YAEC Chemistry Lab Spectrum name: 102F_11NOV2005_1307.An1

Sample description
FSS OOL-02-01-113-F-I-SS-001

Spectrum Filename: C:\GammaVision\Spectra\102F_11NOV2005_1307.An1

Acquisition information
Start time: 11-Nov-2005 13:07:18
Live time: 2000
Real time: 2030
Dead time: 1.47 %
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: 1.9410E+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	10-Nov-2005 13:09:00
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: 0.1610

***** S U M M A R Y O F P E A K 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	186.	17.70	1.10	8.847E-03	74.81	9.600	1.525E+00	PB212
77.05	181.	15.81	1.10	9.541E-03	77.11	17.500	1.039E+00	PB212
					77.11	10.700	1.699E+00	PB214
93.14	115.	41.26	1.50	1.325E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.14	119.	30.61	1.22	1.626E-02	185.99	3.280	PBC<MDA	RA226
209.45	91.	31.41	1.83	1.518E-02				
238.60	729.	4.58	1.21	1.381E-02	238.63	43.100	8.528E-01	PB212
241.18	96.	30.63	1.22	1.369E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.522E-01	PB214
270.48	110.	30.37	1.90	1.242E-02				
295.17	172.	12.24	1.25	1.148E-02	295.22	19.200	5.433E-01	PB214
300.32	56.	31.14	1.26	1.129E-02				
338.53	155.	15.67	1.04	1.006E-02	338.40	12.010	8.932E-01	AC228
351.85	258.	13.54	1.30	9.682E-03	351.99	37.100	4.995E-01	PB214
463.28	42.	34.01	1.37	7.368E-03				
463.28	42.	34.01	1.37	7.368E-03	463.51	10.000	PBC<MDA	SB125
510.78	102.	20.49	1.15	6.694E-03	510.72	22.500	4.733E-01	TL208
583.21	217.	10.23	1.61	5.889E-03	583.14	86.000	2.977E-01	TL208
609.15	196.	9.65	1.45	5.651E-03	609.32	46.090	5.235E-01	BI214
661.43	252.	9.93	1.29	5.231E-03	661.62	84.620	3.973E-01	CS137
727.18	116.	18.57	1.67	4.794E-03	727.17	11.800	1.428E+00	BI212
794.62	40.	31.26	1.19	4.425E-03				
794.62	40.	31.26	1.19	4.425E-03	795.76	85.400	7.311E-02	CS134
910.65	182.	12.65	1.36	3.923E-03	911.07	29.000	1.113E+00	AC228
968.56	127.	20.08	1.15	3.719E-03	968.90	17.460	1.362E+00	AC228
1172.62	263.	7.61	1.94	3.158E-03	1173.23	99.860	5.811E-01	CO60

1331.98	216.	8.51	1.98	2.835E-03	1332.51	99.980	5.310E-01	CO60
1460.25	606.	4.20	1.77	2.622E-03	1460.75	10.700	1.504E+01	K40
1764.24	30.	18.26	1.52	2.226E-03	1764.51	15.920	5.879E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.53	209.45	330.	91.	0.045	94.23	1.831	AC-228	s
540.59	270.48	350.	110.	0.055	91.11	1.902	AC-228	s
599.77	300.06	127.	46.	0.023	110.29	0.821	PB-212	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	149.20	74.81	468.	186.	0.093	53.09	1.098D
PB-212	153.80	77.11	495.	181.	0.090	47.44	1.100A
RA-226	371.53	185.96	576.	107.	0.054	95.34	1.500
PB-212	476.89	238.63	194.	729.	0.364	13.75	1.215D
PB-214	483.47	241.92	268.	89.	0.044	84.33	1.217D
PB-214	589.54	294.94	402.	248.	0.124	50.47	1.348s
AC-228	676.73	338.53	174.	155.	0.078	47.01	1.040s
PB-214	703.39	351.85	275.	258.	0.129	40.62	1.296s
SB-125	925.94	463.10	114.	47.	0.024	101.38	1.500s
TL-208	1021.35	510.78	121.	102.	0.051	61.46	1.154s
TL-208	1166.25	583.21	92.	217.	0.108	30.70	1.607s
BI-214	1218.16	609.15	67.	196.	0.098	28.95	1.450
CS-137	1322.76	661.43	108.	252.	0.126	29.79	1.286
BI-212	1454.31	727.18	87.	116.	0.058	55.71	1.667
CS-134	1589.50	794.74	67.	37.	0.019	105.96	1.601
AC-228	1821.45	910.65	87.	182.	0.091	37.95	1.364s
AC-228	1937.33	968.56	119.	127.	0.063	60.25	1.155s
CO-60	2345.70	1172.62	46.	263.	0.132	22.84	1.938
CO-60	2664.65	1331.98	26.	216.	0.108	25.52	1.983
K-40	2921.41	1460.25	11.	606.	0.303	12.61	1.774
BI-214	3529.93	1764.24	0.	30.	0.015	54.77	1.523s

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

***** S U M M A R Y O 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		1.8349E-01					
			477.56	1.835E-01	%(	5.716E-01 1.71E-01	G
K-40		1.5037E+01					
			1460.75	1.504E+01	(P	4.571E-01 6.32E-01	G
MN-54		7.1935E-03					
			834.81	7.193E-03	%(P	6.694E-02 1.93E-02	G
CO-57		5.1651E-03					
			122.07	5.165E-03	%(	5.258E-02 1.56E-02	G K
			136.43	4.043E-03	&	5.285E-01 1.57E-01	G
CO-60		5.5603E-01					
			1332.51	5.310E-01	(P	6.505E-02 4.52E-02	G K
			1173.23	5.811E-01	(	7.582E-02 4.42E-02	G K
Sr-85		-2.2252E-02					
			514.00	-2.225E-02	%(	6.783E-02 2.03E-02	G
Kr-85		-5.0915E+02					
			513.99	-5.091E+02	%(	1.549E+03 4.64E+02	G
Y-88		-2.1545E-05					
			1836.01	-2.155E-05	%(P	2.419E-02 3.28E-03	G K
			898.02	1.707E-02	& P	8.025E-02 2.35E-02	G
NB-94		1.4022E-02					
			871.10	1.402E-02	%(	6.974E-02 2.04E-02	G K
			702.50	1.674E-02	%	6.279E-02 1.85E-02	G K
Ag-108M		3.5159E-03					
			722.95	3.516E-03	&(	1.200E-01 3.52E-02	G K
			614.37	2.675E-03	% P	6.418E-02 1.84E-02	G
			433.93	2.080E-02	%	5.497E-02 1.65E-02	G
CD-109		-9.4655E-02					
			88.04	-9.466E-02	&(P	2.513E+00 7.51E-01	G
SN-113		6.9819E-03					
			391.71	6.982E-03	&(	7.991E-02 2.34E-02	G K
			255.04	3.655E-02	%	1.992E+00 5.84E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0392E-01						
		427.95	-1.230E-02	%(P	1.649E-01	4.77E-02	G K
		600.77	4.411E-02	% P	2.565E-01	7.43E-02	G
		636.15	7.160E-02	& P	4.600E-01	1.33E-01	G
		463.51	4.479E-01	(P	4.955E-01	1.56E-01	G
		176.29	-2.501E-02	% P	7.445E-01	2.20E-01	G
I-131	3.3333E-03						
		364.48	3.333E-03	%(	6.508E-02	1.90E-02	G K
		636.97	-1.498E-01	&	8.773E-01	2.56E-01	G
		284.29	-2.158E-01	%	8.684E-01	2.59E-01	G
CS-134	3.4115E-02						
		604.66	4.007E-03	%(	1.355E-01	4.02E-02	G K
		795.76	6.852E-02	(	7.562E-02	2.42E-02	G
		569.29	-3.141E-03	%	3.424E-01	9.79E-02	G
		801.84	1.004E-01	% P	8.374E-01	2.43E-01	G
CS-137	3.9728E-01						
		661.62	3.973E-01	(	8.028E-02	3.94E-02	G
CE-139	1.3196E-02						
		165.85	1.320E-02	&(P	5.913E-02	1.77E-02	G
EU-152	-3.3608E-02						
		121.78	-3.361E-02	%(P	1.648E-01	4.93E-02	G K
		344.30	3.774E-02	%	1.894E-01	5.62E-02	G
		1408.08	-1.509E-02	%	2.740E-01	7.44E-02	G
		964.00	3.062E-01	& P	6.039E-01	1.84E-01	G
		1112.07	3.594E-01	%	6.039E-01	1.86E-01	G
		778.90	6.919E-02	& P	4.761E-01	1.38E-01	G
EU-154	-4.3710E-02						
		123.10	-4.371E-02	%(P	1.455E-01	4.38E-02	G K
		1274.80	-4.974E-02	%	1.948E-01	5.66E-02	G
		723.30	4.813E-05	& P	3.640E-01	1.04E-01	G
		1004.80	6.582E-03	&	4.954E-01	1.42E-01	G
EU-155	5.1988E-03						
		86.45	5.199E-03	%(P	2.850E-01	8.50E-02	G K
		105.31	-2.727E-02	%	3.169E-01	9.48E-02	G
HG-203	-7.9423E-03						
		279.17	-7.942E-03	&(P	6.166E-02	1.83E-02	G K
		72.87	-1.517E+00	%	2.306E+00	7.03E-01	G
		70.83	-7.992E-03	&	3.813E+00	1.14E+00	G
		82.50	5.539E-01	%	3.602E+00	1.08E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9770E-01						
		583.14	2.977E-01	(P	6.529E-02	3.05E-02	G
		510.72	4.733E-01	+	2.491E-01	9.70E-02	G
PB-212	8.5303E-01						
		238.63	8.530E-01	(	7.904E-02	3.91E-02	G K
							Energy duplication
		77.11	7.546E-01	}	4.436E-01	1.19E-01	G
		74.81	1.525E+00	+ P	8.486E-01	2.74E-01	G
PB-214	5.1752E-01						
		351.99	4.995E-01	@(P	1.552E-01	6.77E-02	G K
		295.22	7.834E-01	+	3.042E-01	1.32E-01	G
							Energy duplication
		77.11	3.557E-01	}	9.982E-01	2.58E-01	G
		241.92	6.071E-01	(	5.393E-01	1.71E-01	G
BI-212	1.4276E+00						
		727.17	1.428E+00	(	5.683E-01	2.65E-01	G K
		1620.56	3.229E-01	% P	1.951E+00	5.35E-01	G
		785.42	9.084E-01	% P	3.338E+00	9.86E-01	G
BI-214	5.4006E-01						
		609.32	5.235E-01	(	1.094E-01	5.05E-02	G K
		1764.51	5.879E-01	(P	1.448E-01	1.08E-01	G
		1120.28	3.742E-01	&	6.126E-01	1.89E-01	G
RA-224	7.5888E-01						
		241.00	7.589E-01	%(P	1.574E+00	4.77E-01	G
RA-226	1.3966E+00						
		185.99	1.397E+00	(P	1.495E+00	4.62E-01	G
AC-228	1.2063E+00						
		911.07	1.113E+00	@(P	2.830E-01	1.41E-01	G K
		968.90	1.362E+00	(P	5.744E-01	2.73E-01	G
		338.40	8.932E-01	-	3.698E-01	1.40E-01	G
TH-227	-2.6505E-01						
		236.00	-2.650E-01	&(P	5.889E-01	1.78E-01	G K
		256.25	3.117E-02	&	6.775E-01	2.00E-01	G
PA-234	0.0000E+00						
		98.44	0.000E+00	%(	3.044E-01	9.08E-02	G K
		946.00	-2.947E-02	&	3.873E-01	1.11E-01	G
		131.28	-1.082E-01	%	2.966E-01	8.96E-02	G
		94.67	-1.549E-01	%	5.384E-01	1.62E-01	G
		883.24	4.329E-02	&	5.433E-01	1.55E-01	G
		926.70	8.315E-02	%	5.565E-01	1.60E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-8.975E-02 %   5.575E-01 1.63E-01 G

TH-234       1.7452E+00
                           63.29 1.745E+00 &(P 4.662E+00 1.41E+00 G K
                           92.80 1.991E+00 %   2.720E+00 8.32E-01 G
                           92.38 2.361E+00 & P 3.216E+00 9.84E-01 G

AM-241      -5.1444E-02
                           59.54-5.144E-02 &(  7.649E-01 2.28E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.8113E-01	1.8349E-01	5.1247E-01	5.1257E-01	5.643E-01
K-40		1.5037E+01	1.5037E+01	1.8965E+00	2.0758E+00	
MN-54	#A	7.1775E-03	7.1935E-03	5.7764E-02	5.7766E-02	6.679E-02
CO-57	#B	5.1519E-03	5.1651E-03	4.6913E-02	4.6914E-02	5.244E-02
CO-60		5.5583E-01	5.5603E-01	9.5230E-02	1.0021E-01	

Sr-85	#A	-2.2016E-02	-2.2252E-02	6.0904E-02	6.0917E-02	6.711E-02
Kr-85	#A	-5.0914E+02	-5.0915E+02	1.3913E+03	1.3916E+03	1.549E+03
Y-88	#B	-2.1406E-05	-2.1545E-05	1.2927E-04	1.2928E-04	2.404E-02
NB-94	#B	1.4022E-02	1.4022E-02	6.1072E-02	6.1077E-02	6.974E-02
Ag-108M	#B	3.5158E-03	3.5159E-03	1.0551E-01	1.0551E-01	1.200E-01
CD-109	#A	-9.4511E-02	-9.4655E-02	3.6266E+00	3.6266E+00	2.510E+00
SN-113	#B	6.9401E-03	6.9819E-03	7.0220E-02	7.0221E-02	7.943E-02
SB-125	#B	1.0385E-01	1.0392E-01	1.0879E-01	1.0895E-01	1.648E-01
I-131	#B	3.0582E-03	3.3333E-03	5.7048E-02	5.7048E-02	5.971E-02
CS-134	#B	3.4084E-02	3.4115E-02	3.6149E-02	3.6200E-02	1.354E-01
CS-137		3.9726E-01	3.9728E-01	1.1836E-01	1.2044E-01	
CE-139	#A	1.3129E-02	1.3196E-02	5.3131E-02	5.3136E-02	5.883E-02
EU-152	#B	-3.3603E-02	-3.3608E-02	1.5923E-01	1.5924E-01	1.648E-01
EU-154	#B	-4.3700E-02	-4.3710E-02	1.3270E-01	1.3272E-01	1.454E-01
EU-155	#B	5.1969E-03	5.1988E-03	2.5508E-01	2.5508E-01	2.849E-01
HG-203	#B	-7.8251E-03	-7.9423E-03	5.5748E-02	5.5750E-02	6.075E-02
TL-208	#	2.9770E-01	2.9770E-01	9.1554E-02	9.3065E-02	
PB-212		8.5303E-01	8.5303E-01	1.1728E-01	1.2668E-01	
PB-214		5.1752E-01	5.1752E-01	2.1055E-01	2.1254E-01	
BI-212		1.4276E+00	1.4276E+00	7.9531E-01	7.9934E-01	
BI-214		5.4006E-01	5.4006E-01	1.5636E-01	1.5927E-01	
RA-224	#A	7.5888E-01	7.5888E-01	1.4321E+00	1.4327E+00	1.574E+00
RA-226	#A	1.3966E+00	1.3966E+00	1.3870E+00	1.3892E+00	1.495E+00
AC-228		1.2063E+00	1.2063E+00	4.2971E-01	4.3501E-01	
TH-227	#B	-2.6505E-01	-2.6505E-01	5.4024E-01	5.4044E-01	5.889E-01
PA-234	#B	0.0000E+00	0.0000E+00	2.7240E-01	2.7240E-01	3.044E-01
TH-234	#B	1.7452E+00	1.7452E+00	4.2227E+00	4.2238E+00	4.662E+00
AM-241	#A	-5.1444E-02	-5.1444E-02	6.8463E-01	6.8464E-01	7.649E-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 (270.2 to 1999.0 keV) 2.0832018E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 2.0832243E+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_11NOV2005_1347.An1

Sample description
FSS OOL-02-01-162-F-I-SS-001

Spectrum Filename: C:\GammaVision\Spectra\102F_11NOV2005_1347.An1

Acquisition information
Start time: 11-Nov-2005 13:47:49
Live time: 2000
Real time: 2022
Dead time: 1.11 %
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: 1.9030E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9030E+03) =
5.2549E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	10-Nov-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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1476

***** S U M M A R Y O F P E A K 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	132.	33.20	1.50	8.847E-03	70.83	3.520	3.565E+00	HG203
					72.87	6.400	1.800E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.05	166.	26.64	1.50	9.541E-03	77.11	10.700	1.157E+00	PB214
					77.11	17.500	7.075E-01	PB212
77.05	166.	26.64	1.50	9.541E-03	77.11	10.700	1.157E+00	PB214
					77.11	17.500	7.075E-01	PB212
185.83	131.	24.15	1.34	1.627E-02	185.99	3.280	1.684E+00	RA226
209.52	82.	34.74	0.70	1.518E-02				
238.63	673.	4.56	1.21	1.381E-02				
238.63	673.	4.56	1.21	1.381E-02	238.63	43.100	8.034E-01	PB212
241.61	110.	19.53	1.22	1.367E-02	241.00	3.900	1.448E+00	RA224
					241.92	7.470	7.661E-01	PB214
269.87	65.	34.66	1.65	1.244E-02				
295.16	126.	15.36	0.98	1.147E-02				
295.16	126.	15.36	0.98	1.147E-02	295.22	19.200	4.071E-01	PB214
327.96	40.	35.79	0.98	1.037E-02				
338.43	140.	18.79	1.32	1.006E-02	338.40	12.010	8.229E-01	AC228
351.82	224.	9.06	1.28	9.683E-03				
351.82	224.	9.06	1.28	9.683E-03	351.99	37.100	4.424E-01	PB214
462.69	87.	19.83	1.71	7.378E-03				
462.69	87.	19.83	1.71	7.378E-03	463.51	10.000	8.226E-01	SB125
477.33	46.	35.91	1.03	7.154E-03				
477.33	46.	35.91	1.03	7.154E-03	477.56	10.300	4.494E-01	BE7
510.56	68.	24.00	0.75	6.697E-03	510.72	22.500	3.215E-01	TL208
583.16	213.	8.17	1.47	5.890E-03	583.14	86.000	2.980E-01	TL208
609.08	158.	12.92	1.25	5.651E-03	609.32	46.090	4.304E-01	BI214

661.42	56.	27.13	0.69	5.231E-03	661.62	84.620	9.019E-02	CS137
727.35	39.	35.81	1.97	4.794E-03	727.17	11.800	4.896E-01	BI212
767.97	65.	25.77	1.75	4.563E-03				
795.45	21.	39.04	0.59	4.421E-03				
795.45	21.	39.04	0.59	4.421E-03	795.76	85.400	3.955E-02	CS134
910.81	148.	14.46	1.39	3.923E-03	911.07	29.000	9.251E-01	AC228
968.63	92.	16.66	1.50	3.719E-03	968.90	17.460	1.009E+00	AC228
1119.78	36.	35.81	1.06	3.283E-03	1120.28	15.040	5.177E-01	BI214
1146.96	15.	39.32	1.24	3.218E-03				
1460.45	539.	4.34	1.86	2.621E-03	1460.75	10.700	1.364E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.02	19.	25.31	2.24	2.225E-03	1764.51	15.920	3.756E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.67	209.52	296.	82.	0.041	104.21	0.696	AC-228	s
476.89	238.59	134.	673.	0.337	13.68	1.215	PB-212	D
482.85	241.57	176.	110.	0.055	58.60	1.217	PB-214	D
539.38	269.87	177.	65.	0.032	103.97	1.651	AC-228	s
655.59	327.96	78.	40.	0.020	107.37	0.980	AC-228	s
1535.92	767.97	55.	65.	0.032	61.16	1.746	BI-214	M
1590.92	795.45	22.	21.	0.010	117.11	0.591	CS-134	l
2294.35	1146.96	11.	15.	0.008	117.96	1.242	TE-131	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	149.37	74.90	935.	132.	0.066	99.61	1.500s
PB-214	153.80	77.11	899.	166.	0.083	79.91	1.500D
PB-212	153.80	77.11	899.	166.	0.083	79.91	1.500D
RA-226	371.26	185.83	352.	127.	0.063	72.45	1.339
PB-212	476.98	238.67	337.	590.	0.295	18.08	1.500s
PB-214	590.03	295.19	189.	129.	0.064	52.53	1.500
AC-228	676.54	338.43	184.	140.	0.070	56.37	1.318s
PB-214	703.47	351.89	77.	223.	0.111	26.08	1.500s
SB-125	925.85	463.05	68.	58.	0.029	70.27	1.500s
BE-7	954.58	477.41	75.	35.	0.017	117.35	1.500s
TL-208	1020.89	510.56	77.	68.	0.034	72.00	0.753s
TL-208	1166.16	583.16	36.	213.	0.106	24.52	1.471
BI-214	1218.01	609.08	78.	158.	0.079	38.77	1.248
CS-137	1322.75	661.42	61.	56.	0.028	81.40	0.686s
BI-212	1454.65	727.35	52.	39.	0.020	107.42	1.973s
AC-228	1821.76	910.81	73.	148.	0.074	43.39	1.391
AC-228	1937.47	968.63	44.	92.	0.046	49.99	1.503
BI-214	2239.96	1119.78	42.	36.	0.018	107.43	1.058s
K-40	2921.80	1460.45	2.	539.	0.269	13.02	1.863

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3529.51	1764.02	2.	19.	0.009	75.94	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	Peak MDA Value pCi/gm	COMMENTS
BE-7		3.3879E-01					
			477.56	3.388E-01	@(	4.198E-01 1.33E-01	G
K-40		1.3638E+01					
			1460.75	1.364E+01	(P	2.534E-01 5.92E-01	G
MN-54		1.5835E-03					
			834.81	1.584E-03	%(P	6.921E-02 1.97E-02	G
CO-57		-1.1920E-03					
			122.07	-1.192E-03	&(	5.403E-02 1.60E-02	G K
			136.43	-1.097E-01	%	4.415E-01 1.32E-01	G
CO-60		3.3251E-02					
			1332.51	3.325E-02	%(P	5.621E-02 1.75E-02	G K
			1173.23	5.715E-02	%	8.146E-02 2.55E-02	G K
Sr-85		-2.4136E-02					
			514.00	-2.414E-02	%(	6.152E-02 1.85E-02	G
Kr-85		-5.5119E+02					
			513.99	-5.512E+02	%(	1.405E+03 4.22E+02	G
Y-88		-4.2024E-03					
			1836.01	-4.202E-03	%(P	5.844E-02 1.54E-02	G K
			898.02	-2.512E-03	& P	6.104E-02 1.69E-02	G
NB-94		-1.0320E-02					
			871.10	-1.032E-02	%(	6.037E-02 1.74E-02	G K
			702.50	1.014E-02	%	4.925E-02 1.43E-02	G K
Ag-108M		5.0972E-03					
			722.95	5.097E-03	%(	4.604E-02 1.30E-02	G K
			614.37	2.214E-04	& P	4.130E-02 1.14E-02	G
			433.93	1.157E-02	%	4.822E-02 1.42E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-5.8594E-01						
		88.04	-5.859E-01	%(P	2.383E+00	7.16E-01	G
SN-113	5.7428E-04						
		391.71	5.743E-04	%(	5.690E-02	1.62E-02	G K
		255.04	-1.727E-01	&	2.034E+00	5.99E-01	G
SB-125	1.3075E-01						
		427.95	-1.293E-02	%(P	1.365E-01	3.91E-02	G K
		600.77	-5.859E-04	% P	2.479E-01	6.96E-02	G
		636.15	-1.106E-02	% P	3.764E-01	1.05E-01	G
		463.51	5.561E-01	@(P	3.970E-01	1.34E-01	G
		176.29	-1.429E-01	% P	6.847E-01	2.04E-01	G
I-131	1.6766E-02						
		364.48	1.677E-02	%(	4.966E-02	1.48E-02	G K
		636.97	0.000E+00	%	7.080E-01	1.99E-01	G
		284.29	1.451E-01	%	7.270E-01	2.15E-01	G
CS-134	1.3623E-03						
		604.66	1.362E-03	%(	1.191E-01	3.51E-02	G K
		795.76	3.420E-02	%	4.764E-02	1.52E-02	G
		569.29	2.846E-02	%	2.896E-01	8.29E-02	G
		801.84	-3.973E-03	% P	4.986E-01	1.36E-01	G
CS-137	9.0191E-02						
		661.62	9.019E-02	(	6.266E-02	2.45E-02	G
CE-139	-6.0005E-04						
		165.85	-6.000E-04	&(P	5.617E-02	1.66E-02	G
EU-152	7.3205E-03						
		121.78	7.321E-03	&(P	1.556E-01	4.61E-02	G K
		344.30	7.149E-02	%	1.394E-01	4.24E-02	G
		1408.08	1.996E-02	&	2.507E-01	6.77E-02	G
		964.00	2.472E-01	& P	4.270E-01	1.32E-01	G
		1112.07	7.721E-04	&	5.200E-01	1.45E-01	G
		778.90	-8.292E-03	% P	3.335E-01	9.16E-02	G
EU-154	-2.3628E-02						
		123.10	-2.363E-02	%(P	1.211E-01	3.62E-02	G K
		1274.80	2.632E-02	&	1.924E-01	5.45E-02	G
		723.30	-6.563E-02	% P	3.024E-01	8.82E-02	G
		1004.80	2.377E-02	&	3.196E-01	8.93E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	8.2580E-02						
		86.45	8.258E-02	%(P	2.675E-01	8.05E-02	G K
		105.31	0.000E+00	%	2.798E-01	8.32E-02	G
HG-203	-7.7195E-03						
		279.17	-7.719E-03	%(P	5.462E-02	1.61E-02	G K
		72.87	-4.219E-01	%	2.162E+00	6.49E-01	G
		70.83	-1.484E+00	%	3.634E+00	1.10E+00	G
		82.50	-1.406E+00	%	4.277E+00	1.29E+00	G
TL-208	3.0290E-01						
		583.14	2.980E-01	(P	4.322E-02	2.44E-02	G
		510.72	3.215E-01	*(	2.053E-01	7.71E-02	G
PB-212	7.0510E-01						
		238.63	7.041E-01	@(	1.053E-01	4.24E-02	G K
							Energy duplication
		77.11	7.075E-01	&(	6.056E-01	1.88E-01	G
		74.81	1.100E+00	+ P	1.214E+00	3.74E-01	G
PB-214	4.3168E-01						
		351.99	4.405E-01	@(P	8.619E-02	3.84E-02	G K
		295.22	4.147E-01	(	2.155E-01	7.26E-02	G
							Energy duplication
		77.11	1.157E+00	&	9.905E-01	3.08E-01	G
		241.92	2.847E-01	%	7.371E-01	2.22E-01	G
BI-212	4.8956E-01						
		727.17	4.896E-01	(	4.558E-01	1.75E-01	G K
		1620.56	2.813E-01	% P	1.888E+00	5.11E-01	G
		785.42	8.372E-01	% P	2.630E+00	7.77E-01	G
BI-214	4.3610E-01						
		609.32	4.304E-01	(	1.198E-01	5.56E-02	G K
		1764.51	3.756E-01	?(P	1.873E-01	9.55E-02	G
		1120.28	5.177E-01	(	4.733E-01	1.85E-01	G
RA-224	1.0019E+00						
		241.00	1.002E+00	%(P	1.380E+00	4.24E-01	G
RA-226	1.6842E+00						
		185.99	1.684E+00	(P	1.200E+00	4.21E-01	G
AC-228	9.2925E-01						
		911.07	9.251E-01	(P	2.652E-01	1.34E-01	G K
		968.90	1.009E+00	(P	3.668E-01	1.68E-01	G
		338.40	8.229E-01	(	3.875E-01	1.55E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.8489E-01						
		236.00	-1.849E-01	%(P	5.143E-01	1.55E-01	G K
		256.25	-5.027E-03	%	6.382E-01	1.87E-01	G
PA-234	5.5964E-02						
		98.44	5.596E-02	%(	2.684E-01	8.05E-02	G K
		946.00	1.141E-01	%	2.588E-01	7.80E-02	G
		131.28	-5.426E-02	&	2.499E-01	7.49E-02	G
		94.67	-1.152E-01	%	5.012E-01	1.51E-01	G
		883.24	3.256E-02	&	4.058E-01	1.13E-01	G
		926.70	-9.452E-02	%	4.819E-01	1.38E-01	G
		569.26	4.278E-02	%	4.288E-01	1.23E-01	G
TH-234	6.6176E-01						
		63.29	6.618E-01	&(P	4.564E+00	1.36E+00	G K
		92.80	1.119E+00	%	2.550E+00	7.72E-01	G
		92.38	3.969E-01	% P	2.739E+00	8.19E-01	G
AM-241	-3.4706E-02						
		59.54	-3.471E-02	&(	5.353E-01	1.58E-01	G

(- This peak used in the nuclide activity average.

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

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	3.3436E-01	3.3879E-01	3.9756E-01	3.9801E-01	4.144E-01
K-40		1.3638E+01	1.3638E+01	1.7756E+00	1.9335E+00	
MN-54	#A	1.5800E-03	1.5835E-03	5.9025E-02	5.9025E-02	6.906E-02
CO-57	#B	-1.1889E-03	-1.1920E-03	4.8025E-02	4.8025E-02	5.389E-02
CO-60	#B	3.3238E-02	3.3251E-02	5.2627E-02	5.2660E-02	5.618E-02
Sr-85	#A	-2.3876E-02	-2.4136E-02	5.5494E-02	5.5510E-02	6.085E-02
Kr-85	#A	-5.5118E+02	-5.5119E+02	1.2673E+03	1.2677E+03	1.405E+03
Y-88	#B	-4.1748E-03	-4.2024E-03	4.6797E-02	4.6798E-02	5.806E-02
NB-94	#B	-1.0320E-02	-1.0320E-02	5.2236E-02	5.2239E-02	6.037E-02
Ag-108M	#B	5.0971E-03	5.0972E-03	3.8871E-02	3.8872E-02	4.604E-02
CD-109	#A	-5.8504E-01	-5.8594E-01	2.3210E+00	2.3212E+00	2.379E+00
SN-113	#B	5.7079E-04	5.7428E-04	4.8716E-02	4.8716E-02	5.655E-02
SB-125	#B	1.3066E-01	1.3075E-01	9.4342E-02	9.4627E-02	1.364E-01
I-131	#B	1.5363E-02	1.6766E-02	4.4459E-02	4.4469E-02	4.550E-02
CS-134	#B	1.3610E-03	1.3623E-03	1.0537E-01	1.0537E-01	1.190E-01
CS-137		9.0185E-02	9.0191E-02	7.3414E-02	7.3588E-02	
CE-139	#A	-5.9699E-04	-6.0005E-04	1.1142E-01	1.1142E-01	5.588E-02
EU-152	#B	7.3194E-03	7.3205E-03	1.3838E-01	1.3838E-01	1.556E-01
EU-154	#B	-2.3622E-02	-2.3628E-02	1.1062E-01	1.1063E-01	1.210E-01
EU-155	#B	8.2548E-02	8.2580E-02	2.4163E-01	2.4167E-01	2.674E-01
HG-203	#B	-7.6039E-03	-7.7195E-03	4.9299E-02	4.9300E-02	5.381E-02
TL-208		3.0290E-01	3.0290E-01	7.4404E-02	7.6321E-02	
PB-212	#	7.0510E-01	7.0510E-01	1.2747E-01	1.3347E-01	1.053E-01
PB-214	#	4.3168E-01	4.3168E-01	1.1278E-01	1.1535E-01	8.619E-02
BI-212	#	4.8956E-01	4.8956E-01	5.2588E-01	5.2659E-01	
BI-214		4.3610E-01	4.3610E-01	1.6907E-01	1.7084E-01	
RA-224	#A	1.0019E+00	1.0019E+00	1.2707E+00	1.2720E+00	1.380E+00
RA-226		1.6842E+00	1.6842E+00	1.2633E+00	1.2668E+00	
AC-228		9.2925E-01	9.2925E-01	2.6943E-01	2.7443E-01	
TH-227	#B	-1.8489E-01	-1.8489E-01	4.7166E-01	4.7177E-01	5.143E-01
PA-234	#B	5.5964E-02	5.5964E-02	2.4157E-01	2.4159E-01	2.684E-01
TH-234	#B	6.6176E-01	6.6176E-01	4.0894E+00	4.0896E+00	4.564E+00
AM-241	#A	-3.4705E-02	-3.4706E-02	4.7527E-01	4.7528E-01	5.353E-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) 1.7570000E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 1.7570007E+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_11NOV2005_1423.An1

Sample description
FSS OOL-02-01-172-F-I-SS-002

Spectrum Filename: C:\GammaVision\Spectra\102F_11NOV2005_1423.An1

Acquisition information
Start time: 11-Nov-2005 14:23:56
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: 1.8760E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8760E+03) =
5.3305E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	10-Nov-2005 13:38:00
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: 0.2105

***** S U M M A R Y O F P E A 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	196.	21.60	1.50	9.541E-03	77.11	10.700	1.381E+00	PB214
					77.11	17.500	8.444E-01	PB212
77.12	196.	21.60	1.50	9.541E-03	77.11	10.700	1.381E+00	PB214
					77.11	17.500	8.444E-01	PB212
129.53	81.	39.84	0.85	1.717E-02				
129.53	81.	39.84	0.85	1.717E-02	131.28	20.000	1.700E-01	PA234
185.52	61.	37.27	1.30	1.629E-02				
185.52	61.	37.27	1.30	1.629E-02	185.99	3.280	PBC<MDA	RA226
209.70	111.	26.43	1.41	1.517E-02				
238.61	614.	4.87	1.21	1.381E-02				
238.61	614.	4.87	1.21	1.381E-02	238.63	43.100	7.431E-01	PB212
241.50	80.	32.05	1.22	1.368E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.685E-01	PB214
277.15	59.	33.86	0.77	1.215E-02				
277.15	59.	33.86	0.77	1.215E-02	279.17	81.500	PBC<MDA	HG203
295.18	146.	11.81	1.25	1.147E-02				
295.18	146.	11.81	1.25	1.147E-02	295.22	19.200	4.777E-01	PB214
300.36	41.	35.70	1.26	1.128E-02				
328.46	62.	30.69	1.04	1.036E-02				
338.14	117.	19.84	1.37	1.007E-02	338.40	12.010	6.952E-01	AC228
351.76	203.	11.26	1.19	9.685E-03				
351.76	203.	11.26	1.19	9.685E-03	351.99	37.100	4.057E-01	PB214
462.82	46.	33.86	1.24	7.376E-03				
462.82	46.	33.86	1.24	7.376E-03	463.51	10.000	PBC<MDA	SB125
510.19	98.	19.63	1.47	6.702E-03	510.72	22.500	4.696E-01	TL208
583.21	248.	8.78	1.65	5.889E-03	583.14	86.000	3.521E-01	TL208
609.15	174.	9.55	1.35	5.651E-03	609.32	46.090	4.803E-01	BI214

661.97	118.	18.94	1.87	5.227E-03	661.62	84.620	1.921E-01	CS137
794.52	37.	31.17	0.87	4.426E-03				
794.52	37.	31.17	0.87	4.426E-03	795.76	85.400	7.068E-02	CS134
911.03	101.	14.49	1.91	3.922E-03	911.07	29.000	6.370E-01	AC228
968.46	134.	12.57	1.53	3.719E-03	968.90	17.460	1.484E+00	AC228
1121.15	63.	22.62	2.09	3.283E-03	1120.28	15.040	9.191E-01	BI214
1460.35	517.	4.52	1.87	2.621E-03	1460.75	10.700	1.328E+01	K40
1763.97	17.	25.99	2.24	2.225E-03	1764.51	15.920	3.485E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
419.01	209.70	275.	111.	0.055	79.28	1.406	NP-239	s
476.85	238.56	140.	614.	0.307	14.61	1.215	PB-212	D
482.63	241.44	293.	80.	0.040	96.14	1.217	RA-224	D
553.94	277.15	143.	59.	0.030	101.59	0.768	TL-208	l
600.34	300.34	106.	39.	0.020	120.54	1.517	PB-212	s
656.60	328.46	120.	62.	0.031	92.06	1.035	RH-106M	s
925.38	462.82	76.	41.	0.021	100.72	1.244	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-214	153.80	77.11	795.	196.	0.098	64.79	1.500D
PB-212	153.80	77.11	795.	196.	0.098	64.79	1.500D
RA-226	371.45	185.92	380.	69.	0.035	116.76	1.500
PB-212	476.77	238.57	321.	547.	0.274	18.90	1.500
PB-214	590.07	295.21	185.	121.	0.061	54.74	1.500
AC-228	675.96	338.14	149.	117.	0.058	59.51	1.370
PB-214	703.44	351.88	98.	179.	0.089	32.38	1.500
TL-208	1020.15	510.19	83.	98.	0.049	58.88	1.471
TL-208	1166.25	583.21	58.	248.	0.124	26.34	1.649s
BI-214	1218.16	609.15	37.	174.	0.087	28.64	1.347s
CS-137	1323.83	661.97	93.	118.	0.059	56.81	1.865s
CS-134	1589.37	794.68	30.	24.	0.012	114.02	1.601s
AC-228	1822.21	911.03	35.	101.	0.050	43.48	1.910
AC-228	1937.13	968.46	39.	134.	0.067	37.70	1.534
BI-214	2242.69	1121.15	40.	63.	0.032	67.85	2.094s
K-40	2921.60	1460.35	7.	517.	0.259	13.57	1.873
BI-214	3529.40	1763.97	1.	17.	0.009	77.96	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		2.1417E-01						
			477.56	2.142E-01	%(	4.122E-01	1.26E-01	G
K-40		1.3282E+01						
			1460.75	1.328E+01	(P	3.852E-01	6.01E-01	G
MN-54		2.0926E-02						
			834.81	2.093E-02	%(P	5.901E-02	1.75E-02	G
CO-57		-7.0526E-03						
			122.07	-7.053E-03	%(	5.768E-02	1.72E-02	G K
			136.43	6.458E-02	%	4.371E-01	1.30E-01	G
CO-60		4.0286E-02						
			1332.51	4.029E-02	%(P	6.228E-02	1.96E-02	G K
			1173.23	5.257E-02	%	8.029E-02	2.50E-02	G K
Sr-85		-2.7497E-02						
			514.00	-2.750E-02	%(	5.771E-02	1.75E-02	G
Kr-85		-6.1992E+02						
			513.99	-6.199E+02	%(	1.315E+03	3.98E+02	G
Y-88		-2.2296E-05						
			1836.01	-2.230E-05	%(P	2.504E-02	3.40E-03	G K
			898.02	-9.521E-03	% P	6.858E-02	1.95E-02	G
NB-94		-2.8544E-03						
			871.10	-2.854E-03	%(	5.227E-02	1.46E-02	G K
			702.50	-6.450E-03	%	5.060E-02	1.45E-02	G K
Ag-108M		-5.1954E-03						
			722.95	-5.195E-03	&(	6.689E-02	1.92E-02	G K
			614.37	-1.092E-02	% P	5.042E-02	1.46E-02	G
			433.93	-9.042E-03	&	5.138E-02	1.51E-02	G
CD-109		-1.0153E+00						
			88.04	-1.015E+00	%(P	2.142E+00	6.49E-01	G
SN-113		6.2095E-03						
			391.71	6.209E-03	&(	6.500E-02	1.89E-02	G K
			255.04	-3.812E-01	&	2.095E+00	6.22E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-2.1427E-02						
		427.95	-2.143E-02	%(P	1.506E-01	4.36E-02	G K
		600.77	-8.239E-03	& P	2.431E-01	6.84E-02	G
		636.15	1.177E-01	% P	3.814E-01	1.12E-01	G
		463.51	2.654E-02	% P	4.778E-01	1.37E-01	G
		176.29	8.823E-02	% P	7.103E-01	2.11E-01	G
I-131	9.7821E-03						
		364.48	9.782E-03	&(	4.851E-02	1.42E-02	G K
		636.97	3.490E-01	%	5.741E-01	1.79E-01	G
		284.29	-7.670E-02	%	8.152E-01	2.40E-01	G
CS-134	1.9421E-02						
		604.66	-4.146E-03	%(	1.191E-01	3.51E-02	G K
		795.76	4.635E-02	(	5.425E-02	1.76E-02	G
		569.29	9.801E-03	&	2.599E-01	7.30E-02	G
		801.84	-6.859E-02	& P	5.180E-01	1.46E-01	G
CS-137	1.9209E-01						
		661.62	1.921E-01	*(	7.757E-02	3.64E-02	G
CE-139	8.7098E-04						
		165.85	8.710E-04	%(P	5.346E-02	1.58E-02	G
EU-152	-2.5839E-02						
		121.78	-2.584E-02	%(P	1.590E-01	4.74E-02	G K
		344.30	1.099E-02	%	1.093E-01	3.14E-02	G
		1408.08	0.000E+00	%	3.525E-01	9.66E-02	G
		964.00	5.755E-02	& P	4.174E-01	1.19E-01	G
		1112.07	1.601E-01	%	4.823E-01	1.42E-01	G
		778.90	7.182E-02	% P	3.477E-01	9.99E-02	G
EU-154	-1.8127E-02						
		123.10	-1.813E-02	%(P	1.127E-01	3.36E-02	G K
		1274.80	-7.529E-03	&	2.173E-01	6.07E-02	G
		723.30	-2.364E-02	& P	3.324E-01	9.54E-02	G
		1004.80	1.026E-01	%	3.051E-01	9.00E-02	G
EU-155	1.0800E-01						
		86.45	1.080E-01	%(P	2.621E-01	7.92E-02	G K
		105.31	6.338E-02	&	2.658E-01	7.98E-02	G
HG-203	3.0316E-02						
		279.17	3.032E-02	&(P	4.517E-02	1.39E-02	G K
		72.87	-2.623E-01	&	1.989E+00	5.95E-01	G
		70.83	6.708E-01	%	2.999E+00	8.98E-01	G
		82.50	-1.012E+00	%	3.948E+00	1.19E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.5210E-01						
		583.14	3.521E-01	@(P	5.450E-02	3.10E-02	G
		510.72	4.696E-01	+	2.157E-01	9.21E-02	G
PB-212	6.6279E-01						
		238.63	6.628E-01	(	1.044E-01	4.18E-02	G K
							Energy duplication
		77.11	8.444E-01	+	5.787E-01	1.82E-01	G
		74.81	7.288E-01	& P	1.179E+00	3.59E-01	G
PB-214	3.7192E-01						
		351.99	3.587E-01	(P	9.791E-02	3.88E-02	G K
		295.22	3.975E-01	(	2.162E-01	7.25E-02	G
							Energy duplication
		77.11	1.381E+00	+	9.465E-01	2.98E-01	G
		241.92	-1.867E-01	%	7.844E-01	2.35E-01	G
BI-212	3.1973E-01						
		727.17	3.197E-01	%(	4.323E-01	1.37E-01	G K
		1620.56	-3.667E-02	% P	8.054E-01	1.09E-01	G
		785.42	1.359E+00	% P	2.258E+00	7.02E-01	G
BI-214	4.8027E-01						
		609.32	4.803E-01	@(	8.634E-02	4.58E-02	G K
		1764.51	3.485E-01	- P	1.708E-01	9.10E-02	G
		1120.28	9.191E-01	+	4.695E-01	2.08E-01	G
RA-224	5.9504E-01						
		241.00	5.950E-01	%(P	1.385E+00	4.19E-01	G
RA-226	9.3668E-01						
		185.99	9.367E-01	(P	1.264E+00	3.88E-01	G
AC-228	6.5401E-01						
		911.07	6.370E-01	(P	1.928E-01	9.25E-02	G K
		968.90	1.484E+00	+ P	3.540E-01	1.87E-01	G
		338.40	6.952E-01	(	3.558E-01	1.38E-01	G
TH-227	-1.7958E-01						
		236.00	-1.796E-01	%(P	4.885E-01	1.47E-01	G K
		256.25	-1.272E-01	&	5.998E-01	1.78E-01	G
PA-234	-6.3463E-03						
		98.44	-6.346E-03	&(	2.044E-01	6.05E-02	G K
		946.00	5.726E-02	%	3.147E-01	9.07E-02	G
		131.28	7.780E-03	&	2.265E-01	6.71E-02	G
		94.67	-1.762E-01	%	4.869E-01	1.47E-01	G
		883.24	-2.003E-02	%	3.507E-01	9.58E-02	G
		926.70	1.035E-01	%	5.513E-01	1.59E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		569.26	1.339E-02	&	3.608E-01	1.01E-01	G
TH-234	1.5722E-01						
		63.29	1.572E-01	&(P	4.399E+00	1.31E+00	G K
		92.80	1.378E+00	%	2.486E+00	7.56E-01	G
		92.38	1.539E+00	% P	2.983E+00	9.06E-01	G
AM-241	2.5780E-01						
		59.54	2.578E-01	%(	6.413E-01	1.94E-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	2.1132E-01	2.1417E-01	3.7709E-01	3.7728E-01	4.067E-01
K-40		1.3282E+01	1.3282E+01	1.8026E+00	1.9506E+00	
MN-54	#A	2.0878E-02	2.0926E-02	5.2608E-02	5.2621E-02	5.887E-02
CO-57	#B	-7.0339E-03	-7.0526E-03	5.1589E-02	5.1590E-02	5.753E-02
CO-60	#B	4.0271E-02	4.0286E-02	5.8824E-02	5.8867E-02	6.225E-02

Sr-85	#A	-2.7196E-02	-2.7497E-02	5.2488E-02	5.2511E-02	5.708E-02
Kr-85	#A	-6.1992E+02	-6.1992E+02	1.1952E+03	1.1957E+03	1.315E+03
Y-88	#B	-2.2147E-05	-2.2296E-05	1.3378E-04	1.3378E-04	2.487E-02
NB-94	#B	-2.8544E-03	-2.8544E-03	4.3756E-02	4.3756E-02	5.227E-02
Ag-108M	#B	-5.1954E-03	-5.1954E-03	5.7503E-02	5.7503E-02	6.689E-02
CD-109	#A	-1.0137E+00	-1.0153E+00	2.0361E+00	2.0368E+00	2.139E+00
SN-113	#B	6.1710E-03	6.2095E-03	5.6621E-02	5.6622E-02	6.460E-02
SB-125	#B	-2.1411E-02	-2.1427E-02	1.7442E-01	1.7443E-01	1.505E-01
I-131	#B	8.9495E-03	9.7821E-03	4.2692E-02	4.2695E-02	4.438E-02
CS-134	#B	1.9402E-02	1.9421E-02	2.2143E-02	2.2170E-02	1.189E-01
CS-137	#	1.9208E-01	1.9209E-01	1.0913E-01	1.0966E-01	
CE-139	#A	8.6647E-04	8.7098E-04	4.7392E-02	4.7392E-02	5.318E-02
EU-152	#B	-2.5835E-02	-2.5839E-02	1.5708E-01	1.5708E-01	1.590E-01
EU-154	#B	-1.8122E-02	-1.8127E-02	1.0328E-01	1.0328E-01	1.127E-01
EU-155	#B	1.0795E-01	1.0800E-01	2.3766E-01	2.3773E-01	2.620E-01
HG-203	#B	2.9854E-02	3.0316E-02	4.1786E-02	4.1820E-02	4.448E-02
TL-208		3.5210E-01	3.5210E-01	9.2902E-02	9.4980E-02	
PB-212	#	6.6279E-01	6.6279E-01	1.2527E-01	1.3068E-01	1.044E-01
PB-214	#	3.7192E-01	3.7192E-01	1.1834E-01	1.2017E-01	9.791E-02
BI-212	#B	3.1973E-01	3.1973E-01	4.0968E-01	4.1007E-01	4.323E-01
BI-214	#	4.8027E-01	4.8027E-01	1.3753E-01	1.4014E-01	
RA-224	#A	5.9504E-01	5.9504E-01	1.2558E+00	1.2563E+00	1.385E+00
RA-226	#A	9.3668E-01	9.3668E-01	1.1640E+00	1.1652E+00	1.264E+00
AC-228		6.5401E-01	6.5401E-01	2.4119E-01	2.4397E-01	
TH-227	#B	-1.7958E-01	-1.7958E-01	4.4823E-01	4.4834E-01	4.885E-01
PA-234	#B	-6.3463E-03	-6.3463E-03	1.8148E-01	1.8148E-01	2.044E-01
TH-234	#B	1.5722E-01	1.5722E-01	3.9172E+00	3.9172E+00	4.399E+00
AM-241	#A	2.5779E-01	2.5780E-01	5.8129E-01	5.8147E-01	6.413E-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) 1.4960249E+01 pCi/gm
Total Decayed Activity (276.7 to 1999.0 keV) 1.4960260E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS OOL-02-01-001-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_0837.An1

Acquisition information

Start time:	29-Oct-2005 08:37:14
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:	1.7720E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.7720E+03) = 5.6433E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

Half lives decay limit: 12.000
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-Oct-2005 07:56:00
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: 0.1025

***** S U M M A R Y O F P E A 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	204.	19.17	1.50	9.541E-03	77.11	10.700	1.521E+00	PB214
					77.11	17.500	9.298E-01	PB212
77.08	204.	19.17	1.50	9.541E-03	77.11	10.700	1.521E+00	PB214
					77.11	17.500	9.298E-01	PB212
87.21	94.	40.86	1.50	1.235E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
92.94	104.	37.47	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.982E+00	TH234
185.66	132.	23.44	1.80	1.628E-02				
185.66	132.	23.44	1.80	1.628E-02	185.99	3.280	1.823E+00	RA226
209.60	96.	29.14	1.04	1.518E-02				
238.67	505.	5.49	1.21	1.380E-02	238.63	43.100	6.475E-01	PB212
242.01	79.	26.41	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.893E-01	PB214
295.32	101.	16.52	1.25	1.146E-02	295.22	19.200	3.507E-01	PB214
338.59	88.	26.35	1.12	1.005E-02	338.40	12.010	5.567E-01	AC228
351.87	234.	12.98	1.55	9.682E-03				
351.87	234.	12.98	1.55	9.682E-03	351.99	37.100	4.964E-01	PB214
510.44	110.	17.47	1.44	6.698E-03	510.72	22.500	5.559E-01	TL208
583.51	163.	11.77	1.36	5.886E-03	583.14	86.000	2.446E-01	TL208
609.29	118.	13.13	1.51	5.650E-03	609.32	46.090	3.471E-01	BI214
661.78	232.	8.94	1.46	5.228E-03	661.62	84.620	3.998E-01	CS137
911.16	122.	12.90	2.26	3.922E-03	911.07	29.000	8.192E-01	AC228
968.31	89.	19.94	1.11	3.720E-03	968.90	17.460	1.048E+00	AC228
1120.81	34.	31.85	1.43	3.282E-03	1120.28	15.040	5.313E-01	BI214
1172.65	144.	9.80	1.75	3.158E-03	1173.23	99.860	HL>Cutoff	CO60
1332.22	159.	9.95	2.11	2.834E-03	1332.51	99.980	HL>Cutoff	CO60

1460.64	411.	5.02	1.86	2.621E-03	1460.75	10.700	1.116E+01	K40
1764.58	15.	28.64	2.24	2.225E-03	1764.51	15.920	3.136E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.82	209.60	272.	96.	0.048	87.41	1.042	NP-239	
476.97	238.66	132.	505.	0.253	16.47	1.215	PB-212	D
483.64	241.99	177.	79.	0.039	79.23	1.217	PB-214	D
2242.02	1120.81	31.	34.	0.017	95.56	1.434	SC-46	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	660.	204.	0.102	57.52	1.500D
PB-212	153.80	77.11	660.	204.	0.102	57.52	1.500D
CD-109	175.66	88.04	715.	94.	0.047	122.57	1.500D
TH-234	185.46	92.94	707.	104.	0.052	112.41	1.500s
RA-226	371.42	185.91	373.	110.	0.055	76.55	1.500s
PB-212	476.96	238.66	298.	451.	0.225	21.53	1.500
PB-214	590.12	295.23	193.	96.	0.048	68.31	1.500
AC-228	676.87	338.60	141.	97.	0.048	67.68	1.121
PB-214	703.69	352.00	120.	185.	0.093	33.34	1.500s
TL-208	1020.65	510.44	78.	110.	0.055	52.40	1.440s
TL-208	1166.85	583.51	63.	162.	0.081	35.32	1.364s
BI-214	1218.43	609.29	50.	118.	0.059	39.40	1.510s
CS-137	1323.46	661.78	66.	232.	0.116	26.81	1.457
AC-228	1822.45	911.16	40.	122.	0.061	38.69	2.256s
AC-228	1936.82	968.31	53.	89.	0.045	59.81	1.106s
CO-60	2345.77	1172.65	19.	144.	0.072	29.40	1.750s
CO-60	2665.14	1332.22	19.	159.	0.079	29.84	2.106
K-40	2922.19	1460.64	4.	410.	0.205	15.07	1.859
BI-214	3530.62	1764.58	2.	15.	0.007	85.92	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		-7.3086E-05						
			477.56	-7.309E-05	%(	4.732E-01	1.35E-01 G	
K-40		1.1162E+01						
			1460.75	1.116E+01	(P	3.125E-01	5.61E-01 G	
MN-54		9.7025E-03						
			834.81	9.702E-03	&(P	6.760E-02	1.95E-02 G	
CO-57		7.7309E-03						
			122.07	7.731E-03	%(	5.696E-02	1.70E-02 G K	
			136.43	-6.546E-02	&	4.760E-01	1.42E-01 G	
CO-60		4.2777E-01						
			1332.51	4.278E-01	(P	6.208E-02	4.26E-02 G K	
			1173.23	3.484E-01	-	5.570E-02	3.41E-02 G K	
Sr-85		-1.8748E-02						
			514.00	-1.875E-02	%(	6.308E-02	1.88E-02 G	
Kr-85		-4.3274E+02						
			513.99	-4.327E+02	%(	1.456E+03	4.33E+02 G	
Y-88		-5.2757E-03						
			1836.01	-5.276E-03	%(P	5.357E-02	1.40E-02 G K	
			898.02	3.587E-03	& P	5.495E-02	1.52E-02 G	
NB-94		-1.0977E-02						
			871.10	-1.098E-02	&(	7.529E-02	2.18E-02 G K	
			702.50	0.000E+00	&	5.689E-02	1.60E-02 G K	
Ag-108M		-1.4893E-02						
			722.95	-1.489E-02	&(	7.743E-02	2.26E-02 G K	
			614.37	-2.077E-03	% P	6.250E-02	1.78E-02 G	
			433.93	8.619E-04	%	4.956E-02	1.42E-02 G	
CD-109		1.5327E+00						
								Energy duplication
			88.04	1.533E+00	@(P	2.075E+00	6.36E-01 G	
SN-113		6.3370E-03						
			391.71	6.337E-03	%(	6.211E-02	1.80E-02 G K	
			255.04	8.193E-01	&	1.984E+00	5.98E-01 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	2.2415E-02						
		427.95	2.242E-02	%(P	1.438E-01	4.17E-02	G K
		600.77	5.561E-03	& P	2.724E-01	7.69E-02	G
		636.15	1.849E-01	% P	4.089E-01	1.24E-01	G
		463.51	2.721E-01	% P	4.598E-01	1.41E-01	G
		176.29	6.278E-02	& P	7.082E-01	2.10E-01	G
I-131	1.1357E-02						
		364.48	1.136E-02	&(	4.442E-02	1.31E-02	G K
		636.97	3.005E-01	%	6.016E-01	1.83E-01	G
		284.29	1.476E-01	&	6.949E-01	2.06E-01	G
CS-134	1.4617E-03						
		604.66	1.462E-03	%(	1.175E-01	3.46E-02	G K
		795.76	4.652E-02	%	6.179E-02	1.96E-02	G
		569.29	-9.583E-03	&	3.162E-01	8.96E-02	G
		801.84	1.418E-01	& P	6.851E-01	1.99E-01	G
CS-137	3.9982E-01						
		661.62	3.998E-01	(	6.991E-02	3.57E-02	G
CE-139	-7.8235E-03						
		165.85	-7.823E-03	%(P	5.392E-02	1.60E-02	G
EU-152	8.8913E-03						
		121.78	8.891E-03	%(P	1.703E-01	5.05E-02	G K
		344.30	-5.002E-02	%	1.713E-01	5.11E-02	G
		1408.08	1.436E-03	%	2.534E-01	6.61E-02	G
		964.00	-1.307E-02	& P	4.000E-01	1.10E-01	G
		1112.07	1.173E-03	%	5.598E-01	1.56E-01	G
		778.90	3.116E-02	& P	4.336E-01	1.22E-01	G
EU-154	8.7182E-03						
		123.10	8.718E-03	%(P	1.211E-01	3.60E-02	G K
		1274.80	3.454E-02	%	1.974E-01	5.62E-02	G
		723.30	-4.086E-02	% P	3.368E-01	9.71E-02	G
		1004.80	3.858E-03	%	3.386E-01	9.31E-02	G
EU-155	1.6515E-01						
		86.45	1.652E-01	%(P	2.531E-01	7.72E-02	G K
		105.31	-2.260E-02	&	2.987E-01	8.91E-02	G
HG-203	-1.5283E-02						
		279.17	-1.528E-02	%(P	6.011E-02	1.79E-02	G K
		72.87	-7.913E-01	%	2.128E+00	6.43E-01	G
		70.83	-1.410E+00	%	3.608E+00	1.09E+00	G
		82.50	-4.221E-01	%	3.343E+00	9.96E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.4464E-01						
		583.14	2.446E-01	*(P	5.955E-02	2.89E-02	G
		510.72	5.559E-01	+	2.223E-01	9.71E-02	G
PB-212	5.7766E-01						
		238.63	5.777E-01	(	1.065E-01	4.15E-02	G K
							Energy duplication
		77.11	9.298E-01	+	5.592E-01	1.78E-01	G
		74.81	8.306E-01	& P	1.213E+00	3.71E-01	G
PB-214	3.7303E-01						
		351.99	3.933E-01	*(P	1.142E-01	4.38E-02	G K
		295.22	3.339E-01	(	2.335E-01	7.60E-02	G
							Energy duplication
		77.11	1.521E+00	+	9.146E-01	2.92E-01	G
		241.92	-2.073E-01	%	8.279E-01	2.48E-01	G
BI-212	3.6677E-01						
		727.17	3.668E-01	%(	5.318E-01	1.66E-01	G K
		1620.56	4.368E-01	% P	1.691E+00	4.70E-01	G
		785.42	-2.352E-01	% P	2.860E+00	8.10E-01	G
BI-214	3.3849E-01						
		609.32	3.471E-01	@(	1.040E-01	4.56E-02	G K
		1764.51	3.136E-01	?(P	1.840E-01	9.04E-02	G
		1120.28	2.639E-01	%	4.822E-01	1.48E-01	G
RA-224	3.4539E-01						
		241.00	3.454E-01	%(P	1.424E+00	4.26E-01	G
RA-226	1.5716E+00						
		185.99	1.572E+00	(P	1.326E+00	4.17E-01	G
AC-228	9.0499E-01						
		911.07	8.192E-01	(P	2.154E-01	1.06E-01	G K
		968.90	1.048E+00	@(P	4.298E-01	2.09E-01	G
		338.40	6.116E-01	-	3.665E-01	1.38E-01	G
TH-227	-2.5738E-01						
		236.00	-2.574E-01	%(P	5.220E-01	1.58E-01	G K
		256.25	2.099E-01	%	6.480E-01	1.94E-01	G
PA-234	1.7897E-02						
		98.44	1.790E-02	%(	2.557E-01	7.61E-02	G K
		946.00	0.000E+00	&	3.429E-01	9.58E-02	G
		131.28	-2.513E-03	&	2.389E-01	7.07E-02	G
		94.67	-1.791E-01	%	4.856E-01	1.47E-01	G
		883.24	6.238E-02	%	4.910E-01	1.40E-01	G
		926.70	1.092E-01	%	5.582E-01	1.61E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.425E-02 &   4.691E-01 1.33E-01 G

TH-234       9.0282E-01
                           63.29 7.255E-02 &(P 4.963E+00 1.47E+00 G K
                           92.80 1.982E+00  (  2.414E+00 7.43E-01 G
                           92.38 1.737E+00 % P 2.934E+00 8.94E-01 G

AM-241       1.2005E-01
                           59.54 1.200E-01 &(  7.380E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	-7.3059E-05	-7.3086E-05	4.0523E-01	4.0523E-01	4.730E-01
K-40		1.1162E+01	1.1162E+01	1.6830E+00	1.7958E+00	
MN-54	#A	9.7018E-03	9.7025E-03	5.8413E-02	5.8415E-02	6.760E-02
CO-57	#B	7.7303E-03	7.7309E-03	5.0918E-02	5.0920E-02	5.696E-02
CO-60	#H	4.2777E-01	4.2777E-01	1.2773E-01	1.2997E-01	

Sr-85	#A	-1.8742E-02	-1.8748E-02	5.6341E-02	5.6350E-02	6.306E-02
Kr-85	#A	-4.3274E+02	-4.3274E+02	1.3002E+03	1.3005E+03	1.456E+03
Y-88	#B	-5.2747E-03	-5.2757E-03	4.2370E-02	4.2372E-02	5.356E-02
NB-94	#B	-1.0977E-02	-1.0977E-02	6.5362E-02	6.5365E-02	7.529E-02
Ag-108M	#B	-1.4893E-02	-1.4893E-02	6.7930E-02	6.7936E-02	7.743E-02
CD-109	#A	1.5326E+00	1.5327E+00	1.9082E+00	1.9101E+00	2.075E+00
SN-113	#B	6.3359E-03	6.3370E-03	5.3909E-02	5.3911E-02	6.210E-02
SB-125	#B	2.2415E-02	2.2415E-02	1.2517E-01	1.2518E-01	1.438E-01
I-131	#B	1.1329E-02	1.1357E-02	3.9290E-02	3.9295E-02	4.431E-02
CS-134	#B	1.4616E-03	1.4617E-03	1.0370E-01	1.0370E-01	1.175E-01
CS-137		3.9982E-01	3.9982E-01	1.0721E-01	1.0953E-01	
CE-139	#A	-7.8223E-03	-7.8235E-03	5.1186E-02	5.1188E-02	5.391E-02
EU-152	#B	8.8913E-03	8.8913E-03	1.5157E-01	1.5158E-01	1.703E-01
EU-154	#B	8.7181E-03	8.7182E-03	1.0792E-01	1.0792E-01	1.211E-01
EU-155	#B	1.6515E-01	1.6515E-01	2.3168E-01	2.3186E-01	2.531E-01
HG-203	#B	-1.5277E-02	-1.5283E-02	5.4309E-02	5.4316E-02	6.009E-02
TL-208	#	2.4464E-01	2.4464E-01	8.6624E-02	8.7705E-02	
PB-212	#	5.7766E-01	5.7766E-01	1.2436E-01	1.2851E-01	1.065E-01
PB-214	#	3.7303E-01	3.7303E-01	1.2461E-01	1.2636E-01	1.142E-01
BI-212	#B	3.6677E-01	3.6677E-01	4.9784E-01	4.9826E-01	5.318E-01
BI-214	#	3.3849E-01	3.3849E-01	1.3338E-01	1.3472E-01	
RA-224	#A	3.4539E-01	3.4539E-01	1.2775E+00	1.2776E+00	1.424E+00
RA-226	#	1.5716E+00	1.5716E+00	1.2519E+00	1.2550E+00	1.326E+00
AC-228		9.0499E-01	9.0499E-01	3.2257E-01	3.2655E-01	
TH-227	#B	-2.5738E-01	-2.5738E-01	4.8022E-01	4.8044E-01	5.220E-01
PA-234	#B	1.7897E-02	1.7897E-02	2.2834E-01	2.2834E-01	2.557E-01
TH-234	#B	9.0282E-01	9.0282E-01	1.0149E+00	1.0161E+00	4.963E+00
AM-241	#A	1.2005E-01	1.2005E-01	6.6193E-01	6.6196E-01	7.380E-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) 1.3477983E+01 pCi/gm
Total Decayed Activity (295.2 to 1999.0 keV) 1.3477988E+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_29OCT2005_0913.An1

Sample description
FSS OOL-02-01-017-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_0913.An1

Acquisition information
Start time: 29-Oct-2005 09:13:18
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: 1.8320E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8320E+03) =
5.4585E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 11:49:00
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: 0.0934

***** S U M M A R Y O F P E A K 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	112.	36.62	1.50	8.847E-03				
74.68	112.	36.62	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.10	158.	26.28	1.50	9.541E-03	77.11	10.700	1.141E+00	PB214
					77.11	17.500	6.976E-01	PB212
77.10	158.	26.28	1.50	9.541E-03	77.11	10.700	1.141E+00	PB214
					77.11	17.500	6.976E-01	PB212
93.40	87.	32.04	1.11	1.341E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.605E+00	TH234
185.78	87.	28.38	1.43	1.628E-02	185.99	3.280	1.136E+00	RA226
209.53	72.	34.86	1.22	1.518E-02				
238.69	528.	5.23	1.21	1.380E-02	238.63	43.100	6.546E-01	PB212
241.54	100.	19.79	1.22	1.367E-02	241.00	3.900	1.372E+00	RA224
					241.92	7.470	7.267E-01	PB214
270.31	58.	36.35	0.68	1.243E-02				
295.28	151.	16.52	1.24	1.146E-02	295.22	19.200	5.046E-01	PB214
338.36	109.	14.82	1.37	1.006E-02	338.40	12.010	6.630E-01	AC228
352.04	197.	12.30	1.23	9.677E-03	351.99	37.100	4.039E-01	PB214
464.24	70.	24.41	1.28	7.353E-03	463.51	10.000	6.860E-01	SB125
510.32	88.	23.42	1.15	6.700E-03	510.72	22.500	4.334E-01	TL208
583.13	165.	12.63	1.53	5.890E-03	583.14	86.000	2.398E-01	TL208
609.37	167.	12.85	1.42	5.649E-03	609.32	46.090	4.723E-01	BI214
727.18	54.	25.01	1.22	4.794E-03	727.17	11.800	7.106E-01	BI212
795.09	25.	38.14	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
860.07	25.	29.12	1.57	4.125E-03				
911.21	128.	13.48	1.23	3.921E-03	911.07	29.000	8.300E-01	AC228
968.75	84.	16.82	1.48	3.718E-03	968.90	17.460	9.484E-01	AC228
1118.47	29.	35.90	1.18	3.283E-03	1120.28	15.040	4.302E-01	BI214

1460.83	525.	4.39	1.88	2.621E-03	1460.75	10.700	1.381E+01	K40
1764.24	32.	17.68	1.10	2.225E-03	1764.51	15.920	6.645E-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	
186.38	93.19	345.	87.	0.043	96.12	1.112	U-235	lD
418.68	209.53	234.	72.	0.036	104.57	1.220	AC-228	s
477.02	238.74	117.	528.	0.264	15.69	1.215	PB-212	D
482.71	241.59	148.	100.	0.050	59.37	1.217	PB-214	D
540.26	270.31	158.	58.	0.029	109.06	0.680	AC-228	s
1720.23	860.07	14.	25.	0.013	87.36	1.574	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	148.93	74.68	831.	112.	0.056	109.85	1.500s
PB-214	153.80	77.11	782.	158.	0.079	78.84	1.500D
PB-212	153.80	77.11	782.	158.	0.079	78.84	1.500D
RA-226	371.18	185.78	251.	82.	0.041	85.14	1.434s
PB-212	476.99	238.68	309.	457.	0.229	21.52	1.500
RA-224	482.78	241.58	357.	84.	0.042	99.59	1.500
PB-214	590.54	295.44	186.	123.	0.061	54.35	1.500
AC-228	676.40	338.36	68.	109.	0.054	44.46	1.369
PB-214	703.69	352.00	99.	190.	0.095	30.98	1.500
SB-125	925.84	463.05	72.	38.	0.019	101.95	1.500s
TL-208	1020.41	510.32	98.	88.	0.044	70.27	1.148
TL-208	1166.10	583.13	73.	165.	0.082	37.89	1.528
BI-214	1218.59	609.37	71.	167.	0.083	38.56	1.420s
BI-212	1454.31	727.18	38.	54.	0.027	75.02	1.218s
CS-134	1590.19	795.09	33.	25.	0.012	114.41	1.601s
AC-228	1822.57	911.21	45.	128.	0.064	40.43	1.232
AC-228	1937.71	968.75	35.	83.	0.042	50.47	1.484
BI-214	2237.34	1118.47	25.	29.	0.014	107.71	1.182s
K-40	2922.57	1460.83	2.	525.	0.262	13.16	1.878
BI-214	3529.94	1764.24	0.	32.	0.016	53.03	1.099s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	&(	4.203E-01 1.19E-01	G
K-40		1.3809E+01					
			1460.75	1.381E+01	(P	2.468E-01 6.06E-01	G
MN-54		-3.0379E-03					
			834.81	-3.038E-03	%(P	5.392E-02 1.50E-02	G
CO-57		5.4643E-04					
			122.07	5.464E-04	&(	5.373E-02 1.59E-02	G K
			136.43	0.000E+00	%	4.560E-01 1.35E-01	G
CO-60		-8.0611E-03					
			1332.51	-8.061E-03	%(P	6.813E-02 1.90E-02	G K
			1173.23	-1.727E-02	&	9.324E-02 2.71E-02	G K
Sr-85		-1.7760E-02					
			514.00	-1.776E-02	%(	5.663E-02 1.69E-02	G
Kr-85		-4.0665E+02					
			513.99	-4.067E+02	%(	1.295E+03 3.86E+02	G
Y-88		-2.2811E-05					
			1836.01	-2.281E-05	%(P	2.562E-02 3.48E-03	G K
			898.02	4.640E-03	% P	4.720E-02 1.30E-02	G
NB-94		0.0000E+00					
			871.10	0.000E+00	%(	6.760E-02 1.90E-02	G K
			702.50	6.664E-03	%	4.788E-02 1.37E-02	G K
Ag-108M		-8.8392E-03					
			722.95	-8.839E-03	%(	6.038E-02 1.74E-02	G K
			614.37	-1.619E-03	% P	4.423E-02 1.23E-02	G
			433.93	-1.029E-02	%	4.892E-02 1.44E-02	G
CD-109		-5.3170E-01					
			88.04	-5.317E-01	&(P	2.264E+00 6.80E-01	G
SN-113		-1.2701E-03					
			391.71	-1.270E-03	%(	6.141E-02 1.76E-02	G K
			255.04	-4.760E-01	&	2.150E+00 6.40E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.1147E-01						
		427.95	2.051E-02	%(P	1.229E-01	3.55E-02	G K
		600.77	2.018E-02	% P	2.557E-01	7.28E-02	G
		636.15	2.714E-02	& P	4.388E-01	1.24E-01	G
		463.51	3.807E-01	@(P	4.235E-01	1.35E-01	G
		176.29	2.770E-02	% P	6.687E-01	1.97E-01	G
I-131	9.3438E-03						
		364.48	9.344E-03	%(	4.053E-02	1.19E-02	G K
		636.97	1.062E-01	%	7.176E-01	2.06E-01	G
		284.29	-7.451E-02	&	7.104E-01	2.08E-01	G
CS-134	2.2038E-02						
		604.66	-1.419E-03	%(	5.743E-02	1.64E-02	G K
		795.76	4.885E-02	*(	5.756E-02	1.86E-02	G
		569.29	-6.588E-04	%	2.287E-01	6.29E-02	G
		801.84	4.151E-02	% P	4.953E-01	1.37E-01	G
CS-137	3.0043E-02						
		661.62	3.004E-02	%(	5.367E-02	1.65E-02	G
CE-139	3.4690E-03						
		165.85	3.469E-03	&(P	4.883E-02	1.44E-02	G
EU-152	-6.5628E-03						
		121.78	-6.563E-03	&(P	1.648E-01	4.88E-02	G K
		344.30	2.806E-02	&	1.289E-01	3.79E-02	G
		1408.08	8.835E-02	%	1.929E-01	5.86E-02	G
		964.00	9.927E-02	% P	2.993E-01	8.75E-02	G
		1112.07	-1.024E-01	%	5.386E-01	1.55E-01	G
		778.90	-6.174E-02	% P	4.281E-01	1.23E-01	G
EU-154	6.7576E-03						
		123.10	6.758E-03	%(P	1.212E-01	3.60E-02	G K
		1274.80	4.595E-02	&	1.871E-01	5.41E-02	G
		723.30	-6.555E-02	% P	2.992E-01	8.72E-02	G
		1004.80	5.164E-02	&	2.522E-01	7.13E-02	G
EU-155	1.1452E-01						
		86.45	1.145E-01	%(P	2.549E-01	7.71E-02	G K
		105.31	1.663E-02	&	2.808E-01	8.36E-02	G
HG-203	6.5044E-03						
		279.17	6.504E-03	&(P	5.285E-02	1.56E-02	G K
		72.87	-1.028E+00	%	2.201E+00	6.67E-01	G
		70.83	-2.358E+00	&	3.879E+00	1.18E+00	G
		82.50	-2.877E-01	&	4.059E+00	1.21E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.3983E-01						
		583.14	2.398E-01	(P	6.205E-02	3.04E-02	G
		510.72	4.334E-01	+	2.386E-01	1.01E-01	G
PB-212	5.6673E-01						
		238.63	5.667E-01	(	1.049E-01	4.07E-02	G K
							Energy duplication
		77.11	6.976E-01	+	5.877E-01	1.83E-01	G
		74.81	9.721E-01	& P	1.191E+00	3.66E-01	G
PB-214	3.9796E-01						
		351.99	3.911E-01	(P	1.009E-01	4.05E-02	G K
		295.22	4.112E-01	(	2.219E-01	7.45E-02	G
							Energy duplication
		77.11	1.141E+00	+	9.612E-01	3.00E-01	G
		241.92	4.109E-01	%	7.052E-01	2.15E-01	G
BI-212	7.1065E-01						
		727.17	7.106E-01	*(	4.074E-01	1.78E-01	G K
		1620.56	2.644E-01	& P	1.849E+00	4.95E-01	G
		785.42	8.332E-01	% P	2.557E+00	7.55E-01	G
BI-214	4.6192E-01						
		609.32	4.723E-01	@(	1.192E-01	6.07E-02	G K
		1764.51	6.645E-01	+ P	1.535E-01	1.18E-01	G
		1120.28	4.302E-01	(	3.899E-01	1.54E-01	G
RA-224	1.1583E+00						
		241.00	1.158E+00	?(P	1.254E+00	3.90E-01	G
RA-226	1.1356E+00						
		185.99	1.136E+00	(P	1.058E+00	3.40E-01	G
AC-228	8.7449E-01						
		911.07	8.300E-01	(P	2.204E-01	1.12E-01	G K
		968.90	9.484E-01	(P	3.420E-01	1.60E-01	G
		338.40	6.630E-01	-	2.518E-01	9.83E-02	G
TH-227	-2.3549E-01						
		236.00	-2.355E-01	%(P	5.147E-01	1.56E-01	G K
		256.25	-1.378E-01	%	6.150E-01	1.83E-01	G
PA-234	2.7995E-03						
		98.44	2.799E-03	&(	2.643E-01	7.85E-02	G K
		946.00	-4.399E-02	%	2.988E-01	8.52E-02	G
		131.28	-5.162E-04	%	2.010E-01	5.92E-02	G
		94.67	-1.493E-01	%	4.263E-01	1.29E-01	G
		883.24	4.902E-02	&	4.563E-01	1.29E-01	G
		926.70	0.000E+00	&	6.495E-01	1.83E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.814E-03 %   3.393E-01 9.34E-02 G

TH-234       1.3907E+00
                           63.29 1.391E+00 %(P 4.648E+00 1.40E+00 G K
                           92.80 1.517E+00 %   2.402E+00 7.33E-01 G
                           92.38 1.129E-01 & P 2.841E+00 8.46E-01 G

AM-241      -1.2448E-01
                           59.54-1.245E-01 &(  7.115E-01 2.13E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	0.0000E+00	0.0000E+00	3.5762E-01	3.5762E-01	4.154E-01
K-40		1.3809E+01	1.3809E+01	1.8178E+00	1.9761E+00	
MN-54	#A	-3.0319E-03	-3.0379E-03	5.7730E-02	5.7730E-02	5.382E-02
CO-57	#B	5.4518E-04	5.4643E-04	4.7675E-02	4.7675E-02	5.360E-02
CO-60	#B	-8.0586E-03	-8.0611E-03	6.0096E-02	6.0098E-02	6.811E-02

Sr-85	#A	-1.7592E-02	-1.7760E-02	5.0589E-02	5.0599E-02	5.609E-02
Kr-85	#A	-4.0665E+02	-4.0665E+02	1.1570E+03	1.1572E+03	1.295E+03
Y-88	#B	-2.2679E-05	-2.2811E-05	1.3687E-04	1.3687E-04	2.547E-02
NB-94	#B	0.0000E+00	0.0000E+00	5.7083E-02	5.7083E-02	6.760E-02
Ag-108M	#B	-8.8391E-03	-8.8392E-03	5.2109E-02	5.2111E-02	6.038E-02
CD-109	#A	-5.3097E-01	-5.3170E-01	2.2266E+00	2.2268E+00	2.261E+00
SN-113	#B	-1.2633E-03	-1.2701E-03	5.2782E-02	5.2782E-02	6.108E-02
SB-125	#B	1.1140E-01	1.1147E-01	1.1826E-01	1.1843E-01	1.228E-01
I-131	#B	8.6523E-03	9.3438E-03	3.5578E-02	3.5582E-02	3.753E-02
CS-134	#B	2.2020E-02	2.2038E-02	2.5214E-02	2.5245E-02	5.738E-02
CS-137	#A	3.0041E-02	3.0043E-02	4.9531E-02	4.9559E-02	5.367E-02
CE-139	#A	3.4534E-03	3.4690E-03	4.3296E-02	4.3296E-02	4.861E-02
EU-152	#B	-6.5619E-03	-6.5628E-03	2.2001E-01	2.2001E-01	1.648E-01
EU-154	#B	6.7562E-03	6.7576E-03	1.0800E-01	1.0800E-01	1.212E-01
EU-155	#B	1.1448E-01	1.1452E-01	2.3135E-01	2.3144E-01	2.548E-01
HG-203	#B	6.4186E-03	6.5044E-03	4.6711E-02	4.6712E-02	5.215E-02
TL-208		2.3983E-01	2.3983E-01	9.1099E-02	9.2088E-02	
PB-212	#	5.6673E-01	5.6673E-01	1.2196E-01	1.2604E-01	1.049E-01
PB-214	#	3.9796E-01	3.9796E-01	1.2355E-01	1.2555E-01	1.009E-01
BI-212	#	7.1065E-01	7.1065E-01	5.3314E-01	5.3463E-01	
BI-214		4.6192E-01	4.6192E-01	1.7810E-01	1.7998E-01	
RA-224	#A	1.1583E+00	1.1583E+00	1.1695E+00	1.1713E+00	1.254E+00
RA-226	#	1.1356E+00	1.1356E+00	1.0194E+00	1.0214E+00	
AC-228		8.7449E-01	8.7449E-01	2.8302E-01	2.8724E-01	
TH-227	#B	-2.3549E-01	-2.3549E-01	4.7296E-01	4.7315E-01	5.147E-01
PA-234	#B	2.7995E-03	2.7995E-03	2.3565E-01	2.3565E-01	2.643E-01
TH-234	#B	1.3907E+00	1.3907E+00	4.1938E+00	4.1945E+00	4.648E+00
AM-241	#A	-1.2448E-01	-1.2448E-01	6.3847E-01	6.3851E-01	7.115E-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) 1.7231089E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.7231089E+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_29OCT2005_0952.An1

Sample description
FSS OOL-02-01-023-F-B

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_0952.An1

Acquisition information
Start time: 29-Oct-2005 09:52:21
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: 1.9160E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9160E+03) =
5.2192E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 13:46:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1153

***** S U M M A R Y O F P E A K 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	114.	38.24	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.06	179.	24.31	1.50	9.541E-03	77.11	10.700	1.236E+00	PB214
					77.11	17.500	7.555E-01	PB212
77.06	179.	24.31	1.50	9.541E-03	77.11	10.700	1.236E+00	PB214
					77.11	17.500	7.555E-01	PB212
185.48	139.	23.38	1.16	1.629E-02	185.99	3.280	1.773E+00	RA226
209.22	73.	29.54	1.19	1.518E-02				
238.71	659.	4.60	1.21	1.380E-02	238.63	43.100	7.817E-01	PB212
241.70	96.	22.42	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.632E-01	PB214
269.89	64.	37.04	1.49	1.244E-02				
277.82	45.	41.55	1.50	1.207E-02	279.17	81.500	PBC<MDA	HG203
295.10	158.	15.93	1.22	1.147E-02				
295.10	158.	15.93	1.22	1.147E-02	295.22	19.200	5.056E-01	PB214
300.68	52.	32.94	1.13	1.127E-02				
338.48	137.	15.10	1.16	1.006E-02	338.40	12.010	7.998E-01	AC228
351.93	218.	11.66	1.49	9.680E-03				
351.93	218.	11.66	1.49	9.680E-03	351.99	37.100	4.282E-01	PB214
463.05	49.	27.11	0.94	7.372E-03				
463.05	49.	27.11	0.94	7.372E-03	463.51	10.000	4.547E-01	SB125
511.17	96.	20.57	1.59	6.689E-03	510.72	22.500	4.509E-01	TL208
583.04	222.	9.10	1.40	5.891E-03				
583.04	222.	9.10	1.40	5.891E-03	583.14	86.000	3.085E-01	TL208
609.38	172.	11.27	1.55	5.649E-03	609.32	46.090	4.665E-01	BI214
727.53	70.	17.50	0.85	4.792E-03	727.17	11.800	8.752E-01	BI212
911.22	146.	15.22	1.96	3.921E-03	911.07	29.000	9.040E-01	AC228
964.36	27.	28.93	1.71	3.733E-03	964.00	14.580	PBC<MDA	EU152

968.96	78.	13.63	1.72	3.717E-03	968.90	17.460	8.496E-01	AC228
1120.22	43.	30.56	2.21	3.283E-03	1120.28	15.040	6.128E-01	BI214
1460.82	561.	4.28	1.77	2.621E-03	1460.75	10.700	1.412E+01	K40
1765.09	14.	34.59	2.24	2.225E-03	1764.51	15.920	2.781E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.79	209.59	282.	77.	0.038	102.89	0.899	NP-239	
477.05	238.76	131.	659.	0.330	13.81	1.215	PB-212	D
483.04	241.75	183.	96.	0.048	67.25	1.217	PB-214	D
539.42	269.89	202.	64.	0.032	111.12	1.488	AC-228	s
601.02	300.68	112.	52.	0.026	95.05	1.130	PB-212	s
1929.30	964.51	14.	31.	0.015	75.36	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	149.17	74.80	949.	114.	0.057	114.72	1.500s
PB-214	153.80	77.11	856.	179.	0.089	72.94	1.500D
PB-212	153.80	77.11	856.	179.	0.089	72.94	1.500D
RA-226	370.57	185.48	355.	134.	0.067	70.13	1.165
PB-212	477.12	238.75	357.	545.	0.273	19.52	1.500
RA-224	482.95	241.66	417.	79.	0.040	112.69	1.500
HG-203	555.30	277.82	155.	45.	0.023	124.64	1.500s
PB-214	590.22	295.28	183.	135.	0.067	49.87	1.500s
AC-228	676.64	338.48	112.	137.	0.068	45.31	1.161
PB-214	703.77	352.04	115.	204.	0.102	30.59	1.500
SB-125	926.17	463.21	57.	37.	0.019	94.60	1.500
TL-208	1021.69	510.96	75.	64.	0.032	68.85	1.499
TL-208	1166.28	583.22	68.	199.	0.099	27.60	1.499s
BI-214	1218.62	609.38	64.	172.	0.086	33.80	1.551
BI-212	1455.01	727.53	29.	70.	0.035	52.49	0.848s
AC-228	1822.58	911.22	74.	146.	0.073	45.66	1.961
AC-228	1938.01	968.90	21.	78.	0.039	41.85	1.718D
BI-214	2240.84	1120.22	39.	43.	0.021	91.69	2.211s
K-40	2922.54	1460.82	4.	561.	0.281	12.85	1.772
BI-214	3531.63	1765.09	5.	14.	0.007	103.77	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		9.6720E-02					
			477.56	9.672E-02	%(	3.861E-01 1.13E-01	G
K-40		1.4116E+01					
			1460.75	1.412E+01	(P	2.952E-01 6.05E-01	G
MN-54		1.7130E-02					
			834.81	1.713E-02	%(P	4.937E-02 1.46E-02	G
CO-57		4.9807E-03					
			122.07	4.981E-03	%(	4.942E-02 1.47E-02	G K
			136.43	-1.410E-02	%	4.468E-01 1.33E-01	G
CO-60		1.1837E-07					
			1332.51	1.184E-07	%(P	4.002E-02 1.01E-02	G K
			1173.23	2.519E-03	%	5.839E-02 1.61E-02	G K
Sr-85		-7.0956E-03					
			514.00	-7.096E-03	&(	5.189E-02 1.51E-02	G
Kr-85		-1.6152E+02					
			513.99	-1.615E+02	&(	1.187E+03 3.46E+02	G
Y-88		-2.3069E-03					
			1836.01	-2.307E-03	%(P	5.081E-02 1.30E-02	G K
			898.02	-1.333E-02	% P	5.648E-02 1.62E-02	G
NB-94		4.2857E-03					
			871.10	4.286E-03	%(	4.814E-02 1.35E-02	G K
			702.50	0.000E+00	&	6.534E-02 1.87E-02	G K
Ag-108M		-1.7809E-03					
			722.95	-1.781E-03	%(	1.021E-01 2.97E-02	G K
			614.37	-2.324E-02	& P	5.808E-02 1.74E-02	G
			433.93	-1.062E-03	%	4.699E-02 1.35E-02	G
CD-109		4.2700E-01					
			88.04	4.270E-01	%(P	2.185E+00 6.55E-01	G
SN-113		-1.4803E-02					
			391.71	-1.480E-02	%(	6.913E-02 2.04E-02	G K
			255.04	-2.910E-01	%	1.908E+00 5.64E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.1314E-02						
		427.95	-1.174E-02	&(P	1.472E-01	4.23E-02	G K
		600.77	-1.245E-02	& P	2.404E-01	6.79E-02	G
		636.15	-2.739E-02	% P	4.467E-01	1.27E-01	G
		463.51	3.567E-01	?(P	3.628E-01	1.17E-01	G
		176.29	2.420E-01	% P	6.236E-01	1.88E-01	G
I-131	-7.2939E-04						
		364.48	-7.294E-04	&(	5.875E-02	1.70E-02	G K
		636.97	-2.225E-02	%	7.031E-01	1.99E-01	G
		284.29	1.254E-01	&	6.887E-01	2.04E-01	G
CS-134	-2.1634E-02						
		604.66	-2.163E-02	%(	5.610E-02	1.68E-02	G K
		795.76	-6.876E-03	%	6.773E-02	1.94E-02	G
		569.29	9.028E-02	%	2.718E-01	8.06E-02	G
		801.84	-6.193E-02	% P	5.579E-01	1.58E-01	G
CS-137	1.7078E-03						
		661.62	1.708E-03	%(	7.190E-02	2.06E-02	G
CE-139	-4.9161E-03						
		165.85	-4.916E-03	&(P	4.881E-02	1.45E-02	G
EU-152	4.9744E-02						
		121.78	4.974E-02	%(P	1.623E-01	4.88E-02	G K
		344.30	4.064E-03	%	1.338E-01	3.86E-02	G
		1408.08	0.000E+00	%	1.359E-01	3.11E-02	G
		964.00	2.000E-02	% P	6.059E-01	1.74E-01	G
		1112.07	-2.025E-02	%	5.822E-01	1.65E-01	G
		778.90	-6.340E-02	% P	3.674E-01	1.05E-01	G
EU-154	-1.9234E-02						
		123.10	-1.923E-02	%(P	9.559E-02	2.85E-02	G K
		1274.80	8.565E-04	%	1.673E-01	4.53E-02	G
		723.30	-1.188E-01	% P	3.004E-01	8.99E-02	G
		1004.80	5.795E-02	%	3.046E-01	8.71E-02	G
EU-155	-9.0344E-07						
		86.45	-9.034E-07	&(P	2.493E-01	7.41E-02	G K
		105.31	7.825E-02	&	2.793E-01	8.40E-02	G
HG-203	3.2900E-02						
		279.17	3.290E-02	*(P	4.414E-02	1.37E-02	G K
		72.87	-1.071E+00	%	2.217E+00	6.73E-01	G
		70.83	-2.337E+00	&	3.906E+00	1.19E+00	G
		82.50	-9.947E-01	%	4.223E+00	1.27E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8086E-01						
		583.14	2.765E-01	@(P	5.745E-02	2.55E-02	G
		510.72	2.975E-01	(	2.011E-01	6.83E-02	G
PB-212	6.7795E-01						
		238.63	6.465E-01	(	1.076E-01	4.21E-02	G K
							Energy duplication
		77.11	7.555E-01	@(	5.874E-01	1.84E-01	G
		74.81	9.482E-01	& P	1.215E+00	3.72E-01	G
PB-214	4.1106E-01						
		351.99	4.006E-01	(P	1.036E-01	4.09E-02	G K
		295.22	4.312E-01	@(	2.106E-01	7.17E-02	G
							Energy duplication
		77.11	1.236E+00	+	9.607E-01	3.00E-01	G
		241.92	4.744E-01	%	6.843E-01	2.10E-01	G
BI-212	8.7523E-01						
		727.17	8.752E-01	*(	3.456E-01	1.53E-01	G K
		1620.56	2.207E-01	% P	1.604E+00	4.23E-01	G
		785.42	6.552E-01	& P	2.071E+00	6.07E-01	G
BI-214	5.0245E-01						
		609.32	4.665E-01	(	1.082E-01	5.26E-02	G K
		1764.51	2.781E-01	- P	2.588E-01	9.68E-02	G
		1120.28	6.128E-01	(	4.549E-01	1.87E-01	G
RA-224	1.0466E+00						
		241.00	1.047E+00	(P	1.293E+00	3.99E-01	G
RA-226	1.7732E+00						
		185.99	1.773E+00	(P	1.196E+00	4.28E-01	G
AC-228	8.6685E-01						
		911.07	9.040E-01	(P	2.658E-01	1.38E-01	G K
		968.90	8.514E-01	(P	2.595E-01	1.19E-01	G
		338.40	7.998E-01	(	3.037E-01	1.21E-01	G
TH-227	-1.0024E-01						
		236.00	-1.002E-01	%(P	4.137E-01	1.24E-01	G K
		256.25	6.701E-04	%	5.987E-01	1.75E-01	G
PA-234	5.0488E-02						
		98.44	5.049E-02	%(	2.665E-01	7.99E-02	G K
		946.00	1.009E-01	&	2.558E-01	7.64E-02	G
		131.28	4.571E-03	&	2.478E-01	7.36E-02	G
		94.67	5.206E-04	%	4.614E-01	1.37E-01	G
		883.24	-1.057E-02	%	4.115E-01	1.14E-01	G
		926.70	1.759E-02	%	4.126E-01	1.13E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.338E-01 %   4.029E-01 1.19E-01 G

TH-234       8.2914E-01
                           63.29 8.291E-01 &(P 4.639E+00 1.39E+00 G K
                           92.80 1.369E+00 %   2.476E+00 7.53E-01 G
                           92.38-1.308E+00 & P 3.048E+00 9.22E-01 G

AM-241      -1.5670E-01
                           59.54-1.567E-01 &(  6.866E-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	9.5674E-02	9.6720E-02	3.4023E-01	3.4027E-01	3.819E-01
K-40		1.4116E+01	1.4116E+01	1.8140E+00	1.9794E+00	
MN-54	#A	1.7098E-02	1.7130E-02	4.3804E-02	4.3814E-02	4.927E-02
CO-57	#B	4.9700E-03	4.9807E-03	4.4031E-02	4.4031E-02	4.931E-02
CO-60	#B	1.1833E-07	1.1837E-07	3.0223E-02	3.0223E-02	4.001E-02

Sr-85	#A	-7.0324E-03	-7.0956E-03	4.5346E-02	4.5347E-02	5.142E-02
Kr-85	#A	-1.6152E+02	-1.6152E+02	1.0373E+03	1.0373E+03	1.187E+03
Y-88	#B	-2.2943E-03	-2.3069E-03	3.9680E-02	3.9680E-02	5.054E-02
NB-94	#B	4.2857E-03	4.2857E-03	4.0399E-02	4.0400E-02	4.814E-02
Ag-108M	#B	-1.7809E-03	-1.7809E-03	8.9156E-02	8.9156E-02	1.021E-01
CD-109	#A	4.2645E-01	4.2700E-01	1.9659E+00	1.9661E+00	2.182E+00
SN-113	#B	-1.4728E-02	-1.4803E-02	6.1208E-02	6.1214E-02	6.879E-02
SB-125	#B	8.1267E-02	8.1314E-02	8.0116E-02	8.0246E-02	1.471E-01
I-131	#B	-6.7857E-04	-7.2939E-04	5.1089E-02	5.1089E-02	5.465E-02
CS-134	#B	-2.1617E-02	-2.1634E-02	5.0454E-02	5.0469E-02	5.606E-02
CS-137	#A	1.7077E-03	1.7078E-03	6.1725E-02	6.1725E-02	7.189E-02
CE-139	#A	-4.8954E-03	-4.9161E-03	4.7591E-02	4.7592E-02	4.860E-02
EU-152	#B	4.9738E-02	4.9744E-02	1.4641E-01	1.4644E-01	1.623E-01
EU-154	#B	-1.9230E-02	-1.9234E-02	8.7405E-02	8.7411E-02	9.557E-02
EU-155	#B	-9.0315E-07	-9.0344E-07	2.2236E-01	2.2236E-01	2.492E-01
HG-203	#A	3.2493E-02	3.2900E-02	4.1091E-02	4.1132E-02	4.359E-02
TL-208	#	2.8086E-01	2.8086E-01	7.7663E-02	7.9246E-02	5.745E-02
PB-212	#	6.7795E-01	6.7795E-01	1.3236E-01	1.3772E-01	1.076E-01
PB-214	#	4.1106E-01	4.1106E-01	1.2030E-01	1.2249E-01	1.036E-01
BI-212	#	8.7523E-01	8.7523E-01	4.5937E-01	4.6199E-01	
BI-214		5.0245E-01	5.0245E-01	1.6982E-01	1.7214E-01	
RA-224	#A	1.0466E+00	1.0466E+00	1.1967E+00	1.1982E+00	1.293E+00
RA-226		1.7732E+00	1.7732E+00	1.2849E+00	1.2887E+00	
AC-228		8.6685E-01	8.6685E-01	2.2191E-01	2.2718E-01	
TH-227	#B	-1.0024E-01	-1.0024E-01	3.8047E-01	3.8051E-01	4.137E-01
PA-234	#B	5.0488E-02	5.0488E-02	2.3964E-01	2.3965E-01	2.665E-01
TH-234	#B	8.2914E-01	8.2914E-01	4.1648E+00	4.1650E+00	4.639E+00
AM-241	#A	-1.5670E-01	-1.5670E-01	6.1768E-01	6.1774E-01	6.866E-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) 1.8133970E+01 pCi/gm
Total Decayed Activity (1119.8 to 1999.0 keV) 1.8133972E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS OOL-02-01-019-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_1028.An1

Acquisition information

Start time:	29-Oct-2005 10:28:43
Live time:	2000
Real time:	2020
Dead time:	0.99 %
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:	1.9080E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.9080E+03) = 5.2411E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 11:08:00
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: 0.0764

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.16	175.	24.81	1.50	9.541E-03	77.11	10.700	1.217E+00	PB214
					77.11	17.500	7.441E-01	PB212
77.16	175.	24.81	1.50	9.541E-03	77.11	10.700	1.217E+00	PB214
					77.11	17.500	7.441E-01	PB212
185.51	116.	25.37	1.27	1.629E-02	185.99	3.280	1.481E+00	RA226
209.40	94.	31.42	1.24	1.519E-02				
238.65	561.	4.98	1.21	1.380E-02				
238.65	561.	4.98	1.21	1.380E-02	238.63	43.100	6.677E-01	PB212
241.69	102.	19.97	1.22	1.367E-02	241.00	3.900	1.339E+00	RA224
					241.92	7.470	7.092E-01	PB214
295.29	129.	13.53	1.25	1.146E-02	295.22	19.200	4.149E-01	PB214
300.34	40.	38.00	1.45	1.128E-02				
338.49	126.	18.49	1.24	1.006E-02	338.40	12.010	7.357E-01	AC228
352.00	236.	11.41	1.44	9.678E-03	351.99	37.100	4.647E-01	PB214
510.92	101.	20.01	1.26	6.692E-03	510.72	22.500	4.763E-01	TL208
583.25	246.	9.57	1.33	5.889E-03	583.14	86.000	3.440E-01	TL208
609.25	185.	11.48	1.29	5.650E-03	609.32	46.090	5.032E-01	BI214
726.93	47.	27.68	1.21	4.795E-03	727.17	11.800	5.859E-01	BI212
911.24	144.	10.89	1.78	3.921E-03	911.07	29.000	8.978E-01	AC228
968.15	110.	14.83	1.82	3.718E-03	968.90	17.460	1.200E+00	AC228
1119.45	61.	24.39	0.79	3.283E-03	1120.28	15.040	8.721E-01	BI214
1460.71	452.	4.76	1.81	2.621E-03	1460.75	10.700	1.141E+01	K40
1764.37	25.	20.00	0.95	2.225E-03	1764.51	15.920	4.981E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.41	209.40	301.	94.	0.047	94.27	1.237	AC-228	s
476.93	238.62	109.	561.	0.280	14.93	1.215	PB-212	D
483.01	241.66	157.	102.	0.051	59.90	1.217	PB-214	D
600.35	300.34	94.	40.	0.020	114.00	1.454	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	859.	175.	0.088	74.43	1.500D
PB-212	153.80	77.11	859.	175.	0.088	74.43	1.500D
RA-226	370.62	185.51	304.	112.	0.056	76.11	1.271s
PB-212	476.89	238.63	305.	518.	0.259	19.46	1.500D
RA-224	482.89	241.63	392.	75.	0.038	114.71	1.500
PB-214	590.23	295.29	165.	128.	0.064	50.25	1.500
AC-228	676.65	338.49	142.	126.	0.063	55.48	1.238s
PB-214	703.60	351.96	132.	196.	0.098	32.68	1.500
TL-208	1021.63	510.92	84.	101.	0.051	60.04	1.256s
TL-208	1166.33	583.25	74.	246.	0.123	28.70	1.326s
BI-214	1218.35	609.25	70.	185.	0.093	34.44	1.290
BI-212	1453.81	726.93	43.	47.	0.023	83.03	1.215
AC-228	1822.61	911.24	29.	144.	0.072	32.68	1.783
AC-228	1936.50	968.15	39.	110.	0.055	44.48	1.819s
BI-214	2239.29	1119.45	44.	61.	0.030	73.17	0.792s
K-40	2922.32	1460.71	3.	452.	0.226	14.28	1.814
BI-214	3530.21	1764.37	0.	25.	0.012	60.00	0.951s

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

***** S U M M A R Y O 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		1.1279E-01					
			477.56	1.128E-01	%(	3.864E-01 1.14E-01	G
K-40		1.1415E+01					
			1460.75	1.141E+01	(P	2.740E-01 5.44E-01	G
MN-54		-1.0398E-03					
			834.81	-1.040E-03	&(P	4.427E-02 1.21E-02	G
CO-57		7.9237E-03					
			122.07	7.924E-03	%(	5.295E-02 1.58E-02	G K
			136.43	9.194E-02	%	4.182E-01 1.25E-01	G
CO-60		-1.2867E-02					
			1332.51	-1.287E-02	%(P	5.911E-02 1.68E-02	G K
			1173.23	-2.036E-04	%	5.172E-02 1.39E-02	G K
Sr-85		-1.0716E-02					
			514.00	-1.072E-02	%(	5.736E-02 1.69E-02	G
Kr-85		-2.4506E+02					
			513.99	-2.451E+02	%(	1.311E+03 3.85E+02	G
Y-88		-1.0204E-02					
			1836.01	-1.020E-02	%(P	6.327E-02 1.75E-02	G K
			898.02	2.070E-03	% P	5.289E-02 1.45E-02	G
NB-94		-7.6882E-03					
			871.10	-7.688E-03	%(	5.342E-02 1.52E-02	G K
			702.50	1.290E-02	%	4.449E-02 1.31E-02	G K
Ag-108M		-8.0315E-03					
			722.95	-8.031E-03	%(	6.266E-02 1.80E-02	G K
			614.37	-1.335E-02	% P	5.623E-02 1.65E-02	G
			433.93	0.000E+00	%	4.883E-02 1.40E-02	G
CD-109		7.4702E-01					
			88.04	7.470E-01	%(P	2.126E+00 6.41E-01	G
SN-113		4.4343E-03					
			391.71	4.434E-03	%(	6.088E-02 1.76E-02	G K
			255.04	3.515E-02	%	2.007E+00 5.88E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-3.0036E-03						
		427.95	-3.004E-03	&(P	1.585E-01	4.54E-02	G K
		600.77	-4.090E-02	% P	2.406E-01	6.94E-02	G
		636.15	6.381E-02	% P	3.588E-01	1.03E-01	G
		463.51	2.403E-01	% P	3.976E-01	1.22E-01	G
		176.29	5.525E-02	& P	6.446E-01	1.91E-01	G
I-131	8.4179E-03						
		364.48	8.418E-03	&(	3.913E-02	1.14E-02	G K
		636.97	1.373E-01	&	5.862E-01	1.70E-01	G
		284.29	-1.226E-02	&	6.026E-01	1.74E-01	G
CS-134	2.7173E-03						
		604.66	2.717E-03	%(	1.140E-01	3.36E-02	G K
		795.76	4.524E-02	%	6.025E-02	1.91E-02	G
		569.29	-5.566E-02	%	2.986E-01	8.68E-02	G
		801.84	-1.750E-02	% P	5.485E-01	1.52E-01	G
CS-137	2.1083E-02						
		661.62	2.108E-02	%(	5.908E-02	1.76E-02	G
CE-139	8.4302E-03						
		165.85	8.430E-03	&(P	5.074E-02	1.51E-02	G
EU-152	1.7708E-02						
		121.78	1.771E-02	%(P	1.609E-01	4.79E-02	G K
		344.30	-1.161E-03	%	1.254E-01	3.59E-02	G
		1408.08	0.000E+00	&	1.365E-01	3.13E-02	G
		964.00	-1.165E-01	& P	5.039E-01	1.47E-01	G
		1112.07	-4.942E-02	%	5.062E-01	1.43E-01	G
		778.90	1.021E-01	& P	3.968E-01	1.16E-01	G
EU-154	8.9089E-04						
		123.10	8.909E-04	&(P	1.150E-01	3.41E-02	G K
		1274.80	4.722E-03	%	1.830E-01	5.03E-02	G
		723.30	-7.848E-02	% P	3.035E-01	8.91E-02	G
		1004.80	1.283E-03	%	2.917E-01	7.94E-02	G
EU-155	-1.2654E-02						
		86.45	-1.265E-02	%(P	2.686E-01	7.99E-02	G K
		105.31	0.000E+00	&	2.700E-01	8.02E-02	G
HG-203	1.4549E-04						
		279.17	1.455E-04	%(P	4.967E-02	1.45E-02	G K
		72.87	-1.009E-01	%	2.101E+00	6.27E-01	G
		70.83	-1.770E-03	%	3.290E+00	9.76E-01	G
		82.50	1.094E+00	%	4.081E+00	1.23E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.4396E-01						
		583.14	3.440E-01	@(P	5.984E-02	3.30E-02	G
		510.72	4.763E-01	+	2.132E-01	9.54E-02	G
PB-212	6.1611E-01						
							Energy duplication
		238.63	6.161E-01	(	1.001E-01	4.00E-02	G K
							Energy duplication
		77.11	7.441E-01	+	5.910E-01	1.85E-01	G
		74.81	6.809E-01	& P	1.202E+00	3.65E-01	G
PB-214	3.9544E-01						
		351.99	3.873E-01	(P	1.108E-01	4.23E-02	G K
		295.22	4.112E-01	(	2.015E-01	6.89E-02	G
							Energy duplication
		77.11	1.217E+00	+	9.665E-01	3.02E-01	G
		241.92	3.864E-01	%	6.904E-01	2.10E-01	G
BI-212	5.8594E-01						
		727.17	5.859E-01	(	4.174E-01	1.62E-01	G K
		1620.56	7.045E-01	% P	1.648E+00	4.91E-01	G
		785.42	1.259E+00	% P	2.406E+00	7.36E-01	G
BI-214	5.0190E-01						
		609.32	5.032E-01	(	1.134E-01	5.78E-02	G K
		1764.51	4.981E-01	(P	1.473E-01	1.00E-01	G
		1120.28	8.721E-01	+	4.833E-01	2.13E-01	G
RA-224	1.0007E+00						
		241.00	1.001E+00	(P	1.260E+00	3.89E-01	G
RA-226	1.4807E+00						
		185.99	1.481E+00	*(P	1.115E+00	3.90E-01	G
AC-228	8.5032E-01						
		911.07	8.978E-01	(P	1.727E-01	9.80E-02	G K
		968.90	1.200E+00	+ P	3.472E-01	1.78E-01	G
		338.40	7.357E-01	*(	3.420E-01	1.36E-01	G
TH-227	-2.0001E-01						
		236.00	-2.000E-01	%(P	4.765E-01	1.44E-01	G K
		256.25	7.752E-02	%	6.252E-01	1.85E-01	G
PA-234	5.1534E-02						
		98.44	5.153E-02	%(	2.553E-01	7.65E-02	G K
		946.00	2.337E-02	%	2.174E-01	6.01E-02	G
		131.28	9.256E-02	&	1.980E-01	6.00E-02	G
		94.67	-1.430E-01	%	4.498E-01	1.36E-01	G
		883.24	0.000E+00	&	4.361E-01	1.20E-01	G
		926.70	9.956E-02	&	4.083E-01	1.17E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-8.249E-02 %   4.425E-01 1.29E-01 G

TH-234       1.3009E+00
                           63.29 1.301E+00 %(P 4.695E+00 1.41E+00 G K
                           92.80 1.113E+00 %   2.493E+00 7.55E-01 G
                           92.38 1.527E-01 % P 2.916E+00 8.69E-01 G

AM-241      -7.9291E-02
                           59.54-7.929E-02 &(  6.332E-01 1.89E-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	1.1138E-01	1.1279E-01	3.4248E-01	3.4253E-01	3.815E-01
K-40		1.1415E+01	1.1415E+01	1.6311E+00	1.7524E+00	
MN-54	#A	-1.0375E-03	-1.0398E-03	7.4071E-02	7.4071E-02	4.417E-02
CO-57	#B	7.9039E-03	7.9237E-03	4.7368E-02	4.7370E-02	5.282E-02
CO-60	#B	-1.2863E-02	-1.2867E-02	5.2013E-02	5.2018E-02	5.909E-02

Sr-85	#A	-1.0605E-02	-1.0716E-02	5.0592E-02	5.0596E-02	5.677E-02
Kr-85	#A	-2.4506E+02	-2.4506E+02	1.1559E+03	1.1560E+03	1.311E+03
Y-88	#B	-1.0139E-02	-1.0204E-02	5.2587E-02	5.2590E-02	6.287E-02
NB-94	#B	-7.6882E-03	-7.6882E-03	4.5689E-02	4.5691E-02	5.342E-02
Ag-108M	#B	-8.0314E-03	-8.0315E-03	5.4139E-02	5.4141E-02	6.266E-02
CD-109	#A	7.4590E-01	7.4702E-01	1.9237E+00	1.9241E+00	2.122E+00
SN-113	#B	4.4084E-03	4.4343E-03	5.2766E-02	5.2766E-02	6.052E-02
SB-125	#B	-3.0016E-03	-3.0036E-03	2.7253E-01	2.7253E-01	1.584E-01
I-131	#B	7.7408E-03	8.4179E-03	3.4263E-02	3.4267E-02	3.598E-02
CS-134	#B	2.7149E-03	2.7173E-03	1.0078E-01	1.0078E-01	1.139E-01
CS-137	#A	2.1081E-02	2.1083E-02	5.2798E-02	5.2811E-02	5.908E-02
CE-139	#A	8.3890E-03	8.4302E-03	4.5331E-02	4.5333E-02	5.049E-02
EU-152	#B	1.7705E-02	1.7708E-02	1.4368E-01	1.4368E-01	1.609E-01
EU-154	#B	8.9070E-04	8.9089E-04	1.0219E-01	1.0219E-01	1.150E-01
EU-155	#B	-1.2650E-02	-1.2654E-02	8.1299E-01	8.1299E-01	2.685E-01
HG-203	#B	1.4340E-04	1.4549E-04	4.3427E-02	4.3427E-02	4.896E-02
TL-208	#	3.4396E-01	3.4396E-01	9.8867E-02	1.0073E-01	
PB-212	#	6.1611E-01	6.1611E-01	1.1988E-01	1.2477E-01	1.001E-01
PB-214	#	3.9544E-01	3.9544E-01	1.1859E-01	1.2065E-01	1.108E-01
BI-212		5.8594E-01	5.8594E-01	4.8649E-01	4.8760E-01	
BI-214		5.0190E-01	5.0190E-01	1.7284E-01	1.7512E-01	
RA-224	#A	1.0007E+00	1.0007E+00	1.1656E+00	1.1669E+00	1.260E+00
RA-226	#	1.4807E+00	1.4807E+00	1.1719E+00	1.1749E+00	
AC-228		8.5032E-01	8.5032E-01	2.7388E-01	2.7800E-01	
TH-227	#B	-2.0001E-01	-2.0001E-01	4.3764E-01	4.3779E-01	4.765E-01
PA-234	#B	5.1534E-02	5.1534E-02	2.2960E-01	2.2961E-01	2.553E-01
TH-234	#B	1.3009E+00	1.3009E+00	4.2334E+00	4.2341E+00	4.695E+00
AM-241	#A	-7.9291E-02	-7.9291E-02	5.6619E-01	5.6621E-01	6.332E-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) 1.5177580E+01 pCi/gm
Total Decayed Activity (295.2 to 1999.0 keV) 1.5177582E+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_29OCT2005_1104.An1

Sample description
FSS OOL-02-01-003-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_1104.An1

Acquisition information
Start time: 29-Oct-2005 11:04:40
Live time: 2000
Real time: 2022
Dead time: 1.09 %
Detector ID: 3

Detector system
Det 102 - DSPP-468

Calibration
Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration
Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9250E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9250E+03) =
5.1948E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 08:10:00
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. 14 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
77.09	192.	22.76	1.50	9.541E-03	77.11	10.700	1.320E+00	PB214
					77.11	17.500	8.069E-01	PB212
77.09	192.	22.76	1.50	9.541E-03	77.11	10.700	1.320E+00	PB214
					77.11	17.500	8.069E-01	PB212
92.30	140.	31.58	0.98	1.323E-02	88.04	3.790	2.081E+00	CD109
					92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.457E+00	TH234
185.87	73.	39.24	1.13	1.627E-02				
185.87	73.	39.24	1.13	1.627E-02	185.99	3.280	PBC<MDA	RA226
209.84	87.	35.89	0.77	1.517E-02				
238.73	617.	4.89	1.21	1.380E-02	238.63	43.100	7.274E-01	PB212
242.21	80.	25.18	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.532E-01	PB214
269.92	90.	25.76	1.49	1.244E-02				
295.26	124.	15.89	1.11	1.146E-02	295.22	19.200	3.954E-01	PB214
300.61	48.	39.43	1.77	1.127E-02				
338.19	136.	17.80	1.02	1.007E-02	338.40	12.010	7.914E-01	AC228
351.95	234.	10.07	1.26	9.680E-03				
351.95	234.	10.07	1.26	9.680E-03	351.99	37.100	4.567E-01	PB214
462.93	43.	31.00	1.50	7.365E-03	463.51	10.000	4.132E-01	SB125
510.90	105.	18.95	0.73	6.693E-03	510.72	22.500	4.875E-01	TL208
583.34	208.	10.79	1.35	5.888E-03	583.14	86.000	2.871E-01	TL208
609.42	164.	10.75	1.10	5.648E-03	609.32	46.090	4.416E-01	BI214
661.96	73.	21.79	1.47	5.227E-03	661.62	84.620	1.158E-01	CS137
726.26	79.	21.62	1.07	4.800E-03	727.17	11.800	9.803E-01	BI212
911.10	123.	12.69	1.67	3.922E-03	911.07	29.000	7.590E-01	AC228
968.35	98.	17.75	1.28	3.720E-03	968.90	17.460	1.057E+00	AC228

1120.51	33.	31.99	0.82	3.283E-03	1120.28	15.040	4.663E-01	BI214
1460.76	556.	4.30	1.81	2.621E-03	1460.75	10.700	1.391E+01	K40
1764.89	14.	36.98	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	
419.29	209.84	328.	87.	0.043	107.67	0.771	NP-239	s
477.08	238.67	147.	617.	0.308	14.68	1.215	PB-212	D
484.05	242.15	165.	80.	0.040	75.54	1.217	PB-214	D
539.47	269.92	171.	90.	0.045	77.27	1.485	AC-228	s
600.88	300.61	132.	48.	0.024	118.30	1.768	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	859.	192.	0.096	68.29	1.500D
PB-212	153.80	77.11	859.	192.	0.096	68.29	1.500D
TH-234	185.43	92.93	967.	115.	0.057	117.03	1.500s
TH-234	185.37	92.90	955.	113.	0.056	119.52	1.500s
PB-212	477.05	238.71	371.	572.	0.286	19.01	1.500
PB-214	590.31	295.33	169.	129.	0.065	50.18	1.500
AC-228	676.05	338.19	156.	136.	0.068	53.41	1.021
PB-214	703.46	351.89	127.	215.	0.108	30.13	1.500s
SB-125	925.60	462.93	76.	43.	0.022	93.00	1.500s
TL-208	1021.57	510.90	87.	105.	0.052	56.86	0.734s
TL-208	1166.51	583.34	87.	207.	0.104	32.36	1.351
BI-214	1218.70	609.42	52.	164.	0.082	32.24	1.102
CS-137	1323.81	661.96	60.	73.	0.036	65.37	1.470
BI-212	1452.48	726.26	56.	79.	0.040	64.87	1.067
AC-228	1822.35	911.10	42.	123.	0.061	38.07	1.675
AC-228	1936.90	968.35	52.	98.	0.049	53.25	1.279
BI-214	2241.42	1120.51	32.	33.	0.016	95.96	0.824s
K-40	2922.42	1460.76	3.	556.	0.278	12.89	1.813
BI-214	3531.24	1764.89	7.	14.	0.007	110.94	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		1.0287E-01					
			477.56	1.029E-01	%(	4.566E-01 1.34E-01	G
K-40		1.3908E+01					
			1460.75	1.391E+01	(P	2.846E-01 5.98E-01	G
MN-54		-2.2750E-03					
			834.81	-2.275E-03	&(P	5.758E-02 1.62E-02	G
CO-57		-6.2838E-03					
			122.07	-6.284E-03	%(	5.608E-02 1.67E-02	G K
			136.43	2.235E-02	&	4.242E-01 1.26E-01	G
CO-60		3.1089E-02					
			1332.51	3.109E-02	%(P	6.315E-02 1.92E-02	G K
			1173.23	3.621E-02	%	7.776E-02 2.35E-02	G K
Sr-85		-2.0387E-02					
			514.00	-2.039E-02	%(	5.911E-02 1.77E-02	G
Kr-85		-4.6503E+02					
			513.99	-4.650E+02	%(	1.348E+03 4.03E+02	G
Y-88		3.4256E-03					
			1836.01	3.426E-03	%(P	3.914E-02 9.75E-03	G K
			898.02	-2.160E-02	% P	6.697E-02 1.97E-02	G
NB-94		6.3112E-03					
			871.10	6.311E-03	&(	5.383E-02 1.53E-02	G K
			702.50	-4.010E-03	%	4.525E-02 1.28E-02	G K
Ag-108M		1.2673E-02					
			722.95	1.267E-02	&(	6.161E-02 1.80E-02	G K
			614.37	-1.797E-02	% P	6.293E-02 1.86E-02	G
			433.93	3.810E-03	%	4.809E-02 1.39E-02	G
CD-109		3.6897E-02					
			88.04	3.690E-02	%(P	2.059E+00 6.13E-01	G
SN-113		-1.5088E-02					
			391.71	-1.509E-02	%(	7.160E-02 2.11E-02	G K
			255.04	4.342E-01	&	1.910E+00 5.68E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0111E-01						
		427.95	-4.317E-03	%(P	1.230E-01	3.47E-02	G K
		600.77	-2.079E-03	% P	2.291E-01	6.40E-02	G
		636.15	-7.403E-02	% P	4.266E-01	1.23E-01	G
		463.51	4.132E-01	@(P	4.129E-01	1.33E-01	G
		176.29	1.929E-03	& P	6.856E-01	2.02E-01	G
I-131	-1.5761E-03						
		364.48	-1.576E-03	%(	5.409E-02	1.56E-02	G K
		636.97	-1.128E-01	%	6.698E-01	1.93E-01	G
		284.29	-1.288E-01	%	7.385E-01	2.18E-01	G
CS-134	-2.4669E-03						
		604.66	-2.467E-03	&(	3.907E-02	1.10E-02	G K
		795.76	1.618E-02	&	6.827E-02	2.00E-02	G
		569.29	-2.508E-02	&	3.236E-01	9.30E-02	G
		801.84	6.512E-02	& P	6.447E-01	1.84E-01	G
CS-137	1.1581E-01						
		661.62	1.158E-01	(	6.157E-02	2.52E-02	G
CE-139	-2.5986E-04						
		165.85	-2.599E-04	%(P	5.437E-02	1.61E-02	G
EU-152	-1.3720E-02						
		121.78	-1.372E-02	%(P	1.668E-01	4.96E-02	G K
		344.30	4.722E-03	%	1.383E-01	4.00E-02	G
		1408.08	3.980E-02	%	2.552E-01	7.09E-02	G
		964.00	-1.029E-01	% P	5.268E-01	1.53E-01	G
		1112.07	6.712E-02	&	4.555E-01	1.29E-01	G
		778.90	-9.051E-04	% P	5.107E-01	1.45E-01	G
EU-154	-2.1117E-04						
		123.10	-2.112E-04	&(P	1.202E-01	3.56E-02	G K
		1274.80	-1.286E-02	%	2.148E-01	6.04E-02	G
		723.30	5.828E-02	& P	2.680E-01	7.80E-02	G
		1004.80	1.090E-01	&	2.881E-01	8.57E-02	G
EU-155	1.8806E-01						
		86.45	1.881E-01	%(P	2.690E-01	8.22E-02	G K
		105.31	6.788E-02	&	2.610E-01	7.84E-02	G
HG-203	7.0514E-04						
		279.17	7.051E-04	&(P	4.916E-02	1.43E-02	G K
		72.87	6.405E-01	&	1.499E+00	4.54E-01	G
		70.83	1.795E-02	%	3.828E+00	1.14E+00	G
		82.50	1.253E+00	&	3.512E+00	1.06E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8715E-01						
		583.14	2.871E-01	(P	6.393E-02	3.10E-02	G
		510.72	4.875E-01	+	2.157E-01	9.24E-02	G
PB-212	7.1328E-01						
		238.63	6.752E-01	(	1.092E-01	4.28E-02	G K
							Energy duplication
		77.11	8.069E-01	*(	5.855E-01	1.84E-01	G
		74.81	8.388E-01	& P	1.219E+00	3.72E-01	G
PB-214	4.1769E-01						
		351.99	4.204E-01	@(P	1.078E-01	4.23E-02	G K
		295.22	4.125E-01	(	2.021E-01	6.90E-02	G
							Energy duplication
		77.11	1.320E+00	+	9.575E-01	3.00E-01	G
		241.92	2.711E-01	%	7.395E-01	2.23E-01	G
BI-212	9.8035E-01						
		727.17	9.803E-01	(	4.664E-01	2.12E-01	G K
		1620.56	8.030E-01	% P	1.280E+00	4.15E-01	G
		785.42	8.748E-01	% P	2.456E+00	7.29E-01	G
BI-214	4.4770E-01						
		609.32	4.416E-01	(	9.808E-02	4.75E-02	G K
		1764.51	2.787E-01	- P	2.928E-01	1.04E-01	G
		1120.28	4.663E-01	(	4.145E-01	1.49E-01	G
RA-224	6.1894E-01						
		241.00	6.189E-01	%(P	1.408E+00	4.26E-01	G
RA-226	9.4714E-01						
		185.99	9.471E-01	%(P	1.297E+00	3.98E-01	G
AC-228	7.6848E-01						
		911.07	7.590E-01	(P	2.032E-01	9.65E-02	G K
		968.90	1.057E+00	+ P	3.935E-01	1.88E-01	G
		338.40	7.914E-01	(	3.537E-01	1.41E-01	G
TH-227	-1.9732E-01						
		236.00	-1.973E-01	&(P	5.233E-01	1.58E-01	G K
		256.25	-6.013E-02	%	5.366E-01	1.58E-01	G
PA-234	7.7325E-02						
		98.44	7.733E-02	%(	2.621E-01	7.89E-02	G K
		946.00	-7.737E-03	%	3.255E-01	9.16E-02	G
		131.28	2.377E-03	&	2.259E-01	6.69E-02	G
		94.67	-2.050E-01	%	5.164E-01	1.56E-01	G
		883.24	-2.757E-02	&	4.424E-01	1.24E-01	G
		926.70	5.138E-02	&	4.534E-01	1.27E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.856E-02 &   4.962E-01 1.43E-01 G

TH-234       1.4760E+00
                           63.29 4.997E-01 %(P 4.503E+00 1.34E+00 G K
                           92.80 1.982E+00 *(  2.575E+00 7.90E-01 G
                           92.38 2.367E+00 *(P 3.043E+00 9.33E-01 G

AM-241      -6.5700E-02
                           59.54-6.570E-02 %(  6.764E-01 2.02E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.0138E-01	1.0287E-01	4.0312E-01	4.0316E-01	4.500E-01
K-40		1.3908E+01	1.3908E+01	1.7928E+00	1.9554E+00	
MN-54	#A	-2.2693E-03	-2.2750E-03	6.6420E-02	6.6420E-02	5.743E-02
CO-57	#B	-6.2657E-03	-6.2838E-03	5.0128E-02	5.0129E-02	5.592E-02
CO-60	#B	3.1076E-02	3.1089E-02	5.7695E-02	5.7721E-02	6.312E-02

Sr-85	#A	-2.0144E-02	-2.0387E-02	5.3052E-02	5.3064E-02	5.840E-02
Kr-85	#A	-4.6502E+02	-4.6503E+02	1.2102E+03	1.2104E+03	1.348E+03
Y-88	#B	3.4008E-03	3.4256E-03	2.9248E-02	2.9248E-02	3.885E-02
NB-94	#B	6.3112E-03	6.3112E-03	4.5841E-02	4.5843E-02	5.383E-02
Ag-108M	#B	1.2673E-02	1.2673E-02	5.3852E-02	5.3856E-02	6.161E-02
CD-109	#A	3.6834E-02	3.6897E-02	1.8380E+00	1.8380E+00	2.055E+00
SN-113	#B	-1.4986E-02	-1.5088E-02	6.3434E-02	6.3440E-02	7.112E-02
SB-125	#B	1.0103E-01	1.0111E-01	9.7389E-02	9.7554E-02	1.229E-01
I-131	#B	-1.4309E-03	-1.5761E-03	4.6889E-02	4.6889E-02	4.911E-02
CS-134	#B	-2.4644E-03	-2.4669E-03	3.2883E-02	3.2883E-02	3.903E-02
CS-137		1.1581E-01	1.1581E-01	7.5704E-02	7.5983E-02	
CE-139	#A	-2.5839E-04	-2.5986E-04	7.0629E-01	7.0629E-01	5.406E-02
EU-152	#B	-1.3718E-02	-1.3720E-02	1.7870E-01	1.7870E-01	1.668E-01
EU-154	#B	-2.1112E-04	-2.1117E-04	4.3917E-02	4.3917E-02	1.202E-01
EU-155	#B	1.8798E-01	1.8806E-01	2.4652E-01	2.4674E-01	2.689E-01
HG-203	#B	6.9347E-04	7.0514E-04	4.3017E-02	4.3017E-02	4.835E-02
TL-208		2.8715E-01	2.8715E-01	9.3094E-02	9.4478E-02	
PB-212	#	7.1328E-01	7.1328E-01	1.3559E-01	1.4137E-01	1.092E-01
PB-214	#	4.1769E-01	4.1769E-01	1.2229E-01	1.2452E-01	1.078E-01
BI-212		9.8035E-01	9.8035E-01	6.3594E-01	6.3832E-01	
BI-214		4.4770E-01	4.4770E-01	1.4436E-01	1.4653E-01	
RA-224	#A	6.1894E-01	6.1894E-01	1.2777E+00	1.2781E+00	1.408E+00
RA-226	#A	9.4714E-01	9.4714E-01	1.1930E+00	1.1942E+00	1.297E+00
AC-228		7.6848E-01	7.6848E-01	2.5219E-01	2.5585E-01	
TH-227	#B	-1.9732E-01	-1.9732E-01	4.7988E-01	4.8001E-01	5.233E-01
PA-234	#B	7.7325E-02	7.7325E-02	2.3674E-01	2.3678E-01	2.621E-01
TH-234	#B	1.4760E+00	1.4760E+00	1.7450E+00	1.7470E+00	4.503E+00
AM-241	#A	-6.5700E-02	-6.5700E-02	6.0475E-01	6.0476E-01	6.763E-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) 1.6506989E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 1.6506996E+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_29OCT2005_1141.An1

Sample description
FSS OOL-02-01-014-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_1141.An1

Acquisition information
Start time: 29-Oct-2005 11:41:19
Live time: 2000
Real time: 2018
Dead time: 0.87 %
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: 1.6850E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6850E+03) =
5.9347E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 09:57:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0760

***** S U M M A R Y O F P E A K 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	79.	34.38	1.10	8.809E-03				
74.69	79.	34.38	1.10	8.809E-03	74.81	9.600	PBC<MDA	PB212
77.84	80.	35.54	1.10	9.754E-03	77.11	17.500	3.865E-01	PB212
					77.11	10.700	6.321E-01	PB214
87.13	121.	36.40	1.19	1.214E-02	86.45	32.740	PBC<MDA	EU155
93.30	84.	39.17	1.50	1.368E-02	92.80	3.000	1.694E+00	TH234
					94.67	15.500	3.194E-01	PA234
186.14	72.	35.22	1.37	1.626E-02	185.99	3.280	PBC<MDA	RA226
238.84	543.	6.52	1.11	1.379E-02	238.63	43.100	7.318E-01	PB212
295.22	122.	13.22	1.25	1.146E-02	295.22	19.200	4.445E-01	PB214
300.26	50.	26.70	1.26	1.128E-02				
338.75	107.	18.99	1.36	1.005E-02	338.40	12.010	7.103E-01	AC228
351.97	184.	12.49	1.28	9.679E-03				
351.97	184.	12.49	1.28	9.679E-03	351.99	37.100	4.105E-01	PB214
463.12	22.	40.25	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
510.33	98.	17.47	1.50	6.700E-03	510.72	22.500	5.239E-01	TL208
582.92	176.	11.39	1.31	5.892E-03	583.14	86.000	2.780E-01	TL208
609.28	161.	11.34	1.50	5.650E-03	609.32	46.090	4.947E-01	BI214
					614.37	90.393	2.539E-01	Ag108M
727.62	22.	40.40	1.55	4.794E-03	727.17	11.800	PBC<MDA	BI212
911.30	97.	12.85	1.55	3.921E-03	911.07	29.000	6.831E-01	AC228
964.43	21.	39.47	1.71	3.734E-03	964.00	14.580	PBC<MDA	EU152
969.09	86.	16.20	1.33	3.717E-03	968.90	17.460	1.062E+00	AC228
1119.98	35.	29.57	0.76	3.284E-03	1120.28	15.040	5.668E-01	BI214
1460.72	357.	5.29	1.99	2.621E-03	1460.75	10.700	1.021E+01	K40
1764.56	18.	32.31	2.24	2.225E-03	1764.51	15.920	3.980E-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	
148.95	74.69	326.	79.	0.039	103.13	1.098	BI-207	D
155.26	77.84	369.	80.	0.040	106.61	1.101	PB-214	D
173.84	87.13	681.	115.	0.057	100.65	1.191	BI-207	
371.89	186.14	238.	72.	0.036	105.67	1.374	PA-234	l
600.41	300.38	111.	46.	0.023	117.30	1.158	PB-212	
2240.36	1119.98	23.	35.	0.017	88.71	0.756	BI-214	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	697.	125.	0.063	93.38	1.500D
PB-214	153.80	77.11	697.	125.	0.063	93.38	1.500D
PA-234	186.17	93.30	505.	84.	0.042	117.51	1.500
PB-212	477.02	238.69	257.	426.	0.213	21.60	1.500
PB-214	589.98	295.16	126.	116.	0.058	49.50	1.500
AC-228	677.18	338.75	102.	107.	0.054	56.98	1.362s
PB-214	703.68	352.00	68.	172.	0.086	30.53	1.500
TL-208	1020.43	510.33	62.	98.	0.049	52.41	1.504s
TL-208	1165.67	582.92	58.	176.	0.088	34.18	1.309
BI-214	1218.41	609.28	50.	161.	0.080	34.03	1.496
BI-212	1455.20	727.62	28.	22.	0.011	121.20	1.554
AC-228	1822.73	911.30	19.	97.	0.048	38.55	1.554s
EU-152	1929.06	964.43	24.	21.	0.010	118.41	1.714
AC-228	1938.39	969.09	27.	86.	0.043	48.59	1.331
K-40	2922.35	1460.72	0.	357.	0.178	15.88	1.985
BI-214	3530.59	1764.56	8.	18.	0.009	96.93	2.236

