45.	27.	0.013	122.99	1.541	CS-138	

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	149.46	74.90	2323.	349.	0.174	60.13	1.500s
PB-214	153.89	77.11	2047.	582.	0.291	34.92	1.500D
PB-212	153.89	77.11	2042.	587.	0.294	34.92	1.500D
PA-234	257.23	128.79	1036.	127.	0.063	110.98	1.500s
RA-226	372.02	186.19	904.	324.	0.162	49.41	1.631s
TH-227	471.36	235.86	1665.	-191.	-0.095	93.36	1.500s
PB-212	476.93	238.65	1021.	1494.	0.747	11.79	1.500s
RA-224	476.98	238.67	746.	1460.	0.730	11.14	1.500
PB-214	590.20	295.29	534.	305.	0.152	35.86	1.500s
AC-228	676.25	338.32	385.	358.	0.179	31.84	1.130
PB-214	703.42	351.90	341.	574.	0.287	18.33	1.500s
SB-125	925.44	462.92	182.	92.	0.046	67.09	1.500s
TL-208	1021.05	510.73	192.	204.	0.102	32.51	1.730s
TL-208	1165.60	583.01	223.	578.	0.289	19.22	1.893s
BI-214	1217.79	609.10	226.	508.	0.254	21.36	1.863
BI-212	1453.61	727.02	113.	170.	0.085	39.50	1.792s
BI-212	1569.19	784.81	133.	65.	0.032	103.13	1.105s
CS-134	1589.00	794.72	90.	71.	0.035	66.61	1.684s
AC-228	1821.46	910.95	114.	361.	0.180	22.01	1.895s
EU-152	1937.00	968.72	217.	141.	0.070	51.08	1.796s
AC-228	1935.25	967.84	154.	355.	0.177	27.70	2.120s
BI-214	2239.79	1120.11	138.	148.	0.074	54.48	1.991s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2920.04	1460.22	28.	2050.	1.025	6.80	2.253
BI-214	3527.18	1763.77	8.	67.	0.034	40.93	2.070