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.8241E-01					
			477.56	1.824E-01	%(	4.021E-01 1.22E-01	G
K-40		1.0206E+01					
			1460.75	1.021E+01	(P	2.108E-01 5.40E-01	G
MN-54		-4.0504E-04					
			834.81	-4.050E-04	%(P	6.434E-02 1.79E-02	G
CO-57		0.0000E+00					
			122.07	0.000E+00	&(	5.406E-02 1.59E-02	G K
			136.43	6.781E-02	&	4.122E-01 1.23E-01	G
CO-60		-9.7461E-03					
			1332.51	-9.746E-03	%(P	5.684E-02 1.58E-02	G K
			1173.23	2.495E-02	%	7.510E-02 2.22E-02	G K
Sr-85		-1.3562E-02					
			514.00	-1.356E-02	%(	6.274E-02 1.85E-02	G
Kr-85		-3.1240E+02					
			513.99	-3.124E+02	%(	1.432E+03 4.22E+02	G
Y-88		6.5954E-03					
			1836.01	6.595E-03	%(P	5.157E-02 1.35E-02	G K
			898.02	-1.272E-02	% P	6.115E-02 1.73E-02	G
NB-94		5.3779E-03					
			871.10	5.378E-03	&(	4.150E-02 1.14E-02	G K
			702.50	-5.353E-03	&	5.167E-02 1.46E-02	G K
Ag-108M		5.1597E-03					
			722.95	5.160E-03	%(	5.344E-02 1.50E-02	G K
			614.37	1.107E-02	% P	4.359E-02 1.26E-02	G
			433.93	2.204E-03	%	4.622E-02 1.32E-02	G
CD-109		2.1831E-01					
			88.04	2.183E-01	%(P	2.129E+00 6.35E-01	G
SN-113		-1.2692E-02					
			391.71	-1.269E-02	%(	6.937E-02 2.03E-02	G K
			255.04	-2.557E-01	%	1.905E+00 5.61E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-2.3588E-02						
		427.95	-2.359E-02	&(P	1.410E-01	4.06E-02	G K
		600.77	-4.458E-02	% P	2.581E-01	7.42E-02	G
		636.15	-2.335E-02	& P	4.237E-01	1.19E-01	G
		463.51	2.385E-01	% P	3.269E-01	1.03E-01	G
		176.29	-9.753E-02	% P	5.715E-01	1.68E-01	G
I-131	-1.9796E-03						
		364.48	-1.980E-03	%(	4.542E-02	1.29E-02	G K
		636.97	-6.549E-03	&	6.540E-01	1.80E-01	G
		284.29	1.150E-01	%	7.229E-01	2.13E-01	G
CS-134	3.0772E-03						
		604.66	3.077E-03	&(	1.177E-01	3.46E-02	G K
		795.76	3.397E-02	%	5.198E-02	1.64E-02	G
		569.29	5.252E-02	%	2.543E-01	7.32E-02	G
		801.84	2.946E-02	% P	5.534E-01	1.53E-01	G
CS-137	1.2224E-02						
		661.62	1.222E-02	%(	5.301E-02	1.53E-02	G
CE-139	8.3042E-03						
		165.85	8.304E-03	%(P	4.590E-02	1.36E-02	G
EU-152	1.0127E-01						
		121.78	-7.731E-04	%(P	1.476E-01	4.34E-02	G K
		344.30	-1.953E-02	%	1.444E-01	4.20E-02	G
		1408.08	9.118E-02	%	2.351E-01	6.97E-02	G
		964.00	3.059E-01	&(P	3.767E-01	1.22E-01	G
		1112.07	-4.466E-02	%	5.159E-01	1.45E-01	G
		778.90	-2.145E-03	& P	3.819E-01	1.05E-01	G
EU-154	-1.2385E-02						
		123.10	-1.239E-02	%(P	1.136E-01	3.37E-02	G K
		1274.80	-2.485E-02	%	2.131E-01	6.00E-02	G
		723.30	-1.178E-01	% P	3.213E-01	9.56E-02	G
		1004.80	0.000E+00	&	4.392E-01	1.23E-01	G
EU-155	-2.3034E-02						
		86.45	-2.303E-02	%(P	2.743E-01	8.15E-02	G K
		105.31	2.197E-02	%	2.759E-01	8.21E-02	G
HG-203	-6.9344E-03						
		279.17	-6.934E-03	%(P	4.839E-02	1.42E-02	G K
		72.87	-4.291E-01	&	2.101E+00	6.30E-01	G
		70.83	-1.153E+00	%	3.953E+00	1.19E+00	G
		82.50	-4.151E-02	%	3.733E+00	1.11E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7801E-01						
		583.14	2.780E-01	(P	6.068E-02	3.17E-02	G
		510.72	5.239E-01	+	2.092E-01	9.15E-02	G
PB-212	5.8210E-01						
		238.63	5.742E-01	(	1.044E-01	4.13E-02	G K
							Energy duplication
		77.11	6.017E-01	(	6.042E-01	1.87E-01	G
		74.81	5.590E-01	& P	1.280E+00	3.87E-01	G
PB-214	3.9756E-01						
		351.99	3.838E-01	(P	9.182E-02	3.92E-02	G K
		295.22	4.241E-01	(	2.006E-01	7.00E-02	G
							Energy duplication
		77.11	9.840E-01	+	9.881E-01	3.06E-01	G
		241.92	2.540E-01	%	7.462E-01	2.24E-01	G
BI-212	3.0822E-01						
		727.17	3.082E-01	(	3.861E-01	1.25E-01	G K
		1620.56	3.927E-01	% P	1.592E+00	4.35E-01	G
		785.42	6.114E-01	% P	2.184E+00	6.34E-01	G
BI-214	4.6986E-01						
		609.32	4.947E-01	(	1.102E-01	5.61E-02	G K
		1764.51	3.980E-01	?(P	3.512E-01	1.29E-01	G
		1120.28	1.925E-01	%	4.206E-01	1.27E-01	G
RA-224	8.3737E-01						
		241.00	8.374E-01	%(P	1.268E+00	3.89E-01	G
RA-226	7.5218E-01						
		185.99	7.522E-01	%(P	1.257E+00	3.83E-01	G
AC-228	6.9103E-01						
		911.07	6.831E-01	*(P	1.628E-01	8.80E-02	G K
		968.90	1.062E+00	+ P	3.328E-01	1.72E-01	G
		338.40	7.103E-01	@(	3.304E-01	1.35E-01	G
TH-227	-3.0758E-01						
		236.00	-3.076E-01	%(P	5.194E-01	1.58E-01	G K
		256.25	-8.548E-02	%	5.875E-01	1.73E-01	G
PA-234	1.0530E-01						
		98.44	-2.691E-02	&(	2.632E-01	7.84E-02	G K
		946.00	-3.670E-03	%	2.436E-01	6.55E-02	G
		131.28	2.508E-03	&	2.284E-01	6.74E-02	G
		94.67	3.194E-01	(	4.063E-01	1.25E-01	G
		883.24	-2.460E-02	&	4.245E-01	1.17E-01	G
		926.70	-3.786E-02	%	4.563E-01	1.26E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 7.765E-02 %   3.769E-01 1.09E-01 G

TH-234       1.4186E+00
                           63.29 1.419E+00 %(P 4.811E+00 1.45E+00 G K
                           92.80 1.551E+00 %   2.430E+00 7.42E-01 G
                           92.38-9.049E-01 & P 2.623E+00 7.89E-01 G

AM-241       1.3769E-02
                           59.54 1.377E-02 &(  6.335E-01 1.87E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.7988E-01	1.8241E-01	3.6458E-01	3.6472E-01	3.965E-01
K-40		1.0206E+01	1.0206E+01	1.6211E+00	1.7193E+00	
MN-54	#A	-4.0407E-04	-4.0504E-04	2.2941E-02	2.2941E-02	6.419E-02
CO-57	#B	0.0000E+00	0.0000E+00	4.7844E-02	4.7844E-02	5.392E-02
CO-60	#B	-9.7423E-03	-9.7461E-03	4.9468E-02	4.9471E-02	5.682E-02

Sr-85	#A	-1.3407E-02	-1.3562E-02	5.5457E-02	5.5462E-02	6.202E-02
Kr-85	#A	-3.1240E+02	-3.1240E+02	1.2665E+03	1.2666E+03	1.432E+03
Y-88	#B	6.5496E-03	6.5954E-03	4.0483E-02	4.0484E-02	5.121E-02
NB-94	#B	5.3779E-03	5.3779E-03	3.4349E-02	3.4350E-02	4.150E-02
Ag-108M	#B	5.1596E-03	5.1597E-03	4.5071E-02	4.5071E-02	5.343E-02
CD-109	#A	2.1795E-01	2.1831E-01	1.9040E+00	1.9040E+00	2.126E+00
SN-113	#B	-1.2611E-02	-1.2692E-02	6.0960E-02	6.0964E-02	6.892E-02
SB-125	#B	-2.3570E-02	-2.3588E-02	1.6265E-01	1.6266E-01	1.409E-01
I-131	#B	-1.8048E-03	-1.9796E-03	3.8765E-02	3.8765E-02	4.141E-02
CS-134	#B	3.0742E-03	3.0772E-03	1.0382E-01	1.0382E-01	1.176E-01
CS-137	#A	1.2223E-02	1.2224E-02	4.6012E-02	4.6017E-02	5.301E-02
CE-139	#A	8.2594E-03	8.3042E-03	4.0856E-02	4.0859E-02	4.565E-02
EU-152	#B	1.0125E-01	1.0127E-01	1.2125E-01	1.2138E-01	1.475E-01
EU-154	#B	-1.2383E-02	-1.2385E-02	1.0514E-01	1.0514E-01	1.136E-01
EU-155	#B	-2.3024E-02	-2.3034E-02	4.9526E-01	4.9526E-01	2.742E-01
HG-203	#B	-6.8246E-03	-6.9344E-03	4.3558E-02	4.3560E-02	4.763E-02
TL-208		2.7801E-01	2.7801E-01	9.5257E-02	9.6527E-02	
PB-212	#	5.8210E-01	5.8210E-01	1.2573E-01	1.2991E-01	1.044E-01
PB-214	#	3.9756E-01	3.9756E-01	1.1567E-01	1.1780E-01	9.182E-02
BI-212	#A	3.0822E-01	3.0822E-01	3.7354E-01	3.7394E-01	3.861E-01
BI-214		4.6986E-01	4.6986E-01	1.5991E-01	1.6207E-01	
RA-224	#A	8.3737E-01	8.3737E-01	1.1660E+00	1.1670E+00	1.268E+00
RA-226	#A	7.5218E-01	7.5218E-01	1.1485E+00	1.1493E+00	1.257E+00
AC-228		6.9103E-01	6.9103E-01	2.3787E-01	2.4101E-01	
TH-227	#B	-3.0758E-01	-3.0758E-01	4.7972E-01	4.8003E-01	5.194E-01
PA-234	#B	1.0530E-01	1.0530E-01	1.2375E-01	1.2388E-01	2.632E-01
TH-234	#B	1.4186E+00	1.4186E+00	4.3380E+00	4.3387E+00	4.811E+00
AM-241	#A	1.3769E-02	1.3769E-02	5.6170E-01	5.6170E-01	6.334E-01

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

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

Total Activity (86.7 to 1999.0 keV) 1.1644591E+01 pCi/gm
Total Decayed Activity (86.7 to 1999.0 keV) 1.1644591E+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_29OCT2005_1241.An1

Sample description
FSS OOL-02-01-008-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_1241.An1

Acquisition information
Start time: 29-Oct-2005 12:41:15
Live time: 2000
Real time: 2022
Dead time: 1.09 %
Detector ID: 3

Detector system
Det 102 - DSPP-468

Calibration
Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration
Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9310E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9310E+03) =
5.1787E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 08:51:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1140

***** S U M M A R Y O F P E A K 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	137.	21.32	1.10	8.847E-03	74.81	9.600	1.132E+00	PB212
77.10	143.	19.40	1.10	9.541E-03	77.11	17.500	8.181E-01	PB212
					77.11	10.700	1.338E+00	PB214
185.46	90.	37.13	1.49	1.629E-02				
185.46	90.	37.13	1.49	1.629E-02	185.99	3.280	PBC<MDA	RA226
238.69	696.	4.53	1.21	1.380E-02	238.63	43.100	8.190E-01	PB212
241.67	89.	24.91	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.115E-01	PB214
295.34	132.	13.74	1.25	1.146E-02	295.22	19.200	4.201E-01	PB214
300.11	45.	32.67	1.26	1.129E-02				
328.38	43.	37.33	1.21	1.036E-02				
338.39	135.	17.99	1.56	1.006E-02	338.40	12.010	7.837E-01	AC228
352.01	241.	13.40	1.37	9.678E-03	351.99	37.100	4.691E-01	PB214
463.03	33.	40.48	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
510.52	117.	17.07	1.34	6.697E-03	510.72	22.500	5.422E-01	TL208
583.23	220.	8.93	1.78	5.889E-03	583.14	86.000	3.039E-01	TL208
609.31	155.	12.11	1.25	5.649E-03	609.32	46.090	4.161E-01	BI214
661.53	41.	35.43	1.38	5.230E-03	661.62	84.620	6.421E-02	CS137
727.38	46.	23.25	1.88	4.793E-03	727.17	11.800	5.703E-01	BI212
794.77	32.	28.39	1.60	4.420E-03	795.76	85.400	5.974E-02	CS134
911.22	99.	13.03	1.74	3.921E-03	911.07	29.000	6.077E-01	AC228
968.34	117.	13.18	1.25	3.720E-03	968.90	17.460	1.263E+00	AC228
1460.68	527.	4.49	1.85	2.621E-03	1460.75	10.700	1.316E+01	K40
1764.00	28.	23.10	1.57	2.225E-03	1764.51	15.920	5.474E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
599.88	300.19	85.	45.	0.022	98.02	1.258	PB-212 lD
656.43	328.38	101.	43.	0.021	112.00	1.205	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	381.	137.	0.069	63.95	1.098D
PB-212	153.80	77.11	405.	143.	0.071	58.21	1.100A
RA-226	371.64	186.01	423.	76.	0.038	113.20	1.500s
PB-212	476.89	238.63	148.	696.	0.348	13.58	1.215D
RA-224	482.25	241.31	415.	77.	0.038	115.55	1.500
PB-214	483.47	241.92	228.	77.	0.039	89.85	1.217D
PB-214	590.50	295.42	118.	136.	0.068	43.10	1.368s
AC-228	676.45	338.39	158.	135.	0.068	53.98	1.555s
PB-214	703.71	352.01	206.	241.	0.120	40.21	1.370s
TL-208	1020.81	510.52	90.	117.	0.058	51.20	1.338s
TL-208	1166.29	583.23	51.	220.	0.110	26.79	1.779s
BI-214	1218.48	609.31	70.	155.	0.077	36.33	1.245
CS-137	1322.96	661.53	59.	41.	0.020	106.29	1.382
BI-212	1454.72	727.38	30.	46.	0.023	69.75	1.875s
CS-134	1589.56	794.77	26.	32.	0.016	85.17	1.601s
AC-228	1822.59	911.22	27.	99.	0.049	39.10	1.739s
AC-228	1936.88	968.34	37.	117.	0.059	39.54	1.249
K-40	2922.27	1460.68	9.	527.	0.264	13.48	1.845
BI-214	3529.46	1764.00	3.	28.	0.014	69.30	1.572s

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

***** S U M M A R Y O 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		-1.3064E-02					
			477.56	-1.306E-02	%(	4.574E-01 1.31E-01	G
K-40		1.3156E+01					
			1460.75	1.316E+01	(P	4.136E-01 5.91E-01	G
MN-54		4.5153E-03					
			834.81	4.515E-03	&(P	5.571E-02 1.58E-02	G
CO-57		0.0000E+00					
			122.07	0.000E+00	%(	5.685E-02 1.69E-02	G K
			136.43	0.000E+00	&	4.524E-01 1.34E-01	G
CO-60		1.7437E-02					
			1332.51	1.744E-02	%(P	5.579E-02 1.63E-02	G K
			1173.23	-1.097E-02	&	8.206E-02 2.36E-02	G K
Sr-85		-2.1981E-02					
			514.00	-2.198E-02	%(	6.082E-02 1.82E-02	G
Kr-85		-5.0120E+02					
			513.99	-5.012E+02	%(	1.387E+03 4.16E+02	G
Y-88		-9.3556E-03					
			1836.01	-9.356E-03	%(P	6.065E-02 1.66E-02	G K
			898.02	4.239E-04	& P	5.768E-02 1.59E-02	G
NB-94		3.8073E-03					
			871.10	3.807E-03	&(	4.606E-02 1.28E-02	G K
			702.50	-7.948E-03	&	4.695E-02 1.35E-02	G K
Ag-108M		0.0000E+00					
			722.95	0.000E+00	&(	1.013E-01 2.94E-02	G K
			614.37	-9.568E-03	& P	6.580E-02 1.92E-02	G
			433.93	-1.557E-02	%	4.933E-02 1.47E-02	G
CD-109		2.7211E-02					
			88.04	2.721E-02	&(P	2.206E+00 6.57E-01	G
SN-113		1.3011E-03					
			391.71	1.301E-03	&(	5.870E-02 1.68E-02	G K
			255.04	-1.301E-01	&	1.944E+00 5.72E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-2.7233E-03						
		427.95	-2.723E-03	&(P	1.521E-01	4.35E-02	G K
		600.77	-1.451E-02	% P	2.666E-01	7.60E-02	G
		636.15	3.171E-02	% P	3.134E-01	8.77E-02	G
		463.51	3.101E-01	% P	4.222E-01	1.31E-01	G
		176.29	1.605E-02	% P	6.585E-01	1.94E-01	G
I-131	1.8356E-02						
		364.48	1.836E-02	%(	4.714E-02	1.41E-02	G K
		636.97	9.200E-03	%	6.824E-01	1.91E-01	G
		284.29	-6.849E-02	%	7.344E-01	2.16E-01	G
CS-134	2.9310E-02						
		604.66	2.685E-03	&(	4.720E-02	1.34E-02	G K
		795.76	5.974E-02	(	4.884E-02	1.70E-02	G
		569.29	0.000E+00	%	3.331E-01	9.49E-02	G
		801.84	-7.286E-02	% P	5.542E-01	1.57E-01	G
CS-137	6.4212E-02						
		661.62	6.421E-02	(	6.109E-02	2.27E-02	G
CE-139	1.5547E-02						
		165.85	1.555E-02	%(P	4.388E-02	1.32E-02	G
EU-152	-1.9161E-02						
		121.78	-1.916E-02	%(P	1.655E-01	4.93E-02	G K
		344.30	-4.460E-03	%	1.458E-01	4.22E-02	G
		1408.08	2.089E-02	&	2.555E-01	6.94E-02	G
		964.00	1.269E-02	% P	9.724E-01	2.85E-01	G
		1112.07	1.655E-01	&	4.238E-01	1.26E-01	G
		778.90	-7.596E-02	& P	4.278E-01	1.24E-01	G
EU-154	-1.0249E-02						
		123.10	-1.025E-02	%(P	1.175E-01	3.50E-02	G K
		1274.80	6.666E-03	%	2.038E-01	5.67E-02	G
		723.30	-4.445E-03	& P	2.945E-01	8.33E-02	G
		1004.80	1.253E-02	%	3.097E-01	8.57E-02	G
EU-155	6.6542E-02						
		86.45	6.654E-02	&(P	2.667E-01	8.01E-02	G K
		105.31	8.771E-02	%	2.770E-01	8.35E-02	G
HG-203	7.7578E-03						
		279.17	7.758E-03	&(P	5.196E-02	1.54E-02	G K
		72.87	-5.776E-01	%	2.125E+00	6.40E-01	G
		70.83	-1.165E+00	%	3.842E+00	1.16E+00	G
		82.50	-1.936E+00	%	3.795E+00	1.15E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.0394E-01						
		583.14	3.039E-01	@(P	4.972E-02	2.72E-02	G
		510.72	5.422E-01	+	2.183E-01	9.25E-02	G
PB-212	8.1873E-01						
		238.63	8.190E-01	(	6.997E-02	3.71E-02	G K
							Energy duplication
		77.11	5.983E-01	}	4.043E-01	1.16E-01	G
		74.81	1.132E+00	+ P	7.715E-01	2.47E-01	G
PB-214	4.6534E-01						
		351.99	4.691E-01	@(P	1.357E-01	6.30E-02	G K
		295.22	4.333E-01	@(	1.693E-01	6.23E-02	G
							Energy duplication
		77.11	1.719E-01	}	8.987E-01	2.26E-01	G
		241.92	5.289E-01	(	5.013E-01	1.58E-01	G
BI-212	5.7030E-01						
		727.17	5.703E-01	(	3.488E-01	1.33E-01	G K
		1620.56	5.877E-01	% P	1.725E+00	4.99E-01	G
		785.42	1.028E+00	% P	2.590E+00	7.75E-01	G
BI-214	4.4979E-01						
		609.32	4.161E-01	(	1.122E-01	5.04E-02	G K
		1764.51	5.474E-01	(P	2.204E-01	1.27E-01	G
		1120.28	3.176E-01	%	4.277E-01	1.36E-01	G
RA-224	1.0082E+00						
		241.00	1.008E+00	?(P	1.279E+00	3.94E-01	G
RA-226	9.9408E-01						
		185.99	9.941E-01	@(P	1.292E+00	3.97E-01	G
AC-228	6.5927E-01						
		911.07	6.077E-01	*(P	1.663E-01	7.94E-02	G K
		968.90	1.263E+00	+ P	3.341E-01	1.66E-01	G
		338.40	7.837E-01	(	3.547E-01	1.41E-01	G
TH-227	8.2720E-03						
		236.00	8.272E-03	%(P	5.119E-01	1.52E-01	G K
		256.25	-1.049E-02	%	5.304E-01	1.55E-01	G
PA-234	-1.8925E-02						
		98.44	-1.893E-02	%(	2.652E-01	7.91E-02	G K
		946.00	4.263E-02	%	3.136E-01	8.98E-02	G
		131.28	4.030E-03	&	2.404E-01	7.13E-02	G
		94.67	-1.358E-01	&	4.945E-01	1.49E-01	G
		883.24	0.000E+00	%	5.199E-01	1.46E-01	G
		926.70	9.270E-02	%	4.520E-01	1.30E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 0.000E+00 %   4.937E-01 1.41E-01 G

TH-234       9.6729E-01
                           63.29 9.673E-01 %(P 4.500E+00 1.35E+00 G K
                           92.80 1.364E+00 &   2.502E+00 7.61E-01 G
                           92.38 1.552E+00 & P 2.978E+00 9.04E-01 G

AM-241      -1.3763E-01
                           59.54-1.376E-01 %(  6.729E-01 2.02E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-1.2868E-02	-1.3064E-02	3.9407E-01	3.9407E-01	4.506E-01
K-40		1.3156E+01	1.3156E+01	1.7736E+00	1.9212E+00	
MN-54	#A	4.5037E-03	4.5153E-03	4.7295E-02	4.7296E-02	5.557E-02
CO-57	#B	0.0000E+00	0.0000E+00	5.0552E-02	5.0552E-02	5.668E-02
CO-60	#B	1.7430E-02	1.7437E-02	4.8800E-02	4.8810E-02	5.577E-02

Sr-85	#A	-2.1710E-02	-2.1981E-02	5.4702E-02	5.4716E-02	6.007E-02
Kr-85	#A	-5.0119E+02	-5.0120E+02	1.2473E+03	1.2476E+03	1.387E+03
Y-88	#B	-9.2853E-03	-9.3556E-03	5.0148E-02	5.0151E-02	6.020E-02
NB-94	#B	3.8073E-03	3.8073E-03	3.8474E-02	3.8475E-02	4.606E-02
Ag-108M	#B	0.0000E+00	0.0000E+00	8.8251E-02	8.8252E-02	1.013E-01
CD-109	#A	2.7163E-02	2.7211E-02	1.9720E+00	1.9720E+00	2.203E+00
SN-113	#B	1.2920E-03	1.3011E-03	5.0474E-02	5.0474E-02	5.829E-02
SB-125	#B	-2.7212E-03	-2.7233E-03	3.0347E+00	3.0347E+00	1.520E-01
I-131	#B	1.6609E-02	1.8356E-02	4.2434E-02	4.2447E-02	4.265E-02
CS-134	#B	2.9278E-02	2.9310E-02	2.4963E-02	2.5017E-02	4.715E-02
CS-137		6.4207E-02	6.4212E-02	6.8251E-02	6.8346E-02	
CE-139	#A	1.5456E-02	1.5547E-02	3.9581E-02	3.9591E-02	4.362E-02
EU-152	#B	-1.9158E-02	-1.9161E-02	1.6840E-01	1.6841E-01	1.654E-01
EU-154	#B	-1.0246E-02	-1.0249E-02	1.0931E-01	1.0932E-01	1.175E-01
EU-155	#B	6.6513E-02	6.6542E-02	2.4042E-01	2.4045E-01	2.666E-01
HG-203	#B	7.6250E-03	7.7578E-03	4.6071E-02	4.6073E-02	5.108E-02
TL-208	#	3.0394E-01	3.0394E-01	8.1576E-02	8.3340E-02	
PB-212		8.1873E-01	8.1873E-01	1.1117E-01	1.2029E-01	
PB-214		4.6534E-01	4.6534E-01	1.6672E-01	1.6875E-01	
BI-212		5.7030E-01	5.7030E-01	3.9776E-01	3.9905E-01	
BI-214		4.4979E-01	4.4979E-01	1.6339E-01	1.6533E-01	
RA-224	#A	1.0082E+00	1.0082E+00	1.1825E+00	1.1838E+00	1.279E+00
RA-226	#A	9.9408E-01	9.9408E-01	1.1916E+00	1.1929E+00	1.292E+00
AC-228		6.5927E-01	6.5927E-01	2.1989E-01	2.2298E-01	
TH-227	#B	8.2720E-03	8.2720E-03	4.5527E-01	4.5527E-01	5.119E-01
PA-234	#B	-1.8925E-02	-1.8925E-02	2.3733E-01	2.3733E-01	2.652E-01
TH-234	#B	9.6729E-01	9.6729E-01	4.0450E+00	4.0453E+00	4.500E+00
AM-241	#A	-1.3763E-01	-1.3763E-01	6.0467E-01	6.0472E-01	6.729E-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) 1.6487118E+01 pCi/gm
Total Decayed Activity (295.2 to 1999.0 keV) 1.6487122E+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_29OCT2005_1317.An1

Sample description
FSS OOL-02-01-011-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_1317.An1

Acquisition information
Start time: 29-Oct-2005 13:17:14
Live time: 2000
Real time: 2024
Dead time: 1.17 %
Detector ID: 3

Detector system
Det 102 - DSPP-468

Calibration
Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration
Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9270E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9270E+03) =
5.1894E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 13:06:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0350

***** S U M M A R Y O F P E A K 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	142.	33.41	1.50	8.847E-03				
74.87	142.	33.41	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
76.97	195.	23.71	1.50	9.541E-03	77.11	10.700	1.342E+00	PB214
					77.11	17.500	8.207E-01	PB212
76.97	195.	23.71	1.50	9.541E-03	77.11	10.700	1.342E+00	PB214
					77.11	17.500	8.207E-01	PB212
92.86	103.	39.49	1.50	1.368E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.798E+00	TH234
					94.67	15.500	3.391E-01	PA234
186.09	78.	41.20	1.19	1.626E-02	185.99	3.280	PBC<MDA	RA226
209.22	110.	31.27	1.19	1.520E-02				
238.64	744.	4.40	1.21	1.381E-02				
238.64	744.	4.40	1.21	1.381E-02	238.63	43.100	8.771E-01	PB212
241.64	103.	22.59	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.057E-01	PB214
269.88	55.	33.48	1.08	1.244E-02				
277.65	53.	39.31	1.59	1.213E-02				
277.65	53.	39.31	1.59	1.213E-02	279.17	81.500	PBC<MDA	HG203
295.28	122.	15.89	1.25	1.146E-02	295.22	19.200	3.879E-01	PB214
300.39	64.	26.60	1.26	1.128E-02				
327.52	99.	28.27	1.65	1.038E-02				
338.79	189.	13.32	1.18	1.005E-02	338.40	12.010	1.098E+00	AC228
352.01	225.	14.17	1.42	9.678E-03	351.99	37.100	4.383E-01	PB214
462.61	73.	30.53	1.39	7.379E-03				
462.61	73.	30.53	1.39	7.379E-03	463.51	10.000	6.770E-01	SB125
511.13	109.	16.15	1.20	6.690E-03	510.72	22.500	5.084E-01	TL208
583.18	188.	12.21	1.55	5.890E-03	583.14	86.000	2.604E-01	TL208

609.35	138.	14.99	1.50	5.649E-03	609.32	46.090	3.711E-01	BI214
661.69	556.	5.41	1.54	5.229E-03	661.62	84.620	8.813E-01	CS137
726.77	75.	22.27	1.40	4.796E-03	727.17	11.800	9.297E-01	BI212
911.10	139.	10.25	1.59	3.922E-03	911.07	29.000	8.569E-01	AC228
968.78	102.	15.62	1.94	3.718E-03	968.90	17.460	1.102E+00	AC228
1120.26	52.	28.27	1.60	3.283E-03	1120.28	15.040	7.442E-01	BI214
1460.65	608.	4.10	1.86	2.621E-03	1460.75	10.700	1.520E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.27	30.	18.26	0.96	2.226E-03	1764.51	15.920	5.921E-01	BI214

********** U N I D E N T I F I E D P E A K S U 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	410.	78.	0.039	123.59	1.193	PA-234	l
418.06	209.22	411.	110.	0.055	93.81	1.189	AC-228	
476.91	238.60	163.	744.	0.372	13.19	1.215	PB-212	D
482.91	241.60	217.	103.	0.051	67.76	1.217	PB-214	D
539.41	269.88	142.	55.	0.027	100.43	1.078	AC-228	
554.95	277.65	170.	53.	0.026	117.92	1.595	NP-239	l
600.58	300.46	200.	65.	0.032	111.63	1.254	PB-212	
654.72	327.52	223.	99.	0.050	84.80	1.653	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	149.32	74.87	1108.	142.	0.071	100.24	1.500s
PB-214	153.80	77.11	975.	195.	0.098	71.12	1.500D
PB-212	153.80	77.11	975.	195.	0.098	71.12	1.500D
PA-234	185.31	92.86	768.	103.	0.051	118.47	1.500s
PB-212	476.91	238.64	447.	658.	0.329	17.96	1.500s
PB-214	590.22	295.28	243.	102.	0.051	71.13	1.500
AC-228	677.25	338.79	165.	189.	0.095	39.96	1.179s
PB-214	703.62	351.97	179.	203.	0.101	35.00	1.500
SB-125	925.66	462.96	121.	51.	0.026	96.80	1.500s
TL-208	1022.04	511.13	75.	109.	0.055	48.46	1.203s
TL-208	1166.20	583.18	98.	188.	0.094	36.63	1.550s
BI-214	1218.55	609.35	90.	138.	0.069	44.96	1.502
CS-137	1323.27	661.69	90.	556.	0.278	16.24	1.545
BI-212	1453.50	726.77	60.	75.	0.038	66.81	1.403s
AC-228	1822.33	911.10	24.	139.	0.069	30.74	1.595
AC-228	1937.77	968.78	46.	102.	0.051	46.86	1.942
BI-214	2240.91	1120.26	51.	52.	0.026	84.80	1.596
K-40	2922.20	1460.65	4.	608.	0.304	12.30	1.860
BI-214	3530.17	1764.36	1.	17.	0.009	77.48	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		1.2537E-01					
			477.56	1.254E-01	%(	4.897E-01 1.45E-01	G
K-40		1.5196E+01					
			1460.75	1.520E+01	(P	3.109E-01 6.23E-01	G
MN-54		1.0380E-02					
			834.81	1.038E-02	&(P	5.446E-02 1.57E-02	G
CO-57		5.1965E-04					
			122.07	5.196E-04	&(	6.225E-02 1.85E-02	G K
			136.43	1.817E-01	%	4.466E-01 1.35E-01	G
CO-60		6.0408E-03					
			1332.51	6.041E-03	&(P	6.833E-02 1.91E-02	G K
			1173.23	2.318E-02	%	7.362E-02 2.17E-02	G K
Sr-85		-2.6205E-02					
			514.00	-2.620E-02	%(	6.503E-02 1.96E-02	G
Kr-85		-5.9937E+02					
			513.99	-5.994E+02	%(	1.485E+03 4.47E+02	G
Y-88		-2.1703E-05					
			1836.01	-2.170E-05	%(P	7.498E-02 2.00E-02	G K
			898.02	1.085E-03	& P	4.813E-02 1.30E-02	G
NB-94		-6.8120E-03					
			871.10	-6.812E-03	%(	5.333E-02 1.52E-02	G K
			702.50	1.258E-02	%	4.436E-02 1.30E-02	G K
Ag-108M		0.0000E+00					
			722.95	0.000E+00	%(	1.035E-01 3.01E-02	G K
			614.37	-1.147E-03	% P	6.890E-02 1.98E-02	G
			433.93	4.513E-04	%	5.254E-02 1.51E-02	G
CD-109		-2.1400E-01					
			88.04	-2.140E-01	%(P	2.418E+00 7.23E-01	G
SN-113		-7.5357E-03					
			391.71	-7.536E-03	%(	7.829E-02 2.29E-02	G K
			255.04	4.296E-01	&	2.002E+00 5.96E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3544E-01						
		427.95	1.594E-02	%(P	1.645E-01	4.79E-02	G K
		600.77	5.610E-02	& P	2.221E-01	6.48E-02	G
		636.15	1.021E-01	& P	3.785E-01	1.11E-01	G
		463.51	4.892E-01	@(P	5.136E-01	1.63E-01	G
		176.29	1.225E-01	% P	7.221E-01	2.15E-01	G
I-131	-1.2752E-02						
		364.48	-1.275E-02	%(	5.701E-02	1.69E-02	G K
		636.97	8.800E-02	&	5.560E-01	1.58E-01	G
		284.29	-3.513E-03	%	7.847E-01	2.29E-01	G
CS-134	-1.8774E-02						
		604.66	-1.877E-02	&(	5.975E-02	1.78E-02	G K
		795.76	3.893E-02	%	5.588E-02	1.76E-02	G
		569.29	1.021E-01	%	2.941E-01	8.76E-02	G
		801.84	-6.088E-02	% P	5.926E-01	1.68E-01	G
CS-137	8.8133E-01						
		661.62	8.813E-01	(	7.432E-02	4.77E-02	G
CE-139	-1.1038E-02						
		165.85	-1.104E-02	&(P	5.886E-02	1.76E-02	G
EU-152	-1.6022E-02						
		121.78	-1.602E-02	&(P	1.813E-01	5.40E-02	G K
		344.30	-6.097E-02	%	1.757E-01	5.27E-02	G
		1408.08	8.823E-04	%	2.418E-01	6.34E-02	G
		964.00	2.097E-01	& P	4.934E-01	1.48E-01	G
		1112.07	1.177E-01	&	5.181E-01	1.51E-01	G
		778.90	7.659E-02	& P	3.884E-01	1.12E-01	G
EU-154	1.8541E-02						
		123.10	1.854E-02	%(P	1.290E-01	3.85E-02	G K
		1274.80	-4.635E-03	&	2.247E-01	6.29E-02	G
		723.30	3.972E-02	% P	1.935E-01	5.52E-02	G
		1004.80	0.000E+00	&	4.774E-01	1.36E-01	G
EU-155	-1.0627E-02						
		86.45	-1.063E-02	%(P	2.841E-01	8.46E-02	G K
		105.31	5.675E-02	&	2.712E-01	8.13E-02	G
HG-203	3.5437E-02						
		279.17	3.544E-02	&(P	4.947E-02	1.53E-02	G K
		72.87	-1.220E+00	&	2.338E+00	7.10E-01	G
		70.83	3.957E-02	%	4.037E+00	1.20E+00	G
		82.50	1.979E-01	%	4.304E+00	1.28E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.6040E-01						
		583.14	2.604E-01	*(P	6.759E-02	3.19E-02	G
		510.72	5.084E-01	+	2.002E-01	8.22E-02	G
PB-212	7.8887E-01						
		238.63	7.760E-01	@(	1.194E-01	4.65E-02	G K
							Energy duplication
		77.11	8.207E-01	*(	6.225E-01	1.95E-01	G
		74.81	1.174E+00	& P	1.303E+00	4.01E-01	G
PB-214	3.7198E-01						
		351.99	3.957E-01	(P	1.272E-01	4.63E-02	G K
		295.22	3.261E-01	(	2.402E-01	7.73E-02	G
							Energy duplication
		77.11	1.342E+00	+	1.018E+00	3.18E-01	G
		241.92	-1.952E-02	%	9.040E-01	2.69E-01	G
BI-212	9.2974E-01						
		727.17	9.297E-01	*(	4.811E-01	2.07E-01	G K
		1620.56	2.640E-01	% P	1.903E+00	5.14E-01	G
		785.42	9.310E-01	% P	2.662E+00	7.91E-01	G
BI-214	3.6384E-01						
		609.32	3.711E-01	(	1.265E-01	5.56E-02	G K
		1764.51	3.427E-01	?(P	1.660E-01	8.90E-02	G
		1120.28	7.442E-01	+	5.093E-01	2.10E-01	G
RA-224	7.1861E-01						
		241.00	7.186E-01	%(P	1.556E+00	4.71E-01	G
RA-226	9.1077E-01						
		185.99	9.108E-01	%(P	1.456E+00	4.44E-01	G
AC-228	9.7938E-01						
		911.07	8.569E-01	(P	1.576E-01	8.80E-02	G K
		968.90	1.102E+00	(P	3.708E-01	1.72E-01	G
		338.40	1.098E+00	@(	3.631E-01	1.46E-01	G
TH-227	-2.7186E-01						
		236.00	-2.719E-01	&(P	5.947E-01	1.80E-01	G K
		256.25	1.402E-01	%	5.672E-01	1.69E-01	G
PA-234	1.3870E-01						
		98.44	1.498E-02	&(	2.845E-01	8.49E-02	G K
		946.00	-4.372E-02	&	3.137E-01	8.99E-02	G
		131.28	-6.365E-02	&	2.028E-01	6.09E-02	G
		94.67	3.391E-01	?(	4.361E-01	1.34E-01	G
		883.24	1.907E-01	%	3.457E-01	1.07E-01	G
		926.70	-9.041E-03	&	4.251E-01	1.16E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.513E-01 %   4.360E-01 1.30E-01 G

TH-234       1.1881E+00
                           63.29 1.188E+00 %(P 5.084E+00 1.53E+00 G K
                           92.80 1.872E+00 &   2.615E+00 8.00E-01 G
                           92.38 2.114E+00 & P 3.118E+00 9.52E-01 G

AM-241      -6.3641E-02
                           59.54-6.364E-02 %(  7.402E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	1.2374E-01	1.2537E-01	4.3471E-01	4.3477E-01	4.833E-01
K-40		1.5196E+01	1.5196E+01	1.8693E+00	2.0546E+00	
MN-54	#A	1.0357E-02	1.0380E-02	4.7106E-02	4.7110E-02	5.434E-02
CO-57	#B	5.1831E-04	5.1965E-04	5.5495E-02	5.5495E-02	6.209E-02
CO-60	#B	6.0386E-03	6.0408E-03	5.7251E-02	5.7252E-02	6.831E-02

Sr-85	#A	-2.5924E-02	-2.6205E-02	5.8754E-02	5.8772E-02	6.433E-02
Kr-85	#A	-5.9936E+02	-5.9937E+02	1.3420E+03	1.3424E+03	1.485E+03
Y-88	#B	-2.1561E-05	-2.1703E-05	7.8876E-04	7.8876E-04	7.449E-02
NB-94	#B	-6.8120E-03	-6.8120E-03	4.5488E-02	4.5490E-02	5.333E-02
Ag-108M	#B	0.0000E+00	0.0000E+00	9.0295E-02	9.0295E-02	1.035E-01
CD-109	#A	-2.1367E-01	-2.1400E-01	2.6731E+00	2.6731E+00	2.414E+00
SN-113	#B	-7.4901E-03	-7.5357E-03	6.8788E-02	6.8789E-02	7.782E-02
SB-125	#B	1.3534E-01	1.3544E-01	1.3505E-01	1.3526E-01	1.644E-01
I-131	#B	-1.1691E-02	-1.2752E-02	5.0573E-02	5.0578E-02	5.226E-02
CS-134	#B	-1.8756E-02	-1.8774E-02	5.3322E-02	5.3333E-02	5.969E-02
CS-137		8.8127E-01	8.8133E-01	1.4317E-01	1.5147E-01	
CE-139	#A	-1.0982E-02	-1.1038E-02	5.4984E-02	5.4988E-02	5.857E-02
EU-152	#B	-1.6020E-02	-1.6022E-02	1.8948E-01	1.8948E-01	1.813E-01
EU-154	#B	1.8536E-02	1.8541E-02	1.1563E-01	1.1563E-01	1.289E-01
EU-155	#B	-1.0623E-02	-1.0627E-02	1.1642E+00	1.1642E+00	2.840E-01
HG-203	#B	3.4910E-02	3.5437E-02	4.5835E-02	4.5878E-02	4.873E-02
TL-208	#	2.6040E-01	2.6040E-01	9.5594E-02	9.6705E-02	
PB-212	#	7.8887E-01	7.8887E-01	1.4167E-01	1.4842E-01	1.194E-01
PB-214	#	3.7198E-01	3.7198E-01	1.3044E-01	1.3210E-01	1.272E-01
BI-212	#	9.2974E-01	9.2974E-01	6.2119E-01	6.2338E-01	
BI-214		3.6384E-01	3.6384E-01	1.6357E-01	1.6484E-01	
RA-224	#A	7.1861E-01	7.1861E-01	1.4139E+00	1.4144E+00	1.556E+00
RA-226	#A	9.1077E-01	9.1077E-01	1.3318E+00	1.3328E+00	1.456E+00
AC-228		9.7938E-01	9.7938E-01	2.2480E-01	2.3142E-01	
TH-227	#B	-2.7186E-01	-2.7186E-01	5.4556E-01	5.4578E-01	5.947E-01
PA-234	#B	1.3870E-01	1.3870E-01	1.6431E-01	1.6449E-01	2.845E-01
TH-234	#B	1.1881E+00	1.1881E+00	4.5807E+00	4.5811E+00	5.084E+00
AM-241	#A	-6.3641E-02	-6.3641E-02	6.6259E-01	6.6260E-01	7.402E-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 (269.7 to 1999.0 keV) 1.8610615E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 1.8610670E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS OOL-02-01-016-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_1352.An1

Acquisition information

Start time:	29-Oct-2005 13:52:56
Live time:	2000
Real time:	2019
Dead time:	0.96 %
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:	1.8220E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8220E+03) = 5.4885E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 10:25:00
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: 0.1586

***** S U M M A R Y O F P E A 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	151.	27.89	1.50	9.541E-03	77.11	10.700	1.099E+00	PB214
					77.11	17.500	6.718E-01	PB212
77.04	151.	27.89	1.50	9.541E-03	77.11	10.700	1.099E+00	PB214
					77.11	17.500	6.718E-01	PB212
185.84	88.	36.51	1.15	1.627E-02				
185.84	88.	36.51	1.15	1.627E-02	185.99	3.280	PBC<MDA	RA226
209.33	65.	32.78	0.68	1.519E-02				
238.71	538.	5.19	1.21	1.380E-02				
238.71	538.	5.19	1.21	1.380E-02	238.63	43.100	6.713E-01	PB212
241.85	86.	23.51	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.234E-01	PB214
295.19	184.	15.97	1.11	1.147E-02				
295.19	184.	15.97	1.11	1.147E-02	295.22	19.200	6.193E-01	PB214
327.81	40.	38.85	1.06	1.038E-02				
338.38	96.	22.68	0.87	1.006E-02	338.40	12.010	5.893E-01	AC228
351.81	261.	9.57	1.33	9.683E-03				
351.81	261.	9.57	1.33	9.683E-03	351.99	37.100	5.391E-01	PB214
463.24	50.	30.57	1.15	7.369E-03				
463.24	50.	30.57	1.15	7.369E-03	463.51	10.000	4.883E-01	SB125
510.73	94.	15.06	1.18	6.695E-03	510.72	22.500	4.604E-01	TL208
582.92	172.	11.50	1.11	5.892E-03	583.14	86.000	2.517E-01	TL208
609.37	175.	11.34	1.44	5.649E-03	609.32	46.090	4.993E-01	BI214
727.17	50.	26.81	1.79	4.794E-03	727.17	11.800	6.542E-01	BI212
794.79	30.	25.88	1.60	4.420E-03	795.76	85.400	5.804E-02	CS134
910.84	119.	16.07	1.26	3.923E-03	911.07	29.000	7.765E-01	AC228
968.30	88.	17.80	1.46	3.720E-03	968.90	17.460	1.002E+00	AC228
1120.40	36.	31.73	1.11	3.283E-03	1120.28	15.040	5.483E-01	BI214

1460.61	483.	4.55	2.15	2.621E-03	1460.75	10.700	1.277E+01	K40
1763.79	31.	17.96	1.00	2.225E-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	
418.27	209.33	186.	65.	0.033	98.35	0.678	AC-228	s
477.05	238.63	121.	538.	0.269	15.57	1.215	PB-212	D
483.33	241.76	160.	86.	0.043	70.53	1.217	PB-214	D
655.29	327.81	94.	40.	0.020	116.54	1.060	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.	151.	0.076	83.66	1.500D
PB-212	153.80	77.11	814.	151.	0.076	83.66	1.500D
RA-226	371.36	185.87	389.	79.	0.039	105.16	1.500
PB-212	476.89	238.63	318.	494.	0.247	20.43	1.500D
PB-214	590.19	295.27	166.	129.	0.064	50.12	1.500
AC-228	676.43	338.38	135.	96.	0.048	68.04	0.869
PB-214	703.45	351.88	95.	242.	0.121	25.77	1.500
SB-125	926.37	463.31	63.	31.	0.016	114.39	1.500
TL-208	1021.23	510.73	46.	94.	0.047	45.17	1.175s
TL-208	1165.67	582.92	67.	172.	0.086	34.49	1.110s
BI-214	1218.59	609.37	67.	175.	0.088	34.03	1.439
BI-212	1454.30	727.17	39.	50.	0.025	80.42	1.792s
CS-134	1589.60	794.79	14.	30.	0.015	77.64	1.601
AC-228	1821.81	910.84	51.	119.	0.060	48.22	1.260
AC-228	1936.80	968.30	36.	88.	0.044	53.41	1.464
BI-214	2241.19	1120.40	32.	36.	0.018	95.20	1.111s
K-40	2922.12	1460.61	0.	483.	0.241	13.65	2.154
BI-214	3529.04	1763.79	0.	31.	0.015	53.88	0.999s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		1.4048E-01					
			477.56	1.405E-01	&(	3.254E-01 9.80E-02	G
K-40		1.2771E+01					
			1460.75	1.277E+01	(P	1.949E-01 5.81E-01	G
MN-54		1.7784E-03					
			834.81	1.778E-03	&(P	5.776E-02 1.62E-02	G
CO-57		9.2036E-03					
			122.07	9.204E-03	%(	4.094E-02 1.22E-02	G K
			136.43	2.011E-02	%	3.341E-01 9.85E-02	G
CO-60		2.0872E-04					
			1332.51	2.087E-04	%(P	5.450E-02 1.44E-02	G K
			1173.23	-1.773E-02	%	8.272E-02 2.41E-02	G K
Sr-85		-1.6507E-02					
			514.00	-1.651E-02	%(	5.842E-02 1.73E-02	G
Kr-85		-3.7652E+02					
			513.99	-3.765E+02	%(	1.332E+03 3.96E+02	G
Y-88		-5.1434E-03					
			1836.01	-5.143E-03	%(P	4.540E-02 1.17E-02	G K
			898.02	-9.641E-03	% P	6.077E-02 1.72E-02	G
NB-94		7.3648E-03					
			871.10	7.365E-03	&(	4.431E-02 1.25E-02	G K
			702.50	-3.528E-03	&	5.037E-02 1.42E-02	G K
Ag-108M		-1.4468E-02					
			722.95	-1.447E-02	%(	5.898E-02 1.72E-02	G K
			614.37	-9.976E-03	& P	5.895E-02 1.71E-02	G
			433.93	1.237E-02	&	4.382E-02 1.29E-02	G
CD-109		-4.7882E-01					
			88.04	-4.788E-01	&(P	2.008E+00 6.02E-01	G
SN-113		-1.1499E-02					
			391.71	-1.150E-02	&(	7.033E-02 2.06E-02	G K
			255.04	-2.165E-01	%	1.944E+00 5.72E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0674E-01						
		427.95	3.637E-02	&(P	1.040E-01	3.07E-02	G K
		600.77	1.866E-02	& P	2.274E-01	6.42E-02	G
		636.15	8.312E-02	& P	3.994E-01	1.16E-01	G
		463.51	3.150E-01	(P	4.012E-01	1.26E-01	G
		176.29	-3.029E-02	& P	6.456E-01	1.90E-01	G
I-131	1.9524E-03						
		364.48	1.952E-03	%(	5.199E-02	1.50E-02	G K
		636.97	1.396E-01	&	6.906E-01	2.00E-01	G
		284.29	-1.122E-02	&	7.100E-01	2.06E-01	G
CS-134	2.7706E-02						
		604.66	1.163E-03	%(	5.341E-02	1.52E-02	G K
		795.76	5.804E-02	(	4.012E-02	1.50E-02	G
		569.29	-6.059E-02	%	2.645E-01	7.69E-02	G
		801.84	3.227E-02	% P	5.334E-01	1.48E-01	G
CS-137	8.6221E-03						
		661.62	8.622E-03	&(	5.169E-02	1.48E-02	G
CE-139	-1.0530E-02						
		165.85	-1.053E-02	%(P	5.251E-02	1.57E-02	G
EU-152	-5.9474E-03						
		121.78	-5.947E-03	%(P	1.366E-01	4.03E-02	G K
		344.30	1.476E-02	&	1.252E-01	3.63E-02	G
		1408.08	3.947E-02	%	1.865E-01	5.12E-02	G
		964.00	1.714E-01	& P	4.138E-01	1.24E-01	G
		1112.07	6.006E-03	&	5.028E-01	1.39E-01	G
		778.90	-6.013E-02	% P	3.699E-01	1.05E-01	G
EU-154	-2.2756E-04						
		123.10	-2.276E-04	%(P	9.921E-02	2.92E-02	G K
		1274.80	-3.543E-02	%	1.890E-01	5.39E-02	G
		723.30	-9.093E-02	% P	3.169E-01	9.34E-02	G
		1004.80	0.000E+00	&	4.087E-01	1.14E-01	G
EU-155	7.2795E-02						
		86.45	7.279E-02	%(P	2.645E-01	7.95E-02	G K
		105.31	-3.108E-02	&	2.448E-01	7.29E-02	G
HG-203	-7.1054E-05						
		279.17	-7.105E-05	%(P	5.018E-02	1.46E-02	G K
		72.87	-7.376E-01	&	2.195E+00	6.62E-01	G
		70.83	3.873E-01	&	3.746E+00	1.12E+00	G
		82.50	1.614E-01	%	4.122E+00	1.23E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5169E-01						
		583.14	2.517E-01	@(P	5.986E-02	2.90E-02	G
		510.72	4.604E-01	+	1.681E-01	6.93E-02	G
PB-212	6.3161E-01						
							Energy duplication
		238.63	6.153E-01	(	1.070E-01	4.19E-02	G K
							Energy duplication
		77.11	6.718E-01	(	6.025E-01	1.87E-01	G
		74.81	7.568E-01	& P	1.209E+00	3.68E-01	G
PB-214	4.7659E-01						
		351.99	4.992E-01	(P	9.964E-02	4.29E-02	G K
		295.22	4.330E-01	(	2.115E-01	7.23E-02	G
							Energy duplication
		77.11	1.099E+00	+	9.854E-01	3.06E-01	G
		241.92	6.249E-02	%	7.454E-01	2.21E-01	G
BI-212	6.5424E-01						
		727.17	6.542E-01	(	4.176E-01	1.75E-01	G K
		1620.56	3.047E-01	% P	1.426E+00	3.82E-01	G
		785.42	1.425E+00	% P	2.092E+00	6.63E-01	G
BI-214	5.3944E-01						
		609.32	4.993E-01	(	1.161E-01	5.66E-02	G K
		1764.51	6.472E-01	(P	1.543E-01	1.17E-01	G
		1120.28	5.483E-01	(	4.336E-01	1.74E-01	G
RA-224	9.0429E-01						
		241.00	9.043E-01	%(P	1.326E+00	4.06E-01	G
RA-226	1.0961E+00						
		185.99	1.096E+00	(P	1.316E+00	4.06E-01	G
AC-228	8.6109E-01						
		911.07	7.765E-01	(P	2.345E-01	1.25E-01	G K
		968.90	1.002E+00	(P	3.519E-01	1.78E-01	G
		338.40	5.893E-01	-	3.490E-01	1.34E-01	G
TH-227	-1.5365E-01						
		236.00	-1.537E-01	%(P	5.063E-01	1.52E-01	G K
		256.25	1.073E-02	%	5.779E-01	1.69E-01	G
PA-234	1.5288E-03						
		98.44	1.529E-03	&(	2.102E-01	6.21E-02	G K
		946.00	2.783E-02	%	2.872E-01	8.08E-02	G
		131.28	2.292E-03	&	2.539E-01	7.53E-02	G
		94.67	-1.387E-01	%	4.860E-01	1.46E-01	G
		883.24	-5.787E-02	%	4.490E-01	1.27E-01	G
		926.70	1.920E-02	&	4.773E-01	1.32E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-5.264E-02 %   3.883E-01 1.11E-01 G

TH-234       4.6570E-01
                           63.29 4.657E-01 %(P 4.637E+00 1.38E+00 G K
                           92.80 1.350E+00 %   2.477E+00 7.53E-01 G
                           92.38-9.513E-02 % P 2.882E+00 8.57E-01 G

AM-241      -2.3002E-02
                           59.54-2.300E-02 &(  6.788E-01 2.02E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.3841E-01	1.4048E-01	2.9390E-01	2.9401E-01	3.206E-01
K-40		1.2771E+01	1.2771E+01	1.7438E+00	1.8853E+00	
MN-54	#A	1.7738E-03	1.7784E-03	4.8482E-02	4.8482E-02	5.761E-02
CO-57	#B	9.1766E-03	9.2036E-03	3.6592E-02	3.6596E-02	4.082E-02
CO-60	#B	2.0863E-04	2.0872E-04	4.3156E-02	4.3156E-02	5.447E-02

Sr-85	#A	-1.6307E-02	-1.6507E-02	5.2030E-02	5.2038E-02	5.771E-02
Kr-85	#A	-3.7652E+02	-3.7652E+02	1.1866E+03	1.1867E+03	1.332E+03
Y-88	#B	-5.1052E-03	-5.1434E-03	3.5373E-02	3.5374E-02	4.506E-02
NB-94	#B	7.3648E-03	7.3648E-03	3.7502E-02	3.7504E-02	4.431E-02
Ag-108M	#B	-1.4468E-02	-1.4468E-02	5.1694E-02	5.1701E-02	5.898E-02
CD-109	#A	-4.7798E-01	-4.7882E-01	1.9921E+00	1.9922E+00	2.004E+00
SN-113	#B	-1.1420E-02	-1.1499E-02	6.1865E-02	6.1869E-02	6.985E-02
SB-125	#F	1.0665E-01	1.0674E-01	1.2814E-01	1.2828E-01	1.039E-01
I-131	#B	1.7690E-03	1.9524E-03	4.4884E-02	4.4884E-02	4.710E-02
CS-134	#B	2.7677E-02	2.7706E-02	2.1511E-02	2.1567E-02	5.335E-02
CS-137	#A	8.6215E-03	8.6221E-03	4.4412E-02	4.4415E-02	5.168E-02
CE-139	#A	-1.0470E-02	-1.0530E-02	4.9157E-02	4.9161E-02	5.220E-02
EU-152	#B	-5.9464E-03	-5.9474E-03	1.8992E-01	1.8992E-01	1.366E-01
EU-154	#B	-2.2750E-04	-2.2756E-04	8.8753E+00	8.8753E+00	9.918E-02
EU-155	#B	7.2763E-02	7.2795E-02	2.3853E-01	2.3856E-01	2.644E-01
HG-203	#B	-6.9854E-05	-7.1054E-05	8.1139E-03	8.1139E-03	4.934E-02
TL-208	#	2.5169E-01	2.5169E-01	8.7016E-02	8.8155E-02	
PB-212	#	6.3161E-01	6.3161E-01	1.2904E-01	1.3382E-01	1.070E-01
PB-214	#	4.7659E-01	4.7659E-01	1.2299E-01	1.2587E-01	9.964E-02
BI-212	#	6.5424E-01	6.5424E-01	5.2614E-01	5.2741E-01	
BI-214		5.3944E-01	5.3944E-01	1.8357E-01	1.8605E-01	
RA-224	#A	9.0429E-01	9.0429E-01	1.2194E+00	1.2205E+00	1.326E+00
RA-226	#A	1.0961E+00	1.0961E+00	1.2179E+00	1.2194E+00	1.316E+00
AC-228		8.6109E-01	8.6109E-01	3.1015E-01	3.1389E-01	
TH-227	#B	-1.5365E-01	-1.5365E-01	4.6446E-01	4.6454E-01	5.063E-01
PA-234	#B	1.5288E-03	1.5288E-03	1.8638E-01	1.8638E-01	2.102E-01
TH-234	#B	4.6570E-01	4.6570E-01	4.1445E+00	4.1446E+00	4.637E+00
AM-241	#A	-2.3002E-02	-2.3002E-02	6.0451E-01	6.0451E-01	6.788E-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) 1.5077334E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.5077334E+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_29OCT2005_1428.An1

Sample description
FSS OOL-02-01-020-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_1428.An1

Acquisition information
Start time: 29-Oct-2005 14:28:42
Live time: 2000
Real time: 2018
Dead time: 0.88 %
Detector ID: 3

Detector system
Det 102 - DSPP-468

Calibration
Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration
Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.7930E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7930E+03) =
5.5772E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 10:33:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0515

***** S U M M A R Y O F P E A K 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	108.	34.64	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.12	100.	38.42	1.50	9.541E-03	77.11	10.700	PBC<MDA	PB214
					77.11	17.500	4.529E-01	PB212
77.12	100.	38.42	1.50	9.541E-03	77.11	10.700	7.408E-01	PB214
					77.11	17.500	4.529E-01	PB212
186.16	78.	28.38	1.57	1.626E-02	185.99	3.280	PBC<MDA	RA226
208.61	111.	26.98	1.08	1.522E-02				
238.84	530.	7.09	1.22	1.379E-02	238.63	43.100	6.719E-01	PB212
295.13	104.	14.28	1.25	1.146E-02	295.22	19.200	3.556E-01	PB214
300.14	45.	27.50	1.26	1.128E-02				
338.37	118.	19.32	1.35	1.006E-02	338.40	12.010	7.367E-01	AC228
351.73	201.	9.71	1.22	9.686E-03				
351.73	201.	9.71	1.22	9.686E-03	351.99	37.100	4.204E-01	PB214
510.96	82.	15.58	2.29	6.695E-03	510.72	22.500	4.128E-01	TL208
583.13	142.	12.26	1.26	5.890E-03	583.14	86.000	2.114E-01	TL208
609.37	158.	10.57	1.20	5.649E-03	609.32	46.090	4.579E-01	BI214
728.21	56.	22.18	1.54	4.788E-03	727.17	11.800	7.474E-01	BI212
911.14	102.	12.95	1.32	3.922E-03	911.07	29.000	6.770E-01	AC228
969.16	84.	16.50	1.92	3.717E-03	968.90	17.460	9.749E-01	AC228
1120.61	36.	39.69	1.49	3.283E-03	1120.28	15.040	5.525E-01	BI214
1460.64	388.	5.08	1.98	2.621E-03	1460.75	10.700	1.042E+01	K40
1764.98	16.	25.40	2.24	2.225E-03	1764.51	15.920	3.429E-01	BI214

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

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

416.83	208.61	262.	111.	0.056	80.95	1.082	LU-177	s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected
477.31	238.84	711.	105.	0.052	111.66	1.221	PB-212
600.17	300.26	67.	39.	0.020	101.18	1.480	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	149.07	74.75	686.	108.	0.054	103.91	1.500s
PB-214	153.80	77.11	693.	100.	0.050	115.27	1.500D
PB-212	153.80	77.11	693.	100.	0.050	115.27	1.500D
RA-226	371.96	186.17	239.	65.	0.033	99.63	1.500s
PB-212	477.14	238.75	292.	391.	0.196	23.93	1.500
PB-214	590.05	295.20	123.	103.	0.051	54.39	1.500
AC-228	676.42	338.37	122.	118.	0.059	57.95	1.351
PB-214	703.50	351.91	70.	167.	0.083	31.42	1.500
TL-208	1021.70	510.96	28.	82.	0.041	46.73	2.286s
TL-208	1166.10	583.13	53.	142.	0.071	36.78	1.255
BI-214	1218.60	609.37	37.	158.	0.079	31.71	1.201
BI-212	1456.37	728.21	30.	56.	0.028	66.53	1.544s
AC-228	1822.42	911.14	22.	102.	0.051	38.85	1.318
AC-228	1938.53	969.16	27.	84.	0.042	49.49	1.924
BI-214	2241.61	1120.61	45.	36.	0.018	119.07	1.486s
K-40	2922.18	1460.64	0.	388.	0.194	15.23	1.977
BI-214	3531.41	1764.98	0.	16.	0.008	76.20	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		1.6183E-01					
			477.56	1.618E-01	&(	3.048E-01 9.34E-02 G	
K-40		1.0424E+01					
			1460.75	1.042E+01	(P	1.981E-01 5.29E-01 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	-3.8072E-04						
		834.81	-3.807E-04	%(P	5.337E-02	1.47E-02	G
CO-57	1.5296E-03						
		122.07	1.530E-03	&(	3.935E-02	1.15E-02	G K
		136.43	5.225E-02	&	3.881E-01	1.15E-01	G
CO-60	4.3985E-03						
		1332.51	4.399E-03	%(P	4.919E-02	1.32E-02	G K
		1173.23	2.139E-02	&	6.147E-02	1.82E-02	G K
Sr-85	-1.2749E-02						
		514.00	-1.275E-02	%(	5.318E-02	1.57E-02	G
Kr-85	-2.9067E+02						
		513.99	-2.907E+02	%(	1.213E+03	3.57E+02	G
Y-88	-2.3349E-05						
		1836.01	-2.335E-05	%(P	2.622E-02	3.56E-03	G K
		898.02	-1.152E-02	% P	6.091E-02	1.73E-02	G
NB-94	4.3733E-03						
		871.10	4.373E-03	%(	3.984E-02	1.09E-02	G K
		702.50	0.000E+00	&	5.791E-02	1.63E-02	G K
Ag-108M	1.1663E-02						
		722.95	1.166E-02	&(	3.023E-02	8.96E-03	G K
		614.37	-1.120E-02	% P	5.323E-02	1.54E-02	G
		433.93	1.503E-02	%	3.888E-02	1.16E-02	G
CD-109	-2.0981E-02						
		88.04	-2.098E-02	%(P	2.002E+00	5.94E-01	G
SN-113	2.5256E-02						
		391.71	2.526E-02	%(	4.434E-02	1.37E-02	G K
		255.04	4.832E-01	%	1.773E+00	5.28E-01	G
SB-125	2.4282E-02						
		427.95	2.428E-02	%(P	1.265E-01	3.67E-02	G K
		600.77	-1.000E-03	% P	2.718E-01	7.65E-02	G
		636.15	1.416E-02	& P	3.554E-01	9.85E-02	G
		463.51	1.580E-01	% P	3.444E-01	1.03E-01	G
		176.29	-1.352E-01	& P	6.324E-01	1.88E-01	G
I-131	3.5036E-04						
		364.48	3.504E-04	&(	5.041E-02	1.44E-02	G K
		636.97	5.413E-02	%	5.794E-01	1.62E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		284.29	2.276E-02	%	6.626E-01	1.92E-01	G
CS-134	-4.3382E-03						
		604.66	-4.338E-03	%(	1.194E-01	3.52E-02	G K
		795.76	-2.272E-03	&	6.935E-02	1.95E-02	G
		569.29	-6.790E-03	%	2.186E-01	6.01E-02	G
		801.84	1.133E-01	& P	4.039E-01	1.16E-01	G
CS-137	1.4407E-02						
		661.62	1.441E-02	&(	5.653E-02	1.65E-02	G
CE-139	5.6733E-03						
		165.85	5.673E-03	&(P	4.906E-02	1.45E-02	G
EU-152	-1.9295E-02						
		121.78	-1.930E-02	&(P	1.461E-01	4.33E-02	G K
		344.30	3.447E-02	&	1.355E-01	4.00E-02	G
		1408.08	3.908E-02	%	2.252E-01	6.18E-02	G
		964.00	-2.225E-01	& P	5.448E-01	1.63E-01	G
		1112.07	-3.265E-02	%	4.467E-01	1.24E-01	G
		778.90	1.090E-02	% P	3.884E-01	1.08E-01	G
EU-154	2.2096E-02						
		123.10	2.210E-02	%(P	1.012E-01	3.02E-02	G K
		1274.80	1.692E-02	%	1.545E-01	4.24E-02	G
		723.30	-9.222E-02	& P	3.014E-01	8.89E-02	G
		1004.80	3.705E-04	%	2.500E-01	6.61E-02	G
EU-155	9.9998E-02						
		86.45	1.000E-01	%(P	2.424E-01	7.32E-02	G K
		105.31	9.031E-02	&	2.343E-01	7.07E-02	G
HG-203	-1.0013E-02						
		279.17	-1.001E-02	%(P	5.053E-02	1.50E-02	G K
		72.87	-1.226E-01	&	1.366E+00	4.05E-01	G
		70.83	-1.398E+00	&	3.766E+00	1.14E+00	G
		82.50	-3.134E-01	&	3.820E+00	1.14E+00	G
TL-208	2.1142E-01						
		583.14	2.114E-01	(P	5.447E-02	2.60E-02	G
		510.72	4.128E-01	+	1.380E-01	6.43E-02	G
PB-212	4.8347E-01						
		238.63	4.959E-01	(	1.043E-01	3.96E-02	G K
							Energy duplication
		77.11	4.529E-01	(	5.660E-01	1.74E-01	G
		74.81	9.578E-01	+ P	1.107E+00	3.41E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.5115E-01						
		351.99	3.504E-01	(P	8.771E-02	3.68E-02	G K
		295.22	3.525E-01	(	1.860E-01	6.39E-02	G
							Energy duplication
		77.11	7.408E-01	+	9.257E-01	2.85E-01	G
		241.92	2.111E-01	%	6.898E-01	2.07E-01	G
BI-212	7.4742E-01						
		727.17	7.474E-01	@(	3.756E-01	1.66E-01	G K
		1620.56	-1.687E-01	% P	1.967E+00	5.09E-01	G
		785.42	4.181E-01	% P	2.362E+00	6.74E-01	G
BI-214	4.8120E-01						
		609.32	4.579E-01	(	8.967E-02	4.84E-02	G K
		1764.51	3.429E-01	- P	1.568E-01	8.76E-02	G
		1120.28	5.525E-01	@(	5.174E-01	2.19E-01	G
RA-224	4.6278E-01						
		241.00	4.628E-01	%(P	1.313E+00	3.95E-01	G
RA-226	9.2462E-01						
		185.99	9.246E-01	*(P	1.056E+00	3.28E-01	G
AC-228	6.9452E-01						
		911.07	6.770E-01	(P	1.622E-01	8.79E-02	G K
		968.90	9.749E-01	+ P	3.128E-01	1.61E-01	G
		338.40	7.367E-01	(	3.379E-01	1.42E-01	G
TH-227	-1.3006E-01						
		236.00	-1.301E-01	%(P	4.353E-01	1.30E-01	G K
		256.25	1.689E-01	%	5.020E-01	1.50E-01	G
PA-234	1.1001E-01						
		98.44	1.100E-01	%(	2.421E-01	7.33E-02	G K
		946.00	-5.140E-02	%	3.026E-01	8.67E-02	G
		131.28	1.589E-03	&	2.081E-01	6.14E-02	G
		94.67	-5.119E-02	%	4.563E-01	1.36E-01	G
		883.24	-8.550E-03	&	2.867E-01	7.51E-02	G
		926.70	-3.635E-02	&	5.036E-01	1.41E-01	G
		569.26	-1.018E-02	%	3.328E-01	9.18E-02	G
TH-234	6.5997E-01						
		63.29	6.600E-01	%(P	4.493E+00	1.34E+00	G K
		92.80	1.234E+00	%	2.316E+00	7.04E-01	G
		92.38	1.665E+00	& P	2.719E+00	8.29E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	1.4190E-01						
		59.54	1.419E-01	%(	6.544E-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:
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	1.5940E-01	1.6183E-01	2.8027E-01	2.8042E-01	3.002E-01
K-40		1.0424E+01	1.0424E+01	1.5882E+00	1.6925E+00	
MN-54	#A	-3.7974E-04	-3.8072E-04	1.8796E-02	1.8796E-02	5.324E-02
CO-57	#B	1.5250E-03	1.5296E-03	3.4635E-02	3.4635E-02	3.923E-02
CO-60	#B	4.3967E-03	4.3985E-03	3.9506E-02	3.9507E-02	4.917E-02
Sr-85	#A	-1.2591E-02	-1.2749E-02	4.6998E-02	4.7003E-02	5.252E-02
Kr-85	#A	-2.9067E+02	-2.9067E+02	1.0716E+03	1.0717E+03	1.213E+03
Y-88	#B	-2.3173E-05	-2.3349E-05	1.4009E-04	1.4010E-04	2.602E-02
NB-94	#B	4.3733E-03	4.3733E-03	3.2842E-02	3.2843E-02	3.984E-02
Ag-108M	#B	1.1662E-02	1.1663E-02	2.6876E-02	2.6884E-02	3.023E-02
CD-109	#A	-2.0943E-02	-2.0981E-02	2.6872E+01	2.6872E+01	1.998E+00

SN-113	#B	2.5079E-02	2.5256E-02	4.0972E-02	4.0997E-02	4.403E-02
SB-125	#B	2.4263E-02	2.4282E-02	1.1006E-01	1.1007E-01	1.264E-01
I-131	#B	3.1692E-04	3.5036E-04	4.3231E-02	4.3231E-02	4.560E-02
CS-134	#B	-4.3335E-03	-4.3382E-03	1.0562E-01	1.0562E-01	1.193E-01
CS-137	#A	1.4406E-02	1.4407E-02	4.9547E-02	4.9554E-02	5.653E-02
CE-139	#A	5.6401E-03	5.6733E-03	4.3607E-02	4.3609E-02	4.877E-02
EU-152	#B	-1.9292E-02	-1.9295E-02	1.4948E-01	1.4949E-01	1.460E-01
EU-154	#B	2.2090E-02	2.2096E-02	9.0640E-02	9.0648E-02	1.012E-01
EU-155	#B	9.9953E-02	9.9998E-02	2.1964E-01	2.1971E-01	2.423E-01
HG-203	#B	-9.8411E-03	-1.0013E-02	4.5505E-02	4.5508E-02	4.966E-02
TL-208		2.1142E-01	2.1142E-01	7.7988E-02	7.8885E-02	
PB-212	#	4.8347E-01	4.8347E-01	1.1571E-01	1.1885E-01	1.043E-01
PB-214	#	3.5115E-01	3.5115E-01	1.1035E-01	1.1210E-01	8.771E-02
BI-212	#	7.4742E-01	7.4742E-01	4.9724E-01	4.9901E-01	
BI-214		4.8120E-01	4.8120E-01	1.5260E-01	1.5497E-01	
RA-224	#A	4.6278E-01	4.6278E-01	1.1845E+00	1.1848E+00	1.313E+00
RA-226	#A	9.2462E-01	9.2462E-01	9.8399E-01	9.8536E-01	1.056E+00
AC-228		6.9452E-01	6.9452E-01	2.4243E-01	2.4555E-01	
TH-227	#B	-1.3006E-01	-1.3006E-01	3.9981E-01	3.9988E-01	4.353E-01
PA-234	#B	1.1001E-01	1.1001E-01	2.1998E-01	2.2006E-01	2.421E-01
TH-234	#B	6.5997E-01	6.5997E-01	4.0213E+00	4.0214E+00	4.493E+00
AM-241	#A	1.4190E-01	1.4190E-01	5.8753E-01	5.8758E-01	6.544E-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) 1.2558706E+01 pCi/gm
Total Decayed Activity (50.2 to 1999.0 keV) 1.2558706E+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_29OCT2005_1504.An1

Sample description
FSS OOL-02-01-018-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_1504.An1

Acquisition information
Start time: 29-Oct-2005 15:04:23
Live time: 2000
Real time: 2022
Dead time: 1.09 %
Detector ID: 3

Detector system
Det 102 - DSPP-468

Calibration
Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration
Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 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	28-Oct-2005 12:57:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1263

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.02	193.	22.95	1.50	9.541E-03	77.11	17.500	7.278E-01	PB212
					77.11	10.700	1.190E+00	PB214
77.02	193.	22.95	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.190E+00	PB214
186.11	102.	33.19	0.72	1.626E-02	185.99	3.280	1.149E+00	RA226
238.70	599.	4.98	1.21	1.380E-02	238.63	43.100	6.350E-01	PB212
242.23	80.	25.30	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	4.974E-01	PB214
269.91	51.	40.42	1.60	1.244E-02				
295.28	151.	11.99	1.25	1.146E-02	295.22	19.200	4.328E-01	PB214
300.45	42.	36.60	1.26	1.128E-02				
328.35	38.	37.22	1.46	1.036E-02				
338.15	132.	24.62	1.42	1.007E-02	338.40	12.010	6.906E-01	AC228
351.73	281.	9.22	1.50	9.686E-03				
351.73	281.	9.22	1.50	9.686E-03	351.99	37.100	4.933E-01	PB214
510.62	111.	16.30	1.92	6.696E-03	510.72	22.500	4.638E-01	TL208
583.06	188.	12.14	1.29	5.891E-03	583.14	86.000	2.338E-01	TL208
609.41	169.	11.95	1.46	5.649E-03	609.32	46.090	4.102E-01	BI214
727.40	68.	25.56	1.67	4.793E-03	727.17	11.800	7.587E-01	BI212
911.25	141.	12.36	1.32	3.921E-03	911.07	29.000	7.790E-01	AC228
968.19	79.	22.11	1.64	3.720E-03	968.90	17.460	7.678E-01	AC228
1460.71	627.	4.03	2.19	2.621E-03	1460.75	10.700	1.411E+01	K40
1764.42	20.	27.88	0.80	2.225E-03	1764.51	15.920	3.566E-01	BI214

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

Peak Centroid	Background	Net Area	Intensity	Uncert	FWHM	Suspected

Channel	Energy	Counts	Counts	Cts/Sec	3 Sigma %	keV	Nuclide	
477.03	238.66	145.	599.	0.299	14.94	1.215	PB-212	D

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
484.09	242.18	167.	80.	0.040	75.91	1.217	PB-214	D
539.46	269.91	161.	51.	0.025	121.25	1.599	AC-228	s
600.62	300.48	141.	52.	0.026	114.96	0.956	PB-212	s
656.37	328.35	81.	38.	0.019	111.65	1.461	RH-106M	s
1454.76	727.40	96.	37.	0.019	121.38	1.665	J-132	s

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	153.80	77.11	880.	193.	0.096	68.84	1.500D
PB-214	153.80	77.11	880.	193.	0.096	68.84	1.500D
RA-226	371.83	186.11	403.	97.	0.049	99.58	0.718s
PB-212	477.06	238.72	397.	522.	0.261	20.84	1.500
PB-214	590.25	295.30	177.	148.	0.074	45.36	1.500
AC-228	675.98	338.15	238.	132.	0.066	73.87	1.415
PB-214	703.64	351.98	126.	249.	0.124	26.97	1.500s
TL-208	1021.01	510.62	69.	111.	0.055	48.90	1.922s
TL-208	1165.95	583.06	95.	188.	0.094	36.41	1.293
BI-214	1218.67	609.41	75.	169.	0.085	35.84	1.459
AC-228	1822.63	911.25	39.	140.	0.070	37.07	1.316
AC-228	1936.59	968.19	58.	79.	0.039	66.34	1.636
K-40	2922.33	1460.71	3.	627.	0.313	12.09	2.188
BI-214	3530.30	1764.42	3.	20.	0.010	83.65	0.802s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-6.6703E-02					
			477.56	-6.670E-02	%(	3.897E-01	1.14E-01 G
K-40		1.4109E+01					
			1460.75	1.411E+01	(P	2.472E-01	5.69E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	-1.1352E-03						
		834.81	-1.135E-03	&(P	4.401E-02	1.21E-02	G
CO-57	-1.1095E-02						
		122.07	-1.110E-02	%(	5.572E-02	1.67E-02	G K
		136.43	3.465E-03	&	3.396E-01	1.00E-01	G
CO-60	3.8406E-03						
		1332.51	3.841E-03	&(P	5.167E-02	1.41E-02	G K
		1173.23	3.291E-02	%	6.105E-02	1.87E-02	G K
Sr-85	-1.8017E-02						
		514.00	-1.802E-02	%(	5.088E-02	1.52E-02	G
Kr-85	-4.2033E+02						
		513.99	-4.203E+02	%(	1.167E+03	3.49E+02	G
Y-88	6.1669E-03						
		1836.01	6.167E-03	%(P	3.146E-02	8.29E-03	G K
		898.02	1.104E-02	% P	5.054E-02	1.45E-02	G
NB-94	6.0465E-03						
		871.10	6.047E-03	&(	4.605E-02	1.31E-02	G K
		702.50	-8.077E-04	&	3.697E-02	1.02E-02	G K
Ag-108M	-2.3553E-03						
		722.95	-2.355E-03	&(	6.329E-02	1.81E-02	G K
		614.37	-1.479E-02	& P	5.387E-02	1.59E-02	G
		433.93	-6.100E-03	%	3.869E-02	1.13E-02	G
CD-109	9.7270E-01						
		88.04	9.727E-01	&(P	1.896E+00	5.76E-01	G
SN-113	8.4844E-03						
		391.71	8.484E-03	%(	5.627E-02	1.64E-02	G K
		255.04	1.995E-01	&	1.728E+00	5.10E-01	G
SB-125	-1.4828E-02						
		427.95	-1.483E-02	%(P	1.274E-01	3.67E-02	G K
		600.77	-4.872E-03	& P	2.391E-01	6.77E-02	G
		636.15	-1.637E-02	& P	3.410E-01	9.57E-02	G
		463.51	2.339E-01	% P	3.608E-01	1.11E-01	G
		176.29	-1.796E-01	% P	6.092E-01	1.82E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	%(	5.261E-02	1.52E-02	G K
		636.97	-9.705E-02	&	6.281E-01	1.81E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		284.29	3.505E-02	%	5.502E-01	1.60E-01	G
CS-134	-2.7150E-04						
		604.66	-2.715E-04	%(	4.917E-02	1.40E-02	G K
		795.76	3.497E-02	%	4.729E-02	1.51E-02	G
		569.29	5.836E-02	%	1.806E-01	5.31E-02	G
		801.84	-1.960E-02	& P	4.953E-01	1.38E-01	G
CS-137	2.1700E-02						
		661.62	2.170E-02	%(	4.921E-02	1.48E-02	G
CE-139	-3.7468E-03						
		165.85	-3.747E-03	%(P	5.115E-02	1.52E-02	G
EU-152	-3.7927E-02						
		121.78	-3.793E-02	%(P	1.645E-01	4.93E-02	G K
		344.30	1.490E-02	%	1.307E-01	3.82E-02	G
		1408.08	-2.772E-02	&	2.716E-01	7.54E-02	G
		964.00	8.684E-04	& P	4.339E-01	1.22E-01	G
		1112.07	-1.077E-02	&	4.111E-01	1.14E-01	G
		778.90	2.612E-02	% P	2.847E-01	7.93E-02	G
EU-154	-2.0623E-02						
		123.10	-2.062E-02	%(P	1.102E-01	3.30E-02	G K
		1274.80	-2.356E-02	%	1.789E-01	5.08E-02	G
		723.30	2.868E-03	& P	3.188E-01	9.13E-02	G
		1004.80	-6.602E-02	%	3.284E-01	9.50E-02	G
EU-155	1.1277E-01						
		86.45	1.128E-01	%(P	2.299E-01	6.97E-02	G K
		105.31	9.960E-02	%	2.351E-01	7.11E-02	G
HG-203	-9.7200E-03						
		279.17	-9.720E-03	%(P	4.807E-02	1.43E-02	G K
		72.87	-1.170E-01	&	1.714E+00	5.12E-01	G
		70.83	-9.387E-01	%	3.468E+00	1.04E+00	G
		82.50	-8.387E-01	%	3.452E+00	1.04E+00	G
TL-208	2.3375E-01						
		583.14	2.338E-01	(P	6.009E-02	2.84E-02	G
		510.72	4.638E-01	+	1.739E-01	7.56E-02	G
PB-212	5.5395E-01						
		238.63	5.540E-01	(	1.013E-01	3.85E-02	G K
							Energy duplication
		77.11	7.278E-01	+	5.327E-01	1.67E-01	G
		74.81	6.691E-01	& P	1.108E+00	3.37E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	4.3301E-01						
		351.99	4.370E-01	@(P	9.685E-02	3.93E-02	G K
		295.22	4.252E-01	(	1.857E-01	6.43E-02	G
							Energy duplication
		77.11	1.190E+00	+	8.712E-01	2.73E-01	G
		241.92	2.382E-01	%	6.676E-01	2.01E-01	G
BI-212	3.4175E-01						
		727.17	3.418E-01	%(	4.577E-01	1.44E-01	G K
		1620.56	2.415E-01	& P	1.411E+00	3.77E-01	G
		785.42	1.194E+00	% P	2.236E+00	6.85E-01	G
BI-214	3.9640E-01						
		609.32	4.102E-01	(	1.043E-01	4.90E-02	G K
		1764.51	3.566E-01	(P	1.918E-01	9.99E-02	G
		1120.28	1.873E-01	%	4.212E-01	1.27E-01	G
RA-224	6.2889E-01						
		241.00	6.289E-01	%(P	1.252E+00	3.80E-01	G
RA-226	1.1492E+00						
		185.99	1.149E+00	@(P	1.139E+00	3.99E-01	G
AC-228	7.5750E-01						
		911.07	7.790E-01	(P	1.758E-01	9.64E-02	G K
		968.90	7.678E-01	(P	3.715E-01	1.70E-01	G
		338.40	6.906E-01	(	3.896E-01	1.70E-01	G
TH-227	-1.4300E-01						
		236.00	-1.430E-01	%(P	4.654E-01	1.40E-01	G K
		256.25	-2.727E-02	&	5.559E-01	1.63E-01	G
PA-234	8.2102E-02						
		98.44	8.210E-02	%(	2.342E-01	7.06E-02	G K
		946.00	2.073E-03	%	2.432E-01	6.71E-02	G
		131.28	-5.679E-02	%	2.309E-01	6.93E-02	G
		94.67	-1.499E-02	%	4.107E-01	1.22E-01	G
		883.24	-6.356E-02	%	3.928E-01	1.12E-01	G
		926.70	-7.301E-02	%	4.656E-01	1.33E-01	G
		569.26	8.649E-02	%	2.676E-01	7.87E-02	G
TH-234	-7.5147E-02						
		63.29	-7.515E-02	%(P	3.906E+00	1.16E+00	G K
		92.80	1.344E+00	%	2.223E+00	6.78E-01	G
		92.38	7.689E-02	& P	2.685E+00	8.00E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	1.6648E-01						
		59.54	1.665E-01	%(	5.935E-01	1.78E-01	G

(- This peak used in the nuclide activity average.

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

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-6.5767E-02	-6.6703E-02	3.4111E-01	3.4113E-01	3.843E-01
K-40		1.4109E+01	1.4109E+01	1.7069E+00	1.8816E+00	
MN-54	#A	-1.1325E-03	-1.1352E-03	6.4845E-02	6.4845E-02	4.390E-02
CO-57	#B	-1.1064E-02	-1.1095E-02	5.0085E-02	5.0089E-02	5.556E-02
CO-60	#B	3.8391E-03	3.8406E-03	4.2420E-02	4.2421E-02	5.165E-02
Sr-85	#A	-1.7809E-02	-1.8017E-02	4.5687E-02	4.5698E-02	5.029E-02
Kr-85	#A	-4.2032E+02	-4.2033E+02	1.0482E+03	1.0485E+03	1.167E+03
Y-88	#B	6.1234E-03	6.1669E-03	2.4862E-02	2.4864E-02	3.123E-02
NB-94	#B	6.0465E-03	6.0465E-03	3.9201E-02	3.9202E-02	4.605E-02
Ag-108M	#B	-2.3552E-03	-2.3553E-03	5.4334E-02	5.4334E-02	6.329E-02
CD-109	#A	9.7108E-01	9.7270E-01	1.7267E+00	1.7275E+00	1.893E+00

SN-113	#B	8.4289E-03	8.4844E-03	4.9313E-02	4.9316E-02	5.590E-02
SB-125	#B	-1.4817E-02	-1.4828E-02	1.5864E-01	1.5864E-01	1.273E-01
I-131	#B	0.0000E+00	0.0000E+00	4.5651E-02	4.5651E-02	4.790E-02
CS-134	#B	-2.7123E-04	-2.7150E-04	4.1991E-02	4.1991E-02	4.912E-02
CS-137	#A	2.1699E-02	2.1700E-02	4.4528E-02	4.4544E-02	4.920E-02
CE-139	#A	-3.7263E-03	-3.7468E-03	5.0805E-02	5.0806E-02	5.087E-02
EU-152	#B	-3.7920E-02	-3.7927E-02	1.5698E-01	1.5700E-01	1.644E-01
EU-154	#B	-2.0618E-02	-2.0623E-02	1.0070E-01	1.0070E-01	1.101E-01
EU-155	#B	1.1272E-01	1.1277E-01	2.0908E-01	2.0917E-01	2.298E-01
HG-203	#B	-9.5638E-03	-9.7200E-03	4.3347E-02	4.3351E-02	4.729E-02
TL-208		2.3375E-01	2.3375E-01	8.5285E-02	8.6288E-02	
PB-212	#	5.5395E-01	5.5395E-01	1.1544E-01	1.1955E-01	1.013E-01
PB-214	#	4.3301E-01	4.3301E-01	1.1430E-01	1.1685E-01	9.685E-02
BI-212	#B	3.4175E-01	3.4175E-01	4.3105E-01	4.3148E-01	4.577E-01
BI-214		3.9640E-01	3.9640E-01	1.4206E-01	1.4379E-01	
RA-224	#A	6.2889E-01	6.2889E-01	1.1393E+00	1.1399E+00	1.252E+00
RA-226	#	1.1492E+00	1.1492E+00	1.1969E+00	1.1987E+00	
AC-228		7.5750E-01	7.5750E-01	2.6771E-01	2.7106E-01	
TH-227	#B	-1.4300E-01	-1.4300E-01	4.2662E-01	4.2670E-01	4.654E-01
PA-234	#B	8.2102E-02	8.2102E-02	2.1194E-01	2.1199E-01	2.342E-01
TH-234	#B	-7.5147E-02	-7.5147E-02	4.6792E+00	4.6792E+00	3.906E+00
AM-241	#A	1.6648E-01	1.6648E-01	5.3504E-01	5.3512E-01	5.935E-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) 1.6646072E+01 pCi/gm
Total Decayed Activity (269.7 to 1999.0 keV) 1.6646074E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS OOL-02-01-006-F RECOUNT

Spectrum Filename: C:\GammaVision\Spectra\102F_29OCT2005_1540.An1

Acquisition information

Start time:	29-Oct-2005 15:41:02
Live time:	2000
Real time:	2022
Dead time:	1.11 %
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:	1.9080E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.9080E+03) = 5.2411E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 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. 10 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0895

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.14	201.	22.29	1.50	9.541E-03	77.11	17.500	8.536E-01	PB212
					77.11	10.700	1.396E+00	PB214
77.14	201.	22.29	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.396E+00	PB214
238.69	666.	4.64	1.21	1.381E-02				
238.69	666.	4.64	1.21	1.381E-02	238.63	43.100	7.926E-01	PB212
240.89	92.	39.45	1.22	1.371E-02				
240.89	92.	39.45	1.22	1.371E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.376E-01	PB214
270.44	60.	33.34	1.32	1.242E-02				
276.89	58.	34.87	1.16	1.216E-02				
295.31	145.	11.87	1.25	1.147E-02				
295.31	145.	11.87	1.25	1.147E-02	295.22	19.200	4.672E-01	PB214
299.98	53.	28.41	1.26	1.130E-02				
338.44	131.	13.42	1.25	1.006E-02	338.40	12.010	7.679E-01	AC228
352.03	207.	12.44	1.63	9.678E-03	351.99	37.100	4.075E-01	PB214
462.15	53.	24.46	1.78	7.386E-03				
462.15	53.	24.46	1.78	7.386E-03	463.51	10.000	4.981E-01	SB125
510.71	108.	14.13	1.61	6.695E-03	510.72	22.500	5.078E-01	TL208
583.08	238.	9.56	1.54	5.891E-03	583.14	86.000	3.322E-01	TL208
609.29	178.	9.66	1.35	5.650E-03	604.66	97.600	2.266E-01	CS134
					609.32	46.090	4.828E-01	BI214
661.43	27.	37.77	1.51	5.229E-03	661.62	84.620	PBC<MDA	CS137
727.35	62.	23.63	1.74	4.793E-03	727.17	11.800	7.812E-01	BI212
911.33	151.	11.56	2.01	3.921E-03	911.07	29.000	9.414E-01	AC228
968.38	96.	17.72	1.36	3.720E-03	968.90	17.460	1.043E+00	AC228
1120.02	42.	32.09	2.05	3.283E-03	1120.28	15.040	5.967E-01	BI214

1460.79	560.	4.37	1.84	2.621E-03	1460.75	10.700	1.413E+01	K40
1764.35	30.	20.37	1.70	2.225E-03	1764.51	15.920	5.940E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
477.01	238.54	144.	666.	0.333	13.91	1.215	PB-212	D
481.40	240.74	610.	92.	0.046	118.36	1.216	RA-224	D
540.52	270.44	152.	60.	0.030	100.02	1.319	AC-228	s
553.44	276.89	144.	66.	0.033	85.18	1.157	TL-208	s
599.25	299.80	102.	63.	0.031	77.84	0.731	TH-227	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	905.	201.	0.101	66.87	1.500D
PB-214	153.80	77.11	905.	201.	0.101	66.87	1.500D
PB-212	476.96	238.67	361.	582.	0.291	18.61	1.500
PB-214	590.02	295.18	144.	141.	0.071	44.00	1.500
AC-228	676.55	338.44	89.	131.	0.065	40.26	1.254
PB-214	703.77	352.04	115.	197.	0.098	31.37	1.500s
SB-125	925.01	462.63	63.	39.	0.019	95.34	1.500s
TL-208	1021.21	510.71	48.	108.	0.054	42.38	1.606s
TL-208	1165.99	583.08	80.	238.	0.119	28.69	1.537s
BI-214	1218.44	609.29	46.	178.	0.089	28.97	1.350
CS-137	1322.75	661.43	39.	27.	0.014	113.31	1.509
BI-212	1454.16	727.10	47.	35.	0.018	97.28	1.554
AC-228	1822.79	911.33	46.	151.	0.076	34.69	2.005s
AC-228	1936.96	968.38	50.	96.	0.048	53.17	1.359
BI-214	2240.44	1120.02	41.	42.	0.021	96.27	2.046s
K-40	2922.49	1460.79	11.	559.	0.280	13.10	1.843
BI-214	3530.15	1764.35	2.	30.	0.015	61.10	1.700

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

***** S U M M A R Y O 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		2.7218E-02					
			477.56	2.722E-02	&(	3.945E-01 1.13E-01	G
K-40		1.4130E+01					
			1460.75	1.413E+01	(P	4.508E-01 6.17E-01	G
MN-54		-6.9691E-03					
			834.81	-6.969E-03	%(P	5.847E-02 1.67E-02	G
CO-57		-1.3022E-02					
			122.07	-1.302E-02	%(	6.087E-02 1.82E-02	G K
			136.43	-2.853E-02	&	4.543E-01 1.35E-01	G
CO-60		3.0054E-02					
			1332.51	3.005E-02	&(P	5.932E-02 1.81E-02	G K
			1173.23	2.056E-02	%	8.240E-02 2.41E-02	G K
Sr-85		-2.5329E-02					
			514.00	-2.533E-02	%(	5.743E-02 1.73E-02	G
Kr-85		-5.7666E+02					
			513.99	-5.767E+02	%(	1.307E+03 3.95E+02	G
Y-88		-2.1961E-05					
			1836.01	-2.196E-05	%(P	2.466E-02 3.35E-03	G K
			898.02	-7.686E-03	% P	6.438E-02 1.82E-02	G
NB-94		3.9584E-04					
			871.10	3.958E-04	%(	5.612E-02 1.56E-02	G K
			702.50	6.922E-03	&	4.953E-02 1.42E-02	G K
Ag-108M		-1.8143E-02					
			722.95	-1.814E-02	%(	6.535E-02 1.93E-02	G K
			614.37	-6.686E-03	& P	5.023E-02 1.44E-02	G
			433.93	-1.306E-04	%	3.712E-02 1.04E-02	G
CD-109		-5.4804E-02					
			88.04	-5.480E-02	%(P	2.302E+00 6.86E-01	G
SN-113		2.2547E-02					
			391.71	2.255E-02	%(	5.911E-02 1.77E-02	G K
			255.04	5.234E-01	%	1.871E+00 5.59E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.2937E-02						
		427.95	-1.055E-03	%(P	1.443E-01	4.12E-02	G K
		600.77	1.105E-01	% P	2.314E-01	7.01E-02	G
		636.15	-8.113E-02	& P	4.532E-01	1.31E-01	G
		463.51	3.712E-01	*(P	3.813E-01	1.23E-01	G
		176.29	-1.313E-01	& P	7.450E-01	2.22E-01	G
I-131	2.6831E-02						
		364.48	2.683E-02	%(	4.665E-02	1.43E-02	G K
		636.97	-9.616E-02	%	7.197E-01	2.07E-01	G
		284.29	1.211E-01	&	7.758E-01	2.29E-01	G
CS-134	-4.2256E-03						
		604.66	-4.226E-03	&(	4.670E-02	1.33E-02	G K
		795.76	0.000E+00	%	5.906E-02	1.64E-02	G
		569.29	-3.814E-02	&	3.042E-01	8.77E-02	G
		801.84	6.206E-02	% P	5.912E-01	1.68E-01	G
CS-137	4.3368E-02						
		661.62	4.337E-02	(	5.081E-02	1.64E-02	G
CE-139	1.5843E-02						
		165.85	1.584E-02	%(P	5.176E-02	1.55E-02	G
EU-152	-3.9122E-02						
		121.78	-3.912E-02	%(P	1.782E-01	5.34E-02	G K
		344.30	0.000E+00	&	1.678E-01	4.87E-02	G
		1408.08	0.000E+00	%	9.103E-02	1.24E-02	G
		964.00	9.870E-03	& P	6.329E-01	1.82E-01	G
		1112.07	-1.999E-03	&	4.913E-01	1.36E-01	G
		778.90	-3.509E-03	% P	3.352E-01	9.18E-02	G
EU-154	-3.4564E-02						
		123.10	-3.456E-02	&(P	1.189E-01	3.57E-02	G K
		1274.80	5.031E-02	%	1.915E-01	5.57E-02	G
		723.30	-8.421E-02	% P	2.972E-01	8.75E-02	G
		1004.80	0.000E+00	&	3.726E-01	1.04E-01	G
EU-155	2.0579E-02						
		86.45	2.058E-02	%(P	2.399E-01	7.15E-02	G K
		105.31	-7.180E-03	&	2.620E-01	7.79E-02	G
HG-203	-8.3428E-03						
		279.17	-8.343E-03	&(P	5.484E-02	1.62E-02	G K
		72.87	-3.476E-01	%	2.153E+00	6.46E-01	G
		70.83	-2.255E+00	%	3.770E+00	1.15E+00	G
		82.50	3.113E-02	%	4.396E+00	1.31E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.3221E-01						
		583.14	3.322E-01	@(P	6.222E-02	3.18E-02	G
		510.72	5.078E-01	+	1.645E-01	7.17E-02	G
PB-212	6.9248E-01						
		238.63	6.925E-01	(	1.086E-01	4.30E-02	G K
							Energy duplication
		77.11	8.536E-01	+	6.063E-01	1.90E-01	G
		74.81	8.939E-01	% P	1.272E+00	3.89E-01	G
PB-214	4.1108E-01						
		351.99	3.884E-01	(P	1.037E-01	4.07E-02	G K
		295.22	4.549E-01	(	1.888E-01	6.67E-02	G
							Energy duplication
		77.11	1.396E+00	+	9.915E-01	3.11E-01	G
		241.92	3.216E-01	%	7.469E-01	2.26E-01	G
BI-212	4.3964E-01						
		727.17	4.396E-01	(	4.351E-01	1.43E-01	G K
		1620.56	1.447E-01	% P	1.880E+00	4.94E-01	G
		785.42	1.275E+00	% P	2.284E+00	7.04E-01	G
BI-214	5.2803E-01						
		609.32	4.828E-01	(	9.381E-02	4.66E-02	G K
		1764.51	5.940E-01	(P	1.951E-01	1.21E-01	G
		1120.28	5.967E-01	(	4.689E-01	1.91E-01	G
RA-224	9.6452E-01						
		241.00	9.645E-01	%(P	1.395E+00	4.27E-01	G
RA-226	8.1735E-01						
		185.99	8.173E-01	%(P	1.351E+00	4.12E-01	G
AC-228	9.7944E-01						
		911.07	9.414E-01	@(P	2.133E-01	1.09E-01	G K
		968.90	1.043E+00	(P	3.906E-01	1.85E-01	G
		338.40	7.679E-01	-	2.736E-01	1.03E-01	G
TH-227	-2.3285E-01						
		236.00	-2.328E-01	%(P	5.083E-01	1.54E-01	G K
		256.25	-5.956E-02	&	6.428E-01	1.90E-01	G
PA-234	-8.1369E-02						
		98.44	-8.137E-02	&(	2.486E-01	7.49E-02	G K
		946.00	1.055E-01	%	2.534E-01	7.60E-02	G
		131.28	-3.324E-02	&	2.566E-01	7.66E-02	G
		94.67	-1.253E-01	%	4.849E-01	1.46E-01	G
		883.24	1.909E-02	%	3.436E-01	9.37E-02	G
		926.70	-1.396E-03	%	4.219E-01	1.14E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.670E-02 &   4.387E-01 1.25E-01 G

TH-234       8.3130E-01
                           63.29 8.313E-01 %(P 4.846E+00 1.45E+00 G K
                           92.80-1.131E-01 %   2.635E+00 7.86E-01 G
                           92.38 1.936E-01 % P 2.726E+00 8.12E-01 G

AM-241      -8.9739E-02
                           59.54-8.974E-02 &(  7.186E-01 2.15E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	2.6762E-02	2.7218E-02	3.3855E-01	3.3855E-01	3.878E-01
K-40		1.4130E+01	1.4130E+01	1.8514E+00	2.0141E+00	
MN-54	#A	-6.9490E-03	-6.9691E-03	5.5408E-02	5.5409E-02	5.830E-02
CO-57	#B	-1.2979E-02	-1.3022E-02	5.4736E-02	5.4740E-02	6.067E-02
CO-60	#B	3.0040E-02	3.0054E-02	5.4407E-02	5.4434E-02	5.929E-02

Sr-85	#A	-2.4978E-02	-2.5329E-02	5.2039E-02	5.2059E-02	5.663E-02
Kr-85	#A	-5.7666E+02	-5.7666E+02	1.1848E+03	1.1852E+03	1.307E+03
Y-88	#B	-2.1776E-05	-2.1961E-05	1.3177E-04	1.3177E-04	2.445E-02
NB-94	#B	3.9584E-04	3.9584E-04	4.6879E-02	4.6879E-02	5.612E-02
Ag-108M	#B	-1.8143E-02	-1.8143E-02	5.7831E-02	5.7840E-02	6.535E-02
CD-109	#A	-5.4695E-02	-5.4804E-02	4.9301E+00	4.9301E+00	2.298E+00
SN-113	#B	2.2371E-02	2.2547E-02	5.3164E-02	5.3179E-02	5.865E-02
SB-125	#B	9.2854E-02	9.2937E-02	9.2164E-02	9.2311E-02	1.442E-01
I-131	#B	2.3981E-02	2.6831E-02	4.2941E-02	4.2967E-02	4.170E-02
CS-134	#B	-4.2206E-03	-4.2256E-03	3.9982E-02	3.9983E-02	4.665E-02
CS-137	#A	4.3364E-02	4.3368E-02	4.9141E-02	4.9202E-02	5.081E-02
CE-139	#A	1.5739E-02	1.5843E-02	4.6624E-02	4.6632E-02	5.142E-02
EU-152	#B	-3.9114E-02	-3.9122E-02	1.7077E-01	1.7078E-01	1.781E-01
EU-154	#B	-3.4554E-02	-3.4564E-02	1.0855E-01	1.0857E-01	1.189E-01
EU-155	#B	2.0569E-02	2.0579E-02	2.1446E-01	2.1446E-01	2.398E-01
HG-203	#B	-8.1827E-03	-8.3428E-03	4.9473E-02	4.9475E-02	5.379E-02
TL-208	#	3.3221E-01	3.3221E-01	9.5469E-02	9.7273E-02	
PB-212	#	6.9248E-01	6.9248E-01	1.2890E-01	1.3463E-01	1.086E-01
PB-214	#	4.1108E-01	4.1108E-01	1.1115E-01	1.1352E-01	1.037E-01
BI-212	#	4.3964E-01	4.3964E-01	4.2768E-01	4.2839E-01	4.351E-01
BI-214		5.2803E-01	5.2803E-01	1.5296E-01	1.5580E-01	
RA-224	#A	9.6452E-01	9.6452E-01	1.2825E+00	1.2836E+00	1.395E+00
RA-226	#A	8.1735E-01	8.1735E-01	1.2345E+00	1.2354E+00	1.351E+00
AC-228		9.7944E-01	9.7944E-01	3.1113E-01	3.1595E-01	
TH-227	#B	-2.3285E-01	-2.3285E-01	4.6701E-01	4.6719E-01	5.083E-01
PA-234	#B	-8.1369E-02	-8.1369E-02	2.2474E-01	2.2478E-01	2.486E-01
TH-234	#B	8.3130E-01	8.3130E-01	4.3515E+00	4.3518E+00	4.846E+00
AM-241	#A	-8.9739E-02	-8.9739E-02	6.4393E-01	6.4395E-01	7.186E-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 (270.2 to 1999.0 keV) 1.5969603E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.5969603E+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_1NOV2005_0754.An1

Sample description
FSS-OOL-02-01-027-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1NOV2005_0754.An1

Acquisition information
Start time: 01-Nov-2005 07:56:16
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: 1.7110E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7110E+03) =
5.8445E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Oct-2005 15:24:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5312

***** S U M M A R Y O F P E A K 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	99.	23.69	0.99	9.052E-03	74.81	9.600	8.959E-01	PB212
77.05	134.	13.97	0.99	1.011E-02	77.11	17.500	6.104E-01	PB212
86.90	99.	38.52	1.50	1.410E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	1.412E+00	CD109
93.01	104.	31.73	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
93.02	121.	27.67	1.50	1.708E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	3.612E-01	PA234
93.06	91.	35.69	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
129.63	77.	36.29	1.14	2.443E-02				
185.77	104.	32.47	1.34	2.567E-02				
185.77	104.	32.47	1.34	2.567E-02	185.99	3.280	PBC<MDA	RA226
209.08	80.	32.42	1.43	2.472E-02				
238.54	788.	4.19	1.09	2.320E-02	238.63	43.100	6.131E-01	PB212
241.26	117.	20.68	1.09	2.306E-02	241.00	3.900	1.031E+00	RA224
270.14	62.	34.81	1.07	2.152E-02				
276.13	64.	34.88	0.81	2.121E-02				
294.78	212.	11.56	1.01	2.027E-02	295.22	19.200	4.225E-01	PB214
338.05	179.	12.61	0.88	1.832E-02	338.40	12.010	6.386E-01	AC228
351.51	346.	7.49	1.17	1.777E-02	351.99	37.100	4.087E-01	PB214
462.98	61.	29.40	1.21	1.426E-02				
462.98	61.	29.40	1.21	1.426E-02	463.51	10.000	3.323E-01	SB125
510.20	127.	18.84	1.18	1.318E-02	510.72	22.500	2.682E-01	TL208

582.39	288.	7.54	1.22	1.186E-02	583.14	86.000	2.200E-01	TL208
608.70	302.	7.29	1.45	1.145E-02	609.32	46.090	4.435E-01	BI214
726.71	74.	28.21	0.75	9.970E-03	727.17	11.800	4.924E-01	BI212
793.87	58.	30.48	1.16	9.318E-03				
910.31	203.	10.28	1.53	8.407E-03	911.07	29.000	6.485E-01	AC228
967.68	141.	14.21	1.50	8.033E-03	968.90	17.460	7.950E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1118.89	66.	28.49	1.32	7.218E-03	1120.28	15.040	4.632E-01	BI214
1459.23	854.	3.53	1.96	5.937E-03	1460.75	10.700	1.040E+01	K40

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
258.43	129.63	337.	92.	0.046	90.09	1.139	AC-228	s
417.31	209.08	284.	80.	0.040	97.27	1.425	AC-228	s
539.43	270.14	185.	62.	0.031	104.43	1.074	AC-228	s
1586.79	793.87	64.	61.	0.031	67.11	1.155	PA-234	
3523.84	1762.54	0.	62.	0.031	38.10	1.105	BI-214	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	242.	99.	0.049	71.08	0.993D
PB-212	153.39	77.11	242.	134.	0.067	41.90	0.995A
EU-155	172.96	86.90	682.	99.	0.050	115.55	1.500s
TH-234	185.20	93.01	701.	104.	0.052	95.18	1.500
PA-234	185.22	93.02	504.	121.	0.061	83.00	1.500s
RA-226	370.92	185.88	528.	98.	0.049	91.22	1.500s
PB-212	476.34	238.59	518.	773.	0.387	17.93	0.984
RA-224	481.98	241.41	545.	109.	0.054	95.51	1.500
PB-214	588.71	294.78	173.	208.	0.104	34.68	1.013s
AC-228	675.24	338.05	138.	178.	0.089	37.82	0.884s
PB-214	702.16	351.51	136.	341.	0.170	22.46	1.168
SB-125	924.09	462.48	81.	50.	0.025	85.06	1.500s
TL-208	1019.51	510.20	162.	101.	0.050	56.52	1.181s
TL-208	1163.88	582.39	72.	284.	0.142	22.62	1.216s
BI-214	1216.50	608.70	80.	296.	0.148	21.87	1.452
BI-212	1452.50	726.71	98.	73.	0.037	84.63	0.755s
AC-228	1819.64	910.31	65.	200.	0.100	30.85	1.525s
AC-228	1934.37	967.68	77.	141.	0.071	42.62	1.505
BI-214	2236.75	1118.89	74.	64.	0.032	85.47	1.323
K-40	2917.32	1459.23	34.	836.	0.418	10.60	1.957

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

***** S U M M A R Y O 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		1.6855E-01					
			477.56	1.686E-01	%(	2.630E-01 8.13E-02	G
K-40		1.0399E+01					
			1460.75	1.040E+01	(P	3.734E-01 3.75E-01	G
MN-54		1.5335E-02					
			834.81	1.534E-02	%(P	3.191E-02 9.67E-03	G
CO-57		-3.0992E-04					
			122.07	-3.099E-04	&(P	4.403E-02 1.30E-02	G K
			136.43	1.892E-02	%	3.625E-01 1.08E-01	G
CO-60		-5.9364E-03					
			1332.51	-5.936E-03	&(P	3.663E-02 9.84E-03	G K
			1173.23	-3.404E-04	& P	4.069E-02 1.13E-02	G K
Sr-85		-1.1215E-02					
			514.00	-1.121E-02	%(	4.011E-02 1.20E-02	G
Kr-85		-2.5183E+02					
			513.99	-2.518E+02	%(	8.999E+02 2.68E+02	G
Y-88		8.5876E-04					
			1836.01	8.588E-04	&(P	2.530E-02 6.44E-03	G K
			898.02	-1.119E-04	& P	3.308E-02 9.17E-03	G
NB-94		1.3273E-04					
			871.10	1.327E-04	&(	3.109E-02 8.70E-03	G K
			702.50	-5.374E-03	%	3.706E-02 1.08E-02	G K
Ag-108M		-1.1317E-03					
			722.95	-1.132E-03	%(	2.813E-02 7.88E-03	G K
			614.37	8.411E-03	% P	3.072E-02 9.05E-03	G
			433.93	7.190E-03	%	2.797E-02 8.27E-03	G
CD-109		3.0260E-02					
			88.04	3.026E-02	&(	1.858E+00 5.53E-01	G
SN-113		5.7979E-03					
			391.71	5.798E-03	&(	4.515E-02 1.32E-02	G K
			255.04	1.028E-01	%	1.512E+00 4.47E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	6.7395E-02						
		427.95	-3.632E-03	&(P	9.836E-02	2.85E-02	G K
		600.77	-1.061E-02	& P	1.810E-01	5.23E-02	G
		636.15	-3.403E-03	% P	2.572E-01	7.25E-02	G
		463.51	2.776E-01	(P	2.484E-01	8.07E-02	G
		176.29	5.033E-02	&	5.181E-01	1.54E-01	G
I-131	7.8209E-03						
		364.48	7.821E-03	%(P	4.128E-02	1.22E-02	G K
		636.97	1.937E-03	%	4.596E-01	1.29E-01	G
		284.29	-1.227E-01	& P	5.478E-01	1.63E-01	G
CS-134	-2.2509E-03						
		604.66	-2.251E-03	&(	1.053E-01	3.14E-02	G K
		795.76	-3.966E-03	& P	3.817E-02	1.09E-02	G
		569.29	-7.179E-03	% P	2.164E-01	6.17E-02	G
		801.84	-1.605E-02	% P	3.809E-01	1.06E-01	G
CS-137	9.5875E-03						
		661.62	9.588E-03	%(P	4.019E-02	1.18E-02	G
CE-139	-2.1769E-03						
		165.85	-2.177E-03	&(	3.822E-02	1.13E-02	G
EU-152	4.1081E-03						
		121.78	4.108E-03	&(P	1.278E-01	3.79E-02	G K
		344.30	3.284E-03	& P	1.068E-01	3.11E-02	G
		1408.08	-2.616E-05	%	1.436E-01	3.86E-02	G
		964.00	-7.792E-03	& P	3.064E-01	8.73E-02	G
		1112.07	-4.243E-02	%	2.953E-01	8.50E-02	G
		778.90	3.249E-02	%	2.161E-01	6.20E-02	G
EU-154	-4.0206E-03						
		123.10	-4.021E-03	%(	9.163E-02	2.72E-02	G K
		1274.80	-2.018E-02	%	1.120E-01	3.23E-02	G
		723.30	2.188E-02	%	1.586E-01	4.58E-02	G
		1004.80	-3.355E-02	&	1.960E-01	5.65E-02	G
EU-155	1.7004E-01						
		86.45	1.700E-01	(	2.130E-01	6.55E-02	G K
		105.31	5.451E-02	%	2.059E-01	6.18E-02	G
HG-203	-3.6102E-03						
		279.17	-3.610E-03	%(P	4.086E-02	1.21E-02	G K
		72.87	8.319E-01	& P	1.495E+00	4.55E-01	G
		70.83	1.815E+00	%	3.498E+00	1.06E+00	G
		82.50	-7.803E-01	%	3.697E+00	1.11E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2995E-01						
		583.14	2.200E-01	@(P	3.282E-02	1.68E-02	G
		510.72	2.682E-01	*(P	1.655E-01	6.39E-02	G
PB-212	6.1067E-01						
		238.63	6.108E-01	(P	8.590E-02	3.71E-02	G K
							Energy duplication
		77.11	5.962E-01	} P	3.357E-01	8.33E-02	G
		74.81	8.959E-01	+ P	6.841E-01	2.19E-01	G
PB-214	4.1342E-01						
		351.99	4.087E-01	(P	6.845E-02	3.11E-02	G K
		295.22	4.225E-01	@(P	1.300E-01	4.97E-02	G
							Energy duplication
		77.11	0.000E+00	} P	7.130E-01	0.00E+00	G
		241.92	-1.835E-01	%	5.547E-01	1.67E-01	G
BI-212	4.9239E-01						
		727.17	4.924E-01	(P	3.276E-01	1.40E-01	G K
		1620.56	-1.477E-01	& P	1.191E+00	3.30E-01	G
		785.42	6.014E-01	%	1.315E+00	3.98E-01	G
BI-214	4.4830E-01						
		609.32	4.435E-01	(P	6.649E-02	3.30E-02	G K
		1764.51	-3.183E-02	& P	2.452E-01	6.17E-02	G
		1120.28	4.632E-01	(P	3.124E-01	1.36E-01	G
RA-224	9.5489E-01						
		241.00	9.549E-01	(	9.791E-01	3.04E-01	G
RA-226	9.2043E-01						
		185.99	9.204E-01	@(P	1.030E+00	3.17E-01	G
AC-228	6.9018E-01						
		911.07	6.485E-01	@(P	1.305E-01	6.78E-02	G K
		968.90	7.950E-01	(P	2.457E-01	1.13E-01	G
		338.40	6.386E-01	*(P	2.067E-01	8.09E-02	G
TH-227	-5.0877E-02						
		236.00	-5.088E-02	&(	3.120E-01	9.30E-02	G K
		256.25	7.155E-02	& P	4.001E-01	1.19E-01	G
PA-234	1.3400E-01						
		98.44	-6.320E-03	&(P	2.083E-01	6.18E-02	G K
		946.00	-2.155E-02	% P	1.895E-01	5.45E-02	G
		131.28	-3.378E-02	% P	2.038E-01	6.09E-02	G
		94.67	3.612E-01	&(P	3.202E-01	1.00E-01	G
		883.24	7.881E-02	%	2.302E-01	6.82E-02	G
		926.70	9.711E-02	%	2.803E-01	8.32E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.062E-02 % P 3.202E-01 9.13E-02 G

TH-234       9.0552E-03
                           63.29-1.276E+00 &(P 4.987E+00 1.48E+00 G K
                           92.80 1.449E+00 % P 2.029E+00 6.18E-01 G
                           92.38 1.959E+00 &(P 2.376E+00 7.27E-01 G

AM-241       1.6116E-01
                           59.54 1.612E-01 &(P 1.036E+00 3.09E-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
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - 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	1.6277E-01	1.6855E-01	2.4384E-01	2.4403E-01	2.540E-01
K-40		1.0399E+01	1.0399E+01	1.1264E+00	1.2780E+00	
MN-54	#A	1.5244E-02	1.5335E-02	2.9011E-02	2.9025E-02	3.172E-02
CO-57	#B	-3.0779E-04	-3.0992E-04	1.3509E-01	1.3509E-01	4.373E-02
CO-60	#B	-5.9307E-03	-5.9364E-03	1.0327E-01	1.0327E-01	3.659E-02

Sr-85	#A	-1.0897E-02	-1.1215E-02	3.5870E-02	3.5876E-02	3.898E-02
Kr-85	#A	-2.5182E+02	-2.5183E+02	8.0472E+02	8.0485E+02	8.999E+02
Y-88	#B	8.4387E-04	8.5876E-04	1.9314E-02	1.9314E-02	2.486E-02
NB-94	#B	1.3273E-04	1.3273E-04	2.6088E-02	2.6088E-02	3.109E-02
Ag-108M	#B	-1.1317E-03	-1.1317E-03	2.3650E-02	2.3651E-02	2.813E-02
CD-109	#A	3.0136E-02	3.0260E-02	1.6579E+00	1.6579E+00	1.851E+00
SN-113	#B	5.7048E-03	5.7979E-03	3.9725E-02	3.9726E-02	4.443E-02
SB-125	#B	6.7270E-02	6.7395E-02	5.8786E-02	5.8916E-02	9.818E-02
I-131	#B	6.2026E-03	7.8209E-03	3.6480E-02	3.6483E-02	3.274E-02
CS-134	#B	-2.2454E-03	-2.2509E-03	9.4178E-02	9.4178E-02	1.050E-01
CS-137	#A	9.5859E-03	9.5875E-03	3.5386E-02	3.5390E-02	4.019E-02
CE-139	#A	-2.1476E-03	-2.1769E-03	3.3964E-02	3.3964E-02	3.771E-02
EU-152	#B	4.1065E-03	4.1081E-03	1.1369E-01	1.1369E-01	1.278E-01
EU-154	#B	-4.0182E-03	-4.0206E-03	8.1570E-02	8.1570E-02	9.158E-02
EU-155	#A	1.6987E-01	1.7004E-01	1.9649E-01	1.9671E-01	2.128E-01
HG-203	#B	-3.4687E-03	-3.6102E-03	3.6600E-02	3.6601E-02	3.925E-02
TL-208	#	2.2995E-01	2.2995E-01	5.2808E-02	5.4469E-02	
PB-212		6.1067E-01	6.1067E-01	1.1116E-01	1.1668E-01	
PB-214		4.1342E-01	4.1342E-01	8.7000E-02	9.0250E-02	
BI-212		4.9239E-01	4.9239E-01	4.1952E-01	4.2050E-01	
BI-214		4.4830E-01	4.4830E-01	1.0018E-01	1.0351E-01	
RA-224	#A	9.5489E-01	9.5489E-01	9.1205E-01	9.1373E-01	9.791E-01
RA-226	#A	9.2043E-01	9.2043E-01	9.5046E-01	9.5196E-01	1.030E+00
AC-228		6.9018E-01	6.9018E-01	1.5002E-01	1.5527E-01	
TH-227	#B	-5.0877E-02	-5.0877E-02	2.7905E-01	2.7907E-01	3.120E-01
PA-234	#B	1.3400E-01	1.3400E-01	1.1153E-01	1.1178E-01	2.083E-01
TH-234	#B	9.0552E-03	9.0552E-03	1.0082E-02	1.0094E-02	4.987E+00
AM-241	#A	1.6115E-01	1.6116E-01	9.2659E-01	9.2663E-01	1.036E+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) 1.3283458E+01 pCi/gm
Total Decayed Activity (86.4 to 2000.7 keV) 1.3283458E+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_1NOV2005_0835.An1

Sample description
FSS-OOL-02-01-025-F-B

Spectrum Filename: C:\GammaVision\Spectra\103F_1NOV2005_0835.An1

Acquisition information
Start time: 01-Nov-2005 08:35:21
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: 1.9570E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9570E+03) =
5.1099E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Oct-2005 12:56:00
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: 0.4754

***** S U M M A R Y O F P E A K 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	99.	28.70	0.99	9.052E-03	74.81	9.600	7.836E-01	PB212
77.09	130.	18.22	0.99	1.011E-02	77.11	17.500	7.154E-01	PB212
					77.11	10.700	1.170E+00	PB214
93.03	95.	39.20	1.50	1.631E-02				
93.03	95.	39.20	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.04	92.	40.25	1.50	1.645E-02				
93.04	92.	40.25	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.20	153.	26.08	1.34	2.566E-02	185.99	3.280	1.145E+00	RA226
209.34	107.	34.72	0.73	2.471E-02				
238.57	1034.	3.76	1.09	2.320E-02	238.63	43.100	7.060E-01	PB212
270.06	90.	26.06	1.24	2.152E-02				
294.68	264.	12.34	0.97	2.027E-02	295.22	19.200	4.621E-01	PB214
299.80	62.	32.50	1.11	2.003E-02				
327.94	73.	27.72	1.03	1.874E-02				
338.11	218.	12.69	1.15	1.831E-02	338.40	12.010	6.814E-01	AC228
351.55	416.	8.11	1.05	1.777E-02	351.99	37.100	4.303E-01	PB214
462.61	83.	19.61	1.15	1.427E-02				
462.61	83.	19.61	1.15	1.427E-02	463.51	10.000	3.974E-01	SB125
477.17	52.	38.27	1.02	1.392E-02				
477.17	52.	38.27	1.02	1.392E-02	477.56	10.300	2.590E-01	BE7
510.52	177.	14.21	1.47	1.318E-02	510.72	22.500	3.502E-01	TL208
582.44	370.	7.93	1.42	1.186E-02	583.14	86.000	2.482E-01	TL208
608.56	303.	9.86	1.33	1.145E-02	609.32	46.090	3.886E-01	BI214
660.87	37.	37.10	1.50	1.072E-02				
660.87	37.	37.10	1.50	1.072E-02	661.62	84.620	PBC<MDA	CS137

726.31	108.	16.46	1.56	9.974E-03	727.17	11.800	6.313E-01	BI212
793.52	51.	34.46	1.23	9.321E-03				
859.91	79.	22.17	1.74	8.772E-03				
910.20	239.	8.58	1.37	8.407E-03	911.07	29.000	6.684E-01	AC228
963.25	56.	19.12	1.54	8.061E-03				
968.01	156.	9.22	1.54	8.031E-03	968.90	17.460	7.697E-01	AC228
1119.78	104.	19.56	1.56	7.214E-03	1120.28	15.040	6.469E-01	BI214
1172.06	31.	38.49	1.67	6.972E-03	1173.23	99.860	PBC<MDA	CO60
1406.59	17.	39.28	1.81	6.096E-03	1408.08	21.210	PBC<MDA	EU152
1459.25	1279.	2.90	1.87	5.937E-03	1460.75	10.700	1.371E+01	K40
1762.78	61.	12.80	1.81	5.146E-03	1764.51	15.920	4.870E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
417.83	209.34	526.	107.	0.053	104.16	0.728	AC-228	
483.03	241.92	292.	117.	0.058	68.11	1.095	PB-214	lD
539.27	270.06	230.	90.	0.045	78.17	1.243	AC-228	
598.75	299.80	172.	62.	0.031	97.50	1.107	TH-227	
655.02	327.94	162.	73.	0.037	83.16	1.026	AC-228	
1586.09	793.52	75.	63.	0.032	69.33	1.234	PA-234	
1718.86	859.91	69.	79.	0.040	66.50	1.738	TL-208	
1925.53	963.26	55.	30.	0.015	116.62	1.102	EU-152	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	148.79	74.81	378.	99.	0.049	86.11	0.993D
PB-212	153.39	77.11	363.	130.	0.065	54.66	0.995A
RA-226	371.31	186.07	755.	150.	0.075	74.82	1.500s
PB-212	476.31	238.58	559.	1100.	0.550	13.73	1.062
RA-224	482.06	241.45	730.	114.	0.057	104.78	1.500s
PB-214	588.51	294.68	300.	260.	0.130	37.02	0.973
AC-228	675.37	338.11	220.	217.	0.108	38.07	1.149
PB-214	702.23	351.55	255.	410.	0.205	24.32	1.050
SB-125	924.35	462.61	122.	81.	0.040	65.57	1.500
BE-7	953.74	477.31	127.	50.	0.025	105.13	1.500
TL-208	1020.16	510.52	174.	150.	0.075	42.63	1.474s
TL-208	1163.98	582.44	154.	366.	0.183	23.80	1.425
BI-214	1216.21	608.56	170.	297.	0.148	29.57	1.329
CS-137	1320.82	660.87	85.	37.	0.019	111.30	1.500
BI-212	1451.69	726.31	80.	108.	0.054	49.38	1.558
AC-228	1819.42	910.20	62.	236.	0.118	25.75	1.368
AC-228	1933.79	967.39	53.	219.	0.110	26.72	1.582s
BI-214	2238.54	1119.78	89.	102.	0.051	58.67	1.555s
CO-60	2343.08	1172.06	67.	31.	0.016	115.48	1.667s
EU-152	2812.06	1406.59	14.	17.	0.009	117.85	1.812s
K-40	2917.37	1459.25	43.	1260.	0.630	8.70	1.871

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3524.01	1762.63	5.	40.	0.020	46.98	2.033s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		2.4847E-01					
			477.56	2.485E-01	(	2.759E-01 8.71E-02	G
K-40		1.3711E+01					
			1460.75	1.371E+01	(P	3.608E-01 4.03E-01	G
MN-54		1.1278E-02					
			834.81	1.128E-02	%(P	3.328E-02 9.90E-03	G
CO-57		3.0473E-03					
			122.07	3.047E-03	&(P	4.055E-02 1.21E-02	G K
			136.43	-3.563E-02	&	3.161E-01 9.43E-02	G
CO-60		1.0681E-02					
			1332.51	-9.561E-03	&(P	4.141E-02 1.17E-02	G K
			1173.23	3.095E-02	*(P	4.046E-02 1.27E-02	G K
Sr-85		-1.8384E-02					
			514.00	-1.838E-02	&(	4.084E-02 1.24E-02	G
Kr-85		-4.1190E+02					
			513.99	-4.119E+02	&(	9.148E+02 2.77E+02	G
Y-88		1.3515E-05					
			1836.01	1.351E-05	&(P	2.750E-02 7.17E-03	G K
			898.02	-8.972E-03	% P	3.851E-02 1.13E-02	G
NB-94		7.1048E-03					
			871.10	7.105E-03	&(	2.586E-02 7.58E-03	G K
			702.50	-7.852E-04	%	3.508E-02 1.01E-02	G K
Ag-108M		-6.2237E-03					
			722.95	-6.224E-03	&(	4.512E-02 1.32E-02	G K
			614.37	-3.660E-03	% P	3.588E-02 1.04E-02	G
			433.93	-2.564E-03	%	3.494E-02 1.02E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.3231E-02						
		88.04	1.323E-02	&(	1.913E+00	5.71E-01	G
SN-113	1.5304E-04						
		391.71	1.530E-04	%(	4.590E-02	1.34E-02	G K
		255.04	2.970E-01	&	1.541E+00	4.60E-01	G
SB-125	8.7580E-02						
		427.95	-1.557E-02	%(P	9.492E-02	2.80E-02	G K
		600.77	-4.613E-05	% P	1.898E-01	5.49E-02	G
		636.15	3.815E-02	% P	2.680E-01	7.80E-02	G
		463.51	3.929E-01	(P	2.626E-01	8.72E-02	G
		176.29	2.952E-02	&	5.568E-01	1.66E-01	G
I-131	-2.1547E-03						
		364.48	-2.155E-03	&(P	4.645E-02	1.36E-02	G K
		636.97	-3.514E-03	&	4.574E-01	1.30E-01	G
		284.29	-9.726E-02	% P	6.557E-01	1.95E-01	G
CS-134	1.3121E-03						
		604.66	1.312E-03	&(	9.294E-02	2.77E-02	G K
		795.76	-1.100E-02	& P	4.514E-02	1.33E-02	G
		569.29	-6.472E-02	% P	2.336E-01	6.91E-02	G
		801.84	4.549E-02	& P	3.797E-01	1.09E-01	G
CS-137	2.8381E-02						
		661.62	2.838E-02	(P	3.476E-02	1.09E-02	G
CE-139	1.7721E-03						
		165.85	1.772E-03	%(	4.221E-02	1.26E-02	G
EU-152	3.5498E-02						
		121.78	-5.258E-03	&(P	1.401E-01	4.17E-02	G K
		344.30	2.871E-03	% P	1.141E-01	3.35E-02	G
		1408.08	9.168E-02	(	1.081E-01	3.60E-02	G
		964.00	6.354E-02	& P	1.636E-01	4.86E-02	G
		1112.07	7.353E-02	&	2.475E-01	7.30E-02	G
		778.90	4.069E-02	%	2.388E-01	6.95E-02	G
EU-154	-1.6658E-02						
		123.10	-1.666E-02	%(	1.062E-01	3.18E-02	G K
		1274.80	-1.603E-02	%	1.165E-01	3.36E-02	G
		723.30	6.367E-03	&	1.945E-01	5.63E-02	G
		1004.80	2.773E-02	&	1.927E-01	5.56E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	5.7106E-02						
		86.45	5.711E-02	%(	1.695E-01	5.11E-02	G K
		105.31	6.722E-02	&	2.173E-01	6.55E-02	G
HG-203	4.0832E-03						
		279.17	4.083E-03	&(P	4.043E-02	1.20E-02	G K
		72.87	-2.875E-01	% P	2.019E+00	6.04E-01	G
		70.83	1.321E-01	%	3.334E+00	9.90E-01	G
		82.50	-5.479E-02	%	3.941E+00	1.18E+00	G
TL-208	2.4824E-01						
		583.14	2.482E-01	(P	4.101E-02	1.99E-02	G
		510.72	3.502E-01	+ P	1.494E-01	5.86E-02	G
PB-212	7.5175E-01						
		238.63	7.594E-01	(P	7.799E-02	3.51E-02	G K
							Energy duplication
		77.11	5.084E-01	} P	3.568E-01	9.26E-02	G
		74.81	7.836E-01	(P	7.419E-01	2.32E-01	G
PB-214	4.4115E-01						
		351.99	4.303E-01	(P	8.079E-02	3.53E-02	G K
		295.22	4.621E-01	(P	1.481E-01	5.78E-02	G
							Energy duplication
		77.11	2.454E-01	} P	9.016E-01	2.07E-01	G
		241.92	-4.994E-02	%	5.293E-01	1.58E-01	G
BI-212	6.3134E-01						
		727.17	6.313E-01	(P	2.614E-01	1.04E-01	G K
		1620.56	-2.520E-03	& P	8.815E-01	2.30E-01	G
		785.42	2.022E-02	%	1.478E+00	4.19E-01	G
BI-214	3.7615E-01						
		609.32	3.886E-01	(P	8.319E-02	3.91E-02	G K
		1764.51	3.400E-01	?(P	1.087E-01	5.76E-02	G
		1120.28	6.469E-01	+ P	2.977E-01	1.29E-01	G
RA-224	8.7129E-01						
		241.00	8.713E-01	(	9.867E-01	3.04E-01	G
RA-226	1.2283E+00						
		185.99	1.228E+00	(P	1.072E+00	3.33E-01	G
AC-228	6.7222E-01						
		911.07	6.684E-01	(P	1.118E-01	5.81E-02	G K
		968.90	1.081E+00	+ P	1.800E-01	9.63E-02	G
		338.40	6.814E-01	(P	2.257E-01	8.69E-02	G

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

TH-227      -2.1451E-01
                          236.00-2.145E-01 %(  3.804E-01 1.16E-01 G K
                          256.25 1.976E-03 & P 4.385E-01 1.29E-01 G

PA-234       3.6018E-02
                           98.44 3.602E-02 %(P 2.039E-01 6.11E-02 G K
                          946.00-4.586E-02 & P 2.066E-01 6.08E-02 G
                          131.28 3.650E-02 % P 2.067E-01 6.20E-02 G
                           94.67-1.304E-01 & P 3.931E-01 1.19E-01 G
                          883.24-3.863E-02 &   2.776E-01 8.04E-02 G
                          926.70-4.232E-02 &   3.220E-01 9.32E-02 G
                          569.26-4.994E-02 % P 3.391E-01 9.90E-02 G

TH-234       7.8944E-01
                           63.29 7.894E-01 %(P 5.993E+00 1.79E+00 G K
                           92.80 1.280E+00 % P 2.024E+00 6.15E-01 G
                           92.38 1.563E+00 % P 2.391E+00 7.27E-01 G

AM-241      -1.4629E-01
                           59.54-1.463E-01 %(P 1.064E+00 3.18E-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		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	2.3954E-01	2.4847E-01	2.6120E-01	2.6160E-01	2.660E-01
K-40		1.3711E+01	1.3711E+01	1.2102E+00	1.4485E+00	
MN-54	#A	1.1208E-02	1.1278E-02	2.9712E-02	2.9719E-02	3.308E-02
CO-57	#B	3.0253E-03	3.0473E-03	3.6187E-02	3.6187E-02	4.025E-02
CO-60	#B	1.0670E-02	1.0681E-02	1.3105E-02	1.3119E-02	4.137E-02
Sr-85	#A	-1.7838E-02	-1.8384E-02	3.7070E-02	3.7085E-02	3.962E-02
Kr-85	#A	-4.1189E+02	-4.1190E+02	8.3042E+02	8.3076E+02	9.147E+02
Y-88	#B	1.3269E-05	1.3515E-05	2.1508E-02	2.1508E-02	2.700E-02
NB-94	#B	7.1048E-03	7.1048E-03	2.2731E-02	2.2734E-02	2.586E-02
Ag-108M	#B	-6.2234E-03	-6.2237E-03	3.9738E-02	3.9740E-02	4.512E-02
CD-109	#A	1.3174E-02	1.3231E-02	1.7118E+00	1.7118E+00	1.905E+00
SN-113	#B	1.5047E-04	1.5304E-04	4.0149E-02	4.0149E-02	4.513E-02
SB-125	#B	8.7411E-02	8.7580E-02	5.8333E-02	5.8554E-02	9.474E-02
I-131	#B	-1.6898E-03	-2.1547E-03	6.1102E-02	6.1102E-02	3.643E-02
CS-134	#B	1.3087E-03	1.3121E-03	8.3137E-02	8.3137E-02	9.270E-02
CS-137	#A	2.8376E-02	2.8381E-02	3.2765E-02	3.2806E-02	3.476E-02
CE-139	#A	1.7471E-03	1.7721E-03	3.7667E-02	3.7667E-02	4.161E-02
EU-152	#B	3.5483E-02	3.5498E-02	4.1836E-02	4.1882E-02	1.400E-01
EU-154	#B	-1.6647E-02	-1.6658E-02	9.5498E-02	9.5502E-02	1.062E-01
EU-155	#B	5.7044E-02	5.7106E-02	1.5317E-01	1.5320E-01	1.693E-01
HG-203	#B	3.9155E-03	4.0832E-03	3.5989E-02	3.5990E-02	3.877E-02
TL-208		2.4824E-01	2.4824E-01	5.9771E-02	6.1484E-02	
PB-212		7.5175E-01	7.5175E-01	1.0437E-01	1.1312E-01	
PB-214		4.4115E-01	4.4115E-01	9.9170E-02	1.0242E-01	
BI-212		6.3134E-01	6.3134E-01	3.1318E-01	3.1532E-01	
BI-214		3.7615E-01	3.7615E-01	1.1115E-01	1.1328E-01	
RA-224	#A	8.7129E-01	8.7129E-01	9.1298E-01	9.1438E-01	9.867E-01
RA-226	#	1.2283E+00	1.2283E+00	9.9855E-01	1.0011E+00	1.072E+00
AC-228		6.7222E-01	6.7222E-01	1.5572E-01	1.6053E-01	
TH-227	#B	-2.1451E-01	-2.1451E-01	3.4727E-01	3.4749E-01	3.804E-01
PA-234	#B	3.6018E-02	3.6018E-02	1.8324E-01	1.8325E-01	2.039E-01
TH-234	#B	7.8944E-01	7.8944E-01	5.3609E+00	5.3611E+00	5.993E+00
AM-241	#A	-1.4628E-01	-1.4629E-01	9.7569E-01	9.7572E-01	1.064E+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) 1.6831518E+01 pCi/gm
Total Decayed Activity (87.4 to 2000.7 keV) 1.6831518E+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_1NOV2005_0917.An1

Sample description
FSS-OOL-02-01-024-F-B

Spectrum Filename: C:\GammaVision\Spectra\103F_1NOV2005_0917.An1

Acquisition information
Start time: 01-Nov-2005 09:19:11
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: 2.0840E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0840E+03) =
4.7985E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	29-Oct-2005 11:24:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4609

***** S U M M A R Y O F P E A K 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	132.	22.77	0.99	9.052E-03	74.81	9.600	9.813E-01	PB212
77.09	159.	16.08	0.99	1.011E-02	77.11	17.500	7.998E-01	PB212
					77.11	10.700	1.308E+00	PB214
92.79	97.	41.64	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.80	114.	37.01	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.18	108.	38.56	1.01	2.438E-02				
129.18	108.	38.56	1.01	2.438E-02	131.28	20.000	PBC<MDA	PA234
185.73	217.	20.03	1.48	2.567E-02				
185.73	217.	20.03	1.48	2.567E-02	185.99	3.280	1.572E+00	RA226
209.20	134.	19.74	1.08	2.472E-02				
238.60	1141.	3.75	1.09	2.320E-02	238.63	43.100	7.320E-01	PB212
241.63	155.	17.29	1.09	2.304E-02	241.00	3.900	1.117E+00	RA224
					241.92	7.470	5.846E-01	PB214
270.27	199.	18.99	0.99	2.151E-02				
277.42	72.	35.46	1.11	2.114E-02				
277.42	72.	35.46	1.11	2.114E-02	279.17	81.500	PBC<MDA	HG203
294.85	262.	12.57	1.07	2.027E-02	295.22	19.200	4.302E-01	PB214
299.70	68.	38.77	1.33	2.003E-02				
327.28	94.	28.69	1.23	1.877E-02				
337.95	279.	12.11	0.99	1.832E-02	338.40	12.010	8.187E-01	AC228
351.52	466.	8.60	1.13	1.777E-02	351.99	37.100	4.532E-01	PB214
463.01	86.	24.97	1.24	1.426E-02				
463.01	86.	24.97	1.24	1.426E-02	463.51	10.000	3.864E-01	SB125
510.36	166.	14.25	1.39	1.318E-02	510.72	22.500	3.040E-01	TL208
582.60	395.	8.19	1.41	1.185E-02	583.14	86.000	2.488E-01	TL208

608.64	342.	9.15	1.49	1.145E-02	609.32	46.090	4.133E-01	BI214
726.59	77.	19.91	1.10	9.971E-03	727.17	11.800	4.225E-01	BI212
794.25	64.	32.96	1.54	9.315E-03				
794.25	64.	32.96	1.54	9.315E-03	795.76	85.400	5.248E-02	CS134
910.25	280.	9.59	1.40	8.407E-03	911.07	29.000	7.360E-01	AC228
963.84	71.	18.52	1.54	8.057E-03				
963.84	71.	18.52	1.54	8.057E-03	964.00	14.580	3.893E-01	EU152
968.13	165.	9.61	1.54	8.031E-03	968.90	17.460	7.622E-01	AC228
1119.72	105.	18.56	1.62	7.214E-03	1120.28	15.040	6.152E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1459.29	1548.	2.69	1.89	5.936E-03	1460.75	10.700	1.562E+01	K40
1728.13	22.	22.68	1.57	5.225E-03				
1762.89	87.	12.07	1.75	5.145E-03	1764.51	15.920	6.609E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
417.54	209.19	407.	125.	0.062	73.54	1.145	AC-228	
539.68	270.27	426.	199.	0.100	56.97	0.992	AC-228	s
598.55	299.70	287.	68.	0.034	116.31	1.335	TH-227	M
653.70	327.28	250.	94.	0.047	86.08	1.230	AC-228	s
1926.71	963.82	51.	71.	0.036	55.55	1.538	EU-152	lD
3455.03	1728.13	1.	22.	0.011	68.03	1.566	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	405.	132.	0.066	68.31	0.993D
PB-212	153.39	77.11	386.	159.	0.079	48.23	0.995A
PA-234	257.32	129.08	704.	113.	0.057	102.57	1.500s
RA-226	371.06	185.95	836.	175.	0.088	68.32	1.500s
PB-212	476.42	238.63	274.	1132.	0.566	10.71	1.093D
PB-214	483.00	241.92	373.	118.	0.059	63.84	1.095A
HG-203	553.32	277.08	286.	77.	0.039	98.72	1.500s
PB-214	588.84	294.85	347.	258.	0.129	37.72	1.072
AC-228	675.04	337.95	297.	278.	0.139	36.33	0.989
PB-214	702.18	351.52	351.	460.	0.230	25.79	1.131
SB-125	924.37	462.62	171.	72.	0.036	83.54	1.500s
TL-208	1019.83	510.36	177.	139.	0.069	42.74	1.386
TL-208	1164.31	582.60	202.	391.	0.195	24.57	1.406
BI-214	1216.38	608.64	189.	336.	0.168	27.44	1.493
BI-212	1452.25	726.59	69.	77.	0.038	59.72	1.104
CS-134	1588.10	794.52	73.	46.	0.023	90.45	1.500s
AC-228	1819.54	910.25	116.	277.	0.138	28.78	1.401
AC-228	1933.98	967.48	119.	261.	0.131	31.59	1.273
BI-214	2238.41	1119.72	90.	103.	0.051	55.67	1.619s
K-40	2917.44	1459.29	58.	1529.	0.765	8.08	1.886

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3524.41	1762.82	8.	66.	0.033	39.59	1.736s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	%(	3.476E-01 1.02E-01 G	
K-40		1.5623E+01					
			1460.75	1.562E+01	(P	3.894E-01 4.26E-01 G	
MN-54		6.0853E-03					
			834.81	6.085E-03	&(P	2.900E-02 8.46E-03 G	
CO-57		6.8954E-03					
			122.07	6.895E-03	&(P	4.935E-02 1.48E-02 G K	
			136.43	-7.279E-04	&	3.509E-01 1.04E-01 G	
CO-60		3.1349E-03					
			1332.51	3.135E-03	%(P	3.870E-02 1.09E-02 G K	
			1173.23	5.964E-03	& P	4.013E-02 1.16E-02 G K	
Sr-85		-2.0058E-02					
			514.00	-2.006E-02	&(	4.332E-02 1.31E-02 G	
Kr-85		-4.4889E+02					
			513.99	-4.489E+02	&(	9.694E+02 2.94E+02 G	
Y-88		-2.2988E-03					
			1836.01	-2.299E-03	%(P	2.749E-02 7.43E-03 G K	
			898.02	8.049E-03	% P	3.477E-02 1.02E-02 G	
NB-94		0.0000E+00					
			871.10	0.000E+00	%(	3.959E-02 1.14E-02 G K	
			702.50	2.647E-03	%	3.417E-02 9.93E-03 G K	
Ag-108M		-1.6158E-02					
			722.95	-1.616E-02	%(	4.536E-02 1.36E-02 G K	
			614.37	-5.150E-03	% P	3.692E-02 1.08E-02 G	
			433.93	0.000E+00	%	3.364E-02 9.81E-03 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	9.9676E-01						
		88.04	9.968E-01	&(	1.789E+00	5.44E-01	G
SN-113	2.5822E-03						
		391.71	2.582E-03	&(	4.994E-02	1.47E-02	G K
		255.04	3.168E-01	&	1.494E+00	4.47E-01	G
SB-125	9.4109E-02						
		427.95	1.540E-02	%(P	9.186E-02	2.71E-02	G K
		600.77	-3.293E-03	% P	1.890E-01	5.49E-02	G
		636.15	-4.351E-02	% P	2.809E-01	8.21E-02	G
		463.51	3.271E-01	*(P	2.906E-01	9.27E-02	G
		176.29	6.796E-02	&	5.299E-01	1.58E-01	G
I-131	-9.5817E-04						
		364.48	-9.582E-04	%(P	4.598E-02	1.35E-02	G K
		636.97	-1.595E-02	&	4.094E-01	1.16E-01	G
		284.29	1.637E-01	& P	5.309E-01	1.59E-01	G
CS-134	1.6899E-02						
		604.66	-1.232E-03	%(	9.300E-02	2.78E-02	G K
		795.76	3.762E-02	(P	3.491E-02	1.14E-02	G
		569.29	-3.603E-02	& P	2.193E-01	6.42E-02	G
		801.84	-1.037E-01	& P	3.850E-01	1.13E-01	G
CS-137	1.7357E-02						
		661.62	1.736E-02	&(P	3.983E-02	1.20E-02	G
CE-139	4.1181E-03						
		165.85	4.118E-03	&(	4.545E-02	1.36E-02	G
EU-152	1.9836E-02						
		121.78	1.984E-02	&(P	1.437E-01	4.30E-02	G K
		344.30	-1.423E-02	% P	1.018E-01	3.01E-02	G
		1408.08	-1.462E-02	%	1.452E-01	4.09E-02	G
		964.00	2.353E-01	& P	3.236E-01	1.00E-01	G
		1112.07	8.121E-02	%	2.864E-01	8.47E-02	G
		778.90	-2.798E-04	&	2.199E-01	6.24E-02	G
EU-154	1.4456E-02						
		123.10	1.446E-02	%(	9.730E-02	2.91E-02	G K
		1274.80	-1.983E-02	%	1.136E-01	3.30E-02	G
		723.30	-6.257E-02	%	2.092E-01	6.25E-02	G
		1004.80	8.929E-03	&	1.929E-01	5.50E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.2952E-01						
		86.45	1.295E-01	&(	2.224E-01	6.77E-02	G K
		105.31	3.566E-02	&	2.169E-01	6.50E-02	G
HG-203	3.0554E-02						
		279.17	3.055E-02	&(P	3.218E-02	1.01E-02	G K
		72.87	-1.955E-01	% P	1.984E+00	5.93E-01	G
		70.83	1.727E+00	%	3.337E+00	1.01E+00	G
		82.50	-7.089E-01	%	3.622E+00	1.09E+00	G
TL-208	2.6026E-01						
		583.14	2.488E-01	(P	4.390E-02	2.06E-02	G
		510.72	3.040E-01	(P	1.416E-01	5.16E-02	G
PB-212	7.5295E-01						
		238.63	7.339E-01	(P	5.179E-02	2.65E-02	G K
							Energy duplication
		77.11	5.815E-01	} P	3.452E-01	9.35E-02	G
		74.81	9.813E-01	+ P	7.205E-01	2.29E-01	G
PB-214	4.4539E-01						
		351.99	4.532E-01	(P	8.858E-02	3.94E-02	G K
		295.22	4.302E-01	(P	1.493E-01	5.49E-02	G
							Energy duplication
		77.11	3.481E-01	} P	8.625E-01	2.03E-01	G
		241.92	4.454E-01	}	3.498E-01	9.48E-02	G
BI-212	4.2246E-01						
		727.17	4.225E-01	(P	2.290E-01	8.46E-02	G K
		1620.56	-1.309E-01	& P	1.134E+00	3.18E-01	G
		785.42	6.497E-01	%	1.513E+00	4.56E-01	G
BI-214	4.4065E-01						
		609.32	4.133E-01	(P	8.212E-02	3.85E-02	G K
		1764.51	5.199E-01	@(P	1.283E-01	7.20E-02	G
		1120.28	6.152E-01	+ P	2.806E-01	1.16E-01	G
RA-224	6.8683E-01						
							Derived Ave Activity
		241.00	6.868E-01	}(	9.719E-01	3.13E-01	G
RA-226	1.3489E+00						
		185.99	1.349E+00	*(P	1.059E+00	3.30E-01	G
AC-228	7.6021E-01						
		911.07	7.360E-01	(P	1.411E-01	7.14E-02	G K
		968.90	1.210E+00	+ P	2.473E-01	1.27E-01	G
		338.40	8.187E-01	(P	2.451E-01	9.94E-02	G

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

TH-227      -3.5157E-02
                          236.00-3.516E-02 %(  3.576E-01 1.07E-01 G K
                          256.25 8.772E-02 % P 4.288E-01 1.28E-01 G

PA-234       5.2030E-02
                           98.44-2.558E-02 &(P 2.128E-01 6.36E-02 G K
                          946.00 2.486E-02 & P 1.786E-01 5.19E-02 G
                          131.28 1.494E-01 ?(P 1.664E-01 5.14E-02 G
                           94.67-3.441E-03 & P 3.742E-01 1.12E-01 G
                          883.24-3.857E-02 &   3.128E-01 9.11E-02 G
                          926.70-7.638E-03 %   3.032E-01 8.65E-02 G
                          569.26-5.368E-02 & P 3.245E-01 9.50E-02 G

TH-234       1.8712E+00
                           63.29 1.871E+00 %(P 5.859E+00 1.76E+00 G K
                           92.80 1.272E+00 % P 2.062E+00 6.26E-01 G
                           92.38 1.768E+00 % P 2.480E+00 7.55E-01 G

AM-241       1.5408E-01
                           59.54 1.541E-01 %(P 9.373E-01 2.80E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	0.0000E+00	0.0000E+00	3.0490E-01	3.0490E-01	3.347E-01
K-40		1.5623E+01	1.5623E+01	1.2781E+00	1.5673E+00	
MN-54	#A	6.0461E-03	6.0853E-03	2.5372E-02	2.5375E-02	2.881E-02
CO-57	#B	6.8440E-03	6.8954E-03	4.4349E-02	4.4350E-02	4.898E-02
CO-60	#B	3.1316E-03	3.1349E-03	3.2771E-02	3.2771E-02	3.866E-02
Sr-85	#A	-1.9443E-02	-2.0058E-02	3.9367E-02	3.9384E-02	4.199E-02
Kr-85	#A	-4.4888E+02	-4.4889E+02	8.8096E+02	8.8135E+02	9.694E+02
Y-88	#B	-2.2557E-03	-2.2988E-03	2.3987E-02	2.3988E-02	2.698E-02
NB-94	#B	0.0000E+00	0.0000E+00	3.4201E-02	3.4201E-02	3.959E-02
Ag-108M	#B	-1.6158E-02	-1.6158E-02	4.0827E-02	4.0838E-02	4.536E-02
CD-109	#A	9.9233E-01	9.9676E-01	1.6324E+00	1.6333E+00	1.781E+00
SN-113	#B	2.5372E-03	2.5822E-03	4.4076E-02	4.4076E-02	4.907E-02
SB-125	#F	9.3921E-02	9.4109E-02	8.0015E-02	8.0201E-02	9.168E-02
I-131	#B	-7.4536E-04	-9.5817E-04	9.9859E-02	9.9859E-02	3.577E-02
CS-134	#B	1.6854E-02	1.6899E-02	1.5315E-02	1.5346E-02	9.275E-02
CS-137	#A	1.7354E-02	1.7357E-02	3.5993E-02	3.6007E-02	3.982E-02
CE-139	#A	4.0581E-03	4.1181E-03	4.0742E-02	4.0743E-02	4.478E-02
EU-152	#B	1.9827E-02	1.9836E-02	1.2915E-01	1.2915E-01	1.437E-01
EU-154	#B	1.4447E-02	1.4456E-02	8.7420E-02	8.7423E-02	9.724E-02
EU-155	#B	1.2938E-01	1.2952E-01	2.0306E-01	2.0319E-01	2.221E-01
HG-203	#A	2.9258E-02	3.0554E-02	3.0179E-02	3.0231E-02	3.082E-02
TL-208		2.6026E-01	2.6026E-01	6.4661E-02	6.6403E-02	
PB-212		7.5295E-01	7.5295E-01	8.1518E-02	9.2499E-02	
PB-214		4.4539E-01	4.4539E-01	1.0324E-01	1.0643E-01	
BI-212		4.2246E-01	4.2246E-01	2.5392E-01	2.5511E-01	
BI-214		4.4065E-01	4.4065E-01	1.1037E-01	1.1330E-01	
RA-224	A	6.8683E-01	6.8683E-01	9.0733E-01	9.0821E-01	
RA-226	#	1.3489E+00	1.3489E+00	9.8975E-01	9.9284E-01	1.059E+00
AC-228		7.6021E-01	7.6021E-01	1.7742E-01	1.8283E-01	
TH-227	#B	-3.5157E-02	-3.5157E-02	3.2066E-01	3.2067E-01	3.576E-01
PA-234	#B	5.2030E-02	5.2030E-02	5.3661E-02	5.3739E-02	2.128E-01
TH-234	#B	1.8712E+00	1.8712E+00	5.2867E+00	5.2877E+00	5.859E+00
AM-241	#A	1.5408E-01	1.5408E-01	8.4031E-01	8.4036E-01	9.373E-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 (269.9 to 2000.7 keV) 1.9392017E+01 pCi/gm
Total Decayed Activity (269.9 to 2000.7 keV) 1.9392017E+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_1NOV2005_0958.An1

Sample description
FSS-OOL-02-01-026-F-B

Spectrum Filename: C:\GammaVision\Spectra\103F_1NOV2005_0958.An1

Acquisition information
Start time: 01-Nov-2005 09:59:32
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: 1.9180E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9180E+03) =
5.2138E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Oct-2005 14:56:00
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: 0.4820

***** S U M M A R Y O F P E A K 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	132.	21.41	0.99	9.052E-03	74.81	9.600	1.071E+00	PB212
77.15	198.	11.57	0.99	1.011E-02	77.11	10.700	1.339E+00	PB214
					77.11	17.500	8.185E-01	PB212
93.65	80.	37.21	1.00	1.677E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.59	87.	40.97	1.24	2.443E-02				
186.47	214.	17.86	2.01	2.565E-02	185.99	3.280	1.678E+00	RA226
209.44	112.	22.27	1.08	2.471E-02				
238.57	1112.	3.53	1.09	2.320E-02	238.63	43.100	7.752E-01	PB212
270.14	153.	24.18	1.65	2.152E-02				
295.03	213.	10.67	1.13	2.026E-02	295.22	19.200	3.781E-01	PB214
299.73	76.	25.89	1.13	2.003E-02				
327.69	78.	24.39	1.47	1.875E-02				
338.13	267.	11.63	1.15	1.831E-02	338.40	12.010	8.511E-01	AC228
351.43	418.	6.92	1.29	1.778E-02	351.99	37.100	4.406E-01	PB214
462.39	110.	24.36	1.28	1.427E-02				
462.39	110.	24.36	1.28	1.427E-02	463.51	10.000	5.377E-01	SB125
510.16	183.	12.62	1.82	1.318E-02	510.72	22.500	3.726E-01	TL208
582.63	380.	7.08	1.28	1.185E-02	583.14	86.000	2.596E-01	TL208
608.69	272.	8.83	1.17	1.145E-02	609.32	46.090	3.542E-01	BI214
726.23	92.	21.09	0.98	9.975E-03	727.17	11.800	5.507E-01	BI212
784.89	34.	34.85	1.07	9.399E-03				
784.89	34.	34.85	1.07	9.399E-03	785.42	2.000	1.286E+00	BI212
794.41	61.	23.77	1.19	9.313E-03				
794.41	61.	23.77	1.19	9.313E-03	795.76	85.400	5.372E-02	CS134
859.55	73.	26.70	1.06	8.775E-03				
910.31	250.	7.72	1.74	8.406E-03	911.07	29.000	7.147E-01	AC228

963.35	61.	17.25	1.54	8.059E-03				
963.35	61.	17.25	1.54	8.059E-03	964.00	14.580	3.657E-01	EU152
968.08	147.	9.80	1.54	8.030E-03	968.90	17.460	7.376E-01	AC228
1119.00	92.	23.33	1.91	7.218E-03	1120.28	15.040	5.860E-01	BI214
1459.30	1239.	2.93	1.87	5.936E-03	1460.75	10.700	1.355E+01	K40
1620.42	20.	30.06	1.17	5.488E-03	1620.56	2.750	9.130E-01	BI212
1762.74	60.	12.91	1.83	5.146E-03	1764.51	15.920	4.883E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
258.36	129.59	562.	87.	0.043	122.90	1.242	AC-228	l
417.91	209.38	378.	119.	0.060	77.73	0.939	AC-228	
482.13	241.51	308.	154.	0.077	53.88	1.095	PB-214	lD
539.44	270.14	420.	153.	0.077	72.55	1.651	AC-228	s
598.70	299.78	201.	65.	0.032	99.74	0.690	TH-227	s
654.53	327.69	142.	78.	0.039	73.18	1.466	AC-228	s
1568.84	784.89	52.	34.	0.017	104.54	1.065	BI-212	l
1718.14	859.55	86.	73.	0.037	80.11	1.061	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	354.	132.	0.066	64.24	0.993D
PB-212	153.39	77.11	349.	198.	0.099	34.70	0.995A
TH-234	185.26	93.04	929.	107.	0.054	105.92	1.500s
TH-234	185.25	93.04	910.	110.	0.055	102.95	1.500s
RA-226	371.64	186.24	627.	154.	0.077	67.02	1.500s
PB-212	476.17	238.51	728.	1103.	0.551	15.21	1.030
RA-224	482.08	241.46	753.	110.	0.055	109.80	1.500s
PB-214	589.30	295.08	254.	186.	0.093	42.85	0.965
AC-228	675.40	338.13	249.	266.	0.133	34.90	1.152
PB-214	701.99	351.43	172.	412.	0.206	20.75	1.288s
SB-125	924.45	462.66	157.	74.	0.037	78.28	1.500s
TL-208	1019.43	510.16	148.	157.	0.078	37.87	1.823s
TL-208	1164.37	582.63	127.	375.	0.188	21.24	1.281
BI-214	1216.48	608.69	111.	265.	0.133	26.49	1.173
BI-212	1451.54	726.23	103.	92.	0.046	63.26	0.979
CS-134	1587.36	794.15	51.	50.	0.025	73.19	1.500
AC-228	1819.65	910.31	53.	247.	0.124	23.17	1.742
EU-152	1926.38	963.68	78.	45.	0.023	92.93	1.538s
AC-228	1934.43	967.71	56.	252.	0.126	26.45	0.881s
BI-214	2236.98	1119.00	102.	90.	0.045	69.99	1.912s
K-40	2917.47	1459.30	42.	1220.	0.610	8.78	1.866
BI-212	3239.64	1620.42	5.	20.	0.010	90.19	1.167s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3524.31	1762.78	5.	48.	0.024	44.41	1.823

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

***** S U M M A R Y O 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		4.6016E-02					
			477.56	4.602E-02	%(	2.786E-01	8.18E-02 G
K-40		1.3545E+01					
			1460.75	1.355E+01	(P	3.642E-01	4.02E-01 G
MN-54		2.0804E-02					
			834.81	2.080E-02	%(P	3.328E-02	1.03E-02 G
CO-57		2.0935E-03					
			122.07	2.094E-03	&(P	4.995E-02	1.49E-02 G K
			136.43	7.934E-03	%	3.539E-01	1.05E-01 G
CO-60		6.6887E-04					
			1332.51	6.689E-04	%(P	3.085E-02	8.30E-03 G K
			1173.23	1.146E-02	& P	4.078E-02	1.20E-02 G K
Sr-85		-2.2419E-02					
			514.00	-2.242E-02	%(	3.802E-02	1.16E-02 G
Kr-85		-5.0183E+02					
			513.99	-5.018E+02	%(	8.518E+02	2.61E+02 G
Y-88		-9.1212E-05					
			1836.01	-9.121E-05	&(P	2.371E-02	5.98E-03 G K
			898.02	-3.361E-03	% P	3.782E-02	1.08E-02 G
NB-94		4.7127E-03					
			871.10	4.713E-03	&(	3.025E-02	8.74E-03 G K
			702.50	-9.837E-03	%	3.528E-02	1.05E-02 G K
Ag-108M		-1.0332E-02					
			722.95	-1.033E-02	&(	4.597E-02	1.36E-02 G K
			614.37	-1.045E-02	% P	3.559E-02	1.06E-02 G
			433.93	-2.375E-03	&	3.495E-02	1.02E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	2.1957E-02						
		88.04	2.196E-02	&(	1.594E+00	4.74E-01	G
SN-113	-1.9196E-03						
		391.71	-1.920E-03	%(	4.719E-02	1.38E-02	G K
		255.04	1.645E-02	&	1.549E+00	4.58E-01	G
SB-125	7.2121E-02						
		427.95	-2.753E-02	%(P	1.084E-01	3.23E-02	G K
		600.77	-2.290E-02	& P	1.736E-01	5.07E-02	G
		636.15	-3.276E-02	& P	2.643E-01	7.64E-02	G
		463.51	3.671E-01	*(P	3.027E-01	9.74E-02	G
		176.29	-5.129E-02	&	5.749E-01	1.72E-01	G
I-131	5.2464E-03						
		364.48	5.246E-03	&(P	4.585E-02	1.35E-02	G K
		636.97	-1.116E-01	%	5.192E-01	1.53E-01	G
		284.29	-5.957E-02	& P	5.462E-01	1.61E-01	G
CS-134	1.9497E-02						
		604.66	-2.678E-03	%(	9.534E-02	2.84E-02	G K
		795.76	4.484E-02	(P	3.193E-02	1.10E-02	G
		569.29	-4.158E-03	% P	1.782E-01	5.06E-02	G
		801.84	1.197E-01	% P	2.717E-01	8.12E-02	G
CS-137	1.6125E-02						
		661.62	1.613E-02	%(P	4.005E-02	1.20E-02	G
CE-139	-1.2567E-02						
		165.85	-1.257E-02	%(	4.515E-02	1.36E-02	G
EU-152	9.6355E-02						
		121.78	9.447E-03	&(P	1.407E-01	4.20E-02	G K
		344.30	-1.030E-02	% P	1.033E-01	3.04E-02	G
		1408.08	-1.434E-02	&	1.610E-01	4.53E-02	G
		964.00	2.706E-01	&(P	2.627E-01	8.49E-02	G
		1112.07	-6.324E-03	%	2.611E-01	7.37E-02	G
		778.90	-3.378E-03	&	2.158E-01	6.09E-02	G
EU-154	2.4635E-02						
		123.10	2.463E-02	%(	1.049E-01	3.15E-02	G K
		1274.80	7.074E-03	&	1.084E-01	3.08E-02	G
		723.30	-6.120E-02	&	1.877E-01	5.60E-02	G
		1004.80	9.626E-03	%	1.886E-01	5.35E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.4647E-01						
		86.45	1.465E-01	%(	2.181E-01	6.66E-02	G K
		105.31	7.118E-02	%	2.149E-01	6.48E-02	G
HG-203	-3.7488E-03						
		279.17	-3.749E-03	&(P	3.335E-02	9.85E-03	G K
		72.87	-1.054E-01	% P	2.256E+00	6.74E-01	G
		70.83	-3.690E-01	%	4.011E+00	1.20E+00	G
		82.50	-5.589E-02	%	3.996E+00	1.19E+00	G
TL-208	2.5958E-01						
		583.14	2.596E-01	(P	3.816E-02	1.86E-02	G
		510.72	3.726E-01	+ P	1.413E-01	5.50E-02	G
PB-212	7.8902E-01						
		238.63	7.771E-01	(P	9.053E-02	3.98E-02	G K
							Energy duplication
		77.11	7.890E-01	} P	3.575E-01	9.13E-02	G
		74.81	1.071E+00	+ P	7.332E-01	2.35E-01	G
PB-214	4.4058E-01						
		351.99	4.406E-01	@(P	6.830E-02	3.09E-02	G K
		295.22	3.377E-01	- P	1.394E-01	4.93E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.018E-01	0.00E+00	G
		241.92	-4.052E-02	%	5.424E-01	1.62E-01	G
BI-212	6.1918E-01						
		727.17	5.507E-01	(P	2.998E-01	1.17E-01	G K
		1620.56	9.130E-01	*(P	6.342E-01	2.75E-01	G
		785.42	1.108E+00	%	1.530E+00	4.79E-01	G
BI-214	3.6871E-01						
		609.32	3.542E-01	(P	6.922E-02	3.20E-02	G K
		1764.51	4.108E-01	(P	1.154E-01	6.50E-02	G
		1120.28	5.860E-01	+ P	3.230E-01	1.39E-01	G
RA-224	8.5977E-01						
		241.00	8.598E-01	(	1.022E+00	3.15E-01	G
RA-226	1.2907E+00						
		185.99	1.291E+00	*(P	9.990E-01	3.13E-01	G
AC-228	7.5462E-01						
		911.07	7.147E-01	(P	1.058E-01	5.59E-02	G K
		968.90	1.266E+00	+ P	1.893E-01	1.12E-01	G
		338.40	8.511E-01	(P	2.446E-01	9.94E-02	G

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

TH-227      -7.9023E-02
                          236.00-7.902E-02 %(  3.721E-01 1.12E-01 G K
                          256.25-7.980E-02 & P 4.718E-01 1.41E-01 G

PA-234      -1.2003E-02
                           98.44-1.200E-02 %(P 2.152E-01 6.41E-02 G K
                          946.00-3.544E-02 % P 1.844E-01 5.38E-02 G
                          131.28 2.415E-02 & P 2.069E-01 6.19E-02 G
                           94.67 1.926E-03 & P 3.621E-01 1.08E-01 G
                          883.24 9.546E-02 &   2.717E-01 8.10E-02 G
                          926.70 2.312E-02 %   2.508E-01 7.10E-02 G
                          569.26-8.003E-03 % P 2.639E-01 7.48E-02 G

TH-234       8.8276E-01
                           63.29-2.511E-01 &(P 6.166E+00 1.82E+00 G K
                           92.80 1.567E+00 *(P 2.045E+00 6.24E-01 G
                           92.38 1.805E+00 &(P 2.434E+00 7.42E-01 G

AM-241      -2.6856E-01
                           59.54-2.686E-01 %(P 1.067E+00 3.20E-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	4.4377E-02	4.6016E-02	2.4541E-01	2.4543E-01	2.687E-01
K-40		1.3545E+01	1.3545E+01	1.2075E+00	1.4410E+00	
MN-54	#A	2.0676E-02	2.0804E-02	3.0813E-02	3.0837E-02	3.307E-02
CO-57	#B	2.0786E-03	2.0935E-03	4.4676E-02	4.4676E-02	4.960E-02
CO-60	#B	6.6819E-04	6.6887E-04	2.4894E-02	2.4894E-02	3.082E-02
Sr-85	#A	-2.1759E-02	-2.2419E-02	3.4887E-02	3.4911E-02	3.690E-02
Kr-85	#A	-5.0182E+02	-5.0183E+02	7.8166E+02	7.8220E+02	8.518E+02
Y-88	#B	-8.9570E-05	-9.1212E-05	2.2604E-03	2.2604E-03	2.328E-02
NB-94	#B	4.7127E-03	4.7127E-03	2.6206E-02	2.6207E-02	3.025E-02
Ag-108M	#B	-1.0331E-02	-1.0332E-02	4.0829E-02	4.0834E-02	4.597E-02
CD-109	#A	2.1864E-02	2.1957E-02	1.4209E+00	1.4209E+00	1.587E+00
SN-113	#B	-1.8876E-03	-1.9196E-03	4.1418E-02	4.1418E-02	4.640E-02
SB-125	#B	7.1983E-02	7.2121E-02	5.7425E-02	5.7578E-02	1.082E-01
I-131	#B	4.1233E-03	5.2464E-03	4.0514E-02	4.0515E-02	3.604E-02
CS-134	#B	1.9447E-02	1.9497E-02	1.4294E-02	1.4339E-02	9.510E-02
CS-137	#A	1.6122E-02	1.6125E-02	3.6039E-02	3.6051E-02	4.005E-02
CE-139	#A	-1.2392E-02	-1.2567E-02	4.0741E-02	4.0747E-02	4.452E-02
EU-152	#B	9.6315E-02	9.6355E-02	9.0627E-02	9.0785E-02	1.407E-01
EU-154	#B	2.4619E-02	2.4635E-02	9.4557E-02	9.4567E-02	1.048E-01
EU-155	#B	1.4631E-01	1.4647E-01	1.9993E-01	2.0010E-01	2.179E-01
HG-203	#B	-3.5961E-03	-3.7488E-03	2.9814E-02	2.9815E-02	3.200E-02
TL-208		2.5958E-01	2.5958E-01	5.5768E-02	5.7768E-02	
PB-212		7.8902E-01	7.8902E-01	1.2127E-01	1.2964E-01	
PB-214		4.4058E-01	4.4058E-01	9.2665E-02	9.6131E-02	
BI-212		6.1918E-01	6.1918E-01	3.4219E-01	3.4407E-01	
BI-214		3.6871E-01	3.6871E-01	1.0004E-01	1.0231E-01	
RA-224	#A	8.5977E-01	8.5977E-01	9.4401E-01	9.4533E-01	1.022E+00
RA-226	#	1.2907E+00	1.2907E+00	9.3763E-01	9.4062E-01	9.990E-01
AC-228		7.5462E-01	7.5462E-01	1.5918E-01	1.6510E-01	
TH-227	#B	-7.9023E-02	-7.9023E-02	3.3502E-01	3.3506E-01	3.721E-01
PA-234	#B	-1.2003E-02	-1.2003E-02	2.4823E-01	2.4823E-01	2.152E-01
TH-234	#B	8.8276E-01	8.8276E-01	1.0550E+00	1.0561E+00	6.166E+00
AM-241	#A	-2.6855E-01	-2.6856E-01	9.7356E-01	9.7368E-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) 1.6777140E+01 pCi/gm
Total Decayed Activity (86.4 to 2000.7 keV) 1.6777140E+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_11NOV2005_1302.An1

Sample description
FSS OOL-02-01-172-F-I-SS-001

Spectrum Filename: C:\GammaVision\Spectra\103F_11NOV2005_1302.An1

Acquisition information

Start time:	11-Nov-2005 13:02:08
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:	2.0240E+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	10-Nov-2005 13:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5061

***** S U M M A R Y O F P E A K 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	111.	24.64	0.99	9.052E-03	74.81	9.600	8.566E-01	PB212
77.07	195.	11.53	0.99	1.011E-02	77.11	17.500	7.459E-01	PB212
87.61	146.	32.57	1.32	1.455E-02	86.45	32.740	2.112E-01	EU155
					88.04	3.790	1.750E+00	CD109
93.22	94.	35.92	1.54	1.660E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.04	170.	20.58	1.55	2.566E-02	185.99	3.280	1.242E+00	RA226
209.36	114.	25.78	1.12	2.471E-02				
238.42	1064.	3.81	1.09	2.321E-02	238.63	43.100	7.023E-01	PB212
					241.92	7.470	4.130E+00	PB214
269.91	111.	25.46	1.09	2.153E-02				
294.78	254.	10.59	0.99	2.027E-02	295.22	19.200	4.286E-01	PB214
300.00	76.	33.99	1.02	2.002E-02				
337.99	231.	15.82	1.16	1.832E-02	338.40	12.010	6.984E-01	AC228
351.44	364.	7.62	1.03	1.777E-02	351.99	37.100	3.635E-01	PB214
388.65	42.	40.61	0.88	1.642E-02				
462.45	64.	28.77	1.96	1.427E-02				
462.45	64.	28.77	1.96	1.427E-02	463.51	10.000	2.928E-01	SB125
510.32	164.	15.62	1.45	1.318E-02	510.72	22.500	3.094E-01	TL208
582.41	378.	8.49	1.34	1.186E-02	583.14	86.000	2.446E-01	TL208
608.51	351.	7.34	1.29	1.145E-02	609.32	46.090	4.363E-01	BI214
660.77	87.	20.79	1.80	1.073E-02	661.62	84.620	6.300E-02	CS137
726.46	101.	16.60	1.66	9.972E-03	727.17	11.800	5.707E-01	BI212
794.03	35.	33.99	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
909.94	254.	8.16	1.60	8.409E-03	911.07	29.000	6.882E-01	AC228
963.06	41.	27.40	1.54	8.061E-03				
963.06	41.	27.40	1.54	8.061E-03	964.00	14.580	2.322E-01	EU152

967.66	131.	11.27	1.54	8.033E-03	968.90	17.460	6.238E-01	AC228
1119.07	114.	21.46	1.50	7.218E-03	1120.28	15.040	6.888E-01	BI214
1171.23	116.	17.90	1.29	6.980E-03				
1171.23	116.	17.90	1.29	6.980E-03	1173.23	99.860	1.094E-01	CO60
1330.69	55.	24.05	0.98	6.356E-03				
1330.69	55.	24.05	0.98	6.356E-03	1332.51	99.980	5.508E-02	CO60
1458.91	1337.	2.81	1.88	5.938E-03	1460.75	10.700	1.387E+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	
185.61	93.22	523.	94.	0.047	107.76	1.540	U-235	l
417.88	209.36	375.	114.	0.057	77.35	1.116	AC-228	
481.81	241.32	313.	184.	0.092	46.48	1.095	RA-224	lD
538.97	269.91	299.	111.	0.056	76.38	1.085	AC-228	s
599.14	300.00	248.	76.	0.038	101.98	1.018	PB-212	s
776.44	388.65	104.	53.	0.026	92.03	0.883	-	s
2341.42	1171.23	158.	48.	0.024	118.97	1.292	J-132	sM
3523.50	1762.37	3.	75.	0.038	36.96	1.816	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	345.	111.	0.056	73.93	0.993D
PB-212	153.39	77.11	343.	195.	0.097	34.60	0.995A
CD-109	173.68	87.25	909.	122.	0.061	108.48	1.500s
RA-226	371.25	186.04	489.	157.	0.078	61.73	1.548s
PB-212	476.05	238.45	793.	1177.	0.588	15.16	0.878
RA-224	482.01	241.43	818.	152.	0.076	83.67	1.500
PB-214	588.70	294.78	216.	250.	0.125	31.76	0.990
AC-228	675.13	337.99	369.	230.	0.115	47.45	1.161
PB-214	702.02	351.44	190.	359.	0.179	22.87	1.035
SB-125	924.46	462.67	144.	60.	0.030	91.22	1.500s
TL-208	1019.76	510.32	191.	137.	0.069	46.85	1.446s
TL-208	1163.92	582.41	180.	373.	0.187	25.47	1.340
BI-214	1216.11	608.51	110.	345.	0.172	22.01	1.292
CS-137	1320.63	660.77	97.	86.	0.043	62.36	1.799s
BI-212	1452.00	726.46	72.	101.	0.050	49.79	1.657s
CS-134	1587.11	794.03	55.	35.	0.018	101.97	1.500s
AC-228	1818.91	909.94	74.	251.	0.126	24.47	1.599s
EU-152	1925.49	963.24	57.	65.	0.032	61.37	1.538
AC-228	1934.19	967.59	90.	173.	0.086	37.29	1.539
BI-214	2237.11	1119.07	114.	112.	0.056	64.37	1.500s
CO-60	2342.62	1171.83	76.	66.	0.033	64.89	1.667

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2660.34	1330.72	31.	46.	0.023	62.98	1.765
K-40	2916.71	1458.92	36.	1294.	0.647	8.39	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		1.3256E-01					
			477.56	1.326E-01	%(	2.773E-01 8.41E-02	G
K-40		1.3610E+01					
			1460.75	1.361E+01	&(P	3.210E-01 3.86E-01	G
MN-54		1.8657E-03					
			834.81	1.866E-03	%(P	2.964E-02 8.45E-03	G
CO-57		5.7328E-03					
			122.07	5.733E-03	&(P	4.965E-02 1.49E-02	G K
			136.43	4.291E-02	&	3.742E-01 1.12E-01	G
CO-60		5.5889E-02					
			1332.51	4.851E-02	(P	2.999E-02 1.08E-02	G K
			1173.23	6.327E-02	(P	4.154E-02 1.41E-02	G K
Sr-85		-1.8070E-02					
			514.00	-1.807E-02	%(	4.239E-02 1.28E-02	G
Kr-85		-4.1276E+02					
			513.99	-4.128E+02	%(	9.681E+02 2.93E+02	G
Y-88		-1.5402E-04					
			1836.01	-1.540E-04	&(P	2.542E-02 6.59E-03	G K
			898.02	1.046E-02	% P	2.530E-02 7.56E-03	G
NB-94		4.6719E-03					
			871.10	4.672E-03	&(	3.002E-02 8.69E-03	G K
			702.50	3.153E-03	%	2.996E-02 8.68E-03	G K
Ag-108M		-1.7716E-02					
			722.95	-1.772E-02	%(	4.728E-02 1.42E-02	G K
			614.37	-4.491E-03	% P	2.781E-02 8.08E-03	G
			433.93	9.376E-03	%	3.255E-02 9.71E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.4596E+00						
		88.04	1.460E+00	*(	1.716E+00	5.28E-01	G
SN-113	-1.3402E-02						
		391.71	-1.340E-02	%(	4.817E-02	1.44E-02	G K
		255.04	-3.664E-01	&	1.417E+00	4.24E-01	G
SB-125	9.5955E-02						
		427.95	3.329E-02	%(P	8.888E-02	2.67E-02	G K
		600.77	-5.017E-02	% P	1.724E-01	5.13E-02	G
		636.15	4.621E-02	% P	2.641E-01	7.72E-02	G
		463.51	2.814E-01	*(P	2.752E-01	8.74E-02	G
		176.29	-1.443E-01	%	5.667E-01	1.70E-01	G
I-131	1.1368E-02						
		364.48	1.137E-02	&(P	3.811E-02	1.14E-02	G K
		636.97	-4.058E-04	%	4.578E-01	1.31E-01	G
		284.29	1.331E-01	% P	4.706E-01	1.41E-01	G
CS-134	1.2583E-02						
		604.66	-2.533E-03	&(	9.511E-02	2.84E-02	G K
		795.76	2.986E-02	*(P	3.146E-02	1.02E-02	G
		569.29	2.486E-02	% P	2.012E-01	5.87E-02	G
		801.84	5.981E-02	% P	3.527E-01	1.02E-01	G
CS-137	6.3003E-02						
		661.62	6.300E-02	(P	3.584E-02	1.33E-02	G
CE-139	7.5310E-03						
		165.85	7.531E-03	%(	4.414E-02	1.32E-02	G
EU-152	1.2169E-01						
		121.78	-5.710E-04	%(P	1.464E-01	4.36E-02	G K
		344.30	1.580E-02	% P	1.099E-01	3.26E-02	G
		1408.08	8.249E-02	%	1.135E-01	3.66E-02	G
		964.00	3.669E-01	&(P	2.148E-01	7.57E-02	G
		1112.07	-8.314E-02	&	3.301E-01	9.75E-02	G
		778.90	-3.264E-02	&	2.387E-01	6.93E-02	G
EU-154	1.6043E-02						
		123.10	1.604E-02	&(	1.016E-01	3.04E-02	G K
		1274.80	1.925E-02	&	1.118E-01	3.24E-02	G
		723.30	-5.836E-02	%	2.131E-01	6.35E-02	G
		1004.80	9.356E-03	&	1.764E-01	5.00E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.3939E-01						
		86.45	1.394E-01	%(	2.207E-01	6.73E-02	G K
		105.31	5.911E-02	%	2.246E-01	6.76E-02	G
HG-203	1.1842E-02						
		279.17	1.184E-02	&(P	3.334E-02	1.00E-02	G K
		72.87	-6.437E-01	% P	2.077E+00	6.26E-01	G
		70.83	-3.149E-01	&	3.722E+00	1.11E+00	G
		82.50	-1.447E+00	%	3.605E+00	1.09E+00	G
TL-208	2.4461E-01						
		583.14	2.446E-01	(P	4.273E-02	2.10E-02	G
		510.72	3.094E-01	+ P	1.511E-01	5.77E-02	G
PB-212	7.8555E-01						
		238.63	7.858E-01	(P	8.945E-02	4.01E-02	G K
							Energy duplication
		77.11	7.351E-01	} P	3.359E-01	8.48E-02	G
		74.81	8.566E-01	(P	6.854E-01	2.17E-01	G
PB-214	3.8567E-01						
		351.99	3.635E-01	(P	6.794E-02	2.81E-02	G K
		295.22	4.286E-01	(P	1.224E-01	4.61E-02	G
							Energy duplication
		77.11	1.755E-01	} P	7.488E-01	1.76E-01	G
		241.92	-1.943E-01	%	5.181E-01	1.56E-01	G
BI-212	5.7069E-01						
		727.17	5.707E-01	*(P	2.407E-01	9.51E-02	G K
		1620.56	3.438E-03	% P	8.688E-01	2.27E-01	G
		785.42	4.576E-01	%	1.760E+00	5.21E-01	G
BI-214	4.3629E-01						
		609.32	4.363E-01	(P	6.546E-02	3.26E-02	G K
		1764.51	-4.368E-02	% P	1.877E-01	4.72E-02	G
		1120.28	6.888E-01	+ P	3.231E-01	1.50E-01	G
RA-224	1.1247E+00						
		241.00	1.125E+00	(	1.009E+00	3.14E-01	G
RA-226	1.2423E+00						
		185.99	1.242E+00	(P	8.390E-01	2.77E-01	G
AC-228	7.3044E-01						
		911.07	6.882E-01	@(P	1.172E-01	5.68E-02	G K
		968.90	8.226E-01	(P	2.240E-01	1.02E-01	G
		338.40	6.984E-01	(P	2.802E-01	1.11E-01	G

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

TH-227      -1.1501E-01
                          236.00-1.150E-01 &(  3.853E-01 1.16E-01 G K
                          256.25 4.439E-02 % P 4.367E-01 1.30E-01 G

PA-234       9.6670E-02
                           98.44 9.667E-02 %(P 2.101E-01 6.37E-02 G K
                          946.00 3.173E-02 & P 1.286E-01 3.74E-02 G
                          131.28 8.126E-02 % P 1.765E-01 5.35E-02 G
                           94.67-1.663E-01 % P 3.868E-01 1.17E-01 G
                          883.24 2.437E-02 &   2.565E-01 7.36E-02 G
                          926.70 6.699E-03 &   2.483E-01 6.97E-02 G
                          569.26 3.720E-02 % P 2.982E-01 8.70E-02 G

TH-234       8.1836E-01
                           63.29 8.184E-01 %(P 6.015E+00 1.80E+00 G K
                           92.80 1.069E+00 % P 1.997E+00 6.04E-01 G
                           92.38 1.308E+00 % P 2.364E+00 7.16E-01 G

AM-241      -1.2257E-02
                           59.54-1.226E-02 %(P 1.041E+00 3.09E-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
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - 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	1.3085E-01	1.3256E-01	2.5221E-01	2.5232E-01	2.737E-01
K-40		1.3610E+01	1.3610E+01	1.1579E+00	1.4018E+00	3.210E-01
MN-54	#A	1.8616E-03	1.8657E-03	2.5357E-02	2.5357E-02	2.957E-02
CO-57	#B	5.7181E-03	5.7328E-03	4.4571E-02	4.4572E-02	4.952E-02
CO-60		5.5869E-02	5.5889E-02	2.6360E-02	2.6559E-02	2.998E-02
Sr-85	#A	-1.7878E-02	-1.8070E-02	3.8424E-02	3.8438E-02	4.193E-02
Kr-85	#A	-4.1275E+02	-4.1276E+02	8.7761E+02	8.7794E+02	9.681E+02
Y-88	#B	-1.5302E-04	-1.5402E-04	6.9015E-02	6.9015E-02	2.526E-02
NB-94	#B	4.6719E-03	4.6719E-03	2.6059E-02	2.6060E-02	3.002E-02
Ag-108M	#B	-1.7716E-02	-1.7716E-02	4.2628E-02	4.2640E-02	4.728E-02
CD-109	#A	1.4573E+00	1.4596E+00	1.5834E+00	1.5855E+00	1.714E+00
SN-113	#B	-1.3321E-02	-1.3402E-02	4.3175E-02	4.3182E-02	4.788E-02
SB-125	#F	9.5889E-02	9.5955E-02	8.9394E-02	8.9568E-02	8.882E-02
I-131	#B	1.0428E-02	1.1368E-02	3.4175E-02	3.4181E-02	3.495E-02
CS-134	#B	1.2571E-02	1.2583E-02	1.2862E-02	1.2882E-02	9.503E-02
CS-137		6.2999E-02	6.3003E-02	3.9923E-02	4.0090E-02	
CE-139	#A	7.4930E-03	7.5310E-03	3.9666E-02	3.9669E-02	4.392E-02
EU-152	#B	1.2167E-01	1.2169E-01	7.5314E-02	7.5616E-02	1.463E-01
EU-154	#B	1.6040E-02	1.6043E-02	9.1322E-02	9.1326E-02	1.016E-01
EU-155	#B	1.3934E-01	1.3939E-01	2.0193E-01	2.0208E-01	2.206E-01
HG-203	#B	1.1666E-02	1.1842E-02	3.0090E-02	3.0098E-02	3.285E-02
TL-208		2.4461E-01	2.4461E-01	6.3010E-02	6.4590E-02	
PB-212		7.8555E-01	7.8555E-01	1.2033E-01	1.2868E-01	
PB-214		3.8567E-01	3.8567E-01	7.6685E-02	7.9888E-02	
BI-212	#	5.7069E-01	5.7069E-01	2.8555E-01	2.8747E-01	
BI-214		4.3629E-01	4.3629E-01	9.7821E-02	1.0105E-01	
RA-224	#	1.1247E+00	1.1247E+00	9.4099E-01	9.4325E-01	1.009E+00
RA-226	#	1.2423E+00	1.2423E+00	8.3025E-01	8.3337E-01	
AC-228		7.3044E-01	7.3044E-01	1.5931E-01	1.6485E-01	
TH-227	#B	-1.1501E-01	-1.1501E-01	3.4831E-01	3.4837E-01	3.853E-01
PA-234	#B	9.6670E-02	9.6670E-02	1.9101E-01	1.9108E-01	2.101E-01
TH-234	#B	8.1836E-01	8.1836E-01	5.3856E+00	5.3858E+00	6.015E+00
AM-241	#A	-1.2257E-02	-1.2257E-02	1.2115E+00	1.2115E+00	1.041E+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) 4.5144429E+00 pCi/gm
Total Decayed Activity (87.4 to 2000.7 keV) 4.5144687E+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: 103F_11NOV2005_1339.An1

Sample description
FSS OOL-02-01-172-F-I-SS-001-S WET

Spectrum Filename: C:\GammaVision\Spectra\103F_11NOV2005_1339.An1

Acquisition information

Start time:	11-Nov-2005 13:39:05
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:	2.3340E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.3340E+03) = 4.2845E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	10-Nov-2005 13:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5568

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.69	123.	23.48	0.99	9.052E-03	74.81	9.600	8.218E-01	PB212
76.99	115.	23.79	0.99	1.011E-02	77.11	17.500	5.697E-01	PB212
					77.11	10.700	9.318E-01	PB214
93.00	98.	40.55	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
93.02	96.	41.16	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
186.03	200.	23.23	1.13	2.567E-02	185.99	3.280	1.287E+00	RA226
209.57	91.	37.64	1.00	2.470E-02				
238.47	1043.	3.80	1.09	2.321E-02	238.63	43.100	5.968E-01	PB212
241.96	148.	19.10	1.10	2.302E-02	241.00	3.900	9.550E-01	RA224
					241.92	7.470	4.997E-01	PB214
270.09	76.	40.23	0.87	2.152E-02				
277.53	57.	39.97	1.10	2.113E-02				
277.53	57.	39.97	1.10	2.113E-02	279.17	81.500	PBC<MDA	HG203
294.84	248.	13.12	0.93	2.027E-02	295.22	19.200	3.626E-01	PB214
299.94	109.	23.33	1.03	2.002E-02				
337.91	214.	14.02	1.06	1.832E-02	338.40	12.010	5.608E-01	AC228
351.45	479.	7.75	1.11	1.777E-02	351.99	37.100	4.161E-01	PB214
462.23	76.	28.55	0.67	1.428E-02				
462.23	76.	28.55	0.67	1.428E-02	463.51	10.000	3.055E-01	SB125
510.29	208.	11.81	1.96	1.318E-02	510.72	22.500	3.546E-01	TL208
582.51	349.	9.81	1.23	1.185E-02	583.14	86.000	1.961E-01	TL208
608.52	322.	8.71	1.47	1.145E-02	609.32	46.090	3.462E-01	BI214
660.68	104.	14.77	1.06	1.073E-02	661.62	84.620	6.548E-02	CS137

726.27	56.	27.63	1.50	9.965E-03	727.17	11.800	2.775E-01	BI212
793.67	72.	27.76	1.86	9.320E-03				
859.14	91.	23.65	1.62	8.778E-03				
910.13	249.	9.41	1.73	8.408E-03	911.07	29.000	5.837E-01	AC228
963.38	49.	25.88	1.54	8.059E-03				
963.38	49.	25.88	1.54	8.059E-03	964.00	14.580	PBC<MDA	EU152
967.92	129.	11.57	1.54	8.031E-03	968.90	17.460	5.324E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1118.78	83.	21.85	1.51	7.219E-03	1120.28	15.040	4.329E-01	BI214
1376.53	42.	25.14	1.02	6.199E-03				
1458.99	1244.	2.93	1.92	5.937E-03	1460.75	10.700	1.117E+01	K40
1762.37	65.	14.82	1.54	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	
418.31	209.57	492.	91.	0.045	112.93	1.004	AC-228	s
539.33	270.09	360.	76.	0.038	120.69	0.869	AC-228	
599.03	299.94	242.	109.	0.054	69.99	1.026	TH-227	s
1586.40	793.67	94.	69.	0.034	69.97	1.856	PA-234	s
1717.33	859.14	93.	91.	0.045	70.94	1.618	TL-208	s
1925.77	963.47	55.	49.	0.024	77.65	1.537	EU-152	lD
1934.85	968.00	47.	129.	0.065	34.72	1.540	SB-124	lD
2751.95	1376.53	19.	42.	0.021	75.42	1.018	BI-214	s
3523.49	1762.37	9.	65.	0.033	41.87	1.542	BI-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	148.79	74.81	381.	123.	0.062	70.45	0.993D
PB-212	153.39	77.11	383.	115.	0.058	71.37	0.995A
RA-226	371.12	185.98	792.	168.	0.084	69.13	1.500s
PB-212	476.31	238.58	690.	1178.	0.589	14.17	0.976
RA-224	482.19	241.52	900.	125.	0.062	105.63	1.500s
HG-203	553.65	277.25	306.	68.	0.034	114.81	1.500
PB-214	588.82	294.84	327.	243.	0.122	39.35	0.927
AC-228	674.96	337.91	265.	213.	0.106	42.07	1.062
PB-214	702.03	351.45	306.	473.	0.237	23.26	1.115
SB-125	924.07	462.47	153.	50.	0.025	109.46	1.500s
TL-208	1019.69	510.29	163.	182.	0.091	35.44	1.958s
TL-208	1164.11	582.51	216.	345.	0.172	29.44	1.225
BI-214	1216.13	608.52	147.	315.	0.158	26.12	1.470
CS-137	1320.44	660.68	61.	103.	0.051	44.31	1.058
BI-212	1451.62	726.27	95.	56.	0.028	82.88	1.500s
AC-228	1819.29	910.13	84.	246.	0.123	28.22	1.733
BI-214	2236.54	1118.78	84.	81.	0.041	65.56	1.506
K-40	2916.84	1458.99	44.	1225.	0.612	8.79	1.916

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

***** S U M M A R Y O 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		9.8192E-02					
			477.56	9.819E-02	%(	2.500E-01 7.52E-02	G
K-40		1.1174E+01					
			1460.75	1.117E+01	(P	3.067E-01 3.32E-01	G
MN-54		-4.5909E-03					
			834.81	-4.591E-03	&(P	3.102E-02 9.02E-03	G
CO-57		-8.6824E-03					
			122.07	-8.682E-03	%(P	4.321E-02 1.30E-02	G K
			136.43	5.738E-02	%	3.337E-01 1.00E-01	G
CO-60		-1.2721E-03					
			1332.51	-1.272E-03	%(P	3.418E-02 9.44E-03	G K
			1173.23	-6.357E-04	& P	4.603E-02 1.32E-02	G K
Sr-85		-1.8254E-02					
			514.00	-1.825E-02	%(	3.749E-02 1.14E-02	G
Kr-85		-4.1701E+02					
			513.99	-4.170E+02	%(	8.561E+02 2.60E+02	G
Y-88		-3.4329E-03					
			1836.01	-3.433E-03	%(P	2.210E-02 6.06E-03	G K
			898.02	-4.612E-04	& P	2.830E-02 7.95E-03	G
NB-94		5.2385E-03					
			871.10	5.238E-03	%(	2.186E-02 6.37E-03	G K
			702.50	4.779E-03	&	2.115E-02 6.18E-03	G K
Ag-108M		-7.5714E-03					
			722.95	-7.571E-03	%(	3.810E-02 1.13E-02	G K
			614.37	-4.745E-03	% P	2.934E-02 8.59E-03	G
			433.93	6.424E-03	&	2.757E-02 8.18E-03	G
CD-109		-1.2425E-02					
			88.04	-1.243E-02	%(	1.311E+00 3.89E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-7.3244E-03						
		391.71	-7.324E-03	%(	4.188E-02	1.24E-02	G K
		255.04	-1.947E-01	%	1.365E+00	4.07E-01	G
SB-125	5.1064E-02						
		427.95	-9.180E-04	%(P	8.251E-02	2.40E-02	G K
		600.77	-4.138E-02	% P	1.513E-01	4.49E-02	G
		636.15	1.774E-02	% P	2.104E-01	6.06E-02	G
		463.51	2.049E-01	(P	2.455E-01	7.67E-02	G
		176.29	-8.029E-02	%	4.965E-01	1.49E-01	G
I-131	-4.9998E-03						
		364.48	-5.000E-03	&(P	3.646E-02	1.08E-02	G K
		636.97	4.568E-02	%	3.673E-01	1.07E-01	G
		284.29	-6.942E-03	% P	4.983E-01	1.47E-01	G
CS-134	6.3737E-03						
		604.66	6.374E-03	&(	2.027E-02	6.01E-03	G K
		795.76	2.294E-03	& P	2.890E-02	8.27E-03	G
		569.29	-5.255E-03	% P	1.741E-01	4.99E-02	G
		801.84	1.050E-01	% P	2.927E-01	8.69E-02	G
CS-137	6.5484E-02						
		661.62	6.548E-02	(P	2.503E-02	9.79E-03	G
CE-139	-3.3224E-03						
		165.85	-3.322E-03	%(	3.770E-02	1.13E-02	G
EU-152	-2.7743E-02						
		121.78	-2.774E-02	%(P	1.304E-01	3.92E-02	G K
		344.30	1.164E-03	% P	9.701E-02	2.85E-02	G
		1408.08	-3.109E-02	%	1.334E-01	3.87E-02	G
		964.00	1.515E-01	& P	2.833E-01	8.63E-02	G
		1112.07	-4.510E-02	&	2.767E-01	8.08E-02	G
		778.90	-5.211E-02	%	2.045E-01	6.03E-02	G
EU-154	1.8102E-02						
		123.10	1.810E-02	&(	9.372E-02	2.81E-02	G K
		1274.80	-2.479E-02	%	1.055E-01	3.10E-02	G
		723.30	-2.305E-02	&	1.638E-01	4.80E-02	G
		1004.80	-2.921E-02	%	1.734E-01	5.04E-02	G
EU-155	8.0762E-02						
		86.45	8.076E-02	%(	1.951E-01	5.90E-02	G K
		105.31	5.728E-02	&	1.994E-01	6.01E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	2.3354E-02						
		279.17	2.335E-02	&(P	2.888E-02	8.94E-03	G K
		72.87	-7.985E-01	& P	1.806E+00	5.47E-01	G
		70.83	-3.435E-02	%	2.318E+00	6.85E-01	G
		82.50	-2.195E-02	%	2.945E+00	8.77E-01	G
TL-208	1.9609E-01						
		583.14	1.961E-01	(P	4.047E-02	1.95E-02	G
		510.72	3.546E-01	+ P	1.217E-01	4.80E-02	G
PB-212	6.8198E-01						
		238.63	6.820E-01	(P	7.247E-02	3.25E-02	G K
							Energy duplication
		77.11	3.777E-01	} P	3.071E-01	8.99E-02	G
		74.81	8.218E-01	+ P	6.238E-01	1.98E-01	G
PB-214	3.9785E-01						
		351.99	4.161E-01	(P	7.400E-02	3.26E-02	G K
		295.22	3.626E-01	(P	1.294E-01	4.83E-02	G
							Energy duplication
		77.11	2.808E-01	} P	7.793E-01	1.74E-01	G
		241.92	3.332E-02	%	5.402E-01	1.62E-01	G
BI-212	2.7751E-01						
		727.17	2.775E-01	*(P	2.375E-01	7.73E-02	G K
		1620.56	4.793E-03	& P	9.226E-01	2.49E-01	G
		785.42	3.280E-02	%	1.454E+00	4.17E-01	G
BI-214	3.6752E-01						
		609.32	3.462E-01	(P	6.497E-02	3.07E-02	G K
		1764.51	-2.314E-02	% P	1.651E-01	4.04E-02	G
		1120.28	4.329E-01	(P	2.423E-01	9.67E-02	G
RA-224	8.0172E-01						
		241.00	8.017E-01	(	9.170E-01	2.82E-01	G
RA-226	1.1554E+00						
		185.99	1.155E+00	*(P	9.205E-01	2.87E-01	G
AC-228	5.7702E-01						
		911.07	5.837E-01	(P	1.082E-01	5.56E-02	G K
		968.90	-5.119E-03	& P	2.082E-01	5.99E-02	G
		338.40	5.608E-01	(P	2.070E-01	7.90E-02	G
TH-227	-1.9153E-01						
		236.00	-1.915E-01	%(	3.020E-01	9.22E-02	G K
		256.25	8.825E-02	& P	3.611E-01	1.08E-01	G

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

PA-234      -4.2397E-02
                            98.44-4.240E-02 %(P 1.790E-01 5.37E-02 G K
                           946.00 1.180E-02 % P 1.404E-01 4.02E-02 G
                           131.28 2.115E-02 & P 1.863E-01 5.58E-02 G
                            94.67-1.567E-02 % P 3.159E-01 9.42E-02 G
                           883.24 7.794E-02 &   2.103E-01 6.28E-02 G
                           926.70-6.319E-02 %   2.551E-01 7.49E-02 G
                           569.26-7.789E-03 % P 2.580E-01 7.40E-02 G

TH-234      -2.8550E-01
                            63.29-2.855E-01 %(P 5.486E+00 1.63E+00 G K
                            92.80 1.128E+00 % P 1.810E+00 5.50E-01 G
                            92.38 1.355E+00 % P 2.135E+00 6.48E-01 G

AM-241       7.2386E-02
                            59.54 7.239E-02 &(P 8.897E-01 2.65E-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:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - 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	9.6892E-02	9.8192E-02	2.2571E-01	2.2578E-01	2.467E-01
K-40		1.1174E+01	1.1174E+01	9.9694E-01	1.1894E+00	
MN-54	#A	-4.5804E-03	-4.5909E-03	2.9946E-02	2.9947E-02	3.095E-02
CO-57	#B	-8.6595E-03	-8.6824E-03	4.0041E-02	4.0044E-02	4.310E-02
CO-60	#B	-1.2716E-03	-1.2721E-03	9.1414E-02	9.1414E-02	3.416E-02
Sr-85	#A	-1.8055E-02	-1.8254E-02	3.4125E-02	3.4141E-02	3.708E-02
Kr-85	#A	-4.1701E+02	-4.1701E+02	7.7924E+02	7.7962E+02	8.561E+02
Y-88	#B	-3.4101E-03	-3.4329E-03	1.8981E-02	1.8982E-02	2.195E-02
NB-94	#B	5.2385E-03	5.2385E-03	1.9102E-02	1.9105E-02	2.186E-02
Ag-108M	#B	-7.5712E-03	-7.5714E-03	3.3766E-02	3.3769E-02	3.810E-02
CD-109	#A	-1.2406E-02	-1.2425E-02	1.1682E+00	1.1682E+00	1.309E+00
SN-113	#B	-7.2793E-03	-7.3244E-03	3.7252E-02	3.7254E-02	4.162E-02
SB-125	#B	5.1029E-02	5.1064E-02	5.7311E-02	5.7387E-02	8.245E-02
I-131	#B	-4.5761E-03	-4.9998E-03	3.6586E-02	3.6587E-02	3.337E-02
CS-134	#B	6.3677E-03	6.3737E-03	1.8025E-02	1.8029E-02	2.025E-02
CS-137		6.5480E-02	6.5484E-02	2.9411E-02	2.9656E-02	
CE-139	#A	-3.3053E-03	-3.3224E-03	3.3762E-02	3.3763E-02	3.751E-02
EU-152	#B	-2.7739E-02	-2.7743E-02	1.2453E-01	1.2454E-01	1.304E-01
EU-154	#B	1.8097E-02	1.8102E-02	8.4416E-02	8.4422E-02	9.370E-02
EU-155	#B	8.0730E-02	8.0762E-02	1.7714E-01	1.7720E-01	1.950E-01
HG-203	#A	2.2999E-02	2.3354E-02	2.6828E-02	2.6862E-02	2.845E-02
TL-208		1.9609E-01	1.9609E-01	5.8448E-02	5.9547E-02	
PB-212		6.8198E-01	6.8198E-01	9.7604E-02	1.0533E-01	
PB-214		3.9785E-01	3.9785E-01	9.2326E-02	9.5172E-02	
BI-212	#	2.7751E-01	2.7751E-01	2.3201E-01	2.3257E-01	2.375E-01
BI-214		3.6752E-01	3.6752E-01	9.7977E-02	1.0027E-01	
RA-224	#A	8.0172E-01	8.0172E-01	8.4684E-01	8.4811E-01	9.170E-01
RA-226	#	1.1554E+00	1.1554E+00	8.6036E-01	8.6297E-01	9.205E-01
AC-228		5.7702E-01	5.7702E-01	1.4729E-01	1.5105E-01	
TH-227	#B	-1.9153E-01	-1.9153E-01	2.7650E-01	2.7672E-01	3.020E-01
PA-234	#B	-4.2397E-02	-4.2397E-02	1.7100E-01	1.7102E-01	1.790E-01
TH-234	#B	-2.8550E-01	-2.8550E-01	2.7925E+01	2.7925E+01	5.486E+00
AM-241	#A	7.2386E-02	7.2386E-02	7.9533E-01	7.9534E-01	8.897E-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_11NOV2005_1339.An1

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

Total Activity (1764.1 to 2000.7 keV) 1.3460004E+01 pCi/gm
Total Decayed Activity (1764.1 to 2000.7 keV) 1.3460008E+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_11NOV2005_1416.An1

Sample description
FSS OOL-02-01-115-F-I-SS-001

Spectrum Filename: C:\GammaVision\Spectra\103F_11NOV2005_1416.An1

Acquisition information
Start time: 11-Nov-2005 14:16:42
Live time: 2000
Real time: 2005
Dead time: 0.26 %
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: 1.7530E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7530E+03) =
5.7045E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	10-Nov-2005 13:13:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.6326

***** S U M M A R Y O F P E A K 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	145.	25.07	0.99	9.052E-03	74.81	9.600	1.287E+00	PB212
77.04	108.	26.78	0.99	1.011E-02	77.11	17.500	7.079E-01	PB212
					77.11	10.700	PBC<MDA	PB214
186.34	209.	25.97	1.17	2.566E-02	185.99	3.280	1.793E+00	RA226
208.66	179.	27.90	0.89	2.474E-02				
238.48	1178.	4.14	1.09	2.321E-02	238.63	43.100	8.990E-01	PB212
269.30	179.	25.46	1.12	2.156E-02				
277.47	153.	32.15	1.28	2.114E-02				
294.91	218.	14.47	1.13	2.026E-02	295.22	19.200	4.237E-01	PB214
328.09	95.	35.60	1.46	1.874E-02				
338.22	280.	14.28	0.98	1.831E-02	338.40	12.010	9.768E-01	AC228
351.31	390.	11.04	1.04	1.778E-02	351.99	37.100	4.499E-01	PB214
463.07	66.	41.37	1.66	1.426E-02				
463.07	66.	41.37	1.66	1.426E-02	463.51	10.000	PBC<MDA	SB125
510.43	197.	17.40	1.38	1.318E-02	510.72	22.500	4.420E-01	TL208
582.51	402.	9.66	1.21	1.185E-02	583.14	86.000	3.010E-01	TL208
608.47	319.	9.87	1.30	1.145E-02	609.32	46.090	4.570E-01	BI214
660.85	725.	6.37	1.18	1.073E-02	661.62	84.620	6.150E-01	CS137
726.58	115.	22.33	1.81	9.971E-03	727.17	11.800	7.487E-01	BI212
859.91	128.	25.40	1.51	8.773E-03				
910.30	325.	13.85	1.95	8.407E-03	911.07	29.000	1.019E+00	AC228
1118.79	70.	27.98	2.21	7.219E-03	1120.28	15.040	4.812E-01	BI214
1171.77	3098.	2.08	1.74	6.978E-03	1173.23	99.860	3.430E+00	CO60
1330.87	2846.	1.96	1.78	6.355E-03	1332.51	99.980	3.454E+00	CO60
1458.99	1232.	2.90	1.87	5.937E-03	1460.75	10.700	1.474E+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
416.47	208.66	1009.	179.	0.090	83.70	0.887	LU-177 s

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
537.76	269.30	759.	179.	0.090	76.37	1.119	AC-228	s
554.10	277.47	864.	127.	0.064	101.33	1.281	TL-208	s
655.33	328.09	479.	95.	0.048	106.80	1.464	AC-228	s
925.27	463.07	311.	66.	0.033	124.10	1.658	AC-228	l
1718.85	859.91	319.	128.	0.064	76.19	1.511	TL-208	
1933.20	967.09	505.	239.	0.120	57.60	1.525	TB-160	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	619.	145.	0.073	75.20	0.993D
PB-212	153.39	77.11	620.	108.	0.054	80.34	0.995A
RA-226	371.11	185.98	1499.	192.	0.096	82.47	1.500s
PB-212	476.16	238.50	1186.	1196.	0.598	16.22	0.895
PB-214	589.12	294.99	697.	215.	0.107	59.43	0.851
AC-228	675.58	338.22	548.	279.	0.139	42.83	0.976s
PB-214	701.77	351.31	591.	384.	0.192	33.11	1.038s
TL-208	1019.98	510.43	401.	170.	0.085	52.20	1.380s
TL-208	1164.12	582.51	386.	398.	0.199	28.99	1.209
CS-134	1211.43	606.17	604.	-88.	-0.044	122.80	1.500s
BI-214	1216.04	608.47	286.	313.	0.156	29.61	1.305
CS-137	1320.79	660.85	429.	724.	0.362	19.12	1.180
BI-212	1452.23	726.58	236.	114.	0.057	66.98	1.812s
AC-228	1819.63	910.30	505.	322.	0.161	41.55	1.952s
BI-214	2236.56	1118.79	149.	68.	0.034	83.93	2.206s
CO-60	2342.49	1171.77	282.	3096.	1.548	6.25	1.743
CO-60	2660.64	1330.87	73.	2843.	1.422	5.87	1.785
K-40	2916.85	1458.99	36.	1213.	0.607	8.70	1.866

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

***** S U M M A R Y O 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		2.1107E-01					
			477.56	2.111E-01	%(	5.925E-01 1.79E-01	G
K-40		1.4735E+01					
			1460.75	1.474E+01	(P	3.712E-01 4.34E-01	G
MN-54		1.4801E-02					
			834.81	1.480E-02	%(P	6.801E-02 2.02E-02	G
CO-57		2.0839E-02					
			122.07	2.084E-02	%(P	7.782E-02 2.35E-02	G K
			136.43	-1.011E-02	%	5.161E-01 1.54E-01	G
CO-60		3.4417E+00					
			1332.51	3.454E+00	(P	5.161E-02 6.77E-02	G K
			1173.23	3.430E+00	(P	8.968E-02 7.14E-02	G K
Sr-85		-2.2581E-02					
			514.00	-2.258E-02	%(	6.320E-02 1.90E-02	G
Kr-85		-5.1636E+02					
			513.99	-5.164E+02	%(	1.443E+03 4.35E+02	G
Y-88		-5.7925E-03					
			1836.01	-5.793E-03	%(P	3.892E-02 1.09E-02	G K
			898.02	-1.576E-02	% P	8.898E-02 2.65E-02	G
NB-94		5.8813E-03					
			871.10	5.881E-03	%(	7.482E-02 2.21E-02	G K
			702.50	-4.091E-03	&	6.718E-02 1.98E-02	G K
Ag-108M		9.0588E-04					
			722.95	9.059E-04	%(	9.656E-02 2.86E-02	G K
			614.37	1.323E-02	% P	6.529E-02 1.95E-02	G
			433.93	7.152E-03	%	6.253E-02 1.86E-02	G
CD-109		1.5397E+00					
			88.04	1.540E+00	%(	2.622E+00 7.98E-01	G
SN-113		1.7447E-02					
			391.71	1.745E-02	%(	7.905E-02 2.37E-02	G K
			255.04	-7.777E-01	&	2.508E+00 7.56E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	2.9409E-02						
		427.95	2.941E-02	%(P	1.928E-01	5.75E-02	G K
		600.77	5.331E-02	% P	3.212E-01	9.55E-02	G
		636.15	-1.169E-01	% P	5.791E-01	1.73E-01	G
		463.51	3.699E-01	% P	5.312E-01	1.63E-01	G
		176.29	-3.584E-01	%	9.275E-01	2.81E-01	G
I-131	-6.0317E-03						
		364.48	-6.032E-03	%(P	6.481E-02	1.93E-02	G K
		636.97	2.264E-01	%	9.365E-01	2.80E-01	G
		284.29	-2.566E-02	% P	9.113E-01	2.71E-01	G
CS-134	-6.0430E-02						
		604.66	-6.043E-02	&(	8.056E-02	2.47E-02	G K
		795.76	-2.259E-02	% P	8.667E-02	2.59E-02	G
		569.29	7.741E-02	% P	3.628E-01	1.08E-01	G
		801.84	1.283E-01	% P	7.627E-01	2.26E-01	G
CS-137	6.1501E-01						
		661.62	6.150E-01	(P	8.433E-02	3.92E-02	G
CE-139	3.1246E-03						
		165.85	3.125E-03	%(	7.037E-02	2.11E-02	G
EU-152	5.1632E-02						
		121.78	5.163E-02	%(P	2.224E-01	6.70E-02	G K
		344.30	2.289E-05	% P	1.943E-01	5.77E-02	G
		1408.08	2.914E-02	&	1.682E-01	4.80E-02	G
		964.00	-5.500E-03	& P	6.125E-01	1.80E-01	G
		1112.07	-1.180E-01	%	6.730E-01	2.00E-01	G
		778.90	2.934E-02	&	5.040E-01	1.48E-01	G
EU-154	4.7432E-02						
		123.10	4.743E-02	%(	1.633E-01	4.93E-02	G K
		1274.80	-3.125E-02	%	1.732E-01	5.09E-02	G
		723.30	-1.849E-01	%	4.117E-01	1.25E-01	G
		1004.80	-3.288E-02	&	4.798E-01	1.42E-01	G
EU-155	1.8438E-01						
		86.45	1.844E-01	%(	3.314E-01	1.01E-01	G K
		105.31	7.952E-02	&	3.366E-01	1.01E-01	G
HG-203	1.1577E-02						
		279.17	1.158E-02	&(P	6.735E-02	2.02E-02	G K
		72.87	-1.108E+00	& P	2.973E+00	8.99E-01	G
		70.83	-2.610E+00	&	5.813E+00	1.76E+00	G
		82.50	9.092E-01	%	3.655E+00	1.10E+00	G

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

TL-208       3.0104E-01
                          583.14 3.010E-01  (P 7.135E-02 2.94E-02 G
                          510.72 4.420E-01 + P 2.498E-01 8.89E-02 G

PB-212       9.2181E-01
                          238.63 9.218E-01  (P 1.258E-01 5.03E-02 G K
                                                          Energy duplication
                           77.11 4.724E-01 } P 5.173E-01 1.26E-01 G
                           74.81 1.287E+00 + P 1.052E+00 3.30E-01 G

PB-214       4.4180E-01
                          351.99 4.499E-01 @(P 1.357E-01 5.03E-02 G K
                          295.22 4.262E-01  (P 2.493E-01 8.60E-02 G
                                                          Energy duplication
                           77.11 3.342E-02 } P 1.308E+00 2.78E-01 G
                          241.92-3.764E-01 &   8.584E-01 2.60E-01 G

BI-212       7.4873E-01
                          727.17 7.487E-01  (P 4.869E-01 1.68E-01 G K
                         1620.56-2.280E-03 & P 8.360E-01 2.11E-01 G
                          785.42 0.000E+00 %   3.539E+00 1.04E+00 G

BI-214       4.6292E-01
                          609.32 4.570E-01  (P 1.193E-01 4.60E-02 G K
                         1764.51-4.440E-02 % P 7.469E-02 9.42E-03 G
                         1120.28 4.812E-01  (P 4.239E-01 1.38E-01 G

RA-224       5.0574E-01
                          241.00 5.057E-01 &(  1.624E+00 4.90E-01 G

RA-226       1.7591E+00
                          185.99 1.759E+00 *(P 1.677E+00 5.16E-01 G

AC-228       1.0066E+00
                          911.07 1.019E+00 *(P 3.399E-01 1.42E-01 G K
                          968.90-6.319E-02 & P 5.441E-01 1.62E-01 G
                          338.40 9.768E-01 @(P 3.923E-01 1.40E-01 G

TH-227      -3.1995E-01
                          236.00-3.199E-01 &(  6.010E-01 1.83E-01 G K
                          256.25 7.752E-02 % P 7.474E-01 2.24E-01 G

PA-234       1.3604E-02
                           98.44 1.360E-02 %(P 3.264E-01 9.78E-02 G K
                          946.00-1.275E-01 % P 4.657E-01 1.40E-01 G
                          131.28 1.569E-01 & P 2.584E-01 7.87E-02 G
                           94.67-1.706E-01 % P 5.980E-01 1.80E-01 G
                          883.24-4.784E-02 &   6.879E-01 2.04E-01 G
                          926.70 1.371E-01 %   7.789E-01 2.32E-01 G
```

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.150E-01 % P 5.377E-01 1.60E-01 G

TH-234       3.4117E+00
                           63.29 3.412E+00 %(P 9.223E+00 2.79E+00 G K
                           92.80 1.857E+00 % P 3.116E+00 9.46E-01 G
                           92.38 1.736E+00 % P 3.722E+00 1.13E+00 G

AM-241      -4.0000E-01
                           59.54-4.000E-01 %(P 1.625E+00 4.89E-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	2.0823E-01	2.1107E-01	5.3575E-01	5.3589E-01	5.845E-01
K-40		1.4735E+01	1.4735E+01	1.3025E+00	1.5583E+00	
MN-54	#A	1.4767E-02	1.4801E-02	6.0728E-02	6.0734E-02	6.786E-02
CO-57	#B	2.0783E-02	2.0839E-02	7.0413E-02	7.0422E-02	7.761E-02
CO-60		3.4404E+00	3.4417E+00	1.4769E-01	2.4847E-01	

Sr-85	#A	-2.2330E-02	-2.2581E-02	5.7141E-02	5.7156E-02	6.250E-02
Kr-85	#A	-5.1636E+02	-5.1636E+02	1.3046E+03	1.3050E+03	1.443E+03
Y-88	#B	-5.7533E-03	-5.7925E-03	3.3908E-02	3.3909E-02	3.866E-02
NB-94	#B	5.8813E-03	5.8813E-03	6.6281E-02	6.6281E-02	7.482E-02
Ag-108M	#B	9.0586E-04	9.0588E-04	8.5850E-02	8.5850E-02	9.656E-02
CD-109	#A	1.5372E+00	1.5397E+00	2.3936E+00	2.3951E+00	2.618E+00
SN-113	#B	1.7337E-02	1.7447E-02	7.0963E-02	7.0970E-02	7.855E-02
SB-125	#B	2.9388E-02	2.9409E-02	1.7261E-01	1.7262E-01	1.927E-01
I-131	#B	-5.5124E-03	-6.0317E-03	6.6201E-02	6.6202E-02	5.923E-02
CS-134	#A	-6.0372E-02	-6.0430E-02	7.4208E-02	7.4291E-02	8.048E-02
CS-137		6.1497E-01	6.1501E-01	1.1784E-01	1.2313E-01	
CE-139	#A	3.1082E-03	3.1246E-03	6.3229E-02	6.3229E-02	7.000E-02
EU-152	#B	5.1624E-02	5.1632E-02	2.0103E-01	2.0105E-01	2.224E-01
EU-154	#B	4.7421E-02	4.7432E-02	1.4786E-01	1.4788E-01	1.633E-01
EU-155	#B	1.8431E-01	1.8438E-01	3.0225E-01	3.0242E-01	3.313E-01
HG-203	#B	1.1399E-02	1.1577E-02	6.0589E-02	6.0593E-02	6.632E-02
TL-208		3.0104E-01	3.0104E-01	8.8210E-02	8.9924E-02	
PB-212		9.2181E-01	9.2181E-01	1.5098E-01	1.6019E-01	
PB-214		4.4180E-01	4.4180E-01	1.4842E-01	1.5062E-01	
BI-212	#	7.4873E-01	7.4873E-01	5.0370E-01	5.0558E-01	
BI-214		4.6292E-01	4.6292E-01	1.3989E-01	1.4244E-01	
RA-224	#A	5.0574E-01	5.0574E-01	1.4711E+00	1.4714E+00	1.624E+00
RA-226	#	1.7591E+00	1.7591E+00	1.5486E+00	1.5520E+00	1.677E+00
AC-228	#	1.0066E+00	1.0066E+00	3.0245E-01	3.0804E-01	
TH-227	#B	-3.1995E-01	-3.1995E-01	5.4774E-01	5.4806E-01	6.010E-01
PA-234	#B	1.3604E-02	1.3604E-02	2.9329E-01	2.9329E-01	3.264E-01
TH-234	#B	3.4117E+00	3.4117E+00	8.3559E+00	8.3580E+00	9.223E+00
AM-241	#A	-4.0000E-01	-4.0000E-01	1.4816E+00	1.4818E+00	1.625E+00

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

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

Total Activity (83.9 to 2000.7 keV) 2.2673683E+01 pCi/gm
Total Decayed Activity (83.9 to 2000.7 keV) 2.2675016E+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_11NOV2005_1454.An1

Sample description
FSS OOL-02-01-172-F-I-SS-003

Spectrum Filename: C:\GammaVision\Spectra\103F_11NOV2005_1454.An1

Acquisition information

Start time:	11-Nov-2005 14:54:51
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:	1.7680E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.7680E+03) = 5.6561E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	10-Nov-2005 13:33:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5408

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.78	123.	21.44	0.99	9.052E-03	74.81	9.600	1.083E+00	PB212
77.08	188.	12.14	0.99	1.011E-02	77.11	17.500	8.463E-01	PB212
186.37	106.	32.88	1.12	2.565E-02	185.99	3.280	PBC<MDA	RA226
209.44	79.	39.67	1.14	2.471E-02				
238.50	1030.	3.73	1.09	2.321E-02	238.63	43.100	7.779E-01	PB212
241.48	137.	19.22	1.09	2.305E-02	241.00	3.900	1.168E+00	RA224
269.73	102.	29.24	1.58	2.154E-02				
277.02	61.	40.31	0.76	2.116E-02				
294.76	211.	12.71	0.93	2.027E-02	295.22	19.200	4.069E-01	PB214
299.93	71.	31.29	1.07	2.002E-02				
327.74	61.	36.04	1.18	1.875E-02				
337.99	204.	14.28	1.19	1.832E-02	338.40	12.010	7.056E-01	AC228
351.41	367.	8.54	1.14	1.778E-02	351.99	37.100	4.196E-01	PB214
462.31	77.	25.13	1.48	1.428E-02				
462.31	77.	25.13	1.48	1.428E-02	463.51	10.000	4.055E-01	SB125
510.31	178.	12.68	1.48	1.318E-02	510.72	22.500	3.908E-01	TL208
582.57	294.	8.62	1.54	1.185E-02	583.14	86.000	2.174E-01	TL208
608.51	288.	7.64	1.12	1.145E-02	609.32	46.090	4.078E-01	BI214
660.89	185.	11.66	1.56	1.073E-02	661.62	84.620	1.548E-01	CS137
726.42	94.	22.01	1.79	9.973E-03	727.17	11.800	6.052E-01	BI212
794.13	47.	28.11	1.15	9.316E-03				
858.99	73.	24.00	1.67	8.780E-03				
910.12	258.	9.00	1.61	8.408E-03	911.07	29.000	7.979E-01	AC228
967.40	195.	10.44	1.53	8.035E-03	968.90	17.460	1.064E+00	AC228
1008.32	21.	38.68	1.56	7.813E-03	1004.80	17.600	PBC<MDA	EU154
1119.18	75.	24.42	1.10	7.217E-03	1120.28	15.040	5.152E-01	BI214
1171.65	121.	16.35	1.87	6.978E-03	1173.23	99.860	HL>Cutoff	CO60

1330.76	146.	12.73	1.33	6.355E-03	1332.51	99.980	HL>Cutoff CO60
1459.05	1147.	3.04	1.79	5.937E-03	1460.75	10.700	1.359E+01 K40

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.04	209.44	413.	79.	0.040	119.02	1.145	AC-228	
538.61	269.73	315.	102.	0.051	87.72	1.579	AC-228	s
599.01	299.93	192.	71.	0.036	93.86	1.065	TH-227	
654.63	327.74	192.	61.	0.031	108.13	1.183	AC-228	s
923.75	462.31	122.	78.	0.039	69.16	1.485	CS-138	s
1587.32	794.13	62.	36.	0.018	106.93	1.149	PA-234	
1717.01	858.99	65.	73.	0.036	72.01	1.669	TL-208	
3523.44	1762.34	1.	56.	0.028	41.43	1.623	BI-214	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	306.	123.	0.062	64.32	0.993D
PB-212	153.39	77.11	304.	188.	0.094	36.43	0.995A
RA-226	371.63	186.23	710.	126.	0.063	84.33	1.500
PB-212	476.12	238.48	648.	1045.	0.522	15.30	0.992
RA-224	481.97	241.41	704.	113.	0.056	103.59	1.500s
PB-214	588.67	294.76	225.	207.	0.103	38.13	0.929
AC-228	675.12	337.99	249.	203.	0.101	42.84	1.195
PB-214	701.95	351.41	233.	362.	0.181	25.61	1.141
TL-208	1019.74	510.31	145.	152.	0.076	38.05	1.475s
TL-208	1164.25	582.57	120.	290.	0.145	25.85	1.536
BI-214	1216.11	608.51	82.	281.	0.141	22.92	1.117s
CS-137	1320.88	660.89	98.	184.	0.092	34.99	1.564
BI-212	1451.92	726.42	104.	93.	0.047	66.03	1.789s
AC-228	1819.28	910.12	94.	254.	0.127	26.99	1.609
AC-228	1933.81	967.40	65.	195.	0.098	31.33	1.530s
EU-154	2015.64	1008.32	22.	21.	0.010	116.03	1.563s
BI-214	2237.34	1119.18	86.	73.	0.037	73.26	1.099s
CO-60	2342.26	1171.65	81.	119.	0.059	49.05	1.872
CO-60	2660.43	1330.76	49.	143.	0.072	38.19	1.334s
K-40	2916.96	1459.05	37.	1128.	0.564	9.13	1.793

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

***** S U M M A R Y O 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		1.1986E-01					
			477.56	1.199E-01	%(	3.203E-01 9.62E-02	G
K-40		1.3587E+01					
			1460.75	1.359E+01	(P	3.727E-01 4.20E-01	G
MN-54		7.8009E-03					
			834.81	7.801E-03	%(P	3.613E-02 1.06E-02	G
CO-57		9.9178E-03					
			122.07	9.918E-03	%(P	5.243E-02 1.57E-02	G K
			136.43	1.498E-01	%	3.936E-01 1.19E-01	G
CO-60		1.7243E-01					
			1332.51	1.724E-01	@(P	4.249E-02 2.23E-02	G K
			1173.23	1.305E-01	- P	4.908E-02 2.17E-02	G K
Sr-85		-1.5778E-02					
			514.00	-1.578E-02	&(	4.308E-02 1.30E-02	G
Kr-85		-3.6039E+02					
			513.99	-3.604E+02	&(	9.833E+02 2.96E+02	G
Y-88		5.3332E-03					
			1836.01	5.333E-03	%(P	2.424E-02 6.71E-03	G K
			898.02	-6.089E-04	% P	4.079E-02 1.15E-02	G
NB-94		9.3650E-04					
			871.10	9.365E-04	%(	3.781E-02 1.08E-02	G K
			702.50	-3.156E-03	&	2.802E-02 8.04E-03	G K
Ag-108M		1.3128E-05					
			722.95	1.313E-05	%(	4.203E-02 1.21E-02	G K
			614.37	7.069E-04	% P	4.058E-02 1.17E-02	G
			433.93	6.633E-03	&	3.382E-02 9.99E-03	G
CD-109		9.6263E-01					
			88.04	9.626E-01	&(	1.902E+00 5.77E-01	G
SN-113		4.1596E-03					
			391.71	4.160E-03	%(	4.662E-02 1.37E-02	G K
			255.04	-7.033E-02	%	1.585E+00 4.69E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	3.8087E-02						
		427.95	3.809E-02	%(P	9.923E-02	2.98E-02	G K
		600.77	3.039E-02	% P	1.796E-01	5.26E-02	G
		636.15	-7.156E-02	% P	2.791E-01	8.19E-02	G
		463.51	-1.256E-02	% P	3.664E-01	1.07E-01	G
		176.29	1.052E-01	%	5.776E-01	1.73E-01	G
I-131	1.1205E-03						
		364.48	1.121E-03	%(P	4.448E-02	1.30E-02	G K
		636.97	-1.247E-01	&	4.484E-01	1.33E-01	G
		284.29	1.615E-01	& P	5.923E-01	1.77E-01	G
CS-134	-1.5677E-02						
		604.66	-1.568E-02	%(	5.340E-02	1.60E-02	G K
		795.76	1.097E-02	& P	3.752E-02	1.11E-02	G
		569.29	1.583E-02	& P	1.684E-01	4.81E-02	G
		801.84	7.291E-02	% P	3.624E-01	1.05E-01	G
CS-137	1.5477E-01						
		661.62	1.548E-01	(P	4.120E-02	1.82E-02	G
CE-139	-4.0874E-03						
		165.85	-4.087E-03	&(	4.599E-02	1.37E-02	G
EU-152	3.4320E-02						
		121.78	3.432E-02	&(P	1.529E-01	4.59E-02	G K
		344.30	5.382E-03	% P	9.033E-02	2.63E-02	G
		1408.08	0.000E+00	%	1.952E-01	5.44E-02	G
		964.00	6.708E-02	& P	1.833E-01	5.42E-02	G
		1112.07	6.198E-02	&	3.154E-01	9.20E-02	G
		778.90	6.418E-02	%	2.274E-01	6.70E-02	G
EU-154	2.0661E-02						
		123.10	-2.098E-02	%(	9.658E-02	2.89E-02	G K
		1274.80	0.000E+00	&	1.399E-01	3.98E-02	G
		723.30	1.299E-02	%	1.880E-01	5.43E-02	G
		1004.80	1.164E-01	?(	1.374E-01	4.50E-02	G
EU-155	1.2355E-01						
		86.45	1.236E-01	%(	2.391E-01	7.26E-02	G K
		105.31	9.637E-03	%	2.341E-01	6.97E-02	G
HG-203	-1.0067E-02						
		279.17	-1.007E-02	%(P	4.594E-02	1.37E-02	G K
		72.87	3.685E-02	% P	2.475E+00	7.39E-01	G
		70.83	-1.744E-01	%	3.872E+00	1.15E+00	G
		82.50	-5.194E-01	%	3.961E+00	1.19E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.1737E-01						
		583.14	2.174E-01	(P	4.039E-02	1.90E-02	G
		510.72	3.908E-01	+ P	1.519E-01	5.82E-02	G
PB-212	8.1230E-01						
		238.63	7.985E-01	(P	9.279E-02	4.12E-02	G K
							Energy duplication
		77.11	8.123E-01	} P	3.626E-01	9.86E-02	G
		74.81	1.083E+00	+ P	7.411E-01	2.38E-01	G
PB-214	4.1525E-01						
		351.99	4.196E-01	(P	8.577E-02	3.63E-02	G K
		295.22	4.069E-01	(P	1.428E-01	5.27E-02	G
							Energy duplication
		77.11	8.156E-03	} P	7.624E-01	1.10E-01	G
		241.92	-3.736E-02	%	4.214E-01	1.25E-01	G
BI-212	6.0522E-01						
		727.17	6.052E-01	(P	3.264E-01	1.34E-01	G K
		1620.56	1.432E-01	% P	9.845E-01	2.71E-01	G
		785.42	6.046E-01	%	1.761E+00	5.25E-01	G
BI-214	4.0784E-01						
		609.32	4.078E-01	@(P	6.498E-02	3.18E-02	G K
		1764.51	-3.055E-02	% P	2.180E-01	5.34E-02	G
		1120.28	5.152E-01	+ P	3.234E-01	1.29E-01	G
RA-224	9.5940E-01						
		241.00	9.594E-01	(	1.073E+00	3.31E-01	G
RA-226	1.1467E+00						
		185.99	1.147E+00	(P	1.152E+00	3.55E-01	G
AC-228	7.7087E-01						
		911.07	7.979E-01	(P	1.500E-01	7.27E-02	G K
		968.90	1.064E+00	+ P	2.196E-01	1.11E-01	G
		338.40	7.056E-01	(P	2.652E-01	1.01E-01	G
TH-227	-1.7007E-01						
		236.00	-1.701E-01	%(	4.087E-01	1.24E-01	G K
		256.25	9.334E-02	% P	4.826E-01	1.44E-01	G
PA-234	-4.2845E-02						
		98.44	-4.285E-02	&(P	2.148E-01	6.43E-02	G K
		946.00	3.017E-02	& P	1.571E-01	4.54E-02	G
		131.28	-1.757E-02	& P	2.162E-01	6.45E-02	G
		94.67	-7.129E-03	% P	4.129E-01	1.23E-01	G
		883.24	-2.907E-02	&	3.181E-01	9.16E-02	G
		926.70	0.000E+00	&	3.539E-01	1.01E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 2.956E-02 & P 2.490E-01 7.14E-02 G

TH-234      -4.3301E-01
                           63.29-4.330E-01 &(P 6.638E+00 1.97E+00 G K
                           92.80 8.238E-01 % P 2.280E+00 6.85E-01 G
                           92.38 9.710E-01 % P 2.698E+00 8.11E-01 G

AM-241       1.4270E-01
                           59.54 1.427E-01 %(P 1.151E+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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	1.1822E-01	1.1986E-01	2.8860E-01	2.8869E-01	3.160E-01
K-40		1.3587E+01	1.3587E+01	1.2613E+00	1.4877E+00	
MN-54	#A	7.7826E-03	7.8009E-03	3.1708E-02	3.1712E-02	3.605E-02
CO-57	#B	9.8910E-03	9.9178E-03	4.7147E-02	4.7150E-02	5.229E-02
CO-60	#H	1.7236E-01	1.7243E-01	6.7066E-02	6.7809E-02	

Sr-85	#A	-1.5601E-02	-1.5778E-02	3.8853E-02	3.8864E-02	4.259E-02
Kr-85	#A	-3.6039E+02	-3.6039E+02	8.8693E+02	8.8717E+02	9.833E+02
Y-88	#B	5.2967E-03	5.3332E-03	2.0141E-02	2.0143E-02	2.407E-02
NB-94	#B	9.3650E-04	9.3650E-04	3.2365E-02	3.2365E-02	3.781E-02
Ag-108M	#B	1.3128E-05	1.3128E-05	3.6185E-02	3.6185E-02	4.203E-02
CD-109	#A	9.6107E-01	9.6263E-01	1.7321E+00	1.7329E+00	1.899E+00
SN-113	#B	4.1332E-03	4.1596E-03	4.0971E-02	4.0971E-02	4.633E-02
SB-125	#B	3.8059E-02	3.8087E-02	8.9460E-02	8.9487E-02	9.916E-02
I-131	#B	1.0229E-03	1.1205E-03	3.9077E-02	3.9077E-02	4.061E-02
CS-134	#B	-1.5662E-02	-1.5677E-02	4.7953E-02	4.7962E-02	5.335E-02
CS-137		1.5476E-01	1.5477E-01	5.4566E-02	5.5301E-02	
CE-139	#A	-4.0657E-03	-4.0874E-03	4.1124E-02	4.1125E-02	4.574E-02
EU-152	#B	3.4315E-02	3.4320E-02	1.3768E-01	1.3769E-01	1.529E-01
EU-154	#B	2.0656E-02	2.0661E-02	2.3973E-02	2.4000E-02	9.656E-02
EU-155	#B	1.2350E-01	1.2355E-01	2.1788E-01	2.1799E-01	2.390E-01
HG-203	#B	-9.9104E-03	-1.0067E-02	4.1347E-02	4.1352E-02	4.522E-02
TL-208		2.1737E-01	2.1737E-01	5.7036E-02	5.8416E-02	
PB-212		8.1230E-01	8.1230E-01	1.2569E-01	1.3424E-01	
PB-214		4.1525E-01	4.1525E-01	9.7116E-02	1.0006E-01	
BI-212		6.0522E-01	6.0522E-01	4.0178E-01	4.0331E-01	
BI-214	#	4.0784E-01	4.0784E-01	9.5614E-02	9.8502E-02	
RA-224	#A	9.5940E-01	9.5940E-01	9.9384E-01	9.9540E-01	1.073E+00
RA-226	#A	1.1467E+00	1.1467E+00	1.0662E+00	1.0683E+00	1.152E+00
AC-228		7.7087E-01	7.7087E-01	1.9667E-01	2.0170E-01	
TH-227	#B	-1.7007E-01	-1.7007E-01	3.7094E-01	3.7107E-01	4.087E-01
PA-234	#B	-4.2845E-02	-4.2845E-02	2.0839E-01	2.0840E-01	2.148E-01
TH-234	#B	-4.3301E-01	-4.3301E-01	2.4450E+01	2.4450E+01	6.638E+00
AM-241	#A	1.4270E-01	1.4270E-01	1.0310E+00	1.0310E+00	1.151E+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) 1.7142788E+01 pCi/gm
Total Decayed Activity (86.4 to 2000.7 keV) 1.7142862E+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_29OCT2005_0538.An1

Sample description
FSS OOL-02-01-010-F

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_0538.An1

Acquisition information
Start time: 29-Oct-2005 15:38:19
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: 1.8640E+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	28-Oct-2005 08:32:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4929

***** S U M M A R Y O F P E A K 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	108.	25.59	0.99	9.052E-03	74.81	9.600	9.047E-01	PB212
77.15	179.	13.87	0.99	1.011E-02	77.11	10.700	1.278E+00	PB214
					77.11	17.500	7.813E-01	PB212
93.01	88.	40.60	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.01	176.	21.89	1.10	2.567E-02	185.99	3.280	1.408E+00	RA226
209.73	138.	26.38	1.04	2.469E-02				
238.61	1022.	3.68	1.09	2.320E-02	238.63	43.100	7.325E-01	PB212
					241.92	7.470	4.309E+00	PB214
238.72	559.	7.18	1.50	2.302E-02	238.63	43.100	PBC<MDA	PB212
					241.92	7.470	2.358E+00	PB214
269.95	102.	24.25	1.25	2.153E-02				
294.97	228.	9.81	1.13	2.027E-02	295.22	19.200	4.175E-01	PB214
299.68	74.	25.48	1.13	2.004E-02				
327.89	62.	33.98	0.97	1.875E-02				
338.11	229.	13.53	1.01	1.831E-02	338.40	12.010	7.517E-01	AC228
351.44	424.	8.20	1.13	1.777E-02	351.99	37.100	4.605E-01	PB214
462.20	106.	23.61	1.29	1.428E-02				
462.20	106.	23.61	1.29	1.428E-02	463.51	10.000	5.349E-01	SB125
510.21	202.	14.09	1.63	1.318E-02	510.72	22.500	4.289E-01	TL208
582.49	321.	8.58	1.17	1.186E-02	583.14	86.000	2.251E-01	TL208
608.92	310.	8.08	1.18	1.145E-02				
608.92	310.	8.08	1.18	1.145E-02	609.32	46.090	4.174E-01	BI214
661.39	139.	17.74	1.48	1.073E-02	661.62	84.620	1.100E-01	CS137
726.47	86.	16.29	1.35	9.972E-03	727.17	11.800	5.284E-01	BI212
859.53	45.	30.68	1.02	8.775E-03				
910.15	251.	10.23	1.62	8.408E-03	911.07	29.000	7.357E-01	AC228

963.80	63.	19.50	1.54	8.057E-03				
963.80	63.	19.50	1.54	8.057E-03	964.00	14.580	3.836E-01	EU152
967.98	146.	9.82	1.54	8.031E-03	968.90	17.460	7.539E-01	AC228
1118.97	84.	27.83	1.47	7.218E-03				
1118.97	84.	27.83	1.47	7.218E-03	1120.28	15.040	5.495E-01	BI214
1331.30	65.	21.15	2.08	6.354E-03				
1331.30	65.	21.15	2.08	6.354E-03	1332.51	99.980	7.136E-02	CO60
1459.33	1260.	2.88	1.89	5.936E-03	1460.75	10.700	1.418E+01	K40
1620.21	13.	36.85	0.93	5.488E-03	1620.56	2.750	6.464E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1762.95	44.	16.49	2.03	5.142E-03	1764.51	15.920	3.876E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.63	209.73	478.	138.	0.069	79.14	1.042	NP-239	s
482.09	241.51	317.	121.	0.061	68.07	1.095	PB-214	lD
539.06	269.95	233.	102.	0.051	72.76	1.254	AC-228	s
598.03	299.44	186.	66.	0.033	95.13	1.034	TH-227	M
654.92	327.89	184.	62.	0.031	101.93	0.969	AC-228	s
1216.94	608.92	342.	74.	0.037	111.01	1.181	BI-214	s
1718.09	859.53	56.	45.	0.023	92.04	1.020	TL-208	
1926.62	963.81	43.	63.	0.031	58.49	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	355.	108.	0.054	76.76	0.993D
PB-212	153.39	77.11	340.	179.	0.090	41.60	0.995A
RA-226	371.25	186.05	640.	139.	0.069	74.10	1.500s
PB-212	476.40	238.62	561.	985.	0.493	14.65	1.054
RA-224	482.15	241.50	686.	101.	0.051	113.55	1.500s
PB-214	476.59	238.72	527.	559.	0.280	21.54	1.500
PB-214	588.62	294.73	280.	239.	0.119	37.71	1.074s
AC-228	675.37	338.11	262.	228.	0.114	40.59	1.009
PB-214	702.02	351.44	268.	418.	0.209	24.61	1.125s
SB-125	924.36	462.62	141.	63.	0.031	86.90	1.500s
TL-208	1019.53	510.21	196.	175.	0.088	42.28	1.629s
TL-208	1164.08	582.49	141.	316.	0.158	25.75	1.170
BI-214	1216.54	608.72	116.	265.	0.133	24.45	1.500s
CS-137	1321.87	661.39	128.	138.	0.069	53.21	1.484s
BI-212	1452.00	726.47	53.	86.	0.043	48.86	1.346
AC-228	1819.34	910.15	108.	247.	0.124	30.70	1.620
AC-228	1934.33	967.66	73.	206.	0.103	30.44	1.169
BI-214	2237.56	1119.30	76.	47.	0.023	86.50	1.634
CO-60	2661.76	1331.42	21.	43.	0.022	59.21	1.765

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2917.52	1459.33	39.	1241.	0.621	8.65	1.894
BI-212	3239.22	1620.21	5.	13.	0.007	110.55	0.932s
BI-214	3524.66	1762.95	10.	44.	0.022	49.47	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	Code	MDA Value pCi/gm	COMMENTS
BE-7		3.7252E-02					
			477.56	3.725E-02	&(	3.015E-01 8.83E-02	G
K-40		1.4178E+01					
			1460.75	1.418E+01	(P	3.622E-01 4.15E-01	G
MN-54		1.6080E-02					
			834.81	1.608E-02	%(P	3.699E-02 1.11E-02	G
CO-57		-5.5263E-03					
			122.07	-5.526E-03	%(P	4.572E-02 1.36E-02	G K
			136.43	-8.032E-02	%	3.844E-01 1.15E-01	G
CO-60		4.9338E-02					
			1332.51	4.934E-02	(P	2.729E-02 1.03E-02	G K
			1173.23	3.018E-02	& P	4.972E-02 1.52E-02	G K
Sr-85		-1.5584E-03					
			514.00	-1.558E-03	%(	3.874E-02 1.13E-02	G
Kr-85		-3.5482E+01					
			513.99	-3.548E+01	%(	8.821E+02 2.58E+02	G
Y-88		3.5319E-03					
			1836.01	3.532E-03	%(P	2.150E-02 5.77E-03	G K
			898.02	-1.012E-02	% P	3.923E-02 1.15E-02	G
NB-94		8.8827E-04					
			871.10	8.883E-04	%(	3.402E-02 9.68E-03	G K
			702.50	1.291E-02	&	2.904E-02 8.77E-03	G K
Ag-108M		-3.6765E-02					
			722.95	-3.676E-02	&(	5.653E-02 1.74E-02	G K
			614.37	-1.002E-02	% P	3.547E-02 1.05E-02	G
			433.93	3.399E-03	%	2.876E-02 8.40E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.0388E-01						
		88.04	1.039E-01	%(	1.736E+00	5.18E-01	G
SN-113	-7.1250E-03						
		391.71	-7.125E-03	%(	4.618E-02	1.36E-02	G K
		255.04	0.000E+00	&	1.586E+00	4.68E-01	G
SB-125	6.2414E-02						
		427.95	-2.429E-02	%(P	1.032E-01	3.06E-02	G K
		600.77	-5.588E-02	% P	1.748E-01	5.21E-02	G
		636.15	1.126E-01	% P	2.589E-01	7.80E-02	G
		463.51	3.191E-01	*(P	2.954E-01	9.43E-02	G
		176.29	1.164E-01	&	4.626E-01	1.39E-01	G
I-131	-1.2382E-02						
		364.48	-1.238E-02	%(P	3.886E-02	1.16E-02	G K
		636.97	1.998E-01	%	4.572E-01	1.38E-01	G
		284.29	3.293E-02	& P	4.525E-01	1.33E-01	G
CS-134	-2.4582E-02						
		604.66	-2.458E-02	&(	4.702E-02	1.43E-02	G K
		795.76	1.621E-02	& P	2.564E-02	8.01E-03	G
		569.29	1.270E-02	% P	2.121E-01	6.14E-02	G
		801.84	-4.506E-02	% P	2.913E-01	8.11E-02	G
CS-137	1.1005E-01						
		661.62	1.100E-01	@(P	4.434E-02	1.97E-02	G
CE-139	6.2053E-03						
		165.85	6.205E-03	%(	3.976E-02	1.19E-02	G
EU-152	-1.7631E-02						
		121.78	-1.763E-02	%(P	1.382E-01	4.12E-02	G K
		344.30	1.330E-03	& P	1.107E-01	3.24E-02	G
		1408.08	6.176E-02	%	1.257E-01	3.84E-02	G
		964.00	2.386E-01	& P	3.474E-01	1.07E-01	G
		1112.07	7.093E-03	&	2.801E-01	7.93E-02	G
		778.90	-6.511E-02	%	2.629E-01	7.75E-02	G
EU-154	2.1553E-02						
		123.10	2.155E-02	%(	1.000E-01	3.00E-02	G K
		1274.80	-3.251E-03	%	1.108E-01	3.12E-02	G
		723.30	-7.353E-02	&	2.164E-01	6.48E-02	G
		1004.80	-3.723E-02	%	1.624E-01	4.71E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.0477E-01						
		86.45	1.048E-01	%(	2.256E-01	6.84E-02	G K
		105.31	9.723E-02	%	2.154E-01	6.53E-02	G
HG-203	-4.7521E-04						
		279.17	-4.752E-04	&(P	3.921E-02	1.16E-02	G K
		72.87	-4.438E-01	% P	2.111E+00	6.34E-01	G
		70.83	1.974E-02	%	3.140E+00	9.29E-01	G
		82.50	-9.626E-01	%	3.769E+00	1.13E+00	G
TL-208	2.2511E-01						
		583.14	2.251E-01	(P	4.127E-02	1.96E-02	G
		510.72	4.289E-01	+ P	1.661E-01	6.96E-02	G
PB-212	7.3359E-01						
		238.63	7.142E-01	(P	8.199E-02	3.53E-02	G K
							Energy duplication
		77.11	7.336E-01	} P	3.632E-01	1.02E-01	G
		74.81	9.047E-01	+ P	7.547E-01	2.38E-01	G
PB-214	4.5541E-01						
		351.99	4.605E-01	@(P	8.690E-02	3.82E-02	G K
		295.22	4.456E-01	@(P	1.505E-01	5.69E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.804E-01	0.00E+00	G
		241.92	2.358E+00	+	4.625E-01	1.69E-01	G
BI-212	5.5072E-01						
		727.17	5.284E-01	(P	2.265E-01	8.65E-02	G K
		1620.56	6.464E-01	(P	6.074E-01	2.39E-01	G
		785.42	5.629E-01	%	1.739E+00	5.17E-01	G
BI-214	3.5924E-01						
		609.32	3.645E-01	@(P	7.264E-02	3.04E-02	G K
		1764.51	3.876E-01	@(P	1.534E-01	6.87E-02	G
		1120.28	3.130E-01	(P	2.900E-01	9.39E-02	G
RA-224	8.1704E-01						
		241.00	8.170E-01	(	1.005E+00	3.09E-01	G
RA-226	1.1961E+00						
		185.99	1.196E+00	*(P	1.039E+00	3.23E-01	G
AC-228	7.4038E-01						
		911.07	7.357E-01	(P	1.520E-01	7.63E-02	G K
		968.90	1.067E+00	+ P	2.196E-01	1.08E-01	G
		338.40	7.517E-01	(P	2.578E-01	1.02E-01	G

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

TH-227      -8.3402E-02
                          236.00-8.340E-02 %(  3.775E-01 1.13E-01 G K
                          256.25-5.266E-03 & P 4.732E-01 1.40E-01 G

PA-234       3.4228E-03
                           98.44 3.423E-03 &(P 1.919E-01 5.70E-02 G K
                          946.00-9.706E-03 % P 2.014E-01 5.78E-02 G
                          131.28-2.693E-02 % P 1.538E-01 4.58E-02 G
                           94.67-9.606E-02 % P 3.975E-01 1.19E-01 G
                          883.24 0.000E+00 %   2.943E-01 8.35E-02 G
                          926.70 7.157E-02 %   2.834E-01 8.30E-02 G
                          569.26 1.882E-02 % P 3.143E-01 9.09E-02 G

TH-234       1.6191E+00
                           63.29 1.619E+00 %(P 5.911E+00 1.77E+00 G K
                           92.80 1.288E+00 % P 2.069E+00 6.28E-01 G
                           92.38 1.486E+00 % P 2.466E+00 7.48E-01 G

AM-241      -1.4011E-01
                           59.54-1.401E-01 %(P 1.045E+00 3.12E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	3.6630E-02	3.7252E-02	2.6505E-01	2.6506E-01	2.964E-01
K-40		1.4178E+01	1.4178E+01	1.2449E+00	1.4924E+00	
MN-54	#A	1.6034E-02	1.6080E-02	3.3448E-02	3.3461E-02	3.689E-02
CO-57	#B	-5.5080E-03	-5.5263E-03	4.3316E-02	4.3317E-02	4.557E-02
CO-60	#F	4.9315E-02	4.9338E-02	3.1006E-02	3.1138E-02	2.728E-02
Sr-85	#A	-1.5369E-03	-1.5584E-03	3.3997E-02	3.3997E-02	3.821E-02
Kr-85	#A	-3.5481E+01	-3.5482E+01	7.7406E+02	7.7406E+02	8.821E+02
Y-88	#B	3.5023E-03	3.5319E-03	1.7308E-02	1.7309E-02	2.132E-02
NB-94	#B	8.8827E-04	8.8827E-04	2.9030E-02	2.9030E-02	3.402E-02
Ag-108M	#B	-3.6764E-02	-3.6765E-02	5.2101E-02	5.2145E-02	5.653E-02
CD-109	#A	1.0368E-01	1.0388E-01	1.5527E+00	1.5527E+00	1.733E+00
SN-113	#B	-7.0696E-03	-7.1250E-03	4.0878E-02	4.0880E-02	4.583E-02
SB-125	#B	6.2359E-02	6.2414E-02	5.5343E-02	5.5461E-02	1.031E-01
I-131	#B	-1.1073E-02	-1.2382E-02	3.7099E-02	3.7106E-02	3.475E-02
CS-134	#B	-2.4552E-02	-2.4582E-02	4.2912E-02	4.2936E-02	4.696E-02
CS-137	#	1.1004E-01	1.1005E-01	5.9142E-02	5.9486E-02	
CE-139	#A	6.1648E-03	6.2053E-03	3.5608E-02	3.5610E-02	3.950E-02
EU-152	#B	-1.7628E-02	-1.7631E-02	1.3880E-01	1.3880E-01	1.381E-01
EU-154	#B	2.1547E-02	2.1553E-02	9.0000E-02	9.0008E-02	9.998E-02
EU-155	#B	1.0471E-01	1.0477E-01	2.0515E-01	2.0524E-01	2.255E-01
HG-203	#B	-4.6613E-04	-4.7521E-04	3.7171E-02	3.7171E-02	3.846E-02
TL-208		2.2511E-01	2.2511E-01	5.8748E-02	6.0184E-02	
PB-212		7.3359E-01	7.3359E-01	1.0876E-01	1.1680E-01	
PB-214	#	4.5541E-01	4.5541E-01	1.0417E-01	1.0748E-01	
BI-212		5.5072E-01	5.5072E-01	2.7062E-01	2.7251E-01	
BI-214	#	3.5924E-01	3.5924E-01	8.9984E-02	9.2369E-02	7.264E-02
RA-224	#A	8.1704E-01	8.1704E-01	9.2776E-01	9.2897E-01	1.005E+00
RA-226	#	1.1961E+00	1.1961E+00	9.6897E-01	9.7146E-01	1.039E+00
AC-228		7.4038E-01	7.4038E-01	1.8990E-01	1.9471E-01	
TH-227	#B	-8.3402E-02	-8.3402E-02	3.3993E-01	3.3997E-01	3.775E-01
PA-234	#B	3.4228E-03	3.4228E-03	1.7093E-01	1.7093E-01	1.919E-01
TH-234	#B	1.6191E+00	1.6191E+00	5.3162E+00	5.3170E+00	5.911E+00
AM-241	#A	-1.4011E-01	-1.4011E-01	9.5911E-01	9.5914E-01	1.045E+00

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

H - Halflife limit exceeded

YAEC Chemistry Lab Spectrum name: 103F_29OCT2005_0538.An1

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

Total Activity (83.9 to 2000.7 keV) 1.6992973E+01 pCi/gm
Total Decayed Activity (83.9 to 2000.7 keV) 1.6992981E+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_29OCT2005_0834.An1

Sample description
FSS OOL-02-01-021-F-B

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_0834.An1

Acquisition information
Start time: 29-Oct-2005 08:34:22
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: 2.1300E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1300E+03) =
4.6948E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 14:24:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4388

***** S U M M A R Y O F P E A K 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.	27.00	0.99	9.052E-03	74.81	9.600	7.755E-01	PB212
77.07	141.	17.60	0.99	1.011E-02	77.11	17.500	6.502E-01	PB212
					77.11	10.700	1.063E+00	PB214
86.83	79.	40.55	1.00	1.429E-02				
93.35	94.	33.59	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
104.90	100.	41.40	1.50	2.017E-02				
104.90	100.	41.40	1.50	2.017E-02	105.31	21.800	PBC<MDA	EU155
186.07	215.	17.24	1.30	2.566E-02	185.99	3.280	1.520E+00	RA226
209.59	91.	37.19	0.72	2.470E-02				
238.66	1207.	3.44	1.09	2.320E-02	238.63	43.100	7.584E-01	PB212
241.62	176.	17.23	1.09	2.304E-02	241.00	3.900	1.240E+00	RA224
					241.92	7.470	6.488E-01	PB214
269.73	95.	31.11	1.00	2.154E-02				
295.03	279.	8.77	1.13	2.026E-02	295.22	19.200	4.487E-01	PB214
299.76	80.	25.43	1.13	2.003E-02				
327.47	46.	39.88	0.74	1.876E-02				
338.07	295.	11.72	1.10	1.831E-02	338.40	12.010	8.495E-01	AC228
351.62	438.	6.59	1.07	1.777E-02	351.99	37.100	4.165E-01	PB214
462.52	106.	23.14	1.30	1.427E-02				
462.52	106.	23.14	1.30	1.427E-02	463.51	10.000	4.666E-01	SB125
510.28	144.	16.27	1.29	1.318E-02	510.72	22.500	2.507E-01	TL208
582.56	413.	6.68	1.39	1.185E-02	583.14	86.000	2.545E-01	TL208
608.60	351.	7.37	1.44	1.145E-02	609.32	46.090	4.141E-01	BI214
726.45	131.	21.29	1.44	9.972E-03	727.17	11.800	7.052E-01	BI212
794.02	67.	28.36	2.03	9.317E-03				

794.02	67.	28.36	2.03	9.317E-03	795.76	85.400	5.348E-02	CS134
910.28	306.	7.00	1.30	8.407E-03	911.07	29.000	7.894E-01	AC228
963.63	64.	17.92	1.54	8.058E-03				
963.63	64.	17.92	1.54	8.058E-03	964.00	14.580	PBC<MDA	EU152
968.03	157.	9.61	1.54	8.031E-03	968.90	17.460	7.096E-01	AC228
1119.99	100.	18.03	1.72	7.213E-03	1120.28	15.040	5.768E-01	BI214
1459.42	1512.	2.71	1.77	5.936E-03	1460.75	10.700	1.492E+01	K40
1619.48	26.	22.40	1.22	5.488E-03	1620.56	2.750	1.112E+00	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1762.66	38.	17.16	2.03	5.142E-03	1764.51	15.920	2.952E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
172.83	86.91	473.	79.	0.039	121.66	1.001	TB-160	lD
418.33	209.59	484.	91.	0.046	111.56	0.722	NP-239	
538.61	269.73	335.	95.	0.047	93.32	0.998	AC-228	s
598.74	299.80	192.	79.	0.040	79.67	0.952	TH-227	
654.09	327.47	158.	46.	0.023	119.64	0.735	AC-228	s
1926.37	963.68	71.	36.	0.018	110.26	0.944	EU-152	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	384.	106.	0.053	81.01	0.993D
PB-212	153.39	77.11	396.	141.	0.071	52.81	0.995A
PA-234	185.04	92.93	781.	135.	0.068	91.21	1.500s
EU-155	208.96	104.90	799.	100.	0.050	124.19	1.500s
RA-226	371.31	186.07	537.	202.	0.101	51.71	1.301s
PB-212	476.42	238.63	270.	1193.	0.597	10.32	1.093D
RA-224	481.16	241.00	878.	123.	0.062	106.71	1.095D
PB-214	483.00	241.92	351.	116.	0.058	54.41	1.095A
PB-214	589.29	295.07	246.	280.	0.140	30.23	1.046s
AC-228	675.29	338.07	313.	294.	0.147	35.17	1.098
PB-214	702.38	351.62	186.	432.	0.216	19.78	1.071
SB-125	924.31	462.59	144.	92.	0.046	62.50	1.500
TL-208	1019.67	510.28	182.	117.	0.059	48.81	1.289s
TL-208	1164.22	582.56	120.	409.	0.204	20.04	1.386s
BI-214	1216.29	608.60	120.	344.	0.172	22.12	1.439
BI-212	1451.97	726.45	171.	131.	0.065	63.87	1.438s
CS-134	1587.54	794.24	70.	58.	0.029	72.74	1.500s
AC-228	1819.59	910.28	65.	303.	0.152	21.00	1.297
AC-228	1935.08	968.03	69.	140.	0.070	35.69	1.541
BI-214	2238.95	1119.99	75.	99.	0.049	54.09	1.724s
K-40	2917.71	1459.42	56.	1493.	0.746	8.13	1.770

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3237.78	1619.48	3.	26.	0.013	67.21	1.217s
BI-214	3524.08	1762.66	8.	38.	0.019	51.48	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		1.2321E-03					
			477.56	1.232E-03	%(	2.773E-01 8.05E-02	G
K-40		1.4922E+01					
			1460.75	1.492E+01	(P	3.760E-01 4.09E-01	G
MN-54		7.7970E-03					
			834.81	7.797E-03	%(P	3.225E-02 9.49E-03	G
CO-57		-7.3246E-03					
			122.07	-7.325E-03	&(P	4.336E-02 1.30E-02	G K
			136.43	2.803E-02	%	3.518E-01 1.05E-01	G
CO-60		5.1624E-03					
			1332.51	5.162E-03	%(P	3.837E-02 1.09E-02	G K
			1173.23	1.949E-02	% P	4.573E-02 1.37E-02	G K
Sr-85		-1.1629E-02					
			514.00	-1.163E-02	&(	3.744E-02 1.12E-02	G
Kr-85		-2.6668E+02					
			513.99	-2.667E+02	&(	8.573E+02 2.57E+02	G
Y-88		4.0825E-03					
			1836.01	4.083E-03	&(P	1.869E-02 5.14E-03	G K
			898.02	6.273E-04	% P	3.106E-02 8.78E-03	G
NB-94		-4.4078E-03					
			871.10	-4.408E-03	%(	3.226E-02 9.36E-03	G K
			702.50	4.503E-03	%	2.557E-02 7.44E-03	G K
Ag-108M		-1.1580E-02					
			722.95	-1.158E-02	%(	4.539E-02 1.35E-02	G K
			614.37	-7.062E-05	% P	3.078E-02 8.83E-03	G
			433.93	5.000E-04	%	3.050E-02 8.88E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.2134E-02						
		88.04	1.213E-02	%(	1.306E+00	3.87E-01	G
SN-113	3.0375E-03						
		391.71	3.038E-03	&(	4.738E-02	1.39E-02	G K
		255.04	2.456E-01	%	1.467E+00	4.38E-01	G
SB-125	1.3636E-01						
		427.95	4.356E-02	&(P	8.568E-02	2.60E-02	G K
		600.77	-4.215E-03	% P	1.668E-01	4.83E-02	G
		636.15	2.120E-03	% P	2.668E-01	7.67E-02	G
		463.51	4.111E-01	(P	2.616E-01	8.68E-02	G
		176.29	5.673E-02	%	5.182E-01	1.55E-01	G
I-131	-6.9976E-03						
		364.48	-6.998E-03	%(P	3.477E-02	1.03E-02	G K
		636.97	7.131E-04	%	4.458E-01	1.28E-01	G
		284.29	1.384E-01	& P	4.807E-01	1.44E-01	G
CS-134	1.4911E-02						
		604.66	-1.265E-02	%(	3.941E-02	1.18E-02	G K
		795.76	4.640E-02	(P	3.342E-02	1.13E-02	G
		569.29	-5.206E-02	& P	2.002E-01	5.90E-02	G
		801.84	-4.018E-02	% P	3.682E-01	1.05E-01	G
CS-137	1.6589E-02						
		661.62	1.659E-02	%(P	3.277E-02	9.94E-03	G
CE-139	3.0109E-03						
		165.85	3.011E-03	%(	4.126E-02	1.23E-02	G
EU-152	-2.6010E-04						
		121.78	-2.601E-04	&(P	1.414E-01	4.22E-02	G K
		344.30	-1.405E-03	% P	9.833E-02	2.88E-02	G
		1408.08	9.729E-03	%	1.351E-01	3.76E-02	G
		964.00	-9.501E-05	& P	3.734E-01	1.09E-01	G
		1112.07	6.276E-02	%	2.512E-01	7.37E-02	G
		778.90	3.382E-02	%	2.518E-01	7.34E-02	G
EU-154	-1.5266E-03						
		123.10	-1.527E-03	%(	9.447E-02	2.81E-02	G K
		1274.80	-3.109E-02	&	1.287E-01	3.79E-02	G
		723.30	-3.801E-02	&	2.127E-01	6.29E-02	G
		1004.80	2.990E-02	%	1.749E-01	5.07E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	7.7846E-02						
		86.45	3.402E-02	%(	1.880E-01	5.63E-02	G K
		105.31	1.437E-01	(	1.941E-01	5.95E-02	G
HG-203	-1.0932E-02						
		279.17	-1.093E-02	%(P	3.772E-02	1.13E-02	G K
		72.87	-4.821E-02	% P	2.147E+00	6.42E-01	G
		70.83	-1.264E+00	&	3.716E+00	1.12E+00	G
		82.50	5.453E-04	%	2.707E+00	8.03E-01	G
TL-208	2.5375E-01						
		583.14	2.545E-01	*(P	3.352E-02	1.72E-02	G
		510.72	2.507E-01	*(P	1.403E-01	5.00E-02	G
PB-212	7.6060E-01						
		238.63	7.573E-01	(P	5.029E-02	2.63E-02	G K
							Energy duplication
		77.11	5.064E-01	} P	3.419E-01	8.92E-02	G
		74.81	7.755E-01	(P	6.866E-01	2.16E-01	G
PB-214	4.2767E-01						
		351.99	4.165E-01	(P	6.377E-02	2.78E-02	G K
		295.22	4.562E-01	@(P	1.238E-01	4.66E-02	G
							Energy duplication
		77.11	5.066E-02	} P	8.036E-01	2.08E-01	G
		241.92	4.277E-01	}	3.320E-01	7.76E-02	G
BI-212	7.8216E-01						
		727.17	7.052E-01	*(P	3.437E-01	1.51E-01	G K
		1620.56	1.112E+00	(P	4.265E-01	2.49E-01	G
		785.42	5.229E-01	%	1.539E+00	4.59E-01	G
BI-214	4.1410E-01						
		609.32	4.141E-01	(P	6.466E-02	3.11E-02	G K
		1764.51	2.952E-01	- P	1.217E-01	5.50E-02	G
		1120.28	5.768E-01	+ P	2.525E-01	1.06E-01	G
RA-224	8.6879E-01						
							Derived Ave Activity
		241.00	8.688E-01	}(	9.927E-01	3.16E-01	G
RA-226	1.5196E+00						
		185.99	1.520E+00	*(P	8.345E-01	2.79E-01	G
AC-228	8.0698E-01						
		911.07	7.894E-01	(P	1.048E-01	5.58E-02	G K
		968.90	6.327E-01	& P	1.871E-01	7.53E-02	G
		338.40	8.495E-01	(P	2.457E-01	9.99E-02	G

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

TH-227      -4.7561E-02
                          236.00-4.756E-02 %(  3.341E-01 1.00E-01 G K
                          256.25 8.254E-02 % P 4.026E-01 1.20E-01 G

PA-234       1.4198E-01
                           98.44 2.974E-02 %(P 2.050E-01 6.14E-02 G K
                          946.00-5.254E-02 % P 1.950E-01 5.78E-02 G
                          131.28 2.614E-03 & P 1.919E-01 5.72E-02 G
                           94.67 3.237E-01 ?(P 3.185E-01 9.87E-02 G
                          883.24 3.839E-02 %   2.108E-01 6.09E-02 G
                          926.70 6.489E-02 %   2.412E-01 7.07E-02 G
                          569.26-7.765E-02 & P 2.968E-01 8.74E-02 G

TH-234       1.9357E-01
                           63.29 1.936E-01 &(P 4.924E+00 1.46E+00 G K
                           92.80 1.295E+00 % P 1.995E+00 6.06E-01 G
                           92.38 1.517E+00 & P 2.361E+00 7.17E-01 G

AM-241       2.7926E-02
                           59.54 2.793E-02 %(P 1.049E+00 3.12E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.2200E-03	1.2321E-03	2.4151E-01	2.4151E-01	2.746E-01
K-40		1.4922E+01	1.4922E+01	1.2277E+00	1.5026E+00	
MN-54	#A	7.7839E-03	7.7970E-03	2.8474E-02	2.8478E-02	3.220E-02
CO-57	#B	-7.3104E-03	-7.3246E-03	4.0430E-02	4.0432E-02	4.328E-02
CO-60	#B	5.1610E-03	5.1624E-03	3.2814E-02	3.2816E-02	3.836E-02
Sr-85	#A	-1.1535E-02	-1.1629E-02	3.3644E-02	3.3651E-02	3.713E-02
Kr-85	#A	-2.6668E+02	-2.6668E+02	7.7052E+02	7.7067E+02	8.573E+02
Y-88	#B	4.0625E-03	4.0825E-03	1.5425E-02	1.5427E-02	1.860E-02
NB-94	#B	-4.4078E-03	-4.4078E-03	2.8093E-02	2.8094E-02	3.226E-02
Ag-108M	#B	-1.1580E-02	-1.1580E-02	4.0504E-02	4.0510E-02	4.539E-02
CD-109	#A	1.2120E-02	1.2134E-02	1.1610E+00	1.1610E+00	1.304E+00
SN-113	#B	3.0237E-03	3.0375E-03	4.1831E-02	4.1831E-02	4.716E-02
SB-125	#F	1.3629E-01	1.3636E-01	8.6409E-02	8.6771E-02	8.563E-02
I-131	#B	-6.5554E-03	-6.9976E-03	3.3954E-02	3.3956E-02	3.258E-02
CS-134	#B	1.4900E-02	1.4911E-02	1.0863E-02	1.0897E-02	3.938E-02
CS-137	#A	1.6589E-02	1.6589E-02	2.9811E-02	2.9826E-02	3.277E-02
CE-139	#A	2.9994E-03	3.0109E-03	3.6919E-02	3.6920E-02	4.110E-02
EU-152	#B	-2.6007E-04	-2.6010E-04	2.3167E-01	2.3167E-01	1.414E-01
EU-154	#B	-1.5264E-03	-1.5266E-03	8.4427E-02	8.4427E-02	9.446E-02
EU-155	#B	7.7823E-02	7.7846E-02	9.6677E-02	9.6774E-02	1.879E-01
HG-203	#B	-1.0810E-02	-1.0932E-02	3.4057E-02	3.4063E-02	3.730E-02
TL-208	#	2.5375E-01	2.5375E-01	5.1384E-02	5.3454E-02	
PB-212		7.6060E-01	7.6060E-01	7.9316E-02	9.0780E-02	
PB-214		4.2767E-01	4.2767E-01	8.5698E-02	8.9222E-02	
BI-212		7.8216E-01	7.8216E-01	3.6358E-01	3.6641E-01	
BI-214		4.1410E-01	4.1410E-01	9.3311E-02	9.6358E-02	
RA-224	A	8.6879E-01	8.6879E-01	9.2705E-01	9.2842E-01	
RA-226	#	1.5196E+00	1.5196E+00	8.3629E-01	8.4093E-01	
AC-228		8.0698E-01	8.0698E-01	1.6620E-01	1.7268E-01	
TH-227	#B	-4.7561E-02	-4.7561E-02	2.9993E-01	2.9994E-01	3.341E-01
PA-234	#B	1.4198E-01	1.4198E-01	1.2983E-01	1.3007E-01	2.050E-01
TH-234	#B	1.9357E-01	1.9357E-01	4.3740E+00	4.3740E+00	4.924E+00
AM-241	#A	2.7926E-02	2.7926E-02	9.3647E-01	9.3647E-01	1.049E+00

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

H - Halflife limit exceeded

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

Total Activity (269.4 to 2000.7 keV) 2.0755713E+01 pCi/gm
Total Decayed Activity (269.4 to 2000.7 keV) 2.0755714E+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_29OCT2005_0910.An1

Sample description
FSS OOL-02-01-014-F-S

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_0910.An1

Acquisition information
Start time: 29-Oct-2005 09:10:41
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: 1.6680E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6680E+03) =
5.9952E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 09:57:00
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: 0.4677

***** S U M M A R Y O F P E A K 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	102.	24.20	0.99	9.052E-03	74.81	9.600	9.470E-01	PB212
77.11	132.	15.17	0.99	1.011E-02	77.11	17.500	6.877E-01	PB212
					82.50	2.240	4.414E+00	HG203
87.17	91.	40.91	1.50	1.410E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	1.328E+00	CD109
92.03	139.	25.47	1.33	1.618E-02				
92.03	139.	25.47	1.33	1.618E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.987E+00	TH234
185.89	130.	23.92	1.14	2.567E-02				
185.89	130.	23.92	1.14	2.567E-02	185.99	3.280	1.123E+00	RA226
208.99	85.	36.79	0.88	2.473E-02				
238.71	885.	5.25	1.09	2.319E-02	238.63	43.100	7.075E-01	PB212
270.28	98.	28.54	1.10	2.151E-02				
277.20	53.	33.06	1.07	2.115E-02				
295.00	179.	12.77	1.02	2.026E-02	295.22	19.200	3.648E-01	PB214
300.09	57.	30.94	1.11	2.001E-02				
337.90	184.	17.35	1.10	1.832E-02	338.40	12.010	6.742E-01	AC228
351.54	337.	8.89	1.21	1.777E-02	351.99	37.100	4.078E-01	PB214
462.67	68.	26.58	1.24	1.427E-02				
462.67	68.	26.58	1.24	1.427E-02	463.51	10.000	3.786E-01	SB125
510.29	138.	17.02	1.58	1.318E-02	510.72	22.500	3.057E-01	TL208
582.73	251.	8.11	1.38	1.185E-02	583.14	86.000	1.965E-01	TL208
608.79	234.	8.46	1.44	1.145E-02	609.32	46.090	3.499E-01	BI214
726.61	69.	20.07	1.90	9.971E-03	727.17	11.800	4.693E-01	BI212
794.43	42.	25.43	1.97	9.313E-03				
794.43	42.	25.43	1.97	9.313E-03	795.76	85.400	4.268E-02	CS134
859.79	54.	19.87	1.75	8.773E-03				

910.33	192.	11.69	1.34	8.406E-03	911.07	29.000	6.273E-01	AC228
963.82	34.	25.37	1.54	8.057E-03				
968.19	129.	10.51	1.54	8.030E-03	968.90	17.460	7.438E-01	AC228
1119.70	64.	19.75	2.14	7.215E-03	1120.28	15.040	4.602E-01	BI214
1459.39	884.	3.53	1.76	5.936E-03	1460.75	10.700	1.105E+01	K40
1618.79	19.	27.04	0.85	5.488E-03	1620.56	2.750	1.007E+00	BI212
1763.10	59.	13.02	1.22	5.145E-03	1764.51	15.920	5.516E-01	BI214

********** U N I D E N T I F I E D P E A K S U 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	208.99	374.	85.	0.043	110.36	0.882	AC-228	s
539.71	270.28	247.	98.	0.049	85.63	1.102	AC-228	s
553.55	277.20	111.	69.	0.035	73.89	1.069	TL-208	s
599.34	300.09	127.	57.	0.029	92.82	1.112	PB-212	
1587.93	794.43	35.	41.	0.020	77.44	1.974	AC-228	s
1718.62	859.79	25.	54.	0.027	59.61	1.750	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	271.	102.	0.051	72.59	0.993D
PB-212	153.39	77.11	243.	132.	0.066	45.51	0.995A
EU-155	173.50	87.17	652.	91.	0.046	122.74	1.500
TH-234	184.47	92.65	673.	92.	0.046	103.28	1.500s
TH-234	184.46	92.64	631.	93.	0.047	98.98	1.500s
RA-226	370.91	185.87	466.	117.	0.058	74.51	1.500
PB-212	476.43	238.64	471.	826.	0.413	16.50	1.088
PB-214	589.14	295.00	168.	175.	0.088	38.32	1.022
AC-228	674.94	337.90	254.	183.	0.091	52.04	1.103
PB-214	702.23	351.54	199.	332.	0.166	26.68	1.214
SB-125	924.00	462.44	61.	59.	0.029	66.79	1.500
TL-208	1019.70	510.29	153.	112.	0.056	51.07	1.584s
TL-208	1164.56	582.73	73.	247.	0.124	24.34	1.383
BI-214	1216.68	608.79	72.	228.	0.114	25.37	1.444
BI-212	1452.29	726.61	51.	68.	0.034	60.21	1.896s
AC-228	1819.69	910.33	81.	189.	0.094	35.08	1.340
AC-228	1934.72	967.85	46.	153.	0.077	33.05	1.266
BI-214	2238.37	1119.70	39.	62.	0.031	59.24	2.141s
K-40	2917.65	1459.39	36.	865.	0.433	10.58	1.762
BI-212	3236.39	1618.79	2.	19.	0.009	81.12	0.852s
BI-214	3524.96	1763.10	3.	56.	0.028	39.06	1.216s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm		COMMENTS
BE-7		6.8275E-02						
			477.56	6.828E-02	&(	2.982E-01	8.80E-02	G
K-40		1.1047E+01						
			1460.75	1.105E+01	(P	3.891E-01	3.98E-01	G
MN-54		1.2872E-02						
			834.81	1.287E-02	%(P	3.406E-02	1.02E-02	G
CO-57		-1.3854E-02						
			122.07	-1.385E-02	%(P	5.016E-02	1.51E-02	G K
			136.43	-1.884E-05	%	3.577E-01	1.06E-01	G
CO-60		-4.9568E-03						
			1332.51	-4.957E-03	%(P	3.898E-02	1.05E-02	G K
			1173.23	-3.643E-03	% P	4.917E-02	1.38E-02	G K
Sr-85		1.7141E-03						
			514.00	1.714E-03	%(	3.799E-02	1.11E-02	G
Kr-85		3.9128E+01						
			513.99	3.913E+01	%(	8.680E+02	2.53E+02	G
Y-88		-1.3433E-03						
			1836.01	-1.343E-03	%(P	2.649E-02	6.81E-03	G K
			898.02	1.240E-02	% P	3.128E-02	9.32E-03	G
NB-94		1.5970E-03						
			871.10	1.597E-03	&(	2.651E-02	7.38E-03	G K
			702.50	2.561E-03	&	3.533E-02	1.02E-02	G K
Ag-108M		7.3648E-03						
			722.95	7.365E-03	%(	3.449E-02	1.01E-02	G K
			614.37	-2.713E-03	% P	3.441E-02	9.89E-03	G
			433.93	2.221E-03	%	2.844E-02	8.22E-03	G
CD-109		3.0958E-02						
			88.04	3.096E-02	%(	2.066E+00	6.15E-01	G
SN-113		-1.2894E-04						
			391.71	-1.289E-04	&(	4.614E-02	1.34E-02	G K
			255.04	3.356E-01	%	1.321E+00	3.94E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.4594E-02						
		427.95	-6.728E-05	%(P	1.032E-01	2.98E-02	G K
		600.77	8.924E-03	% P	1.622E-01	4.65E-02	G
		636.15	4.070E-02	& P	2.602E-01	7.52E-02	G
		463.51	3.352E-01	(P	2.224E-01	7.62E-02	G
		176.29	-8.196E-02	&	5.348E-01	1.59E-01	G
I-131	-3.6778E-04						
		364.48	-3.678E-04	%(P	3.872E-02	1.12E-02	G K
		636.97	9.776E-02	&	4.303E-01	1.26E-01	G
		284.29	-8.260E-02	% P	5.348E-01	1.58E-01	G
CS-134	-7.6843E-04						
		604.66	-7.684E-04	&(	9.429E-02	2.80E-02	G K
		795.76	9.976E-04	% P	3.790E-02	1.07E-02	G
		569.29	1.310E-02	% P	1.978E-01	5.67E-02	G
		801.84	4.044E-02	% P	3.513E-01	9.96E-02	G
CS-137	1.4908E-02						
		661.62	1.491E-02	%(P	3.278E-02	9.85E-03	G
CE-139	-4.8174E-04						
		165.85	-4.817E-04	%(	4.412E-02	1.31E-02	G
EU-152	-2.9391E-02						
		121.78	-2.939E-02	%(P	1.454E-01	4.35E-02	G K
		344.30	-1.939E-03	% P	1.161E-01	3.39E-02	G
		1408.08	7.043E-02	&	1.276E-01	3.96E-02	G
		964.00	-8.598E-02	& P	3.446E-01	1.01E-01	G
		1112.07	9.470E-02	%	2.327E-01	6.97E-02	G
		778.90	-2.314E-02	%	2.147E-01	6.10E-02	G
EU-154	-1.9027E-02						
		123.10	-1.903E-02	%(	1.014E-01	3.03E-02	G K
		1274.80	-1.337E-03	%	1.137E-01	3.17E-02	G
		723.30	-9.045E-02	%	2.394E-01	7.19E-02	G
		1004.80	-5.639E-03	%	1.644E-01	4.54E-02	G
EU-155	1.6023E-01						
		86.45	1.602E-01	(	2.136E-01	6.56E-02	G K
		105.31	2.904E-03	&	2.164E-01	6.42E-02	G
HG-203	-1.6441E-02						
		279.17	-1.644E-02	%(P	2.980E-02	9.09E-03	G K
		72.87	-6.712E-02	% P	1.921E+00	5.70E-01	G
		70.83	-7.680E-02	%	4.248E+00	1.26E+00	G
		82.50	-2.795E-01	%	2.459E+00	7.28E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.9652E-01						
		583.14	1.965E-01	(P	3.380E-02	1.62E-02	G
		510.72	3.057E-01	+ P	1.651E-01	6.44E-02	G
PB-212	6.7463E-01						
		238.63	6.693E-01	(P	8.414E-02	3.73E-02	G K
							Energy duplication
		77.11	6.035E-01	} P	3.452E-01	9.16E-02	G
		74.81	9.470E-01	+ P	7.411E-01	2.36E-01	G
PB-214	3.9316E-01						
		351.99	4.078E-01	(P	8.428E-02	3.68E-02	G K
		295.22	3.648E-01	(P	1.315E-01	4.76E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.272E-01	0.00E+00	G
		241.92	6.903E-03	%	5.054E-01	1.50E-01	G
BI-212	4.6925E-01						
		727.17	4.693E-01	*(P	2.477E-01	9.48E-02	G K
		1620.56	1.007E+00	+ P	5.203E-01	2.73E-01	G
		785.42	3.966E-02	%	1.597E+00	4.51E-01	G
BI-214	3.4993E-01						
		609.32	3.499E-01	(P	6.504E-02	3.04E-02	G K
		1764.51	5.516E-01	+ P	1.102E-01	7.60E-02	G
		1120.28	4.602E-01	+ P	2.387E-01	9.36E-02	G
RA-224	5.3327E-01						
		241.00	5.333E-01	%(	1.072E+00	3.25E-01	G
RA-226	1.1228E+00						
		185.99	1.123E+00	(P	9.947E-01	3.10E-01	G
AC-228	6.4100E-01						
		911.07	6.273E-01	(P	1.488E-01	7.46E-02	G K
		968.90	8.860E-01	+ P	1.979E-01	9.76E-02	G
		338.40	6.742E-01	(P	2.838E-01	1.18E-01	G
TH-227	-9.5480E-02						
		236.00	-9.548E-02	%(	3.195E-01	9.60E-02	G K
		256.25	-1.147E-02	% P	4.185E-01	1.23E-01	G
PA-234	4.0740E-02						
		98.44	4.074E-02	%(P	1.884E-01	5.64E-02	G K
		946.00	5.479E-02	% P	1.463E-01	4.36E-02	G
		131.28	-8.646E-03	% P	2.021E-01	6.01E-02	G
		94.67	-1.488E-01	% P	3.984E-01	1.20E-01	G
		883.24	-1.996E-02	%	2.939E-01	8.37E-02	G
		926.70	0.000E+00	%	3.404E-01	9.60E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.945E-02 % P 2.933E-01 8.40E-02 G

TH-234       1.2415E+00
                           63.29 6.685E-01 %(P 5.658E+00 1.68E+00 G K
                           92.80 1.530E+00 *(P 1.966E+00 6.00E-01 G
                           92.38 1.775E+00 *(P 2.389E+00 7.28E-01 G

AM-241       1.3070E-02
                           59.54 1.307E-02 &(P 1.035E+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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	6.7423E-02	6.8275E-02	2.6412E-01	2.6415E-01	2.945E-01
K-40		1.1047E+01	1.1047E+01	1.1936E+00	1.3550E+00	
MN-54	#A	1.2845E-02	1.2872E-02	3.0502E-02	3.0511E-02	3.399E-02
CO-57	#B	-1.3819E-02	-1.3854E-02	4.6362E-02	4.6368E-02	5.003E-02
CO-60	#B	-4.9550E-03	-4.9568E-03	1.6594E-01	1.6594E-01	3.897E-02

Sr-85	#A	1.6965E-03	1.7141E-03	3.3183E-02	3.3183E-02	3.760E-02
Kr-85	#A	3.9127E+01	3.9128E+01	7.5817E+02	7.5817E+02	8.680E+02
Y-88	#B	-1.3349E-03	-1.3433E-03	2.3854E-02	2.3854E-02	2.633E-02
NB-94	#B	1.5970E-03	1.5970E-03	2.2136E-02	2.2136E-02	2.651E-02
Ag-108M	#B	7.3647E-03	7.3648E-03	3.0191E-02	3.0194E-02	3.449E-02
CD-109	A	3.0913E-02	3.0958E-02	1.8457E+00	1.8457E+00	2.062E+00
SN-113	#B	-1.2820E-04	-1.2894E-04	4.0094E-02	4.0094E-02	4.587E-02
SB-125	#B	8.4538E-02	8.4594E-02	5.7723E-02	5.7931E-02	1.032E-01
I-131	#B	-3.3834E-04	-3.6778E-04	4.3555E-01	4.3555E-01	3.562E-02
CS-134	#B	-7.6775E-04	-7.6843E-04	8.4096E-02	8.4096E-02	9.421E-02
CS-137	#A	1.4907E-02	1.4908E-02	2.9559E-02	2.9572E-02	3.278E-02
CE-139	#A	-4.7939E-04	-4.8174E-04	3.9224E-02	3.9224E-02	4.390E-02
EU-152	#B	-2.9387E-02	-2.9391E-02	1.4094E-01	1.4095E-01	1.453E-01
EU-154	#B	-1.9023E-02	-1.9027E-02	9.1049E-02	9.1056E-02	1.014E-01
EU-155	#A	1.6017E-01	1.6023E-01	1.9667E-01	1.9687E-01	2.135E-01
HG-203	#B	-1.6206E-02	-1.6441E-02	2.7340E-02	2.7357E-02	2.938E-02
TL-208		1.9652E-01	1.9652E-01	4.8667E-02	4.9987E-02	
PB-212		6.7463E-01	6.7463E-01	1.1290E-01	1.1950E-01	
PB-214		3.9316E-01	3.9316E-01	9.3725E-02	9.6465E-02	
BI-212		4.6925E-01	4.6925E-01	2.8459E-01	2.8589E-01	
BI-214		3.4993E-01	3.4993E-01	9.1285E-02	9.3518E-02	
RA-224	#A	5.3327E-01	5.3327E-01	9.7617E-01	9.7666E-01	1.072E+00
RA-226	#	1.1228E+00	1.1228E+00	9.2957E-01	9.3185E-01	9.947E-01
AC-228		6.4100E-01	6.4100E-01	2.0310E-01	2.0649E-01	
TH-227	#B	-9.5480E-02	-9.5480E-02	2.8793E-01	2.8798E-01	3.195E-01
PA-234	#B	4.0740E-02	4.0740E-02	1.6905E-01	1.6907E-01	1.884E-01
TH-234	#B	1.2415E+00	1.2415E+00	1.4617E+00	1.4633E+00	5.658E+00
AM-241	#A	1.3070E-02	1.3070E-02	9.1815E-01	9.1815E-01	1.035E+00

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

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

Total Activity (84.4 to 2000.7 keV) 1.3771482E+01 pCi/gm
Total Decayed Activity (84.4 to 2000.7 keV) 1.3771482E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS OOL-02-01-015-F

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_0949.An1

Acquisition information

Start time:	29-Oct-2005 09:49:41
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:	1.8990E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8990E+03) = 5.2659E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 10:14:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4474

***** S U M M A R Y O F P E A K 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	89.	27.23	0.99	9.100E-03	74.81	9.600	7.072E-01	PB212
77.17	192.	14.49	0.99	1.018E-02	77.11	17.500	7.617E-01	PB212
127.85	107.	32.62	1.05	2.423E-02				
186.25	140.	24.76	0.75	2.566E-02	185.99	3.280	1.072E+00	RA226
209.39	101.	29.61	0.96	2.471E-02				
238.62	979.	3.73	1.09	2.320E-02	238.63	43.100	6.884E-01	PB212
241.29	134.	20.48	1.09	2.306E-02	241.00	3.900	1.061E+00	RA224
269.84	65.	41.43	0.99	2.153E-02				
294.84	209.	12.31	1.23	2.027E-02	295.22	19.200	3.746E-01	PB214
299.85	64.	35.37	0.74	2.002E-02				
328.04	90.	25.60	1.22	1.874E-02				
337.89	241.	12.82	0.84	1.832E-02	338.40	12.010	7.767E-01	AC228
351.57	410.	6.81	1.13	1.777E-02	351.99	37.100	4.374E-01	PB214
408.47	60.	29.18	1.38	1.578E-02				
462.85	47.	29.56	1.81	1.426E-02				
462.85	47.	29.56	1.81	1.426E-02	463.51	10.000	2.285E-01	SB125
509.75	195.	12.20	1.25	1.319E-02	510.72	22.500	4.051E-01	TL208
582.66	326.	8.75	1.41	1.185E-02	583.14	86.000	2.246E-01	TL208
608.75	278.	8.76	1.39	1.145E-02	609.32	46.090	3.661E-01	BI214
661.19	32.	40.89	1.50	1.072E-02	661.62	84.620	PBC<MDA	CS137
726.22	81.	21.06	1.47	9.975E-03	727.17	11.800	4.872E-01	BI212
767.76	72.	24.78	0.98	9.558E-03				
910.38	252.	8.85	1.27	8.406E-03	911.07	29.000	7.262E-01	AC228
968.21	217.	9.52	1.41	8.030E-03	968.90	17.460	1.101E+00	AC228
1119.68	64.	25.30	1.26	7.215E-03	1120.28	15.040	4.068E-01	BI214
1459.51	1139.	3.03	1.63	5.936E-03	1460.75	10.700	1.256E+01	K40
1762.83	56.	13.99	1.81	5.146E-03	1764.51	15.920	4.593E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
417.94	209.39	364.	101.	0.051	88.82	0.956	AC-228

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
538.83	269.84	279.	65.	0.033	124.28	0.989	AC-228	
598.85	299.85	195.	64.	0.032	106.12	0.741	TH-227	s
655.22	328.04	178.	90.	0.045	76.80	1.216	AC-228	
816.06	408.47	110.	60.	0.030	87.54	1.378	CS-138	s
1534.59	767.76	77.	72.	0.036	74.35	0.982	BI-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	148.79	74.81	299.	86.	0.043	87.45	0.993D
PB-212	153.39	77.11	295.	173.	0.087	36.74	0.995A
RA-226	371.44	186.14	663.	104.	0.052	96.90	1.500s
PB-212	476.39	238.62	621.	938.	0.469	16.08	1.069
RA-224	482.30	241.57	678.	112.	0.056	102.82	1.500
PB-214	588.82	294.84	200.	205.	0.102	36.93	1.228s
AC-228	674.91	337.89	239.	240.	0.120	38.47	0.837
PB-214	702.29	351.57	154.	405.	0.202	20.43	1.126
SB-125	924.84	462.86	84.	68.	0.034	66.36	1.500s
TL-208	1018.62	509.75	143.	169.	0.084	36.61	1.250s
TL-208	1164.42	582.66	140.	321.	0.161	26.25	1.409
BI-214	1216.60	608.75	115.	271.	0.136	26.28	1.393s
BI-212	1451.52	726.22	70.	81.	0.040	63.18	1.474s
AC-228	1819.79	910.38	73.	249.	0.124	26.54	1.272s
AC-228	1935.44	968.21	60.	217.	0.108	28.57	1.414
BI-214	2238.33	1119.68	75.	62.	0.031	75.89	1.262s
K-40	2917.88	1459.51	30.	1120.	0.560	9.10	1.630
BI-214	3524.42	1762.83	5.	53.	0.026	41.97	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 - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		8.7120E-02					
			477.56	8.712E-02	&(	2.830E-01 8.44E-02	G
K-40		1.2555E+01					
			1460.75	1.256E+01	(P	3.171E-01 3.87E-01	G
MN-54		1.0333E-02					
			834.81	1.033E-02	%(P	3.403E-02 1.01E-02	G
CO-57		-3.2278E-03					
			122.07	-3.228E-03	&(P	4.411E-02 1.31E-02	G K
			136.43	3.106E-02	%	3.492E-01 1.04E-01	G
CO-60		5.7285E-03					
			1332.51	5.728E-03	%(P	3.459E-02 9.73E-03	G K
			1173.23	6.805E-03	& P	3.959E-02 1.14E-02	G K
Sr-85		-2.3119E-02					
			514.00	-2.312E-02	%(	3.999E-02 1.22E-02	G
Kr-85		-5.2815E+02					
			513.99	-5.281E+02	%(	9.135E+02 2.79E+02	G
Y-88		1.4072E-03					
			1836.01	1.407E-03	&(P	2.487E-02 6.51E-03	G K
			898.02	8.612E-03	% P	2.659E-02 7.81E-03	G
NB-94		-3.9209E-03					
			871.10	-3.921E-03	%(	3.207E-02 9.24E-03	G K
			702.50	0.000E+00	&	3.442E-02 9.87E-03	G K
Ag-108M		-1.0474E-02					
			722.95	-1.047E-02	%(	4.137E-02 1.23E-02	G K
			614.37	-7.144E-03	% P	3.627E-02 1.07E-02	G
			433.93	-1.780E-04	%	3.034E-02 8.78E-03	G
CD-109		5.3726E-01					
			88.04	5.373E-01	&(	1.808E+00 5.45E-01	G
SN-113		-7.5250E-03					
			391.71	-7.525E-03	%(	4.704E-02 1.39E-02	G K
			255.04	2.903E-01	%	1.323E+00 3.94E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.7255E-02						
		427.95	1.513E-02	&(P	8.810E-02	2.59E-02	G K
		600.77	2.884E-02	& P	1.681E-01	4.93E-02	G
		636.15	3.906E-03	% P	2.481E-01	7.06E-02	G
		463.51	3.404E-01	(P	2.274E-01	7.67E-02	G
		176.29	1.033E-01	%	5.224E-01	1.56E-01	G
I-131	7.5156E-03						
		364.48	7.516E-03	%(P	3.363E-02	9.95E-03	G K
		636.97	2.622E-02	&	4.093E-01	1.17E-01	G
		284.29	-1.192E-01	% P	5.391E-01	1.61E-01	G
CS-134	6.7497E-04						
		604.66	6.750E-04	%(	8.664E-02	2.58E-02	G K
		795.76	-1.033E-03	& P	3.970E-02	1.13E-02	G
		569.29	-2.156E-02	& P	2.072E-01	5.98E-02	G
		801.84	-1.061E-02	% P	3.080E-01	8.49E-02	G
CS-137	2.5370E-02						
		661.62	2.537E-02	%(P	3.475E-02	1.08E-02	G
CE-139	1.1824E-02						
		165.85	1.182E-02	%(	4.121E-02	1.24E-02	G
EU-152	-1.0033E-02						
		121.78	-1.003E-02	%(P	1.331E-01	3.96E-02	G K
		344.30	2.733E-02	% P	9.870E-02	2.94E-02	G
		1408.08	0.000E+00	&	8.965E-02	2.27E-02	G
		964.00	3.336E-02	% P	2.339E-01	6.74E-02	G
		1112.07	7.249E-02	&	2.815E-01	8.27E-02	G
		778.90	7.608E-03	%	1.968E-01	5.54E-02	G
EU-154	-1.3078E-02						
		123.10	-1.308E-02	&(	9.894E-02	2.96E-02	G K
		1274.80	-2.388E-02	&	1.262E-01	3.68E-02	G
		723.30	-5.216E-03	%	1.573E-01	4.50E-02	G
		1004.80	-2.263E-02	%	1.664E-01	4.75E-02	G
EU-155	1.2871E-01						
		86.45	1.287E-01	%(	2.174E-01	6.62E-02	G K
		105.31	5.140E-02	%	1.965E-01	5.90E-02	G
HG-203	2.7336E-03						
		279.17	2.734E-03	%(P	4.001E-02	1.18E-02	G K
		72.87	9.329E-02	% P	2.289E+00	6.84E-01	G
		70.83	-3.243E-01	&	3.754E+00	1.12E+00	G
		82.50	-5.869E-01	%	3.576E+00	1.07E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2459E-01						
		583.14	2.246E-01	(P	4.034E-02	1.99E-02	G
		510.72	4.051E-01	+ P	1.404E-01	5.72E-02	G
PB-212	6.9690E-01						
		238.63	6.679E-01	(P	8.455E-02	3.63E-02	G K
							Energy duplication
		77.11	6.969E-01	} P	3.329E-01	8.53E-02	G
		74.81	7.076E-01	(P	6.817E-01	2.14E-01	G
PB-214	4.1600E-01						
		351.99	4.374E-01	(P	6.544E-02	3.02E-02	G K
		295.22	3.746E-01	@(P	1.257E-01	4.70E-02	G
							Energy duplication
		77.11	0.000E+00	} P	7.716E-01	0.00E+00	G
		241.92	-1.638E-01	%	4.688E-01	1.41E-01	G
BI-212	4.8722E-01						
		727.17	4.872E-01	@(P	2.532E-01	1.03E-01	G K
		1620.56	4.299E-01	% P	8.331E-01	2.57E-01	G
		785.42	5.018E-01	%	1.608E+00	4.77E-01	G
BI-214	3.9328E-01						
		609.32	3.661E-01	@(P	7.104E-02	3.28E-02	G K
		1764.51	4.593E-01	(P	1.157E-01	6.82E-02	G
		1120.28	4.068E-01	(P	2.825E-01	1.06E-01	G
RA-224	8.8396E-01						
		241.00	8.840E-01	(	9.809E-01	3.03E-01	G
RA-226	8.7563E-01						
		185.99	8.756E-01	@(P	1.037E+00	3.18E-01	G
AC-228	7.4100E-01						
		911.07	7.262E-01	@(P	1.245E-01	6.51E-02	G K
		968.90	1.101E+00	+ P	1.973E-01	1.05E-01	G
		338.40	7.767E-01	(P	2.421E-01	9.99E-02	G
TH-227	-6.4833E-02						
		236.00	-6.483E-02	%(	3.117E-01	9.33E-02	G K
		256.25	-1.629E-04	% P	4.555E-01	1.34E-01	G
PA-234	-6.4913E-03						
		98.44	-6.491E-03	%(P	1.926E-01	5.72E-02	G K
		946.00	1.598E-02	& P	1.726E-01	4.95E-02	G
		131.28	-4.681E-02	& P	1.909E-01	5.73E-02	G
		94.67	-1.074E-01	% P	3.723E-01	1.12E-01	G
		883.24	8.281E-02	%	2.322E-01	6.90E-02	G
		926.70	-1.521E-02	&	2.366E-01	6.63E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.201E-02 & P 3.071E-01 8.87E-02 G

TH-234       8.4494E-01
                           63.29 8.449E-01 %(P 5.576E+00 1.66E+00 G K
                           92.80 1.114E+00 % P 1.979E+00 5.99E-01 G
                           92.38 1.193E+00 % P 2.341E+00 7.07E-01 G

AM-241      -2.5758E-02
                           59.54-2.576E-02 %(P 1.012E+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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	8.6016E-02	8.7120E-02	2.5317E-01	2.5322E-01	2.794E-01
K-40		1.2555E+01	1.2555E+01	1.1619E+00	1.3716E+00	
MN-54	#A	1.0310E-02	1.0333E-02	3.0236E-02	3.0242E-02	3.396E-02
CO-57	#B	-3.2197E-03	-3.2278E-03	4.3320E-02	4.3320E-02	4.400E-02
CO-60	#B	5.7265E-03	5.7285E-03	2.9202E-02	2.9204E-02	3.457E-02

Sr-85	#A	-2.2877E-02	-2.3119E-02	3.6648E-02	3.6673E-02	3.957E-02
Kr-85	#A	-5.2815E+02	-5.2815E+02	8.3722E+02	8.3778E+02	9.135E+02
Y-88	#B	1.3983E-03	1.4072E-03	1.9518E-02	1.9519E-02	2.471E-02
NB-94	#B	-3.9209E-03	-3.9209E-03	2.7706E-02	2.7707E-02	3.207E-02
Ag-108M	#B	-1.0474E-02	-1.0474E-02	3.6752E-02	3.6758E-02	4.137E-02
CD-109	#A	5.3645E-01	5.3726E-01	1.6335E+00	1.6338E+00	1.805E+00
SN-113	#B	-7.4806E-03	-7.5250E-03	4.1696E-02	4.1698E-02	4.676E-02
SB-125	#F	9.7190E-02	9.7255E-02	6.5746E-02	6.5988E-02	8.804E-02
I-131	#B	6.9049E-03	7.5156E-03	2.9856E-02	2.9860E-02	3.090E-02
CS-134	#B	6.7436E-04	6.7497E-04	7.7340E-02	7.7340E-02	8.656E-02
CS-137	#A	2.5368E-02	2.5370E-02	3.2459E-02	3.2493E-02	3.475E-02
CE-139	#A	1.1765E-02	1.1824E-02	3.7168E-02	3.7175E-02	4.101E-02
EU-152	#B	-1.0032E-02	-1.0033E-02	1.4503E-01	1.4503E-01	1.331E-01
EU-154	#B	-1.3075E-02	-1.3078E-02	8.8739E-02	8.8742E-02	9.892E-02
EU-155	#B	1.2866E-01	1.2871E-01	1.9868E-01	1.9880E-01	2.173E-01
HG-203	#B	2.6940E-03	2.7336E-03	3.5536E-02	3.5536E-02	3.943E-02
TL-208		2.2459E-01	2.2459E-01	5.9739E-02	6.1145E-02	
PB-212		6.9690E-01	6.9690E-01	1.1346E-01	1.2046E-01	
PB-214		4.1600E-01	4.1600E-01	8.6187E-02	8.9507E-02	
BI-212	#	4.8722E-01	4.8722E-01	3.0972E-01	3.1100E-01	
BI-214		3.9328E-01	3.9328E-01	1.0582E-01	1.0825E-01	
RA-224	#A	8.8396E-01	8.8396E-01	9.0887E-01	9.1032E-01	9.809E-01
RA-226	#A	8.7563E-01	8.7563E-01	9.5458E-01	9.5593E-01	1.037E+00
AC-228		7.4100E-01	7.4100E-01	1.7445E-01	1.7967E-01	
TH-227	#B	-6.4833E-02	-6.4833E-02	2.7989E-01	2.7991E-01	3.117E-01
PA-234	#B	-6.4913E-03	-6.4913E-03	2.7803E-01	2.7803E-01	1.926E-01
TH-234	#B	8.4494E-01	8.4494E-01	4.9826E+00	4.9828E+00	5.576E+00
AM-241	#A	-2.5758E-02	-2.5758E-02	1.0309E+00	1.0309E+00	1.012E+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) 1.5514340E+01 pCi/gm
Total Decayed Activity (86.4 to 2000.7 keV) 1.5514340E+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_29OCT2005_1026.An1

Sample description
FSS OOL-02-01-005-F

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_1026.An1

Acquisition information
Start time: 29-Oct-2005 10:26:06
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: 1.9700E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9700E+03) =
5.0761E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 09:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4090

***** S U M M A R Y O F P E A K 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	141.	20.70	0.99	9.206E-03	74.81	9.600	1.089E+00	PB212
77.17	207.	14.48	0.99	1.032E-02	77.11	10.700	1.296E+00	PB214
					77.11	17.500	7.923E-01	PB212
93.10	135.	29.21	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.10	113.	34.76	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.70	97.	36.29	1.50	2.461E-02				
128.70	97.	36.29	1.50	2.461E-02	131.28	20.000	PBC<MDA	PA234
186.32	201.	18.12	1.35	2.566E-02	185.99	3.280	1.535E+00	RA226
209.47	119.	23.93	0.99	2.470E-02				
238.58	1228.	3.32	1.09	2.320E-02	238.63	43.100	8.343E-01	PB212
241.28	172.	16.54	1.09	2.305E-02	241.00	3.900	1.313E+00	RA224
					241.92	7.470	6.870E-01	PB214
269.60	144.	21.73	1.13	2.154E-02				
276.65	87.	34.43	1.63	2.118E-02				
294.96	266.	12.16	0.94	2.026E-02	295.22	19.200	4.625E-01	PB214
299.92	74.	30.07	0.91	2.002E-02				
327.23	66.	39.79	1.06	1.877E-02				
338.09	288.	11.02	1.17	1.831E-02	338.40	12.010	8.960E-01	AC228
351.59	374.	7.51	1.16	1.777E-02	351.99	37.100	3.841E-01	PB214
462.47	92.	26.40	1.12	1.427E-02				
462.47	92.	26.40	1.12	1.427E-02	463.51	10.000	4.372E-01	SB125
510.26	220.	13.07	1.30	1.318E-02	510.72	22.500	4.463E-01	TL208
582.62	415.	6.41	1.29	1.185E-02	583.14	86.000	2.767E-01	TL208
608.68	324.	7.62	1.23	1.145E-02	609.32	46.090	4.136E-01	BI214
726.66	98.	15.50	1.31	9.970E-03	727.17	11.800	5.717E-01	BI212

793.95	68.	32.42	0.91	9.317E-03				
859.59	58.	35.48	1.56	8.775E-03				
910.42	299.	7.63	1.86	8.406E-03	911.07	29.000	8.324E-01	AC228
962.99	42.	34.29	1.54	8.062E-03				
962.99	42.	34.29	1.54	8.062E-03	964.00	14.580	PBC<MDA	EU152
968.19	179.	9.14	1.54	8.030E-03	968.90	17.460	8.750E-01	AC228
1119.26	75.	25.21	1.95	7.217E-03	1120.28	15.040	4.604E-01	BI214
1459.54	1388.	2.74	1.87	5.936E-03	1460.75	10.700	1.480E+01	K40
1762.99	52.	14.97	1.16	5.145E-03	1764.51	15.920	4.067E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.10	209.47	346.	119.	0.060	71.79	0.987	AC-228	
538.34	269.60	332.	144.	0.072	65.19	1.128	AC-228	s
552.45	276.65	293.	118.	0.059	67.24	1.635	TL-208	s
598.99	299.92	204.	74.	0.037	90.21	0.913	TH-227	
653.61	327.23	254.	66.	0.033	119.38	1.059	AC-228	
1586.95	793.95	118.	68.	0.034	77.30	0.907	PA-234	s
1718.22	859.59	102.	58.	0.029	106.45	1.556	TL-208	
1925.00	962.95	85.	42.	0.021	102.86	1.537	TB-160	lD

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	331.	141.	0.071	58.75	0.993D
PB-212	153.39	77.11	347.	206.	0.103	32.85	0.995A
TH-234	185.37	93.10	983.	113.	0.057	104.27	1.500
TH-234	185.36	93.10	940.	135.	0.068	87.64	1.500
PA-234	256.57	128.70	580.	97.	0.049	108.88	1.500s
RA-226	371.81	186.32	527.	188.	0.094	54.35	1.353s
PB-212	476.42	238.63	221.	1218.	0.609	9.90	1.093D
RA-224	481.16	241.00	779.	107.	0.053	116.34	1.094D
PB-214	483.00	241.92	316.	103.	0.052	68.77	1.095A
PB-214	589.08	294.96	305.	262.	0.131	36.49	0.943
AC-228	675.33	338.09	278.	287.	0.144	33.05	1.171
PB-214	702.32	351.59	195.	369.	0.184	22.54	1.161
SB-125	924.45	462.66	121.	78.	0.039	67.86	1.500
TL-208	1019.64	510.26	199.	193.	0.096	39.22	1.297s
TL-208	1164.34	582.62	113.	411.	0.205	19.24	1.285
BI-214	1216.46	608.68	109.	318.	0.159	22.87	1.235
BI-212	1452.38	726.66	59.	98.	0.049	46.50	1.307
AC-228	1819.88	910.42	77.	296.	0.148	22.90	1.863s
AC-228	1934.73	967.86	131.	262.	0.131	31.74	1.635
BI-214	2237.49	1119.26	92.	73.	0.036	75.63	1.953
K-40	2917.94	1459.54	32.	1369.	0.685	8.21	1.874
BI-214	3524.30	1762.77	9.	34.	0.017	55.77	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		4.8913E-02					
			477.56	4.891E-02	%(	2.531E-01 7.44E-02	G
K-40		1.4800E+01					
			1460.75	1.480E+01	(P	3.120E-01 4.10E-01	G
MN-54		1.6296E-02					
			834.81	1.630E-02	%(P	3.243E-02 9.85E-03	G
CO-57		1.1526E-02					
			122.07	1.153E-02	%(P	5.047E-02 1.52E-02	G K
			136.43	2.834E-02	%	3.232E-01 9.63E-02	G
CO-60		1.7704E-02					
			1332.51	1.770E-02	%(P	3.012E-02 9.17E-03	G K
			1173.23	1.042E-02	& P	4.843E-02 1.42E-02	G K
Sr-85		-2.4916E-02					
			514.00	-2.492E-02	&(	4.342E-02 1.33E-02	G
Kr-85		-5.6871E+02					
			513.99	-5.687E+02	&(	9.911E+02 3.02E+02	G
Y-88		1.0696E-03					
			1836.01	1.070E-03	%(P	1.894E-02 4.75E-03	G K
			898.02	1.069E-02	% P	3.134E-02 9.28E-03	G
NB-94		-5.8231E-03					
			871.10	-5.823E-03	%(	3.336E-02 9.71E-03	G K
			702.50	8.955E-03	&	3.190E-02 9.45E-03	G K
Ag-108M		-2.9152E-02					
			722.95	-2.915E-02	&(	5.291E-02 1.61E-02	G K
			614.37	5.983E-03	% P	3.061E-02 8.96E-03	G
			433.93	4.338E-03	&	3.274E-02 9.63E-03	G
CD-109		8.2461E-01					
			88.04	8.246E-01	&(	1.856E+00 5.62E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	0.0000E+00						
		391.71	0.000E+00	%(	5.119E-02	1.50E-02	G K
		255.04	8.762E-03	%	1.563E+00	4.62E-01	G
SB-125	1.0786E-01						
		427.95	1.775E-02	%(P	1.015E-01	3.00E-02	G K
		600.77	1.827E-02	% P	1.495E-01	4.34E-02	G
		636.15	3.851E-02	% P	2.856E-01	8.33E-02	G
		463.51	3.746E-01	(P	2.605E-01	8.61E-02	G
		176.29	-3.164E-02	%	5.767E-01	1.72E-01	G
I-131	-8.5883E-03						
		364.48	-8.588E-03	%(P	3.943E-02	1.17E-02	G K
		636.97	-1.093E-01	%	5.553E-01	1.64E-01	G
		284.29	-1.895E-03	& P	5.871E-01	1.73E-01	G
CS-134	-1.8675E-02						
		604.66	-1.867E-02	%(	4.210E-02	1.27E-02	G K
		795.76	-7.539E-05	& P	4.482E-02	1.29E-02	G
		569.29	-8.034E-03	% P	1.586E-01	4.47E-02	G
		801.84	-1.320E-02	& P	4.142E-01	1.18E-01	G
CS-137	2.0104E-02						
		661.62	2.010E-02	%(P	3.819E-02	1.16E-02	G
CE-139	1.2928E-02						
		165.85	1.293E-02	%(	4.468E-02	1.34E-02	G
EU-152	3.2822E-02						
		121.78	3.282E-02	%(P	1.477E-01	4.44E-02	G K
		344.30	1.162E-02	% P	1.168E-01	3.45E-02	G
		1408.08	-2.307E-02	%	1.571E-01	4.47E-02	G
		964.00	1.982E-01	& P	3.600E-01	1.10E-01	G
		1112.07	-5.135E-03	&	3.367E-01	9.66E-02	G
		778.90	6.669E-02	%	2.342E-01	6.92E-02	G
EU-154	3.3437E-02						
		123.10	3.344E-02	&(	1.013E-01	3.06E-02	G K
		1274.80	-2.173E-03	&	1.112E-01	3.14E-02	G
		723.30	-7.728E-02	%	2.175E-01	6.52E-02	G
		1004.80	-3.388E-02	&	2.290E-01	6.67E-02	G
EU-155	-4.7455E-03						
		86.45	-4.746E-03	%(	2.415E-01	7.21E-02	G K
		105.31	4.386E-02	%	2.273E-01	6.82E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-1.3229E-02						
		279.17	-1.323E-02	%(	P 4.166E-02	1.25E-02	G K
		72.87	-8.872E-01	%	P 1.375E+00	4.20E-01	G
		70.83	-1.340E+00	&	4.139E+00	1.25E+00	G
		82.50	3.121E-02	&	3.556E+00	1.06E+00	G
TL-208	2.7670E-01						
		583.14	2.767E-01	(	P 3.520E-02	1.79E-02	G
		510.72	4.463E-01	+	P 1.585E-01	6.64E-02	G
PB-212	8.2627E-01						
		238.63	8.357E-01	(	P 4.942E-02	2.79E-02	G K
							Energy duplication
		77.11	7.991E-01	}	P 3.470E-01	8.75E-02	G
		74.81	1.116E+00	+	P 6.910E-01	2.23E-01	G
PB-214	4.1271E-01						
		351.99	3.841E-01	(	P 7.064E-02	2.93E-02	G K
		295.22	4.625E-01	(	P 1.483E-01	5.71E-02	G
							Energy duplication
		77.11	0.000E+00	}	P 9.110E-01	0.00E+00	G
		241.92	4.127E-01	}	3.412E-01	9.46E-02	G
BI-212	5.7175E-01						
		727.17	5.717E-01	(	P 2.246E-01	8.90E-02	G K
		1620.56	1.561E-01	&	P 1.094E+00	3.06E-01	G
		785.42	0.000E+00	%	1.727E+00	4.94E-01	G
BI-214	4.2516E-01						
		609.32	4.136E-01	(	P 6.685E-02	3.22E-02	G K
		1764.51	2.867E-01	-	P 1.386E-01	5.84E-02	G
		1120.28	4.604E-01	(	P 3.001E-01	1.19E-01	G
RA-224	8.1450E-01						
							Derived Ave Activity
		241.00	8.145E-01	}(	1.012E+00	3.26E-01	G
RA-226	1.5355E+00						
		185.99	1.535E+00	*(	P 8.934E-01	2.97E-01	G
AC-228	8.5101E-01						
		911.07	8.324E-01	(	P 1.230E-01	6.42E-02	G K
		968.90	1.284E+00	+	P 2.740E-01	1.36E-01	G
		338.40	8.960E-01	(	P 2.509E-01	9.90E-02	G
TH-227	-5.5866E-03						
		236.00	-5.587E-03	%(	3.803E-01	1.13E-01	G K
		256.25	1.422E-01	%	P 4.364E-01	1.31E-01	G

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

PA-234       5.8214E-02
                           98.44-3.211E-03 %(P 2.132E-01 6.35E-02 G K
                          946.00 1.430E-02 & P 1.852E-01 5.33E-02 G
                          131.28 1.353E-01 ?(P 1.603E-01 4.94E-02 G
                           94.67-2.122E-01 % P 4.039E-01 1.23E-01 G
                          883.24 7.077E-03 &   2.493E-01 7.05E-02 G
                          926.70 6.540E-02 %   2.329E-01 6.82E-02 G
                          569.26-1.633E-02 % P 2.278E-01 6.41E-02 G

TH-234       1.9137E+00
                           63.29 1.981E+00 %(P 6.368E+00 1.92E+00 G K
                           92.80 1.881E+00  (P 2.024E+00 6.21E-01 G
                           92.38 1.850E+00  (P 2.436E+00 7.43E-01 G

AM-241       5.6536E-02
                           59.54 5.654E-02 &(P 1.035E+00 3.08E-01 G
   ( - This peak used in the nuclide activity average.

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

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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	4.8245E-02	4.8913E-02	2.2331E-01	2.2333E-01	2.497E-01
K-40		1.4800E+01	1.4800E+01	1.2312E+00	1.5014E+00	
MN-54	#A	1.6258E-02	1.6296E-02	2.9565E-02	2.9580E-02	3.235E-02
CO-57	#B	1.1495E-02	1.1526E-02	4.5488E-02	4.5492E-02	5.033E-02
CO-60	#B	1.7698E-02	1.7704E-02	2.7517E-02	2.7536E-02	3.011E-02
Sr-85	#A	-2.4635E-02	-2.4916E-02	3.9751E-02	3.9777E-02	4.293E-02
Kr-85	#A	-5.6871E+02	-5.6871E+02	9.0735E+02	9.0795E+02	9.911E+02
Y-88	#B	1.0623E-03	1.0696E-03	1.4244E-02	1.4244E-02	1.881E-02
NB-94	#B	-5.8231E-03	-5.8231E-03	2.9140E-02	2.9142E-02	3.336E-02
Ag-108M	#B	-2.9151E-02	-2.9152E-02	4.8398E-02	4.8427E-02	5.291E-02
CD-109	#A	8.2327E-01	8.2461E-01	1.6868E+00	1.6874E+00	1.853E+00
SN-113	#B	0.0000E+00	0.0000E+00	4.4977E-02	4.4977E-02	5.086E-02
SB-125	#F	1.0778E-01	1.0786E-01	7.4391E-02	7.4654E-02	1.014E-01
I-131	#B	-7.8384E-03	-8.5883E-03	3.8228E-02	3.8232E-02	3.599E-02
CS-134	#B	-1.8657E-02	-1.8675E-02	3.8190E-02	3.8206E-02	4.206E-02
CS-137	#A	2.0103E-02	2.0104E-02	3.4820E-02	3.4839E-02	3.819E-02
CE-139	#A	1.2859E-02	1.2928E-02	4.0342E-02	4.0349E-02	4.444E-02
EU-152	#B	3.2817E-02	3.2822E-02	1.3308E-01	1.3309E-01	1.477E-01
EU-154	#B	3.3430E-02	3.3437E-02	9.1653E-02	9.1672E-02	1.013E-01
EU-155	#B	-4.7436E-03	-4.7455E-03	2.1631E-01	2.1631E-01	2.414E-01
HG-203	#B	-1.3022E-02	-1.3229E-02	3.7660E-02	3.7668E-02	4.101E-02
TL-208		2.7670E-01	2.7670E-01	5.3791E-02	5.6139E-02	
PB-212		8.2627E-01	8.2627E-01	8.2628E-02	9.5544E-02	
PB-214		4.1271E-01	4.1271E-01	9.4461E-02	9.7453E-02	
BI-212		5.7175E-01	5.7175E-01	2.6718E-01	2.6923E-01	
BI-214		4.2516E-01	4.2516E-01	9.9222E-02	1.0225E-01	
RA-224	A	8.1450E-01	8.1450E-01	9.4757E-01	9.4875E-01	
RA-226	#	1.5355E+00	1.5355E+00	8.9192E-01	8.9636E-01	
AC-228		8.5101E-01	8.5101E-01	1.7216E-01	1.7911E-01	
TH-227	#B	-5.5866E-03	-5.5866E-03	3.3999E-01	3.3999E-01	3.803E-01
PA-234	#B	5.8214E-02	5.8214E-02	6.3794E-02	6.3876E-02	2.132E-01
TH-234	#B	1.9137E+00	1.9137E+00	1.8959E+00	1.8989E+00	6.368E+00
AM-241	#A	5.6536E-02	5.6536E-02	9.2387E-01	9.2387E-01	1.035E+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_29OCT2005_1026.An1

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

Total Activity (269.4 to 2000.7 keV) 2.0513950E+01 pCi/gm
Total Decayed Activity (269.4 to 2000.7 keV) 2.0513952E+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_29OCT2005_1101.An1

Sample description
FSS OOL-02-01-002-F

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_1101.An1

Acquisition information
Start time: 29-Oct-2005 11:01:44
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: 1.8430E+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	28-Oct-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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4919

***** S U M M A R Y O F P E A K 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	111.	24.39	0.99	9.052E-03	74.81	9.600	9.379E-01	PB212
77.10	173.	14.71	0.99	1.011E-02	77.11	17.500	7.365E-01	PB212
87.18	129.	31.05	0.89	1.439E-02	86.45	32.740	2.044E-01	EU155
					88.04	3.790	1.694E+00	CD109
92.97	117.	31.41	1.40	1.651E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.73	85.	35.07	1.15	2.433E-02				
186.04	182.	21.66	1.13	2.566E-02	185.99	3.280	1.472E+00	RA226
209.49	139.	23.90	1.27	2.470E-02				
238.51	1059.	3.68	1.09	2.321E-02	238.63	43.100	7.681E-01	PB212
241.35	163.	16.30	1.09	2.306E-02	241.00	3.900	1.326E+00	RA224
269.86	112.	25.82	0.87	2.153E-02				
294.96	251.	9.36	1.13	2.026E-02	295.22	19.200	4.649E-01	PB214
299.65	69.	26.77	1.13	2.003E-02				
338.35	286.	9.55	1.42	1.830E-02	338.40	12.010	9.518E-01	AC228
351.56	384.	8.86	1.04	1.777E-02	351.99	37.100	4.212E-01	PB214
462.73	111.	21.45	1.11	1.427E-02				
462.73	111.	21.45	1.11	1.427E-02	463.51	10.000	5.652E-01	SB125
510.16	144.	17.51	1.62	1.318E-02	510.72	22.500	2.913E-01	TL208
582.53	357.	8.94	1.16	1.185E-02	583.14	86.000	2.542E-01	TL208
608.71	315.	8.37	1.24	1.145E-02	609.32	46.090	4.291E-01	BI214
661.23	89.	27.04	1.34	1.073E-02	661.62	84.620	7.081E-02	CS137
726.70	81.	23.48	1.19	9.970E-03	727.17	11.800	5.033E-01	BI212
794.24	33.	36.57	1.50	9.301E-03				
794.24	33.	36.57	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
910.16	290.	8.73	1.49	8.408E-03	911.07	29.000	8.629E-01	AC228
967.37	194.	13.14	1.76	8.035E-03	968.90	17.460	1.014E+00	AC228

1119.33	77.	25.94	0.90	7.216E-03	1120.28	15.040	5.050E-01	BI214
1171.78	40.	30.04	1.67	6.972E-03	1173.23	99.860	4.206E-02	CO60
1331.16	33.	25.72	1.77	6.349E-03	1332.51	99.980	3.830E-02	CO60
1459.45	1390.	2.77	1.86	5.936E-03	1460.75	10.700	1.584E+01	K40
1762.77	57.	13.25	1.83	5.146E-03	1764.51	15.920	4.813E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
256.62	128.73	416.	93.	0.047	97.63	1.154	AC-228	
418.14	209.49	420.	139.	0.070	71.69	1.274	AC-228	s
538.88	269.86	292.	112.	0.056	77.46	0.868	AC-228	s
598.47	299.66	239.	79.	0.039	95.48	1.275	TH-227	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	334.	111.	0.056	73.17	0.993D
PB-212	153.39	77.11	337.	173.	0.087	44.14	0.995A
EU-155	173.62	87.22	844.	110.	0.055	115.15	1.500
RA-226	371.43	186.13	661.	145.	0.073	72.28	1.500s
PB-212	476.99	238.92	539.	1171.	0.585	13.08	0.971s
RA-224	481.64	241.24	760.	128.	0.064	95.45	1.500s
PB-214	589.10	294.98	245.	246.	0.123	33.95	0.906
AC-228	675.83	338.35	179.	285.	0.143	28.65	1.423s
PB-214	702.25	351.56	264.	378.	0.189	26.59	1.039
SB-125	924.26	462.57	116.	86.	0.043	61.40	1.500
TL-208	1019.43	510.16	186.	118.	0.059	52.52	1.625s
TL-208	1164.16	582.53	189.	353.	0.177	26.83	1.161
BI-214	1216.51	608.71	121.	309.	0.154	25.10	1.235
CS-137	1321.55	661.23	141.	88.	0.044	81.11	1.338
BI-212	1452.48	726.70	101.	81.	0.040	70.43	1.189
CS-134	1587.53	794.24	57.	33.	0.017	109.72	1.500s
AC-228	1819.35	910.16	93.	287.	0.143	26.18	1.488s
AC-228	1933.75	967.37	114.	194.	0.097	39.43	1.765
BI-214	2237.63	1119.33	90.	75.	0.037	77.82	0.904s
CO-60	2342.53	1171.78	60.	40.	0.020	90.13	1.667s
CO-60	2661.23	1331.16	27.	33.	0.017	77.16	1.765s
K-40	2917.77	1459.45	38.	1371.	0.686	8.31	1.856
BI-214	3524.30	1762.77	3.	54.	0.027	39.74	1.834s

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

***** S U M M A R Y O 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		5.5291E-03					
			477.56	5.529E-03	%(	3.562E-01 1.04E-01	G
K-40		1.5841E+01					
			1460.75	1.584E+01	(P	3.619E-01 4.44E-01	G
MN-54		1.5555E-02					
			834.81	1.556E-02	%(P	3.508E-02 1.06E-02	G
CO-57		-9.4404E-03					
			122.07	-9.440E-03	%(P	5.262E-02 1.58E-02	G K
			136.43	-3.302E-02	&	3.763E-01 1.12E-01	G
CO-60		4.0180E-02					
			1332.51	3.830E-02	@(P	3.117E-02 1.06E-02	G K
			1173.23	4.206E-02	(P	4.093E-02 1.33E-02	G K
Sr-85		-2.7625E-02					
			514.00	-2.762E-02	%(	4.239E-02 1.30E-02	G
Kr-85		-6.2948E+02					
			513.99	-6.295E+02	%(	9.669E+02 2.97E+02	G
Y-88		1.2725E-04					
			1836.01	1.272E-04	%(P	1.947E-02 4.69E-03	G K
			898.02	-5.844E-04	& P	3.812E-02 1.08E-02	G
NB-94		-4.6314E-03					
			871.10	-4.631E-03	&(	3.661E-02 1.06E-02	G K
			702.50	1.525E-03	&	3.870E-02 1.12E-02	G K
Ag-108M		-2.4351E-02					
			722.95	-2.435E-02	%(	5.058E-02 1.53E-02	G K
			614.37	-1.036E-02	% P	3.534E-02 1.05E-02	G
			433.93	7.733E-03	%	3.345E-02 9.92E-03	G
CD-109		1.2818E+00					
			88.04	1.282E+00	%(	1.779E+00 5.45E-01	G
SN-113		2.3747E-03					
			391.71	2.375E-03	%(	4.951E-02 1.45E-02	G K
			255.04	-1.629E-01	&	1.655E+00 4.92E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.6642E-02						
		427.95	-1.956E-02	%(P	1.088E-01	3.22E-02	G K
		600.77	6.890E-02	% P	1.423E-01	4.32E-02	G
		636.15	-6.453E-04	% P	2.504E-01	7.10E-02	G
		463.51	4.406E-01	(P	2.721E-01	9.15E-02	G
		176.29	-1.413E-04	%	4.833E-01	1.43E-01	G
I-131	-2.8696E-05						
		364.48	-2.870E-05	&(P	4.110E-02	1.20E-02	G K
		636.97	6.520E-02	&	4.615E-01	1.34E-01	G
		284.29	8.408E-02	% P	5.470E-01	1.62E-01	G
CS-134	1.6126E-02						
		604.66	3.478E-03	%(	9.799E-02	2.92E-02	G K
		795.76	3.058E-02	*(P	3.505E-02	1.12E-02	G
		569.29	-2.888E-02	% P	2.266E-01	6.58E-02	G
		801.84	-7.266E-02	& P	4.385E-01	1.27E-01	G
CS-137	7.0808E-02						
		661.62	7.081E-02	(P	4.697E-02	1.94E-02	G
CE-139	-5.1173E-03						
		165.85	-5.117E-03	%(	4.611E-02	1.38E-02	G
EU-152	-2.8256E-02						
		121.78	-2.826E-02	%(P	1.540E-01	4.61E-02	G K
		344.30	6.193E-03	% P	1.112E-01	3.27E-02	G
		1408.08	6.125E-02	%	1.309E-01	3.97E-02	G
		964.00	-3.754E-03	& P	3.927E-01	1.14E-01	G
		1112.07	1.336E-01	&	2.554E-01	7.81E-02	G
		778.90	-4.386E-02	%	2.690E-01	7.84E-02	G
EU-154	-2.2147E-02						
		123.10	-2.215E-02	%(	1.074E-01	3.22E-02	G K
		1274.80	1.308E-02	%	1.172E-01	3.36E-02	G
		723.30	-2.066E-02	%	1.885E-01	5.48E-02	G
		1004.80	-2.961E-02	&	2.213E-01	6.40E-02	G
EU-155	1.7549E-01						
		86.45	1.755E-01	(	2.193E-01	6.74E-02	G K
		105.31	6.401E-02	&	2.212E-01	6.66E-02	G
HG-203	1.0236E-02						
		279.17	1.024E-02	&(P	4.005E-02	1.20E-02	G K
		72.87	2.998E-02	% P	1.735E+00	5.15E-01	G
		70.83	-1.427E-01	%	3.447E+00	1.02E+00	G
		82.50	-5.795E-01	%	3.731E+00	1.12E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.6185E-01						
		583.14	2.542E-01	(P	4.805E-02	2.30E-02	G
		510.72	2.913E-01	*(P	1.640E-01	6.25E-02	G
PB-212	8.7293E-01						
		238.63	8.585E-01	@(P	8.135E-02	3.78E-02	G K
							Energy duplication
		77.11	7.181E-01	} P	3.657E-01	1.06E-01	G
		74.81	9.379E-01	(P	7.417E-01	2.35E-01	G
PB-214	4.3608E-01						
		351.99	4.212E-01	(P	8.725E-02	3.78E-02	G K
		295.22	4.648E-01	(P	1.426E-01	5.34E-02	G
							Energy duplication
		77.11	0.000E+00	} P	6.876E-01	0.00E+00	G
		241.92	2.374E-02	%	6.354E-01	1.90E-01	G
BI-212	5.0327E-01						
		727.17	5.033E-01	(P	3.094E-01	1.19E-01	G K
		1620.56	2.486E-01	% P	8.382E-01	2.41E-01	G
		785.42	1.263E-01	%	1.777E+00	5.12E-01	G
BI-214	4.5468E-01						
		609.32	4.291E-01	(P	7.520E-02	3.66E-02	G K
		1764.51	4.813E-01	@(P	9.978E-02	6.76E-02	G
		1120.28	5.050E-01	(P	3.177E-01	1.34E-01	G
RA-224	1.0396E+00						
		241.00	1.040E+00	(	1.069E+00	3.31E-01	G
RA-226	1.2661E+00						
		185.99	1.266E+00	*(P	1.067E+00	3.32E-01	G
AC-228	9.2640E-01						
		911.07	8.629E-01	*(P	1.436E-01	7.61E-02	G K
		968.90	1.014E+00	(P	2.747E-01	1.33E-01	G
		338.40	9.518E-01	@(P	2.169E-01	9.12E-02	G
TH-227	-2.1850E-01						
		236.00	-2.185E-01	%(	3.759E-01	1.14E-01	G K
		256.25	7.068E-04	% P	4.912E-01	1.45E-01	G
PA-234	4.7409E-02						
		98.44	4.741E-02	%(P	2.006E-01	6.02E-02	G K
		946.00	3.350E-03	% P	1.846E-01	5.25E-02	G
		131.28	-4.260E-02	% P	2.176E-01	6.53E-02	G
		94.67	-9.327E-02	% P	3.847E-01	1.16E-01	G
		883.24	-1.863E-02	&	3.108E-01	8.92E-02	G
		926.70	1.192E-01	&	2.760E-01	8.31E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-2.790E-02 % P 3.138E-01 9.04E-02 G

TH-234      -1.9446E+00
                           63.29-1.945E+00 &(P 6.411E+00 1.92E+00 G K
                           92.80 1.369E+00 % P 2.045E+00 6.22E-01 G
                           92.38 1.651E+00 % P 2.418E+00 7.36E-01 G

AM-241       3.0269E-01
                           59.54 3.027E-01 &(P 9.577E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	5.4490E-03	5.5291E-03	3.1189E-01	3.1189E-01	3.510E-01
K-40		1.5841E+01	1.5841E+01	1.3338E+00	1.6201E+00	
MN-54	#A	1.5516E-02	1.5555E-02	3.1745E-02	3.1758E-02	3.500E-02
CO-57	#B	-9.4132E-03	-9.4404E-03	4.8928E-02	4.8931E-02	5.247E-02
CO-60	#	4.0164E-02	4.0180E-02	2.5315E-02	2.5422E-02	3.116E-02

Sr-85	#A	-2.7295E-02	-2.7625E-02	3.9049E-02	3.9082E-02	4.189E-02
Kr-85	#A	-6.2947E+02	-6.2948E+02	8.9056E+02	8.9131E+02	9.669E+02
Y-88	#B	1.2632E-04	1.2725E-04	1.4066E-02	1.4066E-02	1.933E-02
NB-94	#B	-4.6314E-03	-4.6314E-03	3.1806E-02	3.1807E-02	3.661E-02
Ag-108M	#B	-2.4351E-02	-2.4351E-02	4.6020E-02	4.6042E-02	5.058E-02
CD-109	#A	1.2796E+00	1.2818E+00	1.6347E+00	1.6362E+00	1.776E+00
SN-113	#B	2.3587E-03	2.3747E-03	4.3511E-02	4.3511E-02	4.918E-02
SB-125	#B	9.6568E-02	9.6642E-02	6.0219E-02	6.0479E-02	1.087E-01
I-131	#B	-2.6045E-05	-2.8696E-05	4.1625E-02	4.1625E-02	3.731E-02
CS-134	#B	1.6109E-02	1.6126E-02	1.7740E-02	1.7765E-02	9.789E-02
CS-137		7.0803E-02	7.0808E-02	5.8341E-02	5.8486E-02	
CE-139	#A	-5.0883E-03	-5.1173E-03	4.1309E-02	4.1310E-02	4.585E-02
EU-152	#B	-2.8251E-02	-2.8256E-02	1.4881E-01	1.4881E-01	1.539E-01
EU-154	#B	-2.2141E-02	-2.2147E-02	9.6702E-02	9.6709E-02	1.074E-01
EU-155	#A	1.7541E-01	1.7549E-01	2.0207E-01	2.0231E-01	2.192E-01
HG-203	#B	1.0066E-02	1.0236E-02	3.5952E-02	3.5957E-02	3.939E-02
TL-208		2.6185E-01	2.6185E-01	7.1122E-02	7.2729E-02	
PB-212		8.7293E-01	8.7293E-01	1.1536E-01	1.2600E-01	
PB-214		4.3608E-01	4.3608E-01	9.5513E-02	9.8812E-02	
BI-212		5.0327E-01	5.0327E-01	3.5664E-01	3.5784E-01	
BI-214		4.5468E-01	4.5468E-01	1.1651E-01	1.1947E-01	
RA-224	#A	1.0396E+00	1.0396E+00	9.9233E-01	9.9417E-01	1.069E+00
RA-226	#	1.2661E+00	1.2661E+00	9.9665E-01	9.9935E-01	1.067E+00
AC-228		9.2640E-01	9.2640E-01	1.7152E-01	1.7976E-01	
TH-227	#B	-2.1850E-01	-2.1850E-01	3.4347E-01	3.4371E-01	3.759E-01
PA-234	#B	4.7409E-02	4.7409E-02	1.8049E-01	1.8051E-01	2.006E-01
TH-234	#B	-1.9446E+00	-1.9446E+00	7.4889E+00	7.4896E+00	6.411E+00
AM-241	#A	3.0268E-01	3.0269E-01	8.6394E-01	8.6410E-01	9.577E-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) 1.9367054E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 1.9367060E+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_29OCT2005_1137.An1

Sample description
FSS OOL-02-01-022-F-B

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_1137.An1

Acquisition information
Start time: 29-Oct-2005 11:37:45
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: 1.9930E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9930E+03) =
5.0176E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 14:10:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4646

***** S U M M A R Y O F P E A K 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	138.	20.76	0.99	9.052E-03	74.81	9.600	1.080E+00	PB212
77.18	129.	18.95	0.99	1.011E-02	77.11	17.500	6.892E-01	PB212
					77.11	10.700	1.127E+00	PB214
87.45	144.	30.90	1.26	1.450E-02	86.45	32.740	2.122E-01	EU155
					88.04	3.790	1.758E+00	CD109
93.89	104.	35.85	1.54	1.682E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
109.58	106.	36.25	0.86	2.118E-02				
186.12	203.	16.19	1.20	2.566E-02	185.99	3.280	1.531E+00	RA226
208.55	121.	29.02	0.97	2.475E-02				
238.52	1111.	3.58	1.09	2.320E-02	238.63	43.100	7.454E-01	PB212
241.91	126.	20.70	1.10	2.302E-02	241.00	3.900	9.493E-01	RA224
					241.92	7.470	4.967E-01	PB214
270.12	68.	37.10	0.95	2.152E-02				
295.01	233.	11.22	0.90	2.026E-02	295.22	19.200	3.986E-01	PB214
300.00	66.	37.94	0.70	2.002E-02				
327.69	62.	37.51	1.37	1.875E-02				
338.22	216.	12.74	1.21	1.831E-02	338.40	12.010	6.630E-01	AC228
351.49	436.	8.83	1.06	1.777E-02	351.99	37.100	4.428E-01	PB214
462.63	73.	29.19	1.03	1.427E-02				
462.63	73.	29.19	1.03	1.427E-02	463.51	10.000	3.397E-01	SB125
510.39	206.	13.18	1.24	1.318E-02	510.72	22.500	4.103E-01	TL208
582.55	349.	8.37	1.39	1.185E-02	583.14	86.000	2.296E-01	TL208
608.84	316.	7.55	1.35	1.145E-02	609.32	46.090	3.974E-01	BI214
726.66	99.	18.92	1.01	9.970E-03	727.17	11.800	5.680E-01	BI212
859.67	57.	24.26	1.26	8.774E-03				

910.44	243.	8.21	1.70	8.406E-03	911.07	29.000	6.658E-01	AC228
963.94	58.	18.61	1.54	8.056E-03				
963.94	58.	18.61	1.54	8.056E-03	964.00	14.580	3.289E-01	EU152
968.10	162.	9.43	1.54	8.030E-03	968.90	17.460	7.816E-01	AC228
1119.12	113.	19.04	1.38	7.217E-03	1120.28	15.040	6.952E-01	BI214
1459.35	1300.	2.80	1.95	5.936E-03	1460.75	10.700	1.368E+01	K40
1618.80	26.	26.37	0.95	5.488E-03	1620.56	2.750	1.148E+00	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1762.58	66.	13.27	1.34	5.146E-03	1764.51	15.920	5.213E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
218.34	109.58	601.	106.	0.053	101.96	0.859	U-235	s
416.27	208.55	465.	121.	0.061	87.05	0.973	LU-177	s
539.40	270.12	262.	68.	0.034	111.30	0.952	AC-228	s
599.15	300.00	243.	66.	0.033	113.81	0.703	PB-212	s
654.53	327.69	205.	62.	0.031	112.54	1.365	AC-228	s
1718.38	859.67	51.	57.	0.028	72.79	1.263	TL-208	s
1926.89	963.98	28.	58.	0.029	55.82	1.538	EU-152	lD

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	364.	138.	0.069	62.27	0.993D
PB-212	153.39	77.11	383.	129.	0.065	56.84	0.995A
CD-109	173.55	87.19	807.	101.	0.050	123.14	1.500s
PA-234	185.24	93.04	668.	120.	0.060	94.79	1.500s
RA-226	371.40	186.12	431.	190.	0.095	48.58	1.200s
PB-212	476.28	238.56	592.	1174.	0.587	13.40	0.916
RA-224	482.26	241.55	691.	122.	0.061	95.50	1.500s
PB-214	589.16	295.01	217.	229.	0.114	33.65	0.899
AC-228	675.58	338.22	209.	215.	0.107	38.21	1.215s
PB-214	702.12	351.49	313.	430.	0.215	26.49	1.061
SB-125	924.27	462.57	131.	67.	0.033	79.68	1.500
TL-208	1019.90	510.39	188.	179.	0.090	39.54	1.241s
TL-208	1164.19	582.55	153.	345.	0.172	25.12	1.386
BI-214	1216.77	608.84	107.	309.	0.155	22.64	1.348
BI-212	1452.40	726.66	90.	99.	0.049	56.77	1.009
AC-228	1819.91	910.44	68.	239.	0.120	24.64	1.703
AC-228	1934.67	967.83	73.	231.	0.116	29.24	1.713
BI-214	2237.22	1119.12	92.	111.	0.056	57.12	1.377s
K-40	2917.57	1459.35	27.	1281.	0.640	8.40	1.950
BI-212	3236.40	1618.80	5.	26.	0.013	79.12	0.950s
BI-214	3524.01	1762.63	14.	54.	0.027	46.66	2.033s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.6848E-03					
			477.56	1.685E-03	&(	2.749E-01 7.95E-02	G
K-40		1.3683E+01					
			1460.75	1.368E+01	(P	2.882E-01 3.89E-01	G
MN-54		1.1747E-02					
			834.81	1.175E-02	%(P	3.267E-02 9.75E-03	G
CO-57		3.6453E-03					
			122.07	3.645E-03	%(P	4.751E-02 1.42E-02	G K
			136.43	1.089E-02	%	3.897E-01 1.16E-01	G
CO-60		1.7740E-02					
			1332.51	1.774E-02	&(P	3.219E-02 9.75E-03	G K
			1173.23	1.599E-02	% P	4.328E-02 1.29E-02	G K
Sr-85		-7.3457E-03					
			514.00	-7.346E-03	%(	3.649E-02 1.08E-02	G
Kr-85		-1.6788E+02					
			513.99	-1.679E+02	%(	8.343E+02 2.47E+02	G
Y-88		3.0428E-03					
			1836.01	3.043E-03	&(P	1.442E-02 3.82E-03	G K
			898.02	-3.414E-03	% P	3.237E-02 9.20E-03	G
NB-94		-2.7813E-03					
			871.10	-2.781E-03	%(	3.339E-02 9.60E-03	G K
			702.50	-7.208E-04	&	3.299E-02 9.49E-03	G K
Ag-108M		-2.1680E-02					
			722.95	-2.168E-02	%(	4.899E-02 1.48E-02	G K
			614.37	4.111E-05	% P	3.380E-02 9.71E-03	G
			433.93	2.034E-03	&	3.108E-02 9.07E-03	G
CD-109		1.2277E+00					
			88.04	1.228E+00	*(	1.644E+00 5.04E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-1.4122E-03						
		391.71	-1.412E-03	%(	4.415E-02	1.29E-02	G K
		255.04	-3.596E-02	%	1.267E+00	3.73E-01	G
SB-125	8.1017E-02						
		427.95	7.793E-04	&(P	9.820E-02	2.86E-02	G K
		600.77	-6.000E-03	% P	1.701E-01	4.92E-02	G
		636.15	-2.167E-02	% P	3.003E-01	8.70E-02	G
		463.51	3.185E-01	(P	2.669E-01	8.62E-02	G
		176.29	5.679E-02	&	5.126E-01	1.53E-01	G
I-131	-2.6699E-03						
		364.48	-2.670E-03	&(P	3.810E-02	1.12E-02	G K
		636.97	7.386E-02	%	4.659E-01	1.36E-01	G
		284.29	3.731E-02	& P	5.214E-01	1.54E-01	G
CS-134	1.3963E-02						
		604.66	1.396E-02	%(	2.383E-02	7.33E-03	G K
		795.76	-3.823E-03	& P	4.381E-02	1.27E-02	G
		569.29	6.644E-02	% P	1.649E-01	4.93E-02	G
		801.84	6.415E-02	% P	3.445E-01	9.98E-02	G
CS-137	8.6984E-03						
		661.62	8.698E-03	&(P	3.856E-02	1.13E-02	G
CE-139	4.5515E-03						
		165.85	4.552E-03	%(	4.331E-02	1.29E-02	G
EU-152	2.2885E-02						
		121.78	2.289E-02	%(P	1.120E-01	3.35E-02	G K
		344.30	-1.170E-02	& P	1.081E-01	3.19E-02	G
		1408.08	-6.818E-03	&	1.483E-01	4.11E-02	G
		964.00	1.243E-01	& P	2.942E-01	8.86E-02	G
		1112.07	-3.062E-03	%	2.575E-01	7.26E-02	G
		778.90	0.000E+00	&	2.362E-01	6.71E-02	G
EU-154	-7.5552E-04						
		123.10	-7.555E-04	%(	1.042E-01	3.10E-02	G K
		1274.80	1.359E-02	%	1.122E-01	3.23E-02	G
		723.30	-8.614E-02	%	2.111E-01	6.36E-02	G
		1004.80	-4.280E-02	&	1.908E-01	5.58E-02	G
EU-155	1.2504E-01						
		86.45	1.250E-01	%(	2.112E-01	6.43E-02	G K
		105.31	-2.406E-02	%	2.056E-01	6.14E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-7.1687E-03						
		279.17	-7.169E-03	%(P	3.996E-02	1.19E-02	G K
		72.87	1.456E-01	% P	1.639E+00	4.89E-01	G
		70.83	6.460E-02	%	3.413E+00	1.01E+00	G
		82.50	-9.392E-01	%	3.498E+00	1.05E+00	G
TL-208	2.2957E-01						
		583.14	2.296E-01	(P	4.019E-02	1.94E-02	G
		510.72	4.103E-01	+ P	1.522E-01	6.21E-02	G
PB-212	7.9643E-01						
		238.63	7.964E-01	(P	7.870E-02	3.59E-02	G K
							Energy duplication
		77.11	4.955E-01	} P	3.598E-01	9.39E-02	G
		74.81	1.080E+00	+ P	7.145E-01	2.29E-01	G
PB-214	4.2776E-01						
		351.99	4.428E-01	(P	8.764E-02	3.96E-02	G K
		295.22	3.986E-01	(P	1.246E-01	4.55E-02	G
							Energy duplication
		77.11	2.607E-01	} P	8.733E-01	2.03E-01	G
		241.92	3.447E-01	%	4.951E-01	1.52E-01	G
BI-212	5.6803E-01						
		727.17	5.680E-01	(P	2.713E-01	1.08E-01	G K
		1620.56	1.148E+00	+ P	6.103E-01	3.03E-01	G
		785.42	7.166E-01	%	1.392E+00	4.24E-01	G
BI-214	4.0977E-01						
		609.32	3.974E-01	(P	6.547E-02	3.06E-02	G K
		1764.51	4.455E-01	?(P	1.675E-01	7.35E-02	G
		1120.28	6.952E-01	+ P	2.960E-01	1.35E-01	G
RA-224	9.1796E-01						
		241.00	9.180E-01	(	9.435E-01	2.92E-01	G
RA-226	1.5307E+00						
		185.99	1.531E+00	@(P	8.010E-01	2.65E-01	G
AC-228	6.6496E-01						
		911.07	6.658E-01	(P	1.143E-01	5.54E-02	G K
		968.90	1.118E+00	+ P	2.057E-01	1.09E-01	G
		338.40	6.630E-01	@(P	2.162E-01	8.48E-02	G
TH-227	-1.1975E-01						
		236.00	-1.197E-01	%(	3.701E-01	1.12E-01	G K
		256.25	-1.553E-04	& P	4.213E-01	1.24E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	1.1797E-01						
		98.44	3.261E-04	%(P	2.122E-01	6.32E-02	G K
		946.00	-2.009E-02	% P	1.621E-01	4.67E-02	G
		131.28	1.067E-02	% P	1.970E-01	5.88E-02	G
		94.67	3.085E-01	*(P	3.155E-01	9.77E-02	G
		883.24	5.716E-02	%	2.510E-01	7.34E-02	G
		926.70	2.141E-02	&	2.345E-01	6.63E-02	G
		569.26	9.844E-02	% P	2.444E-01	7.31E-02	G
TH-234	1.8740E+00						
		63.29	1.874E+00	&(P	5.899E+00	1.77E+00	G K
		92.80	1.109E+00	& P	1.985E+00	6.01E-01	G
		92.38	1.632E+00	& P	2.324E+00	7.08E-01	G
AM-241	2.0110E-01						
		59.54	2.011E-01	%(P	9.847E-01	2.95E-01	G

(- This peak used in the nuclide activity average.

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

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

- -

***** S U 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	1.6654E-03	1.6848E-03	2.3859E-01	2.3859E-01	2.717E-01
K-40		1.3683E+01	1.3683E+01	1.1668E+00	1.4116E+00	
MN-54	#A	1.1724E-02	1.1747E-02	2.9242E-02	2.9250E-02	3.260E-02
CO-57	#B	3.6370E-03	3.6453E-03	4.2544E-02	4.2544E-02	4.740E-02
CO-60	#B	1.7734E-02	1.7740E-02	2.9239E-02	2.9257E-02	3.218E-02
Sr-85	#A	-7.2758E-03	-7.3457E-03	3.2463E-02	3.2466E-02	3.614E-02
Kr-85	#A	-1.6788E+02	-1.6788E+02	7.4228E+02	7.4234E+02	8.343E+02
Y-88	#B	3.0252E-03	3.0428E-03	1.1463E-02	1.1464E-02	1.434E-02
NB-94	#B	-2.7813E-03	-2.7813E-03	2.8814E-02	2.8814E-02	3.339E-02
Ag-108M	#B	-2.1680E-02	-2.1680E-02	4.4427E-02	4.4445E-02	4.899E-02
CD-109	#A	1.2260E+00	1.2277E+00	1.5117E+00	1.5133E+00	1.642E+00
SN-113	#B	-1.4046E-03	-1.4122E-03	3.8698E-02	3.8698E-02	4.391E-02
SB-125	#B	8.0967E-02	8.1017E-02	6.5782E-02	6.5950E-02	9.814E-02
I-131	#B	-2.4718E-03	-2.6699E-03	4.3859E-02	4.3859E-02	3.527E-02
CS-134	#B	1.3951E-02	1.3963E-02	2.2002E-02	2.2017E-02	2.381E-02
CS-137	#A	8.6979E-03	8.6984E-03	3.4032E-02	3.4036E-02	3.856E-02
CE-139	#A	4.5310E-03	4.5515E-03	3.8795E-02	3.8796E-02	4.311E-02
EU-152	#B	2.2882E-02	2.2885E-02	1.0048E-01	1.0049E-01	1.120E-01
EU-154	#B	-7.5537E-04	-7.5552E-04	9.3138E-02	9.3138E-02	1.042E-01
EU-155	#B	1.2499E-01	1.2504E-01	1.9299E-01	1.9312E-01	2.111E-01
HG-203	#B	-7.0740E-03	-7.1687E-03	3.5908E-02	3.5910E-02	3.943E-02
TL-208		2.2957E-01	2.2957E-01	5.8395E-02	5.9896E-02	
PB-212		7.9643E-01	7.9643E-01	1.0783E-01	1.1733E-01	
PB-214		4.2776E-01	4.2776E-01	9.3054E-02	9.6311E-02	
BI-212		5.6803E-01	5.6803E-01	3.2411E-01	3.2578E-01	
BI-214		4.0977E-01	4.0977E-01	9.4703E-02	9.7646E-02	
RA-224	#A	9.1796E-01	9.1796E-01	8.7663E-01	8.7825E-01	9.435E-01
RA-226	#	1.5307E+00	1.5307E+00	7.9436E-01	7.9931E-01	
AC-228		6.6496E-01	6.6496E-01	1.5234E-01	1.5715E-01	
TH-227	#B	-1.1975E-01	-1.1975E-01	3.3476E-01	3.3483E-01	3.701E-01
PA-234	#B	1.1797E-01	1.1797E-01	1.1214E-01	1.1233E-01	2.122E-01
TH-234	#B	1.8740E+00	1.8740E+00	5.3202E+00	5.3212E+00	5.899E+00
AM-241	#A	2.0109E-01	2.0110E-01	8.8449E-01	8.8456E-01	9.847E-01

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

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

Total Activity (87.4 to 2000.7 keV) 1.8310272E+01 pCi/gm
Total Decayed Activity (87.4 to 2000.7 keV) 1.8310274E+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_29OCT2005_1238.An1

Sample description
FSS OOL-02-01-012-F

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_1238.An1

Acquisition information
Start time: 29-Oct-2005 12:38:45
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: 1.7390E+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	28-Oct-2005 10:05:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5238

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.91	80.	31.89	0.99	9.052E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.21	158.	1.63	0.99	1.011E-02	77.11	17.500	6.973E-01	PB212
186.13	165.	20.68	1.71	2.566E-02	185.99	3.280	1.407E+00	RA226
209.64	106.	29.21	1.13	2.470E-02				
238.56	904.	3.97	1.09	2.320E-02	238.63	43.100	6.933E-01	PB212
241.61	129.	18.45	1.09	2.304E-02	241.00	3.900	1.113E+00	RA224
269.98	77.	35.14	1.16	2.152E-02				
294.89	221.	11.89	1.19	2.026E-02	295.22	19.200	4.334E-01	PB214
327.36	77.	33.72	1.06	1.877E-02				
338.47	202.	14.28	1.09	1.830E-02	338.40	12.010	7.121E-01	AC228
351.53	410.	8.83	1.11	1.777E-02	351.99	37.100	4.774E-01	PB214
462.75	66.	23.74	1.00	1.427E-02				
462.75	66.	23.74	1.00	1.427E-02	463.51	10.000	3.511E-01	SB125
510.19	137.	17.80	1.63	1.318E-02	510.72	22.500	2.893E-01	TL208
582.71	318.	8.56	1.28	1.185E-02	583.14	86.000	2.395E-01	TL208
608.59	323.	8.01	1.33	1.145E-02	609.32	46.090	4.661E-01	BI214
726.62	73.	23.84	1.54	9.971E-03	727.17	11.800	4.805E-01	BI212
767.85	58.	33.38	1.24	9.557E-03				
793.96	47.	24.47	1.06	9.317E-03				
859.82	63.	30.31	1.45	8.773E-03				
910.33	214.	9.04	1.38	8.406E-03	911.07	29.000	6.731E-01	AC228
967.25	214.	12.22	1.71	8.036E-03	964.00	14.580	1.412E+00	EU152
					968.90	17.460	1.186E+00	AC228
1119.07	69.	31.55	1.95	7.212E-03	1120.28	15.040	4.944E-01	BI214
1237.48	43.	33.65	0.72	6.704E-03				
1459.32	1277.	2.87	1.79	5.936E-03	1460.75	10.700	1.540E+01	K40

1619.27	14.	26.73	1.58	5.488E-03	1620.56	2.750	7.186E-01	BI212
1762.90	58.	14.84	1.19	5.145E-03	1764.51	15.920	5.224E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.43	209.64	369.	106.	0.053	87.63	1.129	NP-239	
539.10	269.98	273.	77.	0.038	105.43	1.157	AC-228	s
653.86	327.36	219.	77.	0.038	101.15	1.062	AC-228	s
1534.77	767.85	99.	58.	0.029	100.14	1.239	BI-214	M
1586.97	793.96	39.	48.	0.024	69.47	1.058	PA-234	
1718.68	859.82	83.	63.	0.031	90.93	1.446	TL-208	s
2473.90	1237.48	64.	43.	0.022	100.96	0.720	J-133	s

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	313.	80.	0.040	95.66	0.993D
PB-212	153.39	77.11	303.	158.	0.079	4.90	0.995A
RA-226	371.18	186.01	574.	137.	0.069	71.20	1.500s
PB-212	476.20	238.52	622.	882.	0.441	17.12	1.040
RA-224	482.24	241.54	627.	120.	0.060	92.73	1.500s
PB-214	588.93	294.89	208.	217.	0.108	35.68	1.194s
AC-228	676.08	338.47	220.	201.	0.101	42.84	1.091s
PB-214	702.21	351.53	279.	405.	0.202	26.50	1.113
SB-125	924.34	462.61	104.	59.	0.029	81.50	1.500s
TL-208	1019.50	510.19	170.	110.	0.055	53.40	1.630s
TL-208	1164.52	582.71	129.	314.	0.157	25.69	1.280
BI-214	1216.28	608.59	118.	316.	0.158	24.02	1.334
BI-212	1452.30	726.62	80.	73.	0.036	71.53	1.539
AC-228	1819.69	910.33	61.	211.	0.106	27.12	1.384
AC-228	1935.06	968.02	94.	125.	0.063	42.40	1.541s
BI-214	2237.11	1119.07	118.	69.	0.035	94.66	1.948
K-40	2917.51	1459.32	35.	1258.	0.629	8.61	1.788
BI-212	3237.36	1619.27	0.	14.	0.007	80.18	1.583
BI-214	3524.55	1762.90	9.	55.	0.028	44.51	1.194s

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

***** S U M M A R Y O 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		4.8671E-02					
			477.56	4.867E-02	&(	2.511E-01 7.35E-02	G
K-40		1.5405E+01					
			1460.75	1.540E+01	(P	3.693E-01 4.49E-01	G
MN-54		-6.5070E-03					
			834.81	-6.507E-03	%(P	3.521E-02 1.02E-02	G
CO-57		-8.0380E-03					
			122.07	-8.038E-03	&(P	5.215E-02 1.56E-02	G K
			136.43	1.481E-02	&	3.934E-01 1.17E-01	G
CO-60		-9.9072E-03					
			1332.51	-9.907E-03	%(P	4.338E-02 1.22E-02	G K
			1173.23	-3.494E-03	% P	5.292E-02 1.50E-02	G K
Sr-85		-2.2353E-02					
			514.00	-2.235E-02	%(	4.140E-02 1.26E-02	G
Kr-85		-5.0997E+02					
			513.99	-5.100E+02	%(	9.444E+02 2.88E+02	G
Y-88		1.7163E-03					
			1836.01	1.716E-03	%(P	1.865E-02 4.65E-03	G K
			898.02	-2.368E-03	% P	4.525E-02 1.29E-02	G
NB-94		5.3636E-04					
			871.10	5.364E-04	&(	2.883E-02 8.04E-03	G K
			702.50	1.065E-02	%	2.867E-02 8.56E-03	G K
Ag-108M		-1.7063E-02					
			722.95	-1.706E-02	%(	4.551E-02 1.37E-02	G K
			614.37	-2.135E-03	% P	3.317E-02 9.52E-03	G
			433.93	8.587E-03	&	3.432E-02 1.02E-02	G
CD-109		9.4086E-01					
			88.04	9.409E-01	&(	1.807E+00 5.49E-01	G
SN-113		2.5056E-02					
			391.71	2.506E-02	%(	4.770E-02 1.45E-02	G K
			255.04	3.024E-02	%	1.561E+00 4.60E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.1012E-02						
		427.95	1.342E-04	%(P	1.090E-01	3.17E-02	G K
		600.77	-5.186E-05	& P	2.033E-01	5.87E-02	G
		636.15	6.515E-02	% P	2.602E-01	7.64E-02	G
		463.51	3.204E-01	(P	2.742E-01	8.89E-02	G
		176.29	1.132E-01	%	5.846E-01	1.75E-01	G
I-131	-9.7296E-03						
		364.48	-9.730E-03	%(P	4.289E-02	1.27E-02	G K
		636.97	4.786E-02	&	4.624E-01	1.33E-01	G
		284.29	1.295E-01	% P	5.514E-01	1.64E-01	G
CS-134	7.3715E-04						
		604.66	7.372E-04	%(	1.035E-01	3.08E-02	G K
		795.76	-1.128E-03	& P	4.228E-02	1.21E-02	G
		569.29	-2.609E-03	% P	2.225E-01	6.38E-02	G
		801.84	-1.247E-01	& P	3.927E-01	1.15E-01	G
CS-137	1.8233E-03						
		661.62	1.823E-03	&(P	4.073E-02	1.17E-02	G
CE-139	-2.2497E-05						
		165.85	-2.250E-05	&(	4.715E-02	1.40E-02	G
EU-152	-2.2973E-02						
		121.78	-2.297E-02	&(P	1.525E-01	4.56E-02	G K
		344.30	-5.032E-02	% P	1.205E-01	3.64E-02	G
		1408.08	0.000E+00	&	1.984E-01	5.53E-02	G
		964.00	-2.059E-01	& P	4.623E-01	1.40E-01	G
		1112.07	6.068E-02	%	3.151E-01	9.18E-02	G
		778.90	1.338E-01	%	2.052E-01	6.41E-02	G
EU-154	-1.0741E-02						
		123.10	-1.074E-02	%(	1.118E-01	3.34E-02	G K
		1274.80	6.372E-03	%	1.355E-01	3.87E-02	G
		723.30	-4.034E-02	&	1.990E-01	5.85E-02	G
		1004.80	-5.037E-02	&	2.418E-01	7.08E-02	G
EU-155	2.1485E-02						
		86.45	2.148E-02	%(	2.214E-01	6.61E-02	G K
		105.31	8.147E-02	%	2.313E-01	6.98E-02	G
HG-203	-1.7755E-05						
		279.17	-1.776E-05	%(P	4.566E-02	1.35E-02	G K
		72.87	5.277E-04	% P	2.107E+00	6.27E-01	G
		70.83	-6.657E-01	%	4.360E+00	1.31E+00	G
		82.50	2.803E-01	&	3.728E+00	1.11E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.4979E-01						
		583.14	2.395E-01	(P	4.246E-02	2.08E-02	G
		510.72	2.893E-01	*(P	1.663E-01	6.39E-02	G
PB-212	6.9250E-01						
		238.63	6.854E-01	(P	9.244E-02	3.96E-02	G K
							Energy duplication
		77.11	6.925E-01	} P	3.681E-01	1.13E-02	G
		74.81	7.158E-01	(P	7.614E-01	2.37E-01	G
PB-214	4.6243E-01						
		351.99	4.774E-01	(P	9.509E-02	4.27E-02	G K
		295.22	4.334E-01	@(P	1.398E-01	5.25E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.701E-01	0.00E+00	G
		241.92	3.528E-02	%	4.042E-01	1.20E-01	G
BI-212	5.2550E-01						
		727.17	4.805E-01	(P	2.939E-01	1.15E-01	G K
		1620.56	7.186E-01	(P	3.795E-01	1.93E-01	G
		785.42	5.548E-01	%	1.637E+00	4.87E-01	G
BI-214	4.8324E-01						
		609.32	4.661E-01	(P	7.853E-02	3.81E-02	G K
		1764.51	5.224E-01	(P	1.582E-01	8.21E-02	G
		1120.28	4.944E-01	(P	3.821E-01	1.60E-01	G
RA-224	1.0355E+00						
		241.00	1.035E+00	(	1.031E+00	3.20E-01	G
RA-226	1.2675E+00						
		185.99	1.268E+00	*(P	1.055E+00	3.29E-01	G
AC-228	6.8739E-01						
		911.07	6.731E-01	(P	1.247E-01	6.18E-02	G K
		968.90	6.942E-01	&(P	2.660E-01	9.82E-02	G
		338.40	7.121E-01	@(P	2.537E-01	1.02E-01	G
TH-227	-1.1558E-01						
		236.00	-1.156E-01	%(	3.859E-01	1.16E-01	G K
		256.25	1.822E-02	& P	4.399E-01	1.30E-01	G
PA-234	-2.2318E-03						
		98.44	-2.232E-03	&(P	2.005E-01	5.94E-02	G K
		946.00	-3.508E-02	% P	1.738E-01	5.05E-02	G
		131.28	-3.368E-02	& P	2.161E-01	6.47E-02	G
		94.67	-2.400E-02	% P	3.993E-01	1.19E-01	G
		883.24	3.391E-02	%	2.940E-01	8.45E-02	G
		926.70	-7.670E-02	%	3.358E-01	9.83E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.867E-03 % P 3.297E-01 9.45E-02 G

TH-234       2.1514E-01
                           63.29 2.151E-01 &(P 5.858E+00 1.73E+00 G K
                           92.80 1.204E+00 & P 2.131E+00 6.45E-01 G
                           92.38 1.226E+00 & P 2.546E+00 7.68E-01 G

AM-241       1.2750E-02
                           59.54 1.275E-02 &(P 9.641E-01 2.85E-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	4.7977E-02	4.8671E-02	2.2053E-01	2.2055E-01	2.475E-01
K-40		1.5405E+01	1.5405E+01	1.3466E+00	1.6165E+00	
MN-54	#A	-6.4910E-03	-6.5070E-03	3.3702E-02	3.3704E-02	3.512E-02
CO-57	#B	-8.0152E-03	-8.0380E-03	4.8792E-02	4.8794E-02	5.200E-02
CO-60	#B	-9.9033E-03	-9.9072E-03	7.2002E-02	7.2004E-02	4.337E-02

Sr-85	#A	-2.2090E-02	-2.2353E-02	3.7840E-02	3.7863E-02	4.091E-02
Kr-85	#A	-5.0996E+02	-5.0997E+02	8.6330E+02	8.6381E+02	9.444E+02
Y-88	#B	1.7040E-03	1.7163E-03	1.3935E-02	1.3936E-02	1.852E-02
NB-94	#B	5.3636E-04	5.3636E-04	2.4134E-02	2.4134E-02	2.883E-02
Ag-108M	#B	-1.7062E-02	-1.7063E-02	4.0963E-02	4.0975E-02	4.551E-02
CD-109	#A	9.3927E-01	9.4086E-01	1.6468E+00	1.6476E+00	1.804E+00
SN-113	#B	2.4889E-02	2.5056E-02	4.3562E-02	4.3586E-02	4.738E-02
SB-125	#B	8.0951E-02	8.1012E-02	6.7463E-02	6.7626E-02	1.089E-01
I-131	#B	-8.8441E-03	-9.7296E-03	4.1580E-02	4.1584E-02	3.899E-02
CS-134	#B	7.3640E-04	7.3715E-04	9.2546E-02	9.2546E-02	1.034E-01
CS-137	#A	1.8231E-03	1.8233E-03	3.5035E-02	3.5035E-02	4.072E-02
CE-139	#A	-2.2372E-05	-2.2497E-05	4.2004E-02	4.2004E-02	4.689E-02
EU-152	#B	-2.2969E-02	-2.2973E-02	1.5031E-01	1.5032E-01	1.525E-01
EU-154	#B	-1.0739E-02	-1.0741E-02	1.0014E-01	1.0014E-01	1.117E-01
EU-155	#B	2.1476E-02	2.1485E-02	1.9822E-01	1.9822E-01	2.213E-01
HG-203	#B	-1.7465E-05	-1.7755E-05	3.1181E-03	3.1181E-03	4.492E-02
TL-208		2.4979E-01	2.4979E-01	6.5052E-02	6.6649E-02	
PB-212		6.9250E-01	6.9250E-01	1.2018E-01	1.2673E-01	
PB-214		4.6243E-01	4.6243E-01	1.0451E-01	1.0791E-01	
BI-212		5.2550E-01	5.2550E-01	2.8367E-01	2.8531E-01	
BI-214		4.8324E-01	4.8324E-01	1.1846E-01	1.2174E-01	
RA-224	#	1.0355E+00	1.0355E+00	9.6026E-01	9.6214E-01	1.031E+00
RA-226	#	1.2675E+00	1.2675E+00	9.8768E-01	9.9041E-01	1.055E+00
AC-228		6.8739E-01	6.8739E-01	1.5227E-01	1.5741E-01	
TH-227	#B	-1.1558E-01	-1.1558E-01	3.4847E-01	3.4854E-01	3.859E-01
PA-234	#B	-2.2318E-03	-2.2318E-03	1.2586E+00	1.2586E+00	2.005E-01
TH-234	#B	2.1514E-01	2.1514E-01	5.1987E+00	5.1987E+00	5.858E+00
AM-241	#A	1.2750E-02	1.2750E-02	8.5483E-01	8.5483E-01	9.641E-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 (86.9 to 2000.7 keV) 1.8505812E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 1.8505812E+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_29OCT2005_1314.An1

Sample description
FSS OOL-02-01-009-F

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_1314.An1

Acquisition information
Start time: 29-Oct-2005 13:14:17
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: 1.8360E+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	28-Oct-2005 08:43:00
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: 0.4744

***** S U M M A R Y O F P E A K 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	118.	22.13	0.99	9.100E-03	74.81	9.600	9.693E-01	PB212
77.12	216.	13.45	0.99	1.023E-02	77.11	10.700	1.450E+00	PB214
					77.11	17.500	8.869E-01	PB212
84.52	92.	29.89	1.08	1.333E-02				
185.87	171.	22.64	1.30	2.567E-02				
185.87	171.	22.64	1.30	2.567E-02	185.99	3.280	1.382E+00	RA226
209.47	127.	25.83	1.17	2.470E-02				
238.57	1026.	3.63	1.09	2.320E-02	238.63	43.100	7.463E-01	PB212
241.57	157.	15.47	1.09	2.304E-02	241.00	3.900	1.286E+00	RA224
					241.92	7.470	6.726E-01	PB214
270.08	136.	18.44	1.54	2.152E-02				
295.08	219.	13.90	1.09	2.026E-02	295.22	19.200	4.069E-01	PB214
300.47	74.	34.33	1.14	1.999E-02				
328.08	76.	23.17	1.48	1.874E-02				
337.98	250.	12.34	1.11	1.832E-02	338.40	12.010	8.325E-01	AC228
351.53	426.	8.72	1.10	1.777E-02	351.99	37.100	4.700E-01	PB214
462.51	67.	25.41	1.51	1.427E-02				
462.51	67.	25.41	1.51	1.427E-02	463.51	10.000	3.388E-01	SB125
510.15	145.	15.96	1.78	1.318E-02	510.72	22.500	2.941E-01	TL208
582.49	359.	7.07	1.41	1.186E-02	583.14	86.000	2.560E-01	TL208
608.69	312.	10.25	1.43	1.145E-02	609.32	46.090	4.271E-01	BI214
661.40	96.	25.59	1.69	1.072E-02	661.62	84.620	7.676E-02	CS137
726.70	113.	20.34	1.70	9.970E-03	727.17	11.800	7.017E-01	BI212
859.69	63.	20.00	1.60	8.774E-03				
910.21	310.	7.56	1.43	8.407E-03	911.07	29.000	9.269E-01	AC228
963.65	61.	18.88	1.54	8.058E-03				
963.65	61.	18.88	1.54	8.058E-03	964.00	14.580	3.770E-01	EU152

967.98	134.	10.56	1.54	8.031E-03	968.90	17.460	7.029E-01	AC228
1119.32	98.	28.98	1.44	7.216E-03	1120.28	15.040	6.542E-01	BI214
1171.91	42.	40.87	1.57	6.977E-03				
1171.91	42.	40.87	1.57	6.977E-03	1173.23	99.860	PBC<MDA	CO60
1236.59	40.	39.40	0.80	6.708E-03				
1459.31	1275.	2.99	1.95	5.936E-03	1460.75	10.700	1.456E+01	K40
1762.60	53.	14.91	0.70	5.142E-03	1764.51	15.920	4.723E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.10	209.47	415.	127.	0.064	77.49	1.171	AC-228	
539.31	270.08	226.	136.	0.068	55.32	1.545	AC-228	s
600.09	300.47	238.	74.	0.037	102.98	1.142	PB-212	s
655.29	328.08	117.	76.	0.038	69.50	1.478	AC-228	s
1718.42	859.69	41.	63.	0.032	60.01	1.598	TL-208	s
2342.78	1171.91	82.	42.	0.021	122.60	1.566	J-132	l
2472.13	1236.59	78.	40.	0.020	118.20	0.797	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	330.	117.	0.058	69.61	0.993D
PB-212	153.39	77.11	317.	175.	0.088	39.48	0.995A
RA-226	371.04	185.94	647.	133.	0.066	77.28	1.500s
PB-212	476.27	238.56	688.	991.	0.495	16.29	1.048
RA-224	482.30	241.57	638.	148.	0.074	76.55	1.500
PB-214	589.30	295.08	276.	215.	0.107	41.69	1.086
AC-228	675.10	337.98	242.	249.	0.124	37.02	1.109
PB-214	702.19	351.53	295.	421.	0.210	26.17	1.095
SB-125	924.10	462.49	123.	67.	0.034	77.50	1.500s
TL-208	1019.41	510.15	162.	118.	0.059	47.88	1.781s
TL-208	1164.08	582.49	110.	354.	0.177	21.22	1.410
BI-214	1216.47	608.69	194.	306.	0.153	30.75	1.428
CS-137	1321.89	661.40	146.	95.	0.047	76.77	1.687s
BI-212	1452.48	726.70	115.	112.	0.056	61.01	1.702s
AC-228	1819.46	910.21	78.	307.	0.153	22.67	1.428
EU-152	1926.45	963.72	98.	44.	0.022	103.28	1.538
AC-228	1933.77	967.38	93.	219.	0.110	33.93	1.459
BI-214	2237.61	1119.32	154.	96.	0.048	86.93	1.440
K-40	2917.50	1459.31	53.	1256.	0.628	8.98	1.952
BI-214	3523.97	1762.60	6.	53.	0.026	44.74	0.703s

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

***** S U M M A R Y O 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		6.6327E-02					
			477.56	6.633E-02	%(	2.942E-01 8.70E-02	G
K-40		1.4563E+01					
			1460.75	1.456E+01	(P	4.253E-01 4.42E-01	G
MN-54		1.8159E-02					
			834.81	1.816E-02	%(P	3.581E-02 1.09E-02	G
CO-57		1.4865E-04					
			122.07	1.486E-04	%(P	4.743E-02 1.41E-02	G K
			136.43	-5.205E-02	%	3.839E-01 1.15E-01	G
CO-60		5.7963E-03					
			1332.51	5.796E-03	%(P	3.692E-02 1.04E-02	G K
			1173.23	2.029E-02	% P	4.567E-02 1.37E-02	G K
Sr-85		-2.2551E-02					
			514.00	-2.255E-02	%(	4.099E-02 1.25E-02	G
Kr-85		-5.1400E+02					
			513.99	-5.140E+02	%(	9.343E+02 2.85E+02	G
Y-88		-2.2408E-04					
			1836.01	-2.241E-04	&(P	2.164E-02 5.33E-03	G K
			898.02	4.593E-03	& P	3.463E-02 9.93E-03	G
NB-94		1.3428E-04					
			871.10	1.343E-04	%(	3.187E-02 8.98E-03	G K
			702.50	7.656E-04	&	3.655E-02 1.05E-02	G K
Ag-108M		-1.8275E-02					
			722.95	-1.827E-02	&(	5.008E-02 1.50E-02	G K
			614.37	9.771E-03	& P	3.260E-02 9.67E-03	G
			433.93	5.596E-04	%	3.322E-02 9.65E-03	G
CD-109		1.2661E-01					
			88.04	1.266E-01	%(	2.026E+00 6.05E-01	G
SN-113		-6.5610E-03					
			391.71	-6.561E-03	%(	4.832E-02 1.42E-02	G K
			255.04	-1.905E-01	%	1.631E+00 4.85E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0029E-01						
		427.95	1.712E-02	&(P	1.002E-01	2.95E-02	G K
		600.77	-4.861E-04	% P	1.901E-01	5.49E-02	G
		636.15	4.920E-02	% P	2.607E-01	7.60E-02	G
		463.51	3.465E-01	(P	2.809E-01	9.12E-02	G
		176.29	1.638E-02	&	5.794E-01	1.72E-01	G
I-131	-7.1415E-03						
		364.48	-7.141E-03	%(P	4.274E-02	1.26E-02	G K
		636.97	4.193E-02	%	4.626E-01	1.34E-01	G
		284.29	7.901E-03	& P	5.430E-01	1.60E-01	G
CS-134	-2.8448E-03						
		604.66	-2.845E-03	%(	3.876E-02	1.13E-02	G K
		795.76	-1.068E-03	% P	3.715E-02	1.05E-02	G
		569.29	2.172E-02	& P	1.886E-01	5.45E-02	G
		801.84	-6.159E-02	& P	4.269E-01	1.23E-01	G
CS-137	7.6757E-02						
		661.62	7.676E-02	@(P	4.794E-02	1.99E-02	G
CE-139	1.0725E-03						
		165.85	1.072E-03	%(	4.501E-02	1.34E-02	G
EU-152	9.2664E-02						
		121.78	-1.692E-04	%(P	1.342E-01	3.98E-02	G K
		344.30	-3.514E-02	% P	1.231E-01	3.68E-02	G
		1408.08	3.625E-02	%	1.207E-01	3.50E-02	G
		964.00	2.788E-01	&(P	3.064E-01	9.72E-02	G
		1112.07	2.685E-02	&	2.517E-01	7.16E-02	G
		778.90	-5.147E-02	%	2.571E-01	7.52E-02	G
EU-154	-2.0354E-04						
		123.10	-2.035E-04	%(	1.065E-01	3.17E-02	G K
		1274.80	-9.189E-03	%	1.170E-01	3.34E-02	G
		723.30	-3.100E-02	&	2.062E-01	6.05E-02	G
		1004.80	-3.191E-02	%	2.071E-01	5.99E-02	G
EU-155	1.5519E-01						
		86.45	1.552E-01	%(	2.271E-01	6.94E-02	G K
		105.31	2.033E-02	%	2.273E-01	6.78E-02	G
HG-203	-6.5932E-03						
		279.17	-6.593E-03	&(P	3.933E-02	1.17E-02	G K
		72.87	-9.533E-02	% P	2.230E+00	6.66E-01	G
		70.83	-1.149E+00	&	4.198E+00	1.26E+00	G
		82.50	-1.742E+00	%	3.928E+00	1.19E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.6390E-01						
		583.14	2.560E-01	(P	3.723E-02	1.83E-02	G
		510.72	2.941E-01	*(P	1.538E-01	5.75E-02	G
PB-212	7.2923E-01						
		238.63	7.292E-01	(P	9.200E-02	4.01E-02	G K
							Energy duplication
		77.11	7.292E-01	} P	3.565E-01	9.60E-02	G
		74.81	9.895E-01	+ P	7.402E-01	2.36E-01	G
PB-214	4.4848E-01						
		351.99	4.700E-01	(P	9.254E-02	4.15E-02	G K
		295.22	4.069E-01	(P	1.517E-01	5.76E-02	G
							Energy duplication
		77.11	2.562E-01	} P	9.254E-01	2.18E-01	G
		241.92	-2.868E-02	%	6.565E-01	1.96E-01	G
BI-212	7.0174E-01						
		727.17	7.017E-01	(P	3.296E-01	1.43E-01	G K
		1620.56	-1.544E-01	& P	9.992E-01	2.76E-01	G
		785.42	2.086E-01	%	1.564E+00	4.52E-01	G
BI-214	4.3869E-01						
		609.32	4.271E-01	(P	9.441E-02	4.47E-02	G K
		1764.51	4.723E-01	@(P	1.310E-01	7.48E-02	G
		1120.28	6.542E-01	+ P	4.103E-01	1.93E-01	G
RA-224	1.2093E+00						
		241.00	1.209E+00	(	9.847E-01	3.09E-01	G
RA-226	1.1628E+00						
		185.99	1.163E+00	@(P	1.060E+00	3.29E-01	G
AC-228	8.9929E-01						
		911.07	9.269E-01	(P	1.327E-01	7.08E-02	G K
		968.90	1.153E+00	+ P	2.497E-01	1.30E-01	G
		338.40	8.325E-01	(P	2.520E-01	1.03E-01	G
TH-227	-1.0139E-01						
		236.00	-1.014E-01	%(	3.647E-01	1.10E-01	G K
		256.25	7.195E-02	& P	4.583E-01	1.36E-01	G
PA-234	-2.5924E-02						
		98.44	-2.592E-02	&(P	2.233E-01	6.67E-02	G K
		946.00	-3.982E-03	& P	1.696E-01	4.79E-02	G
		131.28	3.834E-03	% P	2.025E-01	6.03E-02	G
		94.67	-9.479E-02	% P	4.022E-01	1.21E-01	G
		883.24	-4.749E-02	%	2.916E-01	8.46E-02	G
		926.70	9.138E-02	&	2.855E-01	8.45E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 3.219E-02 & P 2.795E-01 8.08E-02 G

TH-234       2.2670E+00
                           63.29 2.267E+00 %(P 5.855E+00 1.76E+00 G K
                           92.80 1.107E+00 % P 2.080E+00 6.29E-01 G
                           92.38 1.323E+00 & P 2.462E+00 7.45E-01 G

AM-241      -1.6849E-01
                           59.54-1.685E-01 %(P 1.114E+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	6.5311E-02	6.6327E-02	2.6099E-01	2.6102E-01	2.897E-01
K-40		1.4563E+01	1.4563E+01	1.3279E+00	1.5742E+00	
MN-54	#A	1.8111E-02	1.8159E-02	3.2665E-02	3.2682E-02	3.572E-02
CO-57	#B	1.4819E-04	1.4865E-04	4.2277E-02	4.2277E-02	4.729E-02
CO-60	#B	5.7938E-03	5.7963E-03	3.1207E-02	3.1208E-02	3.690E-02

Sr-85	#A	-2.2266E-02	-2.2551E-02	3.7487E-02	3.7510E-02	4.047E-02
Kr-85	#A	-5.1400E+02	-5.1400E+02	8.5449E+02	8.5501E+02	9.343E+02
Y-88	#B	-2.2236E-04	-2.2408E-04	3.9212E-02	3.9212E-02	2.148E-02
NB-94	#B	1.3428E-04	1.3428E-04	2.6949E-02	2.6949E-02	3.187E-02
Ag-108M	#B	-1.8274E-02	-1.8275E-02	4.5097E-02	4.5109E-02	5.008E-02
CD-109	#A	1.2638E-01	1.2661E-01	1.8158E+00	1.8158E+00	2.022E+00
SN-113	#B	-6.5142E-03	-6.5610E-03	4.2735E-02	4.2736E-02	4.797E-02
SB-125	#F	1.0021E-01	1.0029E-01	7.9204E-02	7.9417E-02	1.001E-01
I-131	#B	-6.4460E-03	-7.1415E-03	4.2362E-02	4.2364E-02	3.858E-02
CS-134	#B	-2.8417E-03	-2.8448E-03	3.3917E-02	3.3918E-02	3.872E-02
CS-137	#	7.6751E-02	7.6757E-02	5.9790E-02	5.9956E-02	
CE-139	#A	1.0661E-03	1.0725E-03	4.0144E-02	4.0144E-02	4.474E-02
EU-152	#B	9.2648E-02	9.2664E-02	9.6876E-02	9.7012E-02	1.341E-01
EU-154	#B	-2.0349E-04	-2.0354E-04	9.5113E-02	9.5113E-02	1.065E-01
EU-155	#B	1.5512E-01	1.5519E-01	2.0826E-01	2.0844E-01	2.270E-01
HG-203	#B	-6.4776E-03	-6.5932E-03	3.5282E-02	3.5284E-02	3.864E-02
TL-208		2.6390E-01	2.6390E-01	5.6671E-02	5.8706E-02	
PB-212		7.2923E-01	7.2923E-01	1.2023E-01	1.2747E-01	
PB-214		4.4848E-01	4.4848E-01	1.1229E-01	1.1527E-01	
BI-212		7.0174E-01	7.0174E-01	4.3005E-01	4.3197E-01	
BI-214		4.3869E-01	4.3869E-01	1.2494E-01	1.2751E-01	
RA-224		1.2093E+00	1.2093E+00	9.2572E-01	9.2838E-01	9.847E-01
RA-226	#	1.1628E+00	1.1628E+00	9.8613E-01	9.8844E-01	1.060E+00
AC-228		8.9929E-01	8.9929E-01	1.9641E-01	2.0323E-01	
TH-227	#B	-1.0139E-01	-1.0139E-01	3.2903E-01	3.2909E-01	3.647E-01
PA-234	#B	-2.5924E-02	-2.5924E-02	2.2621E-01	2.2622E-01	2.233E-01
TH-234	#B	2.2670E+00	2.2670E+00	5.2930E+00	5.2945E+00	5.855E+00
AM-241	#A	-1.6849E-01	-1.6849E-01	1.0202E+00	1.0203E+00	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

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

Total Activity (84.4 to 2000.7 keV) 1.9330595E+01 pCi/gm
Total Decayed Activity (84.4 to 2000.7 keV) 1.9330601E+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_29OCT2005_1349.An1

Sample description
FSS OOL-02-01-013-F

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_1349.An1

Acquisition information
Start time: 29-Oct-2005 13:49:26
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: 1.8560E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8560E+03) =
5.3879E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 11:33:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5062

***** S U M M A R Y O F P E A K 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	139.	19.92	0.99	9.052E-03	74.81	9.600	1.162E+00	PB212
77.14	168.	12.92	0.99	1.011E-02	77.11	17.500	7.204E-01	PB212
87.17	107.	40.65	1.50	1.410E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	1.404E+00	CD109
93.12	87.	41.40	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.15	89.	40.37	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.74	167.	22.29	1.18	2.567E-02				
185.74	167.	22.29	1.18	2.567E-02	185.99	3.280	1.329E+00	RA226
209.31	86.	36.58	1.27	2.471E-02				
238.58	1246.	3.38	1.09	2.320E-02	238.63	43.100	8.986E-01	PB212
241.78	150.	16.68	1.09	2.303E-02	241.00	3.900	1.214E+00	RA224
270.00	80.	28.12	1.06	2.152E-02				
278.12	74.	36.42	0.97	2.110E-02				
294.98	231.	11.08	1.30	2.026E-02	295.22	19.200	4.245E-01	PB214
299.83	85.	24.65	1.04	2.003E-02				
327.79	76.	28.20	1.41	1.875E-02				
337.97	241.	13.08	0.95	1.832E-02	338.40	12.010	7.940E-01	AC228
351.59	400.	8.48	1.15	1.777E-02	351.99	37.100	4.355E-01	PB214
409.44	54.	37.35	1.92	1.575E-02				
462.88	60.	30.68	1.08	1.426E-02				
462.88	60.	30.68	1.08	1.426E-02	463.51	10.000	PBC<MDA	SB125
510.25	191.	16.02	1.22	1.318E-02	510.72	22.500	4.037E-01	TL208
582.56	386.	7.13	1.16	1.185E-02	583.14	86.000	2.731E-01	TL208
608.68	302.	7.60	1.56	1.145E-02	609.32	46.090	4.084E-01	BI214
661.30	130.	18.89	1.45	1.073E-02	661.62	84.620	1.034E-01	CS137

726.31	93.	20.48	1.26	9.974E-03	727.17	11.800	5.703E-01	BI212
859.58	51.	28.84	1.67	8.775E-03				
910.39	273.	7.67	1.34	8.406E-03	911.07	29.000	8.058E-01	AC228
963.82	52.	20.36	1.54	8.057E-03				
963.82	52.	20.36	1.54	8.057E-03	964.00	14.580	3.185E-01	EU152
968.00	150.	9.80	1.54	8.031E-03	968.90	17.460	7.799E-01	AC228
1172.48	97.	20.33	1.66	6.975E-03	1173.23	99.860	9.914E-02	CO60
1330.97	68.	25.75	1.53	6.355E-03	1332.51	99.980	7.545E-02	CO60
1376.82	26.	25.38	1.49	6.198E-03				
1459.32	1177.	2.98	1.91	5.936E-03	1460.75	10.700	1.329E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1619.05	38.	16.22	1.67	5.488E-03	1620.56	2.750	1.831E+00	BI212
1763.03	64.	14.96	1.99	5.145E-03	1764.51	15.920	5.366E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
417.79	209.31	413.	86.	0.043	109.75	1.266	AC-228	
539.15	270.00	213.	80.	0.040	84.35	1.060	AC-228	s
555.39	278.12	270.	74.	0.037	109.25	0.971	SB-126	l
598.81	299.83	177.	85.	0.043	73.95	1.041	TH-227	
654.71	327.79	180.	76.	0.038	84.59	1.412	AC-228	s
818.01	409.44	147.	54.	0.027	112.05	1.917	AC-228	s
924.88	462.88	120.	64.	0.032	82.16	1.078	CS-138	
1718.21	859.58	57.	51.	0.025	86.51	1.672	TL-208	
2235.67	1118.35	69.	82.	0.041	64.38	1.495	KR-89	l
2752.53	1376.82	8.	26.	0.013	76.15	1.487	BI-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	148.79	74.81	331.	139.	0.069	59.76	0.993D
PB-212	153.39	77.11	345.	168.	0.084	38.75	0.995A
EU-155	173.51	87.17	899.	107.	0.054	121.95	1.500
RA-226	371.22	186.03	674.	130.	0.065	80.45	1.500s
PB-212	476.40	238.62	495.	1305.	0.652	11.56	1.027
RA-224	482.07	241.46	709.	136.	0.068	86.95	1.500
PB-214	589.11	294.98	205.	227.	0.113	33.24	1.296
AC-228	675.09	337.97	269.	240.	0.120	39.23	0.952
PB-214	702.32	351.59	264.	394.	0.197	25.45	1.151
TL-208	1019.61	510.25	223.	164.	0.082	48.05	1.224s
TL-208	1164.21	582.56	121.	382.	0.191	21.40	1.155
BI-214	1216.46	608.68	100.	296.	0.148	22.80	1.557
CS-137	1321.69	661.30	123.	129.	0.064	56.68	1.449s
BI-212	1451.69	726.31	96.	92.	0.046	61.45	1.256s
AC-228	1819.80	910.39	60.	270.	0.135	23.01	1.335
EU-152	1926.68	963.83	62.	41.	0.021	92.37	1.538
AC-228	1933.75	967.37	64.	193.	0.096	30.50	1.344

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2343.93	1172.48	80.	95.	0.047	60.98	1.664s
CO-60	2660.85	1330.97	60.	66.	0.033	77.26	1.527
K-40	2917.51	1459.32	36.	1158.	0.579	8.94	1.910
BI-212	3236.90	1619.05	0.	38.	0.019	48.67	1.667
BI-214	3524.34	1762.79	11.	45.	0.022	49.50	2.033s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		9.9061E-02					
			477.56	9.906E-02	%(	2.730E-01 8.18E-02 G	
K-40		1.3289E+01					
			1460.75	1.329E+01	(P	3.497E-01 4.02E-01 G	
MN-54		1.8563E-02					
			834.81	1.856E-02	%(P	3.239E-02 9.94E-03 G	
CO-57		-5.2718E-03					
			122.07	-5.272E-03	&(P	5.066E-02 1.51E-02 G K	
			136.43	-3.704E-02	&	2.736E-01 8.14E-02 G	
CO-60		8.7284E-02					
			1332.51	7.545E-02	(P	4.461E-02 2.02E-02 G K	
			1173.23	9.914E-02	*(P	4.651E-02 2.06E-02 G K	
Sr-85		-1.4455E-02					
			514.00	-1.446E-02	%(	4.245E-02 1.27E-02 G	
Kr-85		-3.2985E+02					
			513.99	-3.298E+02	%(	9.686E+02 2.91E+02 G	
Y-88		2.2854E-03					
			1836.01	2.285E-03	%(P	2.016E-02 5.22E-03 G K	
			898.02	-5.038E-03	% P	3.506E-02 1.00E-02 G	
NB-94		-6.4705E-03					
			871.10	-6.470E-03	&(	3.000E-02 8.73E-03 G K	
			702.50	5.071E-03	&	3.634E-02 1.06E-02 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.3914E-02						
		722.95	-1.391E-02	%(	4.631E-02	1.38E-02	G K
		614.37	6.616E-03	% P	3.351E-02	9.83E-03	G
		433.93	0.000E+00	%	3.236E-02	9.38E-03	G
CD-109	-2.5797E-01						
		88.04	-2.580E-01	&(	1.988E+00	5.95E-01	G
SN-113	-3.2455E-04						
		391.71	-3.245E-04	%(	3.840E-02	1.11E-02	G K
		255.04	2.311E-03	&	1.450E+00	4.27E-01	G
SB-125	-1.7848E-03						
		427.95	-1.785E-03	&(P	1.002E-01	2.91E-02	G K
		600.77	9.131E-03	& P	1.860E-01	5.39E-02	G
		636.15	4.265E-02	& P	2.954E-01	8.62E-02	G
		463.51	-2.285E-02	% P	3.515E-01	1.03E-01	G
		176.29	8.671E-02	&	5.617E-01	1.68E-01	G
I-131	4.8062E-03						
		364.48	4.806E-03	%(P	4.077E-02	1.20E-02	G K
		636.97	8.605E-02	&	5.077E-01	1.49E-01	G
		284.29	-1.246E-01	% P	4.951E-01	1.48E-01	G
CS-134	-1.3814E-03						
		604.66	-1.381E-03	&(	9.897E-02	2.95E-02	G K
		795.76	2.850E-03	& P	4.241E-02	1.22E-02	G
		569.29	6.825E-02	% P	2.001E-01	5.96E-02	G
		801.84	-1.373E-02	% P	3.768E-01	1.06E-01	G
CS-137	1.0338E-01						
		661.62	1.034E-01	*(P	4.368E-02	1.97E-02	G
CE-139	9.3544E-03						
		165.85	9.354E-03	%(	4.269E-02	1.28E-02	G
EU-152	7.7863E-02						
		121.78	-1.025E-02	&(P	1.390E-01	4.14E-02	G K
		344.30	-7.693E-03	% P	1.083E-01	3.18E-02	G
		1408.08	0.000E+00	&	1.234E-01	3.28E-02	G
		964.00	2.546E-01	&(P	2.439E-01	7.94E-02	G
		1112.07	-5.612E-02	%	3.315E-01	9.67E-02	G
		778.90	6.555E-02	%	2.458E-01	7.25E-02	G
EU-154	5.2714E-03						
		123.10	5.271E-03	%(	1.056E-01	3.15E-02	G K
		1274.80	1.359E-02	%	1.062E-01	3.04E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30 0.000E+00 %   2.526E-01 7.36E-02 G
                         1004.80-3.300E-02 &   1.970E-01 5.70E-02 G

EU-155       1.6937E-01
                           86.45 1.694E-01  (  2.247E-01 6.88E-02 G K
                          105.31 2.269E-02 &   2.205E-01 6.58E-02 G

HG-203       8.0313E-03
                          279.17 8.031E-03 %(P 3.933E-02 1.17E-02 G K
                           72.87-5.470E-01 & P 2.282E+00 6.86E-01 G
                           70.83-6.210E-01 &   4.158E+00 1.25E+00 G
                           82.50-1.039E+00 &   3.737E+00 1.12E+00 G

TL-208       2.7311E-01
                          583.14 2.731E-01  (P 3.856E-02 1.97E-02 G
                          510.72 4.037E-01 + P 1.775E-01 7.51E-02 G

PB-212       9.5018E-01
                          238.63 9.502E-01  (P 7.748E-02 3.69E-02 G K
                                                          Energy duplication
                           77.11 6.904E-01 } P 3.671E-01 8.92E-02 G
                           74.81 1.162E+00 + P 7.334E-01 2.37E-01 G

PB-214       4.3175E-01
                          351.99 4.355E-01  (P 8.670E-02 3.74E-02 G K
                          295.22 4.245E-01  (P 1.301E-01 4.78E-02 G
                                                          Energy duplication
                           77.11 0.000E+00 } P 8.456E-01 0.00E+00 G
                          241.92-1.767E-01 %   5.386E-01 1.62E-01 G

BI-212       5.7033E-01
                          727.17 5.703E-01  (P 2.993E-01 1.17E-01 G K
                         1620.56 1.831E+00 + P 3.556E-01 2.97E-01 G
                          785.42 7.872E-01 %   1.641E+00 4.98E-01 G

BI-214       4.0565E-01
                          609.32 4.084E-01  (P 6.818E-02 3.17E-02 G K
                         1764.51 3.977E-01 ?(P 1.592E-01 7.04E-02 G
                         1120.28 2.856E-03 & P 3.360E-01 9.61E-02 G

RA-224       1.1007E+00
                          241.00 1.101E+00  (  1.026E+00 3.19E-01 G

RA-226       1.1222E+00
                          185.99 1.122E+00 *(P 1.070E+00 3.31E-01 G

AC-228       8.0235E-01
                          911.07 8.058E-01  (P 1.163E-01 6.25E-02 G K
                          968.90 1.002E+00 + P 2.080E-01 1.02E-01 G
                          338.40 7.940E-01  (P 2.623E-01 1.04E-01 G
```

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

TH-227      -1.6321E-01
                          236.00-1.632E-01 &(  3.980E-01 1.20E-01 G K
                          256.25-1.473E-01 % P 5.031E-01 1.51E-01 G

PA-234      -2.9179E-02
                           98.44-2.918E-02 &(P 1.766E-01 5.27E-02 G K
                          946.00-4.762E-02 % P 1.951E-01 5.74E-02 G
                          131.28 8.463E-04 % P 2.049E-01 6.10E-02 G
                           94.67 1.370E-02 & P 3.836E-01 1.14E-01 G
                          883.24-6.467E-02 %   2.891E-01 8.47E-02 G
                          926.70 1.000E-01 &   2.678E-01 7.99E-02 G
                          569.26 1.011E-01 % P 2.966E-01 8.83E-02 G

TH-234       9.4822E-01
                           63.29 9.482E-01 %(P 6.187E+00 1.85E+00 G K
                           92.80 1.307E+00 % P 2.084E+00 6.33E-01 G
                           92.38 1.507E+00 % P 2.476E+00 7.51E-01 G

AM-241      -3.2599E-02
                           59.54-3.260E-02 %(P 1.077E+00 3.20E-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	9.7663E-02	9.9061E-02	2.4542E-01	2.4549E-01	2.692E-01
K-40		1.3289E+01	1.3289E+01	1.2066E+00	1.4322E+00	
MN-54	#A	1.8517E-02	1.8563E-02	2.9820E-02	2.9840E-02	3.232E-02
CO-57	#B	-5.2570E-03	-5.2718E-03	4.8186E-02	4.8187E-02	5.052E-02
CO-60		8.7250E-02	8.7284E-02	4.4363E-02	4.4652E-02	
Sr-85	#A	-1.4287E-02	-1.4455E-02	3.8228E-02	3.8238E-02	4.196E-02
Kr-85	#A	-3.2984E+02	-3.2985E+02	8.7226E+02	8.7247E+02	9.686E+02
Y-88	#B	2.2692E-03	2.2854E-03	1.5660E-02	1.5661E-02	2.001E-02
NB-94	#B	-6.4705E-03	-6.4705E-03	2.6191E-02	2.6193E-02	3.000E-02
Ag-108M	#B	-1.3913E-02	-1.3914E-02	4.1411E-02	4.1419E-02	4.631E-02
CD-109	#A	-2.5754E-01	-2.5797E-01	1.7864E+00	1.7864E+00	1.985E+00
SN-113	#B	-3.2241E-04	-3.2455E-04	3.3261E-02	3.3261E-02	3.814E-02
SB-125	#B	-1.7835E-03	-1.7848E-03	9.3497E-02	9.3497E-02	1.001E-01
I-131	#B	4.3733E-03	4.8062E-03	3.6028E-02	3.6029E-02	3.710E-02
CS-134	#B	-1.3800E-03	-1.3814E-03	8.8555E-02	8.8555E-02	9.888E-02
CS-137	#	1.0337E-01	1.0338E-01	5.9230E-02	5.9533E-02	
CE-139	#A	9.3029E-03	9.3544E-03	3.8383E-02	3.8387E-02	4.245E-02
EU-152	#B	7.7850E-02	7.7863E-02	7.2873E-02	7.3001E-02	1.390E-01
EU-154	#B	5.2701E-03	5.2714E-03	9.4486E-02	9.4487E-02	1.056E-01
EU-155	#A	1.6930E-01	1.6937E-01	2.0655E-01	2.0676E-01	2.246E-01
HG-203	#B	7.9016E-03	8.0313E-03	3.5191E-02	3.5195E-02	3.870E-02
TL-208		2.7311E-01	2.7311E-01	5.9096E-02	6.1186E-02	
PB-212		9.5018E-01	9.5018E-01	1.1082E-01	1.2379E-01	
PB-214		4.3175E-01	4.3175E-01	9.1869E-02	9.5228E-02	
BI-212		5.7033E-01	5.7033E-01	3.5233E-01	3.5388E-01	
BI-214		4.0565E-01	4.0565E-01	9.4497E-02	9.7388E-02	
RA-224		1.1007E+00	1.1007E+00	9.5697E-01	9.5910E-01	1.026E+00
RA-226	#	1.1222E+00	1.1222E+00	9.9287E-01	9.9501E-01	1.070E+00
AC-228		8.0235E-01	8.0235E-01	1.8367E-01	1.8948E-01	
TH-227	#B	-1.6321E-01	-1.6321E-01	3.6118E-01	3.6130E-01	3.980E-01
PA-234	#B	-2.9179E-02	-2.9179E-02	1.7596E-01	1.7597E-01	1.766E-01
TH-234	#B	9.4822E-01	9.4822E-01	5.5379E+00	5.5381E+00	6.187E+00
AM-241	#A	-3.2598E-02	-3.2599E-02	1.0705E+00	1.0705E+00	1.077E+00

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

H - Halflife limit exceeded

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

Total Activity (83.9 to 2000.7 keV) 1.8013666E+01 pCi/gm
Total Decayed Activity (83.9 to 2000.7 keV) 1.8013708E+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_29OCT2005_1425.An1

Sample description
FSS OOL-02-01-006-F

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_1425.An1

Acquisition information
Start time: 29-Oct-2005 14:25:56
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: 1.9080E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9080E+03) =
5.2411E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 08:25:00
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: 0.4926

***** S U M M A R Y O F P E A K 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	90.	30.87	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
77.09	158.	15.00	0.99	1.011E-02	77.11	17.500	7.724E-01	PB212
					77.11	10.700	1.263E+00	PB214
90.23	73.	38.49	1.00	1.559E-02				
93.16	124.	23.26	1.00	1.662E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.34	112.	36.45	0.66	2.440E-02				
129.34	112.	36.45	0.66	2.440E-02	131.28	20.000	PBC<MDA	PA234
186.02	165.	21.86	1.16	2.567E-02	185.99	3.280	1.276E+00	RA226
209.49	126.	26.21	1.13	2.470E-02				
238.61	1169.	3.48	1.09	2.320E-02	238.63	43.100	8.199E-01	PB212
241.57	182.	16.11	1.09	2.304E-02	241.00	3.900	1.436E+00	RA224
					241.92	7.470	7.512E-01	PB214
270.00	102.	29.81	1.07	2.152E-02				
277.20	73.	36.81	0.96	2.115E-02				
294.90	219.	15.70	1.03	2.026E-02	295.22	19.200	3.923E-01	PB214
299.70	73.	27.33	0.69	2.003E-02				
326.99	70.	37.64	1.04	1.878E-02				
338.13	247.	10.84	1.23	1.831E-02	338.40	12.010	7.924E-01	AC228
351.62	407.	8.65	1.25	1.777E-02	351.99	37.100	4.317E-01	PB214
462.22	88.	21.95	1.14	1.428E-02				
462.22	88.	21.95	1.14	1.428E-02	463.51	10.000	4.340E-01	SB125
510.06	203.	13.46	1.55	1.319E-02	510.72	22.500	4.223E-01	TL208
582.62	350.	7.22	1.30	1.185E-02	583.14	86.000	2.403E-01	TL208
608.57	300.	7.98	1.28	1.145E-02	609.32	46.090	3.948E-01	BI214
726.66	80.	19.28	0.72	9.970E-03	727.17	11.800	4.795E-01	BI212
767.73	79.	30.45	1.59	9.559E-03				

794.05	43.	37.43	1.04	9.316E-03				
794.05	43.	37.43	1.04	9.316E-03	795.76	85.400	3.822E-02	CS134
834.95	59.	28.09	1.29	8.970E-03	834.81	99.978	4.636E-02	MN54
859.35	73.	25.56	0.97	8.777E-03				
910.29	259.	8.41	1.47	8.407E-03	911.07	29.000	7.431E-01	AC228
963.75	37.	29.49	1.54	8.057E-03				
963.75	37.	29.49	1.54	8.057E-03	964.00	14.580	PBC<MDA	EU152
968.05	144.	10.44	1.54	8.031E-03	968.90	17.460	7.293E-01	AC228
1118.80	91.	15.80	1.17	7.219E-03	1120.28	15.040	5.832E-01	BI214
1459.33	1403.	2.76	2.02	5.936E-03	1460.75	10.700	1.544E+01	K40
1762.79	67.	12.86	1.80	5.146E-03	1764.51	15.920	5.497E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
179.63	90.36	360.	73.	0.037	115.48	1.003	PB-214	lD
185.35	93.30	369.	117.	0.058	75.04	1.004	U-235	D
257.85	129.34	670.	112.	0.056	109.34	0.660	AC-228	l
418.13	209.49	417.	126.	0.063	78.63	1.125	AC-228	
539.15	270.00	326.	102.	0.051	89.42	1.072	AC-228	
553.54	277.20	285.	73.	0.037	110.44	0.955	TL-208	l
598.56	299.70	171.	73.	0.036	81.98	0.688	TH-227	sM
653.13	326.99	254.	70.	0.035	112.93	1.042	AC-228	s
1534.53	767.73	135.	79.	0.040	91.34	1.586	BI-214	M
1587.16	794.05	73.	44.	0.022	94.61	1.039	PA-234	s
1717.75	859.35	88.	73.	0.036	76.68	0.968	TL-208	s
1926.52	963.76	40.	37.	0.018	88.47	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	370.	90.	0.045	92.61	0.993D
PB-212	153.39	77.11	363.	158.	0.079	44.99	0.995A
TH-234	185.30	93.06	934.	118.	0.059	98.32	1.500
TH-234	185.34	93.08	939.	115.	0.058	100.30	1.500
RA-226	371.19	186.02	504.	152.	0.076	65.58	1.156s
PB-212	476.40	238.62	519.	1281.	0.640	11.86	1.118
RA-224	482.16	241.50	701.	175.	0.088	68.02	1.500s
PB-214	588.95	294.90	350.	215.	0.108	47.11	1.027
AC-228	675.40	338.13	197.	246.	0.123	32.53	1.230s
PB-214	702.38	351.62	293.	401.	0.201	25.94	1.255
SB-125	924.37	462.62	127.	71.	0.035	75.08	1.500s
TL-208	1019.24	510.06	192.	177.	0.088	40.39	1.555s
TL-208	1164.33	582.62	111.	346.	0.173	21.67	1.298
BI-214	1216.23	608.57	112.	294.	0.147	23.95	1.276
BI-212	1452.39	726.66	69.	80.	0.040	57.85	0.723s
MN-54	1668.94	834.95	74.	59.	0.029	84.28	1.291s
AC-228	1819.61	910.29	75.	256.	0.128	25.24	1.469

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1934.22	967.60	82.	185.	0.093	34.14	1.711
BI-214	2236.58	1118.80	47.	89.	0.045	47.40	1.169s
K-40	2917.52	1459.33	44.	1384.	0.692	8.28	2.016
BI-214	3524.34	1762.79	5.	64.	0.032	38.59	1.797

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

***** S U M M A R Y O 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		-5.8126E-02					
			477.56	-5.813E-02	%(	3.324E-01 9.82E-02	G
K-40		1.5444E+01					
			1460.75	1.544E+01	(P	3.748E-01 4.32E-01	G
MN-54		4.6362E-02					
			834.81	4.636E-02	(P	3.399E-02 1.31E-02	G
CO-57		-7.0100E-03					
			122.07	-7.010E-03	%(P	5.189E-02 1.55E-02	G K
			136.43	-2.794E-02	%	3.807E-01 1.14E-01	G
CO-60		1.3597E-02					
			1332.51	1.360E-02	&(P	3.654E-02 1.07E-02	G K
			1173.23	7.554E-03	& P	4.908E-02 1.43E-02	G K
Sr-85		-1.7897E-02					
			514.00	-1.790E-02	%(	4.078E-02 1.23E-02	G
Kr-85		-4.0773E+02					
			513.99	-4.077E+02	%(	9.290E+02 2.81E+02	G
Y-88		-6.4880E-03					
			1836.01	-6.488E-03	&(P	3.094E-02 8.73E-03	G K
			898.02	-1.517E-03	& P	4.514E-02 1.30E-02	G
NB-94		7.5861E-03					
			871.10	7.586E-03	%(	2.910E-02 8.53E-03	G K
			702.50	1.160E-02	&	3.117E-02 9.33E-03	G K
Ag-108M		-1.9924E-04					
			722.95	-1.992E-04	%(	3.018E-02 8.52E-03	G K
			614.37	-2.188E-04	& P	3.871E-02 1.12E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	5.560E-03	%	3.195E-02	9.42E-03	G
CD-109	-4.6483E-01						
		88.04	-4.648E-01	&(	1.979E+00	5.95E-01	G
SN-113	-1.0423E-02						
		391.71	-1.042E-02	%(	4.513E-02	1.34E-02	G K
		255.04	-4.521E-01	%	1.414E+00	4.25E-01	G
SB-125	8.0683E-02						
		427.95	-1.077E-02	&(P	1.041E-01	3.06E-02	G K
		600.77	-9.408E-04	& P	1.791E-01	5.16E-02	G
		636.15	-1.352E-02	& P	3.493E-01	1.01E-01	G
		463.51	3.514E-01	&(P	2.750E-01	8.95E-02	G
		176.29	4.353E-02	&	5.687E-01	1.70E-01	G
I-131	1.2338E-02						
		364.48	1.234E-02	&(P	3.935E-02	1.18E-02	G K
		636.97	4.475E-02	&	4.861E-01	1.41E-01	G
		284.29	-1.366E-01	% P	5.588E-01	1.67E-01	G
CS-134	2.0158E-03						
		604.66	2.016E-03	&(	9.369E-02	2.79E-02	G K
		795.76	-8.259E-04	% P	3.663E-02	1.04E-02	G
		569.29	5.081E-02	% P	1.985E-01	5.86E-02	G
		801.84	-1.260E-01	% P	4.423E-01	1.30E-01	G
CS-137	2.3309E-02						
		661.62	2.331E-02	%(P	3.996E-02	1.22E-02	G
CE-139	1.0644E-02						
		165.85	1.064E-02	%(	4.513E-02	1.35E-02	G
EU-152	-2.3556E-02						
		121.78	-2.356E-02	%(P	1.434E-01	4.29E-02	G K
		344.30	5.106E-02	% P	1.106E-01	3.35E-02	G
		1408.08	1.726E-02	%	1.457E-01	4.09E-02	G
		964.00	2.350E-03	% P	3.901E-01	1.13E-01	G
		1112.07	6.021E-02	&	2.657E-01	7.76E-02	G
		778.90	-5.304E-02	%	2.553E-01	7.48E-02	G
EU-154	-1.4970E-02						
		123.10	-1.497E-02	%(	1.091E-01	3.27E-02	G K
		1274.80	-9.519E-03	&	1.372E-01	3.95E-02	G
		723.30	-8.265E-02	%	2.155E-01	6.48E-02	G
		1004.80	-3.957E-02	%	2.185E-01	6.37E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.3300E-01						
		86.45	1.330E-01	%(	2.249E-01	6.85E-02	G K
		105.31	4.318E-02	%	2.275E-01	6.82E-02	G
HG-203	1.0584E-02						
		279.17	1.058E-02	&(P	4.025E-02	1.21E-02	G K
		72.87	-1.850E-02	& P	2.050E+00	6.11E-01	G
		70.83	8.300E-02	%	4.234E+00	1.26E+00	G
		82.50	-3.267E-01	%	3.498E+00	1.04E+00	G
TL-208	2.4029E-01						
		583.14	2.403E-01	(P	3.608E-02	1.76E-02	G
		510.72	4.223E-01	+ P	1.609E-01	6.54E-02	G
PB-212	9.0728E-01						
		238.63	9.073E-01	(P	7.713E-02	3.62E-02	G K
							Energy duplication
		77.11	6.315E-01	} P	3.661E-01	9.47E-02	G
		74.81	7.341E-01	- P	7.527E-01	2.34E-01	G
PB-214	4.1827E-01						
		351.99	4.317E-01	(P	8.862E-02	3.78E-02	G K
		295.22	3.923E-01	(P	1.637E-01	6.27E-02	G
							Energy duplication
		77.11	5.585E-02	} P	9.119E-01	2.12E-01	G
		241.92	-1.985E-02	%	6.611E-01	1.97E-01	G
BI-212	4.7950E-01						
		727.17	4.795E-01	(P	2.501E-01	9.30E-02	G K
		1620.56	7.845E-02	& P	1.117E+00	3.06E-01	G
		785.42	0.000E+00	%	1.830E+00	5.24E-01	G
BI-214	3.9484E-01						
		609.32	3.948E-01	(P	6.991E-02	3.22E-02	G K
		1764.51	5.497E-01	+ P	1.178E-01	7.43E-02	G
		1120.28	5.832E-01	+ P	2.256E-01	9.40E-02	G
RA-224	1.3788E+00						
		241.00	1.379E+00	(	9.926E-01	3.13E-01	G
RA-226	1.2758E+00						
		185.99	1.276E+00	@(P	9.032E-01	3.03E-01	G
AC-228	7.5756E-01						
		911.07	7.431E-01	(P	1.255E-01	6.33E-02	G K
		968.90	9.373E-01	+ P	2.264E-01	1.07E-01	G
		338.40	7.924E-01	@(P	2.195E-01	8.63E-02	G

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

TH-227       2.8841E-03
                          236.00 2.884E-03 %(  3.810E-01 1.13E-01 G K
                          256.25 1.840E-01 % P 4.180E-01 1.26E-01 G

PA-234       1.7963E-02
                           98.44 1.796E-02 %(P 2.160E-01 6.45E-02 G K
                          946.00-9.155E-05 % P 1.778E-01 5.04E-02 G
                          131.28 1.229E-01 & P 1.781E-01 5.45E-02 G
                           94.67-1.287E-01 % P 4.151E-01 1.25E-01 G
                          883.24-6.138E-02 &   2.827E-01 8.27E-02 G
                          926.70-1.052E-02 %   3.222E-01 9.19E-02 G
                          569.26 7.534E-02 % P 2.942E-01 8.68E-02 G

TH-234       1.1735E+00
                           63.29 2.652E-01 %(P 6.243E+00 1.85E+00 G K
                           92.80 1.655E+00  (P 2.088E+00 6.38E-01 G
                           92.38 1.990E+00  (P 2.453E+00 7.50E-01 G

AM-241      -2.0680E-01
                           59.54-2.068E-01 %(P 1.046E+00 3.13E-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		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	-5.7190E-02	-5.8126E-02	2.9470E-01	2.9472E-01	3.270E-01
K-40		1.5444E+01	1.5444E+01	1.2959E+00	1.5758E+00	
MN-54	#	4.6233E-02	4.6362E-02	3.9311E-02	3.9404E-02	
CO-57	#B	-6.9875E-03	-7.0100E-03	4.8668E-02	4.8670E-02	5.172E-02
CO-60	#B	1.3591E-02	1.3597E-02	3.2218E-02	3.2227E-02	3.652E-02
Sr-85	#A	-1.7660E-02	-1.7897E-02	3.6989E-02	3.7003E-02	4.024E-02
Kr-85	#A	-4.0772E+02	-4.0773E+02	8.4259E+02	8.4292E+02	9.290E+02
Y-88	#B	-6.4354E-03	-6.4880E-03	2.6942E-02	2.6944E-02	3.069E-02
NB-94	#B	7.5861E-03	7.5861E-03	2.5596E-02	2.5600E-02	2.910E-02
Ag-108M	#B	-1.9923E-04	-1.9924E-04	2.5574E-02	2.5574E-02	3.018E-02
CD-109	#A	-4.6394E-01	-4.6483E-01	1.7856E+00	1.7858E+00	1.976E+00
SN-113	#B	-1.0344E-02	-1.0423E-02	4.0210E-02	4.0215E-02	4.479E-02
SB-125	#B	8.0614E-02	8.0683E-02	6.1671E-02	6.1849E-02	1.040E-01
I-131	#B	1.1077E-02	1.2338E-02	3.5306E-02	3.5313E-02	3.533E-02
CS-134	#B	2.0135E-03	2.0158E-03	8.3807E-02	8.3807E-02	9.358E-02
CS-137	#A	2.3307E-02	2.3309E-02	3.6650E-02	3.6675E-02	3.996E-02
CE-139	#A	1.0577E-02	1.0644E-02	4.0646E-02	4.0651E-02	4.484E-02
EU-152	#B	-2.3551E-02	-2.3556E-02	1.4005E-01	1.4005E-01	1.434E-01
EU-154	#B	-1.4965E-02	-1.4970E-02	9.8024E-02	9.8028E-02	1.091E-01
EU-155	#B	1.3293E-01	1.3300E-01	2.0553E-01	2.0566E-01	2.248E-01
HG-203	#B	1.0389E-02	1.0584E-02	3.6168E-02	3.6174E-02	3.951E-02
TL-208		2.4029E-01	2.4029E-01	5.2730E-02	5.4545E-02	
PB-212		9.0728E-01	9.0728E-01	1.0860E-01	1.2070E-01	
PB-214		4.1827E-01	4.1827E-01	1.1003E-01	1.1267E-01	
BI-212		4.7950E-01	4.7950E-01	2.7911E-01	2.8049E-01	
BI-214		3.9484E-01	3.9484E-01	9.6633E-02	9.9315E-02	
RA-224	#	1.3788E+00	1.3788E+00	9.3788E-01	9.4129E-01	9.926E-01
RA-226	#	1.2758E+00	1.2758E+00	9.0819E-01	9.1121E-01	
AC-228		7.5756E-01	7.5756E-01	1.5718E-01	1.6322E-01	
TH-227	#B	2.8841E-03	2.8841E-03	3.4030E-01	3.4030E-01	3.810E-01
PA-234	#B	1.7963E-02	1.7963E-02	1.9346E-01	1.9346E-01	2.160E-01
TH-234	#B	1.1735E+00	1.1735E+00	1.3267E+00	1.3282E+00	6.243E+00
AM-241	#A	-2.0680E-01	-2.0680E-01	9.5543E-01	9.5550E-01	1.046E+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_29OCT2005_1425.An1

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

Total Activity (128.9 to 2000.7 keV) 1.9963964E+01 pCi/gm
Total Decayed Activity (128.9 to 2000.7 keV) 1.9964094E+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_29OCT2005_1501.An1

Sample description
FSS OOL-02-01-007-F

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_1501.An1

Acquisition information
Start time: 29-Oct-2005 15:01:21
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: 1.8350E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8350E+03) =
5.4496E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 09:40:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5276

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.82	122.	23.64	0.99	9.052E-03	74.81	9.600	1.038E+00	PB212
77.12	143.	18.82	0.99	1.011E-02	77.11	17.500	8.206E-01	PB212
					77.11	10.700	1.342E+00	PB214
185.70	171.	25.58	1.29	2.568E-02				
185.70	171.	25.58	1.29	2.568E-02	185.99	3.280	1.386E+00	RA226
209.15	96.	40.65	1.06	2.472E-02				
238.60	1173.	3.53	1.09	2.321E-02	238.63	43.100	8.553E-01	PB212
241.40	141.	21.16	1.09	2.306E-02	241.00	3.900	1.157E+00	RA224
269.58	123.	27.48	1.01	2.155E-02				
276.41	96.	31.06	0.99	2.119E-02				
294.90	236.	14.38	0.89	2.026E-02	295.22	19.200	4.394E-01	PB214
300.27	70.	34.24	0.91	2.000E-02				
327.46	69.	36.19	1.04	1.876E-02				
338.29	302.	11.29	1.08	1.831E-02	338.40	12.010	1.009E+00	AC228
351.64	407.	8.85	1.17	1.777E-02	351.99	37.100	4.490E-01	PB214
463.07	76.	36.73	0.88	1.426E-02				
476.57	75.	33.50	0.65	1.393E-02				
476.57	75.	33.50	0.65	1.393E-02	477.56	10.300	3.928E-01	BE7
510.33	188.	15.61	1.58	1.318E-02	510.72	22.500	4.016E-01	TL208
582.61	323.	8.37	1.12	1.185E-02	583.14	86.000	2.305E-01	TL208
608.75	310.	7.75	1.38	1.145E-02	609.32	46.090	4.233E-01	BI214
661.00	802.	4.16	1.34	1.073E-02	661.62	84.620	6.496E-01	CS137
726.20	107.	22.32	1.99	9.975E-03	727.17	11.800	6.683E-01	BI212
794.32	46.	32.73	1.05	9.314E-03				
794.32	46.	32.73	1.05	9.314E-03	795.76	85.400	4.215E-02	CS134
858.91	68.	27.51	1.63	8.780E-03				
910.17	279.	8.06	1.73	8.407E-03	911.07	29.000	8.331E-01	AC228

963.39	85.	16.46	1.54	8.059E-03				
963.39	85.	16.46	1.54	8.059E-03	964.00	14.580	5.266E-01	EU152
968.03	146.	10.90	1.54	8.030E-03	968.90	17.460	7.674E-01	AC228
1119.25	78.	21.72	1.37	7.217E-03	1120.28	15.040	5.194E-01	BI214
1172.07	340.	8.19	1.81	6.977E-03	1173.23	99.860	3.580E-01	CO60
1331.08	253.	7.76	1.77	6.354E-03	1332.51	99.980	2.906E-01	CO60
1459.38	1192.	2.98	1.80	5.936E-03	1460.75	10.700	1.361E+01	K40
1619.13	15.	39.80	0.76	5.488E-03	1620.56	2.750	7.152E-01	BI212
1762.66	62.	12.70	0.84	5.146E-03	1764.51	15.920	5.284E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
417.47	209.15	589.	96.	0.048	121.95	1.058	AC-228	s
481.96	241.28	377.	141.	0.071	63.47	1.095	RA-224	lD
538.32	269.58	392.	123.	0.062	82.43	1.010	AC-228	
551.96	276.41	310.	118.	0.059	69.22	0.992	TL-208	s
599.69	300.27	236.	70.	0.035	102.71	0.910	PB-212	s
654.07	327.46	252.	69.	0.034	108.56	1.041	AC-228	s
925.27	463.07	247.	77.	0.039	93.07	0.877	AC-228	s
952.26	476.57	200.	75.	0.038	100.50	0.649	BE-7	l
1716.87	858.91	94.	68.	0.034	82.54	1.627	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	381.	122.	0.061	70.93	0.993D
PB-212	153.39	77.11	366.	143.	0.072	56.47	0.995A
RA-226	371.22	186.03	746.	161.	0.080	69.94	1.500s
TH-227	471.61	236.22	1121.	-122.	-0.061	119.23	1.500s
PB-212	476.45	238.65	610.	1201.	0.600	13.02	1.036
PB-214	588.94	294.90	356.	232.	0.116	43.13	0.891
AC-228	675.72	338.29	309.	301.	0.151	33.87	1.081s
PB-214	702.43	351.64	313.	402.	0.201	26.56	1.174
TL-208	1019.78	510.33	231.	162.	0.081	46.83	1.578s
TL-208	1164.32	582.61	150.	319.	0.159	25.10	1.124
BI-214	1216.60	608.75	113.	303.	0.152	23.26	1.378
CS-137	1321.08	661.00	120.	800.	0.400	12.47	1.336
BI-212	1451.47	726.20	137.	107.	0.053	66.95	1.994s
CS-134	1587.07	794.01	69.	36.	0.018	110.16	1.500s
AC-228	1819.36	910.17	84.	276.	0.138	24.18	1.732s
EU-152	1925.86	963.42	128.	64.	0.032	83.21	1.538s
AC-228	1934.00	967.49	122.	244.	0.122	32.32	1.531s
BI-214	2237.46	1119.25	77.	77.	0.038	65.17	1.371s
CO-60	2343.11	1172.07	117.	338.	0.169	24.57	1.810s
CO-60	2661.08	1331.08	47.	250.	0.125	23.27	1.768
K-40	2917.63	1459.38	39.	1173.	0.587	8.94	1.803

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3237.07	1619.13	6.	15.	0.007	119.40	0.764s
BI-214	3524.07	1762.66	3.	59.	0.029	38.10	0.841s

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

***** S U M M A R Y O 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		1.9809E-01					
			477.56	1.981E-01	%(	3.521E-01 1.07E-01 G	
K-40		1.3613E+01					
			1460.75	1.361E+01	(P	3.679E-01 4.12E-01 G	
MN-54		1.7408E-02					
			834.81	1.741E-02	%(P	3.461E-02 1.05E-02 G	
CO-57		4.7472E-03					
			122.07	4.747E-03	%(P	5.262E-02 1.57E-02 G K	
			136.43	2.107E-03	%	3.912E-01 1.16E-01 G	
CO-60		2.9056E-01					
			1332.51	2.906E-01	(P	4.008E-02 2.28E-02 G K	
			1173.23	3.580E-01	+ P	5.615E-02 2.95E-02 G K	
Sr-85		-1.5254E-02					
			514.00	-1.525E-02	%(	4.427E-02 1.33E-02 G	
Kr-85		-3.4758E+02					
			513.99	-3.476E+02	%(	1.009E+03 3.03E+02 G	
Y-88		2.7572E-03					
			1836.01	2.757E-03	&(P	2.423E-02 6.44E-03 G K	
			898.02	-5.570E-03	% P	4.119E-02 1.19E-02 G	
NB-94		1.5085E-02					
			871.10	1.508E-02	%(	3.325E-02 1.01E-02 G K	
			702.50	-1.890E-03	&	3.412E-02 9.83E-03 G K	
Ag-108M		-3.2658E-02					
			722.95	-3.266E-02	%(	5.913E-02 1.80E-02 G K	
			614.37	7.808E-03	% P	4.171E-02 1.23E-02 G	
			433.93	5.804E-04	&	4.355E-02 1.28E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-3.0851E-01						
		88.04	-3.085E-01	&(	2.086E+00	6.25E-01	G
SN-113	-6.8566E-03						
		391.71	-6.857E-03	%(	5.481E-02	1.62E-02	G K
		255.04	-3.112E-01	%	1.749E+00	5.22E-01	G
SB-125	-9.4937E-03						
		427.95	-9.494E-03	%(P	1.307E-01	3.85E-02	G K
		600.77	-2.045E-02	& P	2.088E-01	6.11E-02	G
		636.15	-9.776E-03	& P	2.979E-01	8.55E-02	G
		463.51	-1.398E-02	% P	4.078E-01	1.19E-01	G
		176.29	7.470E-02	%	5.976E-01	1.79E-01	G
I-131	-6.0802E-03						
		364.48	-6.080E-03	%(P	4.942E-02	1.46E-02	G K
		636.97	-9.158E-02	%	5.610E-01	1.65E-01	G
		284.29	-7.362E-02	& P	6.358E-01	1.89E-01	G
CS-134	1.5919E-02						
		604.66	6.987E-04	%(	1.014E-01	3.02E-02	G K
		795.76	3.331E-02	*(P	3.854E-02	1.23E-02	G
		569.29	-4.568E-02	& P	2.347E-01	6.87E-02	G
		801.84	-1.108E-01	% P	4.775E-01	1.40E-01	G
CS-137	6.4955E-01						
		661.62	6.496E-01	(P	4.360E-02	2.70E-02	G
CE-139	-9.2984E-03						
		165.85	-9.298E-03	%(	4.655E-02	1.40E-02	G
EU-152	1.4404E-01						
		121.78	1.616E-02	%(P	1.537E-01	4.59E-02	G K
		344.30	-3.263E-02	% P	1.352E-01	4.04E-02	G
		1408.08	-2.064E-03	%	1.584E-01	4.35E-02	G
		964.00	4.005E-01	&(P	3.475E-01	1.12E-01	G
		1112.07	-2.424E-02	%	3.650E-01	1.05E-01	G
		778.90	-7.499E-02	%	2.842E-01	8.40E-02	G
EU-154	1.1654E-02						
		123.10	1.165E-02	&(	1.072E-01	3.20E-02	G K
		1274.80	-1.998E-02	&	1.413E-01	4.11E-02	G
		723.30	4.510E-02	&	1.825E-01	5.39E-02	G
		1004.80	3.080E-03	%	2.094E-01	5.93E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.0123E-01						
		86.45	1.012E-01	%(	2.388E-01	7.23E-02	G K
		105.31	7.924E-02	%	2.296E-01	6.93E-02	G
HG-203	-1.1658E-02						
		279.17	-1.166E-02	%(P	4.872E-02	1.46E-02	G K
		72.87	-1.296E-01	% P	1.906E+00	5.68E-01	G
		70.83	-1.005E-01	%	3.989E+00	1.19E+00	G
		82.50	-7.281E-01	&	4.011E+00	1.20E+00	G
TL-208	2.3054E-01						
		583.14	2.305E-01	(P	4.323E-02	1.95E-02	G
		510.72	4.016E-01	+ P	1.829E-01	7.30E-02	G
PB-212	8.6590E-01						
		238.63	8.843E-01	(P	8.679E-02	3.87E-02	G K
							Energy duplication
		77.11	5.966E-01	} P	3.819E-01	1.12E-01	G
		74.81	1.038E+00	+ P	7.937E-01	2.52E-01	G
PB-214	4.4571E-01						
		351.99	4.490E-01	(P	9.528E-02	4.03E-02	G K
		295.22	4.394E-01	(P	1.717E-01	6.42E-02	G
							Energy duplication
		77.11	3.623E-01	} P	1.016E+00	2.22E-01	G
		241.92	2.977E-02	%	5.362E-01	1.60E-01	G
BI-212	6.7716E-01						
		727.17	6.683E-01	(P	3.589E-01	1.50E-01	G K
		1620.56	7.152E-01	(P	7.051E-01	2.85E-01	G
		785.42	3.923E-01	%	1.439E+00	4.23E-01	G
BI-214	4.4693E-01						
		609.32	4.233E-01	(P	7.297E-02	3.35E-02	G K
		1764.51	5.284E-01	+ P	1.002E-01	7.08E-02	G
		1120.28	5.194E-01	*(P	2.969E-01	1.16E-01	G
RA-224	8.2188E-01						
		241.00	8.219E-01	%(	1.151E+00	3.52E-01	G
RA-226	1.4056E+00						
		185.99	1.406E+00	@(P	1.137E+00	3.54E-01	G
AC-228	8.8460E-01						
		911.07	8.331E-01	@(P	1.376E-01	6.79E-02	G K
		968.90	1.284E+00	+ P	2.843E-01	1.38E-01	G
		338.40	1.009E+00	@(P	2.835E-01	1.14E-01	G

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

TH-227      -3.4467E-01
                          236.00-3.447E-01 ?(  4.472E-01 1.37E-01 G K
                          256.25-1.466E-01 % P 5.549E-01 1.67E-01 G

PA-234       1.0041E-01
                           98.44 1.004E-01 %(P 2.155E-01 6.53E-02 G K
                          946.00 5.505E-02 % P 1.745E-01 5.17E-02 G
                          131.28-9.428E-04 % P 2.228E-01 6.64E-02 G
                           94.67-1.429E-01 % P 4.285E-01 1.29E-01 G
                          883.24 7.844E-02 %   3.145E-01 9.26E-02 G
                          926.70 5.345E-02 %   3.043E-01 8.82E-02 G
                          569.26-6.769E-02 & P 3.478E-01 1.02E-01 G

TH-234       1.2280E+00
                           63.29 1.228E+00 %(P 6.745E+00 2.02E+00 G K
                           92.80 1.173E+00 % P 2.202E+00 6.66E-01 G
                           92.38 1.508E+00 % P 2.575E+00 7.81E-01 G

AM-241      -1.9256E-02
                           59.54-1.926E-02 %(P 1.142E+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		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	1.9497E-01	1.9809E-01	3.2242E-01	3.2263E-01	3.465E-01
K-40		1.3613E+01	1.3613E+01	1.2365E+00	1.4675E+00	
MN-54	#A	1.7360E-02	1.7408E-02	3.1558E-02	3.1574E-02	3.452E-02
CO-57	#B	4.7323E-03	4.7472E-03	4.7164E-02	4.7165E-02	5.246E-02
CO-60		2.9043E-01	2.9056E-01	6.8318E-02	7.0370E-02	
Sr-85	#A	-1.5056E-02	-1.5254E-02	3.9888E-02	3.9898E-02	4.369E-02
Kr-85	#A	-3.4757E+02	-3.4758E+02	9.0888E+02	9.0911E+02	1.009E+03
Y-88	#B	2.7354E-03	2.7572E-03	1.9314E-02	1.9315E-02	2.404E-02
NB-94	#B	1.5085E-02	1.5085E-02	3.0156E-02	3.0168E-02	3.325E-02
Ag-108M	#B	-3.2657E-02	-3.2658E-02	5.4086E-02	5.4119E-02	5.913E-02
CD-109	#A	-3.0793E-01	-3.0851E-01	1.8762E+00	1.8763E+00	2.082E+00
SN-113	#B	-6.8063E-03	-6.8566E-03	4.8606E-02	4.8607E-02	5.441E-02
SB-125	#B	-9.4857E-03	-9.4937E-03	1.1702E-01	1.1702E-01	1.306E-01
I-131	#B	-5.4717E-03	-6.0802E-03	5.0003E-02	5.0005E-02	4.447E-02
CS-134	#B	1.5902E-02	1.5919E-02	1.7580E-02	1.7604E-02	1.013E-01
CS-137		6.4950E-01	6.4955E-01	8.1111E-02	8.9449E-02	
CE-139	#A	-9.2412E-03	-9.2984E-03	4.1858E-02	4.1862E-02	4.626E-02
EU-152	#B	1.4402E-01	1.4404E-01	1.2088E-01	1.2115E-01	1.537E-01
EU-154	#B	1.1651E-02	1.1654E-02	9.6145E-02	9.6147E-02	1.072E-01
EU-155	#B	1.0118E-01	1.0123E-01	2.1685E-01	2.1692E-01	2.387E-01
HG-203	#B	-1.1448E-02	-1.1658E-02	4.3933E-02	4.3938E-02	4.785E-02
TL-208		2.3054E-01	2.3054E-01	5.8657E-02	6.0165E-02	
PB-212		8.6590E-01	8.6590E-01	1.1384E-01	1.2445E-01	
PB-214		4.4571E-01	4.4571E-01	1.1475E-01	1.1763E-01	
BI-212		6.7716E-01	6.7716E-01	4.5545E-01	4.5715E-01	
BI-214		4.4693E-01	4.4693E-01	1.0617E-01	1.0929E-01	
RA-224	#A	8.2188E-01	8.2188E-01	1.0572E+00	1.0583E+00	1.151E+00
RA-226	#	1.4056E+00	1.4056E+00	1.0624E+00	1.0656E+00	1.137E+00
AC-228	#	8.8460E-01	8.8460E-01	1.8528E-01	1.9226E-01	
TH-227	#A	-3.4467E-01	-3.4467E-01	4.1095E-01	4.1143E-01	4.472E-01
PA-234	#B	1.0041E-01	1.0041E-01	1.9595E-01	1.9603E-01	2.155E-01
TH-234	#B	1.2280E+00	1.2280E+00	6.0521E+00	6.0524E+00	6.745E+00
AM-241	#A	-1.9256E-02	-1.9256E-02	1.2272E+00	1.2272E+00	1.142E+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_29OCT2005_1501.An1

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

Total Activity (86.4 to 2000.7 keV) 1.8103607E+01 pCi/gm
Total Decayed Activity (86.4 to 2000.7 keV) 1.8103785E+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_29OCT2005_1613.An1

Sample description
FSS OOL-02-01-004-F

Spectrum Filename: C:\GammaVision\Spectra\103F_29OCT2005_1613.An1

Acquisition information
Start time: 29-Oct-2005 16:13:36
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: 1.7370E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7370E+03) =
5.7571E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	28-Oct-2005 10:50:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.4354

***** S U M M A R Y O F P E A K 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	111.	23.32	0.99	9.052E-03	74.81	9.600	9.910E-01	PB212
77.15	93.	22.91	0.99	1.011E-02	77.11	17.500	6.001E-01	PB212
					77.11	10.700	9.815E-01	PB214
186.08	180.	19.88	1.32	2.566E-02	185.99	3.280	1.540E+00	RA226
209.92	102.	33.06	1.40	2.468E-02				
238.61	894.	3.93	1.09	2.320E-02	238.63	43.100	6.862E-01	PB212
241.84	129.	18.84	1.10	2.302E-02	241.00	3.900	1.116E+00	RA224
270.11	74.	37.87	1.23	2.152E-02				
277.50	67.	36.29	1.03	2.114E-02				
277.50	67.	36.29	1.03	2.114E-02	279.17	81.500	PBC<MDA	HG203
294.90	206.	11.75	1.06	2.026E-02	295.22	19.200	4.039E-01	PB214
299.80	63.	36.90	0.79	2.003E-02				
337.99	151.	17.28	1.01	1.832E-02	338.40	12.010	5.299E-01	AC228
351.61	357.	8.14	1.12	1.777E-02	351.99	37.100	4.148E-01	PB214
462.86	48.	27.91	1.33	1.426E-02				
462.86	48.	27.91	1.33	1.426E-02	463.51	10.000	PBC<MDA	SB125
510.10	182.	13.23	1.69	1.319E-02	510.72	22.500	4.088E-01	TL208
582.60	290.	7.68	1.21	1.185E-02	583.14	86.000	2.183E-01	TL208
608.83	250.	8.72	1.04	1.145E-02	609.32	46.090	3.588E-01	BI214
726.35	74.	25.25	1.77	9.973E-03				
726.35	74.	25.25	1.77	9.973E-03	727.17	11.800	4.850E-01	BI212
767.26	60.	30.73	1.40	9.563E-03				
859.77	31.	34.94	0.93	8.774E-03				
910.23	213.	8.36	1.47	8.407E-03	911.07	29.000	6.694E-01	AC228
963.25	34.	31.99	1.54	8.061E-03				
963.25	34.	31.99	1.54	8.061E-03	964.00	14.580	PBC<MDA	EU152
968.09	99.	12.41	1.54	8.031E-03	968.90	17.460	5.489E-01	AC228

1119.51	79.	19.86	1.74	7.215E-03	1120.28	15.040	5.559E-01	BI214
1459.39	1018.	3.28	1.97	5.936E-03	1460.75	10.700	1.225E+01	K40
1762.32	65.	13.14	2.40	5.147E-03	1764.51	15.920	5.838E-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	
419.00	209.92	414.	102.	0.051	99.17	1.399	NP-239	s
539.37	270.11	280.	74.	0.037	113.61	1.232	AC-228	
554.15	277.50	221.	66.	0.033	102.22	1.027	NP-239	s
598.76	299.80	202.	63.	0.032	110.69	0.785	TH-227	
1533.58	767.26	80.	60.	0.030	92.20	1.397	J-134	
1718.57	859.77	36.	31.	0.015	104.82	0.926	TL-208	s
1925.51	963.27	44.	34.	0.017	95.97	1.537	EU-152	lD
3523.39	1762.32	2.	65.	0.032	39.42	2.403	BI-214	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	298.	111.	0.055	69.97	0.993D
PB-212	153.39	77.11	290.	93.	0.047	68.73	0.995A
RA-226	371.29	186.06	601.	161.	0.081	63.35	1.500s
PB-212	476.43	238.64	450.	893.	0.446	14.67	1.057
RA-224	482.24	241.54	593.	125.	0.062	87.08	1.500
PB-214	588.94	294.90	169.	202.	0.101	35.26	1.063s
AC-228	675.13	337.99	204.	150.	0.075	51.84	1.009
PB-214	702.37	351.61	193.	351.	0.176	24.42	1.118
SB-125	924.68	462.78	109.	50.	0.025	96.46	1.500
TL-208	1019.31	510.10	144.	156.	0.078	39.69	1.685s
TL-208	1164.29	582.60	78.	286.	0.143	23.04	1.214
BI-214	1216.75	608.83	93.	243.	0.122	26.17	1.037
BI-212	1452.19	726.56	74.	57.	0.029	74.11	1.500s
AC-228	1819.49	910.23	43.	210.	0.105	25.08	1.469
AC-228	1934.68	967.83	78.	152.	0.076	42.28	1.307
BI-214	2238.00	1119.51	56.	78.	0.039	59.58	1.738s
K-40	2917.65	1459.39	38.	1000.	0.500	9.83	1.970

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

***** S U M M A R Y O 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		2.0011E-02						
			477.56	2.001E-02	%(	3.122E-01	9.08E-02	G
K-40		1.2254E+01						
			1460.75	1.225E+01	(P	3.863E-01	4.09E-01	G
MN-54		8.3117E-03						
			834.81	8.312E-03	%(P	3.331E-02	9.76E-03	G
CO-57		-7.8851E-04						
			122.07	-7.885E-04	%(P	4.699E-02	1.39E-02	G K
			136.43	1.335E-01	%	3.364E-01	1.02E-01	G
CO-60		5.1623E-03						
			1332.51	5.162E-03	&(P	3.198E-02	8.83E-03	G K
			1173.23	4.839E-03	& P	3.693E-02	1.04E-02	G K
Sr-85		-1.4232E-02						
			514.00	-1.423E-02	%(	3.683E-02	1.11E-02	G
Kr-85		-3.2535E+02						
			513.99	-3.254E+02	%(	8.395E+02	2.52E+02	G
Y-88		4.3139E-03						
			1836.01	4.314E-03	%(P	2.024E-02	5.49E-03	G K
			898.02	2.126E-03	% P	3.122E-02	8.75E-03	G
NB-94		-3.1596E-03						
			871.10	-3.160E-03	%(	2.932E-02	8.33E-03	G K
			702.50	3.178E-04	&	3.451E-02	9.86E-03	G K
Ag-108M		-7.6609E-03						
			722.95	-7.661E-03	%(	4.634E-02	1.36E-02	G K
			614.37	-2.431E-03	& P	3.609E-02	1.04E-02	G
			433.93	9.294E-03	%	3.556E-02	1.06E-02	G
CD-109		-2.9740E-02						
			88.04	-2.974E-02	%(	1.999E+00	5.95E-01	G
SN-113		-7.9681E-04						
			391.71	-7.968E-04	%(	4.536E-02	1.32E-02	G K
			255.04	-3.456E-01	&	1.494E+00	4.46E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.1582E-02						
		427.95	1.762E-02	%(P	1.028E-01	3.03E-02	G K
		600.77	2.076E-03	% P	1.515E-01	4.31E-02	G
		636.15	2.148E-02	% P	2.871E-01	8.26E-02	G
		463.51	2.709E-01	(P	2.813E-01	8.94E-02	G
		176.29	-1.077E-01	&	5.461E-01	1.63E-01	G
I-131	-4.4526E-03						
		364.48	-4.453E-03	&(P	3.561E-02	1.04E-02	G K
		636.97	1.806E-02	%	4.959E-01	1.42E-01	G
		284.29	6.211E-02	% P	5.148E-01	1.52E-01	G
CS-134	-2.6331E-02						
		604.66	-2.633E-02	&(	4.543E-02	1.39E-02	G K
		795.76	-8.551E-05	% P	3.355E-02	9.37E-03	G
		569.29	-5.978E-03	& P	2.288E-01	6.56E-02	G
		801.84	1.003E-02	& P	3.376E-01	9.42E-02	G
CS-137	-2.7735E-04						
		661.62	-2.773E-04	%(P	4.195E-02	1.20E-02	G
CE-139	-4.1269E-03						
		165.85	-4.127E-03	%(	4.522E-02	1.35E-02	G
EU-152	-2.6897E-03						
		121.78	-2.690E-03	&(P	1.330E-01	3.94E-02	G K
		344.30	-1.132E-02	% P	1.120E-01	3.29E-02	G
		1408.08	3.124E-03	%	1.579E-01	4.32E-02	G
		964.00	2.068E-01	& P	2.869E-01	8.95E-02	G
		1112.07	4.370E-02	&	2.507E-01	7.20E-02	G
		778.90	9.014E-02	%	2.465E-01	7.36E-02	G
EU-154	-2.9159E-03						
		123.10	-2.916E-03	&(	9.291E-02	2.76E-02	G K
		1274.80	-2.457E-02	&	1.208E-01	3.51E-02	G
		723.30	-3.581E-03	&	2.111E-01	6.09E-02	G
		1004.80	3.982E-02	&	1.737E-01	5.03E-02	G
EU-155	1.0945E-02						
		86.45	1.095E-02	%(	1.905E-01	5.66E-02	G K
		105.31	-4.383E-03	%	2.016E-01	5.98E-02	G
HG-203	4.7152E-04						
		279.17	4.715E-04	&(P	3.823E-02	1.12E-02	G K
		72.87	-1.878E-01	% P	2.115E+00	6.31E-01	G
		70.83	-9.276E-01	%	4.329E+00	1.30E+00	G
		82.50	-2.257E-01	%	3.410E+00	1.01E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.1835E-01						
		583.14	2.183E-01	(P	3.352E-02	1.70E-02	G
		510.72	4.088E-01	+ P	1.540E-01	6.33E-02	G
PB-212	6.9470E-01						
		238.63	6.947E-01	(P	7.904E-02	3.44E-02	G K
							Energy duplication
		77.11	4.100E-01	} P	3.610E-01	9.39E-02	G
		74.81	9.910E-01	+ P	7.448E-01	2.38E-01	G
PB-214	4.1108E-01						
		351.99	4.148E-01	(P	7.964E-02	3.43E-02	G K
		295.22	4.039E-01	@(P	1.267E-01	4.84E-02	G
							Energy duplication
		77.11	2.052E-01	} P	9.031E-01	2.04E-01	G
		241.92	7.528E-02	%	4.027E-01	1.20E-01	G
BI-212	3.8006E-01						
		727.17	3.801E-01	@(P	2.831E-01	9.47E-02	G K
		1620.56	5.705E-01	% P	1.018E+00	3.17E-01	G
		785.42	1.038E+00	%	1.378E+00	4.36E-01	G
BI-214	3.5876E-01						
		609.32	3.588E-01	(P	7.027E-02	3.21E-02	G K
		1764.51	-4.481E-02	& P	9.944E-02	9.50E-03	G
		1120.28	5.559E-01	+ P	2.707E-01	1.13E-01	G
RA-224	1.0788E+00						
		241.00	1.079E+00	(	1.005E+00	3.13E-01	G
RA-226	1.4879E+00						
		185.99	1.488E+00	*(P	1.081E+00	3.39E-01	G
AC-228	6.6940E-01						
		911.07	6.694E-01	(P	1.066E-01	5.68E-02	G K
		968.90	8.414E-01	+ P	2.442E-01	1.19E-01	G
		338.40	5.299E-01	- P	2.453E-01	9.22E-02	G
TH-227	-2.2709E-01						
		236.00	-2.271E-01	&(	3.920E-01	1.19E-01	G K
		256.25	4.890E-02	& P	4.378E-01	1.30E-01	G
PA-234	-3.2992E-02						
		98.44	-3.299E-02	&(P	2.238E-01	6.69E-02	G K
		946.00	-3.929E-02	& P	2.045E-01	5.97E-02	G
		131.28	4.186E-02	% P	1.967E-01	5.90E-02	G
		94.67	-1.293E-01	& P	4.108E-01	1.24E-01	G
		883.24	-2.963E-02	&	2.975E-01	8.54E-02	G
		926.70	6.110E-02	%	2.645E-01	7.67E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-9.488E-03 & P 3.392E-01 9.72E-02 G

TH-234      -4.0450E-01
                           63.29-4.045E-01 &(P 5.152E+00 1.51E+00 G K
                           92.80 7.923E-01 % P 2.151E+00 6.46E-01 G
                           92.38 1.035E+00 % P 2.526E+00 7.60E-01 G

AM-241      -2.1961E-03
                           59.54-2.196E-03 &(P 1.099E+00 3.26E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.9695E-02	2.0011E-02	2.7247E-01	2.7247E-01	3.073E-01
K-40		1.2254E+01	1.2254E+01	1.2273E+00	1.4186E+00	
MN-54	#A	8.2891E-03	8.3117E-03	2.9270E-02	2.9274E-02	3.322E-02
CO-57	#B	-7.8603E-04	-7.8851E-04	6.4425E-02	6.4425E-02	4.685E-02
CO-60	#B	5.1600E-03	5.1623E-03	2.6494E-02	2.6496E-02	3.197E-02

Sr-85	#A	-1.4047E-02	-1.4232E-02	3.3229E-02	3.3239E-02	3.635E-02
Kr-85	#A	-3.2535E+02	-3.2535E+02	7.5743E+02	7.5767E+02	8.395E+02
Y-88	#B	4.2796E-03	4.3139E-03	1.6462E-02	1.6464E-02	2.008E-02
NB-94	#B	-3.1596E-03	-3.1596E-03	2.4996E-02	2.4997E-02	2.932E-02
Ag-108M	#B	-7.6608E-03	-7.6609E-03	4.0804E-02	4.0806E-02	4.634E-02
CD-109	#A	-2.9685E-02	-2.9740E-02	1.7862E+00	1.7862E+00	1.995E+00
SN-113	#B	-7.9096E-04	-7.9681E-04	3.9519E-02	3.9519E-02	4.503E-02
SB-125	#B	8.1514E-02	8.1582E-02	8.0722E-02	8.0861E-02	1.027E-01
I-131	#B	-4.0064E-03	-4.4526E-03	3.7710E-02	3.7711E-02	3.204E-02
CS-134	#B	-2.6301E-02	-2.6331E-02	4.1671E-02	4.1699E-02	4.538E-02
CS-137	#A	-2.7733E-04	-2.7735E-04	5.7746E-02	5.7746E-02	4.195E-02
CE-139	#A	-4.1015E-03	-4.1269E-03	4.0420E-02	4.0420E-02	4.495E-02
EU-152	#B	-2.6892E-03	-2.6897E-03	2.7835E-01	2.7835E-01	1.330E-01
EU-154	#B	-2.9151E-03	-2.9159E-03	8.2711E-02	8.2711E-02	9.289E-02
EU-155	#B	1.0940E-02	1.0945E-02	1.6978E-01	1.6978E-01	1.904E-01
HG-203	#B	4.6300E-04	4.7152E-04	3.3697E-02	3.3697E-02	3.754E-02
TL-208		2.1835E-01	2.1835E-01	5.1071E-02	5.2621E-02	
PB-212		6.9470E-01	6.9470E-01	1.0325E-01	1.1085E-01	
PB-214		4.1108E-01	4.1108E-01	8.9814E-02	9.2931E-02	
BI-212	#	3.8006E-01	3.8006E-01	2.8409E-01	2.8494E-01	2.831E-01
BI-214		3.5876E-01	3.5876E-01	9.6402E-02	9.8626E-02	
RA-224		1.0788E+00	1.0788E+00	9.3940E-01	9.4149E-01	1.005E+00
RA-226	#	1.4879E+00	1.4879E+00	1.0185E+00	1.0221E+00	1.081E+00
AC-228		6.6940E-01	6.6940E-01	1.7056E-01	1.7493E-01	
TH-227	#B	-2.2709E-01	-2.2709E-01	3.5811E-01	3.5835E-01	3.920E-01
PA-234	#B	-3.2992E-02	-3.2992E-02	2.2221E-01	2.2221E-01	2.238E-01
TH-234	#B	-4.0450E-01	-4.0450E-01	2.2629E+01	2.2629E+01	5.152E+00
AM-241	#A	-2.1961E-03	-2.1961E-03	1.3226E+01	1.3226E+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 (86.9 to 2000.7 keV) 1.5685344E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 1.5685344E+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_20JUL2006_1822.An1

Sample description
FSS-OOL-02-02-004-R

Spectrum Filename: C:\GammaVision\Spectra\101F_20JUL2006_1822.An1

Acquisition information
Start time: 20-Jul-2006 18:22:12
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: 1.6460E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6460E+03) =
6.0753E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	18-Jul-2006 21:16:00
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: 0.4245

***** S U M M A R Y O F P E A K 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	173.	26.55	1.50	1.654E-02				
74.97	173.	26.55	1.50	1.654E-02	74.81	9.600	8.919E-01	PB212
77.15	282.	16.06	1.50	1.720E-02	77.11	17.500	7.677E-01	PB212
					77.11	10.700	1.239E+00	PB214
77.15	278.	16.06	1.50	1.720E-02	77.11	17.500	7.576E-01	PB212
					77.11	10.700	1.239E+00	PB214
87.32	100.	27.53	1.01	1.921E-02	86.45	32.740	1.313E-01	EU155
					88.04	3.790	PBC<MDA	CD109
89.82	81.	35.46	1.02	1.954E-02				
93.22	129.	21.16	1.02	1.993E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.83	110.	27.91	0.87	2.110E-02				
161.38	76.	40.10	1.00	1.995E-02				
186.17	108.	29.32	0.97	1.857E-02	185.99	3.280	1.461E+00	RA226
209.73	85.	22.15	1.10	1.718E-02				
238.93	768.	4.11	1.12	1.556E-02	238.63	43.100	9.315E-01	PB212
241.75	132.	19.14	1.12	1.541E-02	241.00	3.900	1.784E+00	RA224
270.00	60.	38.63	0.74	1.401E-02				
295.57	129.	12.77	1.16	1.291E-02	295.22	19.200	4.209E-01	PB214
300.46	58.	24.46	1.16	1.271E-02				
328.11	48.	36.56	1.30	1.169E-02				
338.71	151.	17.16	1.32	1.134E-02	338.40	12.010	8.963E-01	AC228
352.24	266.	10.39	1.27	1.092E-02	351.99	37.100	5.348E-01	PB214
463.56	32.	38.76	1.59	8.341E-03	463.51	10.000	PBC<MDA	SB125
473.86	29.	29.84	1.50	8.102E-03	477.56	10.300	2.920E-01	BE7
511.03	119.	18.97	1.29	7.586E-03	510.72	22.500	4.969E-01	TL208
583.50	238.	9.88	1.44	6.681E-03	583.14	86.000	3.365E-01	TL208

609.73	167.	11.35	1.27	6.409E-03	609.32	46.090	4.608E-01	BI214
661.57	27.	39.55	1.50	5.937E-03	661.62	84.620	PBC<MDA	CS137
861.14	39.	27.30	1.74	4.674E-03				
911.78	149.	10.11	1.29	4.443E-03	911.07	29.000	9.355E-01	AC228
968.86	114.	14.77	1.94	4.212E-03	968.90	17.460	1.266E+00	AC228
1121.67	47.	22.77	1.16	3.707E-03	1120.28	15.040	6.858E-01	BI214
1461.63	648.	4.16	1.68	2.941E-03	1460.75	10.700	1.682E+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
174.22	87.21	328.	100.	0.050	82.58	1.014	PB-214 lD
179.22	89.71	369.	81.	0.040	106.39	1.016	PB-214 lD
322.39	161.38	348.	79.	0.040	105.17	1.003	BA-140
419.49	209.91	251.	67.	0.034	111.07	1.242	NP-239
477.57	238.91	116.	765.	0.382	12.38	1.122	PB-212 D
539.73	270.00	188.	60.	0.030	115.88	0.735	AC-228 s
600.68	300.38	71.	58.	0.029	73.39	1.165	PB-212 lD
656.00	328.11	110.	48.	0.024	109.69	1.299	AC-228 s
1722.57	861.14	27.	39.	0.019	81.91	1.739	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	149.50	74.97	1030.	173.	0.086	79.65	1.499s
PB-212	153.79	77.11	882.	282.	0.141	48.19	1.499D
PB-214	153.79	77.11	885.	278.	0.139	48.19	1.499D
TH-234	185.81	93.11	817.	135.	0.068	86.21	1.499s
TH-234	185.79	93.10	781.	142.	0.071	83.31	1.499s
RA-226	372.23	186.29	436.	99.	0.049	94.54	1.499s
PB-212	477.47	238.89	382.	628.	0.314	17.62	1.499
RA-224	481.70	241.00	574.	94.	0.047	111.79	1.123D
PB-214	590.88	295.56	168.	116.	0.058	53.83	1.499
AC-228	677.20	338.71	170.	149.	0.074	51.49	1.321
PB-214	704.38	352.29	144.	239.	0.119	28.55	1.499
SB-125	926.43	463.27	76.	35.	0.018	111.59	1.499s
BE-7	947.63	473.86	23.	29.	0.014	89.51	1.499s
TL-208	1022.01	511.03	120.	103.	0.052	56.91	1.286s
TL-208	1167.02	583.50	92.	236.	0.118	29.64	1.439
BI-214	1219.50	609.73	65.	166.	0.083	34.04	1.267
CS-137	1323.24	661.57	47.	27.	0.013	118.66	1.499s
AC-228	1823.92	911.78	26.	147.	0.073	30.33	1.288
AC-228	1938.14	968.86	47.	113.	0.057	44.30	1.940s
BI-214	2243.93	1121.67	27.	47.	0.023	68.30	1.157s
K-40	2924.28	1461.63	20.	645.	0.323	12.49	1.681

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

***** S U M M A R Y O 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		2.9204E-01					
			477.56	2.920E-01	(	2.520E-01 8.71E-02	G
K-40		1.6825E+01					
			1460.75	1.682E+01	(P	6.111E-01 7.03E-01	G
MN-54		-9.6372E-03					
			834.81	-9.637E-03	%(P	5.366E-02 1.53E-02	G
CO-57		5.8692E-03					
			122.07	5.869E-03	%(	4.717E-02 1.40E-02	G K
			136.43	4.014E-03	&	4.219E-01 1.25E-01	G
CO-60		9.9416E-03					
			1332.51	9.942E-03	%(P	5.462E-02 1.53E-02	G K
			1173.23	4.329E-02	% P	6.701E-02 2.10E-02	G K
Sr-85		-2.1761E-02					
			514.00	-2.176E-02	%(	6.621E-02 1.98E-02	G
Kr-85		-5.2215E+02					
			513.99	-5.221E+02	%(P	1.504E+03 4.48E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	2.578E-02 3.50E-03	G K
			898.02	-4.822E-05	% P	5.765E-02 1.59E-02	G
NB-94		-8.8435E-03					
			871.10	-8.843E-03	%(P	5.525E-02 1.58E-02	G K
			702.50	2.257E-02	% P	4.533E-02 1.38E-02	G K
Ag-108M		1.0879E-02					
			722.95	1.088E-02	%(	6.531E-02 1.89E-02	G K
			614.37	-1.804E-02	% P	6.043E-02 1.79E-02	G
			433.93	-1.314E-02	%	5.049E-02 1.49E-02	G
CD-109		3.0631E-02					
			88.04	3.063E-02	%(P	1.697E+00 5.06E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-9.3423E-03						
		391.71	-9.342E-03	%(	7.181E-02	2.10E-02	G K
		255.04	-1.805E-01	% P	2.023E+00	5.95E-01	G
SB-125	6.4373E-02						
		427.95	-3.094E-02	%(P	1.558E-01	4.57E-02	G K
		600.77	-1.333E-02	% P	2.413E-01	6.80E-02	G
		636.15	-2.833E-02	% P	4.170E-01	1.18E-01	G
		463.51	3.465E-01	(P	4.266E-01	1.34E-01	G
		176.29	1.052E-02	% P	5.632E-01	1.65E-01	G
I-131	1.4489E-03						
		364.48	1.449E-03	&(	5.587E-02	1.61E-02	G K
		636.97	4.903E-02	%	6.327E-01	1.77E-01	G
		284.29	-1.073E-01	&	8.367E-01	2.47E-01	G
CS-134	1.1722E-03						
		604.66	1.172E-03	&(P	3.994E-02	1.11E-02	G K
		795.76	1.639E-02	& P	5.838E-02	1.70E-02	G
		569.29	-6.335E-02	& P	3.234E-01	9.40E-02	G
		801.84	0.000E+00	&	5.651E-01	1.56E-01	G
CS-137	4.3845E-02						
		661.62	4.385E-02	(P	5.669E-02	1.79E-02	G
CE-139	-1.1767E-02						
		165.85	-1.177E-02	%(P	5.921E-02	1.77E-02	G
EU-152	8.8121E-03						
		121.78	8.812E-03	&(P	1.555E-01	4.62E-02	G K
		344.30	-2.335E-02	% P	1.749E-01	5.13E-02	G
		1408.08	-4.452E-02	% P	2.797E-01	7.76E-02	G
		964.00	-9.955E-02	% P	5.650E-01	1.64E-01	G
		1112.07	-9.847E-03	& P	5.170E-01	1.44E-01	G
		778.90	-1.209E-03	% P	5.310E-01	1.51E-01	G
EU-154	-2.0291E-02						
		123.10	-2.029E-02	&(P	1.052E-01	3.14E-02	G K
		1274.80	-1.550E-04	& P	2.831E-01	8.02E-02	G
		723.30	4.093E-02	% P	3.014E-01	8.69E-02	G
		1004.80	-1.224E-02	% P	3.380E-01	9.38E-02	G
EU-155	-2.7977E-03						
		86.45	-2.798E-03	&(	1.872E-01	5.58E-02	G K
		105.31	2.695E-02	&	2.077E-01	6.19E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	1.7288E-02						
		279.17	1.729E-02	&(	4.847E-02	1.45E-02	G K
		72.87	-4.941E-01	% P	1.400E+00	4.22E-01	G
		70.83	6.356E-01	%	2.211E+00	6.66E-01	G
		82.50	-7.008E-01	%	2.782E+00	8.36E-01	G
TL-208	3.3651E-01						
		583.14	3.365E-01	(P	6.783E-02	3.36E-02	G
		510.72	4.969E-01	+ P	2.580E-01	1.09E-01	G
PB-212	7.8486E-01						
		238.63	7.680E-01	(P	1.147E-01	4.55E-02	G K
							Energy duplication
		77.11	7.677E-01	(	3.847E-01	1.23E-01	G
		74.81	8.919E-01	?(P	7.873E-01	2.44E-01	G
PB-214	4.8373E-01						
		351.99	4.837E-01	(P	1.188E-01	4.64E-02	G K
		295.22	3.854E-01	- P	2.087E-01	7.02E-02	G
							Energy duplication
		77.11	1.239E+00	+ P	6.305E-01	2.02E-01	G
		241.92	4.804E-02	% P	7.752E-01	2.30E-01	G
BI-212	-6.9247E-03						
		727.17	-6.925E-03	%(P	5.715E-01	1.62E-01	G K
		1620.56	0.000E+00	&	2.377E+00	6.30E-01	G
		785.42	1.244E+00	% P	2.534E+00	7.70E-01	G
BI-214	4.6081E-01						
		609.32	4.608E-01	(P	1.120E-01	5.27E-02	G K
		1764.51	-9.475E-03	% P	4.282E-01	1.11E-01	G
		1120.28	6.858E-01	+ P	3.986E-01	1.58E-01	G
RA-224	1.2787E+00						
		241.00	1.279E+00	(P	1.558E+00	4.80E-01	G
RA-226	1.3315E+00						
		185.99	1.332E+00	*(	1.347E+00	4.20E-01	G
AC-228	9.2402E-01						
		911.07	9.355E-01	(P	1.687E-01	9.58E-02	G K
		968.90	1.266E+00	+ P	3.854E-01	1.88E-01	G
		338.40	8.963E-01	(P	3.825E-01	1.56E-01	G
TH-227	-7.5053E-02						
		236.00	-7.505E-02	%(P	4.646E-01	1.38E-01	G K
		256.25	-2.002E-02	% P	5.517E-01	1.61E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	-4.7950E-03						
		98.44	-4.795E-03	&(	2.006E-01	5.96E-02	G K
		946.00	8.227E-02	%	2.796E-01	8.19E-02	G
		131.28	-6.286E-02	%	2.464E-01	7.40E-02	G
		94.67	-6.923E-02	&	3.333E-01	9.99E-02	G
		883.24	8.483E-02	%	3.735E-01	1.07E-01	G
		926.70	1.530E-01	&	4.445E-01	1.31E-01	G
		569.26	-8.871E-02	&	4.775E-01	1.39E-01	G
TH-234	1.6006E+00						
		63.29	9.496E-01	%(P	2.420E+00	7.29E-01	G K
		92.80	1.956E+00	(P	1.829E+00	5.67E-01	G
		92.38	2.173E+00	(P	2.187E+00	6.75E-01	G
AM-241	3.3246E-02						
		59.54	3.325E-02	%(P	3.022E-01	9.00E-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	#	2.8500E-01	2.9204E-01	2.6141E-01	2.6193E-01	2.459E-01
K-40		1.6825E+01	1.6825E+01	2.1082E+00	2.3126E+00	
MN-54	#A	-9.5970E-03	-9.6372E-03	5.3276E-02	5.3279E-02	5.344E-02
CO-57	#B	5.8410E-03	5.8692E-03	4.2106E-02	4.2108E-02	4.694E-02
CO-60	#B	9.9349E-03	9.9416E-03	4.5897E-02	4.5900E-02	5.458E-02
Sr-85	#A	-2.1328E-02	-2.1761E-02	5.9397E-02	5.9410E-02	6.490E-02
Kr-85	#A	-5.2214E+02	-5.2215E+02	1.5065E+03	1.5068E+03	1.504E+03
Y-88	#B	0.0000E+00	0.0000E+00	1.0493E-02	1.0495E-02	2.546E-02
NB-94	#B	-8.8435E-03	-8.8435E-03	4.9921E-02	4.9924E-02	5.525E-02
Ag-108M	#B	1.0879E-02	1.0879E-02	5.6821E-02	5.6825E-02	6.531E-02
CD-109	#A	3.0543E-02	3.0631E-02	1.5183E+00	1.5183E+00	1.692E+00
SN-113	#B	-9.2372E-03	-9.3423E-03	6.3017E-02	6.3019E-02	7.100E-02
SB-125	#B	6.4290E-02	6.4373E-02	7.4786E-02	7.4875E-02	1.556E-01
I-131	#B	1.2321E-03	1.4489E-03	4.8240E-02	4.8240E-02	4.751E-02
CS-134	#B	1.1702E-03	1.1722E-03	3.3208E-02	3.3208E-02	3.987E-02
CS-137	#A	4.3840E-02	4.3845E-02	5.3739E-02	5.3797E-02	5.669E-02
CE-139	#A	-1.1656E-02	-1.1767E-02	5.4690E-02	5.4694E-02	5.865E-02
EU-152	#B	8.8096E-03	8.8121E-03	1.3867E-01	1.3868E-01	1.555E-01
EU-154	#B	-2.0282E-02	-2.0291E-02	1.0270E-01	1.0270E-01	1.051E-01
EU-155	#B	-2.7957E-03	-2.7977E-03	1.6732E-01	1.6732E-01	1.871E-01
HG-203	#B	1.6811E-02	1.7288E-02	4.3632E-02	4.3643E-02	4.714E-02
TL-208		3.3651E-01	3.3651E-01	1.0075E-01	1.0253E-01	
PB-212	#	7.8486E-01	7.8486E-01	1.3961E-01	1.4649E-01	1.147E-01
PB-214	#	4.8373E-01	4.8373E-01	1.3927E-01	1.4193E-01	1.188E-01
BI-212	#B	-6.9247E-03	-6.9247E-03	4.3675E+00	4.3675E+00	5.715E-01
BI-214		4.6081E-01	4.6081E-01	1.5789E-01	1.6002E-01	
RA-224	A	1.2787E+00	1.2787E+00	1.4403E+00	1.4421E+00	
RA-226	#A	1.3315E+00	1.3315E+00	1.2589E+00	1.2611E+00	1.347E+00
AC-228		9.2402E-01	9.2402E-01	2.8002E-01	2.8484E-01	
TH-227	#B	-7.5053E-02	-7.5053E-02	4.3806E-01	4.3808E-01	4.646E-01
PA-234	#B	-4.7950E-03	-4.7950E-03	1.7883E-01	1.7883E-01	2.006E-01
TH-234	#B	1.6006E+00	1.6006E+00	1.3914E+00	1.3942E+00	2.420E+00
AM-241	#A	3.3246E-02	3.3246E-02	2.6999E-01	2.6999E-01	3.022E-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 (269.6 to 1999.1 keV) 1.9824886E+01 pCi/gm
Total Decayed Activity (269.6 to 1999.1 keV) 1.9824886E+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_20JUL2006_1858.An1

Sample description
FSS-OOL-02-02-002-R

Spectrum Filename: C:\GammaVision\Spectra\101F_20JUL2006_1858.An1

Acquisition information
Start time: 20-Jul-2006 18:58:43
Live time: 2000
Real time: 2002
Dead time: 0.11 %
Detector ID: 1

Detector system
Det 101- DSPE-633

Calibration
Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration
Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.6710E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6710E+03) =
5.9844E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	18-Jul-2006 20:55:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5472

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.33	245.	15.15	1.00	1.650E-02				
74.33	245.	15.15	1.00	1.650E-02	74.81	9.600	1.223E+00	PB212
77.34	492.	7.94	1.01	1.736E-02	77.11	10.700	2.147E+00	PB214
					77.11	17.500	1.323E+00	PB212
86.89	164.	20.13	1.01	1.917E-02	86.45	32.740	2.118E-01	EU155
					88.04	3.790	1.807E+00	CD109
90.40	143.	22.31	1.02	1.963E-02				
93.42	165.	19.97	1.02	1.996E-02	92.80	3.000	PBC<MDA	TH234
					94.67	15.500	4.283E-01	PA234
129.12	112.	40.98	1.04	2.110E-02				
186.52	185.	19.38	1.44	1.855E-02	185.99	3.280	2.460E+00	RA226
209.51	137.	26.87	1.03	1.720E-02				
238.91	1165.	3.36	1.12	1.557E-02	238.63	43.100	1.396E+00	PB212
241.64	156.	17.98	1.12	1.543E-02	241.00	3.900	2.088E+00	RA224
					241.92	7.470	1.094E+00	PB214
270.86	133.	19.37	1.14	1.397E-02				
277.61	46.	41.49	0.84	1.367E-02				
295.51	182.	14.33	1.03	1.291E-02	295.22	19.200	5.869E-01	PB214
300.56	85.	29.95	1.05	1.271E-02				
328.49	60.	26.20	1.04	1.168E-02				
338.70	262.	12.50	1.34	1.134E-02	338.40	12.010	1.544E+00	AC228
352.33	241.	9.16	1.20	1.091E-02	351.99	37.100	4.775E-01	PB214
463.47	77.	28.08	1.64	8.342E-03				
463.47	77.	28.08	1.64	8.342E-03	463.51	10.000	7.334E-01	SB125
477.98	58.	32.70	1.37	8.095E-03	477.56	10.300	5.743E-01	BE7
511.01	150.	16.31	1.47	7.586E-03	510.72	22.500	6.344E-01	TL208
583.48	331.	7.13	1.24	6.681E-03	583.14	86.000	4.624E-01	TL208

609.71	243.	9.59	1.48	6.409E-03	609.32	46.090	6.613E-01	BI214
727.68	85.	19.17	1.11	5.439E-03	727.17	11.800	1.064E+00	BI212
796.29	66.	23.24	1.65	5.013E-03	795.76	85.400	1.231E-01	CS134
861.08	82.	20.47	0.97	4.674E-03				
911.73	221.	8.48	1.40	4.444E-03	911.07	29.000	1.374E+00	AC228
965.07	53.	19.50	1.61	4.227E-03				
969.67	126.	11.05	1.62	4.209E-03	968.90	17.460	1.383E+00	AC228
1121.36	52.	19.97	1.83	3.708E-03	1120.28	15.040	7.523E-01	BI214
1461.68	642.	4.10	1.75	2.941E-03	1460.75	10.700	1.642E+01	K40
1766.09	49.	14.29	1.94	2.481E-03	1764.51	15.920	9.942E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
148.23	74.70	569.	245.	0.123	45.44	1.004	BI-207	D
154.25	77.70	518.	492.	0.246	23.81	1.007	PB-214	D
179.58	90.45	441.	162.	0.081	59.94	1.016	PB-214	D
185.61	93.46	467.	157.	0.079	62.96	1.018	U-235	D
257.84	129.12	796.	106.	0.053	116.16	1.038	AC-228	s
418.69	209.51	467.	137.	0.068	80.62	1.026	AC-228	s
477.52	238.72	184.	1165.	0.582	10.09	1.122	PB-212	D
482.98	241.45	317.	156.	0.078	53.93	1.124	RA-224	D
541.45	270.86	223.	133.	0.067	58.11	1.144	AC-228	s
600.87	300.56	214.	85.	0.042	89.85	1.046	PB-212	
656.75	328.49	103.	60.	0.030	78.61	1.036	RH-106M	
1722.46	861.08	54.	82.	0.041	50.43	0.966	TL-208	s
1931.95	965.15	36.	45.	0.023	71.88	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	149.10	74.77	1363.	295.	0.147	54.94	1.499
PB-214	153.79	77.11	1269.	411.	0.206	39.23	1.499D
PB-212	153.79	77.11	1266.	415.	0.208	39.23	1.499D
EU-155	174.13	87.27	1246.	141.	0.070	109.51	1.499s
CD-109	175.66	88.04	499.	148.	0.074	68.32	1.014D
TH-234	186.09	93.25	1203.	165.	0.082	88.89	1.499s
RA-226	372.30	186.32	590.	167.	0.084	65.80	1.499s
PB-212	477.50	238.90	509.	949.	0.475	13.90	1.499
RA-224	482.60	241.45	632.	125.	0.062	89.10	1.499
PB-214	590.90	295.58	255.	167.	0.083	46.31	1.499
AC-228	677.19	338.70	265.	260.	0.130	37.49	1.343
PB-214	704.22	352.21	169.	234.	0.117	30.34	1.499
SB-125	926.78	463.44	102.	72.	0.036	67.54	1.499s
BE-7	955.88	477.98	121.	55.	0.028	94.04	1.499s
TL-208	1021.96	511.01	148.	134.	0.067	48.94	1.469s
TL-208	1166.96	583.48	80.	329.	0.164	21.38	1.240
BI-214	1219.45	609.71	84.	242.	0.121	28.77	1.479s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	1455.50	727.68	65.	85.	0.042	57.50	1.112s
CS-134	1591.36	795.57	40.	41.	0.021	79.19	1.502s
AC-228	1823.81	911.73	44.	219.	0.110	25.44	1.399s
AC-228	1938.21	968.90	42.	125.	0.063	34.43	1.616D
BI-214	2243.31	1121.36	25.	52.	0.026	59.92	1.832
K-40	2924.38	1461.68	16.	639.	0.320	12.30	1.748
BI-214	3533.62	1766.09	0.	49.	0.024	42.86	1.936

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

***** S U M M A R Y O 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		5.4666E-01					
			477.56	5.467E-01	(	5.367E-01 1.71E-01 G	
K-40		1.6419E+01					
			1460.75	1.642E+01	(P	5.451E-01 6.76E-01 G	
MN-54		3.6067E-02					
			834.81	3.607E-02	%(P	5.452E-02 1.70E-02 G	
CO-57		-9.9145E-03					
			122.07	-9.914E-03	&(	6.343E-02 1.90E-02 G K	
			136.43	-9.067E-02	%	5.148E-01 1.54E-01 G	
CO-60		3.7486E-02					
			1332.51	3.749E-02	&(P	7.033E-02 2.16E-02 G K	
			1173.23	3.079E-02	% P	8.323E-02 2.48E-02 G K	
Sr-85		-3.6038E-02					
			514.00	-3.604E-02	%(	7.630E-02 2.31E-02 G	
Kr-85		-8.4441E+02					
			513.99	-8.444E+02	%(P	1.730E+03 5.23E+02 G	
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	7.692E-02 2.05E-02 G K	
			898.02	1.166E-02	& P	5.301E-02 1.52E-02 G	
NB-94		6.5552E-04					
			871.10	6.555E-04	&(P	5.354E-02 1.48E-02 G K	
			702.50	2.070E-02	% P	6.278E-02 1.87E-02 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	1.7384E-03						
		722.95	1.738E-03	&(	1.041E-01	3.03E-02	G K
		614.37	-1.454E-02	% P	7.395E-02	2.17E-02	G
		433.93	1.222E-02	%	5.111E-02	1.51E-02	G
CD-109	1.6407E+00						
		88.04	1.641E+00	(P	1.183E+00	3.75E-01	G
SN-113	1.3210E-02						
		391.71	1.321E-02	&(	7.553E-02	2.22E-02	G K
		255.04	9.069E-02	% P	1.688E+00	4.92E-01	G
SB-125	1.6055E-01						
		427.95	-2.162E-02	%(P	1.813E-01	5.31E-02	G K
		600.77	4.413E-02	& P	2.561E-01	7.41E-02	G
		636.15	1.342E-01	% P	4.258E-01	1.26E-01	G
		463.51	6.998E-01	(P	4.825E-01	1.61E-01	G
		176.29	-1.590E-01	& P	7.562E-01	2.26E-01	G
I-131	1.6666E-02						
		364.48	1.667E-02	%(	6.530E-02	1.94E-02	G K
		636.97	1.978E-01	%	8.272E-01	2.42E-01	G
		284.29	-3.300E-01	%	1.004E+00	3.01E-01	G
CS-134	2.8700E-02						
		604.66	-1.456E-02	%(P	5.286E-02	1.55E-02	G K
		795.76	7.814E-02	*(P	6.103E-02	2.08E-02	G
		569.29	-4.775E-02	% P	3.490E-01	1.01E-01	G
		801.84	2.270E-02	%	6.090E-01	1.71E-01	G
CS-137	3.1476E-02						
		661.62	3.148E-02	%(P	7.807E-02	2.34E-02	G
CE-139	3.5859E-03						
		165.85	3.586E-03	&(P	6.653E-02	1.98E-02	G
EU-152	-3.8409E-02						
		121.78	-3.841E-02	&(P	1.859E-01	5.58E-02	G K
		344.30	1.420E-03	% P	1.730E-01	5.03E-02	G
		1408.08	2.910E-02	% P	2.848E-01	7.83E-02	G
		964.00	5.565E-02	% P	4.207E-01	1.20E-01	G
		1112.07	-5.879E-02	& P	5.258E-01	1.49E-01	G
		778.90	-1.191E-03	& P	5.312E-01	1.51E-01	G
EU-154	2.8797E-02						
		123.10	2.880E-02	%(P	1.222E-01	3.67E-02	G K
		1274.80	-3.156E-02	% P	1.957E-01	5.57E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-1.416E-01	& P	4.263E-01	1.27E-01	G
		1004.80	1.904E-02	& P	4.149E-01	1.18E-01	G
EU-155	1.8196E-01						
		86.45	1.820E-01	&(	2.165E-01	6.64E-02	G K
		105.31	1.561E-01	%	2.490E-01	7.60E-02	G
HG-203	-5.8290E-04						
		279.17	-5.829E-04	&(	6.268E-02	1.84E-02	G K
		72.87	-7.769E-01	% P	1.560E+00	4.73E-01	G
		70.83	-1.006E+00	&	2.780E+00	8.40E-01	G
		82.50	-9.177E-01	%	3.320E+00	1.00E+00	G
TL-208	4.6244E-01						
		583.14	4.624E-01	(P	6.255E-02	3.32E-02	G
		510.72	6.344E-01	+ P	2.813E-01	1.16E-01	G
PB-212	1.1354E+00						
		238.63	1.144E+00	(P	1.299E-01	5.34E-02	G K
							Energy duplication
		77.11	1.115E+00	(	4.526E-01	1.46E-01	G
		74.81	1.500E+00	& P	8.900E-01	2.80E-01	G
PB-214	4.9300E-01						
		351.99	4.672E-01	(P	1.263E-01	4.77E-02	G K
		295.22	5.429E-01	(P	2.515E-01	8.47E-02	G
							Energy duplication
		77.11	1.807E+00	+ P	7.413E-01	2.38E-01	G
		241.92	-1.189E-03	% P	9.958E-01	2.96E-01	G
BI-212	1.0643E+00						
		727.17	1.064E+00	*(P	5.089E-01	2.06E-01	G K
		1620.56	-2.539E-01	&	2.343E+00	6.43E-01	G
		785.42	-6.643E-01	% P	2.098E+00	6.12E-01	G
BI-214	6.8370E-01						
		609.32	6.613E-01	@(P	1.245E-01	6.38E-02	G K
		1764.51	9.942E-01	+ P	1.509E-01	1.43E-01	G
		1120.28	7.523E-01	(P	3.774E-01	1.51E-01	G
RA-224	1.6747E+00						
		241.00	1.675E+00	(P	1.609E+00	5.00E-01	G
RA-226	2.2202E+00						
		185.99	2.220E+00	*(	1.538E+00	4.87E-01	G
AC-228	1.4094E+00						
		911.07	1.374E+00	@(P	2.106E-01	1.18E-01	G K
		968.90	1.375E+00	(P	3.618E-01	1.59E-01	G
		338.40	1.544E+00	(P	4.659E-01	1.95E-01	G

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

TH-227      -3.5186E-01
                          236.00-3.519E-01 %(P 6.092E-01 1.85E-01 G K
                          256.25-7.182E-03 % P 6.515E-01 1.91E-01 G

PA-234      -9.9509E-02
                           98.44-9.951E-02 &(  2.182E-01 6.61E-02 G K
                          946.00 2.012E-02 %   3.344E-01 9.48E-02 G
                          131.28-1.723E-02 %   2.866E-01 8.56E-02 G
                           94.67-4.675E-05 %   3.908E-01 1.16E-01 G
                          883.24 4.192E-02 %   4.499E-01 1.27E-01 G
                          926.70-1.054E-01 %   5.710E-01 1.65E-01 G
                          569.26-5.919E-02 %   5.244E-01 1.52E-01 G

TH-234       1.1377E+00
                           63.29 2.960E-01 %(P 2.746E+00 8.20E-01 G K
                           92.80 2.232E+00  (P 2.227E+00 6.86E-01 G
                           92.38 3.040E-02 & P 2.619E+00 7.80E-01 G

AM-241       6.4427E-02
                           59.54 6.443E-02 %(P 3.504E-01 1.05E-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	#	5.3321E-01	5.4666E-01	5.1407E-01	5.1500E-01	5.235E-01
K-40		1.6419E+01	1.6419E+01	2.0263E+00	2.2286E+00	
MN-54	#A	3.5914E-02	3.6067E-02	5.1039E-02	5.1079E-02	5.429E-02
CO-57	#B	-9.8657E-03	-9.9145E-03	5.6995E-02	5.6998E-02	6.312E-02
CO-60	#B	3.7460E-02	3.7486E-02	6.4718E-02	6.4752E-02	7.028E-02
Sr-85	#A	-3.5307E-02	-3.6038E-02	6.9372E-02	6.9402E-02	7.475E-02
Kr-85	#A	-8.4440E+02	-8.4441E+02	1.6819E+03	1.6826E+03	1.730E+03
Y-88	#B	0.0000E+00	0.0000E+00	6.1524E-02	6.1525E-02	7.596E-02
NB-94	#B	6.5552E-04	6.5552E-04	4.4509E-02	4.4509E-02	5.354E-02
Ag-108M	#B	1.7384E-03	1.7384E-03	9.0848E-02	9.0848E-02	1.041E-01
CD-109		1.6359E+00	1.6407E+00	1.1244E+00	1.1281E+00	
SN-113	#B	1.3059E-02	1.3210E-02	6.6732E-02	6.6736E-02	7.466E-02
SB-125	#B	1.6034E-01	1.6055E-01	1.1062E-01	1.1099E-01	1.810E-01
I-131	#B	1.4124E-02	1.6666E-02	5.8162E-02	5.8169E-02	5.534E-02
CS-134	#B	2.8649E-02	2.8700E-02	2.2958E-02	2.3015E-02	5.276E-02
CS-137	#A	3.1472E-02	3.1476E-02	7.0273E-02	7.0296E-02	7.806E-02
CE-139	#A	3.5513E-03	3.5859E-03	5.9429E-02	5.9429E-02	6.589E-02
EU-152	#B	-3.8398E-02	-3.8409E-02	1.7647E-01	1.7649E-01	1.859E-01
EU-154	#B	2.8785E-02	2.8797E-02	1.1001E-01	1.1002E-01	1.221E-01
EU-155	#A	1.8183E-01	1.8196E-01	1.9926E-01	1.9952E-01	2.163E-01
HG-203	#B	-5.6649E-04	-5.8290E-04	5.5250E-02	5.5251E-02	6.092E-02
TL-208		4.6244E-01	4.6244E-01	9.9605E-02	1.0297E-01	
PB-212	#	1.1354E+00	1.1354E+00	1.5889E-01	1.7135E-01	1.299E-01
PB-214	#	4.9300E-01	4.9300E-01	1.3785E-01	1.4064E-01	1.263E-01
BI-212	#	1.0643E+00	1.0643E+00	6.1682E-01	6.1975E-01	
BI-214		6.8370E-01	6.8370E-01	1.9763E-01	2.0137E-01	
RA-224	#	1.6747E+00	1.6747E+00	1.5007E+00	1.5037E+00	1.609E+00
RA-226	#	2.2202E+00	2.2202E+00	1.4610E+00	1.4664E+00	1.538E+00
AC-228		1.4094E+00	1.4094E+00	2.6934E-01	2.8086E-01	
TH-227	#B	-3.5186E-01	-3.5186E-01	5.6268E-01	5.6303E-01	6.092E-01
PA-234	#B	-9.9509E-02	-9.9509E-02	1.9840E-01	1.9848E-01	2.182E-01
TH-234	#B	1.1377E+00	1.1377E+00	1.0493E+00	1.0512E+00	2.746E+00
AM-241	#A	6.4426E-02	6.4427E-02	3.1491E-01	3.1493E-01	3.504E-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) 2.1674692E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 2.1679501E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-02-02-002-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\101F_27APRIL2006_0830.An1

Acquisition information

Start time:	27-Apr-2006 08:31:42
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:	1.8910E+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	26-Apr-2006 20:15:00
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: 0.4047

***** S U M M A R Y O F P E A K 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	208.	23.51	1.50	1.654E-02	70.83	3.520	2.816E+00	HG203
					74.81	9.600	9.369E-01	PB212
76.91	328.	14.50	1.50	1.720E-02	77.11	10.700	1.271E+00	PB214
					77.11	17.500	7.774E-01	PB212
76.91	331.	14.50	1.50	1.720E-02	77.11	10.700	1.271E+00	PB214
					77.11	17.500	7.862E-01	PB212
87.01	152.	21.22	1.01	1.921E-02	86.45	32.740	1.736E-01	EU155
93.14	142.	20.33	1.02	1.995E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.19	94.	31.61	0.94	2.109E-02				
185.31	99.	35.80	1.13	1.862E-02				
185.31	99.	35.80	1.13	1.862E-02	185.99	3.280	1.158E+00	RA226
209.54	122.	22.33	1.42	1.720E-02				
238.57	714.	4.42	1.12	1.558E-02				
238.57	714.	4.42	1.12	1.558E-02	238.63	43.100	7.539E-01	PB212
241.79	125.	18.57	1.12	1.541E-02	241.00	3.900	1.469E+00	RA224
					241.92	7.470	PBC<MDA	PB214
269.77	104.	21.91	1.59	1.403E-02				
277.08	88.	31.02	1.15	1.369E-02				
295.25	153.	12.21	1.16	1.292E-02				
295.25	153.	12.21	1.16	1.292E-02	295.22	19.200	4.357E-01	PB214
300.17	50.	28.64	1.16	1.272E-02				
328.07	61.	31.37	1.65	1.169E-02				
338.17	129.	18.76	1.41	1.136E-02	338.40	12.010	6.627E-01	AC228
351.75	281.	11.17	1.28	1.093E-02				
351.75	281.	11.17	1.28	1.093E-02	351.99	37.100	4.913E-01	PB214
462.94	49.	26.72	1.50	8.342E-03	463.51	10.000	4.191E-01	SB125

510.18	108.	22.69	1.29	7.598E-03	510.72	22.500	3.836E-01	TL208
582.67	251.	9.02	1.62	6.690E-03	583.14	86.000	3.086E-01	TL208
608.99	194.	8.88	1.47	6.416E-03	609.32	46.090	4.669E-01	BI214
726.93	67.	23.27	1.71	5.445E-03	727.17	11.800	7.379E-01	BI212
786.01	23.	40.59	1.50	5.075E-03	785.42	2.000	PBC<MDA	BI212
794.37	52.	22.61	1.06	5.024E-03				
835.66	21.	40.42	1.53	4.805E-03	834.81	99.978	PBC<MDA	MN54
910.45	156.	10.66	1.96	4.449E-03	911.07	29.000	8.553E-01	AC228
968.09	98.	21.41	0.95	4.215E-03	968.90	17.460	9.433E-01	AC228
1118.86	78.	19.78	0.74	3.715E-03	1120.28	15.040	9.913E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1459.83	662.	3.89	1.51	2.944E-03	1460.75	10.700	1.497E+01	K40
1763.14	28.	18.90	2.75	2.481E-03	1764.51	15.920	4.986E-01	BI214

********** U N I D E N T I F I E D P E A K S U 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	209.54	269.	122.	0.061	66.98	1.423	AC-228	s
476.87	238.44	142.	714.	0.357	13.28	1.121	PB-212	D
539.26	269.77	172.	104.	0.052	65.72	1.588	AC-228	s
553.89	277.08	236.	78.	0.039	90.20	1.150	TL-208	
600.01	300.13	103.	42.	0.021	112.49	1.044	PB-212	
655.91	328.07	131.	61.	0.030	94.12	1.651	AC-228	s
1588.96	794.37	27.	51.	0.025	60.38	1.065	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
HG-203	146.42	73.42	1160.	-128.	-0.064	115.80	1.499s
PB-212	149.26	74.85	1157.	208.	0.104	70.53	1.499s
PB-214	153.79	77.11	992.	328.	0.164	43.51	1.499D
PB-212	153.79	77.11	988.	331.	0.166	43.51	1.499D
EU-155	173.02	86.72	1062.	123.	0.062	115.27	1.499
TH-234	185.75	93.08	935.	137.	0.068	90.79	1.499s
TH-234	185.73	93.07	885.	147.	0.073	85.86	1.499s
RA-226	371.68	186.01	460.	93.	0.047	102.30	1.499
PB-212	476.77	238.53	429.	624.	0.312	18.30	1.499
RA-224	481.70	241.00	355.	123.	0.061	69.99	1.123D
PB-214	590.19	295.22	211.	148.	0.074	47.76	1.499D
AC-228	676.12	338.17	177.	126.	0.063	56.28	1.410s
PB-214	703.22	351.71	126.	253.	0.127	26.39	1.499
SB-125	925.78	462.94	67.	49.	0.024	80.15	1.499s
TL-208	1020.30	510.18	148.	92.	0.046	68.07	1.294s
TL-208	1165.34	582.67	84.	248.	0.124	27.06	1.618s
BI-214	1218.01	608.99	48.	193.	0.097	26.63	1.471
BI-212	1454.02	726.93	56.	66.	0.033	69.80	1.706s
BI-212	1572.24	786.01	32.	23.	0.011	121.77	1.499
MN-54	1671.60	835.66	28.	21.	0.011	121.26	1.528s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1821.24	910.45	44.	154.	0.077	31.99	1.958s
AC-228	1936.60	968.09	80.	97.	0.049	64.22	0.950s
BI-214	2238.30	1118.86	45.	77.	0.039	59.35	0.740s
K-40	2920.67	1459.83	2.	660.	0.330	11.66	1.513
BI-214	3527.71	1763.14	0.	28.	0.014	56.69	2.748s

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

***** S U M M A R Y O 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		4.5438E-02					
			477.56	4.544E-02	&(	3.739E-01 1.08E-01	G
K-40		1.4974E+01					
			1460.75	1.497E+01	(P	2.212E-01 5.84E-01	G
MN-54		3.1568E-02					
			834.81	3.157E-02	*(P	4.061E-02 1.30E-02	G
CO-57		-2.5560E-03					
			122.07	-2.556E-03	%(	4.503E-02 1.34E-02	G K
			136.43	-3.431E-03	&	3.955E-01 1.17E-01	G
CO-60		4.1115E-03					
			1332.51	4.112E-03	%(P	5.373E-02 1.48E-02	G K
			1173.23	-5.887E-03	% P	8.270E-02 2.37E-02	G K
Sr-85		-2.1153E-02					
			514.00	-2.115E-02	%(	5.249E-02 1.58E-02	G
Kr-85		-5.1159E+02					
			513.99	-5.116E+02	%(P	1.210E+03 3.63E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	5.002E-02 1.27E-02	G K
			898.02	-1.507E-03	& P	3.838E-02 1.03E-02	G
NB-94		1.6057E-02					
			871.10	1.606E-02	%(P	4.039E-02 1.21E-02	G K
			702.50	2.150E-02	% P	3.845E-02 1.18E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	0.0000E+00						
		722.95	0.000E+00	%(	1.029E-01	3.01E-02	G K
		614.37	-8.826E-05	% P	4.784E-02	1.35E-02	G
		433.93	6.816E-03	&	4.401E-02	1.29E-02	G
CD-109	3.0382E-01						
		88.04	3.038E-01	%(P	1.470E+00	4.41E-01	G
SN-113	-1.1130E-02						
		391.71	-1.113E-02	%(	6.232E-02	1.83E-02	G K
		255.04	-4.024E-01	% P	1.950E+00	5.81E-01	G
SB-125	1.0685E-01						
		427.95	1.343E-03	&(P	1.222E-01	3.49E-02	G K
		600.77	-4.186E-02	% P	2.587E-01	7.51E-02	G
		636.15	-4.036E-02	% P	4.398E-01	1.26E-01	G
		463.51	4.191E-01	*(P	3.495E-01	1.15E-01	G
		176.29	1.071E-01	% P	6.291E-01	1.88E-01	G
I-131	1.3430E-02						
		364.48	1.343E-02	%(	4.262E-02	1.27E-02	G K
		636.97	-1.093E-03	%	6.359E-01	1.79E-01	G
		284.29	9.505E-02	%	6.563E-01	1.94E-01	G
CS-134	3.9317E-03						
		604.66	3.932E-03	%(P	5.131E-02	1.48E-02	G K
		795.76	4.712E-04	% P	4.567E-02	1.25E-02	G
		569.29	-6.202E-02	& P	3.191E-01	9.32E-02	G
		801.84	6.828E-02	%	4.273E-01	1.21E-01	G
CS-137	5.1533E-04						
		661.62	5.153E-04	&(P	5.238E-02	1.47E-02	G
CE-139	1.6448E-02						
		165.85	1.645E-02	%(P	4.879E-02	1.47E-02	G
EU-152	9.5224E-03						
		121.78	9.522E-03	%(P	1.495E-01	4.45E-02	G K
		344.30	8.652E-03	% P	1.571E-01	4.59E-02	G
		1408.08	8.227E-02	% P	2.054E-01	6.10E-02	G
		964.00	-3.866E-02	& P	4.949E-01	1.42E-01	G
		1112.07	-1.208E-01	& P	5.062E-01	1.48E-01	G
		778.90	-3.057E-02	& P	3.915E-01	1.11E-01	G
EU-154	-8.9233E-03						
		123.10	-8.923E-03	%(P	1.115E-01	3.32E-02	G K
		1274.80	-2.328E-02	% P	1.913E-01	5.43E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	-1.314E-01	% P	3.542E-01	1.06E-01	G
		1004.80	-3.375E-03	& P	3.149E-01	8.75E-02	G
EU-155	1.4107E-01						
		86.45	1.411E-01	(	1.767E-01	5.42E-02	G K
		105.31	9.292E-02	%	2.016E-01	6.11E-02	G
HG-203	6.4308E-03						
		279.17	6.431E-03	&(	4.952E-02	1.46E-02	G K
		72.87	-7.620E-01	& P	1.339E+00	4.07E-01	G
		70.83	-1.734E+00	+	2.183E+00	6.69E-01	G
		82.50	5.266E-02	%	2.550E+00	7.60E-01	G
TL-208	3.2413E-01						
		583.14	3.086E-01	@(P	5.639E-02	2.81E-02	G
		510.72	3.836E-01	*(P	2.488E-01	1.02E-01	G
PB-212	6.9921E-01						
		238.63	6.639E-01	(P	1.057E-01	4.09E-02	G K Energy duplication
		77.11	7.862E-01	(	3.541E-01	1.14E-01	G
		74.81	9.369E-01	& P	7.257E-01	2.26E-01	G
PB-214	4.3966E-01						
		351.99	4.466E-01	(P	9.717E-02	3.96E-02	G K Energy duplication
		295.22	4.263E-01	*(P	2.029E-01	6.87E-02	G Energy duplication
		77.11	1.271E+00	+ P	5.803E-01	1.86E-01	G
		241.92	-1.680E-02	% P	8.239E-01	2.45E-01	G
BI-212	7.3794E-01						
		727.17	7.379E-01	*(P	4.170E-01	1.73E-01	G K
		1620.56	4.095E-01	%	1.450E+00	4.12E-01	G
		785.42	1.595E+00	+ P	2.047E+00	6.54E-01	G
BI-214	4.7502E-01						
		609.32	4.669E-01	(P	8.454E-02	4.17E-02	G K
		1764.51	4.986E-01	(P	1.333E-01	9.57E-02	G
		1120.28	9.913E-01	+ P	4.331E-01	1.97E-01	G
RA-224	1.4582E+00						
		241.00	1.458E+00	(P	1.074E+00	3.42E-01	G
RA-226	1.0943E+00						
		185.99	1.094E+00	(	1.203E+00	3.73E-01	G
AC-228	8.8839E-01						
		911.07	8.553E-01	(P	1.857E-01	9.22E-02	G K
		968.90	9.433E-01	(P	4.311E-01	2.03E-01	G
		338.40	6.627E-01	- P	3.389E-01	1.26E-01	G

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

TH-227      -2.1029E-01
                          236.00-2.103E-01 &(P 4.798E-01 1.45E-01 G K
                          256.25-1.476E-01 % P 5.860E-01 1.75E-01 G

PA-234       8.6412E-02
                           98.44 8.641E-02 %(  1.834E-01 5.56E-02 G K
                          946.00 3.170E-02 %   2.492E-01 7.07E-02 G
                          131.28-4.167E-02 &   1.826E-01 5.47E-02 G
                           94.67-1.229E-01 %   3.370E-01 1.02E-01 G
                          883.24 0.000E+00 %   4.690E-01 1.32E-01 G
                          926.70-5.034E-02 %   5.115E-01 1.46E-01 G
                          569.26-8.799E-02 &   4.722E-01 1.38E-01 G

TH-234       1.4479E+00
                           63.29 9.033E-01 %(P 2.349E+00 7.08E-01 G K
                           92.80 1.755E+00 @(P 1.693E+00 5.23E-01 G
                           92.38 1.916E+00 @(P 2.034E+00 6.26E-01 G

AM-241      -1.8097E-02
                           59.54-1.810E-02 %(P 3.217E-01 9.59E-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		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	4.5137E-02	4.5438E-02	3.2462E-01	3.2463E-01	3.714E-01
K-40		1.4974E+01	1.4974E+01	1.7520E+00	1.9456E+00	
MN-54	#A	3.1532E-02	3.1568E-02	3.9033E-02	3.9074E-02	4.056E-02
CO-57	#B	-2.5527E-03	-2.5560E-03	4.0131E-02	4.0131E-02	4.497E-02
CO-60	#B	4.1108E-03	4.1115E-03	4.4286E-02	4.4287E-02	5.372E-02
Sr-85	#A	-2.1038E-02	-2.1153E-02	4.7386E-02	4.7401E-02	5.220E-02
Kr-85	#A	-5.1159E+02	-5.1159E+02	1.2041E+03	1.2044E+03	1.210E+03
Y-88	#B	0.0000E+00	0.0000E+00	3.8093E-02	3.8093E-02	4.985E-02
NB-94	#B	1.6057E-02	1.6057E-02	3.6152E-02	3.6163E-02	4.039E-02
Ag-108M	#B	0.0000E+00	0.0000E+00	9.0161E-02	9.0161E-02	1.029E-01
CD-109	#A	3.0358E-01	3.0382E-01	1.3241E+00	1.3242E+00	1.469E+00
SN-113	#B	-1.1096E-02	-1.1130E-02	5.4985E-02	5.4989E-02	6.213E-02
SB-125	#B	1.0681E-01	1.0685E-01	8.8167E-02	8.8374E-02	1.221E-01
I-131	#B	1.2851E-02	1.3430E-02	3.8065E-02	3.8073E-02	4.078E-02
CS-134	#B	3.9299E-03	3.9317E-03	4.4286E-02	4.4286E-02	5.128E-02
CS-137	#A	5.1532E-04	5.1533E-04	4.4076E-02	4.4076E-02	5.238E-02
CE-139	#A	1.6406E-02	1.6448E-02	4.4066E-02	4.4075E-02	4.867E-02
EU-152	#B	9.5217E-03	9.5224E-03	1.3355E-01	1.3355E-01	1.494E-01
EU-154	#B	-8.9223E-03	-8.9233E-03	1.1831E-01	1.1831E-01	1.115E-01
EU-155	#A	1.4104E-01	1.4107E-01	1.6261E-01	1.6280E-01	1.767E-01
HG-203	#B	6.3820E-03	6.4308E-03	4.3910E-02	4.3912E-02	4.914E-02
TL-208	#	3.2413E-01	3.2413E-01	8.8560E-02	9.0434E-02	
PB-212	#	6.9921E-01	6.9921E-01	1.2922E-01	1.3512E-01	1.057E-01
PB-214	#	4.3966E-01	4.3966E-01	1.1693E-01	1.1954E-01	9.717E-02
BI-212		7.3794E-01	7.3794E-01	5.2034E-01	5.2201E-01	
BI-214		4.7502E-01	4.7502E-01	1.2722E-01	1.3002E-01	
RA-224		1.4582E+00	1.4582E+00	1.0266E+00	1.0299E+00	
RA-226	#A	1.0943E+00	1.0943E+00	1.1195E+00	1.1212E+00	1.203E+00
AC-228		8.8839E-01	8.8839E-01	2.8763E-01	2.9198E-01	
TH-227	#B	-2.1029E-01	-2.1029E-01	4.4292E-01	4.4308E-01	4.798E-01
PA-234	#B	8.6412E-02	8.6412E-02	1.6683E-01	1.6690E-01	1.834E-01
TH-234	#B	1.4479E+00	1.4479E+00	1.2956E+00	1.2981E+00	2.349E+00
AM-241	#A	-1.8097E-02	-1.8097E-02	3.6098E-01	3.6098E-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 (269.6 to 1999.1 keV) 1.8857771E+01 pCi/gm
Total Decayed Activity (269.6 to 1999.1 keV) 1.8857771E+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_1MAY2006_0949.An1

Sample description
FSS-OOL-02-02-020-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1MAY2006_0949.An1

Acquisition information
Start time: 01-May-2006 09:50:48
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: 1.9400E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9400E+03) =
5.1546E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	26-Apr-2006 22:07:00
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: 0.7050

***** S U M M A R Y O F P E A K 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	118.	38.67	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.30	169.	27.25	1.50	9.541E-03	77.11	10.700	1.154E+00	PB214
					77.11	17.500	7.058E-01	PB212
77.30	169.	27.25	1.50	9.541E-03	77.11	10.700	1.154E+00	PB214
					77.11	17.500	7.058E-01	PB212
186.86	150.	22.78	1.27	1.623E-02	185.99	3.280	1.905E+00	RA226
209.32	107.	31.92	1.60	1.519E-02				
239.07	700.	4.47	1.22	1.379E-02	238.63	43.100	8.200E-01	PB212
242.09	104.	20.88	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.106E-01	PB214
271.11	68.	37.25	1.45	1.239E-02				
277.95	39.	39.39	1.59	1.212E-02				
295.75	137.	13.08	1.26	1.144E-02	295.22	19.200	4.336E-01	PB214
338.96	116.	15.15	1.16	1.004E-02	338.40	12.010	6.671E-01	AC228
352.55	255.	13.82	1.37	9.664E-03	351.99	37.100	4.933E-01	PB214
464.44	39.	34.26	1.77	7.350E-03	463.51	10.000	PBC<MDA	SB125
511.99	84.	18.92	1.51	6.679E-03	510.72	22.500	3.903E-01	TL208
584.04	253.	9.71	1.46	5.881E-03	583.14	86.000	3.475E-01	TL208
610.52	168.	12.72	1.04	5.639E-03	609.32	46.090	4.505E-01	BI214
728.65	56.	32.04	0.86	4.785E-03	727.17	11.800	6.896E-01	BI212
913.01	137.	11.28	1.61	3.915E-03				
970.47	96.	20.71	0.91	3.713E-03	968.90	17.460	1.030E+00	AC228
1463.32	564.	4.43	1.87	2.617E-03	1460.75	10.700	1.402E+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	Background	Net Area	Intensity	Uncert	FWHM	Suspected

Channel	Energy	Counts	Counts	Cts/Sec	3 Sigma %	keV	Nuclide	
418.26	209.32	380.	107.	0.054	95.75	1.604	AC-228	sM

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
477.77	239.03	140.	700.	0.350	13.41	1.215	PB-212	D
483.80	242.05	184.	104.	0.052	62.64	1.217	PB-214	D
541.87	271.11	219.	68.	0.034	111.74	1.451	AC-228	sM
1826.17	913.01	31.	135.	0.068	31.17	1.614	AC-228	M

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.34	74.88	1043.	118.	0.059	116.01	1.500
PB-214	153.80	77.11	978.	169.	0.085	81.74	1.500D
PB-212	153.80	77.11	978.	169.	0.085	81.74	1.500D
RA-226	372.29	186.34	490.	95.	0.047	99.15	1.500s
PB-212	477.77	239.07	459.	545.	0.272	21.06	1.500
PB-214	591.21	295.78	173.	131.	0.066	50.01	1.500s
AC-228	677.59	338.96	127.	122.	0.061	47.61	1.500
PB-214	704.96	352.64	160.	221.	0.111	31.46	1.500s
SB-125	927.98	464.11	73.	39.	0.019	100.24	1.500s
TL-208	1023.76	511.99	66.	84.	0.042	56.76	1.507s
TL-208	1167.92	584.04	90.	253.	0.126	29.12	1.455
BI-214	1220.89	610.52	81.	168.	0.084	38.15	1.043
BI-212	1457.25	728.65	70.	56.	0.028	96.13	0.860s
AC-228	1941.75	970.77	43.	58.	0.029	61.74	1.718
K-40	2927.65	1463.37	14.	536.	0.268	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	%(	4.765E-01 1.36E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	1.3304E+01						
		1460.75	1.330E+01	(P	5.016E-01	5.90E-01	G
MN-54	-9.5276E-03						
		834.81	-9.528E-03	&(P	5.942E-02	1.71E-02	G
CO-57	-2.8083E-03						
		122.07	-2.808E-03	%(	5.859E-02	1.74E-02	G K
		136.43	6.521E-02	%	3.844E-01	1.15E-01	G
CO-60	-6.5124E-04						
		1332.51	-6.512E-04	&(P	6.198E-02	1.68E-02	G K
		1173.23	-1.423E-02	&	8.598E-02	2.49E-02	G K
Sr-85	-6.1468E-03						
		514.00	-6.147E-03	&(	5.471E-02	1.59E-02	G
Kr-85	-1.3621E+02						
		513.99	-1.362E+02	&(	1.204E+03	3.50E+02	G
Y-88	6.0011E-04						
		1836.01	6.001E-04	%(P	5.288E-02	1.34E-02	G K
		898.02	1.186E-03	& P	5.996E-02	1.66E-02	G
NB-94	-1.3962E-02						
		871.10	-1.396E-02	%(	5.984E-02	1.75E-02	G K
		702.50	-7.399E-03	&	4.922E-02	1.42E-02	G K
Ag-108M	-7.6813E-03						
		722.95	-7.681E-03	%(	5.934E-02	1.71E-02	G K
		614.37	-2.021E-02	% P	7.121E-02	2.11E-02	G
		433.93	-5.939E-03	%	4.685E-02	1.36E-02	G
CD-109	-2.1370E-01						
		88.04	-2.137E-01	%(P	2.232E+00	6.67E-01	G
SN-113	1.9610E-02						
		391.71	1.961E-02	&(	6.894E-02	2.05E-02	G K
		255.04	3.448E-01	&	2.151E+00	6.38E-01	G
SB-125	1.0775E-01						
		427.95	1.941E-02	&(P	1.585E-01	4.62E-02	G K
		600.77	-9.264E-04	% P	2.926E-01	8.33E-02	G
		636.15	8.947E-02	& P	3.891E-01	1.13E-01	G
		463.51	3.693E-01	(P	4.028E-01	1.28E-01	G
		176.29	1.811E-01	% P	6.307E-01	1.89E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	-1.5991E-02						
		364.48	-1.599E-02	%(	7.438E-02	2.20E-02	G K
		636.97	2.001E-01	&	8.504E-01	2.47E-01	G
		284.29	-9.965E-02	&	9.821E-01	2.89E-01	G
CS-134	2.7016E-05						
		604.66	2.702E-05	%(	5.166E-02	1.46E-02	G K
		795.76	3.789E-02	%	5.994E-02	1.87E-02	G
		569.29	-2.398E-02	%	2.836E-01	8.10E-02	G
		801.84	-9.264E-04	% P	6.995E-01	1.97E-01	G
CS-137	4.7379E-04						
		661.62	4.738E-04	&(	5.827E-02	1.64E-02	G
CE-139	-7.8009E-05						
		165.85	-7.801E-05	&(P	5.797E-02	1.72E-02	G
EU-152	1.7757E-03						
		121.78	1.776E-03	%(P	1.947E-01	5.79E-02	G K
		344.30	1.307E-02	&	1.591E-01	4.65E-02	G
		1408.08	-5.103E-02	%	2.599E-01	7.32E-02	G
		964.00	3.048E-02	% P	4.154E-01	1.17E-01	G
		1112.07	1.709E-01	%	4.387E-01	1.31E-01	G
		778.90	-9.673E-03	& P	3.512E-01	9.72E-02	G
EU-154	1.0137E-02						
		123.10	1.014E-02	%(P	1.339E-01	3.99E-02	G K
		1274.80	2.405E-02	&	1.949E-01	5.51E-02	G
		723.30	-1.217E-02	% P	2.592E-01	7.30E-02	G
		1004.80	4.384E-03	&	3.193E-01	8.81E-02	G
EU-155	1.3026E-01						
		86.45	1.303E-01	%(P	2.680E-01	8.12E-02	G K
		105.31	9.588E-02	%	2.874E-01	8.67E-02	G
HG-203	-1.2159E-02						
		279.17	-1.216E-02	%(P	5.628E-02	1.67E-02	G K
		72.87	-5.962E-01	%	2.262E+00	6.81E-01	G
		70.83	-8.801E-01	&	4.126E+00	1.24E+00	G
		82.50	-8.772E-01	&	4.442E+00	1.33E+00	G
TL-208	3.5637E-01						
		583.14	3.475E-01	(P	6.462E-02	3.38E-02	G
		510.72	3.903E-01	(	1.871E-01	7.40E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	6.5749E-01						
		238.63	6.379E-01	(	1.200E-01	4.48E-02	G K
							Energy duplication
		77.11	7.058E-01	@(	6.192E-01	1.92E-01	G
		74.81	9.702E-01	& P	1.257E+00	3.85E-01	G
PB-214	4.2443E-01						
		351.99	4.294E-01	@(P	1.195E-01	4.51E-02	G K
		295.22	4.149E-01	@(	2.027E-01	6.92E-02	G
							Energy duplication
		77.11	1.154E+00	+	1.013E+00	3.15E-01	G
		241.92	3.888E-01	%	7.668E-01	2.33E-01	G
BI-212	6.8956E-01						
		727.17	6.896E-01	(	5.135E-01	2.21E-01	G K
		1620.56	-3.546E-02	% P	8.698E-01	1.54E-01	G
		785.42	-3.501E-01	% P	2.248E+00	6.39E-01	G
BI-214	4.5051E-01						
		609.32	4.505E-01	(	1.192E-01	5.74E-02	G K
		1764.51	-8.775E-02	% P	4.176E-01	1.18E-01	G
		1120.28	-1.156E-01	&	6.012E-01	1.76E-01	G
RA-224	3.9377E-01						
		241.00	3.938E-01	&(P	1.359E+00	4.08E-01	G
RA-226	1.2338E+00						
		185.99	1.234E+00	*(P	1.382E+00	4.27E-01	G
AC-228	3.3779E-01						
		911.07	1.320E-02	%(P	2.120E-01	5.99E-02	G K
		968.90	6.250E-01	(P	3.563E-01	1.29E-01	G
		338.40	7.040E-01	(	3.181E-01	1.12E-01	G
TH-227	3.4797E-03						
		236.00	3.480E-03	%(P	5.758E-01	1.71E-01	G K
		256.25	-2.924E-02	%	5.090E-01	1.49E-01	G
PA-234	1.4499E-02						
		98.44	1.450E-02	&(	2.702E-01	8.06E-02	G K
		946.00	-5.622E-02	%	2.714E-01	7.82E-02	G
		131.28	0.000E+00	%	2.603E-01	7.73E-02	G
		94.67	-1.063E-01	%	4.717E-01	1.42E-01	G
		883.24	1.218E-01	%	3.788E-01	1.11E-01	G
		926.70	2.671E-02	%	5.145E-01	1.44E-01	G
		569.26	-3.575E-02	%	4.191E-01	1.20E-01	G

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

TH-234       7.2170E-01
                           63.29 7.217E-01 %(P 4.666E+00 1.40E+00 G K
                           92.80 1.245E+00 %   2.487E+00 7.55E-01 G
                           92.38-1.329E-01 & P 2.985E+00 8.90E-01 G

AM-241       4.2420E-03
                           59.54 4.242E-03 &(  6.986E-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	0.0000E+00	0.0000E+00	4.0913E-01	4.0913E-01	4.496E-01
K-40		1.3304E+01	1.3304E+01	1.7691E+00	1.9202E+00	5.016E-01
MN-54	#A	-9.4332E-03	-9.5276E-03	5.5210E-02	5.5213E-02	5.883E-02
CO-57	#B	-2.7761E-03	-2.8083E-03	5.2257E-02	5.2257E-02	5.792E-02
CO-60	#B	-6.5019E-04	-6.5124E-04	9.2343E-02	9.2343E-02	6.188E-02
Sr-85	#A	-5.8588E-03	-6.1468E-03	4.7729E-02	4.7730E-02	5.215E-02

Kr-85	#A	-1.3621E+02	-1.3621E+02	1.0505E+03	1.0505E+03	1.204E+03
Y-88	#B	5.8285E-04	6.0011E-04	4.0075E-02	4.0075E-02	5.136E-02
NB-94	#B	-1.3962E-02	-1.3962E-02	5.2359E-02	5.2365E-02	5.984E-02
Ag-108M	#B	-7.6808E-03	-7.6813E-03	5.1179E-02	5.1181E-02	5.934E-02
CD-109	#A	-2.1224E-01	-2.1370E-01	2.4652E+00	2.4653E+00	2.217E+00
SN-113	#B	1.9087E-02	1.9610E-02	6.1471E-02	6.1480E-02	6.710E-02
SB-125	#B	1.0742E-01	1.0775E-01	1.1230E-01	1.1247E-01	1.580E-01
I-131	#B	-1.0860E-02	-1.5991E-02	6.5881E-02	6.5887E-02	5.051E-02
CS-134	#B	2.6905E-05	2.7016E-05	4.3927E-02	4.3927E-02	5.144E-02
CS-137	#A	4.7366E-04	4.7379E-04	4.9234E-02	4.9234E-02	5.825E-02
CE-139	#A	-7.6263E-05	-7.8009E-05	1.0475E-01	1.0475E-01	5.668E-02
EU-152	#B	1.7745E-03	1.7757E-03	1.7382E-01	1.7382E-01	1.946E-01
EU-154	#B	1.0127E-02	1.0137E-02	1.1978E-01	1.1978E-01	1.338E-01
EU-155	#B	1.3004E-01	1.3026E-01	2.4373E-01	2.4384E-01	2.676E-01
HG-203	#B	-1.1374E-02	-1.2159E-02	5.0770E-02	5.0775E-02	5.264E-02
TL-208		3.5637E-01	3.5637E-01	1.0395E-01	1.0586E-01	
PB-212	#	6.5749E-01	6.5749E-01	1.3845E-01	1.4328E-01	1.200E-01
PB-214	#	4.2443E-01	4.2443E-01	1.2543E-01	1.2768E-01	1.195E-01
BI-212		6.8956E-01	6.8956E-01	6.6287E-01	6.6400E-01	
BI-214		4.5051E-01	4.5051E-01	1.7186E-01	1.7371E-01	
RA-224	#A	3.9377E-01	3.9377E-01	1.2232E+00	1.2234E+00	1.359E+00
RA-226	#A	1.2338E+00	1.2338E+00	1.2810E+00	1.2829E+00	1.382E+00
AC-228	F	3.3779E-01	3.3779E-01	1.6083E-01	1.6194E-01	2.120E-01
TH-227	#B	3.4797E-03	3.4797E-03	5.1328E-01	5.1328E-01	5.758E-01
PA-234	#B	1.4499E-02	1.4499E-02	2.4174E-01	2.4174E-01	2.702E-01
TH-234	#B	7.2170E-01	7.2170E-01	4.1856E+00	4.1858E+00	4.666E+00
AM-241	#A	4.2419E-03	4.2420E-03	6.2257E-01	6.2257E-01	6.986E-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) 1.5138147E+01 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.5138147E+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_1MAY2006_1027.An1

Sample description
FSS-OOL-02-02-005-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1MAY2006_1027.An1

Acquisition information
Start time: 01-May-2006 10:29:00
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: 1.9190E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9190E+03) =
5.2110E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 20:36:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.8087

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
75.06	159.	28.98	1.50	8.847E-03				
75.06	159.	28.98	1.50	8.847E-03	74.81	9.600	1.315E+00	PB212
77.13	156.	29.10	1.50	9.541E-03	77.11	10.700	1.077E+00	PB214
					77.11	17.500	6.588E-01	PB212
77.13	156.	29.10	1.50	9.541E-03	77.11	10.700	1.077E+00	PB214
					77.11	17.500	6.588E-01	PB212
93.23	109.	39.60	1.50	1.333E-02	92.80	3.000	PBC<MDA	TH234
					94.67	15.500	3.618E-01	PA234
209.61	54.	39.46	1.06	1.518E-02				
239.12	622.	4.91	1.22	1.379E-02	238.63	43.100	7.368E-01	PB212
242.25	99.	20.21	1.22	1.365E-02	241.92	7.470	6.854E-01	PB214
243.56	45.	26.87	1.50	1.370E-02	241.00	3.900	5.882E-01	RA224
					241.92	7.470	PBC<MDA	PB214
270.87	69.	27.85	1.31	1.240E-02				
277.13	66.	39.21	1.54	1.215E-02				
295.23	170.	14.73	1.21	1.147E-02	295.22	19.200	5.445E-01	PB214
328.80	62.	31.08	1.76	1.035E-02				
338.74	165.	16.89	1.27	1.005E-02	338.40	12.010	9.617E-01	AC228
352.61	288.	9.07	1.41	9.662E-03	351.99	37.100	5.637E-01	PB214
463.52	51.	30.89	1.40	7.365E-03	463.51	10.000	4.724E-01	SB125
511.88	89.	21.98	1.26	6.680E-03	510.72	22.500	4.175E-01	TL208
584.15	227.	11.39	1.49	5.880E-03	583.14	86.000	3.146E-01	TL208
610.49	179.	11.04	1.00	5.639E-03	609.32	46.090	4.841E-01	BI214
912.63	126.	12.10	1.74	3.916E-03	911.07	29.000	7.787E-01	AC228
970.51	84.	15.43	1.32	3.713E-03				
1463.33	589.	4.21	1.73	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	
418.85	209.61	200.	54.	0.027	118.37	1.059	NP-239	M

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
477.86	238.89	156.	622.	0.311	14.73	1.215	PB-212	D
484.13	242.03	152.	99.	0.050	60.64	1.217	PB-214	D
541.39	270.87	143.	69.	0.034	83.55	1.310	AC-228	sM
553.91	277.13	209.	71.	0.036	93.13	1.538	TL-208	sM
657.27	328.80	122.	62.	0.031	93.23	1.763	LA-140	sM
1941.23	970.51	28.	84.	0.042	42.26	1.324	AC-228	M
2927.57	1463.33	10.	586.	0.293	12.60	1.726	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	149.70	75.06	1019.	159.	0.079	86.94	1.500s
PB-214	153.80	77.11	955.	156.	0.078	87.31	1.500D
PB-212	153.80	77.11	955.	156.	0.078	87.31	1.500D
TH-234	186.04	93.23	877.	109.	0.054	118.80	1.500
PB-212	477.64	239.01	346.	534.	0.267	19.66	1.500
RA-224	486.75	243.56	54.	45.	0.022	80.62	1.500
PB-214	484.09	242.23	415.	77.	0.038	118.03	1.500
PB-214	590.09	295.22	176.	131.	0.066	50.21	1.500D
AC-228	677.73	339.03	156.	114.	0.057	54.37	1.500
PB-214	704.89	352.60	129.	237.	0.118	28.13	1.500s
SB-125	927.73	463.99	86.	39.	0.019	107.58	1.500s
TL-208	1023.55	511.88	90.	89.	0.045	65.94	1.261s
TL-208	1168.14	584.15	103.	226.	0.113	34.17	1.487
BI-214	1220.84	610.49	66.	179.	0.090	33.11	1.002
AC-228	1826.00	912.93	20.	93.	0.046	37.20	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	MDA Value pCi/gm	COMMENTS
BE-7		2.6666E-02					
			477.56	2.667E-02	&(	4.728E-01 1.36E-01	G
K-40		6.9048E-02					
			1460.75	6.905E-02	%(P	9.281E-01 2.64E-01	G
MN-54		-4.8617E-03					
			834.81	-4.862E-03	%(P	5.569E-02 1.57E-02	G
CO-57		-5.9330E-03					
			122.07	-5.933E-03	%(	6.218E-02 1.85E-02	G K
			136.43	9.186E-02	%	4.423E-01 1.32E-01	G
CO-60		-8.8505E-03					
			1332.51	-8.850E-03	%(P	6.291E-02 1.76E-02	G K
			1173.23	9.923E-03	&	6.989E-02 1.99E-02	G K
Sr-85		-1.6699E-02					
			514.00	-1.670E-02	%(	6.064E-02 1.80E-02	G
Kr-85		-3.6710E+02					
			513.99	-3.671E+02	%(	1.333E+03 3.96E+02	G
Y-88		9.0075E-03					
			1836.01	9.007E-03	%(P	3.312E-02 9.12E-03	G K
			898.02	1.101E-04	& P	4.857E-02 1.31E-02	G
NB-94		-5.1473E-03					
			871.10	-5.147E-03	%(	4.728E-02 1.33E-02	G K
			702.50	-1.406E-04	%	4.430E-02 1.23E-02	G K
Ag-108M		-4.1264E-03					
			722.95	-4.126E-03	%(	6.300E-02 1.80E-02	G K
			614.37	-3.538E-02	% P	7.271E-02 2.20E-02	G
			433.93	-1.294E-02	%	5.063E-02 1.50E-02	G
CD-109		1.1506E-01					
			88.04	1.151E-01	%(P	2.163E+00 6.45E-01	G
SN-113		1.3240E-03					
			391.71	1.324E-03	&(	6.842E-02 1.97E-02	G K
			255.04	7.006E-01	&	1.776E+00 5.35E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0719E-01						
		427.95	1.759E-02	&(P	1.043E-01	2.99E-02	G K
		600.77	-1.463E-02	& P	2.616E-01	7.44E-02	G
		636.15	-3.625E-02	& P	4.045E-01	1.15E-01	G
		463.51	3.724E-01	*(P	4.409E-01	1.39E-01	G
		176.29	-1.365E-01	& P	6.907E-01	2.05E-01	G
I-131	-6.1026E-03						
		364.48	-6.103E-03	&(	7.359E-02	2.14E-02	G K
		636.97	-1.802E-01	%	8.072E-01	2.34E-01	G
		284.29	3.310E-03	%	1.031E+00	3.01E-01	G
CS-134	2.3111E-03						
		604.66	2.311E-03	%(	4.173E-02	1.17E-02	G K
		795.76	3.399E-02	%	5.489E-02	1.71E-02	G
		569.29	3.703E-02	%	2.797E-01	8.04E-02	G
		801.84	-1.191E-01	% P	5.886E-01	1.70E-01	G
CS-137	1.3633E-03						
		661.62	1.363E-03	%(	6.201E-02	1.76E-02	G
CE-139	-1.3456E-02						
		165.85	-1.346E-02	%(P	5.649E-02	1.69E-02	G
EU-152	-2.4195E-02						
		121.78	-2.419E-02	%(P	1.753E-01	5.23E-02	G K
		344.30	-3.444E-02	%	1.544E-01	4.57E-02	G
		1408.08	-3.328E-02	%	2.585E-01	7.13E-02	G
		964.00	-8.184E-02	% P	4.355E-01	1.25E-01	G
		1112.07	-1.416E-02	%	4.359E-01	1.20E-01	G
		778.90	2.575E-02	% P	3.257E-01	9.06E-02	G
EU-154	-1.2451E-02						
		123.10	-1.245E-02	%(P	1.341E-01	4.00E-02	G K
		1274.80	6.482E-02	%	1.798E-01	5.33E-02	G
		723.30	-4.143E-02	% P	3.262E-01	9.43E-02	G
		1004.80	5.149E-02	&	2.519E-01	7.14E-02	G
EU-155	-2.5942E-02						
		86.45	-2.594E-02	%(P	2.363E-01	7.03E-02	G K
		105.31	8.444E-02	&	2.740E-01	8.25E-02	G
HG-203	-4.2461E-03						
		279.17	-4.246E-03	%(P	5.786E-02	1.70E-02	G K
		72.87	-5.384E-01	%	2.342E+00	7.04E-01	G
		70.83	-4.188E-02	%	2.911E+00	8.61E-01	G
		82.50	-1.236E-01	&	3.806E+00	1.13E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.3593E-01						
		583.14	3.146E-01	(P	6.942E-02	3.60E-02	G
		510.72	4.175E-01	*(	2.190E-01	9.19E-02	G
PB-212	6.4009E-01						
		238.63	6.325E-01	(	1.058E-01	4.15E-02	G K
							Energy duplication
		77.11	6.588E-01	@(	6.189E-01	1.92E-01	G
		74.81	1.315E+00	& P	1.256E+00	3.88E-01	G
PB-214	4.5864E-01						
		351.99	4.647E-01	*(P	1.093E-01	4.36E-02	G K
							Energy duplication
		295.22	4.199E-01	@(	2.062E-01	7.03E-02	G
							Energy duplication
		77.11	1.077E+00	+	1.012E+00	3.14E-01	G
		241.92	5.282E-01	(	6.740E-01	2.08E-01	G
BI-212	2.9615E-01						
		727.17	2.961E-01	%(	4.468E-01	1.39E-01	G K
		1620.56	3.095E-01	% P	1.397E+00	3.77E-01	G
		785.42	8.649E-02	& P	2.872E+00	8.11E-01	G
BI-214	4.8411E-01						
		609.32	4.841E-01	(	1.097E-01	5.35E-02	G K
		1764.51	-1.723E-03	& P	4.481E-01	1.19E-01	G
		1120.28	-1.842E-02	&	4.509E-01	1.26E-01	G
RA-224	5.8821E-01						
		241.00	5.882E-01	(P	4.869E-01	1.62E-01	G
RA-226	7.0623E-01						
		185.99	7.062E-01	%(P	1.402E+00	4.25E-01	G
AC-228	6.0112E-01						
		911.07	5.752E-01	(P	1.469E-01	7.15E-02	G K
		968.90	-3.763E-04	% P	2.837E-01	7.71E-02	G
		338.40	6.637E-01	(	3.550E-01	1.20E-01	G
TH-227	-1.6629E-01						
		236.00	-1.663E-01	%(P	4.593E-01	1.38E-01	G K
		256.25	-1.694E-02	&	5.932E-01	1.74E-01	G
PA-234	-7.8111E-02						
		98.44	-7.811E-02	%(	2.623E-01	7.90E-02	G K
		946.00	9.119E-02	&	2.720E-01	8.04E-02	G
		131.28	9.689E-02	&	2.249E-01	6.80E-02	G
		94.67	2.690E-03	%	4.291E-01	1.28E-01	G
		883.24	3.413E-02	%	4.677E-01	1.32E-01	G
		926.70	-4.801E-02	&	4.367E-01	1.22E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 5.452E-02 %   4.133E-01 1.19E-01 G

TH-234       1.3037E+00
                           63.29 8.307E-01 &(P 4.211E+00 1.26E+00 G K
                           92.80 1.919E+00  (  2.477E+00 7.60E-01 G
                           92.38-8.931E-01 & P 3.000E+00 9.03E-01 G

AM-241      -4.1802E-02
                           59.54-4.180E-02 &(  6.924E-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	2.5127E-02	2.6666E-02	4.0839E-01	4.0839E-01	4.455E-01
K-40	A	6.9048E-02	6.9048E-02	7.9238E-01	7.9239E-01	9.281E-01
MN-54	#A	-4.8125E-03	-4.8617E-03	5.4672E-02	5.4673E-02	5.512E-02
CO-57	#B	-5.8637E-03	-5.9330E-03	5.5628E-02	5.5629E-02	6.145E-02
CO-60	#B	-8.8359E-03	-8.8505E-03	5.5277E-02	5.5279E-02	6.280E-02

Sr-85	#A	-1.5901E-02	-1.6699E-02	5.4024E-02	5.4032E-02	5.774E-02
Kr-85	#A	-3.6708E+02	-3.6710E+02	1.1876E+03	1.1878E+03	1.333E+03
Y-88	#B	8.7433E-03	9.0075E-03	2.7361E-02	2.7366E-02	3.215E-02
NB-94	#B	-5.1473E-03	-5.1473E-03	3.9805E-02	3.9806E-02	4.728E-02
Ag-108M	#B	-4.1262E-03	-4.1264E-03	5.3930E-02	5.3930E-02	6.299E-02
CD-109	#A	1.1425E-01	1.1506E-01	1.9351E+00	1.9352E+00	2.148E+00
SN-113	#B	1.2880E-03	1.3240E-03	5.9229E-02	5.9229E-02	6.656E-02
SB-125	#F	1.0686E-01	1.0719E-01	1.1991E-01	1.2006E-01	1.039E-01
I-131	#B	-4.1123E-03	-6.1026E-03	6.4198E-02	6.4199E-02	4.959E-02
CS-134	#B	2.3014E-03	2.3111E-03	3.5232E-02	3.5232E-02	4.156E-02
CS-137	#A	1.3629E-03	1.3633E-03	5.2711E-02	5.2711E-02	6.199E-02
CE-139	#A	-1.3149E-02	-1.3456E-02	5.2502E-02	5.2507E-02	5.520E-02
EU-152	#B	-2.4178E-02	-2.4195E-02	1.7410E-01	1.7410E-01	1.752E-01
EU-154	#B	-1.2438E-02	-1.2451E-02	1.2414E-01	1.2414E-01	1.339E-01
EU-155	#B	-2.5896E-02	-2.5942E-02	3.6249E-01	3.6249E-01	2.358E-01
HG-203	#B	-3.9665E-03	-4.2461E-03	5.2800E-02	5.2800E-02	5.405E-02
TL-208		3.3593E-01	3.3593E-01	1.1498E-01	1.1652E-01	
PB-212	#	6.4009E-01	6.4009E-01	1.2586E-01	1.3089E-01	1.058E-01
PB-214	#	4.5864E-01	4.5864E-01	1.2924E-01	1.3178E-01	1.093E-01
BI-212	#B	2.9615E-01	2.9615E-01	4.1789E-01	4.1822E-01	4.468E-01
BI-214		4.8411E-01	4.8411E-01	1.6027E-01	1.6256E-01	
RA-224		5.8821E-01	5.8821E-01	4.8652E-01	4.8763E-01	4.869E-01
RA-226	#A	7.0622E-01	7.0623E-01	1.2744E+00	1.2750E+00	1.402E+00
AC-228		6.0112E-01	6.0112E-01	1.9815E-01	2.0100E-01	1.469E-01
TH-227	#B	-1.6629E-01	-1.6629E-01	4.2156E-01	4.2166E-01	4.593E-01
PA-234	#B	-7.8111E-02	-7.8111E-02	2.3687E-01	2.3691E-01	2.623E-01
TH-234	#B	1.3037E+00	1.3037E+00	1.5488E+00	1.5505E+00	4.211E+00
AM-241	#A	-4.1801E-02	-4.1802E-02	6.1828E-01	6.1828E-01	6.924E-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) 2.0093668E+00 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 2.0093668E+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_1MAY2006_1106.An1

Sample description
FSS-OOL-02-02-018-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1MAY2006_1106.An1

Acquisition information
Start time: 01-May-2006 11:08:07
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: 2.0270E+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	26-Apr-2006 22:00:00
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: 0.7036

***** S U M M A R Y O F P E A K 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	111.	39.68	1.50	8.847E-03				
74.92	111.	39.68	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.24	173.	26.28	1.50	9.541E-03	77.11	10.700	1.131E+00	PB214
					77.11	17.500	6.912E-01	PB212
77.24	173.	26.28	1.50	9.541E-03	77.11	10.700	1.131E+00	PB214
					77.11	17.500	6.912E-01	PB212
186.14	119.	29.53	0.74	1.626E-02	185.99	3.280	1.434E+00	RA226
210.16	111.	28.73	1.24	1.515E-02				
239.13	689.	4.58	1.22	1.379E-02	238.63	43.100	7.725E-01	PB212
242.21	117.	17.57	1.22	1.364E-02	241.00	3.900	1.449E+00	RA224
					241.92	7.470	7.666E-01	PB214
271.14	77.	36.33	1.57	1.239E-02				
278.28	64.	35.68	1.19	1.211E-02				
278.28	64.	35.68	1.19	1.211E-02	279.17	81.500	PBC<MDA	HG203
295.49	122.	19.56	1.14	1.146E-02	295.22	19.200	3.701E-01	PB214
301.01	72.	29.30	2.05	1.126E-02				
328.90	55.	35.68	1.50	1.034E-02				
338.97	128.	16.04	1.09	1.004E-02	338.40	12.010	7.091E-01	AC228
352.48	258.	10.18	1.06	9.665E-03	351.99	37.100	4.783E-01	PB214
410.34	52.	38.41	0.74	8.312E-03				
463.99	56.	23.36	1.83	7.357E-03	463.51	10.000	4.972E-01	SB125
511.63	108.	19.04	0.86	6.683E-03	510.72	22.500	4.780E-01	TL208
584.36	207.	10.67	1.42	5.878E-03	583.14	86.000	2.718E-01	TL208
610.49	150.	13.70	1.15	5.639E-03	609.32	46.090	3.846E-01	BI214
728.41	65.	23.00	1.06	4.787E-03	727.17	11.800	7.613E-01	BI212
796.23	39.	27.38	0.98	4.417E-03	795.76	85.400	6.918E-02	CS134
912.81	135.	11.67	1.50	3.915E-03				

969.88	108.	14.60	1.30	3.715E-03	968.90	17.460	1.109E+00	AC228
1122.13	61.	28.06	1.07	3.278E-03				
1463.46	627.	4.13	2.07	2.617E-03	1460.75	10.700	1.489E+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
419.94	210.16	347.	111.	0.055	86.20	1.243	NP-239 sM
477.89	239.05	154.	689.	0.345	13.74	1.215	PB-212 D
484.05	242.13	154.	117.	0.059	52.71	1.217	PB-214 D
541.93	271.14	241.	77.	0.038	108.99	1.574	AC-228 sM
556.20	278.28	183.	64.	0.032	107.05	1.190	SB-126 l
601.69	301.01	152.	72.	0.036	87.90	2.045	PB-212 sM
657.47	328.90	132.	55.	0.027	107.03	1.499	LA-140 sM
820.40	410.34	122.	52.	0.026	115.22	0.738	EU-152 s
1825.77	912.81	35.	135.	0.067	31.88	1.495	AC-228 M
2244.66	1122.13	54.	61.	0.030	64.43	1.066	TA-182 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	149.41	74.92	972.	111.	0.056	119.05	1.500s
PB-214	153.80	77.11	949.	173.	0.087	78.85	1.500D
PB-212	153.80	77.11	949.	173.	0.087	78.85	1.500D
RA-226	372.28	186.33	429.	102.	0.051	86.78	1.500s
PB-212	477.77	239.07	423.	567.	0.284	19.89	1.500
RA-224	483.93	242.15	436.	93.	0.047	98.62	1.500
PB-214	483.96	242.17	447.	83.	0.041	113.35	1.500
PB-214	591.29	295.82	184.	118.	0.059	55.85	1.500s
AC-228	677.75	339.03	134.	124.	0.062	47.88	1.500
PB-214	704.83	352.57	124.	228.	0.114	28.65	1.500
SB-125	927.39	463.82	62.	54.	0.027	71.50	1.500s
TL-208	1023.03	511.63	90.	108.	0.054	57.13	0.855s
TL-208	1168.56	584.36	86.	206.	0.103	32.02	1.416
BI-214	1220.83	610.49	83.	150.	0.075	41.10	1.152
Ag-108M	1224.63	612.39	159.	-51.	-0.025	114.38	1.499s
BI-212	1456.79	728.41	50.	65.	0.032	69.01	1.062
CS-134	1593.23	796.61	29.	35.	0.017	82.49	1.601s
AC-228	1942.09	970.94	44.	69.	0.035	54.19	1.718
K-40	2927.90	1463.49	5.	598.	0.299	12.37	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		-9.3471E-02					
			477.56	-9.347E-02	%(	4.302E-01 1.26E-01	G
K-40		1.4205E+01					
			1460.75	1.421E+01	(P	3.138E-01 5.86E-01	G
MN-54		-6.5805E-03					
			834.81	-6.581E-03	%(P	5.267E-02 1.50E-02	G
CO-57		-8.8154E-03					
			122.07	-8.815E-03	%(	6.172E-02 1.85E-02	G K
			136.43	-1.172E-02	%	4.662E-01 1.39E-01	G
CO-60		-5.5643E-03					
			1332.51	-5.564E-03	%(P	5.600E-02 1.54E-02	G K
			1173.23	2.513E-02	%	6.387E-02 1.91E-02	G K
Sr-85		-6.2230E-04					
			514.00	-6.223E-04	%(	4.340E-02 1.23E-02	G
Kr-85		-1.4034E+01					
			513.99	-1.403E+01	%(	9.546E+02 2.71E+02	G
Y-88		-6.1484E-03					
			1836.01	-6.148E-03	%(P	5.741E-02 1.54E-02	G K
			898.02	-1.084E-03	% P	6.156E-02 1.71E-02	G
NB-94		-3.8689E-04					
			871.10	-3.869E-04	&(	4.744E-02 1.31E-02	G K
			702.50	-1.109E-02	%	5.573E-02 1.63E-02	G K
Ag-108M		-1.1513E-02					
			722.95	-1.151E-02	%(	5.874E-02 1.71E-02	G K
			614.37	-6.654E-02	& P	8.100E-02 2.53E-02	G
			433.93	1.388E-04	%	3.950E-02 1.12E-02	G
CD-109		2.3508E-01					
			88.04	2.351E-01	%(P	2.099E+00 6.28E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-7.5754E-03						
		391.71	-7.575E-03	%(	6.497E-02	1.90E-02	G K
		255.04	-5.447E-01	%	1.916E+00	5.73E-01	G
SB-125	1.2446E-01						
		427.95	-3.727E-05	%(P	1.488E-01	4.27E-02	G K
		600.77	-6.915E-03	% P	2.372E-01	6.70E-02	G
		636.15	-2.784E-02	% P	3.862E-01	1.09E-01	G
		463.51	4.930E-01	(P	3.582E-01	1.21E-01	G
		176.29	-7.171E-02	% P	6.656E-01	1.97E-01	G
I-131	6.4026E-03						
		364.48	6.403E-03	&(	7.557E-02	2.21E-02	G K
		636.97	-1.129E-01	&	8.940E-01	2.56E-01	G
		284.29	-1.124E-01	%	9.717E-01	2.86E-01	G
CS-134	3.0795E-02						
		604.66	3.636E-03	&(	4.865E-02	1.39E-02	G K
		795.76	6.183E-02	(	4.895E-02	1.70E-02	G
		569.29	-2.968E-02	%	2.960E-01	8.52E-02	G
		801.84	3.163E-03	% P	5.256E-01	1.45E-01	G
CS-137	-2.9341E-03						
		661.62	-2.934E-03	%(	5.773E-02	1.64E-02	G
CE-139	-6.2040E-03						
		165.85	-6.204E-03	&(P	5.588E-02	1.66E-02	G
EU-152	-5.9640E-02						
		121.78	-5.964E-02	%(P	1.818E-01	5.48E-02	G K
		344.30	1.038E-02	%	1.507E-01	4.40E-02	G
		1408.08	-4.057E-02	%	3.143E-01	8.85E-02	G
		964.00	-1.139E-01	% P	4.798E-01	1.40E-01	G
		1112.07	2.371E-01	&	4.032E-01	1.25E-01	G
		778.90	-7.489E-02	% P	3.857E-01	1.11E-01	G
EU-154	-3.7381E-02						
		123.10	-3.738E-02	%(P	1.218E-01	3.67E-02	G K
		1274.80	2.997E-02	%	1.844E-01	5.26E-02	G
		723.30	-6.404E-02	% P	2.807E-01	8.20E-02	G
		1004.80	-1.526E-02	&	3.302E-01	9.24E-02	G
EU-155	-1.0542E-02						
		86.45	-1.054E-02	%(P	2.445E-01	7.27E-02	G K
		105.31	-3.314E-02	%	2.550E-01	7.62E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	1.6620E-02						
		279.17	1.662E-02	%(P	5.179E-02	1.55E-02	G K
		72.87	-7.513E-01	%	2.153E+00	6.50E-01	G
		70.83	-5.801E-01	%	3.973E+00	1.19E+00	G
		82.50	-7.459E-01	&	4.151E+00	1.24E+00	G
TL-208	2.7177E-01						
		583.14	2.718E-01	(P	6.028E-02	2.91E-02	G
		510.72	4.780E-01	+	2.077E-01	9.12E-02	G
PB-212	6.5162E-01						
		238.63	6.355E-01	(	1.105E-01	4.21E-02	G K
							Energy duplication
		77.11	6.912E-01	*(	5.839E-01	1.82E-01	G
		74.81	8.724E-01	& P	1.162E+00	3.56E-01	G
PB-214	4.0129E-01						
		351.99	4.234E-01	(P	1.014E-01	4.05E-02	G K
		295.22	3.586E-01	@(	1.995E-01	6.68E-02	G
							Energy duplication
		77.11	1.131E+00	+	9.550E-01	2.97E-01	G
		241.92	5.406E-01	+	6.616E-01	2.04E-01	G
BI-212	7.6131E-01						
		727.17	7.613E-01	(	4.218E-01	1.75E-01	G K
		1620.56	-2.097E-01	% P	1.871E+00	4.96E-01	G
		785.42	8.170E-02	% P	3.344E+00	9.57E-01	G
BI-214	3.8458E-01						
		609.32	3.846E-01	(	1.155E-01	5.28E-02	G K
		1764.51	-1.631E-03	% P	4.242E-01	1.13E-01	G
		1120.28	0.000E+00	%	4.180E-01	1.16E-01	G
RA-224	1.1645E+00						
		241.00	1.164E+00	&(P	1.248E+00	3.88E-01	G
RA-226	1.2806E+00						
		185.99	1.281E+00	(P	1.241E+00	3.87E-01	G
AC-228	3.5193E-01						
		911.07	-1.342E-03	%(P	2.011E-01	5.61E-02	G K
		968.90	7.102E-01	(P	3.436E-01	1.28E-01	G
		338.40	6.842E-01	(	3.124E-01	1.09E-01	G
TH-227	-2.7526E-01						
		236.00	-2.753E-01	%(P	5.194E-01	1.58E-01	G K
		256.25	4.142E-04	%	5.427E-01	1.59E-01	G

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

PA-234      -2.7755E-02
                           98.44-2.776E-02 &(  2.697E-01 8.06E-02 G K
                          946.00 6.235E-02 %   2.237E-01 6.50E-02 G
                          131.28-2.036E-02 %   2.265E-01 6.74E-02 G
                           94.67-1.089E-02 %   4.024E-01 1.20E-01 G
                          883.24-3.934E-02 &   4.058E-01 1.14E-01 G
                          926.70 2.224E-01 %   4.362E-01 1.33E-01 G
                          569.26-4.391E-02 %   4.373E-01 1.26E-01 G

TH-234       2.9175E-01
                           63.29 2.917E-01 %(P 4.687E+00 1.40E+00 G K
                           92.80 1.490E+00 %   2.464E+00 7.51E-01 G
                           92.38 1.559E+00 & P 2.869E+00 8.72E-01 G

AM-241       2.0086E-01
                           59.54 2.009E-01 %(  6.203E-01 1.87E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-8.8113E-02	-9.3471E-02	3.7876E-01	3.7880E-01	4.055E-01
K-40		1.4205E+01	1.4205E+01	1.7579E+00	1.9302E+00	3.138E-01
MN-54	#A	-6.5144E-03	-6.5805E-03	4.9810E-02	4.9811E-02	5.214E-02
CO-57	#B	-8.7131E-03	-8.8154E-03	5.5372E-02	5.5374E-02	6.100E-02
CO-60	#B	-5.5552E-03	-5.5643E-03	4.9491E-02	4.9492E-02	5.591E-02
Sr-85	#A	-5.9277E-04	-6.2230E-04	3.6983E-02	3.6983E-02	4.135E-02
Kr-85	#A	-1.4033E+01	-1.4034E+01	8.1341E+02	8.1341E+02	9.546E+02
Y-88	#B	-5.9693E-03	-6.1484E-03	4.6593E-02	4.6594E-02	5.574E-02
NB-94	#B	-3.8689E-04	-3.8689E-04	3.9233E-02	3.9233E-02	4.744E-02
Ag-108M	#B	-1.1512E-02	-1.1513E-02	5.1279E-02	5.1283E-02	5.874E-02
CD-109	#A	2.3345E-01	2.3508E-01	1.8834E+00	1.8834E+00	2.085E+00
SN-113	#B	-7.3708E-03	-7.5754E-03	5.6861E-02	5.6863E-02	6.321E-02
SB-125	#B	1.2407E-01	1.2446E-01	9.1515E-02	9.1781E-02	1.484E-01
I-131	#B	4.3261E-03	6.4026E-03	6.6165E-02	6.6166E-02	5.106E-02
CS-134	#B	3.0666E-02	3.0795E-02	2.5404E-02	2.5463E-02	4.845E-02
CS-137	#A	-2.9333E-03	-2.9341E-03	4.9244E-02	4.9244E-02	5.771E-02
CE-139	#A	-6.0634E-03	-6.2040E-03	5.3546E-02	5.3547E-02	5.462E-02
EU-152	#B	-5.9599E-02	-5.9640E-02	1.7098E-01	1.7101E-01	1.817E-01
EU-154	#B	-3.7343E-02	-3.7381E-02	1.1118E-01	1.1120E-01	1.217E-01
EU-155	#B	-1.0524E-02	-1.0542E-02	9.1798E-01	9.1798E-01	2.441E-01
HG-203	#B	1.5533E-02	1.6620E-02	4.6539E-02	4.6548E-02	4.840E-02
TL-208		2.7177E-01	2.7177E-01	8.7199E-02	8.8523E-02	
PB-212	#	6.5162E-01	6.5162E-01	1.2961E-01	1.3467E-01	1.105E-01
PB-214	#	4.0129E-01	4.0129E-01	1.1518E-01	1.1736E-01	1.014E-01
BI-212		7.6131E-01	7.6131E-01	5.2540E-01	5.2713E-01	
BI-214		3.8458E-01	3.8458E-01	1.5806E-01	1.5953E-01	
RA-224	#A	1.1645E+00	1.1645E+00	1.1627E+00	1.1645E+00	1.248E+00
RA-226	#	1.2806E+00	1.2806E+00	1.1597E+00	1.1619E+00	1.241E+00
AC-228	F	3.5193E-01	3.5193E-01	1.6851E-01	1.6967E-01	2.011E-01
TH-227	#B	-2.7526E-01	-2.7526E-01	4.7773E-01	4.7798E-01	5.194E-01
PA-234	#B	-2.7755E-02	-2.7755E-02	2.4193E-01	2.4194E-01	2.697E-01
TH-234	#B	2.9175E-01	2.9175E-01	4.1910E+00	4.1911E+00	4.687E+00
AM-241	#A	2.0085E-01	2.0086E-01	5.6031E-01	5.6042E-01	6.203E-01

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

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

Total Activity (1121.8 to 1999.0 keV) 1.5974697E+01 pCi/gm
Total Decayed Activity (1121.8 to 1999.0 keV) 1.5974697E+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_1MAY2006_1146.An1

Sample description
FSS-OOL-02-02-009-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1MAY2006_1146.An1

Acquisition information
Start time: 01-May-2006 11:47:16
Live time: 2000
Real time: 2024
Dead time: 1.17 %
Detector ID: 3

Detector system
Det 102 - DSPP-468

Calibration
Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration
Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8510E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8510E+03) =
5.4025E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 21:00:00
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: 0.8099

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
75.08	136.	34.22	1.50	8.847E-03				
75.08	136.	34.22	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.30	213.	22.08	1.50	9.541E-03	77.11	10.700	1.522E+00	PB214
					77.11	17.500	9.306E-01	PB212
77.30	213.	22.08	1.50	9.541E-03	77.11	10.700	1.522E+00	PB214
					77.11	17.500	9.306E-01	PB212
93.34	111.	40.67	1.50	1.333E-02	92.80	3.000	PBC<MDA	TH234
186.37	100.	29.37	1.49	1.625E-02	185.99	3.280	PBC<MDA	RA226
209.95	95.	32.57	1.40	1.516E-02				
239.13	809.	4.14	1.22	1.378E-02	238.63	43.100	9.921E-01	PB212
					241.00	3.900	1.103E+01	RA224
242.16	115.	20.03	1.22	1.364E-02	241.92	7.470	8.222E-01	PB214
270.53	82.	28.07	1.74	1.242E-02				
278.59	59.	41.35	1.35	1.209E-02				
278.59	59.	41.35	1.35	1.209E-02	279.17	81.500	PBC<MDA	HG203
295.49	175.	14.61	1.26	1.146E-02	295.22	19.200	5.804E-01	PB214
301.18	72.	32.48	1.37	1.125E-02				
328.91	49.	41.42	1.16	1.034E-02				
339.23	212.	11.38	1.12	1.004E-02	338.40	12.010	1.279E+00	AC228
352.55	268.	10.64	1.24	9.664E-03	351.99	37.100	5.445E-01	PB214
464.72	57.	31.99	1.39	7.346E-03	463.51	10.000	5.514E-01	SB125
511.54	134.	17.16	2.02	6.684E-03	510.72	22.500	6.485E-01	TL208
584.41	287.	9.01	1.49	5.878E-03	583.14	86.000	4.134E-01	TL208
610.62	176.	11.57	1.43	5.638E-03	609.32	46.090	4.940E-01	BI214
728.50	50.	22.90	1.31	4.786E-03	727.17	11.800	6.440E-01	BI212
912.91	164.	9.10	1.63	3.915E-03	911.07	29.000	1.049E+00	AC228
966.67	36.	24.83	1.72	3.725E-03				

970.71	86.	13.54	1.72	3.712E-03	968.90	17.460	9.681E-01	AC228
1121.73	60.	30.74	1.73	3.279E-03	1120.28	15.040	8.930E-01	BI214
1463.47	553.	4.31	1.97	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	
419.52	209.95	345.	95.	0.047	97.72	1.397	NP-239	sM
477.89	239.10	155.	809.	0.404	12.41	1.215	PB-212	D
483.96	242.13	207.	115.	0.057	60.08	1.217	PB-214	D
540.70	270.53	182.	82.	0.041	84.21	1.736	AC-228	sM
602.02	301.18	178.	72.	0.036	97.43	1.367	PB-212	M
657.49	328.91	141.	49.	0.025	124.26	1.156	LA-140	sM
1933.54	966.77	21.	36.	0.018	74.48	1.716	TB-160	D
1941.63	970.81	25.	86.	0.043	40.61	1.719	J-135	D
2927.85	1463.47	7.	552.	0.276	12.93	1.967	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	149.73	75.08	1073.	136.	0.068	102.65	1.500s
PB-214	153.80	77.11	998.	213.	0.106	66.25	1.500D
PB-212	153.80	77.11	998.	213.	0.106	66.25	1.500D
TH-234	186.26	93.34	969.	111.	0.056	122.00	1.500
RA-226	371.87	186.13	445.	90.	0.045	99.10	1.500s
PB-212	477.86	239.11	487.	683.	0.341	17.88	1.500
RA-224	477.89	239.13	287.	720.	0.360	14.95	1.500
HG-203	555.30	277.83	167.	49.	0.025	118.86	1.500s
PB-214	591.06	295.70	195.	163.	0.081	43.30	1.500
AC-228	677.74	339.03	134.	172.	0.086	36.60	1.500
PB-214	704.82	352.57	131.	235.	0.117	28.41	1.500
SB-125	927.64	463.95	104.	40.	0.020	113.42	1.500s
TL-208	1022.87	511.54	109.	134.	0.067	51.47	2.020s
TL-208	1168.66	584.41	101.	287.	0.143	27.04	1.490
BI-214	1221.09	610.62	75.	176.	0.088	34.71	1.435
BI-212	1456.95	728.50	35.	50.	0.025	68.71	1.312
AC-228	1826.13	912.99	26.	154.	0.077	27.80	1.679
AC-228	1941.84	970.81	12.	84.	0.042	37.09	1.718
BI-214	2243.85	1121.73	65.	60.	0.030	92.21	1.729

s - Peak fails shape tests.
D - Peak area deconvoluted.

A Derived peak area.

***** S U M M A R Y O 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		3.0785E-02					
			477.56	3.079E-02	&(	4.750E-01 1.37E-01	G
K-40		3.3825E-02					
			1460.75	3.383E-02	%(P	1.081E+00 3.08E-01	G
MN-54		-6.8589E-03					
			834.81	-6.859E-03	%(P	7.167E-02 2.06E-02	G
CO-57		5.4602E-04					
			122.07	5.460E-04	%(	6.252E-02 1.86E-02	G K
			136.43	-8.646E-02	%	4.851E-01 1.45E-01	G
CO-60		-3.2792E-05					
			1332.51	-3.279E-05	&(P	6.937E-02 1.89E-02	G K
			1173.23	-1.539E-02	%	9.123E-02 2.65E-02	G K
Sr-85		-1.5454E-02					
			514.00	-1.545E-02	%(	6.652E-02 1.97E-02	G
Kr-85		-3.3960E+02					
			513.99	-3.396E+02	%(	1.462E+03 4.33E+02	G
Y-88		-7.5921E-03					
			1836.01	-7.592E-03	%(P	5.316E-02 1.42E-02	G K
			898.02	-9.015E-03	% P	6.644E-02 1.88E-02	G
NB-94		1.0460E-02					
			871.10	1.046E-02	%(	3.987E-02 1.15E-02	G K
			702.50	1.912E-02	&	4.927E-02 1.47E-02	G K
Ag-108M		-7.0132E-05					
			722.95	-7.013E-05	&(	5.328E-02 1.48E-02	G K
			614.37	-1.870E-02	% P	7.428E-02 2.20E-02	G
			433.93	-6.874E-03	%	5.202E-02 1.52E-02	G
CD-109		7.9476E-01					
			88.04	7.948E-01	%(P	2.272E+00 6.86E-01	G
SN-113		1.4875E-02					
			391.71	1.488E-02	&(	7.511E-02 2.21E-02	G K
			255.04	2.287E-02	%	2.193E+00 6.43E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.4428E-01						
		427.95	5.856E-02	%(P	1.296E-01	3.90E-02	G K
		600.77	-2.318E-03	% P	2.525E-01	7.09E-02	G
		636.15	-6.761E-02	% P	4.585E-01	1.32E-01	G
		463.51	3.980E-01	@(P	5.001E-01	1.56E-01	G
		176.29	1.060E-02	% P	7.273E-01	2.15E-01	G
I-131	-1.1610E-02						
		364.48	-1.161E-02	%(	7.632E-02	2.24E-02	G K
		636.97	-1.737E-01	%	1.078E+00	3.12E-01	G
		284.29	1.609E-02	%	1.174E+00	3.44E-01	G
CS-134	-4.2346E-03						
		604.66	-4.235E-03	&(	4.124E-02	1.17E-02	G K
		795.76	4.248E-02	%	6.141E-02	1.93E-02	G
		569.29	6.640E-02	%	2.909E-01	8.49E-02	G
		801.84	-1.206E-01	& P	6.261E-01	1.81E-01	G
CS-137	8.6253E-03						
		661.62	8.625E-03	%(	5.387E-02	1.55E-02	G
CE-139	1.6405E-02						
		165.85	1.640E-02	%(P	5.788E-02	1.74E-02	G
EU-152	-2.7975E-02						
		121.78	-2.798E-02	%(P	1.858E-01	5.55E-02	G K
		344.30	-1.105E-02	%	1.756E-01	5.13E-02	G
		1408.08	4.435E-03	&	2.320E-01	6.04E-02	G
		964.00	7.370E-02	& P	3.651E-01	1.04E-01	G
		1112.07	-7.415E-02	%	5.648E-01	1.62E-01	G
		778.90	3.868E-03	% P	4.154E-01	1.16E-01	G
EU-154	-1.1698E-03						
		123.10	-1.170E-03	%(P	1.358E-01	4.03E-02	G K
		1274.80	9.218E-02	&	1.494E-01	4.70E-02	G
		723.30	-7.397E-04	& P	2.541E-01	7.06E-02	G
		1004.80	-5.287E-02	&	3.237E-01	9.21E-02	G
EU-155	-6.8833E-02						
		86.45	-6.883E-02	&(P	2.835E-01	8.50E-02	G K
		105.31	1.383E-01	%	3.027E-01	9.17E-02	G
HG-203	3.9252E-02						
		279.17	3.925E-02	*(P	5.009E-02	1.56E-02	G K
		72.87	-5.385E-01	&	2.465E+00	7.41E-01	G
		70.83	-1.032E+00	%	4.383E+00	1.32E+00	G
		82.50	-6.172E-01	%	4.674E+00	1.40E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	4.1335E-01						
		583.14	4.134E-01	(P	7.147E-02	3.74E-02	G
		510.72	6.485E-01	+	2.491E-01	1.11E-01	G
PB-212	8.6457E-01						
		238.63	8.377E-01	(	1.295E-01	4.99E-02	G K
							Energy duplication
		77.11	9.306E-01	@(	6.557E-01	2.06E-01	G
		74.81	1.173E+00	& P	1.335E+00	4.10E-01	G
PB-214	4.9867E-01						
		351.99	4.772E-01	(P	1.138E-01	4.53E-02	G K
		295.22	5.401E-01	(	2.247E-01	7.80E-02	G
							Energy duplication
		77.11	1.522E+00	+	1.072E+00	3.36E-01	G
		241.92	3.782E-01	%	8.489E-01	2.57E-01	G
BI-212	6.4399E-01						
		727.17	6.440E-01	(	3.913E-01	1.48E-01	G K
		1620.56	-4.822E-02	% P	2.031E+00	5.19E-01	G
		785.42	-7.029E-01	% P	2.625E+00	7.67E-01	G
BI-214	4.9405E-01						
		609.32	4.940E-01	(	1.206E-01	5.73E-02	G K
		1764.51	-5.552E-02	% P	4.933E-01	1.37E-01	G
		1120.28	8.930E-01	+	5.938E-01	2.75E-01	G
RA-224	9.8453E+00						
		241.00	9.845E+00	&(P	1.115E+00	4.91E-01	G
RA-226	1.2335E+00						
		185.99	1.233E+00	(P	1.383E+00	4.28E-01	G
AC-228	9.8610E-01						
		911.07	9.914E-01	(P	1.688E-01	9.20E-02	G K
		968.90	9.414E-01	(P	2.103E-01	1.16E-01	G
		338.40	1.038E+00	(	3.421E-01	1.27E-01	G
TH-227	-1.8513E-02						
		236.00	-1.851E-02	&(P	3.373E-01	9.89E-02	G K
		256.25	1.946E-01	%	5.512E-01	1.65E-01	G
PA-234	-6.8797E-02						
		98.44	-6.880E-02	%(	2.826E-01	8.49E-02	G K
		946.00	-6.821E-02	%	3.388E-01	9.83E-02	G
		131.28	-5.139E-03	&	2.405E-01	7.13E-02	G
		94.67	-1.556E-01	%	5.291E-01	1.59E-01	G
		883.24	9.069E-02	&	4.650E-01	1.34E-01	G
		926.70	6.908E-02	%	4.880E-01	1.38E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 9.810E-02 %   4.298E-01 1.25E-01 G

TH-234       1.0811E+00
                           63.29 3.500E-01 %(P 4.743E+00 1.41E+00 G K
                           92.80 2.032E+00  (  2.697E+00 8.26E-01 G
                           92.38-1.283E+00 % P 2.694E+00 8.16E-01 G

AM-241       2.3877E-01
                           59.54 2.388E-01 %(  7.147E-01 2.15E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	2.8995E-02	3.0785E-02	4.1002E-01	4.1002E-01	4.473E-01
K-40	A	3.3825E-02	3.3825E-02	9.2332E-01	9.2332E-01	1.081E+00
MN-54	#A	-6.7890E-03	-6.8589E-03	6.8751E-02	6.8752E-02	7.094E-02
CO-57	#B	5.3959E-04	5.4602E-04	5.5682E-02	5.5682E-02	6.179E-02
CO-60	#B	-3.2738E-05	-3.2792E-05	7.8900E-02	7.8900E-02	6.926E-02

Sr-85	#A	-1.4710E-02	-1.5454E-02	5.9080E-02	5.9086E-02	6.332E-02
Kr-85	#A	-3.3959E+02	-3.3960E+02	1.2983E+03	1.2984E+03	1.462E+03
Y-88	#B	-7.3676E-03	-7.5921E-03	4.2860E-02	4.2862E-02	5.158E-02
NB-94	#B	1.0459E-02	1.0460E-02	3.4428E-02	3.4433E-02	3.987E-02
Ag-108M	#B	-7.0127E-05	-7.0132E-05	4.4393E-02	4.4393E-02	5.328E-02
CD-109	#A	7.8917E-01	7.9476E-01	2.0566E+00	2.0571E+00	2.256E+00
SN-113	#B	1.4467E-02	1.4875E-02	6.6433E-02	6.6438E-02	7.305E-02
SB-125	#F	1.4382E-01	1.4428E-01	1.6748E-01	1.6767E-01	1.292E-01
I-131	#B	-7.7984E-03	-1.1610E-02	6.7078E-02	6.7082E-02	5.126E-02
CS-134	#B	-4.2167E-03	-4.2346E-03	3.5016E-02	3.5016E-02	4.107E-02
CS-137	#A	8.6228E-03	8.6253E-03	4.6374E-02	4.6376E-02	5.385E-02
CE-139	#A	1.6028E-02	1.6405E-02	5.2113E-02	5.2121E-02	5.655E-02
EU-152	#B	-2.7956E-02	-2.7975E-02	1.8271E-01	1.8271E-01	1.856E-01
EU-154	#B	-1.1686E-03	-1.1698E-03	1.7699E-01	1.7699E-01	1.356E-01
EU-155	#B	-6.8711E-02	-6.8833E-02	3.1387E-01	3.1389E-01	2.830E-01
HG-203	#A	3.6646E-02	3.9252E-02	4.6744E-02	4.6796E-02	4.677E-02
TL-208		4.1335E-01	4.1335E-01	1.1194E-01	1.1432E-01	
PB-212	#	8.6457E-01	8.6457E-01	1.5461E-01	1.6205E-01	1.295E-01
PB-214	#	4.9867E-01	4.9867E-01	1.2918E-01	1.3218E-01	1.138E-01
BI-212		6.4399E-01	6.4399E-01	4.4251E-01	4.4398E-01	
BI-214		4.9405E-01	4.9405E-01	1.7147E-01	1.7370E-01	
RA-224	#	9.8453E+00	9.8453E+00	1.4741E+00	1.5743E+00	1.115E+00
RA-226	#A	1.2335E+00	1.2335E+00	1.2829E+00	1.2847E+00	1.383E+00
AC-228		9.8610E-01	9.8610E-01	1.9424E-01	2.0197E-01	1.688E-01
TH-227	#B	-1.8513E-02	-1.8513E-02	3.4273E-01	3.4273E-01	3.373E-01
PA-234	#B	-6.8797E-02	-6.8797E-02	2.5472E-01	2.5475E-01	2.826E-01
TH-234	#B	1.0811E+00	1.0811E+00	1.3189E+00	1.3203E+00	4.743E+00
AM-241	#A	2.3877E-01	2.3877E-01	6.4613E-01	6.4626E-01	7.147E-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) 2.5374837E+00 pCi/gm
Total Decayed Activity (1119.8 to 1999.0 keV) 2.5374837E+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_1MAY2006_1350.An1

Sample description
FSS-OOL-02-02-016-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1MAY2006_1350.An1

Acquisition information
Start time: 01-May-2006 13:52:19
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: 1.7810E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7810E+03) =
5.6148E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 21:50:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5745

***** S U M M A R Y O F P E A 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.	30.04	1.50	8.847E-03				
75.00	147.	30.04	1.50	8.847E-03	74.81	9.600	1.314E+00	PB212
77.05	198.	22.45	1.50	9.541E-03				
77.05	198.	22.45	1.50	9.541E-03	77.11	17.500	9.014E-01	PB212
					77.11	10.700	1.474E+00	PB214
77.05	198.	22.45	1.50	9.541E-03				
77.05	198.	22.45	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.474E+00	PB214
186.04	104.	31.26	1.01	1.626E-02	185.99	3.280	1.421E+00	RA226
209.59	71.	38.89	0.91	1.518E-02				
239.03	742.	4.38	1.22	1.379E-02	238.63	43.100	9.464E-01	PB212
242.11	130.	15.91	1.22	1.365E-02	241.00	3.900	1.830E+00	RA224
					241.92	7.470	9.670E-01	PB214
270.79	62.	36.35	1.04	1.241E-02				
295.66	134.	12.92	1.25	1.145E-02	295.22	19.200	4.608E-01	PB214
300.84	44.	35.40	1.26	1.127E-02				
328.72	36.	40.06	0.71	1.035E-02				
339.06	141.	20.49	1.29	1.004E-02	338.40	12.010	8.836E-01	AC228
352.59	265.	10.03	1.47	9.662E-03	351.99	37.100	5.600E-01	PB214
464.41	55.	23.71	1.01	7.351E-03	463.51	10.000	5.556E-01	SB125
511.70	110.	19.59	1.01	6.682E-03	510.72	22.500	5.551E-01	TL208
584.08	236.	8.44	1.41	5.881E-03	583.14	86.000	3.535E-01	TL208
610.17	178.	10.72	1.34	5.642E-03	609.32	46.090	5.187E-01	BI214
796.12	27.	37.27	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
912.55	140.	9.18	1.68	3.917E-03	911.07	29.000	9.304E-01	AC228
966.06	38.	22.19	1.72	3.727E-03				
970.75	77.	14.58	1.72	3.711E-03	968.90	17.460	9.021E-01	AC228

1121.34	55.	23.79	3.44	3.283E-03	1120.28	15.040	8.482E-01	BI214
1463.06	574.	4.24	2.24	2.617E-03	1460.75	10.700	1.553E+01	K40
1767.53	30.	18.26	0.98	2.222E-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	
418.80	209.59	290.	71.	0.036	116.67	0.915	NP-239	
477.69	238.95	158.	742.	0.371	13.15	1.215	PB-212	D
483.85	242.03	149.	130.	0.065	47.74	1.217	PB-214	D
541.22	270.79	182.	62.	0.031	109.06	1.039	AC-228	s
601.24	300.79	129.	60.	0.030	95.77	0.677	PB-212	s
657.12	328.72	86.	36.	0.018	120.19	0.710	LA-140	s
1457.57	728.81	59.	45.	0.023	97.74	0.981	J-132	l
1932.62	966.21	16.	39.	0.019	65.46	1.716	TB-160	D
3536.52	1767.53	-2.	32.	0.016	50.03	0.983	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	149.57	75.00	945.	147.	0.074	90.12	1.500s
PB-212	153.80	77.11	893.	198.	0.099	67.36	1.500D
PB-214	153.80	77.11	893.	198.	0.099	67.36	1.500D
RA-226	372.26	186.33	411.	76.	0.038	111.49	1.500s
PB-212	477.71	239.04	387.	618.	0.309	18.11	1.500
RA-224	484.54	242.45	366.	101.	0.050	85.04	1.500
PB-214	483.96	242.17	467.	85.	0.042	113.24	1.500
PB-214	591.09	295.72	168.	138.	0.069	47.40	1.500
AC-228	677.76	339.04	214.	147.	0.074	60.16	1.291
PB-214	704.82	352.57	116.	241.	0.121	26.98	1.500
SB-125	927.50	463.88	54.	48.	0.024	75.50	1.500s
TL-208	1023.17	511.70	99.	110.	0.055	58.76	1.008s
TL-208	1168.00	584.08	58.	236.	0.118	25.31	1.411
BI-214	1220.19	610.17	62.	178.	0.089	32.16	1.338
CS-134	1592.27	796.12	36.	27.	0.013	111.80	1.601s
AC-228	1822.28	911.07	111.	41.	0.021	116.51	1.679D
AC-228	1938.01	968.90	24.	67.	0.034	47.64	1.718D
BI-214	2243.08	1121.34	38.	55.	0.028	71.36	3.438s
K-40	2927.10	1463.10	16.	547.	0.273	13.19	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		1.1894E-01					
			477.56	1.189E-01	%(	4.737E-01 1.40E-01	G
K-40		1.4800E+01					
			1460.75	1.480E+01	(P	5.746E-01 6.51E-01	G
MN-54		-3.3878E-04					
			834.81	-3.388E-04	%(P	5.979E-02 1.66E-02	G
CO-57		8.2232E-03					
			122.07	8.223E-03	&(	6.421E-02 1.92E-02	G K
			136.43	-5.912E-02	%	4.891E-01 1.46E-01	G
CO-60		7.3293E-03					
			1332.51	7.329E-03	&(P	6.347E-02 1.76E-02	G K
			1173.23	3.281E-02	%	6.530E-02 1.99E-02	G K
Sr-85		-7.5207E-03					
			514.00	-7.521E-03	&(	6.329E-02 1.85E-02	G
Kr-85		-8.0662E+01					
			513.99	-8.066E+01	&(	1.374E+03 3.98E+02	G
Y-88		-2.4048E-05					
			1836.01	-2.405E-05	&(P	2.700E-02 3.66E-03	G K
			898.02	-4.790E-03	% P	5.923E-02 1.63E-02	G
NB-94		9.7360E-03					
			871.10	9.736E-03	&(	5.148E-02 1.47E-02	G K
			702.50	-6.501E-03	%	5.208E-02 1.49E-02	G K
Ag-108M		-1.5717E-02					
			722.95	-1.572E-02	%(	5.942E-02 1.74E-02	G K
			614.37	-5.722E-02	% P	8.561E-02 2.64E-02	G
			433.93	-3.274E-03	&	5.104E-02 1.47E-02	G
CD-109		-6.6612E-03					
			88.04	-6.661E-03	&(P	1.771E+00 5.24E-01	G
SN-113		9.7099E-03					
			391.71	9.710E-03	%(	6.913E-02 2.02E-02	G K
			255.04	-8.219E-01	%	2.344E+00 7.05E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.1598E-02						
		427.95	-5.832E-02	%(P	1.563E-01	4.65E-02	G K
		600.77	1.256E-02	& P	2.544E-01	7.18E-02	G
		636.15	1.888E-01	% P	3.947E-01	1.20E-01	G
		463.51	4.958E-01	@(P	3.834E-01	1.29E-01	G
		176.29	-2.746E-02	% P	7.577E-01	2.24E-01	G
I-131	-1.0617E-03						
		364.48	-1.062E-03	%(	8.113E-02	2.34E-02	G K
		636.97	3.878E-01	%	9.046E-01	2.72E-01	G
		284.29	2.733E-02	%	9.524E-01	2.77E-01	G
CS-134	1.9282E-02						
		604.66	-1.114E-02	%(	5.269E-02	1.54E-02	G K
		795.76	5.405E-02	*(	6.223E-02	2.01E-02	G
		569.29	2.106E-02	%	3.264E-01	9.32E-02	G
		801.84	-1.695E-01	% P	6.106E-01	1.78E-01	G
CS-137	3.0498E-02						
		661.62	3.050E-02	%(	4.715E-02	1.48E-02	G
CE-139	-1.3684E-02						
		165.85	-1.368E-02	%(P	6.092E-02	1.82E-02	G
EU-152	2.1154E-02						
		121.78	2.115E-02	%(P	1.865E-01	5.56E-02	G K
		344.30	-1.435E-03	&	1.632E-01	4.72E-02	G
		1408.08	3.061E-02	%	2.629E-01	7.18E-02	G
		964.00	-3.208E-03	% P	5.212E-01	1.46E-01	G
		1112.07	-8.142E-03	%	4.855E-01	1.34E-01	G
		778.90	-1.077E-01	& P	4.856E-01	1.42E-01	G
EU-154	-2.4768E-02						
		123.10	-2.477E-02	%(P	1.429E-01	4.28E-02	G K
		1274.80	0.000E+00	%	2.261E-01	6.26E-02	G
		723.30	9.006E-02	% P	2.515E-01	7.46E-02	G
		1004.80	1.355E-01	%	2.545E-01	7.85E-02	G
EU-155	2.0135E-03						
		86.45	2.014E-03	%(P	2.585E-01	7.68E-02	G K
		105.31	5.512E-02	%	3.010E-01	9.02E-02	G
HG-203	-2.5110E-03						
		279.17	-2.511E-03	&(P	5.911E-02	1.73E-02	G K
		72.87	-2.811E-01	&	2.485E+00	7.44E-01	G
		70.83	-1.966E-01	&	4.305E+00	1.28E+00	G
		82.50	8.071E-01	&	4.321E+00	1.29E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.5350E-01						
		583.14	3.535E-01	(P	5.722E-02	2.99E-02	G
		510.72	5.551E-01	+	2.470E-01	1.09E-01	G
PB-212	8.2093E-01						
		238.63	7.883E-01	(	1.203E-01	4.76E-02	G K
							Energy duplication
		77.11	9.014E-01	*(	6.450E-01	2.02E-01	G
		74.81	1.314E+00	& P	1.304E+00	4.03E-01	G
PB-214	4.9754E-01						
		351.99	5.096E-01	(P	1.116E-01	4.59E-02	G K
		295.22	4.743E-01	(	2.172E-01	7.49E-02	G
							Energy duplication
		77.11	1.474E+00	+	1.055E+00	3.31E-01	G
		241.92	6.290E-01	+	7.693E-01	2.37E-01	G
BI-212	1.4799E-02						
		727.17	1.480E-02	&(	6.226E-01	1.78E-01	G K
		1620.56	-5.001E-01	% P	2.355E+00	6.55E-01	G
		785.42	-4.499E-01	% P	3.050E+00	8.78E-01	G
BI-214	5.1871E-01						
		609.32	5.187E-01	(	1.148E-01	5.57E-02	G K
		1764.51	-1.204E-01	% P	5.269E-01	1.51E-01	G
		1120.28	8.482E-01	+	4.819E-01	2.02E-01	G
RA-224	1.4289E+00						
		241.00	1.429E+00	&(P	1.305E+00	4.10E-01	G
RA-226	1.0801E+00						
		185.99	1.080E+00	*(P	1.382E+00	4.25E-01	G
AC-228	5.6234E-01						
		911.07	2.767E-01	(P	3.449E-01	1.08E-01	G K
		968.90	7.869E-01	(P	2.960E-01	1.25E-01	G
		338.40	9.257E-01	(	4.447E-01	1.86E-01	G
TH-227	-2.8718E-01						
		236.00	-2.872E-01	%(P	5.586E-01	1.70E-01	G K
		256.25	1.746E-01	&	6.482E-01	1.94E-01	G
PA-234	-7.8505E-02						
		98.44	-7.850E-02	%(	2.650E-01	7.97E-02	G K
		946.00	-3.702E-04	%	2.841E-01	7.80E-02	G
		131.28	-1.403E-02	%	2.603E-01	7.74E-02	G
		94.67	2.549E-01	&	4.813E-01	1.46E-01	G
		883.24	1.060E-01	%	3.954E-01	1.15E-01	G
		926.70	2.785E-02	&	5.510E-01	1.54E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 3.112E-02 %   4.821E-01 1.38E-01 G

TH-234       2.1026E+00
                           63.29 2.103E+00 %(P 5.095E+00 1.54E+00 G K
                           92.80 1.410E+00 &   2.803E+00 8.51E-01 G
                           92.38 1.636E+00 & P 3.302E+00 1.00E+00 G

AM-241       6.0009E-02
                           59.54 6.001E-02 &(  7.293E-01 2.17E-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	1.1194E-01	1.1894E-01	4.1854E-01	4.1859E-01	4.459E-01
K-40		1.4800E+01	1.4800E+01	1.9523E+00	2.1216E+00	5.746E-01
MN-54	#A	-3.3529E-04	-3.3878E-04	7.6100E-01	7.6100E-01	5.917E-02
CO-57	#B	8.1252E-03	8.2232E-03	5.7492E-02	5.7494E-02	6.345E-02
CO-60	#B	7.3170E-03	7.3293E-03	5.2816E-02	5.2818E-02	6.336E-02

Sr-85	#A	-7.1546E-03	-7.5207E-03	5.5389E-02	5.5391E-02	6.021E-02
Kr-85	#A	-8.0659E+01	-8.0662E+01	1.1939E+03	1.1939E+03	1.374E+03
Y-88	#B	-2.3329E-05	-2.4048E-05	1.4429E-04	1.4429E-04	2.620E-02
NB-94	#B	9.7360E-03	9.7360E-03	4.4170E-02	4.4173E-02	5.148E-02
Ag-108M	#B	-1.5716E-02	-1.5717E-02	5.2220E-02	5.2227E-02	5.942E-02
CD-109	#A	-6.6138E-03	-6.6612E-03	2.7606E+00	2.7606E+00	1.759E+00
SN-113	#B	9.4407E-03	9.7099E-03	6.0511E-02	6.0513E-02	6.722E-02
SB-125	#B	8.1337E-02	8.1598E-02	6.3597E-02	6.3761E-02	1.558E-01
I-131	#B	-7.0994E-04	-1.0617E-03	7.0276E-02	7.0276E-02	5.425E-02
CS-134	#B	1.9199E-02	1.9282E-02	2.1557E-02	2.1584E-02	5.247E-02
CS-137	#A	3.0489E-02	3.0498E-02	4.4367E-02	4.4400E-02	4.714E-02
CE-139	#A	-1.3366E-02	-1.3684E-02	5.6700E-02	5.6706E-02	5.951E-02
EU-152	#B	2.1139E-02	2.1154E-02	1.6683E-01	1.6684E-01	1.864E-01
EU-154	#B	-2.4742E-02	-2.4768E-02	1.3065E-01	1.3066E-01	1.427E-01
EU-155	#B	2.0100E-03	2.0135E-03	2.3039E-01	2.3039E-01	2.581E-01
HG-203	#B	-2.3425E-03	-2.5110E-03	5.5208E-02	5.5208E-02	5.514E-02
TL-208		3.5350E-01	3.5350E-01	8.9615E-02	9.1784E-02	
PB-212	#	8.2093E-01	8.2093E-01	1.4863E-01	1.5561E-01	1.203E-01
PB-214	#	4.9754E-01	4.9754E-01	1.3447E-01	1.3734E-01	1.116E-01
BI-212	B	1.4799E-02	1.4799E-02	5.3544E-01	5.3544E-01	6.226E-01
BI-214		5.1871E-01	5.1871E-01	1.6679E-01	1.6931E-01	
RA-224	#	1.4289E+00	1.4289E+00	1.2291E+00	1.2317E+00	1.305E+00
RA-226	#A	1.0801E+00	1.0801E+00	1.2750E+00	1.2764E+00	1.382E+00
AC-228		5.6234E-01	5.6234E-01	2.6252E-01	2.6441E-01	
TH-227	#B	-2.8718E-01	-2.8718E-01	5.1381E-01	5.1406E-01	5.586E-01
PA-234	#B	-7.8505E-02	-7.8505E-02	2.3923E-01	2.3927E-01	2.650E-01
TH-234	#B	2.1026E+00	2.1026E+00	4.6220E+00	4.6235E+00	5.095E+00
AM-241	#A	6.0008E-02	6.0009E-02	6.5164E-01	6.5165E-01	7.293E-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 (1767.3 to 1999.0 keV) 1.6234739E+01 pCi/gm
Total Decayed Activity (1767.3 to 1999.0 keV) 1.6234739E+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_1MAY2006_1433.An1

Sample description
FSS-OOL-02-02-017-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1MAY2006_1433.An1

Acquisition information
Start time: 01-May-2006 14:34:38
Live time: 2000
Real time: 2022
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: 1.8230E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8230E+03) =
5.4855E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 21:55:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5577

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.42	124.	24.62	1.10	8.817E-03				
74.42	124.	24.62	1.10	8.817E-03	74.81	9.600	PBC<MDA	PB212
77.32	211.	14.06	1.10	9.687E-03	77.11	10.700	1.530E+00	PB214
					77.11	17.500	9.354E-01	PB212
93.01	101.	41.28	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.864E+00	TH234
128.85	79.	35.85	1.47	1.714E-02				
186.12	118.	28.25	1.49	1.626E-02	185.99	3.280	1.583E+00	RA226
239.11	615.	4.84	1.22	1.378E-02	238.63	43.100	7.665E-01	PB212
242.16	83.	24.87	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.037E-01	PB214
270.64	87.	20.03	1.45	1.241E-02				
295.64	138.	14.85	1.35	1.145E-02	295.22	19.200	4.640E-01	PB214
327.83	52.	36.08	1.51	1.038E-02				
338.78	114.	17.69	1.09	1.005E-02	338.40	12.010	6.994E-01	AC228
352.37	215.	12.11	1.25	9.668E-03	351.99	37.100	4.428E-01	PB214
463.61	50.	27.16	0.78	7.363E-03	463.51	10.000	4.893E-01	SB125
511.22	121.	17.37	1.52	6.688E-03	510.72	22.500	5.935E-01	TL208
583.99	178.	9.17	1.16	5.882E-03	583.14	86.000	2.593E-01	TL208
610.17	193.	8.66	1.38	5.642E-03	609.32	46.090	5.506E-01	BI214
728.51	47.	24.35	1.55	4.794E-03	727.17	11.800	6.193E-01	BI212
796.75	25.	36.09	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
912.44	157.	11.85	1.49	3.917E-03	911.07	29.000	1.022E+00	AC228
970.25	105.	14.68	1.89	3.713E-03	968.90	17.460	1.194E+00	AC228
1121.72	45.	23.87	2.22	3.283E-03	1120.28	15.040	6.801E-01	BI214
1463.22	496.	4.49	1.80	2.617E-03	1460.75	10.700	1.311E+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	
148.41	74.71	401.	124.	0.062	73.86	1.098	BI-207	D
154.21	77.61	333.	211.	0.105	42.18	1.100	PB-214	D
477.84	239.06	135.	615.	0.308	14.51	1.215	PB-212	D
483.96	242.12	172.	83.	0.042	74.62	1.217	PB-214	D
540.91	270.64	102.	87.	0.043	60.09	1.446	AC-228	M
655.33	327.83	120.	52.	0.026	108.24	1.512	AC-228	sM
1825.03	912.44	41.	158.	0.079	29.37	1.493	AC-228	M
1940.70	970.25	35.	106.	0.053	37.63	1.890	AC-228	M

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.34	74.88	904.	124.	0.062	103.35	1.500s
PB-214	153.80	77.11	813.	172.	0.086	74.05	1.500D
PB-212	153.80	77.11	813.	172.	0.086	74.05	1.500D
TH-234	185.61	93.01	812.	101.	0.050	123.83	1.500
RA-226	372.52	186.46	409.	75.	0.038	111.86	1.500s
PB-212	477.80	239.09	388.	562.	0.281	19.51	1.500
PB-214	591.26	295.80	165.	134.	0.067	48.18	1.500s
AC-228	677.42	338.87	125.	112.	0.056	51.06	1.500
PB-214	704.78	352.55	121.	192.	0.096	32.43	1.500
SB-125	927.66	463.96	76.	35.	0.017	112.18	1.500s
TL-208	1022.23	511.22	88.	121.	0.060	52.11	1.525s
TL-208	1167.80	583.99	37.	177.	0.089	27.50	1.163
BI-214	1220.19	610.17	34.	193.	0.097	25.99	1.383
BI-212	1456.97	728.51	43.	47.	0.024	73.05	1.554s
CS-134	1593.53	796.75	28.	25.	0.012	108.26	1.601s
BI-214	2243.85	1121.72	25.	45.	0.023	71.61	2.222s
K-40	2927.36	1463.22	-3.	477.	0.239	13.63	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		1.8398E-01					
			477.56	1.840E-01	%(	4.104E-01 1.24E-01	G
K-40		1.2615E+01					
			1460.75	1.262E+01	(P	1.948E-01 5.74E-01	G
MN-54		4.4678E-03					
			834.81	4.468E-03	&(P	5.087E-02 1.42E-02	G
CO-57		-1.5333E-03					
			122.07	-1.533E-03	&(	6.061E-02 1.80E-02	G K
			136.43	-4.782E-02	%	4.588E-01 1.37E-01	G
CO-60		1.1633E-03					
			1332.51	1.163E-03	&(P	6.537E-02 1.78E-02	G K
			1173.23	1.516E-02	%	7.161E-02 2.07E-02	G K
Sr-85		-1.1291E-03					
			514.00	-1.129E-03	%(	5.296E-02 1.51E-02	G
Kr-85		-1.0230E+02					
			513.99	-1.023E+02	%(	1.128E+03 3.25E+02	G
Y-88		-4.6502E-03					
			1836.01	-4.650E-03	%(P	5.119E-02 1.32E-02	G K
			898.02	-5.248E-03	& P	6.133E-02 1.70E-02	G
NB-94		0.0000E+00					
			871.10	0.000E+00	%(	5.186E-02 1.42E-02	G K
			702.50	1.505E-02	%	4.737E-02 1.40E-02	G K
Ag-108M		6.9094E-03					
			722.95	6.909E-03	&(	6.062E-02 1.73E-02	G K
			614.37	-3.694E-02	% P	6.922E-02 2.11E-02	G
			433.93	4.675E-05	%	3.330E-02 9.25E-03	G
CD-109		9.4634E-01					
			88.04	9.463E-01	&(P	2.143E+00 6.49E-01	G
SN-113		-4.6871E-04					
			391.71	-4.687E-04	&(	7.042E-02 2.03E-02	G K
			255.04	-1.833E-01	&	2.098E+00 6.18E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0506E-01						
		427.95	2.200E-02	&(P	1.363E-01	3.95E-02	G K
		600.77	1.593E-02	% P	2.644E-01	7.51E-02	G
		636.15	-6.581E-03	& P	4.321E-01	1.21E-01	G
		463.51	3.509E-01	(P	4.363E-01	1.37E-01	G
		176.29	-2.204E-02	% P	5.570E-01	1.63E-01	G
I-131	-6.1091E-03						
		364.48	-6.109E-03	%(	7.142E-02	2.07E-02	G K
		636.97	9.365E-02	%	1.097E+00	3.14E-01	G
		284.29	-5.925E-02	&	9.300E-01	2.71E-01	G
CS-134	2.2146E-02						
		604.66	-1.427E-03	%(	7.180E-02	2.07E-02	G K
		795.76	4.909E-02	(	5.388E-02	1.77E-02	G
		569.29	-1.747E-02	%	2.751E-01	7.78E-02	G
		801.84	-1.788E-03	% P	4.906E-01	1.33E-01	G
CS-137	0.0000E+00						
		661.62	0.000E+00	%(	6.192E-02	1.74E-02	G
CE-139	-3.1230E-03						
		165.85	-3.123E-03	&(P	5.392E-02	1.59E-02	G
EU-152	-1.8287E-02						
		121.78	-1.829E-02	&(P	1.802E-01	5.37E-02	G K
		344.30	7.779E-04	%	1.600E-01	4.63E-02	G
		1408.08	0.000E+00	%	1.899E-01	4.70E-02	G
		964.00	1.077E-01	& P	2.958E-01	8.72E-02	G
		1112.07	-1.374E-03	%	4.284E-01	1.17E-01	G
		778.90	-9.563E-04	% P	5.630E-01	1.60E-01	G
EU-154	1.6036E-02						
		123.10	1.604E-02	%(P	1.336E-01	3.99E-02	G K
		1274.80	-2.337E-02	%	1.869E-01	5.25E-02	G
		723.30	-1.053E-02	& P	2.736E-01	7.69E-02	G
		1004.80	6.933E-02	&	3.330E-01	9.58E-02	G
EU-155	7.3792E-02						
		86.45	7.379E-02	%(P	2.636E-01	7.92E-02	G K
		105.31	2.769E-02	&	2.577E-01	7.68E-02	G
HG-203	1.2637E-02						
		279.17	1.264E-02	&(P	5.764E-02	1.71E-02	G K
		72.87	-1.189E-01	%	1.931E+00	5.75E-01	G
		70.83	-1.258E+00	%	4.383E+00	1.32E+00	G
		82.50	-6.905E-02	&	3.983E+00	1.18E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5931E-01						
		583.14	2.593E-01	(P	4.534E-02	2.39E-02	G
		510.72	5.935E-01	+	2.289E-01	1.03E-01	G
PB-212	7.1847E-01						
		238.63	7.005E-01	(	1.177E-01	4.56E-02	G K
							Energy duplication
		77.11	7.628E-01	*(	6.020E-01	1.88E-01	G
		74.81	1.086E+00	& P	1.247E+00	3.83E-01	G
PB-214	4.1553E-01						
		351.99	3.966E-01	(P	1.113E-01	4.30E-02	G K
		295.22	4.521E-01	@(	2.109E-01	7.26E-02	G
							Energy duplication
		77.11	1.248E+00	+	9.846E-01	3.08E-01	G
		241.92	0.000E+00	%	7.222E-01	2.13E-01	G
BI-212	6.1932E-01						
		727.17	6.193E-01	&(	4.340E-01	1.51E-01	G K
		1620.56	-3.773E-02	& P	8.288E-01	1.12E-01	G
		785.42	6.159E-01	% P	2.190E+00	6.37E-01	G
BI-214	5.8245E-01						
		609.32	5.506E-01	(	8.462E-02	4.78E-02	G K
		1764.51	-7.692E-03	% P	3.779E-01	9.77E-02	G
		1120.28	6.801E-01	@(	3.884E-01	1.63E-01	G
RA-224	8.6357E-01						
		241.00	8.636E-01	%(P	1.325E+00	4.06E-01	G
RA-226	1.0486E+00						
		185.99	1.049E+00	*(P	1.346E+00	4.14E-01	G
AC-228	1.9425E-01						
		911.07	-9.261E-03	%(P	2.359E-01	6.65E-02	G K
		968.90	-1.432E-02	% P	4.132E-01	1.17E-01	G
		338.40	6.857E-01	(	3.363E-01	1.17E-01	G
TH-227	8.7621E-03						
		236.00	8.762E-03	&(P	6.232E-01	1.85E-01	G K
		256.25	-5.535E-02	%	6.127E-01	1.80E-01	G
PA-234	-6.5744E-02						
		98.44	-6.574E-02	&(	2.688E-01	8.07E-02	G K
		946.00	-7.894E-02	%	3.391E-01	9.89E-02	G
		131.28	-5.642E-02	%	2.703E-01	8.10E-02	G
		94.67	-1.022E-01	%	4.944E-01	1.48E-01	G
		883.24	-7.731E-02	%	5.196E-01	1.49E-01	G
		926.70	0.000E+00	%	4.525E-01	1.23E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-2.456E-02 %   4.059E-01 1.15E-01 G

TH-234       1.3817E+00
                           63.29 1.010E+00 %(P 4.788E+00 1.43E+00 G K
                           92.80 1.864E+00  (  2.511E+00 7.70E-01 G
                           92.38 2.157E+00 % P 2.979E+00 9.12E-01 G

AM-241       1.4917E-01
                           59.54 1.492E-01 %(  5.321E-01 1.59E-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	1.7310E-01	1.8398E-01	3.7188E-01	3.7202E-01	3.861E-01
K-40		1.2615E+01	1.2615E+01	1.7206E+00	1.8606E+00	1.948E-01
MN-54	#A	4.4215E-03	4.4678E-03	4.2719E-02	4.2720E-02	5.034E-02
CO-57	#B	-1.5149E-03	-1.5333E-03	5.3961E-02	5.3961E-02	5.988E-02
CO-60	#B	1.1613E-03	1.1633E-03	5.3266E-02	5.3266E-02	6.526E-02

Sr-85	#A	-1.0738E-03	-1.1291E-03	4.5437E-02	4.5437E-02	5.037E-02
Kr-85	#A	-1.0230E+02	-1.0230E+02	9.7504E+02	9.7505E+02	1.128E+03
Y-88	#B	-4.5104E-03	-4.6502E-03	4.0083E-02	4.0083E-02	4.965E-02
NB-94	#B	0.0000E+00	0.0000E+00	4.2730E-02	4.2730E-02	5.186E-02
Ag-108M	#B	6.9089E-03	6.9094E-03	5.2024E-02	5.2026E-02	6.062E-02
CD-109	#A	9.3958E-01	9.4634E-01	1.9463E+00	1.9470E+00	2.128E+00
SN-113	#B	-4.5565E-04	-4.6871E-04	6.0792E-02	6.0792E-02	6.846E-02
SB-125	#B	1.0472E-01	1.0506E-01	1.2310E-01	1.2324E-01	1.359E-01
I-131	#B	-4.0759E-03	-6.1091E-03	6.2065E-02	6.2066E-02	4.765E-02
CS-134	#B	2.2051E-02	2.2146E-02	2.3975E-02	2.4007E-02	7.149E-02
CS-137	#A	0.0000E+00	0.0000E+00	5.2241E-02	5.2241E-02	6.190E-02
CE-139	#A	-3.0500E-03	-3.1230E-03	5.5943E-02	5.5944E-02	5.266E-02
EU-152	#B	-1.8274E-02	-1.8287E-02	1.8609E-01	1.8609E-01	1.801E-01
EU-154	#B	1.6019E-02	1.6036E-02	1.1958E-01	1.1959E-01	1.334E-01
EU-155	#B	7.3659E-02	7.3792E-02	2.3768E-01	2.3772E-01	2.631E-01
HG-203	#B	1.1785E-02	1.2637E-02	5.1381E-02	5.1386E-02	5.375E-02
TL-208		2.5931E-01	2.5931E-01	7.1463E-02	7.2930E-02	
PB-212	#	7.1847E-01	7.1847E-01	1.4021E-01	1.4589E-01	1.177E-01
PB-214	#	4.1553E-01	4.1553E-01	1.2074E-01	1.2298E-01	1.113E-01
BI-212		6.1932E-01	6.1932E-01	4.5241E-01	4.5374E-01	4.340E-01
BI-214		5.8245E-01	5.8245E-01	1.5139E-01	1.5488E-01	
RA-224	#A	8.6357E-01	8.6357E-01	1.2167E+00	1.2176E+00	1.325E+00
RA-226	#A	1.0486E+00	1.0486E+00	1.2422E+00	1.2436E+00	1.346E+00
AC-228	B	1.9425E-01	1.9425E-01	9.9178E-02	9.9775E-02	2.359E-01
TH-227	#B	8.7621E-03	8.7621E-03	5.5597E-01	5.5597E-01	6.232E-01
PA-234	#B	-6.5744E-02	-6.5744E-02	2.4213E-01	2.4216E-01	2.688E-01
TH-234	#B	1.3817E+00	1.3817E+00	1.7110E+00	1.7127E+00	4.788E+00
AM-241	#A	1.4916E-01	1.4917E-01	4.7829E-01	4.7836E-01	5.321E-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) 1.4270765E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.4270765E+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_1MAY2006_1511.An1

Sample description
FSS-OOL-02-02-014-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1MAY2006_1511.An1

Acquisition information
Start time: 01-May-2006 15:11:59
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: 1.6190E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6190E+03) =
6.1767E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 21:42:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.7100

***** S U M M A R Y O F P E A K 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	134.	31.09	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.21	173.	24.32	1.50	9.541E-03	77.11	10.700	1.417E+00	PB214
					77.11	17.500	8.662E-01	PB212
77.21	173.	24.32	1.50	9.541E-03	77.11	10.700	1.417E+00	PB214
					77.11	17.500	8.662E-01	PB212
186.67	93.	31.96	1.05	1.624E-02	185.99	3.280	PBC<MDA	RA226
209.45	82.	32.02	0.93	1.518E-02				
239.17	652.	6.52	1.16	1.378E-02	238.63	43.100	9.141E-01	PB212
270.48	78.	28.78	1.55	1.242E-02				
295.82	129.	12.58	1.26	1.145E-02	295.22	19.200	4.873E-01	PB214
300.60	44.	32.23	1.26	1.128E-02				
339.03	134.	17.44	1.35	1.004E-02	338.40	12.010	9.237E-01	AC228
352.71	178.	10.42	1.33	9.659E-03	351.99	37.100	4.117E-01	PB214
463.55	51.	25.03	1.67	7.364E-03	463.51	10.000	5.600E-01	SB125
511.18	102.	17.55	1.15	6.695E-03	510.72	22.500	5.669E-01	TL208
584.25	209.	9.59	1.37	5.879E-03	583.14	86.000	3.432E-01	TL208
610.47	174.	10.63	1.52	5.639E-03	609.32	46.090	5.584E-01	BI214
727.76	35.	25.77	0.68	4.794E-03	727.17	11.800	5.105E-01	BI212
796.41	28.	32.46	1.60	4.420E-03	795.76	85.400	6.112E-02	CS134
912.12	115.	11.70	1.49	3.918E-03	911.07	29.000	8.408E-01	AC228
970.29	113.	14.13	1.60	3.713E-03	968.90	17.460	1.453E+00	AC228
1122.34	46.	19.98	0.90	3.278E-03				
1463.31	436.	4.88	1.76	2.617E-03	1460.75	10.700	1.298E+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	Background	Net Area	Intensity	Uncert	FWHM	Suspected

Channel	Energy	Counts	Counts	Cts/Sec	3 Sigma %	keV	Nuclide	
418.52	209.45	243.	82.	0.041	96.07	0.931	AC-228	sM

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
477.96	239.17	832.	158.	0.079	81.10	1.159	PB-212	M
540.59	270.48	165.	78.	0.039	86.35	1.550	AC-228	sM
600.85	300.45	79.	44.	0.022	96.69	1.258	PB-212	lD
2245.39	1122.34	12.	44.	0.022	56.21	1.820	TA-182	D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.49	74.96	842.	134.	0.067	93.27	1.500s
PB-214	153.80	77.11	801.	173.	0.087	72.97	1.500D
PB-212	153.80	77.11	801.	173.	0.087	72.97	1.500D
PB-212	477.72	239.04	316.	455.	0.228	21.73	1.500
PB-214	591.26	295.80	159.	114.	0.057	54.93	1.500
AC-228	677.46	338.89	107.	112.	0.056	48.40	1.500
PB-214	704.94	352.63	85.	185.	0.093	30.48	1.500s
SB-125	926.24	463.25	45.	34.	0.017	93.77	1.500s
TL-208	1022.15	511.18	67.	102.	0.051	52.66	1.155s
TL-208	1168.33	584.25	50.	208.	0.104	28.78	1.371
BI-214	1220.80	610.47	53.	174.	0.087	31.90	1.516
BI-212	1455.47	727.76	20.	35.	0.017	77.30	0.681s
CS-134	1592.83	796.41	26.	28.	0.014	97.39	1.601s
AC-228	1825.55	912.70	21.	84.	0.042	39.65	1.679
AC-228	1941.45	970.62	25.	77.	0.038	43.85	1.718
K-40	2927.44	1463.27	11.	397.	0.199	15.44	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		-9.1403E-02					
			477.56	-9.140E-02	%(	5.247E-01 1.53E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	1.1829E+01						
		1460.75	1.183E+01	(P	5.316E-01	6.09E-01	G
MN-54	-1.2867E-03						
		834.81	-1.287E-03	&(P	6.170E-02	1.71E-02	G
CO-57	-1.1000E-03						
		122.07	-1.100E-03	%(	4.908E-02	1.44E-02	G K
		136.43	1.238E-02	&	5.109E-01	1.51E-01	G
CO-60	-5.1047E-03						
		1332.51	-5.105E-03	%(P	7.493E-02	2.06E-02	G K
		1173.23	4.724E-03	%	8.047E-02	2.25E-02	G K
Sr-85	-2.2932E-02						
		514.00	-2.293E-02	&(	7.027E-02	2.10E-02	G
Kr-85	-5.8236E+00						
		513.99	-5.824E+00	&(	1.318E+03	3.76E+02	G
Y-88	5.6519E-03						
		1836.01	5.652E-03	%(P	4.507E-02	1.14E-02	G K
		898.02	-1.399E-03	% P	5.636E-02	1.50E-02	G
NB-94	-3.5295E-03						
		871.10	-3.529E-03	%(	4.777E-02	1.31E-02	G K
		702.50	1.260E-02	%	5.893E-02	1.71E-02	G K
Ag-108M	-1.5964E-02						
		722.95	-1.596E-02	&(	6.110E-02	1.78E-02	G K
		614.37	-1.829E-02	% P	7.327E-02	2.16E-02	G
		433.93	-6.422E-03	%	5.492E-02	1.59E-02	G
CD-109	5.9464E-02						
		88.04	5.946E-02	&(P	2.433E+00	7.24E-01	G
SN-113	1.7129E-02						
		391.71	1.713E-02	%(	6.915E-02	2.04E-02	G K
		255.04	4.065E-01	&	1.845E+00	5.46E-01	G
SB-125	6.1257E-02						
		427.95	-4.836E-02	%(P	1.649E-01	4.85E-02	G K
		600.77	-3.479E-02	% P	3.032E-01	8.69E-02	G
		636.15	-8.326E-02	% P	5.016E-01	1.45E-01	G
		463.51	3.857E-01	(P	3.873E-01	1.26E-01	G
		176.29	-9.438E-02	% P	7.278E-01	2.15E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	0.0000E+00						
		364.48	0.000E+00	%(	7.792E-02	2.23E-02	G K
		636.97	-1.983E-01	&	1.096E+00	3.17E-01	G
		284.29	-2.200E-01	%	1.128E+00	3.34E-01	G
CS-134	2.6039E-02						
		604.66	-4.658E-03	&(	5.664E-02	1.62E-02	G K
		795.76	6.112E-02	*(	5.895E-02	1.98E-02	G
		569.29	3.775E-02	&	2.989E-01	8.53E-02	G
		801.84	1.344E-01	% P	6.920E-01	1.99E-01	G
CS-137	1.5278E-02						
		661.62	1.528E-02	%(	5.017E-02	1.47E-02	G
CE-139	-5.0326E-03						
		165.85	-5.033E-03	&(P	6.059E-02	1.79E-02	G
EU-152	-6.3891E-04						
		121.78	-6.389E-04	%(P	1.814E-01	5.36E-02	G K
		344.30	1.810E-02	%	1.710E-01	4.99E-02	G
		1408.08	-1.032E-02	%	2.810E-01	7.43E-02	G
		964.00	-7.566E-02	% P	4.970E-01	1.42E-01	G
		1112.07	1.187E-02	%	5.304E-01	1.46E-01	G
		778.90	-1.434E-02	% P	4.561E-01	1.27E-01	G
EU-154	-2.2297E-02						
		123.10	-2.230E-02	%(P	1.374E-01	4.10E-02	G K
		1274.80	7.282E-03	&	1.775E-01	4.79E-02	G
		723.30	-8.084E-02	& P	2.992E-01	8.74E-02	G
		1004.80	4.775E-04	&	3.331E-01	9.03E-02	G
EU-155	3.9929E-02						
		86.45	3.993E-02	%(P	2.925E-01	8.74E-02	G K
		105.31	3.825E-02	%	2.942E-01	8.78E-02	G
HG-203	7.4501E-03						
		279.17	7.450E-03	&(P	6.094E-02	1.79E-02	G K
		72.87	-8.976E-01	%	2.597E+00	7.84E-01	G
		70.83	-5.395E-02	&	3.013E+00	8.88E-01	G
		82.50	-4.405E-01	&	4.429E+00	1.32E+00	G
TL-208	3.4323E-01						
		583.14	3.432E-01	(P	5.860E-02	3.31E-02	G
		510.72	5.669E-01	+	2.259E-01	9.96E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	6.3858E-01						
		238.63	6.386E-01	(	1.200E-01	4.62E-02	G K
							Energy duplication
		77.11	8.662E-01	+	6.730E-01	2.11E-01	G
		74.81	1.317E+00	& P	1.356E+00	4.19E-01	G
PB-214	4.3056E-01						
		351.99	4.306E-01	(P	1.064E-01	4.38E-02	G K
		295.22	4.305E-01	(	2.333E-01	7.88E-02	G
							Energy duplication
		77.11	1.417E+00	+	1.101E+00	3.45E-01	G
		241.92	2.195E-01	%	7.839E-01	2.35E-01	G
BI-212	5.1052E-01						
		727.17	5.105E-01	(	3.505E-01	1.32E-01	G K
		1620.56	1.670E-02	& P	1.977E+00	4.92E-01	G
		785.42	3.726E-01	% P	2.850E+00	8.10E-01	G
BI-214	5.5843E-01						
		609.32	5.584E-01	(	1.172E-01	5.95E-02	G K
		1764.51	-6.515E-02	% P	5.319E-01	1.47E-01	G
		1120.28	2.183E-02	%	3.915E-01	1.07E-01	G
RA-224	5.8359E-01						
		241.00	5.836E-01	%(P	1.511E+00	4.56E-01	G
RA-226	1.0268E+00						
		185.99	1.027E+00	%(P	1.426E+00	4.37E-01	G
AC-228	6.6505E-01						
		911.07	6.199E-01	(P	1.748E-01	8.21E-02	G K
		968.90	9.860E-01	+ P	3.317E-01	1.44E-01	G
		338.40	7.742E-01	(	3.524E-01	1.25E-01	G
TH-227	-1.0252E-01						
		236.00	-1.025E-01	%(P	4.999E-01	1.49E-01	G K
		256.25	-1.356E-01	%	6.963E-01	2.07E-01	G
PA-234	7.5070E-02						
		98.44	7.507E-02	&(	2.781E-01	8.35E-02	G K
		946.00	0.000E+00	&	4.246E-01	1.20E-01	G
		131.28	2.698E-02	%	2.794E-01	8.32E-02	G
		94.67	-1.970E-01	%	5.329E-01	1.61E-01	G
		883.24	-5.419E-03	%	3.831E-01	1.03E-01	G
		926.70	4.964E-03	%	4.061E-01	1.08E-01	G
		569.26	5.636E-02	&	4.413E-01	1.26E-01	G

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

TH-234       6.4612E-01
                           63.29 6.461E-01 %(P 5.135E+00 1.53E+00 G K
                           92.80 1.818E+00 %   2.652E+00 8.11E-01 G
                           92.38-2.687E-03 & P 3.133E+00 9.30E-01 G

AM-241      -4.0634E-03
                           59.54-4.063E-03 &(  7.117E-01 2.11E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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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	-8.5961E-02	-9.1403E-02	4.5893E-01	4.5896E-01	4.935E-01
K-40		1.1829E+01	1.1829E+01	1.8265E+00	1.9434E+00	5.316E-01
MN-54	#A	-1.2733E-03	-1.2867E-03	1.0183E-01	1.0183E-01	6.106E-02
CO-57	#B	-1.0867E-03	-1.1000E-03	4.3304E-02	4.3304E-02	4.849E-02
CO-60	#B	-5.0960E-03	-5.1047E-03	6.7718E-02	6.7719E-02	7.480E-02
Sr-85	#A	-2.1802E-02	-2.2932E-02	6.2918E-02	6.2931E-02	6.681E-02

Kr-85	#A	-5.8234E+00	-5.8236E+00	1.1290E+03	1.1290E+03	1.318E+03
Y-88	#B	5.4807E-03	5.6519E-03	3.4207E-02	3.4209E-02	4.370E-02
NB-94	#B	-3.5295E-03	-3.5295E-03	3.9281E-02	3.9281E-02	4.777E-02
Ag-108M	#B	-1.5963E-02	-1.5964E-02	5.3541E-02	5.3548E-02	6.110E-02
CD-109	#A	5.9036E-02	5.9464E-02	2.1717E+00	2.1717E+00	2.415E+00
SN-113	#B	1.6648E-02	1.7129E-02	6.1134E-02	6.1142E-02	6.721E-02
SB-125	#B	6.1059E-02	6.1257E-02	6.0059E-02	6.0158E-02	1.644E-01
I-131	#B	0.0000E+00	0.0000E+00	6.6867E-02	6.6867E-02	5.183E-02
CS-134	#B	2.5926E-02	2.6039E-02	2.5361E-02	2.5403E-02	5.639E-02
CS-137	#A	1.5274E-02	1.5278E-02	4.4069E-02	4.4077E-02	5.015E-02
CE-139	#A	-4.9140E-03	-5.0326E-03	6.0042E-02	6.0043E-02	5.916E-02
EU-152	#B	-6.3846E-04	-6.3891E-04	4.0230E-01	4.0230E-01	1.813E-01
EU-154	#B	-2.2274E-02	-2.2297E-02	1.2583E-01	1.2584E-01	1.372E-01
EU-155	#B	3.9857E-02	3.9929E-02	2.6217E-01	2.6218E-01	2.919E-01
HG-203	#B	6.9440E-03	7.4501E-03	5.3803E-02	5.3805E-02	5.680E-02
TL-208		3.4323E-01	3.4323E-01	9.8989E-02	1.0085E-01	
PB-212	#	6.3858E-01	6.3858E-01	1.3873E-01	1.4329E-01	1.200E-01
PB-214	#	4.3056E-01	4.3056E-01	1.3151E-01	1.3371E-01	1.064E-01
BI-212	#	5.1052E-01	5.1052E-01	3.9463E-01	3.9567E-01	
BI-214		5.5843E-01	5.5843E-01	1.7815E-01	1.8089E-01	
RA-224	#A	5.8359E-01	5.8359E-01	1.3666E+00	1.3670E+00	1.511E+00
RA-226	#A	1.0268E+00	1.0268E+00	1.3120E+00	1.3133E+00	1.426E+00
AC-228		6.6505E-01	6.6505E-01	2.0827E-01	2.1159E-01	1.748E-01
TH-227	#B	-1.0252E-01	-1.0252E-01	4.6077E-01	4.6081E-01	4.999E-01
PA-234	#B	7.5070E-02	7.5070E-02	2.5060E-01	2.5063E-01	2.781E-01
TH-234	#B	6.4612E-01	6.4612E-01	4.5941E+00	4.5942E+00	5.135E+00
AM-241	#A	-4.0633E-03	-4.0634E-03	6.3183E-01	6.3183E-01	7.117E-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) 1.3906216E+01 pCi/gm
Total Decayed Activity (1460.5 to 1999.0 keV) 1.3906216E+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_1MAY2006_1549.An1

Sample description
FSS-OOL-02-02-002-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1MAY2006_1549.An1

Acquisition information
Start time: 01-May-2006 15:50:52
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: 1.6060E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6060E+03) =
6.2266E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 20:15:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.7210

***** S U M M A R Y O F P E A K 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	118.	37.69	1.50	8.847E-03				
74.85	118.	37.69	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.18	171.	26.07	1.50	9.541E-03	77.11	17.500	8.600E-01	PB212
					77.11	10.700	1.407E+00	PB214
77.18	171.	26.07	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.407E+00	PB214
90.08	85.	34.39	1.11	1.279E-02				
93.42	127.	22.62	1.11	1.346E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.672E+00	TH234
186.36	82.	39.70	1.02	1.625E-02	185.99	3.280	PBC<MDA	RA226
209.34	102.	26.84	1.00	1.519E-02				
239.12	672.	4.51	1.22	1.378E-02	238.63	43.100	9.501E-01	PB212
242.80	75.	26.49	1.22	1.362E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.204E-01	PB214
270.36	84.	26.92	1.64	1.242E-02				
295.75	143.	12.82	1.26	1.144E-02	295.22	19.200	5.460E-01	PB214
300.96	39.	36.90	1.26	1.126E-02				
328.19	39.	38.07	0.70	1.036E-02				
338.95	198.	14.24	1.44	1.004E-02	338.40	12.010	1.381E+00	AC228
352.64	254.	10.91	1.64	9.661E-03	351.99	37.100	5.955E-01	PB214
463.58	73.	24.46	1.32	7.364E-03	463.51	10.000	8.214E-01	SB125
511.99	139.	14.92	1.31	6.679E-03	510.72	22.500	7.748E-01	TL208
584.32	210.	9.16	1.50	5.879E-03	583.14	86.000	3.480E-01	TL208
610.31	191.	10.42	1.67	5.641E-03	609.32	46.090	6.169E-01	BI214
728.23	80.	20.60	1.38	4.788E-03	727.17	11.800	1.185E+00	BI212
862.27	38.	23.67	1.05	4.116E-03				
912.81	134.	11.78	1.17	3.915E-03	911.07	29.000	9.860E-01	AC228

970.26	110.	13.65	2.15	3.713E-03				
1122.31	38.	26.49	1.82	3.283E-03	1120.28	15.040	6.501E-01	BI214
1463.38	532.	4.37	1.87	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	
179.73	90.11	383.	85.	0.042	103.16	1.109	PB-214	lD
418.30	209.34	267.	102.	0.051	80.51	1.001	AC-228	sM
540.36	270.36	171.	84.	0.042	80.77	1.635	AC-228	sM
601.73	301.04	93.	36.	0.018	124.16	1.834	PB-212	sM
656.05	328.19	87.	39.	0.020	114.21	0.701	AC-228	sM
1724.62	862.27	19.	38.	0.019	71.00	1.050	TL-208	sM
1940.74	970.26	34.	110.	0.055	36.31	2.146	AC-228	sM
2927.68	1463.38	6.	530.	0.265	13.20	1.872	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	149.27	74.85	983.	118.	0.059	113.07	1.500s
PB-212	153.80	77.11	905.	171.	0.085	78.22	1.500D
PB-214	153.80	77.11	905.	171.	0.085	78.22	1.500D
TH-234	186.21	93.32	884.	132.	0.066	98.82	1.500s
PB-212	477.81	239.09	371.	597.	0.298	18.39	1.500
PB-214	591.21	295.78	177.	145.	0.072	46.31	1.500
AC-228	677.50	338.91	163.	144.	0.072	45.19	1.500
PB-214	704.97	352.64	103.	221.	0.110	28.00	1.500s
SB-125	927.30	463.77	62.	53.	0.026	72.82	1.500s
TL-208	1023.75	511.99	78.	139.	0.069	44.77	1.306s
TL-208	1168.48	584.32	56.	209.	0.105	27.48	1.504
BI-214	1220.47	610.31	62.	191.	0.095	31.27	1.669
BI-212	1456.41	728.23	51.	80.	0.040	61.79	1.377
AC-228	1825.83	912.84	36.	109.	0.054	37.11	1.679
BI-214	2245.01	1122.31	32.	38.	0.019	79.46	1.819s

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

***** S U M M A R Y O 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		8.3292E-02					
			477.56	8.329E-02	&(	4.518E-01 1.31E-01	G
K-40		8.2506E-02					
			1460.75	8.251E-02	%(P	1.157E+00 3.30E-01	G
MN-54		-9.9009E-03					
			834.81	-9.901E-03	%(P	6.647E-02 1.90E-02	G
CO-57		1.4710E-04					
			122.07	1.471E-04	&(	7.047E-02 2.09E-02	G K
			136.43	-4.050E-02	%	5.379E-01 1.60E-01	G
CO-60		9.5587E-03					
			1332.51	9.559E-03	%(P	8.075E-02 2.27E-02	G K
			1173.23	-4.538E-03	%	8.048E-02 2.25E-02	G K
Sr-85		-1.4278E-03					
			514.00	-1.428E-03	&(	6.273E-02 1.80E-02	G
Kr-85		-3.1309E+01					
			513.99	-3.131E+01	&(	1.376E+03 3.94E+02	G
Y-88		-8.7243E-03					
			1836.01	-8.724E-03	%(P	6.727E-02 1.81E-02	G K
			898.02	1.258E-02	& P	7.439E-02 2.13E-02	G
NB-94		-5.0776E-03					
			871.10	-5.078E-03	&(	6.104E-02 1.71E-02	G K
			702.50	-6.726E-03	&	6.650E-02 1.91E-02	G K
Ag-108M		2.2958E-02					
			722.95	2.296E-02	%(	3.971E-02 1.24E-02	G K
			614.37	-3.445E-02	% P	7.972E-02 2.40E-02	G
			433.93	-1.590E-02	%	5.497E-02 1.63E-02	G
CD-109		-6.1138E-02					
			88.04	-6.114E-02	%(P	2.565E+00 7.63E-01	G
SN-113		0.0000E+00					
			391.71	0.000E+00	%(	7.842E-02 2.25E-02	G K
			255.04	7.210E-01	&	2.021E+00 6.06E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.8433E-01						
		427.95	4.160E-02	&(P	1.584E-01	4.66E-02	G K
		600.77	1.013E-01	& P	2.979E-01	8.85E-02	G
		636.15	2.380E-01	% P	4.692E-01	1.43E-01	G
		463.51	6.068E-01	*(P	4.508E-01	1.52E-01	G
		176.29	-7.859E-02	% P	6.974E-01	2.05E-01	G
I-131	8.9135E-03						
		364.48	8.913E-03	%(	8.214E-02	2.39E-02	G K
		636.97	5.452E-01	%	1.055E+00	3.22E-01	G
		284.29	-7.420E-02	%	1.128E+00	3.30E-01	G
CS-134	-5.3555E-03						
		604.66	-5.355E-03	%(	6.563E-02	1.89E-02	G K
		795.76	4.288E-02	%	7.076E-02	2.19E-02	G
		569.29	-6.390E-02	%	3.659E-01	1.06E-01	G
		801.84	-7.338E-02	& P	7.563E-01	2.15E-01	G
CS-137	1.4479E-02						
		661.62	1.448E-02	%(	5.594E-02	1.63E-02	G
CE-139	-1.3785E-02						
		165.85	-1.378E-02	%(P	6.523E-02	1.95E-02	G
EU-152	-1.4368E-04						
		121.78	-1.437E-04	&(P	1.993E-01	5.91E-02	G K
		344.30	-5.583E-02	%	1.902E-01	5.67E-02	G
		1408.08	-4.956E-02	%	3.473E-01	9.71E-02	G
		964.00	-1.156E-01	& P	4.355E-01	1.26E-01	G
		1112.07	1.666E-01	%	5.343E-01	1.57E-01	G
		778.90	-7.875E-02	% P	4.858E-01	1.40E-01	G
EU-154	1.3427E-03						
		123.10	1.343E-03	%(P	1.332E-01	3.94E-02	G K
		1274.80	0.000E+00	&	3.456E-01	9.82E-02	G
		723.30	-1.151E-01	% P	3.534E-01	1.05E-01	G
		1004.80	-6.213E-02	%	4.093E-01	1.17E-01	G
EU-155	9.5241E-02						
		86.45	9.524E-02	%(P	3.121E-01	9.39E-02	G K
		105.31	9.594E-02	%	3.338E-01	1.00E-01	G
HG-203	5.1631E-04						
		279.17	5.163E-04	&(P	6.749E-02	1.97E-02	G K
		72.87	-4.202E-01	&	2.270E+00	6.80E-01	G
		70.83	-9.925E-01	%	5.050E+00	1.52E+00	G
		82.50	-2.026E-01	&	4.616E+00	1.37E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.4800E-01						
		583.14	3.480E-01	(P	6.217E-02	3.20E-02	G
		510.72	7.748E-01	+	2.455E-01	1.16E-01	G
PB-212	8.4849E-01						
		238.63	8.438E-01	(	1.307E-01	5.17E-02	G K
							Energy duplication
		77.11	8.600E-01	@(	7.200E-01	2.24E-01	G
		74.81	1.169E+00	+ P	1.475E+00	4.52E-01	G
PB-214	5.2997E-01						
		351.99	5.178E-01	(P	1.172E-01	4.84E-02	G K
		295.22	5.536E-01	(	2.476E-01	8.54E-02	G
							Energy duplication
		77.11	1.407E+00	+	1.178E+00	3.67E-01	G
		241.92	5.228E-01	%	8.409E-01	2.57E-01	G
BI-212	1.1855E+00						
		727.17	1.185E+00	(	5.368E-01	2.44E-01	G K
		1620.56	-4.283E-02	% P	2.795E+00	7.36E-01	G
		785.42	8.583E-02	% P	3.579E+00	1.01E+00	G
BI-214	6.2508E-01						
		609.32	6.169E-01	(	1.274E-01	6.44E-02	G K
		1764.51	-2.058E-03	& P	1.750E-01	2.38E-02	G
		1120.28	6.501E-01	&(	4.952E-01	1.72E-01	G
RA-224	1.1100E+00						
		241.00	1.110E+00	&(P	1.508E+00	4.64E-01	G
RA-226	1.0797E+00						
		185.99	1.080E+00	%(P	1.550E+00	4.75E-01	G
AC-228	8.6158E-01						
		911.07	8.038E-01	(P	2.283E-01	9.96E-02	G K
		968.90	-9.280E-03	% P	4.957E-01	1.40E-01	G
		338.40	1.001E+00	(	4.326E-01	1.51E-01	G
TH-227	-2.8927E-01						
		236.00	-2.893E-01	%(P	5.285E-01	1.61E-01	G K
		256.25	-7.091E-03	&	6.957E-01	2.03E-01	G
PA-234	-7.0950E-04						
		98.44	-7.095E-04	&(	3.104E-01	9.23E-02	G K
		946.00	-5.299E-02	%	3.679E-01	1.05E-01	G
		131.28	8.683E-02	%	2.764E-01	8.32E-02	G
		94.67	-2.129E-01	%	5.758E-01	1.74E-01	G
		883.24	-2.273E-02	&	5.045E-01	1.40E-01	G
		926.70	1.050E-01	&	5.363E-01	1.53E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-9.317E-02 %   5.404E-01 1.57E-01 G

TH-234       1.8021E+00
                           63.29 1.046E+00 &(P 5.506E+00 1.65E+00 G K
                           92.80 2.785E+00 *(  2.972E+00 9.17E-01 G
                           92.38-2.657E-01 % P 3.426E+00 1.02E+00 G

AM-241       9.8923E-03
                           59.54 9.892E-03 &(  8.181E-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	7.8244E-02	8.3292E-02	3.9310E-01	3.9312E-01	4.244E-01
K-40	A	8.2506E-02	8.2506E-02	9.8991E-01	9.8992E-01	1.157E+00
MN-54	#A	-9.7956E-03	-9.9009E-03	6.2097E-02	6.2099E-02	6.576E-02
CO-57	#B	1.4529E-04	1.4710E-04	6.2706E-02	6.2706E-02	6.960E-02
CO-60	#B	9.5421E-03	9.5587E-03	6.8041E-02	6.8043E-02	8.061E-02

Sr-85	#A	-1.3562E-03	-1.4278E-03	5.3963E-02	5.3963E-02	5.958E-02
Kr-85	#A	-3.1308E+01	-3.1309E+01	1.1833E+03	1.1833E+03	1.375E+03
Y-88	#B	-8.4553E-03	-8.7243E-03	5.4546E-02	5.4548E-02	6.520E-02
NB-94	#B	-5.0776E-03	-5.0776E-03	5.1408E-02	5.1408E-02	6.104E-02
Ag-108M	#B	2.2957E-02	2.2958E-02	3.7204E-02	3.7226E-02	3.971E-02
CD-109	#A	-6.0689E-02	-6.1138E-02	5.8886E+00	5.8886E+00	2.547E+00
SN-113	#B	0.0000E+00	0.0000E+00	6.7567E-02	6.7567E-02	7.617E-02
SB-125	#F	1.8372E-01	1.8433E-01	1.3815E-01	1.3853E-01	1.579E-01
I-131	#B	5.8845E-03	8.9135E-03	7.1586E-02	7.1588E-02	5.422E-02
CS-134	#B	-5.3318E-03	-5.3555E-03	5.6652E-02	5.6652E-02	6.534E-02
CS-137	#A	1.4474E-02	1.4479E-02	4.8848E-02	4.8854E-02	5.593E-02
CE-139	#A	-1.3454E-02	-1.3785E-02	6.0854E-02	6.0859E-02	6.366E-02
EU-152	#B	-1.4358E-04	-1.4368E-04	2.1467E-01	2.1467E-01	1.992E-01
EU-154	#B	1.3413E-03	1.3427E-03	1.1824E-01	1.1824E-01	1.330E-01
EU-155	#B	9.5065E-02	9.5241E-02	2.8181E-01	2.8186E-01	3.115E-01
HG-203	#B	4.8060E-04	5.1631E-04	5.9205E-02	5.9205E-02	6.282E-02
TL-208		3.4800E-01	3.4800E-01	9.5819E-02	9.7789E-02	
PB-212	#	8.4849E-01	8.4849E-01	1.5606E-01	1.6316E-01	1.307E-01
PB-214	#	5.2997E-01	5.2997E-01	1.4347E-01	1.4652E-01	1.172E-01
BI-212		1.1855E+00	1.1855E+00	7.3257E-01	7.3558E-01	
BI-214		6.2508E-01	6.2508E-01	1.9543E-01	1.9856E-01	
RA-224	#A	1.1100E+00	1.1100E+00	1.3907E+00	1.3921E+00	1.508E+00
RA-226	#A	1.0797E+00	1.0797E+00	1.4237E+00	1.4250E+00	1.550E+00
AC-228		8.6158E-01	8.6158E-01	2.5211E-01	2.5670E-01	2.283E-01
TH-227	#B	-2.8927E-01	-2.8927E-01	4.8755E-01	4.8782E-01	5.285E-01
PA-234	#B	-7.0950E-04	-7.0950E-04	2.7689E-01	2.7689E-01	3.104E-01
TH-234	#B	1.8021E+00	1.8021E+00	1.7808E+00	1.7836E+00	5.506E+00
AM-241	#A	9.8921E-03	9.8923E-03	7.2873E-01	7.2873E-01	8.181E-01

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

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

Total Activity (50.2 to 1999.0 keV) 3.0201440E+00 pCi/gm
Total Decayed Activity (50.2 to 1999.0 keV) 3.0201440E+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_1MAY2006_1627.An1

Sample description
FSS-OOL-02-02-011-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1MAY2006_1627.An1

Acquisition information
Start time: 01-May-2006 16:29:02
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: 1.9900E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9900E+03) =
5.0251E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 21:17:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.7619

***** S U M M A R Y O F P E A 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	129.	33.48	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.13	177.	24.56	1.50	9.541E-03				
77.13	177.	24.56	1.50	9.541E-03	77.11	10.700	1.176E+00	PB214
					77.11	17.500	7.190E-01	PB212
77.13	177.	24.56	1.50	9.541E-03				
77.13	177.	24.56	1.50	9.541E-03	77.11	10.700	1.176E+00	PB214
					77.11	17.500	7.190E-01	PB212
87.40	131.	38.54	1.05	1.221E-02				
87.40	131.	38.54	1.05	1.221E-02	88.04	3.790	PBC<MDA	CD109
186.10	91.	32.54	1.09	1.626E-02	185.99	3.280	PBC<MDA	RA226
209.80	104.	26.54	1.07	1.517E-02				
239.13	684.	4.58	1.22	1.378E-02	238.63	43.100	7.811E-01	PB212
241.77	94.	29.03	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.256E-01	PB214
271.73	94.	28.26	1.60	1.237E-02				
295.89	150.	11.86	1.26	1.144E-02	295.22	19.200	4.625E-01	PB214
300.89	52.	29.00	1.26	1.127E-02				
328.97	57.	36.15	0.96	1.034E-02				
339.17	182.	18.11	1.16	1.004E-02	338.40	12.010	1.023E+00	AC228
352.54	239.	9.80	1.20	9.664E-03	351.99	37.100	4.505E-01	PB214
511.43	83.	20.33	1.18	6.686E-03	510.72	22.500	3.742E-01	TL208
584.40	214.	9.88	1.28	5.878E-03	583.14	86.000	2.869E-01	TL208
610.40	222.	8.81	1.54	5.640E-03	609.32	46.090	5.800E-01	BI214
728.64	65.	25.75	1.69	4.785E-03	727.17	11.800	7.755E-01	BI212
796.56	28.	30.48	1.07	4.416E-03	795.76	85.400	4.970E-02	CS134
912.91	151.	12.68	1.68	3.915E-03				
970.61	134.	11.73	1.47	3.712E-03				

1122.68	34.	30.96	1.82	3.283E-03	1120.28	15.040	4.658E-01	BI214
1463.36	616.	4.10	1.84	2.617E-03	1460.75	10.700	1.491E+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
174.38	87.40	933.	131.	0.066	115.61	1.053	PB-214 l
419.21	209.80	286.	104.	0.052	79.62	1.072	NP-239 sM
477.90	239.10	149.	684.	0.342	13.74	1.215	PB-212 D
483.18	241.74	325.	94.	0.047	87.08	1.217	PB-214 D
543.10	271.73	226.	94.	0.047	84.79	1.599	PA-234 sM
601.44	300.79	89.	52.	0.026	86.99	1.259	PB-212 lD
657.62	328.97	138.	57.	0.029	108.45	0.964	LA-140 M
1593.14	796.56	22.	28.	0.014	91.43	1.066	PA-234 l
1825.97	912.91	52.	150.	0.075	31.98	1.682	AC-228 M
1941.43	970.61	32.	136.	0.068	31.31	1.471	AC-228 M

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.58	75.00	920.	129.	0.065	100.45	1.500s
PB-214	153.80	77.11	854.	177.	0.088	73.67	1.500D
PB-212	153.80	77.11	854.	177.	0.088	73.67	1.500D
RA-226	372.39	186.39	473.	80.	0.040	113.72	1.500s
PB-212	477.94	239.15	436.	594.	0.297	19.33	1.500
PB-214	591.58	295.96	197.	148.	0.074	47.03	1.500
AC-228	677.65	338.99	163.	124.	0.062	51.15	1.500
PB-214	705.03	352.68	131.	221.	0.110	29.78	1.500s
TL-208	1022.64	511.43	72.	83.	0.041	60.98	1.184
TL-208	1168.63	584.40	76.	214.	0.107	29.64	1.277
BI-214	1220.66	610.40	51.	222.	0.111	26.44	1.538
BI-212	1457.23	728.64	62.	65.	0.032	77.26	1.690
BI-214	2245.76	1122.68	38.	34.	0.017	92.88	1.819s
K-40	2927.78	1463.43	12.	565.	0.283	12.89	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		-5.9605E-02					
			477.56	-5.961E-02	&(	4.227E-01 1.23E-01	G
K-40		1.3684E+01					
			1460.75	1.368E+01	(P	4.602E-01 5.88E-01	G
MN-54		7.2189E-03					
			834.81	7.219E-03	&(P	4.616E-02 1.31E-02	G
CO-57		1.2968E-03					
			122.07	1.297E-03	%(	5.687E-02 1.69E-02	G K
			136.43	-1.026E-01	%	4.663E-01 1.40E-01	G
CO-60		-2.9238E-03					
			1332.51	-2.924E-03	%(P	6.692E-02 1.85E-02	G K
			1173.23	0.000E+00	&	6.666E-02 1.85E-02	G K
Sr-85		-1.1740E-02					
			514.00	-1.174E-02	%(	5.831E-02 1.72E-02	G
Kr-85		-2.5744E+02					
			513.99	-2.574E+02	%(	1.279E+03 3.77E+02	G
Y-88		-2.1541E-05					
			1836.01	-2.154E-05	%(P	5.523E-02 1.41E-02	G K
			898.02	-1.534E-03	& P	5.821E-02 1.60E-02	G
NB-94		0.0000E+00					
			871.10	0.000E+00	&(	3.154E-02 8.20E-03	G K
			702.50	1.175E-02	&	4.455E-02 1.30E-02	G K
Ag-108M		1.4239E-02					
			722.95	1.424E-02	&(	4.131E-02 1.22E-02	G K
			614.37	-2.739E-02	& P	5.784E-02 1.75E-02	G
			433.93	-2.076E-03	%	4.720E-02 1.36E-02	G
CD-109		9.2138E-01					
			88.04	9.214E-01	%(P	2.179E+00 6.59E-01	G
SN-113		1.5202E-02					
			391.71	1.520E-02	&(	5.322E-02 1.57E-02	G K
			255.04	4.221E-01	%	1.922E+00 5.72E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	3.2384E-02						
		427.95	3.238E-02	%(P	1.353E-01	3.98E-02	G K
		600.77	3.144E-02	% P	2.230E-01	6.39E-02	G
		636.15	7.433E-02	% P	4.025E-01	1.17E-01	G
		463.51	2.688E-01	% P	4.183E-01	1.29E-01	G
		176.29	-1.316E-01	% P	6.678E-01	1.99E-01	G
I-131	-1.4383E-02						
		364.48	-1.438E-02	%(	7.792E-02	2.30E-02	G K
		636.97	2.066E-01	%	8.984E-01	2.62E-01	G
		284.29	1.786E-01	&	8.753E-01	2.59E-01	G
CS-134	8.7697E-03						
		604.66	8.770E-03	%(	4.392E-02	1.27E-02	G K
		795.76	3.006E-02	%	5.929E-02	1.81E-02	G
		569.29	5.157E-02	%	2.852E-01	8.28E-02	G
		801.84	1.126E-03	& P	6.784E-01	1.91E-01	G
CS-137	1.0783E-02						
		661.62	1.078E-02	%(	4.695E-02	1.36E-02	G
CE-139	6.8644E-03						
		165.85	6.864E-03	%(P	5.540E-02	1.65E-02	G
EU-152	9.4704E-03						
		121.78	9.470E-03	&(P	1.791E-01	5.33E-02	G K
		344.30	1.401E-02	%	1.614E-01	4.73E-02	G
		1408.08	-4.007E-02	&	2.775E-01	7.76E-02	G
		964.00	-8.797E-02	% P	4.076E-01	1.18E-01	G
		1112.07	-1.293E-01	&	4.908E-01	1.43E-01	G
		778.90	-7.211E-02	% P	4.111E-01	1.19E-01	G
EU-154	1.5829E-02						
		123.10	1.583E-02	%(P	1.284E-01	3.83E-02	G K
		1274.80	1.162E-02	&	1.780E-01	4.94E-02	G
		723.30	5.663E-02	& P	1.973E-01	5.75E-02	G
		1004.80	2.014E-02	%	3.237E-01	9.06E-02	G
EU-155	-7.8081E-02						
		86.45	-7.808E-02	&(P	2.019E-01	6.07E-02	G K
		105.31	3.634E-02	%	2.843E-01	8.50E-02	G
HG-203	2.2988E-03						
		279.17	2.299E-03	%(P	5.910E-02	1.74E-02	G K
		72.87	-1.138E+00	%	2.225E+00	6.76E-01	G
		70.83	-2.565E+00	&	3.882E+00	1.19E+00	G
		82.50	-1.237E+00	&	4.251E+00	1.28E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8688E-01						
		583.14	2.869E-01	(P	5.810E-02	2.85E-02	G
		510.72	3.742E-01	+	1.905E-01	7.62E-02	G
PB-212	6.8984E-01						
		238.63	6.780E-01	(	1.141E-01	4.37E-02	G K
							Energy duplication
		77.11	7.190E-01	*(	5.649E-01	1.77E-01	G
		74.81	1.035E+00	& P	1.152E+00	3.55E-01	G
PB-214	4.3140E-01						
		351.99	4.177E-01	@(P	1.060E-01	4.15E-02	G K
		295.22	4.580E-01	(	2.099E-01	7.18E-02	G
							Energy duplication
		77.11	1.176E+00	+	9.239E-01	2.89E-01	G
		241.92	3.079E-01	%	7.227E-01	2.19E-01	G
BI-212	7.7547E-01						
		727.17	7.755E-01	(	4.744E-01	2.00E-01	G K
		1620.56	-2.444E-01	% P	2.055E+00	5.52E-01	G
		785.42	-1.293E-01	% P	2.763E+00	7.82E-01	G
BI-214	5.8003E-01						
		609.32	5.800E-01	(	9.352E-02	5.12E-02	G K
		1764.51	-9.708E-02	% P	4.879E-01	1.39E-01	G
		1120.28	4.658E-01	&	4.325E-01	1.44E-01	G
RA-224	6.6228E-01						
		241.00	6.623E-01	%(P	1.377E+00	4.17E-01	G
RA-226	1.0159E+00						
		185.99	1.016E+00	*(P	1.324E+00	4.07E-01	G
AC-228	2.0875E-01						
		911.07	5.751E-03	%(P	2.354E-01	6.67E-02	G K
		968.90	-1.312E-02	% P	3.786E-01	1.07E-01	G
		338.40	6.989E-01	(	3.492E-01	1.19E-01	G
TH-227	-1.8036E-01						
		236.00	-1.804E-01	%(P	4.745E-01	1.43E-01	G K
		256.25	-2.352E-02	&	5.912E-01	1.74E-01	G
PA-234	7.4897E-02						
		98.44	7.490E-02	%(	2.533E-01	7.63E-02	G K
		946.00	6.746E-02	&	2.742E-01	7.97E-02	G
		131.28	9.071E-02	&	2.260E-01	6.83E-02	G
		94.67	-5.994E-02	%	4.871E-01	1.46E-01	G
		883.24	-6.137E-02	&	4.585E-01	1.31E-01	G
		926.70	4.720E-02	%	3.925E-01	1.09E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 4.797E-02 %   4.133E-01 1.19E-01 G

TH-234       9.8689E-01
                           63.29 9.869E-01 %(P 4.311E+00 1.29E+00 G K
                           92.80 9.000E-01 %   2.571E+00 7.76E-01 G
                           92.38 2.107E-03 % P 2.759E+00 8.21E-01 G

AM-241      -1.7965E-01
                           59.54-1.797E-01 %(  6.563E-01 1.97E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-5.6005E-02	-5.9605E-02	3.6784E-01	3.6785E-01	3.971E-01
K-40		1.3684E+01	1.3684E+01	1.7637E+00	1.9236E+00	4.602E-01
MN-54	#A	7.1423E-03	7.2189E-03	3.9327E-02	3.9329E-02	4.568E-02
CO-57	#B	1.2809E-03	1.2968E-03	5.0658E-02	5.0658E-02	5.618E-02
CO-60	#B	-2.9188E-03	-2.9238E-03	6.3034E-02	6.3034E-02	6.681E-02

Sr-85	#A	-1.1153E-02	-1.1740E-02	5.1543E-02	5.1547E-02	5.540E-02
Kr-85	#A	-2.5743E+02	-2.5744E+02	1.1304E+03	1.1305E+03	1.279E+03
Y-88	#B	-2.0879E-05	-2.1541E-05	5.5356E-04	5.5356E-04	5.354E-02
NB-94	#B	0.0000E+00	0.0000E+00	2.4611E-02	2.4611E-02	3.154E-02
Ag-108M	#B	1.4238E-02	1.4239E-02	3.6604E-02	3.6613E-02	4.131E-02
CD-109	#A	9.1464E-01	9.2138E-01	1.9782E+00	1.9788E+00	2.163E+00
SN-113	#B	1.4769E-02	1.5202E-02	4.7214E-02	4.7222E-02	5.170E-02
SB-125	#B	3.2277E-02	3.2384E-02	1.1928E-01	1.1929E-01	1.348E-01
I-131	#B	-9.5086E-03	-1.4383E-02	6.8889E-02	6.8893E-02	5.152E-02
CS-134	#B	8.7310E-03	8.7697E-03	3.8242E-02	3.8245E-02	4.372E-02
CS-137	#A	1.0780E-02	1.0783E-02	4.0823E-02	4.0827E-02	4.693E-02
CE-139	#A	6.7003E-03	6.8644E-03	4.9484E-02	4.9485E-02	5.407E-02
EU-152	#B	9.4636E-03	9.4704E-03	1.5995E-01	1.5995E-01	1.789E-01
EU-154	#B	1.5812E-02	1.5829E-02	1.1503E-01	1.1503E-01	1.282E-01
EU-155	#B	-7.7937E-02	-7.8081E-02	2.1580E-01	2.1584E-01	2.016E-01
HG-203	#B	2.1404E-03	2.2988E-03	5.2118E-02	5.2118E-02	5.502E-02
TL-208		2.8688E-01	2.8688E-01	8.5199E-02	8.6706E-02	
PB-212	#	6.8984E-01	6.8984E-01	1.3337E-01	1.3888E-01	1.141E-01
PB-214	#	4.3140E-01	4.3140E-01	1.2013E-01	1.2254E-01	1.060E-01
BI-212		7.7547E-01	7.7547E-01	5.9910E-01	6.0068E-01	
BI-214		5.8003E-01	5.8003E-01	1.5338E-01	1.5680E-01	
RA-224	#A	6.6228E-01	6.6228E-01	1.2520E+00	1.2526E+00	1.377E+00
RA-226	#A	1.0158E+00	1.0159E+00	1.2198E+00	1.2211E+00	1.324E+00
AC-228	B	2.0875E-01	2.0875E-01	1.0677E-01	1.0742E-01	2.354E-01
TH-227	#B	-1.8036E-01	-1.8036E-01	4.3534E-01	4.3546E-01	4.745E-01
PA-234	#B	7.4897E-02	7.4897E-02	2.2876E-01	2.2880E-01	2.533E-01
TH-234	#B	9.8689E-01	9.8689E-01	3.8775E+00	3.8779E+00	4.311E+00
AM-241	#A	-1.7965E-01	-1.7965E-01	5.9159E-01	5.9168E-01	6.562E-01

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

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

Total Activity (271.7 to 1999.0 keV) 1.5535229E+01 pCi/gm
Total Decayed Activity (271.7 to 1999.0 keV) 1.5535229E+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_1MAY2006_1706.An1

Sample description
FSS-OOL-02-02-013-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1MAY2006_1706.An1

Acquisition information
Start time: 01-May-2006 17:07:19
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: 1.9590E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9590E+03) =
5.1046E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

YAEC Chemistry Lab Spectrum name: 102F_1MAY2006_1706.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	26-Apr-2006 21:28:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.7227

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.87	184.	17.09	1.10	8.817E-03	74.81	9.600	1.470E+00	PB212
77.23	221.	15.33	1.10	9.530E-03	77.11	17.500	9.132E-01	PB212
					77.11	10.700	1.494E+00	PB214
209.23	117.	26.62	0.95	1.520E-02				
239.17	701.	4.46	1.22	1.378E-02	236.00	11.200	3.099E+00	TH227
					238.63	43.100	8.128E-01	PB212
241.97	127.	22.96	1.22	1.365E-02	241.00	3.900	1.631E+00	RA224
					241.92	7.470	8.621E-01	PB214
270.26	72.	34.65	1.85	1.243E-02				
277.77	73.	36.84	1.08	1.213E-02				
295.52	176.	14.54	1.27	1.145E-02	295.22	19.200	5.515E-01	PB214
301.86	96.	24.14	1.16	1.123E-02				
329.47	54.	31.83	1.21	1.033E-02				
338.90	165.	13.59	1.74	1.005E-02	338.40	12.010	9.421E-01	AC228
352.57	275.	10.64	0.96	9.663E-03	351.99	37.100	5.268E-01	PB214
464.22	47.	27.07	1.33	7.354E-03	463.51	10.000	4.300E-01	SB125
511.51	122.	17.10	1.83	6.685E-03	510.72	22.500	5.573E-01	TL208
584.36	247.	9.48	1.56	5.878E-03	583.14	86.000	3.361E-01	TL208
610.30	182.	12.65	1.45	5.641E-03	609.32	46.090	4.822E-01	BI214
728.82	91.	20.22	1.54	4.784E-03				
912.78	172.	12.27	1.72	3.916E-03				
970.50	103.	17.32	1.32	3.713E-03				
1122.89	52.	40.24	1.41	3.277E-03				
1463.49	635.	4.05	1.69	2.617E-03	1460.75	10.700	1.563E+01	K40
1767.51	34.	20.95	1.15	2.222E-03	1764.51	15.920	6.506E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.07	209.23	328.	117.	0.058	79.85	0.952	AC-228	
540.16	270.26	206.	72.	0.036	103.96	1.850	AC-228	s
555.19	277.77	208.	87.	0.044	77.34	1.083	NP-239	
603.38	301.86	162.	96.	0.048	72.43	1.160	PB-212	sM

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
658.62	329.47	112.	54.	0.027	95.50	1.205	TH-227	M
1457.60	728.82	69.	86.	0.043	52.32	1.539	J-132	M
1825.70	912.78	55.	174.	0.087	29.04	1.721	AC-228	M
1941.20	970.50	47.	111.	0.056	38.65	1.316	AC-228	M
2245.20	1122.89	31.	37.	0.018	81.21	1.820	J-135	D
2927.89	1463.49	8.	632.	0.316	12.07	1.694	K-40	M
3536.87	1767.51	2.	29.	0.014	59.35	2.239	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	149.20	74.81	406.	182.	0.091	51.02	1.098D
PB-212	153.80	77.11	463.	155.	0.078	52.70	1.100A
PB-212	476.89	238.63	167.	689.	0.345	13.92	1.215D
RA-224	483.38	241.87	469.	104.	0.052	92.06	1.500s
PB-214	483.47	241.92	390.	102.	0.051	87.47	1.217D
PB-214	590.69	295.52	171.	176.	0.088	43.62	1.269s
AC-228	677.54	338.93	163.	155.	0.077	42.54	1.500
PB-214	704.82	352.57	171.	274.	0.137	31.93	0.958s
SB-125	927.88	464.07	69.	41.	0.020	93.96	1.500s
TL-208	1022.80	511.51	94.	122.	0.061	51.29	1.826s
TL-208	1168.55	584.36	89.	247.	0.123	28.44	1.565
BI-214	1220.46	610.30	87.	182.	0.091	37.95	1.451s

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

***** S U M M A R Y O 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		6.5862E-02					
			477.56	6.586E-02	%(	4.494E-01 1.31E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	6.8347E-02						
		1460.75	6.835E-02	%(P	8.048E-01	2.28E-01	G
MN-54	-2.3234E-03						
		834.81	-2.323E-03	%(P	4.971E-02	1.38E-02	G
CO-57	5.1619E-04						
		122.07	5.162E-04	%(	6.632E-02	1.97E-02	G K
		136.43	-3.453E-02	&	4.741E-01	1.41E-01	G
CO-60	-1.1750E-03						
		1332.51	-1.175E-03	%(P	6.004E-02	1.63E-02	G K
		1173.23	-2.636E-04	%	6.869E-02	1.91E-02	G K
Sr-85	-1.0370E-03						
		514.00	-1.037E-03	&(	5.454E-02	1.57E-02	G
Kr-85	-2.3198E+01						
		513.99	-2.320E+01	&(	1.196E+03	3.44E+02	G
Y-88	-3.8636E-03						
		1836.01	-3.864E-03	%(P	4.325E-02	1.10E-02	G K
		898.02	-9.782E-03	& P	6.112E-02	1.73E-02	G
NB-94	-1.1436E-03						
		871.10	-1.144E-03	%(	4.659E-02	1.28E-02	G K
		702.50	1.676E-02	%	4.478E-02	1.34E-02	G K
Ag-108M	-1.7419E-03						
		722.95	-1.742E-03	%(	6.356E-02	1.81E-02	G K
		614.37	-4.920E-02	& P	7.733E-02	2.38E-02	G
		433.93	1.068E-03	%	4.070E-02	1.16E-02	G
CD-109	2.7211E-01						
		88.04	2.721E-01	%(P	2.131E+00	6.38E-01	G
SN-113	2.8719E-05						
		391.71	2.872E-05	&(	7.258E-02	2.10E-02	G K
		255.04	-5.675E-01	%	2.136E+00	6.38E-01	G
SB-125	7.6142E-02						
		427.95	-2.818E-02	&(P	1.442E-01	4.20E-02	G K
		600.77	2.909E-03	% P	2.384E-01	6.70E-02	G
		636.15	-9.461E-02	% P	4.808E-01	1.40E-01	G
		463.51	3.849E-01	@(P	3.890E-01	1.25E-01	G
		176.29	1.529E-01	% P	6.766E-01	2.02E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	1.4247E-02						
		364.48	1.425E-02	%(	7.136E-02	2.10E-02	G K
		636.97	-1.708E-01	&	1.061E+00	3.08E-01	G
		284.29	-2.595E-01	&	1.047E+00	3.12E-01	G
CS-134	-2.0068E-03						
		604.66	-2.007E-03	%(	4.923E-02	1.40E-02	G K
		795.76	3.832E-02	%	6.533E-02	2.01E-02	G
		569.29	6.780E-03	%	2.781E-01	7.86E-02	G
		801.84	-8.565E-02	& P	7.012E-01	2.02E-01	G
CS-137	1.5982E-02						
		661.62	1.598E-02	&(	5.223E-02	1.54E-02	G
CE-139	1.1479E-03						
		165.85	1.148E-03	%(P	4.560E-02	1.34E-02	G
EU-152	-3.3265E-02						
		121.78	-3.326E-02	&(P	1.836E-01	5.49E-02	G K
		344.30	-4.358E-02	%	1.535E-01	4.57E-02	G
		1408.08	4.239E-03	%	3.073E-01	8.37E-02	G
		964.00	-7.980E-03	% P	4.314E-01	1.20E-01	G
		1112.07	8.113E-03	&	4.802E-01	1.34E-01	G
		778.90	6.903E-02	% P	3.514E-01	1.01E-01	G
EU-154	-2.1082E-02						
		123.10	-2.108E-02	%(P	1.322E-01	3.96E-02	G K
		1274.80	0.000E+00	&	2.871E-01	8.17E-02	G
		723.30	4.889E-02	% P	2.510E-01	7.26E-02	G
		1004.80	-6.877E-02	%	3.405E-01	9.83E-02	G
EU-155	-3.5522E-02						
		86.45	-3.552E-02	&(P	2.704E-01	8.08E-02	G K
		105.31	7.261E-02	%	2.697E-01	8.11E-02	G
HG-203	-1.0843E-02						
		279.17	-1.084E-02	%(P	5.660E-02	1.68E-02	G K
		72.87	-1.198E+00	&	2.340E+00	7.10E-01	G
		70.83	6.479E-01	%	3.915E+00	1.17E+00	G
		82.50	-5.014E-02	%	4.482E+00	1.34E+00	G
TL-208	3.3609E-01						
		583.14	3.361E-01	(P	6.363E-02	3.20E-02	G
		510.72	5.573E-01	+	2.196E-01	9.54E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	8.3275E-01						
		238.63	7.993E-01	(	7.301E-02	3.71E-02	G K
							Energy duplication
		77.11	6.410E-01	}	4.257E-01	1.13E-01	G
		74.81	1.479E+00	+ P	7.845E-01	2.56E-01	G
PB-214	5.5322E-01						
		351.99	5.268E-01	@(P	1.222E-01	5.62E-02	G K
		295.22	5.515E-01	*(	1.994E-01	8.03E-02	G
							Energy duplication
		77.11	3.417E-01	}	8.855E-01	2.60E-01	G
		241.92	6.889E-01	(	6.408E-01	2.01E-01	G
BI-212	6.5356E-02						
		727.17	6.536E-02	%(	3.620E-01	1.04E-01	G K
		1620.56	-3.511E-02	% P	7.712E-01	1.05E-01	G
		785.42	-9.002E-02	% P	2.740E+00	7.72E-01	G
BI-214	4.8218E-01						
		609.32	4.822E-01	@(	1.223E-01	6.11E-02	G K
		1764.51	-1.621E-03	% P	3.590E-01	9.26E-02	G
		1120.28	-2.056E-02	%	5.876E-01	1.68E-01	G
RA-224	1.3421E+00						
		241.00	1.342E+00	?(P	1.338E+00	4.16E-01	G
RA-226	7.7768E-01						
		185.99	7.777E-01	%(P	1.371E+00	4.17E-01	G
AC-228	2.4887E-01						
		911.07	-1.396E-02	%(P	2.332E-01	6.62E-02	G K
		968.90	-8.754E-02	% P	4.413E-01	1.29E-01	G
		338.40	8.835E-01	(	3.556E-01	1.25E-01	G
TH-227	-2.1251E-01						
		236.00	-2.125E-01	%(P	4.984E-01	1.51E-01	G K
		256.25	-2.320E-02	&	4.897E-01	1.43E-01	G
PA-234	1.8471E-02						
		98.44	1.847E-02	%(	2.098E-01	6.24E-02	G K
		946.00	0.000E+00	&	3.781E-01	1.07E-01	G
		131.28	-2.257E-02	%	2.588E-01	7.72E-02	G
		94.67	2.190E-01	%	4.392E-01	1.33E-01	G
		883.24	1.496E-01	%	3.894E-01	1.16E-01	G
		926.70	5.816E-02	&	4.576E-01	1.29E-01	G
		569.26	9.700E-03	%	4.108E-01	1.16E-01	G

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

TH-234       7.3938E-01
                           63.29 7.394E-01 &(P 4.730E+00 1.41E+00 G K
                           92.80 1.271E+00 %   2.557E+00 7.76E-01 G
                           92.38-4.073E-01 & P 3.097E+00 9.27E-01 G

AM-241       8.5372E-03
                           59.54 8.537E-03 %(  6.261E-01 1.86E-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	6.1868E-02	6.5862E-02	3.9216E-01	3.9218E-01	4.222E-01
K-40	A	6.8347E-02	6.8347E-02	6.8262E-01	6.8264E-01	8.048E-01
MN-54	#A	-2.2986E-03	-2.3234E-03	5.6176E-02	5.6176E-02	4.918E-02
CO-57	#B	5.0984E-04	5.1619E-04	5.9205E-02	5.9205E-02	6.551E-02
CO-60	#B	-1.1730E-03	-1.1750E-03	6.7561E-02	6.7561E-02	5.993E-02
Sr-85	#A	-9.8492E-04	-1.0370E-03	4.7048E-02	4.7048E-02	5.180E-02

Kr-85	#A	-2.3197E+01	-2.3198E+01	1.0317E+03	1.0318E+03	1.196E+03
Y-88	#B	-3.7444E-03	-3.8636E-03	3.3300E-02	3.3301E-02	4.191E-02
NB-94	#B	-1.1436E-03	-1.1436E-03	3.8474E-02	3.8474E-02	4.659E-02
Ag-108M	#B	-1.7418E-03	-1.7419E-03	5.4199E-02	5.4199E-02	6.356E-02
CD-109	#A	2.7011E-01	2.7211E-01	1.9126E+00	1.9126E+00	2.116E+00
SN-113	#B	2.7898E-05	2.8719E-05	6.2949E-02	6.2949E-02	7.051E-02
SB-125	#B	7.5891E-02	7.6142E-02	7.4245E-02	7.4368E-02	1.438E-01
I-131	#B	9.4038E-03	1.4247E-02	6.2991E-02	6.2996E-02	4.710E-02
CS-134	#B	-1.9979E-03	-2.0068E-03	4.2014E-02	4.2014E-02	4.901E-02
CS-137	#A	1.5978E-02	1.5982E-02	4.6199E-02	4.6207E-02	5.221E-02
CE-139	#A	1.1203E-03	1.1479E-03	4.0289E-02	4.0289E-02	4.451E-02
EU-152	#B	-3.3241E-02	-3.3265E-02	1.7751E-01	1.7752E-01	1.835E-01
EU-154	#B	-2.1060E-02	-2.1082E-02	1.2103E-01	1.2104E-01	1.321E-01
EU-155	#B	-3.5457E-02	-3.5522E-02	3.5538E-01	3.5539E-01	2.699E-01
HG-203	#B	-1.0092E-02	-1.0843E-02	5.1050E-02	5.1054E-02	5.269E-02
TL-208		3.3609E-01	3.3609E-01	9.5736E-02	9.7576E-02	
PB-212		8.3275E-01	8.3275E-01	1.1595E-01	1.2502E-01	
PB-214		5.5322E-01	5.5322E-01	1.7687E-01	1.7957E-01	
BI-212	B	6.5356E-02	6.5356E-02	3.1119E-01	3.1122E-01	3.620E-01
BI-214	#	4.8218E-01	4.8218E-01	1.8298E-01	1.8497E-01	
RA-224	#	1.3421E+00	1.3421E+00	1.2493E+00	1.2516E+00	1.338E+00
RA-226	#A	7.7768E-01	7.7768E-01	1.2501E+00	1.2509E+00	1.371E+00
AC-228	F	2.4887E-01	2.4887E-01	1.0587E-01	1.0679E-01	2.332E-01
TH-227	#B	-2.1251E-01	-2.1251E-01	4.5756E-01	4.5771E-01	4.984E-01
PA-234	#B	1.8471E-02	1.8471E-02	1.8715E-01	1.8716E-01	2.098E-01
TH-234	#B	7.3938E-01	7.3938E-01	4.2443E+00	4.2445E+00	4.730E+00
AM-241	#A	8.5370E-03	8.5372E-03	5.5692E-01	5.5692E-01	6.261E-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 (1767.3 to 1999.0 keV) 2.4531033E+00 pCi/gm
Total Decayed Activity (1767.3 to 1999.0 keV) 2.4531033E+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_2MAY2006_0753.An1

Sample description
FSS-OOL-02-02-003-F

Spectrum Filename: C:\GammaVision\Spectra\102F_2MAY2006_0753.An1

Acquisition information
Start time: 02-May-2006 08:02:39
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: 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	26-Apr-2006 20:25:00
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: 0.6647

***** S U M M A R Y O F P E A K 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	104.	27.12	1.10	8.865E-03	74.81	9.600	PBC<MDA	PB212
77.21	275.	10.98	1.10	9.653E-03	77.11	17.500	1.169E+00	PB212
					77.11	10.700	1.912E+00	PB214
186.32	84.	31.60	1.33	1.625E-02	185.99	3.280	PBC<MDA	RA226
209.71	71.	32.59	0.97	1.517E-02				
239.11	634.	4.72	1.22	1.378E-02	238.63	43.100	7.566E-01	PB212
241.82	110.	23.75	1.22	1.366E-02	241.00	3.900	1.442E+00	RA224
					241.92	7.470	7.631E-01	PB214
270.61	57.	38.32	1.18	1.241E-02				
295.61	153.	12.76	1.13	1.145E-02	295.22	19.200	4.936E-01	PB214
301.75	77.	24.69	1.60	1.123E-02				
329.52	70.	29.57	1.33	1.032E-02				
339.01	136.	15.97	1.31	1.004E-02	338.40	12.010	7.983E-01	AC228
352.70	206.	10.34	1.22	9.659E-03	351.99	37.100	4.072E-01	PB214
463.73	46.	36.09	1.23	7.361E-03	463.51	10.000	4.319E-01	SB125
512.03	128.	15.39	1.82	6.678E-03	510.72	22.500	6.040E-01	TL208
584.19	175.	9.36	1.34	5.880E-03	583.14	86.000	2.442E-01	TL208
610.49	182.	11.92	1.36	5.639E-03	609.32	46.090	4.972E-01	BI214
728.61	41.	33.71	1.30	4.794E-03	727.17	11.800	5.144E-01	BI212
837.50	26.	38.61	1.19	4.223E-03				
912.76	138.	15.15	0.92	3.916E-03				
969.61	100.	14.91	1.73	3.716E-03	968.90	17.460	1.093E+00	AC228
1463.15	514.	4.48	1.98	2.617E-03	1460.75	10.700	1.299E+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	Background	Net Area	Intensity	Uncert	FWHM	Suspected

Channel	Energy	Counts	Counts	Cts/Sec	3 Sigma %	keV	Nuclide	
148.76	74.87	346.	104.	0.052	81.37	1.098	BI-207	D
154.01	77.49	318.	275.	0.137	32.93	1.100	PB-214	D
419.03	209.71	214.	71.	0.036	97.76	0.967	NP-239	M

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
477.85	239.10	131.	634.	0.317	14.16	1.215	PB-212	D
483.27	241.81	284.	110.	0.055	71.25	1.217	PB-214	D
540.87	270.61	175.	57.	0.029	114.95	1.184	AC-228	M
603.17	301.75	116.	77.	0.039	74.08	1.599	PB-212	sM
658.72	329.52	130.	70.	0.035	77.36	1.333	TH-227	sM
1675.05	837.50	26.	27.	0.014	97.16	1.187	J-135	sM
1825.66	912.76	60.	146.	0.073	33.61	0.924	AC-228	sM
1939.43	969.61	34.	102.	0.051	38.13	1.732	AC-228	M

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	153.80	77.11	926.	229.	0.114	59.82	1.500D
PB-214	153.80	77.11	926.	229.	0.114	59.82	1.500D
RA-226	372.38	186.39	429.	78.	0.039	111.47	1.500s
PB-212	477.75	239.06	407.	554.	0.277	20.02	1.500
RA-224	483.55	241.96	462.	77.	0.039	120.72	1.500
PB-214	590.94	295.64	161.	154.	0.077	42.43	1.500
AC-228	677.63	338.98	125.	123.	0.062	46.99	1.500
PB-214	704.89	352.60	146.	195.	0.098	33.83	1.500
SB-125	927.13	463.69	67.	39.	0.019	97.52	1.500
TL-208	1023.83	512.03	77.	128.	0.064	46.17	1.823s
TL-208	1168.21	584.19	41.	174.	0.087	28.08	1.341
BI-214	1220.83	610.49	81.	182.	0.091	35.75	1.357
BI-212	1457.17	728.61	50.	41.	0.021	101.12	1.304
K-40	2927.32	1463.20	6.	482.	0.241	13.84	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		-2.7664E-02					
			477.56	-2.766E-02	%(	5.358E-01 1.55E-01	G
K-40		1.2191E+01					
			1460.75	1.219E+01	(P	3.632E-01 5.63E-01	G
MN-54		-4.2162E-03					
			834.81	-4.216E-03	&(P	4.845E-02 1.35E-02	G
CO-57		1.4159E-02					
			122.07	1.416E-02	%(	6.241E-02 1.87E-02	G K
			136.43	8.282E-02	&	4.416E-01 1.32E-01	G
CO-60		-8.9859E-03					
			1332.51	-8.986E-03	%(P	6.290E-02 1.76E-02	G K
			1173.23	1.415E-02	%	7.343E-02 2.12E-02	G K
Sr-85		1.2130E-03					
			514.00	1.213E-03	&(	5.624E-02 1.62E-02	G
Kr-85		2.6409E+01					
			513.99	2.641E+01	&(	1.224E+03 3.52E+02	G
Y-88		-3.1663E-03					
			1836.01	-3.166E-03	%(P	5.879E-02 1.54E-02	G K
			898.02	7.190E-03	& P	4.779E-02 1.33E-02	G
NB-94		-5.9959E-03					
			871.10	-5.996E-03	&(	5.148E-02 1.46E-02	G K
			702.50	1.499E-02	&	4.352E-02 1.29E-02	G K
Ag-108M		7.4064E-03					
			722.95	7.406E-03	&(	5.219E-02 1.49E-02	G K
			614.37	-2.528E-02	& P	7.504E-02 2.24E-02	G
			433.93	1.585E-02	%	3.902E-02 1.17E-02	G
CD-109		-9.6395E-03					
			88.04	-9.640E-03	%(P	2.236E+00 6.66E-01	G
SN-113		1.2205E-02					
			391.71	1.220E-02	&(	6.568E-02 1.93E-02	G K
			255.04	1.806E-02	%	1.996E+00 5.84E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0885E-01						
		427.95	1.945E-02	%(P	1.181E-01	3.41E-02	G K
		600.77	5.496E-02	% P	2.295E-01	6.69E-02	G
		636.15	-3.739E-02	% P	4.261E-01	1.21E-01	G
		463.51	3.735E-01	(P	3.942E-01	1.26E-01	G
		176.29	-3.458E-02	% P	7.027E-01	2.07E-01	G
I-131	1.4502E-04						
		364.48	1.450E-04	%(	6.453E-02	1.84E-02	G K
		636.97	-3.078E-02	%	1.123E+00	3.18E-01	G
		284.29	9.370E-02	%	9.695E-01	2.84E-01	G
CS-134	-1.0201E-02						
		604.66	-1.020E-02	%(	4.617E-02	1.35E-02	G K
		795.76	4.524E-02	%	6.532E-02	2.05E-02	G
		569.29	7.914E-02	%	2.550E-01	7.52E-02	G
		801.84	5.270E-02	& P	5.805E-01	1.64E-01	G
CS-137	1.1175E-02						
		661.62	1.117E-02	&(	5.743E-02	1.67E-02	G
CE-139	7.5543E-03						
		165.85	7.554E-03	&(P	5.330E-02	1.59E-02	G
EU-152	3.6522E-02						
		121.78	3.652E-02	%(P	1.869E-01	5.60E-02	G K
		344.30	-3.206E-02	%	1.601E-01	4.73E-02	G
		1408.08	-9.962E-03	%	2.791E-01	7.53E-02	G
		964.00	-1.277E-02	% P	4.700E-01	1.32E-01	G
		1112.07	8.006E-02	%	5.773E-01	1.66E-01	G
		778.90	1.948E-01	% P	3.653E-01	1.12E-01	G
EU-154	2.9663E-02						
		123.10	2.966E-02	&(P	1.222E-01	3.66E-02	G K
		1274.80	-3.371E-02	%	1.810E-01	5.16E-02	G
		723.30	3.195E-02	& P	2.385E-01	6.79E-02	G
		1004.80	5.665E-02	&	2.791E-01	7.96E-02	G
EU-155	1.4659E-01						
		86.45	1.466E-01	&(P	2.588E-01	7.87E-02	G K
		105.31	1.319E-01	%	2.678E-01	8.13E-02	G
HG-203	2.5042E-02						
		279.17	2.504E-02	&(P	4.975E-02	1.51E-02	G K
		72.87	-1.593E-01	%	1.992E+00	5.94E-01	G
		70.83	-9.243E-02	&	4.541E+00	1.36E+00	G
		82.50	-9.881E-01	%	4.391E+00	1.32E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.4421E-01						
		583.14	2.442E-01	(P	4.546E-02	2.30E-02	G
		510.72	6.040E-01	+	2.052E-01	9.31E-02	G
PB-212	6.6134E-01						
		238.63	6.613E-01	(	1.154E-01	4.41E-02	G K
							Energy duplication
		77.11	9.722E-01	+	6.141E-01	1.94E-01	G
		74.81	5.052E-01	& P	1.270E+00	3.84E-01	G
PB-214	4.2398E-01						
		351.99	3.860E-01	(P	1.166E-01	4.36E-02	G K
		295.22	4.974E-01	(	1.993E-01	7.03E-02	G
							Energy duplication
		77.11	1.590E+00	+	1.004E+00	3.17E-01	G
		241.92	4.680E-01	%	7.267E-01	2.22E-01	G
BI-212	5.1440E-01						
		727.17	5.144E-01	(	4.474E-01	1.74E-01	G K
		1620.56	9.890E-02	& P	1.595E+00	4.04E-01	G
		785.42	8.810E-01	% P	2.165E+00	6.48E-01	G
BI-214	4.9719E-01						
		609.32	4.972E-01	(	1.214E-01	5.94E-02	G K
		1764.51	-1.876E-03	& P	3.774E-01	9.77E-02	G
		1120.28	3.524E-01	&	5.654E-01	1.75E-01	G
RA-224	1.0290E+00						
		241.00	1.029E+00	&(P	1.367E+00	4.20E-01	G
RA-226	1.0330E+00						
		185.99	1.033E+00	(P	1.320E+00	4.06E-01	G
AC-228	1.7735E-01						
		911.07	-4.929E-02	%(P	2.281E-01	6.63E-02	G K
		968.90	-2.705E-02	% P	3.672E-01	1.04E-01	G
		338.40	7.246E-01	(	3.220E-01	1.14E-01	G
TH-227	-1.5731E-01						
		236.00	-1.573E-01	&(P	4.843E-01	1.46E-01	G K
		256.25	-8.535E-03	%	6.481E-01	1.90E-01	G
PA-234	1.2605E-02						
		98.44	1.260E-02	%(	2.899E-01	8.65E-02	G K
		946.00	-2.812E-02	%	2.852E-01	8.05E-02	G
		131.28	-4.809E-02	%	2.596E-01	7.77E-02	G
		94.67	-2.138E-02	%	4.599E-01	1.37E-01	G
		883.24	-1.105E-02	%	3.792E-01	1.04E-01	G
		926.70	1.045E-01	&	4.894E-01	1.41E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.030E-01 %   4.404E-01 1.29E-01 G

TH-234       1.6522E+00
                           63.29 1.652E+00 %(P 4.843E+00 1.46E+00 G K
                           92.80 1.665E+00 %   2.497E+00 7.63E-01 G
                           92.38-1.132E-01 & P 3.027E+00 9.02E-01 G

AM-241       7.6707E-02
                           59.54 7.671E-02 %(  7.220E-01 2.15E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-2.5763E-02	-2.7664E-02	4.6505E-01	4.6505E-01	4.990E-01
K-40		1.2191E+01	1.2191E+01	1.6876E+00	1.8210E+00	3.632E-01
MN-54	#A	-4.1652E-03	-4.2162E-03	4.8131E-02	4.8131E-02	4.786E-02
CO-57	#B	1.3961E-02	1.4159E-02	5.6158E-02	5.6164E-02	6.154E-02
CO-60	#B	-8.9682E-03	-8.9859E-03	5.5244E-02	5.5246E-02	6.277E-02

Sr-85	#A	1.1439E-03	1.2130E-03	4.8518E-02	4.8518E-02	5.304E-02
Kr-85	#A	2.6408E+01	2.6409E+01	1.0563E+03	1.0563E+03	1.224E+03
Y-88	#B	-3.0554E-03	-3.1663E-03	4.6745E-02	4.6746E-02	5.674E-02
NB-94	#B	-5.9959E-03	-5.9959E-03	4.3668E-02	4.3669E-02	5.148E-02
Ag-108M	#B	7.4058E-03	7.4064E-03	4.4726E-02	4.4728E-02	5.218E-02
CD-109	#A	-9.5590E-03	-9.6395E-03	4.9427E+00	4.9427E+00	2.218E+00
SN-113	#B	1.1808E-02	1.2205E-02	5.7815E-02	5.7819E-02	6.354E-02
SB-125	#B	1.0844E-01	1.0885E-01	1.1040E-01	1.1057E-01	1.176E-01
I-131	#B	9.0379E-05	1.4502E-04	5.5073E-02	5.5073E-02	4.022E-02
CS-134	#B	-1.0149E-02	-1.0201E-02	4.0356E-02	4.0360E-02	4.594E-02
CS-137	#A	1.1171E-02	1.1175E-02	4.9967E-02	4.9971E-02	5.741E-02
CE-139	#A	7.3483E-03	7.5543E-03	4.7580E-02	4.7582E-02	5.185E-02
EU-152	#B	3.6492E-02	3.6522E-02	1.6798E-01	1.6800E-01	1.868E-01
EU-154	#B	2.9626E-02	2.9663E-02	1.0994E-01	1.0995E-01	1.220E-01
EU-155	#B	1.4628E-01	1.4659E-01	2.3601E-01	2.3615E-01	2.582E-01
HG-203	#B	2.3080E-02	2.5042E-02	4.5344E-02	4.5366E-02	4.585E-02
TL-208		2.4421E-01	2.4421E-01	6.8736E-02	7.0089E-02	
PB-212	#	6.6134E-01	6.6134E-01	1.3239E-01	1.3750E-01	1.154E-01
PB-214	#	4.2398E-01	4.2398E-01	1.1512E-01	1.1755E-01	1.166E-01
BI-212		5.1440E-01	5.1440E-01	5.2018E-01	5.2098E-01	
BI-214		4.9719E-01	4.9719E-01	1.7777E-01	1.7994E-01	
RA-224	#A	1.0290E+00	1.0290E+00	1.2608E+00	1.2621E+00	1.367E+00
RA-226	#A	1.0330E+00	1.0330E+00	1.2176E+00	1.2190E+00	1.320E+00
AC-228	B	1.7735E-01	1.7735E-01	8.3340E-02	8.3932E-02	2.281E-01
TH-227	#B	-1.5731E-01	-1.5731E-01	4.4419E-01	4.4428E-01	4.843E-01
PA-234	#B	1.2605E-02	1.2605E-02	2.5947E-01	2.5947E-01	2.899E-01
TH-234	#B	1.6522E+00	1.6522E+00	4.3805E+00	4.3815E+00	4.843E+00
AM-241	#A	7.6705E-02	7.6707E-02	6.4643E-01	6.4644E-01	7.220E-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 (259.7 to 1999.0 keV) 1.3624313E+01 pCi/gm
Total Decayed Activity (259.7 to 1999.0 keV) 1.3624313E+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_20JUL2006_1739.An1

Sample description
FSS-OOL-02-02-006-R

Spectrum Filename: C:\GammaVision\Spectra\102F_20JUL2006_1739.An1

Acquisition information
Start time: 20-Jul-2006 17:39:12
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: 1.8300E+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	18-Jul-2006 21:44:00
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: 0.6842

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.23	196.	23.05	1.50	9.541E-03	77.11	17.500	8.655E-01	PB212
					77.11	10.700	1.416E+00	PB214
77.23	196.	23.05	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.416E+00	PB214
185.72	129.	25.65	0.78	1.628E-02				
185.72	129.	25.65	0.78	1.628E-02	185.99	3.280	1.726E+00	RA226
209.64	84.	35.47	1.52	1.518E-02				
239.07	734.	4.36	1.22	1.378E-02	238.63	43.100	9.106E-01	PB212
241.82	120.	22.24	1.22	1.366E-02	241.00	3.900	1.641E+00	RA224
					241.92	7.470	8.677E-01	PB214
270.48	102.	23.62	1.80	1.242E-02				
295.81	157.	11.86	1.26	1.144E-02	295.22	19.200	5.276E-01	PB214
300.46	58.	26.54	1.26	1.128E-02				
338.87	147.	12.45	1.50	1.005E-02	338.40	12.010	8.991E-01	AC228
352.63	258.	10.56	1.21	9.661E-03	351.99	37.100	5.302E-01	PB214
463.70	62.	24.30	1.53	7.362E-03	463.51	10.000	6.069E-01	SB125
511.55	124.	18.29	1.19	6.684E-03	510.72	22.500	6.103E-01	TL208
584.31	262.	8.37	1.55	5.879E-03	583.14	86.000	3.811E-01	TL208
610.29	128.	11.52	1.55	5.641E-03	609.32	46.090	3.636E-01	BI214
728.20	37.	30.74	1.55	4.794E-03	727.17	11.800	4.829E-01	BI212
796.39	32.	30.95	1.60	4.420E-03	795.76	85.400	6.261E-02	CS134
912.67	158.	12.58	2.10	3.916E-03				
966.14	24.	40.41	1.71	3.734E-03	964.00	14.580	PBC<MDA	EU152
969.46	93.	16.35	1.80	3.716E-03				
1122.16	30.	39.35	1.82	3.283E-03	1120.28	15.040	PBC<MDA	BI214
1463.13	589.	4.18	1.93	2.617E-03	1460.75	10.700	1.551E+01	K40

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
418.89	209.64	326.	84.	0.042	106.41	1.520	NP-239 sM
477.77	239.11	146.	734.	0.367	13.09	1.215	PB-212 D
483.26	241.85	295.	120.	0.060	66.71	1.217	PB-214 D
540.61	270.48	186.	102.	0.051	70.86	1.802	AC-228 sM
600.57	300.46	89.	58.	0.029	79.63	1.258	PB-212 lD
1825.48	912.67	53.	166.	0.083	29.89	2.100	AC-228 sM
1939.12	969.46	36.	98.	0.049	40.14	1.796	AC-228 M

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	153.80	77.11	919.	196.	0.098	69.14	1.500D
PB-214	153.80	77.11	919.	196.	0.098	69.14	1.500D
RA-226	372.20	186.29	442.	95.	0.048	93.88	1.500s
PB-212	477.71	239.04	389.	624.	0.312	18.00	1.500
RA-224	483.16	241.77	461.	95.	0.048	99.12	1.500
PB-214	483.43	241.90	480.	85.	0.042	114.75	1.500s
PB-214	591.17	295.76	189.	141.	0.070	48.50	1.500
AC-228	677.44	338.88	93.	149.	0.074	36.85	1.500
PB-214	704.87	352.60	110.	233.	0.117	27.34	1.500
SB-125	927.38	463.82	94.	38.	0.019	113.29	1.500
TL-208	1022.81	511.51	133.	136.	0.068	57.74	1.194s
TL-208	1168.45	584.31	69.	261.	0.131	25.11	1.551
BI-214	1220.44	610.29	41.	128.	0.064	34.55	1.554
BI-212	1456.36	728.20	46.	37.	0.018	92.23	1.554s
CS-134	1592.80	796.39	33.	32.	0.016	92.84	1.601s
EU-152	1932.49	966.14	36.	24.	0.012	121.22	1.714s
BI-214	2244.72	1122.16	53.	30.	0.015	118.04	1.819s
K-40	2927.16	1463.13	5.	573.	0.287	12.63	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		1.5224E-02					
			477.56	1.522E-02	&(	4.001E-01 1.14E-01	G
K-40		1.5098E+01					
			1460.75	1.510E+01	(P	3.436E-01 6.36E-01	G
MN-54		-3.7357E-04					
			834.81	-3.736E-04	&(P	7.166E-02 2.03E-02	G
CO-57		-5.6698E-03					
			122.07	-5.670E-03	&(	5.551E-02 1.65E-02	G K
			136.43	-7.655E-02	&	4.928E-01 1.47E-01	G
CO-60		-2.0285E-04					
			1332.51	-2.029E-04	&(P	9.504E-02 2.67E-02	G K
			1173.23	1.620E-02	%	7.168E-02 2.08E-02	G K
Sr-85		-2.4030E-02					
			514.00	-2.403E-02	%(	6.856E-02 2.05E-02	G
Kr-85		-5.4405E+02					
			513.99	-5.440E+02	%(	1.552E+03 4.65E+02	G
Y-88		-2.2976E-05					
			1836.01	-2.298E-05	%(P	2.580E-02 3.50E-03	G K
			898.02	1.073E-02	& P	5.349E-02 1.52E-02	G
NB-94		9.6147E-03					
			871.10	9.615E-03	%(	5.308E-02 1.52E-02	G K
			702.50	3.204E-03	&	4.666E-02 1.31E-02	G K
Ag-108M		-1.3536E-02					
			722.95	-1.354E-02	%(	6.705E-02 1.96E-02	G K
			614.37	-4.377E-02	% P	6.929E-02 2.14E-02	G
			433.93	-1.727E-03	&	3.603E-02 1.02E-02	G
CD-109		1.1562E+00					
			88.04	1.156E+00	%(P	2.217E+00 6.73E-01	G
SN-113		1.1539E-02					
			391.71	1.154E-02	%(	6.349E-02 1.86E-02	G K
			255.04	-2.938E-02	%	2.092E+00 6.13E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.2787E-02						
		427.95	-1.877E-02	%(P	1.675E-01	4.86E-02	G K
		600.77	2.473E-02	% P	2.104E-01	5.95E-02	G
		636.15	1.591E-01	% P	3.556E-01	1.07E-01	G
		463.51	3.834E-01	(P	4.814E-01	1.51E-01	G
		176.29	-2.005E-02	% P	6.579E-01	1.93E-01	G
I-131	4.7502E-04						
		364.48	4.750E-04	%(	5.245E-02	1.50E-02	G K
		636.97	1.866E-01	%	7.491E-01	2.19E-01	G
		284.29	-1.727E-01	%	8.482E-01	2.52E-01	G
CS-134	3.0314E-02						
		604.66	2.059E-03	&(	5.507E-02	1.57E-02	G K
		795.76	6.261E-02	(	5.769E-02	1.94E-02	G
		569.29	-2.635E-02	&	2.856E-01	8.14E-02	G
		801.84	-1.370E-01	% P	5.937E-01	1.72E-01	G
CS-137	0.0000E+00						
		661.62	0.000E+00	&(	6.561E-02	1.85E-02	G
CE-139	9.4090E-03						
		165.85	9.409E-03	%(P	5.436E-02	1.62E-02	G
EU-152	9.9967E-02						
		121.78	-1.340E-02	&(P	1.790E-01	5.32E-02	G K
		344.30	2.924E-02	%	1.380E-01	4.06E-02	G
		1408.08	-8.284E-02	&	3.109E-01	8.99E-02	G
		964.00	3.273E-01	&(P	4.186E-01	1.34E-01	G
		1112.07	1.109E-01	&	5.311E-01	1.54E-01	G
		778.90	2.006E-01	% P	3.673E-01	1.13E-01	G
EU-154	2.8908E-02						
		123.10	2.891E-02	&(P	1.268E-01	3.80E-02	G K
		1274.80	-7.307E-03	%	1.948E-01	5.38E-02	G
		723.30	-6.873E-02	% P	3.085E-01	9.00E-02	G
		1004.80	-8.880E-02	&	4.185E-01	1.22E-01	G
EU-155	-2.1215E-02						
		86.45	-2.121E-02	&(P	2.918E-01	8.70E-02	G K
		105.31	-3.046E-02	%	2.532E-01	7.55E-02	G
HG-203	-7.1468E-05						
		279.17	-7.147E-05	&(P	5.215E-02	1.52E-02	G K
		72.87	-5.048E-01	&	2.082E+00	6.26E-01	G
		70.83	8.188E-01	&	3.904E+00	1.17E+00	G
		82.50	-1.556E-01	&	4.337E+00	1.29E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.8107E-01						
		583.14	3.811E-01	(P	6.022E-02	3.20E-02	G
		510.72	6.652E-01	+	2.770E-01	1.28E-01	G
PB-212	8.0088E-01						
		238.63	7.746E-01	(	1.175E-01	4.65E-02	G K
							Energy duplication
		77.11	8.655E-01	(	6.369E-01	1.99E-01	G
		74.81	8.192E-01	& P	1.296E+00	3.95E-01	G
PB-214	4.7695E-01						
		351.99	4.793E-01	(P	1.061E-01	4.37E-02	G K
		295.22	4.724E-01	(	2.239E-01	7.64E-02	G
							Energy duplication
		77.11	1.416E+00	+	1.042E+00	3.26E-01	G
		241.92	6.119E-01	+	7.591E-01	2.34E-01	G
BI-212	4.8292E-01						
		727.17	4.829E-01	(	4.487E-01	1.48E-01	G K
		1620.56	6.800E-01	% P	1.317E+00	4.08E-01	G
		785.42	9.009E-03	% P	3.253E+00	9.19E-01	G
BI-214	3.8304E-01						
		609.32	3.636E-01	(	9.210E-02	4.19E-02	G K
		1764.51	-3.105E-02	& P	4.549E-01	1.23E-01	G
		1120.28	4.427E-01	&(	5.480E-01	1.74E-01	G
RA-224	1.3172E+00						
		241.00	1.317E+00	?(P	1.420E+00	4.40E-01	G
RA-226	1.3189E+00						
		185.99	1.319E+00	*(P	1.393E+00	4.32E-01	G
AC-228	2.3048E-01						
		911.07	-5.109E-02	%(P	2.338E-01	6.79E-02	G K
		968.90	-5.706E-02	% P	4.192E-01	1.21E-01	G
		338.40	9.104E-01	(	2.910E-01	1.12E-01	G
TH-227	1.0482E-02						
		236.00	1.048E-02	&(P	4.104E-01	1.21E-01	G K
		256.25	5.756E-04	%	6.391E-01	1.87E-01	G
PA-234	-1.2005E-01						
		98.44	-1.201E-01	%(	2.223E-01	6.76E-02	G K
		946.00	-3.598E-02	%	2.960E-01	8.40E-02	G
		131.28	-1.340E-02	&	2.100E-01	6.22E-02	G
		94.67	-1.305E-01	%	4.965E-01	1.49E-01	G
		883.24	1.148E-03	&	4.443E-01	1.22E-01	G
		926.70	-5.452E-02	%	5.721E-01	1.62E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.729E-02 &   4.383E-01 1.25E-01 G

TH-234      -9.5917E-02
                           63.29-9.592E-02 %(P 5.323E+00 1.58E+00 G K
                           92.80 1.470E+00 %   2.572E+00 7.83E-01 G
                           92.38 2.567E-01 & P 2.797E+00 8.34E-01 G

AM-241       1.0961E-01
                           59.54 1.096E-01 &(  7.082E-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		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	1.4867E-02	1.5224E-02	3.4098E-01	3.4098E-01	3.907E-01
K-40		1.5098E+01	1.5098E+01	1.9075E+00	2.0872E+00	3.436E-01
MN-54	#A	-3.7206E-04	-3.7357E-04	2.5953E-02	2.5953E-02	7.137E-02
CO-57	#B	-5.6432E-03	-5.6698E-03	4.9535E-02	4.9536E-02	5.525E-02
CO-60	#B	-2.0272E-04	-2.0285E-04	1.2449E-02	1.2449E-02	9.497E-02

Sr-85	#A	-2.3565E-02	-2.4030E-02	6.1641E-02	6.1656E-02	6.723E-02
Kr-85	#A	-5.4404E+02	-5.4405E+02	1.3955E+03	1.3958E+03	1.552E+03
Y-88	#B	-2.2704E-05	-2.2976E-05	1.3786E-04	1.3786E-04	2.550E-02
NB-94	#B	9.6147E-03	9.6147E-03	4.5608E-02	4.5611E-02	5.308E-02
Ag-108M	#B	-1.3536E-02	-1.3536E-02	5.8656E-02	5.8661E-02	6.705E-02
CD-109	#A	1.1530E+00	1.1562E+00	2.0201E+00	2.0212E+00	2.211E+00
SN-113	#B	1.1412E-02	1.1539E-02	5.5768E-02	5.5771E-02	6.280E-02
SB-125	#B	8.2684E-02	8.2787E-02	9.7587E-02	9.7698E-02	1.673E-01
I-131	#B	4.0569E-04	4.7502E-04	4.4999E-02	4.4999E-02	4.480E-02
CS-134	#B	3.0263E-02	3.0314E-02	2.8144E-02	2.8196E-02	5.497E-02
CS-137	#A	0.0000E+00	0.0000E+00	5.5613E-02	5.5613E-02	6.560E-02
CE-139	#A	9.3226E-03	9.4090E-03	4.8606E-02	4.8609E-02	5.386E-02
EU-152	#B	9.9939E-02	9.9967E-02	1.2233E-01	1.2246E-01	1.789E-01
EU-154	#B	2.8896E-02	2.8908E-02	1.1404E-01	1.1405E-01	1.268E-01
EU-155	#B	-2.1200E-02	-2.1215E-02	5.2838E-01	5.2838E-01	2.916E-01
HG-203	#B	-6.9549E-05	-7.1468E-05	8.4432E-03	8.4432E-03	5.075E-02
TL-208		3.8107E-01	3.8107E-01	9.5822E-02	9.8179E-02	
PB-212	#	8.0088E-01	8.0088E-01	1.4418E-01	1.5102E-01	1.175E-01
PB-214	#	4.7695E-01	4.7695E-01	1.3060E-01	1.3332E-01	1.061E-01
BI-212	#	4.8292E-01	4.8292E-01	4.4538E-01	4.4620E-01	4.487E-01
BI-214		3.8304E-01	3.8304E-01	1.3233E-01	1.3407E-01	
RA-224	#A	1.3172E+00	1.3172E+00	1.3215E+00	1.3236E+00	1.420E+00
RA-226	#A	1.3189E+00	1.3189E+00	1.2961E+00	1.2982E+00	1.393E+00
AC-228	B	2.3048E-01	2.3048E-01	8.4922E-02	8.5901E-02	2.338E-01
TH-227	#B	1.0482E-02	1.0482E-02	3.6250E-01	3.6251E-01	4.104E-01
PA-234	#B	-1.2005E-01	-1.2005E-01	2.0289E-01	2.0300E-01	2.223E-01
TH-234	#B	-9.5917E-02	-9.5917E-02	6.2390E+00	6.2390E+00	5.323E+00
AM-241	#A	1.0961E-01	1.0961E-01	6.3488E-01	6.3491E-01	7.082E-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) 1.6092594E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.6092594E+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_20JUL2006_1816.An1

Sample description
FSS-OOL-02-02-007-R

Spectrum Filename: C:\GammaVision\Spectra\102F_20JUL2006_1816.An1

Acquisition information
Start time: 20-Jul-2006 18:16:14
Live time: 2000
Real time: 2027
Dead time: 1.35 %
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: 1.7890E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7890E+03) =
5.5897E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	18-Jul-2006 21:54:00
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: 0.7461

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
75.18	179.	21.02	1.10	8.971E-03	72.87	6.400	2.632E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.19	328.	12.05	1.10	9.574E-03	77.11	10.700	2.426E+00	PB214
					77.11	17.500	1.483E+00	PB212
128.14	137.	34.14	0.58	1.712E-02				
186.16	181.	22.78	1.25	1.626E-02	185.99	3.280	2.499E+00	RA226
209.42	129.	23.05	1.03	1.519E-02				
239.08	1031.	3.64	1.22	1.379E-02	238.63	43.100	1.309E+00	PB212
241.63	180.	17.54	1.22	1.367E-02	241.00	3.900	2.528E+00	RA224
					241.92	7.470	1.333E+00	PB214
270.70	105.	21.50	1.43	1.241E-02				
295.80	182.	11.76	1.26	1.144E-02	295.22	19.200	6.233E-01	PB214
300.54	81.	22.53	1.26	1.127E-02				
328.54	65.	31.58	1.54	1.035E-02				
339.27	257.	11.63	1.20	1.003E-02	338.40	12.010	1.608E+00	AC228
352.53	358.	10.46	1.19	9.664E-03	351.99	37.100	7.514E-01	PB214
463.00	67.	24.74	1.28	7.373E-03				
463.00	67.	24.74	1.28	7.373E-03	463.51	10.000	6.681E-01	SB125
511.50	140.	15.02	1.27	6.685E-03	510.72	22.500	7.020E-01	TL208
584.22	333.	7.39	1.71	5.880E-03	583.14	86.000	4.957E-01	TL208
610.39	226.	8.86	1.56	5.640E-03	609.32	46.090	6.571E-01	BI214
727.97	80.	22.15	0.93	4.789E-03	727.17	11.800	1.068E+00	BI212
796.18	45.	26.21	1.60	4.420E-03	795.76	85.400	8.980E-02	CS134
912.65	207.	8.97	1.47	3.916E-03				
966.23	52.	21.94	1.72	3.726E-03	964.00	14.580	7.226E-01	EU152
970.38	129.	10.52	1.72	3.712E-03	968.90	17.460	1.503E+00	AC228
1121.67	65.	25.77	1.73	3.283E-03	1120.28	15.040	9.882E-01	BI214

1463.14	804.	3.62	1.85	2.617E-03	1460.75	10.700	2.167E+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	
149.93	75.21	615.	179.	0.089	63.07	1.099	PB-214	D
153.95	77.22	616.	328.	0.164	36.14	1.100	PB-214	D
255.88	128.14	764.	167.	0.084	73.89	0.577	AC-228	s
418.45	209.42	346.	129.	0.065	69.15	1.032	AC-228	
477.79	239.03	193.	1028.	0.514	10.97	1.215	PB-212	D
541.05	270.70	185.	105.	0.053	64.51	1.435	AC-228	M
600.77	300.56	216.	65.	0.032	113.52	1.345	PB-212	M
656.75	328.54	162.	65.	0.032	94.74	1.538	RH-106M	sM
1825.44	912.65	46.	212.	0.106	24.71	1.466	AC-228	M
1932.66	966.43	40.	52.	0.026	65.83	1.716	TB-160	D
1940.97	970.58	28.	129.	0.065	31.57	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	149.84	75.13	1416.	141.	0.071	113.23	1.500s
PB-214	153.80	77.11	1238.	294.	0.147	53.74	1.500D
PB-212	153.80	77.11	1238.	294.	0.147	53.74	1.500D
RA-226	372.48	186.44	667.	150.	0.075	74.76	1.500s
PB-212	477.81	239.09	592.	883.	0.441	15.46	1.500
PB-214	483.34	241.85	721.	111.	0.056	106.51	1.500
PB-214	591.23	295.79	269.	186.	0.093	43.29	1.500s
AC-228	677.76	339.04	201.	217.	0.109	34.34	1.500
PB-214	704.78	352.55	179.	312.	0.156	24.83	1.500s
SB-125	926.82	463.53	95.	66.	0.033	70.93	1.500
TL-208	1022.78	511.50	108.	140.	0.070	45.07	1.271s
TL-208	1168.26	584.22	98.	332.	0.166	22.17	1.713
BI-214	1220.64	610.39	70.	226.	0.113	26.58	1.561
BI-212	1455.89	727.97	78.	80.	0.040	66.45	0.926s
CS-134	1592.38	796.18	47.	45.	0.022	78.63	1.601s
EU-152	1932.89	966.35	48.	46.	0.023	77.87	1.714s
BI-214	2243.75	1121.67	64.	65.	0.032	77.31	1.726s
K-40	2927.26	1463.17	22.	772.	0.386	11.10	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	Code	MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	%(	5.641E-01 1.63E-01	G
K-40		2.0784E+01					
			1460.75	2.078E+01	(P	6.589E-01 7.69E-01	G
MN-54		-4.7948E-03					
			834.81	-4.795E-03	%(P	7.199E-02 2.05E-02	G
CO-57		-1.6828E-03					
			122.07	-1.683E-03	%(	7.801E-02 2.33E-02	G K
			136.43	1.551E-01	&	5.033E-01 1.51E-01	G
CO-60		1.4865E-02					
			1332.51	1.486E-02	%(P	6.764E-02 1.94E-02	G K
			1173.23	2.218E-02	&	1.098E-01 3.22E-02	G K
Sr-85		-2.7429E-02					
			514.00	-2.743E-02	%(	7.928E-02 2.38E-02	G
Kr-85		-6.2083E+02					
			513.99	-6.208E+02	%(	1.795E+03 5.38E+02	G
Y-88		-1.6655E-03					
			1836.01	-1.666E-03	%(P	6.986E-02 1.84E-02	G K
			898.02	-1.516E-02	% P	7.443E-02 2.15E-02	G
NB-94		0.0000E+00					
			871.10	0.000E+00	&(	8.374E-02 2.39E-02	G K
			702.50	1.637E-02	%	6.488E-02 1.91E-02	G K
Ag-108M		-1.1364E-02					
			722.95	-1.136E-02	%(	8.672E-02 2.53E-02	G K
			614.37	-4.999E-02	% P	9.533E-02 2.90E-02	G
			433.93	-1.451E-02	%	6.650E-02 1.97E-02	G
CD-109		5.5859E-01					
			88.04	5.586E-01	%(P	2.770E+00 8.32E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	2.3703E-02						
		391.71	2.370E-02	&(	8.791E-02	2.62E-02	G K
		255.04	1.112E-01	%	2.445E+00	7.21E-01	G
SB-125	1.7823E-01						
		427.95	9.322E-03	&(P	1.911E-01	5.55E-02	G K
		600.77	6.055E-02	% P	3.378E-01	9.88E-02	G
		636.15	1.569E-01	& P	5.662E-01	1.68E-01	G
		463.51	6.782E-01	(P	4.953E-01	1.64E-01	G
		176.29	-3.388E-02	% P	9.254E-01	2.75E-01	G
I-131	-1.1387E-02						
		364.48	-1.139E-02	&(	7.475E-02	2.20E-02	G K
		636.97	2.340E-01	&	1.045E+00	3.07E-01	G
		284.29	2.962E-02	&	8.741E-01	2.56E-01	G
CS-134	4.1135E-02						
		604.66	-1.450E-03	%(	7.867E-02	2.28E-02	G K
		795.76	8.980E-02	@(	6.916E-02	2.35E-02	G
		569.29	6.567E-02	%	3.610E-01	1.05E-01	G
		801.84	-1.131E-01	% P	7.135E-01	2.06E-01	G
CS-137	2.9524E-02						
		661.62	2.952E-02	%(	7.588E-02	2.28E-02	G
CE-139	-1.6971E-02						
		165.85	-1.697E-02	&(P	7.353E-02	2.21E-02	G
EU-152	1.8049E-01						
		121.78	-4.534E-02	%(P	2.184E-01	6.55E-02	G K
		344.30	-1.751E-02	&	1.872E-01	5.49E-02	G
		1408.08	-2.285E-02	%	3.388E-01	9.36E-02	G
		964.00	6.334E-01	?(P	4.865E-01	1.65E-01	G
		1112.07	0.000E+00	%	9.079E-01	2.62E-01	G
		778.90	3.801E-02	% P	4.320E-01	1.22E-01	G
EU-154	6.8982E-05						
		123.10	6.898E-05	&(P	1.512E-01	4.50E-02	G K
		1274.80	-3.044E-03	%	2.766E-01	7.81E-02	G
		723.30	-8.897E-02	% P	4.198E-01	1.24E-01	G
		1004.80	7.281E-03	&	3.342E-01	9.21E-02	G
EU-155	1.5133E-01						
		86.45	1.513E-01	%(P	3.344E-01	1.01E-01	G K
		105.31	7.344E-02	&	3.222E-01	9.68E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	3.7226E-02						
		279.17	3.723E-02	&(P	6.340E-02	1.94E-02	G K
		72.87	-3.478E-01	%	2.709E+00	8.13E-01	G
		70.83	-5.987E-01	%	4.920E+00	1.48E+00	G
		82.50	-2.015E+00	%	5.319E+00	1.61E+00	G
TL-208	4.9568E-01						
		583.14	4.957E-01	(P	7.270E-02	3.67E-02	G
		510.72	7.020E-01	+	2.564E-01	1.06E-01	G
PB-212	1.1455E+00						
		238.63	1.121E+00	(	1.474E-01	5.77E-02	G K
							Energy duplication
		77.11	1.329E+00	+	7.541E-01	2.38E-01	G
		74.81	1.257E+00	&(P	1.584E+00	4.85E-01	G
PB-214	6.5127E-01						
		351.99	6.572E-01	@(P	1.369E-01	5.45E-02	G K
		295.22	6.398E-01	*(	2.714E-01	9.23E-02	G
							Energy duplication
		77.11	2.174E+00	+	1.233E+00	3.89E-01	G
		241.92	8.223E-01	+	9.471E-01	2.92E-01	G
BI-212	1.0682E+00						
		727.17	1.068E+00	(	5.857E-01	2.37E-01	G K
		1620.56	-4.747E-01	% P	2.656E+00	7.40E-01	G
		785.42	-3.881E-03	% P	3.669E+00	1.04E+00	G
BI-214	6.5709E-01						
		609.32	6.571E-01	(	1.214E-01	5.83E-02	G K
		1764.51	-1.848E-03	& P	1.571E-01	2.13E-02	G
		1120.28	9.882E-01	+	6.135E-01	2.55E-01	G
RA-224	1.6902E+00						
		241.00	1.690E+00	%(P	2.320E+00	7.09E-01	G
RA-226	2.1219E+00						
		185.99	2.122E+00	*(P	1.742E+00	5.45E-01	G
AC-228	3.7454E-01						
		911.07	-3.319E-02	%(P	3.002E-01	8.68E-02	G K
		968.90	2.798E-02	% P	5.643E-01	1.63E-01	G
		338.40	1.359E+00	(	4.299E-01	1.56E-01	G
TH-227	-2.8129E-01						
		236.00	-2.813E-01	%(P	6.435E-01	1.95E-01	G K
		256.25	-1.088E-01	%	8.269E-01	2.46E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	-2.6079E-02						
		98.44	-2.608E-02	&(	2.805E-01	8.37E-02	G K
		946.00	0.000E+00	%	3.861E-01	1.09E-01	G
		131.28	-7.671E-02	%	3.316E-01	9.97E-02	G
		94.67	1.443E-02	%	5.738E-01	1.71E-01	G
		883.24	-1.727E-01	%	6.571E-01	1.94E-01	G
		926.70	3.513E-01	%	5.333E-01	1.67E-01	G
		569.26	9.734E-02	%	5.347E-01	1.56E-01	G
TH-234	2.0970E+00						
		63.29	2.097E+00	%(P	6.006E+00	1.81E+00	G K
		92.80	1.932E+00	%	3.119E+00	9.51E-01	G
		92.38	9.510E-01	& P	3.256E+00	9.80E-01	G
AM-241	7.5944E-02						
		59.54	7.594E-02	%(	8.455E-01	2.53E-01	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - 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	4.8765E-01	4.8765E-01	5.507E-01
K-40		2.0784E+01	2.0784E+01	2.3070E+00	2.5851E+00	6.589E-01
MN-54	#A	-4.7751E-03	-4.7948E-03	7.2277E-02	7.2277E-02	7.170E-02
CO-57	#B	-1.6749E-03	-1.6828E-03	6.9778E-02	6.9779E-02	7.764E-02
CO-60	#B	1.4855E-02	1.4865E-02	5.8113E-02	5.8119E-02	6.760E-02
Sr-85	#A	-2.6892E-02	-2.7429E-02	7.1353E-02	7.1370E-02	7.773E-02
Kr-85	#A	-6.2082E+02	-6.2083E+02	1.6150E+03	1.6154E+03	1.795E+03
Y-88	#B	-1.6456E-03	-1.6655E-03	5.6811E-02	5.6811E-02	6.902E-02
NB-94	#B	0.0000E+00	0.0000E+00	7.1671E-02	7.1671E-02	8.374E-02
Ag-108M	#B	-1.1363E-02	-1.1364E-02	7.5859E-02	7.5861E-02	8.672E-02
CD-109	#A	5.5701E-01	5.5859E-01	2.4975E+00	2.4977E+00	2.762E+00
SN-113	#B	2.3440E-02	2.3703E-02	7.8541E-02	7.8552E-02	8.693E-02
SB-125	#B	1.7800E-01	1.7823E-01	1.2937E-01	1.2976E-01	1.909E-01
I-131	#B	-9.7089E-03	-1.1387E-02	6.6088E-02	6.6091E-02	6.374E-02
CS-134	#B	4.1065E-02	4.1135E-02	3.2345E-02	3.2428E-02	7.854E-02
CS-137	#A	2.9520E-02	2.9524E-02	6.8276E-02	6.8296E-02	7.587E-02
CE-139	#A	-1.6814E-02	-1.6971E-02	6.8125E-02	6.8132E-02	7.285E-02
EU-152	#B	1.8045E-01	1.8049E-01	1.4126E-01	1.4162E-01	2.184E-01
EU-154	#B	6.8953E-05	6.8982E-05	1.3495E-01	1.3495E-01	1.512E-01
EU-155	#B	1.5123E-01	1.5133E-01	3.0386E-01	3.0397E-01	3.342E-01
HG-203	#B	3.6216E-02	3.7226E-02	5.8096E-02	5.8134E-02	6.168E-02
TL-208		4.9568E-01	4.9568E-01	1.1004E-01	1.1350E-01	
PB-212	#	1.1455E+00	1.1455E+00	1.7704E-01	1.8835E-01	1.474E-01
PB-214	#	6.5127E-01	6.5127E-01	1.6193E-01	1.6601E-01	1.369E-01
BI-212	#	1.0682E+00	1.0682E+00	7.0984E-01	7.1236E-01	
BI-214		6.5709E-01	6.5709E-01	1.7466E-01	1.7851E-01	
RA-224	A	1.6902E+00	1.6902E+00	2.1277E+00	2.1299E+00	
RA-226	#	2.1219E+00	2.1219E+00	1.6336E+00	1.6379E+00	1.742E+00
AC-228	F	3.7454E-01	3.7454E-01	1.2862E-01	1.3033E-01	3.002E-01
TH-227	#B	-2.8129E-01	-2.8129E-01	5.9016E-01	5.9037E-01	6.435E-01
PA-234	#B	-2.6079E-02	-2.6079E-02	2.5114E-01	2.5114E-01	2.805E-01
TH-234	#B	2.0970E+00	2.0970E+00	5.4389E+00	5.4401E+00	6.006E+00
AM-241	#A	7.5944E-02	7.5944E-02	7.5771E-01	7.5773E-01	8.455E-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 (1119.8 to 1999.0 keV) 2.3379803E+01 pCi/gm
Total Decayed Activity (1119.8 to 1999.0 keV) 2.3379803E+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_20JUL2006_1853.An1

Sample description
FSS-OOL-02-02-001-R

Spectrum Filename: C:\GammaVision\Spectra\102F_20JUL2006_1853.An1

Acquisition information
Start time: 20-Jul-2006 18:53:52
Live time: 2000
Real time: 2021
Dead time: 1.04 %
Detector ID: 3

Detector system
Det 102 - DSPP-468

Calibration
Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration
Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0950E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0950E+03) =
4.7733E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	18-Jul-2006 20:45:00
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: 0.8120

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.52	188.	16.30	1.10	9.786E-03	77.11	10.700	1.186E+00	PB214
					77.11	17.500	7.254E-01	PB212
93.23	111.	39.02	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.789E+00	TH234
93.23	104.	40.58	1.50	1.325E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.15	86.	32.96	0.84	1.626E-02	185.99	3.280	PBC<MDA	RA226
209.37	101.	31.36	1.55	1.519E-02				
239.07	633.	4.72	1.22	1.378E-02	238.63	43.100	6.867E-01	PB212
241.99	112.	18.86	1.22	1.364E-02	241.00	3.900	1.341E+00	RA224
					241.92	7.470	7.095E-01	PB214
295.75	108.	15.93	1.26	1.145E-02	295.22	19.200	3.151E-01	PB214
300.66	40.	35.93	1.26	1.127E-02				
339.07	160.	14.77	1.24	1.004E-02	338.40	12.010	8.548E-01	AC228
352.57	203.	14.65	1.30	9.663E-03	351.99	37.100	3.643E-01	PB214
464.05	46.	29.85	1.74	7.356E-03	463.51	10.000	3.899E-01	SB125
511.71	120.	17.68	2.15	6.682E-03	510.72	22.500	5.134E-01	TL208
584.06	202.	9.83	1.11	5.881E-03	583.14	86.000	2.567E-01	TL208
610.19	134.	13.67	1.49	5.642E-03	609.32	46.090	3.320E-01	BI214
720.74	20.	38.97	1.55	4.820E-03	722.95	90.499	PBC<MDA	Ag108M
728.11	39.	25.87	1.55	4.794E-03	727.17	11.800	4.410E-01	BI212
796.35	51.	28.18	1.42	4.417E-03	795.76	85.400	8.800E-02	CS134
912.74	137.	10.10	1.35	3.916E-03	911.07	29.000	7.734E-01	AC228
969.75	74.	19.81	1.43	3.715E-03				
1121.76	36.	39.67	1.43	3.283E-03	1120.28	15.040	PBC<MDA	BI214
1463.22	641.	4.09	1.80	2.617E-03	1460.75	10.700	1.475E+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	
154.61	77.95	374.	188.	0.094	48.89	1.100	PB-214	D
418.36	209.37	335.	101.	0.051	94.09	1.553	AC-228	sM
477.76	239.19	130.	633.	0.317	14.15	1.215	PB-212	D
483.62	242.12	168.	112.	0.056	56.82	1.217	PB-214	D
600.99	300.60	82.	40.	0.020	107.80	1.259	PB-212	lD
1592.72	796.35	41.	51.	0.026	84.53	1.418	PA-234	l
1939.71	969.75	43.	75.	0.038	50.39	1.428	AC-228	sM

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.80	77.11	935.	190.	0.095	71.48	1.500D
PB-212	153.80	77.11	935.	190.	0.095	71.48	1.500D
TH-234	186.04	93.23	861.	104.	0.052	121.74	1.500
TH-234	186.04	93.23	881.	111.	0.055	117.05	1.500
RA-226	372.61	186.50	449.	75.	0.038	117.35	1.500s
PB-212	477.77	239.07	412.	559.	0.279	19.96	1.500s
RA-224	483.43	241.90	428.	91.	0.045	100.26	1.500
PB-214	483.46	241.91	433.	88.	0.044	105.29	1.500
PB-214	591.05	295.70	185.	100.	0.050	64.99	1.500
AC-228	677.59	338.96	158.	144.	0.072	44.59	1.500
PB-214	704.93	352.63	127.	180.	0.090	34.56	1.500
SB-125	927.69	463.97	47.	42.	0.021	79.64	1.500s
TL-208	1022.95	511.59	87.	123.	0.062	51.83	2.161s
TL-208	1167.95	584.06	64.	202.	0.101	29.48	1.112
BI-214	1220.23	610.19	72.	134.	0.067	41.01	1.494s
Ag-108M	1441.42	720.74	21.	20.	0.010	116.90	1.551
BI-212	1456.18	728.11	31.	39.	0.019	77.60	1.554s
AC-228	1825.57	912.72	28.	132.	0.066	31.15	1.679
BI-214	2243.92	1121.76	56.	36.	0.018	119.02	1.426s
K-40	2927.29	1463.19	16.	618.	0.309	12.37	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		6.0999E-02					
			477.56	6.100E-02	%(	3.567E-01 1.04E-01	G
K-40		1.4210E+01					
			1460.75	1.421E+01	(P	4.879E-01 5.86E-01	G
MN-54		2.5218E-02					
			834.81	2.522E-02	%(P	4.679E-02 1.43E-02	G
CO-57		8.6547E-03					
			122.07	8.655E-03	&(	5.321E-02 1.59E-02	G K
			136.43	4.991E-03	%	3.928E-01 1.16E-01	G
CO-60		8.7751E-04					
			1332.51	8.775E-04	&(P	5.978E-02 1.63E-02	G K
			1173.23	-1.273E-03	&	6.428E-02 1.79E-02	G K
Sr-85		4.8150E-05					
			514.00	4.815E-05	%(	4.987E-02 1.43E-02	G
Kr-85		1.5452E+00					
			513.99	1.545E+00	%(	1.128E+03 3.24E+02	G
Y-88		2.1830E-03					
			1836.01	2.183E-03	%(P	4.096E-02 1.02E-02	G K
			898.02	-2.125E-03	& P	4.422E-02 1.19E-02	G
NB-94		-3.9458E-03					
			871.10	-3.946E-03	%(	5.385E-02 1.52E-02	G K
			702.50	6.044E-03	&	4.262E-02 1.22E-02	G K
Ag-108M		2.9658E-02					
			722.95	2.966E-02	&(	3.522E-02 1.16E-02	G K
			614.37	-1.690E-02	& P	6.502E-02 1.92E-02	G
			433.93	-4.382E-03	%	4.042E-02 1.17E-02	G
CD-109		3.2234E-01					
			88.04	3.223E-01	%(P	1.945E+00 5.83E-01	G
SN-113		2.1055E-02					
			391.71	2.106E-02	&(	5.127E-02 1.54E-02	G K
			255.04	2.821E-01	%	1.734E+00 5.13E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.2624E-02						
		427.95	-1.149E-03	%(P	1.200E-01	3.40E-02	G K
		600.77	-7.383E-03	% P	2.178E-01	6.13E-02	G
		636.15	1.052E-01	% P	3.385E-01	9.97E-02	G
		463.51	3.702E-01	(P	3.043E-01	1.02E-01	G
		176.29	-1.382E-01	% P	6.510E-01	1.94E-01	G
I-131	-3.7711E-03						
		364.48	-3.771E-03	&(	5.260E-02	1.53E-02	G K
		636.97	0.000E+00	%	7.953E-01	2.25E-01	G
		284.29	-1.540E-01	%	7.325E-01	2.17E-01	G
CS-134	-8.3826E-03						
		604.66	-8.383E-03	&(	5.441E-02	1.59E-02	G K
		795.76	3.636E-02	%	5.150E-02	1.63E-02	G
		569.29	1.079E-03	&	2.622E-01	7.39E-02	G
		801.84	3.068E-02	% P	5.020E-01	1.40E-01	G
CS-137	9.2402E-04						
		661.62	9.240E-04	&(	6.324E-02	1.80E-02	G
CE-139	-1.0131E-02						
		165.85	-1.013E-02	&(P	5.026E-02	1.50E-02	G
EU-152	2.5236E-02						
		121.78	2.524E-02	%(P	1.590E-01	4.75E-02	G K
		344.30	-4.080E-02	&	1.529E-01	4.55E-02	G
		1408.08	-2.246E-02	&	2.623E-01	7.21E-02	G
		964.00	-6.084E-02	% P	4.755E-01	1.37E-01	G
		1112.07	-4.825E-02	%	5.174E-01	1.48E-01	G
		778.90	-5.192E-02	% P	3.973E-01	1.14E-01	G
EU-154	1.7384E-02						
		123.10	1.738E-02	%(P	1.104E-01	3.30E-02	G K
		1274.80	-4.210E-02	%	2.048E-01	5.93E-02	G
		723.30	-5.788E-02	& P	2.495E-01	7.27E-02	G
		1004.80	6.317E-02	&	2.677E-01	7.72E-02	G
EU-155	-6.2770E-03						
		86.45	-6.277E-03	%(P	2.546E-01	7.58E-02	G K
		105.31	2.941E-02	%	2.429E-01	7.25E-02	G
HG-203	-9.9888E-04						
		279.17	-9.989E-04	%(P	4.542E-02	1.32E-02	G K
		72.87	-5.758E-01	%	2.049E+00	6.17E-01	G
		70.83	-2.166E+00	%	3.605E+00	1.10E+00	G
		82.50	-5.729E-01	%	3.848E+00	1.15E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5671E-01						
		583.14	2.567E-01	(P	5.107E-02	2.53E-02	G
		510.72	5.276E-01	+	1.975E-01	9.13E-02	G
PB-212	6.0590E-01						
		238.63	6.059E-01	@(	1.055E-01	4.03E-02	G K
							Energy duplication
		77.11	7.359E-01	+	5.609E-01	1.75E-01	G
		74.81	5.979E-01	& P	1.184E+00	3.59E-01	G
PB-214	3.1359E-01						
		351.99	3.240E-01	(P	9.911E-02	3.74E-02	G K
		295.22	2.935E-01	(	1.938E-01	6.36E-02	G
							Energy duplication
		77.11	1.204E+00	+	9.173E-01	2.87E-01	G
		241.92	5.563E-01	+	6.301E-01	1.95E-01	G
BI-212	4.4103E-01						
		727.17	4.410E-01	@(	3.254E-01	1.14E-01	G K
		1620.56	2.765E-01	% P	1.496E+00	4.04E-01	G
		785.42	-4.009E-01	% P	2.256E+00	6.48E-01	G
BI-214	3.3196E-01						
		609.32	3.320E-01	@(	1.047E-01	4.54E-02	G K
		1764.51	-5.866E-02	% P	3.332E-01	9.17E-02	G
		1120.28	4.703E-01	+	4.909E-01	1.87E-01	G
RA-224	1.0973E+00						
		241.00	1.097E+00	(P	1.197E+00	3.71E-01	G
RA-226	9.0833E-01						
		185.99	9.083E-01	*(P	1.227E+00	3.76E-01	G
AC-228	7.5442E-01						
		911.07	7.478E-01	(P	1.558E-01	7.78E-02	G K
		968.90	-1.583E-02	% P	3.078E-01	8.61E-02	G
		338.40	7.703E-01	(	3.270E-01	1.15E-01	G
TH-227	3.2223E-03						
		236.00	3.222E-03	&(P	5.285E-01	1.57E-01	G K
		256.25	6.761E-02	%	5.279E-01	1.56E-01	G
PA-234	-3.6347E-04						
		98.44	-3.635E-04	&(	2.329E-01	6.92E-02	G K
		946.00	-5.361E-05	%	2.167E-01	5.88E-02	G
		131.28	5.980E-03	&	2.266E-01	6.73E-02	G
		94.67	-2.086E-01	&	4.048E-01	1.23E-01	G
		883.24	1.608E-01	&	3.670E-01	1.11E-01	G
		926.70	-2.366E-02	&	4.818E-01	1.35E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 7.244E-03 &   3.865E-01 1.09E-01 G

TH-234       1.1420E+00
                           63.29 9.734E-02 %(P 4.548E+00 1.35E+00 G K
                           92.80 1.789E+00  (  2.275E+00 6.98E-01 G
                           92.38 1.972E+00  (P 2.641E+00 8.09E-01 G

AM-241       1.5606E-01
                           59.54 1.561E-01 %(  5.500E-01 1.65E-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:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - 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	5.9496E-02	6.0999E-02	3.1060E-01	3.1062E-01	3.479E-01
K-40		1.4210E+01	1.4210E+01	1.7581E+00	1.9305E+00	4.879E-01
MN-54	#A	2.5111E-02	2.5218E-02	4.3009E-02	4.3032E-02	4.659E-02
CO-57	#B	8.6120E-03	8.6547E-03	4.7706E-02	4.7708E-02	5.295E-02
CO-60	#B	8.7690E-04	8.7751E-04	4.8955E-02	4.8955E-02	5.974E-02

Sr-85	A	4.7171E-05	4.8150E-05	4.2945E-02	4.2945E-02	4.885E-02
Kr-85	A	1.5452E+00	1.5452E+00	9.7123E+02	9.7123E+02	1.128E+03
Y-88	#B	2.1559E-03	2.1830E-03	3.0727E-02	3.0728E-02	4.045E-02
NB-94	#B	-3.9458E-03	-3.9458E-03	4.5739E-02	4.5740E-02	5.385E-02
Ag-108M	#A	2.9658E-02	2.9658E-02	3.4672E-02	3.4712E-02	3.522E-02
CD-109	#A	3.2140E-01	3.2234E-01	1.7478E+00	1.7479E+00	1.940E+00
SN-113	#B	2.0813E-02	2.1055E-02	4.6253E-02	4.6268E-02	5.068E-02
SB-125	#B	9.2502E-02	9.2624E-02	7.6465E-02	7.6642E-02	1.198E-01
I-131	#B	-3.1950E-03	-3.7711E-03	4.5790E-02	4.5791E-02	4.457E-02
CS-134	#B	-8.3678E-03	-8.3826E-03	4.7598E-02	4.7601E-02	5.431E-02
CS-137	#A	9.2391E-04	9.2402E-04	5.4093E-02	5.4093E-02	6.323E-02
CE-139	#A	-1.0034E-02	-1.0131E-02	4.6933E-02	4.6937E-02	4.977E-02
EU-152	#B	2.5229E-02	2.5236E-02	1.4248E-01	1.4249E-01	1.589E-01
EU-154	#B	1.7376E-02	1.7384E-02	9.8928E-02	9.8933E-02	1.104E-01
EU-155	#B	-6.2724E-03	-6.2770E-03	1.7350E+00	1.7350E+00	2.544E-01
HG-203	#B	-9.7071E-04	-9.9888E-04	4.5055E-02	4.5055E-02	4.414E-02
TL-208		2.5671E-01	2.5671E-01	7.5830E-02	7.7186E-02	
PB-212	#	6.0590E-01	6.0590E-01	1.2097E-01	1.2565E-01	1.055E-01
PB-214	#	3.1359E-01	3.1359E-01	1.0860E-01	1.1001E-01	9.911E-02
BI-212	#	4.4103E-01	4.4103E-01	3.4225E-01	3.4315E-01	3.254E-01
BI-214	#	3.3196E-01	3.3196E-01	1.3615E-01	1.3742E-01	
RA-224	#A	1.0973E+00	1.0973E+00	1.1142E+00	1.1159E+00	1.197E+00
RA-226	#A	9.0833E-01	9.0833E-01	1.1292E+00	1.1304E+00	1.227E+00
AC-228		7.5442E-01	7.5442E-01	2.0531E-01	2.0963E-01	1.558E-01
TH-227	#B	3.2223E-03	3.2223E-03	4.7103E-01	4.7103E-01	5.285E-01
PA-234	#B	-3.6347E-04	-3.6347E-04	2.0759E-01	2.0759E-01	2.329E-01
TH-234	#B	1.1420E+00	1.1420E+00	1.3367E+00	1.3382E+00	4.548E+00
AM-241	#A	1.5606E-01	1.5606E-01	4.9541E-01	4.9549E-01	5.500E-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 (246.2 to 1999.0 keV) 1.5552608E+01 pCi/gm
Total Decayed Activity (246.2 to 1999.0 keV) 1.5552608E+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_1MAY2006_1022.An1

Sample description
FSS-OOL-02-02-019-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1MAY2006_1022.An1

Acquisition information

Start time:	01-May-2006 10:24:06
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:	1.8650E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8650E+03) = 5.3619E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	26-Apr-2006 22:15:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2263

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.41	68.	36.74	0.99	9.100E-03	74.81	9.600	PBC<MDA	PB212
77.62	171.	17.07	0.99	1.058E-02	77.11	17.500	6.879E-01	PB212
128.69	89.	38.05	1.20	2.433E-02				
186.38	143.	24.35	1.12	2.565E-02	185.99	3.280	1.118E+00	RA226
209.74	121.	30.76	1.05	2.469E-02				
238.83	1116.	3.51	1.09	2.320E-02	238.63	43.100	8.002E-01	PB212
241.76	168.	14.74	1.09	2.304E-02	241.00	3.900	1.354E+00	RA224
					241.92	7.470	7.082E-01	PB214
270.00	100.	32.19	1.23	2.152E-02				
295.39	202.	11.05	1.13	2.024E-02	295.22	19.200	3.690E-01	PB214
300.20	91.	25.45	1.17	2.001E-02				
328.33	80.	27.13	0.62	1.873E-02				
338.35	212.	12.16	1.25	1.830E-02	338.40	12.010	6.966E-01	AC228
351.96	364.	7.96	1.18	1.775E-02	351.99	37.100	3.945E-01	PB214
409.58	45.	40.04	1.47	1.574E-02				
463.07	102.	24.77	1.07	1.426E-02				
463.07	102.	24.77	1.07	1.426E-02	463.51	10.000	5.129E-01	SB125
510.73	185.	14.52	0.96	1.317E-02	510.72	22.500	3.866E-01	TL208
583.37	369.	7.60	1.20	1.184E-02	583.14	86.000	2.591E-01	TL208
609.58	317.	8.77	1.34	1.144E-02	609.32	46.090	4.268E-01	BI214
677.54	53.	28.36	1.15	1.053E-02				
684.06	44.	33.79	0.87	1.045E-02				
727.36	98.	20.64	1.17	9.963E-03	727.17	11.800	6.021E-01	BI212
861.27	59.	27.03	1.30	8.762E-03				
911.64	274.	8.36	1.73	8.397E-03	911.07	29.000	8.052E-01	AC228
964.75	52.	24.01	1.54	8.051E-03	964.00	14.580	3.178E-01	EU152
969.43	147.	9.53	1.54	8.022E-03	968.90	17.460	7.573E-01	AC228

1120.72	85.	22.39	2.18	7.212E-03	1120.28	15.040	5.652E-01	BI214
1461.29	1217.	2.90	2.03	5.930E-03	1460.75	10.700	1.368E+01	K40
1620.83	20.	30.62	0.64	5.488E-03	1620.56	2.750	9.582E-01	BI212
1765.30	69.	11.79	2.29	5.142E-03	1764.51	15.920	6.084E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
256.55	128.69	488.	106.	0.053	93.23	1.202	AC-228	s
418.64	209.74	490.	121.	0.061	92.28	1.048	NP-239	s
539.16	270.00	360.	100.	0.050	96.56	1.225	AC-228	
599.55	300.20	200.	91.	0.045	76.34	1.166	PB-212	s
655.81	328.33	179.	80.	0.040	81.40	0.615	RH-106M	s
818.28	409.58	130.	45.	0.023	120.13	1.468	AC-228	s
1354.16	677.54	61.	53.	0.026	85.07	1.149	AG-110M	s
1367.20	684.06	69.	44.	0.022	101.37	0.867	W-187	s
1721.58	861.27	63.	59.	0.029	69.16	1.299	TL-208	s
1929.57	964.80	44.	60.	0.030	60.89	1.539	AC-228	D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	296.	105.	0.053	72.97	0.993D
PB-212	153.39	77.11	311.	195.	0.097	40.23	0.995A
RA-226	371.91	186.37	635.	157.	0.078	66.50	1.500
PB-212	476.83	238.84	654.	1059.	0.530	14.66	0.956
RA-224	482.84	241.84	663.	152.	0.076	75.65	1.500
PB-214	482.38	241.61	317.	83.	0.042	92.17	1.185
PB-214	589.95	295.40	180.	176.	0.088	38.44	1.055
AC-228	675.85	338.35	199.	211.	0.106	36.47	1.251
PB-214	703.05	351.96	204.	359.	0.179	23.89	1.177
SB-125	925.68	463.28	162.	64.	0.032	90.88	1.500s
TL-208	1020.57	510.73	194.	158.	0.079	43.55	0.956s
TL-208	1165.84	583.37	139.	364.	0.182	22.81	1.196
BI-214	1218.25	609.58	144.	311.	0.155	26.30	1.340
BI-212	1453.79	727.36	101.	98.	0.049	61.91	1.165
AC-228	1822.31	911.64	79.	271.	0.135	25.07	1.726
EU-152	1929.46	965.22	70.	53.	0.026	78.00	1.538
AC-228	1936.81	968.90	27.	147.	0.073	28.96	1.541D
BI-214	2240.41	1120.72	84.	85.	0.042	67.18	2.178s
K-40	2921.44	1461.29	28.	1198.	0.599	8.70	2.028
BI-212	3240.48	1620.83	5.	20.	0.010	91.86	0.636s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3529.36	1765.30	3.	69.	0.034	35.36	2.292s

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

***** S U M M A R Y O 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		1.5338E-03					
			477.56	1.534E-03	%(	3.274E-01 9.50E-02	G
K-40		1.3682E+01					
			1460.75	1.368E+01	(P	3.100E-01 4.03E-01	G
MN-54		4.0935E-03					
			834.81	4.094E-03	%(P	3.280E-02 9.45E-03	G
CO-57		6.3120E-03					
			122.07	6.312E-03	%(P	4.988E-02 1.49E-02	G K
			136.43	7.862E-02	&	3.682E-01 1.10E-01	G
CO-60		4.2176E-03					
			1332.51	4.218E-03	%(P	3.192E-02 8.82E-03	G K
			1173.23	1.397E-02	& P	4.238E-02 1.25E-02	G K
Sr-85		-1.9951E-02					
			514.00	-1.995E-02	%(	4.424E-02 1.34E-02	G
Kr-85		-4.3893E+02					
			513.99	-4.389E+02	%(	9.734E+02 2.95E+02	G
Y-88		-9.4854E-05					
			1836.01	-9.485E-05	&(P	2.128E-02 5.19E-03	G K
			898.02	-4.783E-03	% P	4.294E-02 1.24E-02	G
NB-94		6.1349E-03					
			871.10	6.135E-03	%(	2.769E-02 8.04E-03	G K
			702.50	2.424E-03	%	3.358E-02 9.70E-03	G K
Ag-108M		-1.7030E-03					
			722.95	-1.703E-03	&(	6.317E-02 1.86E-02	G K
			614.37	-1.768E-02	& P	4.161E-02 1.25E-02	G
			433.93	0.000E+00	&	3.522E-02 1.02E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.3087E-01						
		88.04	1.309E-01	%(	1.588E+00	4.73E-01	G
SN-113	7.5382E-03						
		391.71	7.538E-03	%(	4.500E-02	1.33E-02	G K
		255.04	-7.086E-02	%	1.286E+00	3.78E-01	G
SB-125	9.3359E-02						
		427.95	1.524E-02	&(P	9.474E-02	2.79E-02	G K
		600.77	8.800E-03	& P	1.865E-01	5.41E-02	G
		636.15	-8.745E-02	& P	2.969E-01	8.79E-02	G
		463.51	3.246E-01	*(P	3.165E-01	1.00E-01	G
		176.29	-1.566E-01	&	5.067E-01	1.52E-01	G
I-131	6.1860E-03						
		364.48	6.186E-03	&(P	4.850E-02	1.42E-02	G K
		636.97	9.602E-02	%	6.024E-01	1.76E-01	G
		284.29	-1.730E-01	% P	7.885E-01	2.35E-01	G
CS-134	0.0000E+00						
		604.66	0.000E+00	%(	5.967E-02	1.76E-02	G K
		795.76	2.335E-02	% P	3.253E-02	1.02E-02	G
		569.29	-2.948E-02	% P	2.162E-01	6.27E-02	G
		801.84	-6.922E-02	% P	3.517E-01	1.00E-01	G
CS-137	1.8950E-02						
		661.62	1.895E-02	%(P	4.114E-02	1.24E-02	G
CE-139	-4.7476E-03						
		165.85	-4.748E-03	&(	3.718E-02	1.11E-02	G
EU-152	1.2028E-01						
		121.78	1.777E-02	%(P	1.447E-01	4.33E-02	G K
		344.30	1.731E-02	% P	1.134E-01	3.36E-02	G
		1408.08	7.215E-02	%	1.417E-01	4.33E-02	G
		964.00	3.259E-01	(P	2.574E-01	8.56E-02	G
		1112.07	4.178E-02	%	2.480E-01	7.14E-02	G
		778.90	0.000E+00	%	2.675E-01	7.63E-02	G
EU-154	1.2854E-02						
		123.10	1.285E-02	&(	9.806E-02	2.93E-02	G K
		1274.80	1.477E-02	&	1.156E-01	3.32E-02	G
		723.30	-1.069E-01	%	2.257E-01	6.84E-02	G
		1004.80	4.174E-02	&	1.873E-01	5.46E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	0.0000E+00						
		86.45	0.000E+00	%(	2.436E-01	7.26E-02	G K
		105.31	-5.943E-03	%	2.242E-01	6.68E-02	G
HG-203	2.3312E-02						
		279.17	2.331E-02	%(P	3.811E-02	1.17E-02	G K
		72.87	-4.836E-01	% P	2.110E+00	6.33E-01	G
		70.83	-1.982E+00	%	4.482E+00	1.36E+00	G
		82.50	-4.954E-01	%	3.880E+00	1.16E+00	G
TL-208	2.5913E-01						
		583.14	2.591E-01	(P	4.097E-02	1.99E-02	G
		510.72	3.866E-01	+ P	1.653E-01	6.56E-02	G
PB-212	8.0180E-01						
		238.63	7.678E-01	(P	8.830E-02	3.79E-02	G K
							Energy duplication
		77.11	7.979E-01	} P	3.474E-01	1.07E-01	G
		74.81	8.779E-01	(P	6.916E-01	2.20E-01	G
PB-214	3.8711E-01						
		351.99	3.945E-01	(P	7.628E-02	3.19E-02	G K
		295.22	3.279E-01	- P	1.216E-01	4.30E-02	G
							Energy duplication
		77.11	0.000E+00	} P	7.827E-01	0.00E+00	G
		241.92	3.506E-01	(	3.609E-01	1.08E-01	G
BI-212	6.6939E-01						
		727.17	6.021E-01	(P	3.057E-01	1.25E-01	G K
		1620.56	9.582E-01	*(P	6.327E-01	2.94E-01	G
		785.42	1.194E+00	%	1.587E+00	4.98E-01	G
BI-214	4.2676E-01						
		609.32	4.268E-01	(P	8.070E-02	3.82E-02	G K
		1764.51	6.084E-01	+ P	9.860E-02	7.51E-02	G
		1120.28	5.652E-01	+ P	3.041E-01	1.29E-01	G
RA-224	1.2279E+00						
		241.00	1.228E+00	(	9.880E-01	3.10E-01	G
RA-226	1.3482E+00						
		185.99	1.348E+00	(P	1.034E+00	3.24E-01	G
AC-228	7.6901E-01						
		911.07	8.052E-01	(P	1.314E-01	6.81E-02	G K
		968.90	7.588E-01	(P	1.398E-01	7.33E-02	G
		338.40	6.966E-01	(P	2.255E-01	8.51E-02	G

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

TH-227      -8.5983E-02
                          236.00-8.598E-02 &(  3.531E-01 1.06E-01 G K
                          256.25-5.441E-02 % P 4.313E-01 1.28E-01 G

PA-234      -5.0401E-02
                           98.44-5.040E-02 %(P 2.268E-01 6.81E-02 G K
                          946.00 1.259E-02 & P 1.482E-01 4.20E-02 G
                          131.28-2.737E-02 % P 2.008E-01 6.00E-02 G
                           94.67 2.403E-01 % P 3.417E-01 1.05E-01 G
                          883.24 7.215E-02 %   2.369E-01 6.99E-02 G
                          926.70-1.514E-03 &   3.067E-01 8.66E-02 G
                          569.26-3.789E-02 % P 3.180E-01 9.20E-02 G

TH-234       5.3707E-01
                           63.29 5.371E-01 %(P 6.383E+00 1.90E+00 G K
                           92.80 1.079E+00 & P 2.107E+00 6.37E-01 G
                           92.38 1.148E+00 & P 2.503E+00 7.55E-01 G

AM-241      -1.0937E-01
                           59.54-1.094E-01 &(P 8.886E-01 2.64E-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		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	1.4466E-03	1.5338E-03	2.8494E-01	2.8494E-01	3.088E-01
K-40		1.3682E+01	1.3682E+01	1.2086E+00	1.4462E+00	
MN-54	#A	4.0528E-03	4.0935E-03	2.8349E-02	2.8350E-02	3.248E-02
CO-57	#B	6.2394E-03	6.3120E-03	4.4736E-02	4.4737E-02	4.930E-02
CO-60	#B	4.2107E-03	4.2176E-03	2.6472E-02	2.6473E-02	3.187E-02
Sr-85	#A	-1.9013E-02	-1.9951E-02	4.0168E-02	4.0185E-02	4.216E-02
Kr-85	#A	-4.3892E+02	-4.3893E+02	8.8373E+02	8.8409E+02	9.734E+02
Y-88	#B	-9.2115E-05	-9.4854E-05	1.9617E-03	1.9618E-03	2.067E-02
NB-94	#B	6.1349E-03	6.1349E-03	2.4125E-02	2.4128E-02	2.769E-02
Ag-108M	#B	-1.7029E-03	-1.7030E-03	5.5653E-02	5.5653E-02	6.317E-02
CD-109	#A	1.2998E-01	1.3087E-01	1.4188E+00	1.4188E+00	1.577E+00
SN-113	#B	7.3364E-03	7.5382E-03	3.9830E-02	3.9832E-02	4.380E-02
SB-125	#B	9.3072E-02	9.3359E-02	8.6547E-02	8.6716E-02	9.445E-02
I-131	#B	4.1945E-03	6.1860E-03	4.2730E-02	4.2731E-02	3.288E-02
CS-134	#B	0.0000E+00	0.0000E+00	5.2727E-02	5.2727E-02	5.942E-02
CS-137	#A	1.8944E-02	1.8950E-02	3.7246E-02	3.7263E-02	4.113E-02
CE-139	#A	-4.6410E-03	-4.7476E-03	3.3205E-02	3.3206E-02	3.635E-02
EU-152	#B	1.2020E-01	1.2028E-01	9.4785E-02	9.5019E-02	1.446E-01
EU-154	#B	1.2841E-02	1.2854E-02	8.7909E-02	8.7912E-02	9.797E-02
EU-155	#B	0.0000E+00	0.0000E+00	2.1788E-01	2.1788E-01	2.432E-01
HG-203	#B	2.1801E-02	2.3312E-02	3.4962E-02	3.4989E-02	3.564E-02
TL-208		2.5913E-01	2.5913E-01	5.9798E-02	6.1662E-02	
PB-212		8.0180E-01	8.0180E-01	1.1884E-01	1.2763E-01	
PB-214		3.8711E-01	3.8711E-01	9.3944E-02	9.6595E-02	
BI-212		6.6939E-01	6.6939E-01	3.7190E-01	3.7393E-01	
BI-214		4.2676E-01	4.2676E-01	1.1458E-01	1.1723E-01	
RA-224		1.2279E+00	1.2279E+00	9.2885E-01	9.3159E-01	9.880E-01
RA-226	#	1.3482E+00	1.3482E+00	9.7072E-01	9.7387E-01	1.034E+00
AC-228		7.6901E-01	7.6901E-01	1.3634E-01	1.4346E-01	
TH-227	#B	-8.5983E-02	-8.5983E-02	3.1806E-01	3.1810E-01	3.531E-01
PA-234	#B	-5.0401E-02	-5.0401E-02	2.1729E-01	2.1731E-01	2.268E-01
TH-234	#B	5.3707E-01	5.3707E-01	5.6989E+00	5.6990E+00	6.383E+00
AM-241	#A	-1.0937E-01	-1.0937E-01	8.1832E-01	8.1834E-01	8.885E-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) 1.8222593E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.8222593E+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_1MAY2006_1102.An1

Sample description
FSS-OOL-02-02-015-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1MAY2006_1102.An1

Acquisition information
Start time: 01-May-2006 11:03:56
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: 1.9890E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9890E+03) =
5.0277E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 21:36:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1974

***** S U M M A R Y O F P E A K 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	152.	20.33	0.99	9.052E-03	74.81	9.600	1.190E+00	PB212
77.21	243.	10.47	0.99	1.011E-02	77.11	17.500	9.584E-01	PB212
129.80	192.	24.98	0.78	2.445E-02				
129.80	192.	24.98	0.78	2.445E-02	131.28	20.000	2.635E-01	PA234
185.83	191.	23.78	0.99	2.567E-02				
185.83	191.	23.78	0.99	2.567E-02	185.99	3.280	1.437E+00	RA226
209.47	158.	26.11	1.08	2.470E-02				
238.83	1426.	3.03	1.09	2.319E-02	238.63	43.100	9.611E-01	PB212
241.51	172.	20.71	1.09	2.305E-02	241.00	3.900	1.301E+00	RA224
270.22	147.	19.63	1.13	2.151E-02				
277.70	92.	33.21	0.72	2.112E-02				
277.70	92.	33.21	0.72	2.112E-02	279.17	81.500	3.919E-02	HG203
295.17	236.	12.40	0.91	2.025E-02	295.22	19.200	4.053E-01	PB214
300.33	103.	23.41	1.01	2.000E-02				
329.00	132.	22.12	1.39	1.870E-02				
338.49	314.	11.82	1.03	1.830E-02	338.40	12.010	9.666E-01	AC228
352.11	451.	6.35	1.15	1.775E-02	351.99	37.100	4.594E-01	PB214
463.16	95.	25.28	1.21	1.426E-02				
463.16	95.	25.28	1.21	1.426E-02	463.51	10.000	4.493E-01	SB125
510.90	236.	12.34	1.12	1.317E-02	510.72	22.500	4.798E-01	TL208
583.43	475.	6.49	1.30	1.184E-02	583.14	86.000	3.137E-01	TL208
609.48	338.	8.10	1.17	1.144E-02	609.32	46.090	4.268E-01	BI214
727.39	129.	19.80	1.33	9.962E-03	727.17	11.800	7.402E-01	BI212
769.28	73.	28.79	0.97	9.544E-03				
794.80	78.	25.40	0.94	9.310E-03				
794.80	78.	25.40	0.94	9.310E-03	795.76	85.400	6.727E-02	CS134
860.86	67.	23.10	2.02	8.765E-03				

911.63	296.	6.96	1.37	8.397E-03	911.07	29.000	8.155E-01	AC228
965.09	71.	17.87	1.54	8.049E-03	964.00	14.580	4.078E-01	EU152
969.43	199.	8.23	1.54	8.022E-03	968.90	17.460	9.657E-01	AC228
1120.89	122.	17.13	1.86	7.209E-03	1120.28	15.040	7.523E-01	BI214
1461.32	1401.	2.78	2.03	5.930E-03	1460.75	10.700	1.479E+01	K40
1620.67	17.	30.86	0.53	5.488E-03	1620.56	2.750	7.544E-01	BI212
1765.13	71.	12.65	1.44	5.140E-03	1764.51	15.920	5.646E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
418.11	209.47	614.	158.	0.079	78.33	1.080	AC-228 s
539.60	270.22	296.	147.	0.073	58.90	1.128	AC-228 s
599.81	300.33	229.	103.	0.052	70.23	1.011	PB-212
657.15	329.00	269.	132.	0.066	66.36	1.388	LA-140 s
1537.63	769.28	113.	73.	0.037	70.74	0.973	BI-214 sM
1720.77	860.86	61.	67.	0.033	69.31	2.016	TL-208 s
1930.19	965.11	50.	66.	0.033	58.11	1.539	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	424.	152.	0.076	60.98	0.993D
PB-212	153.39	77.11	418.	243.	0.122	31.40	0.995A
PA-234	257.74	129.29	772.	115.	0.058	105.33	1.500s
RA-226	371.84	186.34	821.	162.	0.081	72.40	1.500s
PB-212	476.82	238.83	791.	1357.	0.679	12.91	1.002
RA-224	482.90	241.87	874.	139.	0.070	93.65	1.500
HG-203	554.37	277.61	336.	66.	0.033	123.05	1.500s
PB-214	589.48	295.17	286.	232.	0.116	37.20	0.913
AC-228	676.12	338.49	333.	313.	0.156	35.47	1.028s
PB-214	703.30	352.08	268.	468.	0.234	22.24	1.157
SB-125	925.46	463.17	170.	73.	0.037	81.52	1.500
TL-208	1020.92	510.90	207.	209.	0.105	37.02	1.123s
TL-208	1165.96	583.43	158.	470.	0.235	19.48	1.295
BI-214	1218.06	609.48	139.	331.	0.166	24.29	1.166
BI-212	1453.86	727.39	141.	128.	0.064	59.39	1.332
CS-134	1589.55	795.24	69.	45.	0.023	89.46	1.500s
AC-228	1822.28	911.63	57.	292.	0.146	20.87	1.374
AC-228	1936.81	968.90	38.	199.	0.099	24.98	1.541D
BI-214	2240.75	1120.89	92.	120.	0.060	51.40	1.862
K-40	2921.50	1461.32	45.	1382.	0.691	8.33	2.027
BI-212	3240.14	1620.67	4.	17.	0.008	92.58	0.531s
BI-214	3529.02	1765.13	6.	68.	0.034	37.94	1.435

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm		COMMENTS
BE-7		0.0000E+00						
			477.56	0.000E+00	%(	3.413E-01	9.94E-02	G
K-40		1.4792E+01						
			1460.75	1.479E+01	(P	3.641E-01	4.17E-01	G
MN-54		1.4262E-02						
			834.81	1.426E-02	%(P	3.755E-02	1.13E-02	G
CO-57		-6.1061E-03						
			122.07	-6.106E-03	%(P	5.224E-02	1.56E-02	G K
			136.43	-1.211E-01	&	3.287E-01	9.92E-02	G
CO-60		1.0917E-02						
			1332.51	1.092E-02	%(P	3.794E-02	1.10E-02	G K
			1173.23	-1.977E-03	& P	4.198E-02	1.18E-02	G K
Sr-85		-1.8117E-02						
			514.00	-1.812E-02	%(	4.422E-02	1.33E-02	G
Kr-85		-3.9852E+02						
			513.99	-3.985E+02	%(	9.723E+02	2.93E+02	G
Y-88		-1.7277E-04						
			1836.01	-1.728E-04	%(P	2.413E-02	6.15E-03	G K
			898.02	-4.983E-03	& P	3.923E-02	1.13E-02	G
NB-94		9.7284E-04						
			871.10	9.728E-04	%(	2.294E-02	6.38E-03	G K
			702.50	6.409E-04	%	3.757E-02	1.09E-02	G K
Ag-108M		-1.7825E-02						
			722.95	-1.783E-02	%(	4.557E-02	1.37E-02	G K
			614.37	-2.250E-03	% P	3.701E-02	1.08E-02	G
			433.93	-2.590E-04	%	3.078E-02	8.93E-03	G
CD-109		1.2600E+00						
			88.04	1.260E+00	%(	1.880E+00	5.74E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	1.4053E-03						
		391.71	1.405E-03	%(	4.373E-02	1.28E-02	G K
		255.04	1.341E-01	%	1.622E+00	4.82E-01	G
SB-125	7.7379E-02						
		427.95	-1.526E-02	%(P	1.097E-01	3.24E-02	G K
		600.77	-5.114E-02	% P	1.891E-01	5.62E-02	G
		636.15	1.213E-01	% P	2.626E-01	7.94E-02	G
		463.51	3.516E-01	(P	3.039E-01	9.72E-02	G
		176.29	-8.885E-03	%	5.831E-01	1.74E-01	G
I-131	1.6591E-02						
		364.48	1.659E-02	&(P	5.040E-02	1.51E-02	G K
		636.97	2.750E-01	&	5.897E-01	1.79E-01	G
		284.29	-2.538E-03	% P	7.937E-01	2.34E-01	G
CS-134	1.9548E-02						
		604.66	2.586E-03	&(	5.879E-02	1.74E-02	G K
		795.76	3.893E-02	@(P	3.559E-02	1.16E-02	G
		569.29	2.874E-02	% P	2.048E-01	5.98E-02	G
		801.84	1.575E-03	% P	3.303E-01	9.27E-02	G
CS-137	-7.3111E-04						
		661.62	-7.311E-04	%(P	3.336E-02	9.44E-03	G
CE-139	1.9526E-02						
		165.85	1.953E-02	%(	4.631E-02	1.40E-02	G
EU-152	-1.2801E-02						
		121.78	-1.280E-02	%(P	1.511E-01	4.52E-02	G K
		344.30	-2.829E-02	% P	1.200E-01	3.58E-02	G
		1408.08	2.290E-02	%	1.397E-01	3.96E-02	G
		964.00	-7.436E-02	% P	3.295E-01	9.72E-02	G
		1112.07	1.323E-01	%	2.756E-01	8.36E-02	G
		778.90	1.575E-02	%	2.557E-01	7.37E-02	G
EU-154	-8.0465E-03						
		123.10	-8.047E-03	&(	1.085E-01	3.24E-02	G K
		1274.80	2.528E-02	&	1.016E-01	2.97E-02	G
		723.30	-3.910E-02	%	2.147E-01	6.34E-02	G
		1004.80	-2.740E-02	&	2.002E-01	5.79E-02	G
EU-155	1.4682E-01						
		86.45	1.468E-01	%(	2.374E-01	7.24E-02	G K
		105.31	4.516E-02	&	2.261E-01	6.79E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	2.8039E-02						
		279.17	2.804E-02	&(P	3.733E-02	1.15E-02	G K
		72.87	-4.299E-01	% P	2.132E+00	6.40E-01	G
		70.83	-8.251E-01	%	3.496E+00	1.05E+00	G
		82.50	-1.363E+00	%	4.204E+00	1.27E+00	G
TL-208	3.1374E-01						
		583.14	3.137E-01	(P	4.083E-02	2.06E-02	G
		510.72	4.798E-01	+ P	1.598E-01	6.68E-02	G
PB-212	9.3277E-01						
		238.63	9.224E-01	(P	9.087E-02	4.00E-02	G K
							Energy duplication
		77.11	9.328E-01	} P	3.762E-01	9.76E-02	G
		74.81	1.190E+00	+ P	7.712E-01	2.47E-01	G
PB-214	4.8293E-01						
		351.99	4.829E-01	(P	8.147E-02	3.62E-02	G K
		295.22	4.053E-01	- P	1.425E-01	5.11E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.276E-01	0.00E+00	G
		241.92	-7.134E-02	%	5.473E-01	1.64E-01	G
BI-212	7.4288E-01						
		727.17	7.402E-01	(P	3.353E-01	1.47E-01	G K
		1620.56	7.544E-01	(P	5.543E-01	2.33E-01	G
		785.42	9.229E-01	%	1.673E+00	5.12E-01	G
BI-214	4.2683E-01						
		609.32	4.268E-01	(P	7.423E-02	3.52E-02	G K
		1764.51	5.646E-01	+ P	1.170E-01	7.49E-02	G
		1120.28	7.523E-01	+ P	2.968E-01	1.31E-01	G
RA-224	1.0507E+00						
		241.00	1.051E+00	(	1.061E+00	3.28E-01	G
RA-226	1.3107E+00						
		185.99	1.311E+00	*(P	1.099E+00	3.42E-01	G
AC-228	8.9107E-01						
		911.07	8.155E-01	(P	1.053E-01	5.74E-02	G K
		968.90	9.646E-01	(P	1.525E-01	8.04E-02	G
		338.40	9.666E-01	@(P	2.714E-01	1.15E-01	G
TH-227	-1.8297E-01						
		236.00	-1.830E-01	%(	3.770E-01	1.14E-01	G K
		256.25	7.340E-03	& P	4.864E-01	1.44E-01	G

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

PA-234       7.4507E-02
                           98.44 7.001E-03 &(P 1.823E-01 5.42E-02 G K
                          946.00 1.669E-03 % P 1.951E-01 5.59E-02 G
                          131.28 1.592E-01 &(P 1.824E-01 5.62E-02 G
                           94.67-3.352E-02 % P 4.017E-01 1.20E-01 G
                          883.24-3.696E-02 %   3.064E-01 8.89E-02 G
                          926.70 7.942E-02 %   3.014E-01 8.87E-02 G
                          569.26-2.171E-02 % P 3.027E-01 8.72E-02 G

TH-234       9.2501E-01
                           63.29 9.250E-01 %(P 6.451E+00 1.93E+00 G K
                           92.80 1.221E+00 % P 2.171E+00 6.58E-01 G
                           92.38 1.307E+00 & P 2.609E+00 7.89E-01 G

AM-241      -3.5065E-01
                           59.54-3.507E-01 %(P 9.569E-01 2.89E-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	2.9829E-01	2.9829E-01	3.217E-01
K-40		1.4792E+01	1.4792E+01	1.2495E+00	1.5162E+00	
MN-54	#A	1.4118E-02	1.4262E-02	3.3759E-02	3.3769E-02	3.717E-02
CO-57	#B	-6.0350E-03	-6.1061E-03	4.9227E-02	4.9228E-02	5.163E-02
CO-60	#B	1.0899E-02	1.0917E-02	3.3097E-02	3.3103E-02	3.788E-02
Sr-85	#A	-1.7255E-02	-1.8117E-02	4.0037E-02	4.0051E-02	4.211E-02
Kr-85	#A	-3.9851E+02	-3.9852E+02	8.8036E+02	8.8066E+02	9.722E+02
Y-88	#B	-1.6772E-04	-1.7277E-04	5.7623E-02	5.7623E-02	2.342E-02
NB-94	#B	9.7284E-04	9.7284E-04	1.9131E-02	1.9131E-02	2.294E-02
Ag-108M	#B	-1.7824E-02	-1.7825E-02	4.1130E-02	4.1143E-02	4.557E-02
CD-109	#A	1.2512E+00	1.2600E+00	1.7219E+00	1.7233E+00	1.867E+00
SN-113	#B	1.3672E-03	1.4053E-03	3.8274E-02	3.8274E-02	4.254E-02
SB-125	#B	7.7138E-02	7.7379E-02	6.4176E-02	6.4333E-02	1.093E-01
I-131	#B	1.1197E-02	1.6591E-02	4.5282E-02	4.5292E-02	3.402E-02
CS-134	#B	1.9466E-02	1.9548E-02	1.7521E-02	1.7558E-02	5.854E-02
CS-137	#A	-7.3090E-04	-7.3111E-04	1.6251E-01	1.6251E-01	3.335E-02
CE-139	#A	1.9083E-02	1.9526E-02	4.2044E-02	4.2059E-02	4.526E-02
EU-152	#B	-1.2792E-02	-1.2801E-02	1.5714E-01	1.5714E-01	1.510E-01
EU-154	#B	-8.0383E-03	-8.0465E-03	9.7302E-02	9.7303E-02	1.084E-01
EU-155	#B	1.4657E-01	1.4682E-01	2.1706E-01	2.1721E-01	2.370E-01
HG-203	#A	2.6199E-02	2.8039E-02	3.4523E-02	3.4561E-02	3.488E-02
TL-208		3.1374E-01	3.1374E-01	6.1670E-02	6.4304E-02	
PB-212		9.3277E-01	9.3277E-01	1.2146E-01	1.3299E-01	
PB-214		4.8293E-01	4.8293E-01	1.0872E-01	1.1228E-01	
BI-212		7.4288E-01	7.4288E-01	4.0979E-01	4.1205E-01	
BI-214		4.2683E-01	4.2683E-01	1.0572E-01	1.0858E-01	
RA-224	A	1.0507E+00	1.0507E+00	9.8394E-01	9.8583E-01	1.061E+00
RA-226	#	1.3107E+00	1.3107E+00	1.0246E+00	1.0274E+00	1.099E+00
AC-228		8.9107E-01	8.9107E-01	1.4362E-01	1.5265E-01	
TH-227	#B	-1.8297E-01	-1.8297E-01	3.4314E-01	3.4330E-01	3.770E-01
PA-234	#B	7.4507E-02	7.4507E-02	7.8910E-02	7.9019E-02	1.823E-01
TH-234	#B	9.2501E-01	9.2501E-01	5.7825E+00	5.7828E+00	6.451E+00
AM-241	#A	-3.5065E-01	-3.5065E-01	8.7400E-01	8.7422E-01	9.569E-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) 1.9632620E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.9632620E+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_1may2006_1141.An1

Sample description
FSS-OOL-02-02-010-F

Spectrum Filename: C:\GammaVision\Spectra\103f_1may2006_1141.An1

Acquisition information
Start time: 01-May-2006 11:42:43
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: 1.9310E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9310E+03) =
5.1787E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 21:17:00
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: 0.1539

***** S U M M A R Y O F P E A K 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	159.	17.75	0.99	9.100E-03	74.81	9.600	1.257E+00	PB212
77.31	275.	10.53	0.99	1.025E-02	77.11	17.500	1.076E+00	PB212
					77.11	10.700	1.760E+00	PB214
84.31	104.	25.66	1.00	1.329E-02				
87.31	132.	23.92	1.00	1.448E-02	86.45	32.740	1.998E-01	EU155
					88.04	3.790	1.662E+00	CD109
90.27	92.	30.81	1.00	1.559E-02				
92.92	151.	20.27	1.00	1.653E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.82	192.	23.01	1.19	2.567E-02				
185.82	192.	23.01	1.19	2.567E-02	185.99	3.280	1.487E+00	RA226
209.35	147.	29.05	0.99	2.471E-02				
238.80	1305.	3.23	1.09	2.320E-02	238.63	43.100	9.052E-01	PB212
241.65	156.	22.12	1.09	2.304E-02	241.00	3.900	1.210E+00	RA224
270.53	136.	21.02	1.26	2.150E-02				
277.30	118.	28.83	1.39	2.115E-02				
295.31	282.	12.45	1.00	2.024E-02	295.22	19.200	5.010E-01	PB214
300.24	97.	24.16	1.02	2.001E-02				
328.27	67.	36.96	1.55	1.873E-02				
338.51	268.	9.96	0.98	1.830E-02	338.40	12.010	8.485E-01	AC228
352.02	428.	6.90	1.13	1.775E-02	351.99	37.100	4.491E-01	PB214
463.37	90.	23.96	1.03	1.425E-02				
463.37	90.	23.96	1.03	1.425E-02	463.51	10.000	4.372E-01	SB125
511.04	249.	11.70	1.80	1.317E-02	510.72	22.500	5.245E-01	TL208
583.39	482.	6.42	1.24	1.184E-02	583.14	86.000	3.280E-01	TL208
609.54	354.	7.08	1.44	1.144E-02	609.32	46.090	4.618E-01	BI214
727.43	105.	22.98	1.00	9.962E-03	727.17	11.800	6.244E-01	BI212

795.42	60.	24.99	1.40	9.304E-03				
795.42	60.	24.99	1.40	9.304E-03	795.76	85.400	5.265E-02	CS134
861.38	71.	20.94	1.59	8.761E-03				
911.49	297.	7.54	1.63	8.398E-03	911.07	29.000	8.426E-01	AC228
964.82	49.	25.78	1.54	8.051E-03				
969.46	182.	9.24	1.54	8.023E-03	968.90	17.460	9.071E-01	AC228
1120.84	84.	18.55	2.08	7.209E-03	1120.28	15.040	5.330E-01	BI214
1461.35	1490.	2.65	1.91	5.930E-03	1460.75	10.700	1.622E+01	K40
1765.40	72.	12.17	1.57	5.140E-03	1764.51	15.920	5.893E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
167.79	84.41	307.	104.	0.052	76.98	0.999	TA-182 lD
173.79	87.41	429.	132.	0.066	71.75	1.001	PB-214 lD
179.72	90.38	359.	92.	0.046	92.44	1.003	PB-214 lD
185.20	93.02	434.	112.	0.056	83.62	1.004	TH-234 D
417.86	209.35	643.	147.	0.073	87.16	0.985	AC-228 s
540.22	270.53	298.	136.	0.068	63.07	1.260	AC-228 s
553.75	277.30	390.	116.	0.058	77.13	1.388	TL-208 s
599.62	300.24	213.	97.	0.048	72.48	1.024	PB-212
655.69	328.27	235.	67.	0.033	110.89	1.552	RH-106M s
1721.80	861.38	60.	71.	0.036	62.81	1.589	TL-208 s
1929.62	964.78	49.	55.	0.028	66.81	1.539	AC-228 D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	376.	161.	0.080	55.16	0.993D
PB-212	153.39	77.11	385.	227.	0.114	33.33	0.995A
TH-234	185.32	93.07	1071.	142.	0.071	89.19	1.500s
TH-234	185.34	93.08	1074.	125.	0.063	99.80	1.500s
RA-226	371.57	186.20	784.	146.	0.073	77.78	1.500s
PB-212	476.80	238.82	716.	1283.	0.642	12.95	1.069
RA-224	482.56	241.70	835.	125.	0.063	101.41	1.500
PB-214	589.77	295.31	358.	278.	0.139	37.36	1.001
AC-228	676.16	338.51	193.	267.	0.133	29.87	0.977
PB-214	703.19	352.02	199.	423.	0.211	20.71	1.129
SB-125	925.37	463.12	158.	83.	0.042	70.92	1.500s
TL-208	1021.19	511.04	220.	222.	0.111	35.11	1.799s
TL-208	1165.89	583.39	158.	477.	0.239	19.27	1.239
BI-214	1218.18	609.54	112.	348.	0.174	21.23	1.440
BI-212	1453.93	727.43	142.	105.	0.052	68.95	1.000
CS-134	1589.83	795.39	69.	48.	0.024	85.39	1.500s
AC-228	1822.00	911.49	74.	293.	0.147	22.62	1.629s
AC-228	1936.81	968.90	53.	182.	0.091	28.00	1.541D
BI-214	2240.66	1120.84	66.	83.	0.041	55.66	2.077s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2921.57	1461.35	38.	1471.	0.736	7.95	1.909
BI-214	3529.56	1765.40	5.	69.	0.034	36.52	1.571s

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

***** S U M M A R Y O 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		1.5513E-01					
			477.56	1.551E-01	%(	3.210E-01 9.74E-02	G
K-40		1.6223E+01					
			1460.75	1.622E+01	(P	3.450E-01 4.36E-01	G
MN-54		3.9767E-03					
			834.81	3.977E-03	%(P	3.820E-02 1.11E-02	G
CO-57		-1.0495E-02					
			122.07	-1.050E-02	%(P	5.278E-02 1.58E-02	G K
			136.43	6.559E-02	%	3.991E-01 1.20E-01	G
CO-60		5.0000E-03					
			1332.51	5.000E-03	&(P	3.658E-02 1.03E-02	G K
			1173.23	-1.777E-02	% P	4.964E-02 1.47E-02	G K
Sr-85		-2.1772E-02					
			514.00	-2.177E-02	&(	4.921E-02 1.49E-02	G
Kr-85		-4.7889E+02					
			513.99	-4.789E+02	&(	1.082E+03 3.27E+02	G
Y-88		-2.4128E-04					
			1836.01	-2.413E-04	%(P	2.308E-02 5.80E-03	G K
			898.02	2.761E-03	& P	4.065E-02 1.17E-02	G
NB-94		-4.2129E-03					
			871.10	-4.213E-03	&(	3.162E-02 9.12E-03	G K
			702.50	3.680E-03	&	3.347E-02 9.72E-03	G K
Ag-108M		8.2609E-03					
			722.95	8.261E-03	&(	3.134E-02 9.23E-03	G K
			614.37	-2.258E-02	% P	4.241E-02 1.29E-02	G
			433.93	-7.464E-03	%	3.560E-02 1.06E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	8.0673E-02						
		88.04	8.067E-02	%(	2.136E+00	6.39E-01	G
SN-113	1.0354E-02						
		391.71	1.035E-02	%(	5.172E-02	1.54E-02	G K
		255.04	-2.082E-01	%	1.495E+00	4.44E-01	G
SB-125	8.5253E-02						
		427.95	-2.424E-02	%(P	1.097E-01	3.26E-02	G K
		600.77	-1.378E-04	% P	1.521E-01	4.34E-02	G
		636.15	-1.286E-03	% P	2.993E-01	8.60E-02	G
		463.51	4.094E-01	@(P	3.019E-01	9.83E-02	G
		176.29	6.381E-02	%	5.436E-01	1.62E-01	G
I-131	-9.3944E-03						
		364.48	-9.394E-03	%(P	5.570E-02	1.65E-02	G K
		636.97	2.252E-02	&	6.565E-01	1.89E-01	G
		284.29	1.497E-02	& P	8.189E-01	2.42E-01	G
CS-134	1.3717E-02						
		604.66	-1.125E-02	&(	3.771E-02	1.12E-02	G K
		795.76	4.225E-02	*(P	3.662E-02	1.20E-02	G
		569.29	-1.039E-02	& P	2.411E-01	6.98E-02	G
		801.84	-4.684E-02	% P	3.153E-01	8.87E-02	G
CS-137	5.2102E-03						
		661.62	5.210E-03	&(P	4.124E-02	1.20E-02	G
CE-139	9.4358E-03						
		165.85	9.436E-03	%(	4.308E-02	1.29E-02	G
EU-152	-3.0978E-02						
		121.78	-3.098E-02	%(P	1.531E-01	4.59E-02	G K
		344.30	1.081E-02	& P	1.136E-01	3.35E-02	G
		1408.08	0.000E+00	%	1.463E-01	3.99E-02	G
		964.00	4.680E-02	% P	3.114E-01	9.10E-02	G
		1112.07	-8.384E-02	&	3.657E-01	1.08E-01	G
		778.90	-1.214E-02	%	3.452E-01	1.00E-01	G
EU-154	-2.1639E-02						
		123.10	-2.164E-02	%(	1.039E-01	3.12E-02	G K
		1274.80	-1.424E-02	%	1.300E-01	3.76E-02	G
		723.30	-1.785E-01	&	2.584E-01	7.96E-02	G
		1004.80	-2.485E-02	%	2.236E-01	6.47E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.2337E-01						
		86.45	1.234E-01	%(	2.400E-01	7.29E-02	G K
		105.31	7.208E-02	%	2.443E-01	7.36E-02	G
HG-203	8.6312E-04						
		279.17	8.631E-04	&(P	4.442E-02	1.31E-02	G K
		72.87	-3.611E-01	% P	2.431E+00	7.29E-01	G
		70.83	-2.623E+00	%	4.490E+00	1.37E+00	G
		82.50	-9.920E-01	&	4.240E+00	1.28E+00	G
TL-208	3.2797E-01						
		583.14	3.280E-01	(P	4.205E-02	2.13E-02	G
		510.72	5.245E-01	+ P	1.696E-01	6.88E-02	G
PB-212	8.9801E-01						
		238.63	8.980E-01	(P	8.917E-02	3.91E-02	G K
							Energy duplication
		77.11	8.980E-01	} P	3.725E-01	9.98E-02	G
		74.81	1.296E+00	+ P	7.496E-01	2.43E-01	G
PB-214	4.6681E-01						
		351.99	4.491E-01	(P	7.279E-02	3.14E-02	G K
		295.22	5.010E-01	(P	1.635E-01	6.33E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.948E-01	0.00E+00	G
		241.92	-1.993E-01	%	5.175E-01	1.56E-01	G
BI-212	6.2436E-01						
		727.17	6.244E-01	(P	3.467E-01	1.44E-01	G K
		1620.56	7.125E-01	& P	9.199E-01	3.02E-01	G
		785.42	7.565E-01	%	1.944E+00	5.84E-01	G
BI-214	4.7933E-01						
		609.32	4.618E-01	(P	6.908E-02	3.33E-02	G K
		1764.51	5.893E-01	+ P	1.129E-01	7.52E-02	G
		1120.28	5.330E-01	*(P	2.625E-01	1.01E-01	G
RA-224	9.7487E-01						
		241.00	9.749E-01	(	1.068E+00	3.30E-01	G
RA-226	1.2151E+00						
		185.99	1.215E+00	*(P	1.107E+00	3.43E-01	G
AC-228	8.6319E-01						
		911.07	8.426E-01	*(P	1.227E-01	6.43E-02	G K
		968.90	9.075E-01	(P	1.834E-01	8.48E-02	G
		338.40	8.485E-01	(P	2.150E-01	8.49E-02	G

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

TH-227      -1.4204E-01
                          236.00-1.420E-01 &(  3.568E-01 1.08E-01 G K
                          256.25-8.053E-02 % P 5.056E-01 1.51E-01 G

PA-234      -1.0697E-02
                           98.44-1.070E-02 &(P 2.012E-01 5.99E-02 G K
                          946.00-3.496E-02 % P 1.939E-01 5.67E-02 G
                          131.28-1.275E-03 & P 2.208E-01 6.58E-02 G
                           94.67-2.512E-01 & P 3.459E-01 1.06E-01 G
                          883.24-2.232E-02 &   2.950E-01 8.48E-02 G
                          926.70-7.564E-02 %   2.820E-01 8.28E-02 G
                          569.26-1.535E-02 & P 3.561E-01 1.03E-01 G

TH-234       1.5464E+00
                           63.29 8.227E-01 %(P 6.784E+00 2.03E+00 G K
                           92.80 1.774E+00 *(P 2.204E+00 6.73E-01 G
                           92.38 2.379E+00 *(P 2.592E+00 7.95E-01 G

AM-241      -2.7209E-01
                           59.54-2.721E-01 %(P 1.020E+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		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	1.4614E-01	1.5513E-01	2.9209E-01	2.9223E-01	3.024E-01
K-40		1.6223E+01	1.6223E+01	1.3064E+00	1.6106E+00	
MN-54	#A	3.9362E-03	3.9767E-03	3.3231E-02	3.3231E-02	3.781E-02
CO-57	#B	-1.0372E-02	-1.0495E-02	4.8913E-02	4.8917E-02	5.216E-02
CO-60	#B	4.9917E-03	5.0000E-03	3.0917E-02	3.0918E-02	3.652E-02
Sr-85	#A	-2.0727E-02	-2.1772E-02	4.4664E-02	4.4682E-02	4.685E-02
Kr-85	#A	-4.7887E+02	-4.7889E+02	9.8169E+02	9.8209E+02	1.082E+03
Y-88	#B	-2.3417E-04	-2.4128E-04	3.8734E-02	3.8734E-02	2.240E-02
NB-94	#B	-4.2129E-03	-4.2129E-03	2.7360E-02	2.7361E-02	3.162E-02
Ag-108M	#B	8.2603E-03	8.2609E-03	2.7681E-02	2.7685E-02	3.133E-02
CD-109	#A	8.0107E-02	8.0673E-02	1.9164E+00	1.9164E+00	2.122E+00
SN-113	#B	1.0071E-02	1.0354E-02	4.6090E-02	4.6094E-02	5.030E-02
SB-125	#B	8.4984E-02	8.5253E-02	6.1393E-02	6.1593E-02	1.093E-01
I-131	#B	-6.3182E-03	-9.3944E-03	5.5061E-02	5.5063E-02	3.746E-02
CS-134	#B	1.3659E-02	1.3717E-02	1.1734E-02	1.1761E-02	3.755E-02
CS-137	#A	5.2087E-03	5.2102E-03	3.6048E-02	3.6049E-02	4.123E-02
CE-139	#A	9.2194E-03	9.4358E-03	3.8754E-02	3.8757E-02	4.209E-02
EU-152	#B	-3.0957E-02	-3.0978E-02	1.4679E-01	1.4680E-01	1.530E-01
EU-154	#B	-2.1617E-02	-2.1639E-02	9.3577E-02	9.3584E-02	1.038E-01
EU-155	#B	1.2315E-01	1.2337E-01	2.1869E-01	2.1879E-01	2.396E-01
HG-203	#B	8.0601E-04	8.6312E-04	3.9409E-02	3.9409E-02	4.148E-02
TL-208		3.2797E-01	3.2797E-01	6.3756E-02	6.6539E-02	
PB-212		8.9801E-01	8.9801E-01	1.1739E-01	1.2844E-01	
PB-214		4.6681E-01	4.6681E-01	9.7944E-02	1.0162E-01	
BI-212		6.2436E-01	6.2436E-01	4.3253E-01	4.3405E-01	
BI-214		4.7933E-01	4.7933E-01	1.0365E-01	1.0732E-01	
RA-224	A	9.7487E-01	9.7487E-01	9.8864E-01	9.9026E-01	1.068E+00
RA-226	#	1.2151E+00	1.2151E+00	1.0288E+00	1.0312E+00	1.107E+00
AC-228		8.6319E-01	8.6319E-01	1.3522E-01	1.4421E-01	
TH-227	#B	-1.4204E-01	-1.4204E-01	3.2359E-01	3.2370E-01	3.568E-01
PA-234	#B	-1.0697E-02	-1.0697E-02	2.3872E-01	2.3872E-01	2.012E-01
TH-234	#B	1.5464E+00	1.5464E+00	1.5501E+00	1.5525E+00	6.784E+00
AM-241	#A	-2.7209E-01	-2.7209E-01	9.3014E-01	9.3027E-01	1.020E+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 (980.0 to 2000.7 keV) 2.0857327E+01 pCi/gm
Total Decayed Activity (980.0 to 2000.7 keV) 2.0857327E+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_1MAY2006_1346.An1

Sample description
FSS-OOL-02-02-008-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1MAY2006_1346.An1

Acquisition information
Start time: 01-May-2006 13:47:48
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: 1.8840E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8840E+03) =
5.3079E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 20:55:00
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: 0.0823

***** S U M M A R Y O F P E A K 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	130.	21.60	0.99	9.052E-03	74.81	9.600	1.073E+00	PB212
77.26	163.	14.62	0.99	1.011E-02	77.11	17.500	8.568E-01	PB212
					77.11	10.700	1.401E+00	PB214
93.62	85.	37.66	1.30	1.673E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.26	186.	19.99	1.21	2.566E-02	185.99	3.280	1.478E+00	RA226
209.55	104.	27.67	0.75	2.470E-02				
238.69	1230.	3.34	1.09	2.319E-02	238.63	43.100	8.736E-01	PB212
					241.92	7.470	5.129E+00	PB214
269.91	123.	22.22	1.21	2.153E-02				
276.90	62.	36.43	1.06	2.117E-02				
295.28	272.	9.32	1.19	2.025E-02	295.22	19.200	4.944E-01	PB214
300.34	79.	33.83	0.92	2.000E-02				
328.26	80.	34.87	1.01	1.873E-02				
338.31	219.	12.20	1.11	1.831E-02	338.40	12.010	7.118E-01	AC228
351.96	470.	6.91	1.25	1.775E-02	351.99	37.100	5.061E-01	PB214
462.77	86.	29.56	1.40	1.427E-02				
462.77	86.	29.56	1.40	1.427E-02	463.51	10.000	4.254E-01	SB125
511.05	177.	13.40	1.42	1.317E-02	510.72	22.500	3.638E-01	TL208
583.17	414.	6.41	1.28	1.184E-02	583.14	86.000	2.885E-01	TL208
609.36	336.	8.30	1.18	1.144E-02	609.32	46.090	4.486E-01	BI214
662.11	179.	12.38	1.33	1.072E-02	661.62	84.620	1.405E-01	CS137
727.79	112.	18.06	1.95	9.958E-03	727.17	11.800	6.826E-01	BI212
795.03	66.	25.98	1.03	9.308E-03				
795.03	66.	25.98	1.03	9.308E-03	795.76	85.400	5.978E-02	CS134
834.68	44.	35.50	1.47	8.971E-03				
860.86	72.	27.22	1.60	8.765E-03				

911.33	267.	8.13	1.70	8.400E-03	911.07	29.000	7.753E-01	AC228
964.55	70.	15.54	1.54	8.053E-03	964.00	14.580	4.268E-01	EU152
968.88	154.	9.60	1.54	8.026E-03	968.90	17.460	7.865E-01	AC228
1120.65	90.	22.49	2.04	7.210E-03	1120.28	15.040	5.860E-01	BI214
1332.73	29.	31.55	1.77	6.349E-03	1332.51	99.980	PBC<MDA	CO60
1407.60	19.	37.11	1.81	6.096E-03	1408.08	21.210	PBC<MDA	EU152
1460.81	1232.	2.90	1.83	5.932E-03	1460.75	10.700	1.371E+01	K40
1620.38	19.	25.97	1.91	5.488E-03	1620.56	2.750	9.200E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.46	66.	14.14	1.86	5.142E-03	1764.51	15.920	5.488E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
186.41	93.62	496.	85.	0.043	112.99	1.303	U-235	l
418.27	209.55	362.	104.	0.052	83.00	0.752	AC-228	
482.46	241.72	268.	158.	0.079	49.87	1.095	PB-214	lD
538.97	269.91	286.	123.	0.062	66.66	1.208	AC-228	
599.83	300.34	263.	79.	0.039	101.48	0.916	PB-212	
655.66	328.26	267.	80.	0.040	104.62	1.007	RH-106M	
1668.41	834.68	74.	45.	0.022	92.91	1.471	MN-54	s
1720.76	860.86	91.	72.	0.036	81.65	1.599	TL-208	
1928.02	964.51	25.	70.	0.035	46.80	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	349.	130.	0.065	64.80	0.993D
PB-212	153.39	77.11	341.	163.	0.082	43.86	0.995A
RA-226	371.78	186.31	724.	181.	0.091	62.14	1.500s
PB-212	476.57	238.71	755.	1195.	0.598	14.09	1.107
RA-224	482.24	241.54	811.	122.	0.061	103.10	1.500
PB-214	589.72	295.28	189.	268.	0.134	27.95	1.188
AC-228	675.75	338.31	217.	218.	0.109	36.61	1.112
PB-214	703.02	351.94	330.	482.	0.241	24.51	1.251
SB-125	924.83	462.86	138.	61.	0.031	87.83	1.500
TL-208	1021.21	511.05	160.	150.	0.075	40.21	1.421s
TL-208	1165.44	583.17	116.	410.	0.205	19.24	1.278s
BI-214	1217.82	609.36	149.	330.	0.165	24.90	1.182
CS-137	1323.30	662.11	105.	178.	0.089	37.14	1.332s
BI-212	1454.65	727.79	97.	112.	0.056	54.17	1.953s
CS-134	1589.14	795.04	57.	48.	0.024	79.76	1.500s
AC-228	1821.68	911.33	74.	263.	0.132	24.40	1.699
EU-152	1927.95	964.46	80.	46.	0.023	91.75	1.538
AC-228	1936.81	968.90	32.	154.	0.077	28.82	1.541D
BI-214	2240.27	1120.65	94.	89.	0.044	67.47	2.045s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	2664.37	1332.73	38.	29.	0.015	94.65	1.765s
EU-152	2814.09	1407.60	16.	19.	0.010	111.34	1.812
K-40	2920.49	1460.81	33.	1213.	0.607	8.70	1.828
BI-212	3239.57	1620.38	3.	19.	0.010	77.90	1.909
BI-214	3527.68	1764.46	7.	63.	0.031	42.42	1.859

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

***** S U M M A R Y O 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		6.1249E-02						
			477.56	6.125E-02	&(	3.110E-01	9.18E-02	G
K-40		1.3713E+01						
			1460.75	1.371E+01	(P	3.309E-01	4.04E-01	G
MN-54		-1.0841E-03						
			834.81	-1.084E-03	%(P	3.161E-02	8.94E-03	G
CO-57		1.3075E-02						
			122.07	1.308E-02	%(P	4.406E-02	1.33E-02	G K
			136.43	-4.005E-03	%	3.888E-01	1.16E-01	G
CO-60		3.3187E-02						
			1332.51	3.319E-02	(P	3.538E-02	1.14E-02	G K
			1173.23	3.146E-02	% P	4.593E-02	1.42E-02	G K
Sr-85		-1.4453E-02						
			514.00	-1.445E-02	%(	4.439E-02	1.33E-02	G
Kr-85		-3.1736E+02						
			513.99	-3.174E+02	%(	9.745E+02	2.92E+02	G
Y-88		6.0200E-03						
			1836.01	6.020E-03	&(P	1.892E-02	5.41E-03	G K
			898.02	-2.379E-03	% P	4.033E-02	1.15E-02	G
NB-94		0.0000E+00						
			871.10	0.000E+00	&(	3.069E-02	8.64E-03	G K
			702.50	1.204E-02	%	3.477E-02	1.04E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-2.5288E-03						
		722.95	-2.529E-03	&(	6.599E-02	1.94E-02	G K
		614.37	-6.938E-03	% P	3.895E-02	1.15E-02	G
		433.93	8.630E-03	%	3.191E-02	9.49E-03	G
CD-109	-6.8915E-02						
		88.04	-6.892E-02	%(	2.030E+00	6.06E-01	G
SN-113	0.0000E+00						
		391.71	0.000E+00	&(	5.178E-02	1.51E-02	G K
		255.04	4.808E-02	%	1.527E+00	4.51E-01	G
SB-125	5.8010E-02						
		427.95	-2.720E-02	%(P	1.128E-01	3.36E-02	G K
		600.77	3.270E-02	% P	1.824E-01	5.36E-02	G
		636.15	8.261E-02	% P	2.712E-01	8.05E-02	G
		463.51	3.102E-01	(P	2.906E-01	9.27E-02	G
		176.29	-1.184E-02	%	5.660E-01	1.68E-01	G
I-131	8.9192E-03						
		364.48	8.919E-03	&(P	5.771E-02	1.71E-02	G K
		636.97	1.048E-01	&	6.671E-01	1.95E-01	G
		284.29	-1.989E-01	& P	7.032E-01	2.10E-01	G
CS-134	-1.8944E-02						
		604.66	-1.894E-02	%(	4.311E-02	1.30E-02	G K
		795.76	4.324E-02	+ P	3.432E-02	1.15E-02	G
		569.29	-5.512E-02	% P	2.328E-01	6.85E-02	G
		801.84	5.944E-02	& P	4.073E-01	1.18E-01	G
CS-137	1.4045E-01						
		661.62	1.405E-01	@(P	3.997E-02	1.75E-02	G
CE-139	1.3621E-02						
		165.85	1.362E-02	%(	4.093E-02	1.23E-02	G
EU-152	1.0590E-01						
		121.78	1.580E-02	%(P	1.473E-01	4.40E-02	G K
		344.30	3.805E-02	% P	1.080E-01	3.24E-02	G
		1408.08	1.076E-01	(	1.191E-01	3.99E-02	G
		964.00	2.841E-01	&(P	2.720E-01	8.79E-02	G
		1112.07	1.053E-01	%	2.723E-01	8.15E-02	G
		778.90	1.837E-02	%	2.718E-01	7.84E-02	G
EU-154	1.1275E-02						
		123.10	1.128E-02	%(	1.084E-01	3.24E-02	G K
		1274.80	-8.998E-04	%	1.225E-01	3.47E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	7.671E-02	&	1.344E-01	4.13E-02	G
		1004.80	5.137E-02	&	1.787E-01	5.25E-02	G
EU-155	-8.2818E-03						
		86.45	-8.282E-03	%(	2.527E-01	7.55E-02	G K
		105.31	8.966E-02	%	2.328E-01	7.04E-02	G
HG-203	-4.8109E-03						
		279.17	-4.811E-03	&(P	4.481E-02	1.33E-02	G K
		72.87	-7.009E-01	& P	2.283E+00	6.88E-01	G
		70.83	-2.736E-01	%	3.531E+00	1.05E+00	G
		82.50	9.773E-02	%	3.944E+00	1.18E+00	G
TL-208	2.8848E-01						
		583.14	2.885E-01	@(P	3.730E-02	1.87E-02	G
		510.72	3.638E-01	+ P	1.491E-01	5.74E-02	G
PB-212	8.5720E-01						
		238.63	8.574E-01	(P	9.379E-02	4.07E-02	G K
							Energy duplication
		77.11	6.621E-01	} P	3.595E-01	9.68E-02	G
		74.81	1.073E+00	+ P	7.415E-01	2.37E-01	G
PB-214	5.1475E-01						
		351.99	5.253E-01	(P	9.509E-02	4.34E-02	G K
		295.22	4.944E-01	(P	1.232E-01	4.68E-02	G
							Energy duplication
		77.11	2.728E-02	} P	8.661E-01	2.02E-01	G
		241.92	-1.030E-01	%	5.451E-01	1.63E-01	G
BI-212	7.2750E-01						
		727.17	6.826E-01	*(P	2.966E-01	1.24E-01	G K
		1620.56	9.200E-01	(P	4.890E-01	2.39E-01	G
		785.42	6.172E-01	%	1.713E+00	5.12E-01	G
BI-214	4.9610E-01						
		609.32	4.486E-01	(P	8.114E-02	3.80E-02	G K
		1764.51	5.488E-01	(P	1.346E-01	8.16E-02	G
		1120.28	5.860E-01	(P	3.173E-01	1.35E-01	G
RA-224	9.6880E-01						
		241.00	9.688E-01	(	1.080E+00	3.33E-01	G
RA-226	1.5428E+00						
		185.99	1.543E+00	*(P	1.091E+00	3.42E-01	G
AC-228	7.6553E-01						
		911.07	7.753E-01	(P	1.257E-01	6.39E-02	G K
		968.90	7.864E-01	(P	1.496E-01	7.56E-02	G
		338.40	7.118E-01	(P	2.328E-01	8.73E-02	G

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

TH-227      -8.8726E-02
                          236.00-8.873E-02 &(  3.759E-01 1.13E-01 G K
                          256.25 1.076E-01 % P 4.726E-01 1.41E-01 G

PA-234       3.4287E-03
                           98.44 3.429E-03 %(P 2.207E-01 6.57E-02 G K
                          946.00 1.941E-03 % P 1.372E-01 3.81E-02 G
                          131.28 4.411E-03 % P 2.178E-01 6.49E-02 G
                           94.67-1.270E-01 % P 4.059E-01 1.22E-01 G
                          883.24 6.799E-02 &   2.630E-01 7.72E-02 G
                          926.70 4.231E-02 %   3.149E-01 9.09E-02 G
                          569.26-8.145E-02 % P 3.439E-01 1.01E-01 G

TH-234       1.1774E+00
                           63.29 1.177E+00 %(P 6.254E+00 1.87E+00 G K
                           92.80 1.275E+00 % P 2.141E+00 6.49E-01 G
                           92.38 1.536E+00 & P 2.526E+00 7.67E-01 G

AM-241       5.4364E-02
                           59.54 5.436E-02 %(P 1.184E+00 3.53E-01 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - 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	5.7622E-02	6.1249E-02	2.7535E-01	2.7538E-01	2.925E-01
K-40		1.3713E+01	1.3713E+01	1.2118E+00	1.4500E+00	
MN-54	#A	-1.0729E-03	-1.0841E-03	4.6311E-02	4.6311E-02	3.128E-02
CO-57	#B	1.2918E-02	1.3075E-02	3.9753E-02	3.9759E-02	4.353E-02
CO-60	#B	3.3131E-02	3.3187E-02	3.4246E-02	3.4300E-02	3.532E-02
Sr-85	#A	-1.3744E-02	-1.4453E-02	3.9938E-02	3.9947E-02	4.221E-02
Kr-85	#A	-3.1735E+02	-3.1736E+02	8.7682E+02	8.7701E+02	9.745E+02
Y-88	#B	5.8387E-03	6.0200E-03	1.6220E-02	1.6223E-02	1.835E-02
NB-94	#B	0.0000E+00	0.0000E+00	2.5907E-02	2.5907E-02	3.069E-02
Ag-108M	#B	-2.5286E-03	-2.5288E-03	5.8285E-02	5.8285E-02	6.599E-02
CD-109	#A	-6.8421E-02	-6.8915E-02	1.8189E+00	1.8189E+00	2.016E+00
SN-113	#B	0.0000E+00	0.0000E+00	4.5405E-02	4.5405E-02	5.034E-02
SB-125	#B	5.7823E-02	5.8010E-02	5.2008E-02	5.2117E-02	1.124E-01
I-131	#B	5.9460E-03	8.9192E-03	5.1220E-02	5.1223E-02	3.847E-02
CS-134	#B	-1.8862E-02	-1.8944E-02	3.9092E-02	3.9108E-02	4.292E-02
CS-137	#	1.4041E-01	1.4045E-01	5.2568E-02	5.3197E-02	
CE-139	#A	1.3302E-02	1.3621E-02	3.6984E-02	3.6992E-02	3.997E-02
EU-152	#B	1.0582E-01	1.0590E-01	9.8299E-02	9.8474E-02	1.472E-01
EU-154	#B	1.1264E-02	1.1275E-02	9.7235E-02	9.7237E-02	1.083E-01
EU-155	#B	-8.2669E-03	-8.2818E-03	2.2645E-01	2.2645E-01	2.522E-01
HG-203	#B	-4.4857E-03	-4.8109E-03	4.0220E-02	4.0221E-02	4.178E-02
TL-208	#	2.8848E-01	2.8848E-01	5.6097E-02	5.8544E-02	
PB-212		8.5720E-01	8.5720E-01	1.2197E-01	1.3173E-01	
PB-214		5.1475E-01	5.1475E-01	9.6976E-02	1.0148E-01	
BI-212		7.2750E-01	7.2750E-01	3.4618E-01	3.4874E-01	
BI-214		4.9610E-01	4.9610E-01	1.2597E-01	1.2922E-01	
RA-224	A	9.6880E-01	9.6880E-01	9.9880E-01	1.0004E+00	1.080E+00
RA-226	#	1.5428E+00	1.5428E+00	1.0272E+00	1.0311E+00	1.091E+00
AC-228		7.6553E-01	7.6553E-01	1.3495E-01	1.4208E-01	
TH-227	#B	-8.8726E-02	-8.8726E-02	3.3871E-01	3.3875E-01	3.759E-01
PA-234	#B	3.4287E-03	3.4287E-03	1.9718E-01	1.9718E-01	2.207E-01
TH-234	#B	1.1774E+00	1.1774E+00	5.6091E+00	5.6095E+00	6.254E+00
AM-241	#A	5.4363E-02	5.4364E-02	1.0583E+00	1.0583E+00	1.184E+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) 1.8471840E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.8471882E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-02-02-004-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1MAY2006_1428.An1

Acquisition information

Start time:	01-May-2006 14:29:51
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:	1.7280E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.7280E+03) = 5.7870E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 20:30:00
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. 18 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
75.05	148.	18.49	0.99	9.220E-03	74.81	9.600	1.307E+00	PB212
77.11	192.	14.87	0.99	1.017E-02	77.11	17.500	8.372E-01	PB212
					77.11	10.700	1.369E+00	PB214
93.65	94.	39.94	1.50	1.674E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.11	96.	37.15	1.00	2.438E-02				
186.26	161.	20.84	1.46	2.566E-02	185.99	3.280	1.376E+00	RA226
208.99	119.	28.59	0.86	2.473E-02				
238.76	1032.	3.63	1.09	2.319E-02	238.63	43.100	7.976E-01	PB212
241.94	140.	17.56	1.10	2.302E-02	241.00	3.900	1.220E+00	RA224
					241.92	7.470	6.385E-01	PB214
295.37	230.	11.27	1.07	2.024E-02	295.22	19.200	4.553E-01	PB214
338.50	213.	12.75	1.22	1.830E-02	338.40	12.010	7.540E-01	AC228
352.01	404.	8.36	1.10	1.775E-02	351.99	37.100	4.726E-01	PB214
463.07	84.	24.25	1.31	1.426E-02				
463.07	84.	24.25	1.31	1.426E-02	463.51	10.000	4.567E-01	SB125
511.00	190.	11.97	1.03	1.317E-02	510.72	22.500	4.310E-01	TL208
583.25	398.	7.38	1.35	1.184E-02	583.14	86.000	3.024E-01	TL208
609.52	308.	7.75	1.23	1.144E-02	609.32	46.090	4.474E-01	BI214
727.25	75.	28.08	1.88	9.964E-03	727.17	11.800	4.929E-01	BI212
795.43	40.	28.06	1.50	9.301E-03	795.76	85.400	3.961E-02	CS134
911.18	290.	8.43	1.46	8.401E-03	911.07	29.000	9.207E-01	AC228
964.65	40.	34.59	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152
968.85	198.	10.95	1.33	8.026E-03	968.90	17.460	1.105E+00	AC228
1120.37	99.	15.80	2.06	7.211E-03	1120.28	15.040	7.001E-01	BI214
1461.03	1263.	2.91	1.98	5.931E-03	1460.75	10.700	1.533E+01	K40
1621.13	17.	35.51	1.94	5.488E-03	1620.56	2.750	PBC<MDA	BI212

1764.86	55.	15.18	1.90	5.141E-03	1764.51	15.920	4.904E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
417.14	208.99	431.	119.	0.059	85.77	0.863	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	305.	150.	0.075	53.75	0.993D
PB-212	153.39	77.11	314.	149.	0.074	46.46	0.995A
RA-226	371.69	186.26	433.	148.	0.074	62.51	1.457s
PB-212	476.77	238.81	520.	962.	0.481	14.26	1.027
RA-224	482.48	241.66	620.	123.	0.061	90.17	1.500
PB-214	589.89	295.37	206.	226.	0.113	33.80	1.073
AC-228	676.15	338.50	211.	212.	0.106	38.26	1.218
PB-214	703.15	352.01	243.	398.	0.199	25.08	1.104
SB-125	925.06	462.97	117.	66.	0.033	76.94	1.500s
TL-208	1021.12	511.00	144.	163.	0.082	35.92	1.034s
TL-208	1165.60	583.25	141.	394.	0.197	22.14	1.353
BI-214	1218.14	609.52	103.	302.	0.151	23.24	1.227
BI-212	1454.16	727.54	75.	51.	0.026	82.50	1.500s
CS-134	1589.92	795.43	43.	40.	0.020	84.19	1.500s
AC-228	1821.39	911.18	89.	287.	0.143	25.30	1.460
EU-152	1928.33	964.65	78.	40.	0.020	103.78	1.538s
AC-228	1936.72	968.85	83.	198.	0.099	32.86	1.330
BI-214	2239.72	1120.37	58.	97.	0.049	47.39	2.056s
K-40	2920.92	1461.03	45.	1244.	0.622	8.74	1.983
BI-212	3241.06	1621.13	10.	17.	0.009	106.53	1.944
BI-214	3528.47	1764.86	8.	51.	0.026	45.53	1.902

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

***** S U M M A R Y O 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		-2.4069E-02					
			477.56	-2.407E-02	&(	2.856E-01 8.28E-02	G
K-40		1.5326E+01					
			1460.75	1.533E+01	(P	4.191E-01 4.53E-01	G
MN-54		-8.7441E-04					
			834.81	-8.744E-04	%(P	4.000E-02 1.14E-02	G
CO-57		3.6708E-03					
			122.07	3.671E-03	&(P	4.837E-02 1.44E-02	G K
			136.43	5.325E-02	%	3.929E-01 1.17E-01	G
CO-60		8.6679E-03					
			1332.51	8.668E-03	%(P	3.529E-02 1.00E-02	G K
			1173.23	3.624E-03	% P	4.555E-02 1.30E-02	G K
Sr-85		-1.3724E-02					
			514.00	-1.372E-02	%(	4.721E-02 1.41E-02	G
Kr-85		-3.0169E+02					
			513.99	-3.017E+02	%(	1.036E+03 3.10E+02	G
Y-88		-1.0254E-04					
			1836.01	-1.025E-04	%(P	1.200E-02 1.63E-03	G K
			898.02	-1.331E-04	% P	4.010E-02 1.13E-02	G
NB-94		-9.0414E-03					
			871.10	-9.041E-03	%(	3.662E-02 1.08E-02	G K
			702.50	1.514E-02	&	3.195E-02 9.68E-03	G K
Ag-108M		-2.0090E-03					
			722.95	-2.009E-03	%(	3.190E-02 9.07E-03	G K
			614.37	-1.799E-02	& P	4.499E-02 1.35E-02	G
			433.93	1.137E-02	%	3.699E-02 1.11E-02	G
CD-109		3.2384E-01					
			88.04	3.238E-01	%(	2.098E+00 6.29E-01	G
SN-113		8.9166E-03					
			391.71	8.917E-03	%(	4.408E-02 1.30E-02	G K
			255.04	1.513E-01	%	1.708E+00 5.07E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0794E-01						
		427.95	2.159E-02	%(P	1.035E-01	3.06E-02	G K
		600.77	3.318E-02	& P	1.724E-01	5.05E-02	G
		636.15	3.562E-02	% P	2.592E-01	7.48E-02	G
		463.51	3.635E-01	*(P	2.919E-01	9.50E-02	G
		176.29	-4.009E-02	%	4.763E-01	1.41E-01	G
I-131	-8.8209E-03						
		364.48	-8.821E-03	%(P	6.189E-02	1.83E-02	G K
		636.97	-8.253E-02	%	7.446E-01	2.17E-01	G
		284.29	-2.288E-02	% P	8.877E-01	2.62E-01	G
CS-134	1.1225E-02						
		604.66	-1.361E-02	%(	3.695E-02	1.11E-02	G K
		795.76	3.961E-02	(P	3.306E-02	1.11E-02	G
		569.29	5.217E-02	% P	2.199E-01	6.47E-02	G
		801.84	-7.328E-02	% P	4.040E-01	1.16E-01	G
CS-137	1.0395E-02						
		661.62	1.040E-02	&(P	4.250E-02	1.25E-02	G
CE-139	-1.0734E-02						
		165.85	-1.073E-02	%(	4.830E-02	1.45E-02	G
EU-152	1.0944E-01						
		121.78	3.129E-02	&(P	1.375E-01	4.12E-02	G K
		344.30	-1.600E-03	% P	1.069E-01	3.12E-02	G
		1408.08	4.480E-02	%	1.559E-01	4.54E-02	G
		964.00	2.662E-01	(P	2.930E-01	9.33E-02	G
		1112.07	-3.133E-05	&	2.923E-01	8.22E-02	G
		778.90	7.444E-02	%	2.158E-01	6.41E-02	G
EU-154	8.7455E-03						
		123.10	8.745E-03	%(	8.665E-02	2.58E-02	G K
		1274.80	2.220E-02	%	1.180E-01	3.41E-02	G
		723.30	3.514E-03	%	1.973E-01	5.67E-02	G
		1004.80	-2.393E-02	%	2.303E-01	6.62E-02	G
EU-155	1.1160E-01						
		86.45	1.116E-01	%(	2.430E-01	7.37E-02	G K
		105.31	-4.993E-02	%	2.431E-01	7.29E-02	G
HG-203	-1.8679E-03						
		279.17	-1.868E-03	&(P	4.456E-02	1.32E-02	G K
		72.87	-7.955E-01	% P	2.280E+00	6.88E-01	G
		70.83	-7.076E-02	&	5.174E+00	1.54E+00	G
		82.50	-1.089E+00	%	4.260E+00	1.28E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.0240E-01						
		583.14	3.024E-01	(P	4.458E-02	2.26E-02	G
		510.72	4.310E-01	+ P	1.545E-01	6.01E-02	G
PB-212	7.8052E-01						
		238.63	7.522E-01	(P	8.525E-02	3.62E-02	G K
							Energy duplication
		77.11	6.565E-01	} P	3.766E-01	1.02E-01	G
		74.81	1.354E+00	+ P	7.563E-01	2.48E-01	G
PB-214	4.6673E-01						
		351.99	4.726E-01	(P	8.946E-02	4.01E-02	G K
		295.22	4.553E-01	(P	1.399E-01	5.22E-02	G
							Energy duplication
		77.11	1.445E-01	} P	9.118E-01	2.22E-01	G
		241.92	2.022E-01	%	5.697E-01	1.72E-01	G
BI-212	3.4011E-01						
		727.17	3.401E-01	(P	2.873E-01	9.44E-02	G K
		1620.56	8.872E-01	+ P	9.055E-01	3.16E-01	G
		785.42	7.902E-01	%	1.936E+00	5.82E-01	G
BI-214	4.5843E-01						
		609.32	4.474E-01	(P	7.430E-02	3.54E-02	G K
		1764.51	4.904E-01	(P	1.492E-01	7.92E-02	G
		1120.28	7.001E-01	+ P	2.752E-01	1.13E-01	G
RA-224	1.0676E+00						
		241.00	1.068E+00	(	1.032E+00	3.21E-01	G
RA-226	1.3762E+00						
		185.99	1.376E+00	(P	9.258E-01	3.12E-01	G
AC-228	9.9006E-01						
		911.07	9.207E-01	(P	1.499E-01	7.86E-02	G K
		968.90	1.105E+00	(P	2.520E-01	1.21E-01	G
		338.40	7.540E-01	- P	2.505E-01	9.67E-02	G
TH-227	-9.5535E-03						
		236.00	-9.553E-03	%(	4.481E-01	1.34E-01	G K
		256.25	1.272E-02	% P	5.266E-01	1.56E-01	G
PA-234	-3.6016E-02						
		98.44	-3.602E-02	%(P	2.076E-01	6.20E-02	G K
		946.00	2.504E-02	% P	1.280E-01	3.66E-02	G
		131.28	-1.147E-02	& P	2.291E-01	6.83E-02	G
		94.67	-8.555E-02	% P	4.303E-01	1.29E-01	G
		883.24	5.081E-02	%	2.968E-01	8.61E-02	G
		926.70	-3.972E-02	%	3.155E-01	9.06E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 7.706E-02 % P 3.248E-01 9.56E-02 G

TH-234       1.8528E+00
                           63.29 1.853E+00 &(P 6.408E+00 1.92E+00 G K
                           92.80 1.557E+00 % P 2.258E+00 6.87E-01 G
                           92.38 1.825E+00 & P 2.681E+00 8.16E-01 G

AM-241       1.8488E-02
                           59.54 1.849E-02 &(P 1.244E+00 3.70E-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	-2.2629E-02	-2.4069E-02	2.4827E-01	2.4828E-01	2.686E-01
K-40		1.5326E+01	1.5326E+01	1.3593E+00	1.6246E+00	
MN-54	#A	-8.6524E-04	-8.7441E-04	7.2834E-02	7.2834E-02	3.958E-02
CO-57	#B	3.6263E-03	3.6708E-03	4.3209E-02	4.3209E-02	4.778E-02
CO-60	#B	8.6531E-03	8.6679E-03	3.0101E-02	3.0106E-02	3.523E-02

Sr-85	#A	-1.3044E-02	-1.3724E-02	4.2355E-02	4.2362E-02	4.487E-02
Kr-85	#A	-3.0167E+02	-3.0169E+02	9.2944E+02	9.2961E+02	1.036E+03
Y-88	#B	-9.9418E-05	-1.0254E-04	6.1522E-04	6.1525E-04	1.164E-02
NB-94	#B	-9.0414E-03	-9.0414E-03	3.2274E-02	3.2278E-02	3.662E-02
Ag-108M	#B	-2.0089E-03	-2.0090E-03	2.7200E-02	2.7201E-02	3.190E-02
CD-109	#A	3.2150E-01	3.2384E-01	1.8861E+00	1.8862E+00	2.083E+00
SN-113	#B	8.6651E-03	8.9166E-03	3.9035E-02	3.9038E-02	4.284E-02
SB-125	#F	1.0759E-01	1.0794E-01	8.4648E-02	8.4880E-02	1.032E-01
I-131	#B	-5.8569E-03	-8.8209E-03	6.2397E-02	6.2400E-02	4.110E-02
CS-134	#B	1.1176E-02	1.1225E-02	9.4703E-03	9.4927E-03	3.679E-02
CS-137	#A	1.0392E-02	1.0395E-02	3.7528E-02	3.7533E-02	4.249E-02
CE-139	#A	-1.0480E-02	-1.0734E-02	4.3459E-02	4.3463E-02	4.716E-02
EU-152	#B	1.0937E-01	1.0944E-01	1.1513E-01	1.1529E-01	1.374E-01
EU-154	#B	8.7362E-03	8.7455E-03	7.7282E-02	7.7283E-02	8.655E-02
EU-155	#B	1.1140E-01	1.1160E-01	2.2095E-01	2.2104E-01	2.426E-01
HG-203	#B	-1.7404E-03	-1.8679E-03	4.0268E-02	4.0268E-02	4.152E-02
TL-208		3.0240E-01	3.0240E-01	6.7672E-02	6.9912E-02	
PB-212		7.8052E-01	7.8052E-01	1.1270E-01	1.2147E-01	
PB-214		4.6673E-01	4.6673E-01	9.9858E-02	1.0347E-01	
BI-212	#	3.4011E-01	3.4011E-01	2.8332E-01	2.8400E-01	2.873E-01
BI-214		4.5843E-01	4.5843E-01	1.0883E-01	1.1204E-01	
RA-224	#	1.0676E+00	1.0676E+00	9.6264E-01	9.6463E-01	1.032E+00
RA-226	#	1.3762E+00	1.3762E+00	9.3550E-01	9.3891E-01	
AC-228		9.9006E-01	9.9006E-01	2.0632E-01	2.1417E-01	
TH-227	#B	-9.5535E-03	-9.5535E-03	4.0095E-01	4.0095E-01	4.481E-01
PA-234	#B	-3.6016E-02	-3.6016E-02	2.0442E-01	2.0443E-01	2.076E-01
TH-234	#B	1.8528E+00	1.8528E+00	5.7681E+00	5.7690E+00	6.408E+00
AM-241	#A	1.8488E-02	1.8488E-02	1.1097E+00	1.1097E+00	1.244E+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) 1.9699905E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 1.9699913E+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_1MAY2006_1506.An1

Sample description
FSS-OOL-02-02-007-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1MAY2006_1506.An1

Acquisition information
Start time: 01-May-2006 15:06:06
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: 1.9060E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9060E+03) =
5.2466E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

YAEC Chemistry Lab Spectrum name: 103F_1MAY2006_1506.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	26-Apr-2006 20:50:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1586

***** S U M M A R Y O F P E A K 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	122.	22.01	0.99	9.100E-03	74.81	9.600	9.696E-01	PB212
77.24	207.	14.06	0.99	1.026E-02	77.11	10.700	1.335E+00	PB214
					77.11	17.500	8.161E-01	PB212
93.24	100.	36.81	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
93.28	101.	36.72	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
129.40	107.	35.04	1.34	2.441E-02				
186.02	154.	25.78	1.17	2.567E-02	185.99	3.280	1.184E+00	RA226
209.26	132.	24.02	1.05	2.471E-02				
238.82	1201.	3.39	1.09	2.319E-02	238.63	43.100	8.432E-01	PB212
242.02	169.	16.84	1.10	2.302E-02	241.00	3.900	1.331E+00	RA224
					241.92	7.470	6.966E-01	PB214
270.36	93.	28.18	1.21	2.150E-02				
295.12	326.	9.82	1.02	2.025E-02	295.22	19.200	5.875E-01	PB214
300.63	96.	25.74	1.13	1.999E-02				
328.11	70.	40.07	0.98	1.874E-02				
338.52	249.	14.61	1.01	1.830E-02	338.40	12.010	8.010E-01	AC228
352.03	441.	6.46	1.17	1.775E-02	351.99	37.100	4.684E-01	PB214
463.56	96.	20.21	0.82	1.425E-02	463.51	10.000	4.720E-01	SB125
511.12	201.	12.89	1.13	1.316E-02	510.72	22.500	4.165E-01	TL208
583.40	404.	7.46	1.24	1.184E-02	583.14	86.000	2.783E-01	TL208
609.33	334.	7.49	1.26	1.144E-02	609.32	46.090	4.408E-01	BI214
727.55	94.	18.79	1.55	9.961E-03	727.17	11.800	5.662E-01	BI212
860.66	74.	18.37	1.53	8.767E-03				

911.38	298.	8.28	1.39	8.399E-03	911.07	29.000	8.568E-01	AC228
964.37	39.	34.09	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152
968.78	228.	10.07	1.64	8.027E-03	968.90	17.460	1.151E+00	AC228
1120.68	115.	16.82	1.87	7.210E-03	1120.28	15.040	7.380E-01	BI214
1461.16	1231.	2.95	1.87	5.931E-03	1460.75	10.700	1.354E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1620.95	17.	27.81	0.96	5.488E-03	1620.56	2.750	8.013E-01	BI212
1765.04	79.	11.55	1.24	5.141E-03	1764.51	15.920	6.585E-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	
257.98	129.40	592.	108.	0.054	99.67	1.343	AC-228	s
417.69	209.26	400.	132.	0.066	72.06	1.048	AC-228	s
539.87	270.36	270.	93.	0.047	84.55	1.214	AC-228	
600.41	300.63	222.	96.	0.048	77.23	1.134	PB-212	s
655.37	328.11	269.	70.	0.035	120.20	0.982	AC-228	
1720.37	860.66	44.	74.	0.037	55.10	1.532	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	353.	122.	0.061	68.64	0.993D
PB-212	153.39	77.11	355.	204.	0.102	33.95	0.995A
RA-226	371.49	186.17	737.	156.	0.078	71.28	1.500
TH-227	472.67	236.76	1037.	-112.	-0.056	124.77	1.500s
PB-212	476.42	238.63	241.	1192.	0.596	10.16	1.093D
RA-224	481.16	241.00	1075.	126.	0.063	114.47	1.095D
PB-214	483.00	241.92	376.	114.	0.057	58.25	1.095A
PB-214	589.39	295.12	273.	322.	0.161	29.45	1.023
AC-228	676.18	338.52	328.	248.	0.124	43.82	1.010
PB-214	703.20	352.03	167.	435.	0.218	19.39	1.173
SB-125	925.72	463.30	149.	74.	0.037	76.40	1.500s
TL-208	1021.36	511.12	178.	174.	0.087	38.66	1.129s
TL-208	1165.89	583.40	153.	400.	0.200	22.39	1.241
BI-214	1217.75	609.33	107.	328.	0.164	22.46	1.263
BI-212	1454.18	727.55	82.	94.	0.047	56.38	1.545s
AC-228	1821.79	911.38	95.	294.	0.147	24.84	1.392
EU-152	1927.75	964.37	71.	39.	0.019	102.26	1.538s
AC-228	1936.58	968.78	79.	227.	0.114	30.22	1.644
BI-214	2240.33	1120.68	80.	113.	0.056	50.46	1.873
K-40	2921.20	1461.16	43.	1212.	0.606	8.86	1.866
BI-212	3240.70	1620.95	2.	17.	0.009	83.42	0.960s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3528.84	1765.04	5.	76.	0.038	34.65	1.236s

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		3.6173E-02					
			477.56	3.617E-02	%(	2.572E-01 7.50E-02	G
K-40		1.3538E+01					
			1460.75	1.354E+01	(P	3.717E-01 4.06E-01	G
MN-54		-6.9865E-03					
			834.81	-6.987E-03	%(P	3.829E-02 1.12E-02	G
CO-57		-6.6638E-03					
			122.07	-6.664E-03	%(P	5.174E-02 1.55E-02	G K
			136.43	-3.028E-02	%	3.571E-01 1.07E-01	G
CO-60		-5.3702E-03					
			1332.51	-5.370E-03	%(P	3.501E-02 9.50E-03	G K
			1173.23	-2.582E-03	& P	4.051E-02 1.13E-02	G K
Sr-85		-4.9505E-03					
			514.00	-4.950E-03	%(	4.111E-02 1.21E-02	G
Kr-85		-6.3539E+01					
			513.99	-6.354E+01	%(	8.969E+02 2.63E+02	G
Y-88		-1.3020E-03					
			1836.01	-1.302E-03	&(P	2.825E-02 7.46E-03	G K
			898.02	-1.554E-03	& P	4.128E-02 1.18E-02	G
NB-94		9.3823E-03					
			871.10	9.382E-03	&(	3.022E-02 8.94E-03	G K
			702.50	5.557E-03	%	2.562E-02 7.47E-03	G K
Ag-108M		-1.6664E-03					
			722.95	-1.666E-03	%(	6.454E-02 1.90E-02	G K
			614.37	-1.352E-02	& P	3.675E-02 1.10E-02	G
			433.93	6.542E-04	%	3.316E-02 9.65E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.1410E+00						
		88.04	1.141E+00	%(	1.793E+00	5.47E-01	G
SN-113	-3.7675E-03						
		391.71	-3.768E-03	&(	4.606E-02	1.35E-02	G K
		255.04	-1.205E-02	%	1.297E+00	3.81E-01	G
SB-125	1.0763E-01						
		427.95	1.866E-02	%(P	1.022E-01	3.02E-02	G K
		600.77	4.243E-02	% P	1.629E-01	4.82E-02	G
		636.15	5.490E-02	& P	2.292E-01	6.71E-02	G
		463.51	3.710E-01	*(P	2.973E-01	9.61E-02	G
		176.29	8.561E-02	%	5.527E-01	1.65E-01	G
I-131	-5.9004E-03						
		364.48	-5.900E-03	%(P	5.294E-02	1.55E-02	G K
		636.97	1.146E-01	%	5.201E-01	1.52E-01	G
		284.29	9.170E-02	& P	7.568E-01	2.24E-01	G
CS-134	0.0000E+00						
		604.66	0.000E+00	%(	7.008E-02	2.07E-02	G K
		795.76	2.455E-02	% P	3.323E-02	1.05E-02	G
		569.29	3.767E-02	% P	1.673E-01	4.89E-02	G
		801.84	2.313E-02	% P	3.119E-01	8.78E-02	G
CS-137	6.8257E-03						
		661.62	6.826E-03	%(P	3.638E-02	1.06E-02	G
CE-139	1.4015E-04						
		165.85	1.401E-04	&(	4.599E-02	1.37E-02	G
EU-152	6.3296E-02						
		121.78	-2.198E-02	%(P	1.502E-01	4.50E-02	G K
		344.30	-2.420E-02	% P	1.153E-01	3.43E-02	G
		1408.08	4.402E-02	%	1.513E-01	4.42E-02	G
		964.00	2.343E-01	*(P	2.532E-01	8.10E-02	G
		1112.07	1.502E-01	%	2.489E-01	7.70E-02	G
		778.90	1.895E-02	&	2.268E-01	6.49E-02	G
EU-154	-1.2338E-02						
		123.10	-1.234E-02	%(	1.035E-01	3.10E-02	G K
		1274.80	-2.308E-02	%	1.125E-01	3.27E-02	G
		723.30	-7.830E-02	%	2.141E-01	6.43E-02	G
		1004.80	-2.173E-02	%	2.168E-01	6.25E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-1.1461E-02						
		86.45	-1.146E-02	&(	2.412E-01	7.21E-02	G K
		105.31	9.330E-02	%	2.249E-01	6.80E-02	G
HG-203	-4.8932E-04						
		279.17	-4.893E-04	%(P	4.273E-02	1.26E-02	G K
		72.87	-7.492E-01	% P	2.256E+00	6.81E-01	G
		70.83	1.604E-01	&	4.588E+00	1.37E+00	G
		82.50	-3.793E-01	&	3.984E+00	1.19E+00	G
TL-208	2.7833E-01						
		583.14	2.783E-01	(P	4.202E-02	2.10E-02	G
		510.72	4.165E-01	+ P	1.552E-01	6.19E-02	G
PB-212	8.3743E-01						
		238.63	8.450E-01	(P	5.324E-02	2.89E-02	G K
							Energy duplication
		77.11	8.179E-01	} P	3.623E-01	9.25E-02	G
		74.81	9.986E-01	+ P	7.361E-01	2.34E-01	G
PB-214	4.6828E-01						
		351.99	4.684E-01	(P	6.771E-02	3.07E-02	G K
		295.22	5.875E-01	+ P	1.453E-01	5.84E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.004E-01	0.00E+00	G
		241.92	4.683E-01	}	3.835E-01	9.09E-02	G
BI-212	6.1065E-01						
		727.17	5.662E-01	*(P	2.709E-01	1.07E-01	G K
		1620.56	8.013E-01	(P	4.326E-01	2.23E-01	G
		785.42	7.493E-01	%	1.576E+00	4.78E-01	G
BI-214	4.4085E-01						
		609.32	4.408E-01	(P	6.852E-02	3.37E-02	G K
		1764.51	6.585E-01	+ P	1.135E-01	7.94E-02	G
		1120.28	7.380E-01	+ P	2.903E-01	1.26E-01	G
RA-224	9.9486E-01						
							Derived Ave Activity
		241.00	9.949E-01	}(	1.225E+00	3.88E-01	G
RA-226	1.3164E+00						
		185.99	1.316E+00	(P	1.088E+00	3.39E-01	G
AC-228	8.4046E-01						
		911.07	8.568E-01	(P	1.398E-01	7.18E-02	G K
		968.90	1.151E+00	+ P	2.227E-01	1.16E-01	G
		338.40	8.010E-01	(P	2.809E-01	1.18E-01	G

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

TH-227      -3.0494E-01
                          236.00-3.049E-01 &(  4.144E-01 1.27E-01 G K
                          256.25-1.627E-01 % P 4.964E-01 1.49E-01 G

PA-234      -7.1408E-02
                           98.44-7.141E-02 &(P 1.967E-01 5.93E-02 G K
                          946.00 3.681E-02 & P 1.361E-01 3.98E-02 G
                          131.28-2.441E-03 & P 2.010E-01 5.98E-02 G
                           94.67-9.463E-03 % P 3.686E-01 1.10E-01 G
                          883.24-3.205E-02 &   2.420E-01 6.94E-02 G
                          926.70 2.307E-03 &   2.760E-01 7.75E-02 G
                          569.26 7.081E-02 % P 2.408E-01 7.09E-02 G

TH-234       7.2564E-01
                           63.29 7.256E-01 %(P 6.109E+00 1.82E+00 G K
                           92.80 1.433E+00 % P 2.039E+00 6.21E-01 G
                           92.38 1.711E+00 & P 2.423E+00 7.38E-01 G

AM-241      -2.8212E-01
                           59.54-2.821E-01 %(P 1.068E+00 3.21E-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		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	3.4005E-02	3.6173E-02	2.2499E-01	2.2500E-01	2.418E-01
K-40		1.3538E+01	1.3538E+01	1.2178E+00	1.4494E+00	
MN-54	#A	-6.9131E-03	-6.9865E-03	3.6413E-02	3.6416E-02	3.789E-02
CO-57	#B	-6.5828E-03	-6.6638E-03	4.8640E-02	4.8641E-02	5.111E-02
CO-60	#B	-5.3610E-03	-5.3702E-03	9.8564E-02	9.8565E-02	3.495E-02
Sr-85	#A	-4.7048E-03	-4.9505E-03	3.6366E-02	3.6367E-02	3.907E-02
Kr-85	#A	-6.3537E+01	-6.3539E+01	7.9012E+02	7.9013E+02	8.969E+02
Y-88	#B	-1.2623E-03	-1.3020E-03	2.5821E-02	2.5821E-02	2.738E-02
NB-94	#B	9.3823E-03	9.3823E-03	2.6817E-02	2.6822E-02	3.022E-02
Ag-108M	#B	-1.6663E-03	-1.6664E-03	5.6932E-02	5.6932E-02	6.454E-02
CD-109	#A	1.1327E+00	1.1410E+00	1.6417E+00	1.6429E+00	1.780E+00
SN-113	#B	-3.6610E-03	-3.7675E-03	4.0510E-02	4.0511E-02	4.476E-02
SB-125	#F	1.0728E-01	1.0763E-01	8.3642E-02	8.3875E-02	1.019E-01
I-131	#B	-3.9140E-03	-5.9004E-03	5.5677E-02	5.5678E-02	3.512E-02
CS-134	#B	0.0000E+00	0.0000E+00	6.2242E-02	6.2242E-02	6.978E-02
CS-137	#A	6.8237E-03	6.8257E-03	3.1832E-02	3.1835E-02	3.637E-02
CE-139	#A	1.3682E-04	1.4015E-04	4.1016E-02	4.1016E-02	4.490E-02
EU-152	#B	6.3251E-02	6.3296E-02	6.5636E-02	6.5730E-02	1.501E-01
EU-154	#B	-1.2325E-02	-1.2338E-02	9.2879E-02	9.2882E-02	1.034E-01
EU-155	#B	-1.1440E-02	-1.1461E-02	2.1616E-01	2.1616E-01	2.408E-01
HG-203	#B	-4.5586E-04	-4.8932E-04	4.0571E-02	4.0571E-02	3.981E-02
TL-208		2.7833E-01	2.7833E-01	6.2993E-02	6.5033E-02	
PB-212		8.3743E-01	8.3743E-01	8.5952E-02	9.8750E-02	
PB-214		4.6828E-01	4.6828E-01	9.1969E-02	9.5904E-02	
BI-212		6.1065E-01	6.1065E-01	3.0848E-01	3.1051E-01	
BI-214		4.4085E-01	4.4085E-01	1.0096E-01	1.0416E-01	
RA-224	A	9.9486E-01	9.9486E-01	1.1388E+00	1.1403E+00	
RA-226	#	1.3164E+00	1.3164E+00	1.0161E+00	1.0190E+00	1.088E+00
AC-228		8.4046E-01	8.4046E-01	2.1113E-01	2.1670E-01	
TH-227	#A	-3.0494E-01	-3.0494E-01	3.8046E-01	3.8087E-01	4.144E-01
PA-234	#B	-7.1408E-02	-7.1408E-02	1.8569E-01	1.8573E-01	1.967E-01
TH-234	#B	7.2564E-01	7.2564E-01	5.4603E+00	5.4604E+00	6.109E+00
AM-241	#A	-2.8211E-01	-2.8212E-01	9.7445E-01	9.7458E-01	1.068E+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) 1.8008888E+01 pCi/gm
Total Decayed Activity (269.9 to 2000.7 keV) 1.8008888E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-02-02-001-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1MAY2006_1543.An1

Acquisition information

Start time:	01-May-2006 15:44:33
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:	1.8100E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8100E+03) = 5.5249E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	26-Apr-2006 20:10:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3213

***** S U M M A R Y O F P E A K 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	159.	18.12	0.99	9.052E-03	74.81	9.600	1.366E+00	PB212
77.22	194.	1.42	0.99	1.011E-02	77.11	17.500	8.286E-01	PB212
					77.11	10.700	1.355E+00	PB214
93.62	103.	37.46	0.76	1.673E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	PBC<MDA	PA234
129.40	86.	40.28	1.51	2.441E-02				
186.48	133.	19.95	1.06	2.565E-02	185.99	3.280	PBC<MDA	RA226
209.67	121.	25.76	1.43	2.470E-02				
238.85	1128.	3.52	1.09	2.319E-02	238.63	43.100	8.335E-01	PB212
241.88	154.	17.38	1.10	2.303E-02	241.00	3.900	1.278E+00	RA224
					241.92	7.470	6.685E-01	PB214
270.36	108.	26.20	1.16	2.150E-02				
276.74	74.	41.02	1.18	2.117E-02				
295.37	262.	10.41	1.12	2.024E-02	295.22	19.200	4.946E-01	PB214
300.19	75.	29.81	0.87	2.001E-02				
328.57	66.	34.31	1.07	1.872E-02				
338.58	254.	11.60	1.10	1.829E-02	338.40	12.010	8.597E-01	AC228
352.12	487.	5.97	1.17	1.775E-02	351.99	37.100	5.457E-01	PB214
463.14	68.	32.76	1.46	1.426E-02				
463.14	68.	32.76	1.46	1.426E-02	463.51	10.000	3.508E-01	SB125
510.76	250.	10.96	1.38	1.317E-02	510.72	22.500	5.621E-01	TL208
583.43	410.	6.85	1.55	1.184E-02	583.14	86.000	2.973E-01	TL208
609.49	368.	6.47	1.32	1.144E-02	609.32	46.090	5.122E-01	BI214
727.34	109.	21.24	1.60	9.963E-03	727.17	11.800	6.915E-01	BI212
786.11	30.	34.83	0.85	9.394E-03	785.42	2.000	PBC<MDA	BI212
795.00	69.	26.28	1.56	9.308E-03				

795.00	69.	26.28	1.56	9.308E-03	795.76	85.400	6.487E-02	CS134
860.66	75.	24.39	1.65	8.767E-03				
911.49	289.	6.89	1.52	8.398E-03	911.07	29.000	8.759E-01	AC228
964.75	46.	26.35	1.54	8.052E-03				
969.57	158.	10.01	1.54	8.022E-03	968.90	17.460	8.436E-01	AC228
1121.00	86.	23.91	1.50	7.208E-03	1120.28	15.040	5.824E-01	BI214
1461.30	1353.	2.77	1.86	5.930E-03	1460.75	10.700	1.569E+01	K40
1621.69	22.	27.65	1.29	5.488E-03	1620.56	2.750	1.066E+00	BI212
1765.10	55.	13.48	1.80	5.140E-03	1764.51	15.920	4.718E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
257.96	129.40	529.	86.	0.043	118.24	1.509	AC-228	s
418.49	209.67	385.	121.	0.060	77.28	1.430	NP-239	s
539.87	270.36	290.	108.	0.054	78.60	1.162	AC-228	s
552.62	276.74	322.	82.	0.041	98.77	1.184	TL-208	
599.53	300.19	205.	75.	0.038	89.42	0.867	PB-212	s
656.29	328.57	200.	66.	0.033	102.92	1.070	RH-106M	s
1720.37	860.66	78.	75.	0.037	73.17	1.646	TL-208	s
1929.58	964.69	48.	47.	0.024	75.88	1.539	AC-228	D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	353.	159.	0.079	54.36	0.993D
PB-212	153.39	77.11	350.	194.	0.097	4.25	0.995A
RA-226	372.26	186.55	708.	135.	0.068	79.28	1.500s
PB-212	476.89	238.87	709.	1088.	0.544	14.89	1.006
RA-224	482.84	241.84	746.	134.	0.067	90.47	1.500
PB-214	589.88	295.37	222.	258.	0.129	31.24	1.119
AC-228	676.31	338.58	238.	253.	0.127	34.81	1.104
PB-214	703.38	352.12	162.	481.	0.241	17.92	1.173s
SB-125	924.95	462.91	130.	60.	0.030	87.01	1.500
TL-208	1020.63	510.76	183.	223.	0.112	32.88	1.375s
TL-208	1165.96	583.43	130.	406.	0.203	20.54	1.552
BI-214	1218.07	609.49	83.	362.	0.181	19.42	1.319s
BI-212	1453.74	727.34	120.	109.	0.054	63.72	1.604s
BI-212	1571.28	786.11	36.	30.	0.015	104.50	0.851s
CS-134	1589.55	795.24	54.	46.	0.023	80.89	1.500s
AC-228	1822.00	911.49	50.	286.	0.143	20.66	1.519
AC-228	1936.81	968.90	47.	158.	0.079	30.02	1.541D
BI-214	2240.96	1120.99	98.	83.	0.042	71.59	1.494
K-40	2921.47	1461.30	35.	1334.	0.667	8.30	1.860
BI-212	3242.20	1621.69	4.	22.	0.011	82.96	1.293s
BI-214	3528.96	1765.10	3.	52.	0.026	40.45	1.800

s - Peak fails shape tests.
D - Peak area deconvoluted.

A Derived peak area.

***** S U M M A R Y O 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		-1.6217E-02					
			477.56	-1.622E-02	&(	3.893E-01 1.14E-01	G
K-40		1.5695E+01					
			1460.75	1.569E+01	(P	3.549E-01 4.40E-01	G
MN-54		-3.0103E-04					
			834.81	-3.010E-04	%(P	4.580E-02 1.32E-02	G
CO-57		1.7739E-02					
			122.07	1.774E-02	%(P	5.043E-02 1.52E-02	G K
			136.43	-9.082E-03	%	4.172E-01 1.24E-01	G
CO-60		6.8060E-03					
			1332.51	6.806E-03	%(P	3.669E-02 1.04E-02	G K
			1173.23	-4.573E-03	% P	4.381E-02 1.23E-02	G K
Sr-85		-2.2622E-02					
			514.00	-2.262E-02	%(	4.959E-02 1.50E-02	G
Kr-85		-4.9620E+02					
			513.99	-4.962E+02	%(	1.087E+03 3.29E+02	G
Y-88		2.9935E-03					
			1836.01	2.993E-03	%(P	2.197E-02 5.79E-03	G K
			898.02	-2.820E-04	% P	2.987E-02 8.22E-03	G
NB-94		3.0126E-03					
			871.10	3.013E-03	%(	2.980E-02 8.49E-03	G K
			702.50	5.850E-03	%	3.824E-02 1.12E-02	G K
Ag-108M		-9.6154E-03					
			722.95	-9.615E-03	%(	4.728E-02 1.40E-02	G K
			614.37	-2.687E-02	% P	4.164E-02 1.28E-02	G
			433.93	4.067E-03	&	3.611E-02 1.06E-02	G
CD-109		-1.0044E-01					
			88.04	-1.004E-01	%(	2.046E+00 6.11E-01	G
SN-113		-2.6755E-05					
			391.71	-2.676E-05	&(	5.099E-02 1.49E-02	G K
			255.04	-1.662E-01	%	1.708E+00 5.07E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.8732E-02						
		427.95	-2.862E-02	%(P	1.137E-01	3.38E-02	G K
		600.77	2.873E-02	% P	1.743E-01	5.10E-02	G
		636.15	1.146E-01	& P	2.576E-01	7.77E-02	G
		463.51	3.173E-01	(P	2.938E-01	9.40E-02	G
		176.29	1.230E-01	%	5.659E-01	1.70E-01	G
I-131	2.3463E-03						
		364.48	2.346E-03	%(P	4.207E-02	1.22E-02	G K
		636.97	1.244E-01	%	6.593E-01	1.93E-01	G
		284.29	2.045E-01	& P	7.882E-01	2.36E-01	G
CS-134	-1.8887E-02						
		604.66	-1.889E-02	%(	4.136E-02	1.25E-02	G K
		795.76	4.346E-02	+ P	3.499E-02	1.17E-02	G
		569.29	-1.047E-02	& P	2.132E-01	6.11E-02	G
		801.84	-6.909E-02	% P	3.693E-01	1.05E-01	G
CS-137	1.3490E-02						
		661.62	1.349E-02	%(P	4.660E-02	1.38E-02	G
CE-139	-3.9071E-04						
		165.85	-3.907E-04	&(	4.615E-02	1.37E-02	G
EU-152	5.0898E-02						
		121.78	5.090E-02	%(P	1.462E-01	4.41E-02	G K
		344.30	-1.517E-02	% P	1.192E-01	3.52E-02	G
		1408.08	5.884E-02	%	1.372E-01	4.12E-02	G
		964.00	5.482E-02	% P	2.597E-01	7.58E-02	G
		1112.07	-2.262E-02	&	3.059E-01	8.76E-02	G
		778.90	3.854E-02	&	2.183E-01	6.31E-02	G
EU-154	3.0393E-02						
		123.10	3.039E-02	%(	1.001E-01	3.01E-02	G K
		1274.80	-3.547E-02	%	1.233E-01	3.64E-02	G
		723.30	-5.138E-02	%	2.296E-01	6.80E-02	G
		1004.80	-3.525E-03	&	2.057E-01	5.81E-02	G
EU-155	1.4360E-01						
		86.45	1.436E-01	%(	2.417E-01	7.36E-02	G K
		105.31	3.721E-02	%	2.387E-01	7.15E-02	G
HG-203	-4.2843E-03						
		279.17	-4.284E-03	&(P	4.469E-02	1.33E-02	G K
		72.87	-4.726E-02	% P	2.402E+00	7.17E-01	G
		70.83	-2.185E-01	&	3.123E+00	9.25E-01	G
		82.50	-4.176E-01	&	4.223E+00	1.26E+00	G

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

TL-208       2.9735E-01
                          583.14 2.973E-01  (P 4.097E-02 2.06E-02 G
                          510.72 5.621E-01 + P 1.656E-01 6.90E-02 G

PB-212       8.1710E-01
                          238.63 8.124E-01  (P 9.467E-02 4.08E-02 G K
                                                          Energy duplication
                           77.11 8.171E-01 } P 3.789E-01 1.16E-02 G
                           74.81 1.366E+00 + P 7.757E-01 2.52E-01 G

PB-214       5.2824E-01
                          351.99 5.457E-01 @(P 7.023E-02 3.30E-02 G K
                          295.22 4.946E-01  (P 1.387E-01 5.23E-02 G
                                                          Energy duplication
                           77.11 0.000E+00 } P 8.777E-01 0.00E+00 G
                          241.92 3.582E-01 %   5.890E-01 1.80E-01 G

BI-212       8.1430E-01
                          727.17 6.915E-01 @(P 3.415E-01 1.48E-01 G K
                         1620.56 1.066E+00  (P 6.201E-01 2.96E-01 G
                          785.42 1.192E+00  (  1.219E+00 8.31E-03 G

BI-214       5.1556E-01
                          609.32 5.122E-01 @(P 6.405E-02 3.38E-02 G K
                         1764.51 4.718E-01  (P 1.016E-01 6.77E-02 G
                         1120.28 5.721E-01  (P 3.360E-01 1.40E-01 G

RA-224       1.1096E+00
                          241.00 1.110E+00  (  1.079E+00 3.35E-01 G

RA-226       1.2011E+00
                          185.99 1.201E+00 *(P 1.123E+00 3.48E-01 G

AC-228       8.6296E-01
                          911.07 8.759E-01  (P 1.094E-01 6.11E-02 G K
                          968.90 8.437E-01  (P 1.840E-01 8.45E-02 G
                          338.40 8.597E-01  (P 2.534E-01 1.00E-01 G

TH-227      -1.1947E-01
                          236.00-1.195E-01 %(  3.391E-01 1.02E-01 G K
                          256.25-5.753E-02 % P 5.005E-01 1.49E-01 G

PA-234      -6.0386E-02
                           98.44-6.039E-02 &(P 2.186E-01 6.57E-02 G K
                          946.00-5.960E-03 & P 2.018E-01 5.77E-02 G
                          131.28 5.182E-02 & P 1.939E-01 5.83E-02 G
                           94.67 4.797E-03 % P 3.889E-01 1.16E-01 G
                          883.24 3.609E-02 %   2.129E-01 6.08E-02 G
                          926.70 6.099E-02 %   2.715E-01 7.89E-02 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.532E-02 & P 3.220E-01 9.24E-02 G

TH-234       1.1163E+00
                           63.29 1.116E+00 %(P 6.477E+00 1.93E+00 G K
                           92.80 1.542E+00 % P 2.218E+00 6.75E-01 G
                           92.38 1.831E+00 & P 2.625E+00 7.99E-01 G

AM-241       4.2877E-02
                           59.54 4.288E-02 &(P 1.159E+00 3.45E-01 G
   ( - This peak used in the nuclide activity average.

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

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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	-1.5234E-02	-1.6217E-02	3.4194E-01	3.4194E-01	3.657E-01
K-40		1.5695E+01	1.5695E+01	1.3208E+00	1.6046E+00	
MN-54	#A	-2.9783E-04	-3.0103E-04	2.8308E-02	2.8308E-02	4.531E-02
CO-57	#B	1.7521E-02	1.7739E-02	4.5642E-02	4.5652E-02	4.981E-02
CO-60	#B	6.7943E-03	6.8060E-03	3.1130E-02	3.1132E-02	3.662E-02

Sr-85	#A	-2.1487E-02	-2.2622E-02	4.5041E-02	4.5060E-02	4.710E-02
Kr-85	#A	-4.9618E+02	-4.9620E+02	9.8768E+02	9.8810E+02	1.087E+03
Y-88	#B	2.9012E-03	2.9935E-03	1.7374E-02	1.7374E-02	2.129E-02
NB-94	#B	3.0126E-03	3.0126E-03	2.5475E-02	2.5476E-02	2.980E-02
Ag-108M	#B	-9.6148E-03	-9.6154E-03	4.1869E-02	4.1873E-02	4.727E-02
CD-109	#A	-9.9706E-02	-1.0044E-01	1.8331E+00	1.8331E+00	2.031E+00
SN-113	#B	-2.5990E-05	-2.6755E-05	4.4611E-02	4.4611E-02	4.953E-02
SB-125	#B	5.8539E-02	5.8732E-02	5.2180E-02	5.2291E-02	1.133E-01
I-131	#B	1.5491E-03	2.3463E-03	3.6490E-02	3.6490E-02	2.777E-02
CS-134	#B	-1.8803E-02	-1.8887E-02	3.7552E-02	3.7568E-02	4.118E-02
CS-137	#A	1.3486E-02	1.3490E-02	4.1515E-02	4.1522E-02	4.659E-02
CE-139	#A	-3.8134E-04	-3.9071E-04	4.1126E-02	4.1126E-02	4.504E-02
EU-152	#B	5.0862E-02	5.0898E-02	1.3231E-01	1.3234E-01	1.461E-01
EU-154	#B	3.0360E-02	3.0393E-02	9.0355E-02	9.0370E-02	9.995E-02
EU-155	#B	1.4333E-01	1.4360E-01	2.2087E-01	2.2101E-01	2.413E-01
HG-203	#B	-3.9881E-03	-4.2843E-03	4.0090E-02	4.0091E-02	4.160E-02
TL-208		2.9735E-01	2.9735E-01	6.1723E-02	6.4092E-02	
PB-212		8.1710E-01	8.1710E-01	1.2303E-01	1.3186E-01	
PB-214		5.2824E-01	5.2824E-01	9.5746E-02	1.0054E-01	
BI-212		8.1430E-01	8.1430E-01	4.0195E-01	4.0472E-01	
BI-214		5.1556E-01	5.1556E-01	1.0189E-01	1.0620E-01	
RA-224		1.1096E+00	1.1096E+00	1.0038E+00	1.0059E+00	1.079E+00
RA-226	#	1.2011E+00	1.2011E+00	1.0434E+00	1.0457E+00	1.123E+00
AC-228		8.6296E-01	8.6296E-01	1.4560E-01	1.5398E-01	
TH-227	#B	-1.1947E-01	-1.1947E-01	3.0677E-01	3.0685E-01	3.391E-01
PA-234	#B	-6.0386E-02	-6.0386E-02	2.0788E-01	2.0791E-01	2.186E-01
TH-234	#B	1.1163E+00	1.1163E+00	5.8045E+00	5.8049E+00	6.477E+00
AM-241	#A	4.2876E-02	4.2877E-02	1.0341E+00	1.0341E+00	1.159E+00

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

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

Total Activity (1120.0 to 2000.7 keV) 2.0639757E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.0639757E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-02-02-012-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1MAY2006_1621.An1

Acquisition information

Start time:	01-May-2006 16:22:17
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:	1.8630E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8630E+03) = 5.3677E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

Half lives decay limit: 12.000
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-Apr-2006 21:24:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2475

***** S U M M A R Y O F P E A K 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	90.	30.19	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
77.22	199.	1.40	0.99	1.011E-02	77.11	17.500	9.163E-01	PB212
					77.11	10.700	1.499E+00	PB214
93.15	124.	30.48	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.15	121.	30.97	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.85	88.	39.83	0.73	2.446E-02				
185.94	127.	26.86	1.34	2.567E-02				
185.94	127.	26.86	1.34	2.567E-02	185.99	3.280	PBC<MDA	RA226
209.79	128.	25.82	0.86	2.469E-02				
238.83	1129.	3.46	1.09	2.319E-02	238.63	43.100	8.103E-01	PB212
241.74	142.	17.19	1.09	2.303E-02	241.00	3.900	1.142E+00	RA224
					241.92	7.470	5.973E-01	PB214
270.45	95.	28.58	0.89	2.150E-02				
277.49	86.	32.81	0.96	2.114E-02				
295.37	279.	12.34	1.26	2.024E-02	295.22	19.200	5.130E-01	PB214
300.65	80.	32.42	0.96	1.999E-02				
328.20	55.	32.08	1.15	1.873E-02				
338.52	258.	12.41	1.06	1.830E-02	338.40	12.010	8.475E-01	AC228
352.01	440.	7.30	1.17	1.775E-02	351.99	37.100	4.780E-01	PB214
409.89	46.	34.87	0.94	1.573E-02				
462.76	124.	15.83	1.29	1.427E-02				
462.76	124.	15.83	1.29	1.427E-02	463.51	10.000	6.274E-01	SB125
510.96	188.	13.24	0.96	1.317E-02	510.72	22.500	3.948E-01	TL208
583.39	404.	6.98	1.30	1.184E-02	583.14	86.000	2.846E-01	TL208
609.40	302.	8.98	1.40	1.144E-02	609.32	46.090	4.064E-01	BI214

727.58	98.	22.92	1.75	9.960E-03	727.17	11.800	6.046E-01	BI212
794.74	96.	19.37	1.82	9.310E-03				
794.74	96.	19.37	1.82	9.310E-03	795.76	85.400	8.806E-02	CS134
911.46	249.	9.06	1.57	8.399E-03	911.07	29.000	7.307E-01	AC228
964.48	32.	36.79	1.54	8.052E-03	964.00	14.580	PBC<MDA	EU152
969.42	154.	9.93	1.54	8.021E-03	968.90	17.460	7.939E-01	AC228
1120.74	128.	18.01	1.36	7.210E-03	1120.28	15.040	8.433E-01	BI214
1378.63	21.	32.60	1.48	6.192E-03				
1461.36	1198.	3.03	1.93	5.930E-03	1460.75	10.700	1.347E+01	K40
1620.96	17.	33.62	1.23	5.488E-03	1620.56	2.750	8.294E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1765.37	63.	15.10	2.04	5.142E-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	
418.74	209.79	417.	128.	0.064	77.47	0.862	NP-239	s
540.05	270.45	269.	95.	0.048	85.74	0.890	AC-228	
554.12	277.49	280.	86.	0.043	88.39	0.956	NP-239	
600.44	300.65	237.	80.	0.040	97.25	0.963	PB-212	s
655.44	328.15	163.	64.	0.032	94.17	1.523	AC-228	s
818.90	409.89	100.	46.	0.023	104.60	0.941	AC-228	
1929.34	964.69	46.	41.	0.021	84.20	1.538	AC-228	D
2756.16	1378.63	12.	21.	0.011	97.79	1.476	BI-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	148.79	74.81	347.	90.	0.045	90.56	0.993D
PB-212	153.39	77.11	324.	199.	0.099	4.19	0.995A
TH-234	185.47	93.15	873.	124.	0.062	91.44	1.500s
TH-234	185.48	93.15	876.	121.	0.061	92.91	1.500s
RA-226	371.30	186.07	696.	111.	0.056	93.34	1.500s
PB-212	476.85	238.85	673.	1086.	0.543	14.67	1.074
RA-224	482.92	241.88	740.	103.	0.051	116.22	1.500
PB-214	589.89	295.37	328.	275.	0.137	37.03	1.265
AC-228	676.19	338.52	265.	257.	0.128	37.22	1.059
PB-214	703.16	352.01	209.	434.	0.217	21.89	1.169s
SB-125	925.33	463.10	102.	93.	0.047	54.52	1.500s
TL-208	1021.03	510.96	171.	161.	0.081	39.73	0.955s
TL-208	1165.88	583.39	130.	400.	0.200	20.93	1.296s
BI-214	1217.90	609.40	138.	295.	0.148	26.93	1.399s
BI-212	1454.24	727.58	118.	98.	0.049	68.76	1.748s
CS-134	1589.80	795.37	68.	55.	0.028	74.92	1.500s
AC-228	1821.95	911.46	74.	245.	0.123	27.19	1.574
AC-228	1936.81	968.90	40.	153.	0.077	29.88	1.541D
BI-214	2240.46	1120.74	98.	126.	0.063	54.02	1.357
K-40	2921.59	1461.36	44.	1179.	0.590	9.08	1.934

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3240.72	1620.96	6.	17.	0.009	100.86	1.230s
BI-214	3529.50	1765.37	12.	63.	0.032	45.30	2.043

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

***** S U M M A R Y O 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		1.7473E-01					
			477.56	1.747E-01	&(	2.557E-01 7.93E-02	G
K-40		1.3475E+01					
			1460.75	1.347E+01	(P	3.839E-01 4.14E-01	G
MN-54		1.5025E-02					
			834.81	1.502E-02	&(P	3.129E-02 9.48E-03	G
CO-57		5.3785E-03					
			122.07	5.378E-03	&(P	4.939E-02 1.48E-02	G K
			136.43	-8.582E-02	%	3.930E-01 1.18E-01	G
CO-60		2.5714E-03					
			1332.51	2.571E-03	&(P	3.375E-02 9.27E-03	G K
			1173.23	-5.443E-03	% P	4.692E-02 1.34E-02	G K
Sr-85		-1.1937E-02					
			514.00	-1.194E-02	%(	4.486E-02 1.34E-02	G
Kr-85		-2.6274E+02					
			513.99	-2.627E+02	%(	9.840E+02 2.94E+02	G
Y-88		-1.3847E-03					
			1836.01	-1.385E-03	%(P	2.256E-02 5.75E-03	G K
			898.02	-5.527E-03	% P	3.847E-02 1.11E-02	G
NB-94		9.1815E-03					
			871.10	9.182E-03	%(	2.642E-02 7.84E-03	G K
			702.50	2.015E-03	%	3.288E-02 9.47E-03	G K
Ag-108M		-3.2321E-03					
			722.95	-3.232E-03	&(	3.978E-02 1.15E-02	G K
			614.37	-1.480E-02	% P	4.001E-02 1.20E-02	G
			433.93	9.812E-05	%	2.729E-02 7.84E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	5.2365E-02						
		88.04	5.236E-02	&(	1.756E+00	5.23E-01	G
SN-113	2.0951E-03						
		391.71	2.095E-03	&(	5.022E-02	1.47E-02	G K
		255.04	-4.054E-01	%	1.606E+00	4.81E-01	G
SB-125	1.3808E-01						
		427.95	2.363E-02	%(P	1.017E-01	3.02E-02	G K
		600.77	8.573E-04	% P	1.635E-01	4.68E-02	G
		636.15	1.724E-02	& P	2.760E-01	7.95E-02	G
		463.51	4.768E-01	*(P	2.540E-01	8.78E-02	G
		176.29	8.097E-02	%	5.580E-01	1.67E-01	G
I-131	-1.4736E-02						
		364.48	-1.474E-02	%(P	5.399E-02	1.61E-02	G K
		636.97	1.117E-01	%	6.209E-01	1.81E-01	G
		284.29	1.266E-01	% P	6.779E-01	2.01E-01	G
CS-134	2.1271E-02						
		604.66	-4.441E-03	%(	3.842E-02	1.13E-02	G K
		795.76	5.066E-02	*(P	3.769E-02	1.27E-02	G
		569.29	4.362E-02	& P	1.458E-01	4.28E-02	G
		801.84	-6.707E-02	% P	3.394E-01	9.66E-02	G
CS-137	8.9823E-03						
		661.62	8.982E-03	%(P	3.684E-02	1.08E-02	G
CE-139	-7.3366E-03						
		165.85	-7.337E-03	%(	4.550E-02	1.36E-02	G
EU-152	1.5540E-02						
		121.78	1.554E-02	&(P	1.432E-01	4.28E-02	G K
		344.30	1.976E-02	% P	9.058E-02	2.68E-02	G
		1408.08	5.275E-03	%	1.440E-01	3.95E-02	G
		964.00	-3.677E-03	% P	2.787E-01	7.92E-02	G
		1112.07	2.104E-02	%	2.651E-01	7.54E-02	G
		778.90	1.575E-02	%	2.454E-01	7.03E-02	G
EU-154	-4.2175E-04						
		123.10	-4.217E-04	&(	1.039E-01	3.09E-02	G K
		1274.80	-4.193E-02	%	1.401E-01	4.16E-02	G
		723.30	-6.618E-02	&	2.148E-01	6.41E-02	G
		1004.80	-4.789E-02	&	2.186E-01	6.40E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-1.0050E-02						
		86.45	-1.005E-02	%(	2.383E-01	7.11E-02	G K
		105.31	4.457E-02	%	2.297E-01	6.89E-02	G
HG-203	-3.5966E-04						
		279.17	-3.597E-04	&(P	4.307E-02	1.27E-02	G K
		72.87	-3.178E-01	% P	2.234E+00	6.69E-01	G
		70.83	-2.349E-01	&	4.478E+00	1.34E+00	G
		82.50	-2.845E-03	%	3.413E+00	1.01E+00	G
TL-208	2.8462E-01						
		583.14	2.846E-01	@(P	3.981E-02	2.01E-02	G
		510.72	3.948E-01	+ P	1.556E-01	6.10E-02	G
PB-212	8.1419E-01						
		238.63	7.877E-01	(P	8.969E-02	3.90E-02	G K
							Energy duplication
		77.11	8.142E-01	} P	3.551E-01	1.14E-02	G
		74.81	7.472E-01	(P	7.477E-01	2.33E-01	G
PB-214	4.8996E-01						
		351.99	4.780E-01	@(P	7.717E-02	3.53E-02	G K
		295.22	5.130E-01	(P	1.625E-01	6.43E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.575E-01	0.00E+00	G
		241.92	3.307E-01	%	5.490E-01	1.67E-01	G
BI-212	6.4708E-01						
		727.17	6.046E-01	@(P	3.290E-01	1.39E-01	G K
		1620.56	8.294E-01	(P	6.671E-01	2.80E-01	G
		785.42	6.688E-01	%	1.464E+00	4.43E-01	G
BI-214	4.0645E-01						
		609.32	4.064E-01	@(P	7.893E-02	3.73E-02	G K
		1764.51	5.585E-01	+ P	1.669E-01	8.87E-02	G
		1120.28	8.433E-01	+ P	3.265E-01	1.54E-01	G
RA-224	8.2802E-01						
		241.00	8.280E-01	(	1.044E+00	3.21E-01	G
RA-226	9.5753E-01						
		185.99	9.575E-01	(P	1.083E+00	3.33E-01	G
AC-228	7.7310E-01						
		911.07	7.307E-01	(P	1.271E-01	6.72E-02	G K
		968.90	7.923E-01	(P	1.665E-01	7.90E-02	G
		338.40	8.475E-01	(P	2.594E-01	1.06E-01	G

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

TH-227      -9.6671E-02
                          236.00-9.667E-02 %(  3.685E-01 1.11E-01 G K
                          256.25-8.914E-02 & P 4.644E-01 1.39E-01 G

PA-234      -2.4863E-02
                           98.44-2.486E-02 %(P 2.154E-01 6.43E-02 G K
                          946.00 3.658E-02 & P 1.225E-01 3.58E-02 G
                          131.28-2.498E-03 & P 2.097E-01 6.24E-02 G
                           94.67-3.628E-02 % P 3.620E-01 1.08E-01 G
                          883.24 1.221E-02 &   2.784E-01 7.93E-02 G
                          926.70 3.598E-02 &   2.546E-01 7.27E-02 G
                          569.26 2.742E-02 & P 2.400E-01 6.88E-02 G

TH-234       1.7351E+00
                           63.29 1.431E+00 %(P 6.054E+00 1.81E+00 G K
                           92.80 1.785E+00 *(P 2.067E+00 6.33E-01 G
                           92.38 2.138E+00 *(P 2.430E+00 7.45E-01 G

AM-241      -2.7684E-01
                           59.54-2.768E-01 &(P 1.136E+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	1.6420E-01	1.7473E-01	2.3800E-01	2.3821E-01	2.403E-01
K-40		1.3475E+01	1.3475E+01	1.2426E+00	1.4684E+00	
MN-54	#A	1.4866E-02	1.5025E-02	2.8447E-02	2.8460E-02	3.096E-02
CO-57	#B	5.3128E-03	5.3785E-03	4.4264E-02	4.4265E-02	4.879E-02
CO-60	#B	2.5670E-03	2.5714E-03	2.7819E-02	2.7819E-02	3.369E-02
Sr-85	#A	-1.1341E-02	-1.1937E-02	4.0186E-02	4.0192E-02	4.262E-02
Kr-85	#A	-2.6273E+02	-2.6274E+02	8.8154E+02	8.8167E+02	9.840E+02
Y-88	#B	-1.3422E-03	-1.3847E-03	1.9800E-02	1.9800E-02	2.187E-02
NB-94	#B	9.1815E-03	9.1815E-03	2.3506E-02	2.3512E-02	2.642E-02
Ag-108M	#B	-3.2319E-03	-3.2321E-03	3.4579E-02	3.4580E-02	3.978E-02
CD-109	#A	5.1982E-02	5.2365E-02	1.5688E+00	1.5688E+00	1.744E+00
SN-113	#B	2.0355E-03	2.0951E-03	4.4118E-02	4.4118E-02	4.879E-02
SB-125	#F	1.3762E-01	1.3808E-01	7.6305E-02	7.6725E-02	1.013E-01
I-131	#B	-9.7506E-03	-1.4736E-02	5.1822E-02	5.1829E-02	3.572E-02
CS-134	#B	2.1177E-02	2.1271E-02	1.5962E-02	1.6010E-02	3.825E-02
CS-137	#A	8.9796E-03	8.9823E-03	3.2452E-02	3.2456E-02	3.683E-02
CE-139	#A	-7.1616E-03	-7.3366E-03	4.0831E-02	4.0833E-02	4.441E-02
EU-152	#B	1.5529E-02	1.5540E-02	1.2831E-01	1.2831E-01	1.431E-01
EU-154	#B	-4.2130E-04	-4.2175E-04	9.2708E-02	9.2708E-02	1.038E-01
EU-155	#B	-1.0032E-02	-1.0050E-02	2.1343E-01	2.1343E-01	2.379E-01
HG-203	#B	-3.3492E-04	-3.5966E-04	4.2004E-02	4.2004E-02	4.010E-02
TL-208	#	2.8462E-01	2.8462E-01	6.0218E-02	6.2444E-02	
PB-212		8.1419E-01	8.1419E-01	1.2080E-01	1.2972E-01	
PB-214		4.8996E-01	4.8996E-01	1.0689E-01	1.1061E-01	
BI-212		6.4708E-01	6.4708E-01	3.9628E-01	3.9806E-01	
BI-214		4.0645E-01	4.0645E-01	1.1186E-01	1.1432E-01	
RA-224	A	8.2802E-01	8.2802E-01	9.6231E-01	9.6351E-01	1.044E+00
RA-226	#A	9.5752E-01	9.5753E-01	9.9794E-01	9.9949E-01	1.083E+00
AC-228		7.7310E-01	7.7310E-01	1.4235E-01	1.4926E-01	
TH-227	#B	-9.6671E-02	-9.6671E-02	3.3229E-01	3.3234E-01	3.685E-01
PA-234	#B	-2.4863E-02	-2.4863E-02	2.1893E-01	2.1894E-01	2.154E-01
TH-234	#B	1.7351E+00	1.7351E+00	1.8131E+00	1.8157E+00	6.054E+00
AM-241	#A	-2.7684E-01	-2.7684E-01	1.0361E+00	1.0362E+00	1.136E+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) 1.7717920E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.7717920E+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_1MAY2006_1659.An1

Sample description
FSS-OOL-02-02-006-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1MAY2006_1659.An1

Acquisition information

Start time:	01-May-2006 17:00:09
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:	1.9020E+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	26-Apr-2006 20:40:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2640

***** S U M M A R Y O F P E A K 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	134.	21.35	0.99	9.052E-03	74.81	9.600	1.094E+00	PB212
77.28	209.	14.11	0.99	1.011E-02	77.11	17.500	1.017E+00	PB212
93.15	118.	34.38	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
93.16	110.	36.64	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
93.16	94.	41.61	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
128.95	93.	39.46	1.33	2.436E-02				
186.43	179.	25.26	1.01	2.565E-02	185.99	3.280	1.402E+00	RA226
210.24	126.	27.92	0.90	2.467E-02				
238.86	1193.	3.38	1.09	2.319E-02	238.63	43.100	8.395E-01	PB212
241.88	189.	14.38	1.10	2.303E-02	241.00	3.900	1.495E+00	RA224
					241.92	7.470	7.821E-01	PB214
270.65	123.	22.72	1.25	2.149E-02				
295.31	226.	15.35	1.03	2.024E-02	295.22	19.200	4.063E-01	PB214
300.41	104.	23.08	1.50	2.000E-02				
327.76	127.	22.46	1.35	1.875E-02				
338.54	322.	10.74	1.03	1.830E-02	338.40	12.010	1.036E+00	AC228
352.01	422.	7.58	1.13	1.775E-02	351.99	37.100	4.487E-01	PB214
463.27	124.	20.00	1.37	1.425E-02				
463.27	124.	20.00	1.37	1.425E-02	463.51	10.000	6.161E-01	SB125
511.00	201.	15.75	1.57	1.317E-02	510.72	22.500	4.189E-01	TL208
583.43	495.	6.02	1.31	1.184E-02	583.14	86.000	3.425E-01	TL208

609.56	344.	7.38	1.10	1.144E-02	609.32	46.090	4.542E-01	BI214
727.63	130.	16.29	1.68	9.960E-03	727.17	11.800	7.831E-01	BI212
795.26	57.	29.70	1.52	9.306E-03				
795.26	57.	29.70	1.52	9.306E-03	795.76	85.400	5.131E-02	CS134
861.36	79.	22.95	0.77	8.761E-03				
911.60	275.	7.39	1.46	8.398E-03	911.07	29.000	7.910E-01	AC228
964.46	40.	30.28	1.54	8.053E-03	964.00	14.580	2.368E-01	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
969.50	189.	8.56	1.54	8.022E-03	968.90	17.460	9.591E-01	AC228
1121.07	113.	20.04	1.20	7.208E-03	1120.28	15.040	7.278E-01	BI214
1461.51	1342.	2.84	1.86	5.930E-03	1460.75	10.700	1.481E+01	K40
1765.59	62.	15.76	1.57	5.139E-03	1764.51	15.920	5.080E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
257.08	128.95	528.	135.	0.068	76.64	1.331	AC-228	s
419.64	210.24	488.	126.	0.063	83.77	0.905	TH-227	s
540.45	270.65	286.	123.	0.062	68.15	1.254	AC-228	s
599.97	300.41	223.	104.	0.052	69.23	1.498	PB-212	s
654.66	327.76	262.	127.	0.063	67.39	1.346	AC-228	
1721.76	861.36	76.	79.	0.040	57.63	0.770	TL-208	s
1929.17	964.51	44.	48.	0.024	72.83	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.	134.	0.067	64.05	0.993D
PB-212	153.39	77.11	384.	209.	0.105	42.32	0.995A
PA-234	185.48	93.15	766.	118.	0.059	103.13	1.500s
RA-226	372.01	186.43	705.	166.	0.083	75.79	1.012
PB-212	476.42	238.63	227.	1183.	0.591	10.12	1.093D
RA-224	481.16	241.00	1089.	117.	0.059	124.06	1.095D
PB-214	483.00	241.92	380.	107.	0.053	66.32	1.095A
PB-214	589.76	295.31	382.	222.	0.111	46.06	1.034
AC-228	676.22	338.54	282.	321.	0.160	32.23	1.032s
PB-214	703.15	352.01	236.	416.	0.208	22.73	1.127
SB-125	925.72	463.30	152.	78.	0.039	73.65	1.500s
TL-208	1021.12	511.00	250.	175.	0.087	47.25	1.565s
TL-208	1165.95	583.43	124.	491.	0.246	18.07	1.311
BI-214	1218.22	609.56	117.	337.	0.169	22.13	1.100
BI-212	1454.34	727.63	103.	130.	0.065	48.87	1.683s
CS-134	1589.54	795.24	55.	56.	0.028	69.08	1.500s
AC-228	1822.23	911.60	61.	271.	0.136	22.18	1.456
EU-152	1929.06	965.02	52.	46.	0.023	78.21	1.538s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1936.81	968.90	36.	189.	0.095	25.61	1.541D
BI-214	2241.12	1121.07	110.	111.	0.056	60.11	1.197s
K-40	2921.88	1461.51	45.	1323.	0.661	8.53	1.864
BI-214	3529.93	1765.59	10.	59.	0.029	47.29	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	Peak MDA Value pCi/gm	COMMENTS
BE-7		-2.9681E-04					
			477.56	-2.968E-04	&(	3.044E-01 8.80E-02	G
K-40		1.4808E+01					
			1460.75	1.481E+01	(P	3.807E-01 4.27E-01	G
MN-54		-1.2687E-02					
			834.81	-1.269E-02	%(P	4.334E-02 1.29E-02	G
CO-57		6.1147E-03					
			122.07	6.115E-03	&(P	4.987E-02 1.49E-02	G K
			136.43	-1.137E-01	%	3.919E-01 1.18E-01	G
CO-60		-3.2300E-03					
			1332.51	-3.230E-03	%(P	3.876E-02 1.05E-02	G K
			1173.23	5.928E-03	& P	3.764E-02 1.08E-02	G K
Sr-85		-1.6933E-02					
			514.00	-1.693E-02	%(	4.573E-02 1.38E-02	G
Kr-85		-3.7117E+02					
			513.99	-3.712E+02	%(	1.002E+03 3.02E+02	G
Y-88		-3.5364E-03					
			1836.01	-3.536E-03	&(P	2.916E-02 7.94E-03	G K
			898.02	-1.558E-03	& P	4.457E-02 1.28E-02	G
NB-94		-5.6765E-03					
			871.10	-5.676E-03	%(	3.555E-02 1.03E-02	G K
			702.50	-3.212E-03	%	3.529E-02 1.02E-02	G K
Ag-108M		-2.0825E-02					
			722.95	-2.083E-02	&(	4.870E-02 1.47E-02	G K
			614.37	-3.754E-04	% P	3.776E-02 1.09E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	-3.411E-03	%	3.183E-02	9.32E-03	G
CD-109	1.2301E+00						
		88.04	1.230E+00	&(	1.912E+00	5.83E-01	G
SN-113	-1.0345E-02						
		391.71	-1.034E-02	%(	5.204E-02	1.55E-02	G K
		255.04	2.173E-01	&	1.586E+00	4.72E-01	G
SB-125	9.1362E-02						
		427.95	-1.019E-02	&(P	1.036E-01	3.04E-02	G K
		600.77	-2.608E-02	% P	1.728E-01	5.06E-02	G
		636.15	1.046E-01	% P	2.419E-01	7.28E-02	G
		463.51	3.920E-01	*(P	3.015E-01	9.78E-02	G
		176.29	2.099E-02	&	5.980E-01	1.78E-01	G
I-131	-1.4221E-02						
		364.48	-1.422E-02	%(P	5.899E-02	1.75E-02	G K
		636.97	2.317E-01	%	5.532E-01	1.66E-01	G
		284.29	5.595E-02	% P	7.953E-01	2.35E-01	G
CS-134	1.6928E-02						
		604.66	-1.218E-02	&(	3.681E-02	1.10E-02	G K
		795.76	5.019E-02	@(P	3.351E-02	1.16E-02	G
		569.29	1.435E-02	% P	2.211E-01	6.42E-02	G
		801.84	-8.047E-03	% P	3.786E-01	1.07E-01	G
CS-137	5.6952E-03						
		661.62	5.695E-03	%(P	4.070E-02	1.19E-02	G
CE-139	-1.9220E-02						
		165.85	-1.922E-02	%(	4.816E-02	1.46E-02	G
EU-152	1.0466E-01						
		121.78	1.728E-02	&(P	1.446E-01	4.32E-02	G K
		344.30	-4.561E-02	% P	1.114E-01	3.36E-02	G
		1408.08	2.604E-02	%	1.331E-01	3.78E-02	G
		964.00	2.799E-01	(P	2.189E-01	7.38E-02	G
		1112.07	-1.560E-02	%	3.110E-01	8.91E-02	G
		778.90	5.138E-02	&	1.957E-01	5.73E-02	G
EU-154	1.5847E-03						
		123.10	1.585E-03	&(	1.086E-01	3.24E-02	G K
		1274.80	2.823E-02	%	1.187E-01	3.48E-02	G
		723.30	-9.724E-02	%	2.330E-01	7.03E-02	G
		1004.80	5.736E-03	&	2.454E-01	7.04E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-4.9223E-03						
		86.45	-4.922E-03	&(	2.509E-01	7.49E-02	G K
		105.31	-6.893E-03	%	2.382E-01	7.10E-02	G
HG-203	2.3541E-02						
		279.17	2.354E-02	&(P	3.827E-02	1.17E-02	G K
		72.87	-6.243E-01	% P	2.050E+00	6.17E-01	G
		70.83	-6.412E-01	%	4.626E+00	1.39E+00	G
		82.50	1.583E-01	%	3.279E+00	9.75E-01	G
TL-208	3.4253E-01						
		583.14	3.425E-01	(P	3.807E-02	2.08E-02	G
		510.72	4.189E-01	+ P	1.832E-01	7.61E-02	G
PB-212	8.4054E-01						
		238.63	8.405E-01	(P	5.183E-02	2.86E-02	G K
							Energy duplication
		77.11	8.405E-01	} P	3.773E-01	1.19E-01	G
		74.81	1.094E+00	+ P	7.468E-01	2.39E-01	G
PB-214	4.4040E-01						
		351.99	4.487E-01	(P	8.015E-02	3.45E-02	G K
		295.22	4.063E-01	(P	1.713E-01	6.35E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.783E-01	0.00E+00	G
		241.92	4.404E-01	}	3.866E-01	9.74E-02	G
BI-212	7.8313E-01						
		727.17	7.831E-01	*(P	3.027E-01	1.28E-01	G K
		1620.56	2.016E-02	% P	1.070E+00	2.87E-01	G
		785.42	1.066E+00	%	1.943E+00	5.94E-01	G
BI-214	4.6799E-01						
		609.32	4.542E-01	(P	7.157E-02	3.42E-02	G K
		1764.51	5.080E-01	(P	1.544E-01	8.46E-02	G
		1120.28	7.278E-01	+ P	3.377E-01	1.48E-01	G
RA-224	9.2503E-01						
							Derived Ave Activity
		241.00	9.250E-01	}(	1.236E+00	3.92E-01	G
RA-226	1.4022E+00						
		185.99	1.402E+00	(P	1.067E+00	3.82E-01	G
AC-228	8.9159E-01						
		911.07	7.910E-01	(P	1.138E-01	5.92E-02	G K
		968.90	9.594E-01	(P	1.558E-01	8.20E-02	G
		338.40	1.036E+00	@(P	2.619E-01	1.12E-01	G

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

TH-227      -1.3488E-01
                          236.00-1.349E-01 &(  3.668E-01 1.11E-01 G K
                          256.25-1.098E-01 % P 4.889E-01 1.46E-01 G

PA-234       7.5056E-02
                           98.44-7.383E-02 %(P 2.325E-01 7.01E-02 G K
                          946.00-2.044E-02 & P 2.060E-01 5.97E-02 G
                          131.28-7.296E-02 % P 2.123E-01 6.40E-02 G
                           94.67 3.162E-01 ?(P 3.534E-01 1.09E-01 G
                          883.24-3.683E-02 %   2.793E-01 8.07E-02 G
                          926.70 0.000E+00 &   3.738E-01 1.07E-01 G
                          569.26 2.136E-02 % P 3.265E-01 9.48E-02 G

TH-234      -2.2152E+00
                           63.29-2.215E+00 &(P 6.638E+00 1.99E+00 G K
                           92.80 1.352E+00 & P 2.202E+00 6.68E-01 G
                           92.38 1.865E+00 & P 2.603E+00 7.93E-01 G

AM-241      -1.4468E-01
                           59.54-1.447E-01 %(P 1.031E+00 3.08E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-2.7871E-04	-2.9681E-04	2.6413E-01	2.6413E-01	2.858E-01
K-40		1.4808E+01	1.4808E+01	1.2810E+00	1.5427E+00	
MN-54	#A	-1.2551E-02	-1.2687E-02	4.0389E-02	4.0395E-02	4.288E-02
CO-57	#B	6.0391E-03	6.1147E-03	4.4736E-02	4.4738E-02	4.925E-02
CO-60	#B	-3.2244E-03	-3.2300E-03	7.4632E-01	7.4632E-01	3.869E-02
Sr-85	#A	-1.6077E-02	-1.6933E-02	4.1293E-02	4.1305E-02	4.342E-02
Kr-85	#A	-3.7115E+02	-3.7117E+02	9.0517E+02	9.0542E+02	1.002E+03
Y-88	#B	-3.4267E-03	-3.5364E-03	2.5119E-02	2.5120E-02	2.826E-02
NB-94	#B	-5.6765E-03	-5.6765E-03	3.1028E-02	3.1029E-02	3.555E-02
Ag-108M	#B	-2.0824E-02	-2.0825E-02	4.4102E-02	4.4118E-02	4.870E-02
CD-109	#A	1.2210E+00	1.2301E+00	1.7504E+00	1.7517E+00	1.898E+00
SN-113	#B	-1.0047E-02	-1.0345E-02	4.6359E-02	4.6363E-02	5.054E-02
SB-125	#B	9.1059E-02	9.1362E-02	6.8382E-02	6.8588E-02	1.032E-01
I-131	#B	-9.3632E-03	-1.4221E-02	5.6694E-02	5.6700E-02	3.884E-02
CS-134	#B	1.6853E-02	1.6928E-02	1.1712E-02	1.1753E-02	3.665E-02
CS-137	#A	5.6934E-03	5.6952E-03	3.5584E-02	3.5586E-02	4.069E-02
CE-139	#A	-1.8756E-02	-1.9220E-02	4.3686E-02	4.3700E-02	4.700E-02
EU-152	#B	1.0458E-01	1.0466E-01	8.2815E-02	8.3018E-02	1.445E-01
EU-154	#B	1.5830E-03	1.5847E-03	9.7085E-02	9.7085E-02	1.085E-01
EU-155	#B	-4.9132E-03	-4.9223E-03	2.2475E-01	2.2475E-01	2.504E-01
HG-203	#B	2.1903E-02	2.3541E-02	3.5111E-02	3.5137E-02	3.561E-02
TL-208		3.4253E-01	3.4253E-01	6.2427E-02	6.5518E-02	
PB-212		8.4054E-01	8.4054E-01	8.5937E-02	9.8826E-02	
PB-214		4.4040E-01	4.4040E-01	1.0147E-01	1.0465E-01	
BI-212	#	7.8313E-01	7.8313E-01	3.8415E-01	3.8683E-01	
BI-214		4.6799E-01	4.6799E-01	1.0554E-01	1.0898E-01	
RA-224	A	9.2503E-01	9.2503E-01	1.1476E+00	1.1489E+00	
RA-226		1.4022E+00	1.4022E+00	1.1456E+00	1.1485E+00	
AC-228		8.9159E-01	8.9159E-01	1.3964E-01	1.4892E-01	
TH-227	#B	-1.3488E-01	-1.3488E-01	3.3222E-01	3.3232E-01	3.668E-01
PA-234	#B	7.5056E-02	7.5056E-02	7.7627E-02	7.7739E-02	2.325E-01
TH-234	#B	-2.2152E+00	-2.2152E+00	7.4705E+00	7.4716E+00	6.638E+00
AM-241	#A	-1.4467E-01	-1.4468E-01	9.4535E-01	9.4539E-01	1.031E+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) 2.0901276E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.0901283E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-02-02-019-F

Spectrum Filename: C:\GammaVision\Spectra\103F_6MAY2006_0828.An1

Acquisition information

Start time:	04-May-2006 08:29:49
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:	1.8650E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8650E+03) = 5.3619E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	26-Apr-2006 22:15:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3280

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.52	90.	29.20	0.99	9.100E-03	70.83	3.520	2.899E+00	HG203
					74.81	9.600	7.285E-01	PB212
77.41	237.	12.57	0.99	1.043E-02	77.11	17.500	9.565E-01	PB212
					77.11	10.700	1.564E+00	PB214
87.29	105.	40.75	1.50	1.472E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	1.377E+00	CD109
93.70	98.	39.36	1.25	1.676E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.45	131.	29.82	1.29	2.565E-02	185.99	3.280	PBC<MDA	RA226
209.39	94.	35.35	1.07	2.471E-02				
238.86	1110.	3.57	1.09	2.319E-02	238.63	43.100	7.960E-01	PB212
242.04	173.	16.24	1.10	2.302E-02	241.00	3.900	1.391E+00	RA224
					241.92	7.470	7.279E-01	PB214
270.48	94.	31.20	0.73	2.150E-02				
277.42	62.	33.94	1.05	2.114E-02				
295.48	274.	10.97	1.04	2.024E-02	295.22	19.200	5.022E-01	PB214
300.46	91.	22.00	1.11	2.000E-02				
338.57	220.	16.56	1.35	1.829E-02	338.40	12.010	7.216E-01	AC228
352.04	450.	7.87	1.25	1.775E-02	351.99	37.100	4.889E-01	PB214
409.34	54.	38.45	0.79	1.575E-02				
463.45	64.	25.72	1.36	1.425E-02				
463.45	64.	25.72	1.36	1.425E-02	463.51	10.000	3.217E-01	SB125
511.29	183.	15.01	1.20	1.316E-02	510.72	22.500	3.822E-01	TL208
583.56	401.	6.82	1.24	1.184E-02	583.14	86.000	2.820E-01	TL208
600.69	24.	35.25	1.50	1.151E-02	600.77	18.400	PBC<MDA	SB125
					604.66	97.600	1.587E-02	CS134
609.75	369.	8.47	1.40	1.143E-02	609.32	46.090	4.986E-01	BI214

727.76	95.	21.24	1.64	9.959E-03	727.17	11.800	5.824E-01	BI212
795.80	65.	26.33	1.37	9.301E-03	795.76	85.400	5.962E-02	CS134
861.09	90.	23.30	1.46	8.763E-03				
911.79	249.	8.34	1.84	8.396E-03	911.07	29.000	7.311E-01	AC228
965.21	43.	35.35	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152
968.96	243.	10.85	1.76	8.025E-03	968.90	17.460	1.258E+00	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.98	74.	21.08	1.46	7.208E-03	1120.28	15.040	4.824E-01	BI214
1461.68	1230.	2.90	1.84	5.929E-03	1460.75	10.700	1.383E+01	K40
1765.88	64.	12.96	0.83	5.142E-03	1764.51	15.920	5.694E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
417.94	209.39	438.	94.	0.047	106.04	1.075	AC-228	
540.12	270.48	316.	94.	0.047	93.61	0.735	AC-228	s
600.07	300.46	164.	91.	0.046	65.99	1.106	PB-212	
817.80	409.34	160.	54.	0.027	115.34	0.790	AC-228	
1721.22	861.09	90.	90.	0.045	54.70	1.456	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	320.	124.	0.062	65.01	0.993D
PB-212	153.39	77.11	351.	192.	0.096	38.31	0.995A
CD-109	173.76	87.29	859.	105.	0.052	122.24	1.500
RA-226	371.75	186.30	684.	105.	0.053	97.00	1.500s
PB-212	476.86	238.85	730.	1084.	0.542	14.91	0.962
RA-224	483.01	241.93	742.	148.	0.074	81.64	1.500
PB-214	482.87	241.86	860.	106.	0.053	121.01	1.500s
PB-214	590.10	295.48	255.	269.	0.135	32.90	1.044s
AC-228	676.28	338.57	358.	219.	0.109	49.67	1.350
PB-214	703.22	352.04	274.	444.	0.222	23.61	1.251
SB-125	925.69	463.28	131.	65.	0.032	81.82	1.500
TL-208	1021.69	511.29	195.	156.	0.078	45.02	1.196s
TL-208	1166.21	583.56	116.	396.	0.198	20.45	1.242
CS-134	1200.48	600.69	25.	24.	0.012	105.76	1.500s
BI-214	1218.59	609.75	171.	363.	0.181	25.41	1.398
BI-212	1454.59	727.76	104.	95.	0.047	63.71	1.642
CS-134	1590.15	795.55	65.	46.	0.023	86.61	1.500
AC-228	1822.62	911.79	62.	246.	0.123	25.01	1.845s
EU-152	1929.43	965.21	97.	43.	0.022	106.06	1.538s
AC-228	1936.94	968.96	106.	243.	0.122	32.55	1.762
BI-214	2240.94	1120.98	65.	72.	0.036	63.23	1.462

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2922.22	1461.68	30.	1211.	0.606	8.70	1.841
BI-214	3530.51	1765.88	7.	64.	0.032	38.89	0.831s

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

***** S U M M A R Y O 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		-3.0007E-02					
			477.56	-3.001E-02	&(	3.069E-01 8.95E-02	G
K-40		1.3825E+01					
			1460.75	1.383E+01	(P	3.219E-01 4.07E-01	G
MN-54		1.5322E-02					
			834.81	1.532E-02	%(P	3.223E-02 9.76E-03	G
CO-57		-1.2056E-02					
			122.07	-1.206E-02	%(P	5.233E-02 1.57E-02	G K
			136.43	-4.949E-02	%	4.014E-01 1.20E-01	G
CO-60		-3.0277E-03					
			1332.51	-3.028E-03	%(P	3.298E-02 8.68E-03	G K
			1173.23	-1.240E-03	% P	4.425E-02 1.24E-02	G K
Sr-85		-8.4555E-03					
			514.00	-8.456E-03	&(	4.025E-02 1.19E-02	G
Kr-85		-1.8033E+02					
			513.99	-1.803E+02	&(	8.583E+02 2.55E+02	G
Y-88		-3.3410E-03					
			1836.01	-3.341E-03	%(P	3.174E-02 8.64E-03	G K
			898.02	-2.958E-03	% P	2.968E-02 8.29E-03	G
NB-94		-4.8485E-03					
			871.10	-4.848E-03	%(	3.197E-02 9.24E-03	G K
			702.50	-2.424E-03	%	3.512E-02 1.02E-02	G K
Ag-108M		-4.0666E-03					
			722.95	-4.067E-03	&(	4.022E-02 1.17E-02	G K
			614.37	-1.232E-02	% P	4.402E-02 1.31E-02	G
			433.93	7.966E-03	&	3.246E-02 9.63E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.3766E+00						
		88.04	1.377E+00	(	1.830E+00	5.61E-01	G
SN-113	-5.9234E-03						
		391.71	-5.923E-03	%(	4.805E-02	1.41E-02	G K
		255.04	-9.309E-02	&	1.672E+00	4.95E-01	G
SB-125	8.3697E-02						
		427.95	-6.044E-05	%(P	1.072E-01	3.12E-02	G K
		600.77	2.373E-02	% P	1.556E-01	4.53E-02	G
		636.15	1.621E-02	& P	2.699E-01	7.76E-02	G
		463.51	3.316E-01	(P	2.864E-01	9.22E-02	G
		176.29	1.011E-01	%	5.602E-01	1.68E-01	G
I-131	-1.8875E-02						
		364.48	-1.888E-02	%(P	7.246E-02	2.16E-02	G K
		636.97	-1.296E-01	%	8.885E-01	2.60E-01	G
		284.29	-2.316E-01	% P	1.060E+00	3.17E-01	G
CS-134	2.8101E-02						
		604.66	1.587E-02	?(	1.686E-02	5.59E-03	G K
		795.76	4.208E-02	(P	3.699E-02	1.22E-02	G
		569.29	-6.615E-03	& P	2.376E-01	6.85E-02	G
		801.84	-5.117E-02	% P	3.909E-01	1.11E-01	G
CS-137	8.0382E-03						
		661.62	8.038E-03	%(P	3.813E-02	1.12E-02	G
CE-139	3.4313E-03						
		165.85	3.431E-03	&(	4.865E-02	1.45E-02	G
EU-152	6.4940E-02						
		121.78	-3.519E-02	%(P	1.555E-01	4.67E-02	G K
		344.30	-2.034E-02	% P	1.167E-01	3.46E-02	G
		1408.08	9.801E-02	%	1.481E-01	4.66E-02	G
		964.00	2.658E-01	(P	3.008E-01	9.51E-02	G
		1112.07	3.372E-02	%	2.998E-01	8.64E-02	G
		778.90	-6.288E-03	%	2.956E-01	8.51E-02	G
EU-154	-8.1412E-05						
		123.10	-8.141E-05	%(	9.627E-02	2.86E-02	G K
		1274.80	-2.263E-02	%	1.082E-01	3.14E-02	G
		723.30	-9.868E-02	%	2.277E-01	6.88E-02	G
		1004.80	-2.293E-02	%	2.579E-01	7.47E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	6.6999E-03						
		86.45	6.700E-03	&(	2.487E-01	7.42E-02	G K
							Energy duplication
		105.31	7.310E-02	%	2.277E-01	6.86E-02	G
HG-203	-8.4737E-03						
		279.17	-8.474E-03	&(P	4.681E-02	1.40E-02	G K
		72.87	-2.844E-01	& P	2.416E+00	7.23E-01	G
		70.83	-2.725E+00	%	4.360E+00	1.33E+00	G
		82.50	1.955E-01	&	4.167E+00	1.24E+00	G
TL-208	2.8196E-01						
		583.14	2.820E-01	(P	3.757E-02	1.94E-02	G
		510.72	3.822E-01	+ P	1.656E-01	6.72E-02	G
PB-212	7.8529E-01						
		238.63	7.853E-01	(P	9.323E-02	3.95E-02	G K
							Energy duplication
		77.11	7.853E-01	} P	3.687E-01	1.00E-01	G
		74.81	1.036E+00	+ P	7.175E-01	2.30E-01	G
PB-214	4.8790E-01						
		351.99	4.889E-01	(P	8.779E-02	3.90E-02	G K
		295.22	5.022E-01	*(P	1.436E-01	5.59E-02	G
							Energy duplication
		77.11	7.840E-02	} P	8.738E-01	2.23E-01	G
		241.92	4.464E-01	(	5.874E-01	1.80E-01	G
BI-212	5.8237E-01						
		727.17	5.824E-01	(P	3.102E-01	1.24E-01	G K
		1620.56	7.048E-02	% P	8.316E-01	2.20E-01	G
		785.42	2.467E-02	%	1.719E+00	4.91E-01	G
BI-214	5.1009E-01						
		609.32	4.986E-01	(P	8.751E-02	4.30E-02	G K
		1764.51	5.694E-01	(P	1.305E-01	7.76E-02	G
		1120.28	4.824E-01	(P	2.687E-01	1.04E-01	G
RA-224	1.1957E+00						
		241.00	1.196E+00	(	1.044E+00	3.25E-01	G
RA-226	9.0589E-01						
		185.99	9.059E-01	*(P	1.072E+00	3.29E-01	G
AC-228	7.2835E-01						
		911.07	7.311E-01	(P	1.173E-01	6.18E-02	G K
		968.90	1.258E+00	+ P	2.618E-01	1.37E-01	G
		338.40	7.216E-01	(P	2.996E-01	1.20E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.1613E-01
                          236.00-2.161E-01 %(  3.971E-01 1.21E-01 G K
                          256.25 4.778E-02 & P 4.776E-01 1.42E-01 G

PA-234      -1.3336E-02
                           98.44-1.334E-02 &(P 2.291E-01 6.83E-02 G K
                          946.00-2.882E-02 & P 1.848E-01 5.36E-02 G
                          131.28 3.774E-03 & P 2.021E-01 6.02E-02 G
                           94.67 7.723E-04 & P 4.086E-01 1.22E-01 G
                          883.24 1.771E-02 %   2.309E-01 6.53E-02 G
                          926.70 1.883E-02 &   3.141E-01 8.96E-02 G
                          569.26-9.748E-03 & P 3.501E-01 1.01E-01 G

TH-234       8.1834E-01
                           63.29 8.183E-01 %(P 6.311E+00 1.88E+00 G K
                           92.80 1.539E+00 % P 2.142E+00 6.53E-01 G
                           92.38 1.726E+00 & P 2.565E+00 7.80E-01 G

AM-241      -3.5893E-01
                           59.54-3.589E-01 %(P 1.148E+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
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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	-2.7249E-02	-3.0007E-02	2.6846E-01	2.6847E-01	2.787E-01
K-40		1.3825E+01	1.3825E+01	1.2216E+00	1.4617E+00	
MN-54	#A	1.5071E-02	1.5322E-02	2.9283E-02	2.9297E-02	3.171E-02
CO-57	#B	-1.1829E-02	-1.2056E-02	4.8402E-02	4.8407E-02	5.134E-02
CO-60	#B	-3.0196E-03	-3.0277E-03	1.1345E+02	1.1345E+02	3.289E-02
Sr-85	#A	-7.8102E-03	-8.4555E-03	3.5805E-02	3.5808E-02	3.718E-02
Kr-85	#A	-1.8032E+02	-1.8033E+02	7.6353E+02	7.6360E+02	8.583E+02
Y-88	#B	-3.1835E-03	-3.3410E-03	2.7479E-02	2.7480E-02	3.024E-02
NB-94	#B	-4.8485E-03	-4.8485E-03	2.7718E-02	2.7719E-02	3.197E-02
Ag-108M	#B	-4.0662E-03	-4.0666E-03	3.5061E-02	3.5061E-02	4.021E-02
CD-109	#A	1.3611E+00	1.3766E+00	1.6827E+00	1.6844E+00	1.809E+00
SN-113	#B	-5.6643E-03	-5.9234E-03	4.2415E-02	4.2417E-02	4.595E-02
SB-125	#B	8.3272E-02	8.3697E-02	6.9829E-02	6.9998E-02	1.066E-01
I-131	#B	-9.9498E-03	-1.8875E-02	6.9475E-02	6.9484E-02	3.820E-02
CS-134	#	2.7910E-02	2.8101E-02	1.9222E-02	1.9291E-02	1.674E-02
CS-137	#A	8.0345E-03	8.0382E-03	3.3499E-02	3.3503E-02	3.812E-02
CE-139	#A	3.3052E-03	3.4313E-03	4.3527E-02	4.3528E-02	4.686E-02
EU-152	#B	6.4868E-02	6.4940E-02	6.9747E-02	6.9840E-02	1.553E-01
EU-154	#B	-8.1278E-05	-8.1412E-05	8.5773E-02	8.5773E-02	9.611E-02
EU-155	#B	6.6809E-03	6.6999E-03	2.2275E-01	2.2275E-01	2.480E-01
HG-203	#B	-7.5873E-03	-8.4737E-03	4.2065E-02	4.2068E-02	4.192E-02
TL-208		2.8196E-01	2.8196E-01	5.8274E-02	6.0530E-02	
PB-212		7.8529E-01	7.8529E-01	1.1835E-01	1.2683E-01	
PB-214		4.8790E-01	4.8790E-01	1.1665E-01	1.2004E-01	
BI-212		5.8237E-01	5.8237E-01	3.7296E-01	3.7449E-01	
BI-214		5.1009E-01	5.1009E-01	1.3194E-01	1.3523E-01	
RA-224		1.1957E+00	1.1957E+00	9.7617E-01	9.7864E-01	1.044E+00
RA-226	#A	9.0589E-01	9.0589E-01	9.8689E-01	9.8829E-01	1.072E+00
AC-228		7.2835E-01	7.2835E-01	1.8463E-01	1.8941E-01	
TH-227	#B	-2.1613E-01	-2.1613E-01	3.6219E-01	3.6240E-01	3.971E-01
PA-234	#B	-1.3336E-02	-1.3336E-02	2.5947E-01	2.5947E-01	2.291E-01
TH-234	#B	8.1834E-01	8.1834E-01	5.6450E+00	5.6452E+00	6.311E+00
AM-241	#A	-3.5892E-01	-3.5893E-01	1.0477E+00	1.0479E+00	1.148E+00

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

H - Halflife limit exceeded

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

Total Activity (87.4 to 2000.7 keV) 1.8397022E+01 pCi/gm
Total Decayed Activity (87.4 to 2000.7 keV) 1.8397022E+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_6MAY2006_0907.An1

Sample description
FSS-OOL-02-02-019-F-RC

Spectrum Filename: C:\GammaVision\Spectra\103F_6MAY2006_0907.An1

Acquisition information

Start time:	04-May-2006 09:07:58
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:	1.8650E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8650E+03) = 5.3619E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	26-Apr-2006 22:15:00
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. 20 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2960

***** S U M M A R Y O F P E A K 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	147.	18.94	0.99	9.052E-03	74.81	9.600	1.229E+00	PB212
77.24	150.	16.32	0.99	1.011E-02	77.11	17.500	7.851E-01	PB212
					77.11	10.700	1.284E+00	PB214
93.07	106.	34.80	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.08	103.	36.10	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.29	179.	21.00	1.15	2.566E-02	185.99	3.280	1.433E+00	RA226
209.75	81.	38.88	1.01	2.469E-02				
238.82	1118.	3.52	1.09	2.319E-02	238.63	43.100	8.018E-01	PB212
242.42	153.	17.82	1.10	2.299E-02	241.00	3.900	1.232E+00	RA224
					241.92	7.470	6.446E-01	PB214
270.16	100.	29.32	1.49	2.152E-02				
277.66	50.	38.86	1.00	2.113E-02				
277.66	50.	38.86	1.00	2.113E-02	279.17	81.500	PBC<MDA	HG203
295.32	289.	11.14	0.83	2.024E-02	295.22	19.200	5.303E-01	PB214
300.49	72.	33.24	1.68	1.999E-02				
328.60	94.	25.82	0.80	1.872E-02				
338.44	300.	13.40	1.14	1.830E-02	338.40	12.010	9.870E-01	AC228
352.10	486.	7.86	1.15	1.775E-02	351.99	37.100	5.280E-01	PB214
409.26	74.	31.20	1.13	1.575E-02				
463.27	99.	17.58	1.16	1.425E-02				
463.27	99.	17.58	1.16	1.425E-02	463.51	10.000	5.016E-01	SB125
511.05	175.	15.76	1.49	1.317E-02	510.72	22.500	3.624E-01	TL208
583.48	405.	6.74	1.32	1.184E-02	583.14	86.000	2.852E-01	TL208
609.74	378.	6.50	1.29	1.143E-02	609.32	46.090	5.102E-01	BI214
727.62	107.	21.37	1.26	9.960E-03	727.17	11.800	6.532E-01	BI212

785.05	44.	28.68	1.65	9.394E-03	785.42	2.000	1.705E+00	BI212
795.42	53.	36.08	1.48	9.304E-03				
795.42	53.	36.08	1.48	9.304E-03	795.76	85.400	4.842E-02	CS134
860.58	75.	27.80	1.13	8.767E-03				
911.81	249.	9.07	1.32	8.396E-03	911.07	29.000	7.311E-01	AC228
965.01	60.	17.57	1.54	8.049E-03				
969.67	146.	9.98	1.54	8.021E-03	968.90	17.460	7.564E-01	AC228
1120.46	98.	19.98	1.71	7.211E-03	1120.28	15.040	6.454E-01	BI214
1461.65	1194.	2.98	1.96	5.929E-03	1460.75	10.700	1.342E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1621.12	16.	38.33	0.73	5.488E-03	1620.56	2.750	PBC<MDA	BI212
1765.57	76.	12.12	1.39	5.139E-03	1764.51	15.920	6.473E-01	BI214

********** U N I D E N T I F I E D P E A K S U 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	209.75	414.	81.	0.041	116.64	1.014	NP-239
539.47	270.16	318.	100.	0.050	87.95	1.489	AC-228 s
600.13	300.49	217.	72.	0.036	99.72	1.679	PB-212 s
656.35	328.60	204.	94.	0.047	77.47	0.805	RH-106M s
817.65	409.26	170.	74.	0.037	93.60	1.129	AC-228 s
1720.19	860.58	93.	75.	0.038	64.53	1.125	TL-208
1930.44	965.09	30.	55.	0.028	58.27	1.539	AC-228 D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	334.	147.	0.074	56.81	0.993D
PB-212	153.39	77.11	397.	150.	0.075	48.97	0.995A
TH-234	185.31	93.07	879.	106.	0.053	104.41	1.500
RA-226	371.84	186.34	677.	157.	0.079	68.30	1.500s
PB-212	476.85	238.85	706.	1058.	0.529	15.04	1.002
RA-224	482.76	241.80	738.	157.	0.079	77.07	1.500
PB-214	483.33	242.09	807.	113.	0.056	110.38	1.500s
PB-214	589.78	295.32	290.	285.	0.142	33.41	0.834
AC-228	676.02	338.44	379.	299.	0.150	40.20	1.138
PB-214	703.33	352.10	300.	480.	0.240	23.58	1.152
SB-125	925.76	463.32	130.	90.	0.045	61.21	1.500
TL-208	1021.21	511.05	204.	148.	0.074	47.27	1.485
TL-208	1166.07	583.48	122.	401.	0.200	20.23	1.324
BI-214	1218.58	609.74	90.	371.	0.186	19.50	1.287
BI-212	1454.32	727.62	118.	106.	0.053	64.10	1.259s
BI-212	1569.16	785.05	45.	44.	0.022	86.04	1.651s
CS-134	1590.07	795.51	63.	37.	0.019	102.23	1.500
AC-228	1822.65	911.81	80.	246.	0.123	27.20	1.319
AC-228	1936.81	968.90	32.	146.	0.073	29.82	1.541D
BI-214	2239.89	1120.46	84.	97.	0.048	59.94	1.707s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2922.17	1461.65	36.	1175.	0.588	8.95	1.956
BI-212	3241.05	1621.12	8.	16.	0.008	115.00	0.734s
BI-214	3529.89	1765.57	6.	73.	0.037	36.36	1.394s

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

***** S U M M A R Y O 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		1.3436E-02					
			477.56	1.344E-02	&(	3.243E-01 9.42E-02	G
K-40		1.3417E+01					
			1460.75	1.342E+01	(P	3.489E-01 4.07E-01	G
MN-54		-1.1683E-03					
			834.81	-1.168E-03	%(P	4.162E-02 1.20E-02	G
CO-57		-1.7040E-03					
			122.07	-1.704E-03	&(P	4.429E-02 1.32E-02	G K
			136.43	6.343E-02	%	3.710E-01 1.11E-01	G
CO-60		-3.3967E-03					
			1332.51	-3.397E-03	%(P	3.833E-02 1.04E-02	G K
			1173.23	-1.627E-02	% P	4.934E-02 1.45E-02	G K
Sr-85		-6.0224E-03					
			514.00	-6.022E-03	%(	3.756E-02 1.11E-02	G
Kr-85		-1.2838E+02					
			513.99	-1.284E+02	%(	8.006E+02 2.36E+02	G
Y-88		-4.1500E-03					
			1836.01	-4.150E-03	%(P	2.835E-02 7.73E-03	G K
			898.02	-1.151E-02	% P	4.089E-02 1.20E-02	G
NB-94		6.5890E-03					
			871.10	6.589E-03	%(	2.666E-02 7.77E-03	G K
			702.50	1.075E-02	%	3.354E-02 9.99E-03	G K
Ag-108M		-1.4479E-03					
			722.95	-1.448E-03	%(	4.134E-02 1.19E-02	G K
			614.37	-1.358E-02	% P	4.193E-02 1.25E-02	G
			433.93	-1.143E-04	%	3.339E-02 9.69E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.0377E+00						
		88.04	1.038E+00	%(	1.913E+00	5.82E-01	G
SN-113	-6.9760E-05						
		391.71	-6.976E-05	%(	4.622E-02	1.34E-02	G K
		255.04	-4.761E-01	%	1.641E+00	4.93E-01	G
SB-125	1.3656E-01						
		427.95	2.658E-02	&(P	1.004E-01	2.99E-02	G K
		600.77	-1.604E-02	& P	1.591E-01	4.61E-02	G
		636.15	5.995E-02	& P	2.422E-01	7.11E-02	G
		463.51	4.621E-01	(P	2.858E-01	9.56E-02	G
		176.29	-1.021E-01	%	5.392E-01	1.61E-01	G
I-131	-1.9499E-02						
		364.48	-1.950E-02	%(P	7.213E-02	2.15E-02	G K
		636.97	1.814E-01	&	8.126E-01	2.39E-01	G
		284.29	2.184E-01	% P	8.573E-01	2.56E-01	G
CS-134	-2.2843E-02						
		604.66	-2.284E-02	&(	3.907E-02	1.20E-02	G K
		795.76	3.441E-02	+ P	3.651E-02	1.18E-02	G
		569.29	-1.683E-02	& P	2.159E-01	6.22E-02	G
		801.84	3.971E-02	% P	4.077E-01	1.17E-01	G
CS-137	1.8350E-02						
		661.62	1.835E-02	%(P	4.068E-02	1.23E-02	G
CE-139	1.0250E-02						
		165.85	1.025E-02	&(	4.075E-02	1.22E-02	G
EU-152	1.3394E-02						
		121.78	1.339E-02	&(P	1.406E-01	4.20E-02	G K
		344.30	-9.492E-03	% P	1.162E-01	3.42E-02	G
		1408.08	0.000E+00	%	1.229E-01	3.27E-02	G
		964.00	4.589E-02	% P	1.967E-01	5.70E-02	G
		1112.07	7.564E-02	%	2.983E-01	8.77E-02	G
		778.90	3.909E-04	%	2.589E-01	7.37E-02	G
EU-154	-9.6607E-03						
		123.10	-9.661E-03	&(	1.055E-01	3.15E-02	G K
		1274.80	-6.141E-03	%	1.154E-01	3.27E-02	G
		723.30	-4.972E-03	%	1.619E-01	4.63E-02	G
		1004.80	-4.109E-02	%	2.074E-01	6.04E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-1.8425E-02						
		86.45	-1.842E-02	&(	2.402E-01	7.18E-02	G K
		105.31	4.627E-02	%	2.254E-01	6.76E-02	G
HG-203	-4.6727E-03						
		279.17	-4.673E-03	&(P	3.992E-02	1.18E-02	G K
		72.87	-8.827E-01	% P	2.196E+00	6.64E-01	G
		70.83	-2.141E+00	%	4.398E+00	1.33E+00	G
		82.50	-1.406E+00	%	4.274E+00	1.29E+00	G
TL-208	2.8516E-01						
		583.14	2.852E-01	(P	3.856E-02	1.94E-02	G
		510.72	3.624E-01	+ P	1.693E-01	6.74E-02	G
PB-212	7.7183E-01						
		238.63	7.664E-01	(P	9.172E-02	3.89E-02	G K
							Energy duplication
		77.11	6.161E-01	} P	3.913E-01	1.01E-01	G
		74.81	1.229E+00	+ P	7.324E-01	2.38E-01	G
PB-214	5.2262E-01						
		351.99	5.280E-01	(P	9.178E-02	4.20E-02	G K
		295.22	5.303E-01	(P	1.531E-01	5.99E-02	G
							Energy duplication
		77.11	6.769E-02	} P	9.186E-01	2.23E-01	G
		241.92	4.760E-01	?(	5.693E-01	1.75E-01	G
BI-212	6.7094E-01						
		727.17	6.532E-01	@(P	3.286E-01	1.40E-01	G K
		1620.56	7.469E-01	(P	7.803E-01	2.87E-01	G
		785.42	1.705E+00	+	1.307E+00	4.89E-01	G
BI-214	5.1018E-01						
		609.32	5.102E-01	(P	6.440E-02	3.38E-02	G K
		1764.51	6.473E-01	+ P	1.239E-01	8.20E-02	G
		1120.28	6.454E-01	+ P	3.041E-01	1.31E-01	G
RA-224	1.2665E+00						
		241.00	1.267E+00	(	1.041E+00	3.25E-01	G
RA-226	1.3514E+00						
		185.99	1.351E+00	*(P	1.067E+00	3.33E-01	G
AC-228	7.3950E-01						
		911.07	7.311E-01	(P	1.321E-01	6.72E-02	G K
		968.90	7.534E-01	(P	1.509E-01	7.50E-02	G
		338.40	9.870E-01	+ P	3.078E-01	1.33E-01	G

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

TH-227      -1.3668E-01
                          236.00-1.367E-01 %(  3.837E-01 1.16E-01 G K
                          256.25 9.196E-02 & P 4.664E-01 1.39E-01 G

PA-234      -3.2346E-03
                           98.44-3.235E-03 %(P 2.169E-01 6.45E-02 G K
                          946.00-2.953E-03 & P 1.725E-01 4.88E-02 G
                          131.28-1.949E-02 % P 2.101E-01 6.27E-02 G
                           94.67-1.276E-01 % P 4.016E-01 1.21E-01 G
                          883.24 1.633E-02 %   2.414E-01 6.83E-02 G
                          926.70-9.942E-04 &   2.361E-01 6.52E-02 G
                          569.26-1.944E-02 & P 3.169E-01 9.11E-02 G

TH-234       8.5643E-01
                           63.29 3.202E-01 %(P 6.502E+00 1.93E+00 G K
                           92.80 1.553E+00  (P 2.068E+00 6.31E-01 G
                           92.38 1.786E+00 % P 2.478E+00 7.55E-01 G

AM-241      -8.6117E-02
                           59.54-8.612E-02 %(P 1.061E+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	1.2197E-02	1.3436E-02	2.8272E-01	2.8272E-01	2.944E-01
K-40		1.3417E+01	1.3417E+01	1.2199E+00	1.4474E+00	
MN-54	#A	-1.1491E-03	-1.1683E-03	6.0026E-02	6.0027E-02	4.094E-02
CO-57	#B	-1.6717E-03	-1.7040E-03	4.7574E-02	4.7574E-02	4.346E-02
CO-60	#B	-3.3876E-03	-3.3967E-03	5.4449E-01	5.4449E-01	3.823E-02
Sr-85	#A	-5.5612E-03	-6.0224E-03	3.3200E-02	3.3201E-02	3.468E-02
Kr-85	#A	-1.2838E+02	-1.2838E+02	7.0777E+02	7.0781E+02	8.006E+02
Y-88	#B	-3.9537E-03	-4.1500E-03	2.4312E-02	2.4313E-02	2.701E-02
NB-94	#B	6.5890E-03	6.5890E-03	2.3304E-02	2.3307E-02	2.666E-02
Ag-108M	#B	-1.4478E-03	-1.4479E-03	3.5812E-02	3.5812E-02	4.134E-02
CD-109	#A	1.0259E+00	1.0377E+00	1.7450E+00	1.7460E+00	1.892E+00
SN-113	#B	-6.6698E-05	-6.9760E-05	4.0300E-02	4.0300E-02	4.419E-02
SB-125	#F	1.3587E-01	1.3656E-01	8.4772E-02	8.5142E-02	9.988E-02
I-131	#B	-1.0255E-02	-1.9499E-02	6.9054E-02	6.9063E-02	3.793E-02
CS-134	#B	-2.2687E-02	-2.2843E-02	3.5882E-02	3.5906E-02	3.881E-02
CS-137	#A	1.8341E-02	1.8350E-02	3.6788E-02	3.6804E-02	4.066E-02
CE-139	#A	9.8725E-03	1.0250E-02	3.6666E-02	3.6671E-02	3.925E-02
EU-152	#B	1.3379E-02	1.3394E-02	1.2587E-01	1.2588E-01	1.405E-01
EU-154	#B	-9.6447E-03	-9.6607E-03	9.4517E-02	9.4519E-02	1.053E-01
EU-155	#B	-1.8372E-02	-1.8425E-02	2.1539E-01	2.1540E-01	2.395E-01
HG-203	#B	-4.1822E-03	-4.6727E-03	3.5733E-02	3.5734E-02	3.573E-02
TL-208		2.8516E-01	2.8516E-01	5.8317E-02	6.0622E-02	
PB-212		7.7183E-01	7.7183E-01	1.1739E-01	1.2565E-01	
PB-214		5.2262E-01	5.2262E-01	1.2470E-01	1.2834E-01	
BI-212		6.7094E-01	6.7094E-01	4.3205E-01	4.3380E-01	
BI-214		5.1018E-01	5.1018E-01	1.0121E-01	1.0546E-01	
RA-224		1.2665E+00	1.2665E+00	9.7607E-01	9.7884E-01	1.041E+00
RA-226	#	1.3514E+00	1.3514E+00	9.9912E-01	1.0022E+00	1.067E+00
AC-228		7.3950E-01	7.3950E-01	1.5023E-01	1.5625E-01	
TH-227	#B	-1.3668E-01	-1.3668E-01	3.4741E-01	3.4750E-01	3.837E-01
PA-234	#B	-3.2346E-03	-3.2346E-03	5.5613E-01	5.5613E-01	2.169E-01
TH-234	#B	8.5643E-01	8.5643E-01	1.0434E+00	1.0444E+00	6.502E+00
AM-241	#A	-8.6114E-02	-8.6117E-02	9.8682E-01	9.8683E-01	1.061E+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) 1.8183432E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.8183432E+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_20JUL2006_1716.An1

Sample description
FSS-OOL-02-02-010-R

Spectrum Filename: C:\GammaVision\Spectra\103F_20JUL2006_1716.An1

Acquisition information
Start time: 20-Jul-2006 17:16:39
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: 1.7960E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7960E+03) =
5.5679E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	18-Jul-2006 22:15:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1566

***** S U M M A R Y O F P E A K 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	121.	22.64	0.99	9.052E-03	74.81	9.600	1.052E+00	PB212
77.24	155.	15.05	0.99	1.011E-02	77.11	17.500	8.709E-01	PB212
					77.11	10.700	1.424E+00	PB214
93.05	118.	24.75	1.00	1.654E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.35	160.	25.64	1.36	2.565E-02	185.99	3.280	1.314E+00	RA226
209.26	93.	30.17	1.08	2.471E-02				
238.81	1178.	3.42	1.09	2.319E-02	238.63	43.100	8.777E-01	PB212
241.99	160.	17.18	1.10	2.302E-02	241.00	3.900	1.335E+00	RA224
					241.92	7.470	6.986E-01	PB214
270.81	105.	27.52	1.61	2.148E-02				
295.36	235.	9.54	1.13	2.025E-02	295.22	19.200	4.465E-01	PB214
300.01	89.	21.34	1.13	2.002E-02				
338.44	217.	10.60	1.06	1.830E-02	338.40	12.010	7.391E-01	AC228
351.99	431.	7.61	1.27	1.775E-02	351.99	37.100	4.856E-01	PB214
463.02	80.	23.52	1.16	1.426E-02				
463.02	80.	23.52	1.16	1.426E-02	463.51	10.000	4.173E-01	SB125
510.95	173.	17.67	0.97	1.317E-02	510.72	22.500	3.710E-01	TL208
583.45	396.	7.52	1.32	1.184E-02	583.14	86.000	2.897E-01	TL208
609.49	375.	8.52	1.26	1.144E-02	609.32	46.090	5.255E-01	BI214
661.79	79.	29.44	1.15	1.072E-02	661.62	84.620	6.404E-02	CS137
727.88	97.	17.17	1.79	9.957E-03	727.17	11.800	6.156E-01	BI212
794.31	79.	24.62	1.25	9.314E-03				
794.31	79.	24.62	1.25	9.314E-03	795.76	85.400	7.525E-02	CS134
911.58	276.	7.79	1.36	8.398E-03	911.07	29.000	8.420E-01	AC228
969.02	200.	10.32	1.20	8.025E-03	968.90	17.460	1.076E+00	AC228
1120.58	101.	18.64	1.70	7.210E-03	1120.28	15.040	6.882E-01	BI214

1238.25	53.	37.47	0.90	6.701E-03				
1461.33	1288.	2.91	1.87	5.930E-03	1460.75	10.700	1.505E+01	K40
1764.71	67.	14.95	2.36	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	
417.67	209.26	347.	93.	0.047	90.50	1.078	AC-228	
540.77	270.81	307.	105.	0.053	82.55	1.612	AC-228	s
599.01	299.93	184.	86.	0.043	75.53	1.138	TH-227	
1322.66	661.79	134.	79.	0.039	88.33	1.152	CS-137	l
2475.44	1238.25	109.	53.	0.026	112.40	0.901	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	339.	121.	0.061	67.91	0.993D
PB-212	153.39	77.11	353.	155.	0.078	45.14	0.995A
TH-234	185.48	93.15	896.	125.	0.063	91.60	1.500s
TH-234	185.45	93.14	877.	127.	0.063	89.85	1.500s
RA-226	371.73	186.28	723.	150.	0.075	73.41	1.500s
PB-212	476.42	238.63	237.	1168.	0.584	10.26	1.093D
PB-214	483.00	241.92	348.	108.	0.054	60.60	1.095A
PB-214	589.72	295.28	208.	231.	0.115	33.38	1.186
AC-228	676.02	338.44	157.	216.	0.108	31.80	1.059
PB-214	703.13	351.99	228.	425.	0.213	22.84	1.267
SB-125	925.13	463.00	143.	75.	0.038	74.33	1.500s
TL-208	1021.01	510.95	232.	146.	0.073	53.00	0.974s
TL-208	1166.01	583.45	154.	392.	0.196	22.57	1.316
BI-214	1218.08	609.49	172.	368.	0.184	25.56	1.258
BI-212	1454.84	727.88	67.	96.	0.048	51.51	1.789s
CS-134	1589.62	795.28	85.	47.	0.023	94.04	1.500
AC-228	1822.18	911.58	65.	273.	0.136	23.36	1.363
AC-228	1937.04	969.02	74.	200.	0.100	30.97	1.198
BI-214	2240.13	1120.58	84.	99.	0.050	55.91	1.697
K-40	2921.52	1461.33	43.	1269.	0.635	8.74	1.875
BI-214	3528.18	1764.71	13.	67.	0.034	44.84	2.365s

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

***** S U M M A R Y O 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		1.1504E-01					
			477.56	1.150E-01	%(	3.087E-01 9.27E-02	G
K-40		1.5046E+01					
			1460.75	1.505E+01	(P	3.932E-01 4.45E-01	G
MN-54		1.2205E-02					
			834.81	1.220E-02	%(P	3.598E-02 1.07E-02	G
CO-57		4.8263E-03					
			122.07	4.826E-03	&(P	5.278E-02 1.58E-02	G K
			136.43	-4.952E-02	&	4.210E-01 1.26E-01	G
CO-60		1.3022E-02					
			1332.51	1.302E-02	%(P	3.808E-02 1.11E-02	G K
			1173.23	-4.099E-04	& P	4.614E-02 1.30E-02	G K
Sr-85		-5.6852E-03					
			514.00	-5.685E-03	%(	4.141E-02 1.22E-02	G
Kr-85		-1.2865E+02					
			513.99	-1.286E+02	%(	9.377E+02 2.77E+02	G
Y-88		-3.5366E-03					
			1836.01	-3.537E-03	&(P	3.151E-02 8.59E-03	G K
			898.02	2.139E-03	& P	3.614E-02 1.03E-02	G
NB-94		5.0532E-03					
			871.10	5.053E-03	%(	3.269E-02 9.44E-03	G K
			702.50	5.161E-03	%	3.223E-02 9.38E-03	G K
Ag-108M		1.8143E-03					
			722.95	1.814E-03	%(	3.156E-02 8.98E-03	G K
			614.37	-2.396E-02	& P	4.282E-02 1.31E-02	G
			433.93	1.029E-02	&	3.049E-02 9.11E-03	G
CD-109		3.0942E-01					
			88.04	3.094E-01	%(	1.676E+00 5.02E-01	G
SN-113		4.6291E-03					
			391.71	4.629E-03	%(	5.228E-02 1.54E-02	G K
			255.04	-4.446E-01	%	1.705E+00 5.11E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0034E-01						
		427.95	-4.451E-04	%(P	9.243E-02	2.67E-02	G K
		600.77	-6.752E-02	% P	2.043E-01	6.11E-02	G
		636.15	-2.465E-02	% P	3.026E-01	8.73E-02	G
		463.51	3.987E-01	*(P	3.094E-01	1.00E-01	G
		176.29	1.087E-01	%	4.644E-01	1.39E-01	G
I-131	9.3391E-03						
		364.48	9.339E-03	%(P	4.206E-02	1.25E-02	G K
		636.97	6.635E-02	%	4.937E-01	1.43E-01	G
		284.29	-3.485E-02	% P	5.066E-01	1.49E-01	G
CS-134	1.7515E-02						
		604.66	-6.099E-03	%(	3.016E-02	8.83E-03	G K
		795.76	4.450E-02	(P	4.336E-02	1.40E-02	G
		569.29	-6.834E-03	& P	2.348E-01	6.75E-02	G
		801.84	1.761E-02	& P	3.615E-01	1.02E-01	G
CS-137	2.6071E-02						
		661.62	2.607E-02	%(P	4.589E-02	1.40E-02	G
CE-139	1.4315E-03						
		165.85	1.431E-03	%(	4.745E-02	1.41E-02	G
EU-152	1.3339E-02						
		121.78	1.334E-02	%(P	1.542E-01	4.60E-02	G K
		344.30	2.269E-02	% P	9.643E-02	2.86E-02	G
		1408.08	5.530E-02	%	1.455E-01	4.33E-02	G
		964.00	1.946E-01	% P	2.985E-01	9.22E-02	G
		1112.07	-2.359E-03	%	3.611E-01	1.03E-01	G
		778.90	-3.782E-02	&	2.849E-01	8.28E-02	G
EU-154	2.9821E-03						
		123.10	2.982E-03	&(	9.391E-02	2.79E-02	G K
		1274.80	-1.198E-02	%	1.344E-01	3.86E-02	G
		723.30	-1.156E-01	%	2.378E-01	7.22E-02	G
		1004.80	-3.525E-02	&	2.545E-01	7.40E-02	G
EU-155	1.6136E-01						
		86.45	1.614E-01	%(	2.317E-01	7.09E-02	G K
		105.31	4.567E-02	&	2.443E-01	7.33E-02	G
HG-203	7.9992E-03						
		279.17	7.999E-03	&(P	4.021E-02	1.20E-02	G K
		72.87	-6.202E-02	% P	2.093E+00	6.23E-01	G
		70.83	5.290E-02	&	3.785E+00	1.12E+00	G
		82.50	1.470E-01	&	4.205E+00	1.26E+00	G

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

TL-208       2.8969E-01
                          583.14 2.897E-01  (P 4.469E-02 2.20E-02 G
                          510.72 3.710E-01 + P 1.870E-01 7.76E-02 G

PB-212       8.7658E-01
                          238.63 8.789E-01  (P 5.597E-02 3.04E-02 G K
                                                          Energy duplication
                           77.11 6.594E-01 } P 3.838E-01 9.92E-02 G
                           74.81 1.052E+00 + P 7.658E-01 2.44E-01 G

PB-214       4.7255E-01
                          351.99 4.856E-01  (P 8.347E-02 3.75E-02 G K
                          295.22 4.470E-01  (P 1.353E-01 5.06E-02 G
                                                          Energy duplication
                           77.11 1.124E-01 } P 9.365E-01 2.25E-01 G
                          241.92 4.725E-01 }   3.921E-01 9.55E-02 G

BI-212       6.1562E-01
                          727.17 6.156E-01 @(P 2.610E-01 1.06E-01 G K
                         1620.56 2.132E-01 % P 1.027E+00 2.89E-01 G
                          785.42-3.614E-01 %   1.777E+00 5.20E-01 G

BI-214       5.4900E-01
                          609.32 5.255E-01  (P 9.103E-02 4.56E-02 G K
                         1764.51 6.170E-01 @(P 1.786E-01 9.67E-02 G
                         1120.28 6.882E-01 + P 3.147E-01 1.31E-01 G

RA-224       9.0728E-01
                                                          Derived Ave Activity
                          241.00 9.073E-01 }(  1.277E+00 4.03E-01 G

RA-226       1.3376E+00
                          185.99 1.338E+00 @(P 1.144E+00 3.56E-01 G

AC-228       8.1185E-01
                          911.07 8.420E-01  (P 1.247E-01 6.64E-02 G K
                          968.90 1.076E+00 + P 2.293E-01 1.11E-01 G
                          338.40 7.391E-01  (P 2.092E-01 7.87E-02 G

TH-227      -2.3688E-01
                          236.00-2.369E-01 %(  4.267E-01 1.30E-01 G K
                          256.25-1.723E-04 & P 4.958E-01 1.46E-01 G

PA-234       5.2089E-02
                           98.44 5.209E-02 %(P 2.277E-01 6.84E-02 G K
                          946.00-1.717E-02 % P 1.812E-01 5.19E-02 G
                          131.28 3.070E-02 & P 2.187E-01 6.55E-02 G
                           94.67-1.180E-01 % P 4.278E-01 1.29E-01 G
                          883.24 5.705E-02 %   3.070E-01 8.95E-02 G
```

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          926.70-8.862E-03 &   3.615E-01 1.03E-01 G
                          569.26-1.012E-02 & P 3.478E-01 1.00E-01 G

TH-234       1.7982E+00
                           63.29 1.402E+00 %(P 6.576E+00 1.97E+00 G K
                           92.80 1.929E+00 *(P 2.146E+00 6.58E-01 G
                           92.38 2.247E+00 *(P 2.554E+00 7.83E-01 G

AM-241      -3.6351E-01
                           59.54-3.635E-01 %(P 1.187E+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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	1.1240E-01	1.1504E-01	2.7798E-01	2.7806E-01	3.016E-01
K-40		1.5046E+01	1.5046E+01	1.3344E+00	1.5949E+00	
MN-54	#A	1.2156E-02	1.2205E-02	3.2114E-02	3.2122E-02	3.583E-02
CO-57	#B	4.8042E-03	4.8263E-03	4.7295E-02	4.7296E-02	5.254E-02

CO-60	#B	1.3014E-02	1.3022E-02	3.3362E-02	3.3370E-02	3.805E-02
Sr-85	#A	-5.5773E-03	-5.6852E-03	3.6657E-02	3.6659E-02	4.062E-02
Kr-85	#A	-1.2864E+02	-1.2865E+02	8.3016E+02	8.3020E+02	9.377E+02
Y-88	#B	-3.4957E-03	-3.5366E-03	2.7235E-02	2.7236E-02	3.115E-02
NB-94	#B	5.0532E-03	5.0532E-03	2.8333E-02	2.8334E-02	3.269E-02
Ag-108M	#B	1.8142E-03	1.8143E-03	2.6941E-02	2.6941E-02	3.156E-02
CD-109	#A	3.0857E-01	3.0942E-01	1.5049E+00	1.5050E+00	1.671E+00
SN-113	#B	4.5794E-03	4.6291E-03	4.6133E-02	4.6134E-02	5.172E-02
SB-125	#F	1.0022E-01	1.0034E-01	7.5847E-02	7.6070E-02	9.232E-02
I-131	#B	8.0017E-03	9.3391E-03	3.7427E-02	3.7431E-02	3.604E-02
CS-134	#B	1.7486E-02	1.7515E-02	1.6502E-02	1.6534E-02	3.011E-02
CS-137	#A	2.6068E-02	2.6071E-02	4.2011E-02	4.2038E-02	4.589E-02
CE-139	#A	1.4186E-03	1.4315E-03	4.2356E-02	4.2356E-02	4.702E-02
EU-152	#B	1.3336E-02	1.3339E-02	1.3811E-01	1.3811E-01	1.542E-01
EU-154	#B	2.9809E-03	2.9821E-03	8.3679E-02	8.3679E-02	9.387E-02
EU-155	#B	1.6125E-01	1.6136E-01	2.1256E-01	2.1275E-01	2.315E-01
HG-203	#B	7.7887E-03	7.9992E-03	3.5951E-02	3.5954E-02	3.915E-02
TL-208		2.8969E-01	2.8969E-01	6.6102E-02	6.8209E-02	
PB-212		8.7658E-01	8.7658E-01	9.0879E-02	1.0416E-01	
PB-214		4.7255E-01	4.7255E-01	1.0937E-01	1.1276E-01	
BI-212	#	6.1562E-01	6.1562E-01	3.1876E-01	3.2076E-01	
BI-214		5.4900E-01	5.4900E-01	1.4281E-01	1.4632E-01	
RA-224	A	9.0728E-01	9.0728E-01	1.1831E+00	1.1843E+00	
RA-226	#	1.3376E+00	1.3376E+00	1.0669E+00	1.0697E+00	1.144E+00
AC-228		8.1185E-01	8.1185E-01	1.6139E-01	1.6813E-01	
TH-227	#B	-2.3688E-01	-2.3688E-01	3.8936E-01	3.8960E-01	4.267E-01
PA-234	#B	5.2089E-02	5.2089E-02	2.0506E-01	2.0508E-01	2.277E-01
TH-234	#B	1.7982E+00	1.7982E+00	1.8410E+00	1.8437E+00	6.576E+00
AM-241	#A	-3.6350E-01	-3.6351E-01	1.0827E+00	1.0829E+00	1.187E+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 (270.4 to 2000.7 keV) 1.9569010E+01 pCi/gm
Total Decayed Activity (270.4 to 2000.7 keV) 1.9569010E+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_20JUL2006_1753.An1

Sample description
FSS-OOL-02-02-009-R

Spectrum Filename: C:\GammaVision\Spectra\103F_20JUL2006_1753.An1

Acquisition information
Start time: 20-Jul-2006 17:53:24
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: 1.9870E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9870E+03) =
5.0327E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	18-Jul-2006 22:08:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1952

***** S U M M A R Y O F P E A K 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.	21.60	0.99	9.052E-03	74.81	9.600	1.064E+00	PB212
77.22	221.	11.61	0.99	1.011E-02	77.11	17.500	1.033E+00	PB212
					77.11	10.700	1.690E+00	PB214
93.17	105.	38.95	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.97	209.	19.89	1.53	2.567E-02				
185.97	209.	19.89	1.53	2.567E-02	185.99	3.280	1.587E+00	RA226
209.57	127.	30.07	1.09	2.470E-02				
238.79	1262.	3.29	1.09	2.319E-02	238.63	43.100	8.506E-01	PB212
241.45	174.	19.87	1.09	2.305E-02	241.00	3.900	1.313E+00	RA224
					241.92	7.470	6.871E-01	PB214
270.60	138.	20.34	1.17	2.149E-02				
295.24	287.	11.78	1.01	2.025E-02	295.22	19.200	4.946E-01	PB214
300.52	104.	25.09	0.77	1.999E-02				
328.44	82.	34.86	0.96	1.872E-02				
338.68	310.	10.67	0.98	1.829E-02	338.40	12.010	9.564E-01	AC228
352.01	477.	7.22	1.18	1.775E-02	351.99	37.100	4.869E-01	PB214
463.12	96.	25.46	0.97	1.426E-02				
463.12	96.	25.46	0.97	1.426E-02	463.51	10.000	4.518E-01	SB125
510.95	158.	17.29	1.44	1.317E-02	510.72	22.500	3.014E-01	TL208
583.38	402.	6.59	1.27	1.184E-02	583.14	86.000	2.654E-01	TL208
609.47	339.	7.71	1.44	1.144E-02	609.32	46.090	4.284E-01	BI214
727.54	128.	20.62	1.97	9.961E-03	727.17	11.800	7.381E-01	BI212
794.97	75.	25.61	1.59	9.308E-03				
794.97	75.	25.61	1.59	9.308E-03	795.76	85.400	6.425E-02	CS134
860.66	62.	25.15	1.22	8.767E-03				
911.54	314.	8.12	1.36	8.398E-03	911.07	29.000	8.660E-01	AC228

964.72	46.	28.19	1.54	8.051E-03	964.00	14.580	PBC<MDA	EU152
969.34	167.	9.64	1.54	8.023E-03	968.90	17.460	8.114E-01	AC228
1120.69	98.	25.26	1.60	7.210E-03	1120.28	15.040	5.995E-01	BI214
1461.33	1520.	2.63	1.95	5.930E-03	1460.75	10.700	1.608E+01	K40
1621.03	23.	31.75	1.40	5.488E-03	1620.56	2.750	1.030E+00	BI212
1765.17	62.	14.02	1.63	5.142E-03	1764.51	15.920	5.145E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
418.29	209.57	559.	127.	0.064	90.22	1.090	AC-228 s
540.34	270.60	282.	138.	0.069	61.02	1.175	AC-228 s
600.19	300.52	254.	104.	0.052	75.28	0.774	PB-212
656.03	328.44	294.	82.	0.041	104.57	0.957	RH-106M s
1720.36	860.66	66.	62.	0.031	75.44	1.224	TL-208 s
1929.41	964.78	67.	40.	0.020	99.26	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	384.	136.	0.068	64.79	0.993D
PB-212	153.39	77.11	385.	221.	0.110	34.83	0.995A
RA-226	371.57	186.20	850.	168.	0.084	71.59	1.500s
PB-212	476.42	238.63	265.	1247.	0.624	10.01	1.093D
PB-214	483.00	241.92	393.	124.	0.062	54.09	1.095A
PB-214	589.62	295.24	320.	283.	0.141	35.33	1.012
AC-228	676.49	338.68	282.	309.	0.155	32.02	0.983s
PB-214	703.16	352.01	259.	472.	0.236	21.67	1.179
SB-125	925.31	463.09	172.	80.	0.040	75.65	1.500s
TL-208	1021.02	510.95	223.	131.	0.066	51.86	1.438s
TL-208	1165.87	583.38	120.	397.	0.199	19.77	1.273
BI-214	1218.04	609.47	129.	332.	0.166	23.13	1.439
BI-212	1454.15	727.54	154.	128.	0.064	61.85	1.975s
CS-134	1589.38	795.16	82.	51.	0.025	86.66	1.500
AC-228	1822.11	911.54	102.	310.	0.155	24.35	1.359
AC-228	1936.81	968.90	48.	167.	0.084	29.07	1.541D
BI-214	2240.35	1120.69	132.	96.	0.048	75.77	1.598s
K-40	2921.53	1461.33	41.	1501.	0.750	7.89	1.948
BI-212	3240.87	1621.03	8.	23.	0.011	95.26	1.396
BI-214	3529.10	1765.17	10.	62.	0.031	42.06	1.627

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

***** S U M M A R Y O 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		-2.3903E-02					
			477.56	-2.390E-02	%(	2.934E-01 8.57E-02	G
K-40		1.6081E+01					
			1460.75	1.608E+01	(P	3.496E-01 4.28E-01	G
MN-54		2.0227E-02					
			834.81	2.023E-02	%(P	3.313E-02 1.02E-02	G
CO-57		2.3790E-04					
			122.07	2.379E-04	%(P	4.949E-02 1.47E-02	G K
			136.43	-1.391E-01	%	3.146E-01 9.53E-02	G
CO-60		9.0324E-03					
			1332.51	9.032E-03	%(P	4.099E-02 1.18E-02	G K
			1173.23	-4.215E-03	% P	5.061E-02 1.45E-02	G K
Sr-85		-1.3570E-02					
			514.00	-1.357E-02	&(	4.223E-02 1.27E-02	G
Kr-85		-3.0722E+02					
			513.99	-3.072E+02	&(	9.560E+02 2.87E+02	G
Y-88		-3.0167E-03					
			1836.01	-3.017E-03	%(P	2.775E-02 7.54E-03	G K
			898.02	-3.825E-03	& P	3.843E-02 1.10E-02	G
NB-94		1.0422E-02					
			871.10	1.042E-02	%(	2.738E-02 8.18E-03	G K
			702.50	-6.944E-03	%	4.003E-02 1.18E-02	G K
Ag-108M		1.9003E-03					
			722.95	1.900E-03	&(	3.265E-02 9.37E-03	G K
			614.37	-1.265E-02	% P	3.936E-02 1.18E-02	G
			433.93	-6.322E-04	%	3.198E-02 9.31E-03	G
CD-109		1.0943E+00					
			88.04	1.094E+00	%(	1.890E+00 5.75E-01	G
SN-113		6.6517E-03					
			391.71	6.652E-03	&(	3.831E-02 1.13E-02	G K
			255.04	3.230E-03	%	1.545E+00 4.57E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.5920E-02						
		427.95	-1.296E-03	%(P	1.041E-01	3.04E-02	G K
		600.77	6.704E-02	% P	1.504E-01	4.54E-02	G
		636.15	4.923E-02	& P	2.665E-01	7.80E-02	G
		463.51	3.837E-01	*(P	3.050E-01	9.83E-02	G
		176.29	-5.068E-02	%	5.512E-01	1.64E-01	G
I-131	7.1831E-03						
		364.48	7.183E-03	&(P	4.175E-02	1.24E-02	G K
		636.97	-7.084E-02	%	5.238E-01	1.53E-01	G
		284.29	-1.201E-01	% P	6.245E-01	1.86E-01	G
CS-134	1.5329E-02						
		604.66	-9.325E-03	%(	3.651E-02	1.08E-02	G K
		795.76	4.350E-02	(P	3.861E-02	1.26E-02	G
		569.29	-3.479E-02	% P	2.185E-01	6.38E-02	G
		801.84	1.153E-02	% P	3.937E-01	1.12E-01	G
CS-137	2.6866E-02						
		661.62	2.687E-02	%(P	4.012E-02	1.24E-02	G
CE-139	1.0978E-03						
		165.85	1.098E-03	%(	4.242E-02	1.26E-02	G
EU-152	1.4586E-03						
		121.78	1.459E-03	&(P	1.445E-01	4.30E-02	G K
		344.30	-2.236E-02	% P	1.162E-01	3.46E-02	G
		1408.08	-6.765E-03	%	1.394E-01	3.84E-02	G
		964.00	2.132E-01	% P	3.056E-01	9.46E-02	G
		1112.07	0.000E+00	%	3.162E-01	9.03E-02	G
		778.90	-5.421E-02	%	2.709E-01	7.96E-02	G
EU-154	-8.0236E-03						
		123.10	-8.024E-03	%(	9.646E-02	2.88E-02	G K
		1274.80	0.000E+00	&	9.472E-02	2.63E-02	G
		723.30	3.803E-03	&	1.747E-01	5.03E-02	G
		1004.80	-5.949E-02	%	2.497E-01	7.37E-02	G
EU-155	-2.8925E-02						
		86.45	-2.893E-02	%(	2.032E-01	6.08E-02	G K
		105.31	3.280E-02	%	2.332E-01	6.99E-02	G
HG-203	1.6163E-02						
		279.17	1.616E-02	%(P	4.030E-02	1.22E-02	G K
		72.87	-1.133E+00	% P	2.234E+00	6.78E-01	G
		70.83	-2.121E+00	&	4.167E+00	1.27E+00	G
		82.50	-1.195E+00	%	3.771E+00	1.14E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7284E-01						
		583.14	2.654E-01	(P	3.582E-02	1.77E-02	G
		510.72	3.014E-01	@(P	1.658E-01	6.27E-02	G
PB-212	8.4849E-01						
		238.63	8.485E-01	(P	5.343E-02	2.86E-02	G K
							Energy duplication
		77.11	8.485E-01	} P	3.618E-01	9.85E-02	G
		74.81	1.064E+00	+ P	7.360E-01	2.35E-01	G
PB-214	4.8955E-01						
		351.99	4.869E-01	(P	8.030E-02	3.56E-02	G K
		295.22	4