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		-5.3937E-02					
			477.56	-5.394E-02	%(	2.160E-01 6.43E-02	G
K-40		1.3742E+01					
			1460.75	1.374E+01	(P	1.839E-01 3.12E-01	G
MN-54		8.6948E-04					
			834.81	8.695E-04	%(P	2.867E-02 8.33E-03	G
CO-57		4.9919E-03					
			122.07	4.992E-03	&(P	3.102E-02 9.31E-03	G K
			136.43	5.978E-03	& P	2.623E-01 7.85E-02	G
CO-60		1.3791E-02					
			1332.51	1.379E-02	%(P	2.940E-02 8.81E-03	G K
			1173.23	1.533E-02	& P	3.691E-02 1.11E-02	G K
Sr-85		-1.5189E-02					
			514.00	-1.519E-02	%(	2.926E-02 8.90E-03	G
Kr-85		-3.7117E+02					
			513.99	-3.712E+02	%(P	6.742E+02 2.04E+02	G
Y-88		-3.3299E-03					
			1836.01	-3.330E-03	&(P	2.044E-02 5.59E-03	G K
			898.02	-1.893E-03	% P	2.773E-02 7.96E-03	G
NB-94		-7.7165E-03					
			871.10	-7.716E-03	%(P	2.325E-02 6.92E-03	G K
			702.50	2.941E-03	% P	2.405E-02 7.04E-03	G K
Ag-108M		-1.6253E-02					
			722.95	-1.625E-02	%(	3.600E-02 1.09E-02	G K
			614.37	-1.577E-02	%	2.922E-02 8.90E-03	G
			433.93	1.272E-03	& P	2.395E-02 7.02E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-5.8097E-03						
		88.04	-5.810E-03	%(P	9.797E-01	2.94E-01	G
SN-113	4.5968E-03						
		391.71	4.597E-03	%(P	3.240E-02	9.58E-03	G K
		255.04	2.896E-01	%	9.275E-01	2.79E-01	G
SB-125	8.3721E-02						
		427.95	1.809E-02	&(P	7.137E-02	2.13E-02	G K
		600.77	-3.119E-02	% P	1.175E-01	3.47E-02	G
		636.15	-3.509E-02	& P	2.181E-01	6.41E-02	G
		463.51	2.780E-01	(P	1.972E-01	6.41E-02	G
		176.29	-5.091E-03	& P	3.962E-01	1.18E-01	G
I-131	-6.8436E-03						
		364.48	-6.844E-03	%(	2.434E-02	7.27E-03	G K
		636.97	-6.424E-03	&	3.329E-01	9.66E-02	G
		284.29	-1.233E-01	%	3.960E-01	1.19E-01	G
CS-134	1.9565E-02						
		604.66	3.577E-03	%(P	5.942E-02	1.78E-02	G K
		795.76	3.784E-02	@(P	2.510E-02	8.46E-03	G
		569.29	-3.122E-02	&	1.507E-01	4.47E-02	G
		801.84	-4.146E-03	& P	2.613E-01	7.50E-02	G
CS-137	1.2818E-02						
		661.62	1.282E-02	%(P	2.758E-02	8.31E-03	G
CE-139	5.9178E-03						
		165.85	5.918E-03	&(P	3.136E-02	9.42E-03	G
EU-152	1.7483E-01						
		121.78	7.977E-03	&(P	9.222E-02	2.76E-02	G K
		344.30	-1.472E-02	% P	8.431E-02	2.51E-02	G
		1408.08	3.535E-03	% P	1.048E-01	2.92E-02	G
		964.00	5.094E-01	&(P	2.585E-01	8.68E-02	G
		1112.07	2.346E-02	% P	2.020E-01	5.85E-02	G
		778.90	-2.404E-02	% P	1.917E-01	5.59E-02	G
EU-154	-4.6536E-03						
		123.10	-4.654E-03	&(P	6.696E-02	2.00E-02	G K
		1274.80	1.687E-02	% P	8.821E-02	2.58E-02	G
		723.30	-7.570E-02	% P	1.674E-01	5.06E-02	G
		1004.80	-4.528E-04	% P	1.049E-01	2.92E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	7.9671E-02						
		86.45	7.967E-02	%(	1.132E-01	3.45E-02	G K
		105.31	2.729E-02	% P	1.326E-01	3.99E-02	G
HG-203	-6.2478E-04						
		279.17	-6.248E-04	&(P	2.926E-02	8.67E-03	G K
		72.87	-3.122E-01	% P	8.413E-01	2.54E-01	G
		70.83	2.307E-01	%	1.348E+00	4.06E-01	G
		82.50	-3.836E-01	%	1.763E+00	5.31E-01	G
TL-208	2.4231E-01						
		583.14	2.423E-01	(P	3.034E-02	1.56E-02	G
		510.72	2.950E-01	+ P	9.711E-02	3.72E-02	G
PB-212	6.4678E-01						
		238.63	6.387E-01	*(P	6.479E-02	2.54E-02	G K
							Energy duplication
		77.11	6.667E-01	*(	2.422E-01	7.76E-02	G
		74.81	7.487E-01	& P	4.882E-01	1.52E-01	G
PB-214	3.6175E-01						
		351.99	3.745E-01	@(P	5.795E-02	2.31E-02	G K
		295.22	3.372E-01	(P	1.221E-01	4.09E-02	G
							Energy duplication
		77.11	1.082E+00	+ P	3.965E-01	1.27E-01	G
		241.92	-2.612E-01	% P	4.467E-01	1.36E-01	G
BI-212	6.1489E-01						
		727.17	6.149E-01	*(P	1.895E-01	8.16E-02	G K
		1620.56	1.299E-01	% P	6.612E-01	1.86E-01	G
		785.42	1.467E+00	+ P	1.280E+00	5.14E-01	G
BI-214	3.9595E-01						
		609.32	4.116E-01	(P	5.889E-02	2.95E-02	G K
		1764.51	3.507E-01	(P	8.147E-02	4.85E-02	G
		1120.28	5.780E-01	+ P	2.255E-01	1.06E-01	G
RA-224	6.9399E+00						
		241.00	6.940E+00	?(P	6.175E-01	2.58E-01	G
RA-226	1.6096E+00						
		185.99	1.610E+00	*(	7.085E-01	2.65E-01	G
AC-228	6.5033E-01						
		911.07	6.297E-01	(P	9.166E-02	4.67E-02	G K
		968.90	1.076E+00	+ P	1.838E-01	9.99E-02	G
		338.40	7.002E-01	(P	1.842E-01	7.50E-02	G

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

TH-227      -3.1190E-01
                          236.00-3.119E-01 &(P 3.151E-01 9.69E-02 G K
                          256.25-9.574E-02 & P 3.449E-01 1.03E-01 G

PA-234       4.2255E-02
                           98.44-1.694E-03 %(  1.055E-01 3.15E-02 G K
                          946.00 1.533E-02 &   1.307E-01 3.80E-02 G
                          131.28 9.741E-02 &(  1.174E-01 3.60E-02 G
                           94.67-9.848E-03 %   1.910E-01 5.72E-02 G
                          883.24 2.017E-02 %   1.682E-01 4.85E-02 G
                          926.70 2.125E-02 %   2.171E-01 6.29E-02 G
                          569.26-4.629E-02 &   2.234E-01 6.62E-02 G

TH-234       4.1312E-01
                           63.29 4.131E-01 %(P 1.458E+00 4.39E-01 G K
                           92.80 7.797E-01 % P 1.133E+00 3.45E-01 G
                           92.38 1.819E-02 % P 1.246E+00 3.72E-01 G

AM-241      -5.0756E-02
                           59.54-5.076E-02 &(P 1.889E-01 5.69E-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	-5.3528E-02	-5.3937E-02	1.9302E-01	1.9304E-01	2.143E-01
K-40		1.3742E+01	1.3742E+01	9.3670E-01	1.2394E+00	
MN-54	#A	8.6835E-04	8.6948E-04	2.4988E-02	2.4988E-02	2.863E-02
CO-57	#B	4.9844E-03	4.9919E-03	2.7937E-02	2.7938E-02	3.097E-02
CO-60	#B	1.3788E-02	1.3791E-02	2.6430E-02	2.6443E-02	2.939E-02
Sr-85	#A	-1.5094E-02	-1.5189E-02	2.6685E-02	2.6700E-02	2.908E-02
Kr-85	#A	-3.7117E+02	-3.7117E+02	6.9204E+02	6.9239E+02	6.742E+02
Y-88	#B	-3.3172E-03	-3.3299E-03	2.5733E-02	2.5734E-02	2.036E-02
NB-94	#B	-7.7165E-03	-7.7165E-03	2.1133E-02	2.1137E-02	2.325E-02
Ag-108M	#B	-1.6253E-02	-1.6253E-02	3.2681E-02	3.2695E-02	3.599E-02
CD-109	#A	-5.8045E-03	-5.8097E-03	1.4893E+00	1.4893E+00	9.789E-01
SN-113	#B	4.5806E-03	4.5968E-03	2.8736E-02	2.8737E-02	3.229E-02
SB-125	#F	8.3688E-02	8.3721E-02	5.7880E-02	5.8091E-02	7.134E-02
I-131	#B	-6.5061E-03	-6.8436E-03	2.1824E-02	2.1828E-02	2.314E-02
CS-134	#B	1.9555E-02	1.9565E-02	1.3130E-02	1.3180E-02	5.938E-02
CS-137	#A	1.2817E-02	1.2818E-02	2.4919E-02	2.4930E-02	2.758E-02
CE-139	#A	5.9003E-03	5.9178E-03	2.8246E-02	2.8249E-02	3.126E-02
EU-152	#F	1.7481E-01	1.7483E-01	8.9381E-02	8.9906E-02	9.221E-02
EU-154	#B	-4.6530E-03	-4.6536E-03	6.5725E-02	6.5726E-02	6.695E-02
EU-155	#B	7.9653E-02	7.9671E-02	1.0360E-01	1.0369E-01	1.131E-01
HG-203	#B	-6.1935E-04	-6.2478E-04	8.3150E-02	8.3150E-02	2.901E-02
TL-208		2.4231E-01	2.4231E-01	4.6934E-02	4.9067E-02	
PB-212	#	6.4678E-01	6.4678E-01	7.7035E-02	8.5986E-02	6.479E-02
PB-214	#	3.6175E-01	3.6175E-01	6.6909E-02	7.0237E-02	5.795E-02
BI-212		6.1489E-01	6.1489E-01	2.4474E-01	2.4742E-01	
BI-214		3.9595E-01	3.9595E-01	8.5287E-02	8.8435E-02	
RA-224	#	6.9399E+00	6.9399E+00	7.7418E-01	8.7599E-01	6.175E-01
RA-226	#	1.6096E+00	1.6096E+00	7.9529E-01	8.0095E-01	
AC-228		6.5033E-01	6.5033E-01	1.2710E-01	1.3277E-01	
TH-227	#A	-3.1190E-01	-3.1190E-01	2.9161E-01	2.9219E-01	3.151E-01
PA-234	#B	4.2255E-02	4.2255E-02	4.6895E-02	4.6954E-02	1.055E-01
TH-234	#B	4.1312E-01	4.1312E-01	1.3164E+00	1.3166E+00	1.458E+00
AM-241	#A	-5.0756E-02	-5.0756E-02	1.7517E-01	1.7520E-01	1.889E-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 2000.1 keV) 1.7255047E+01 pCi/gm
Total Decayed Activity (50.2 to 2000.1 keV) 1.7255047E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab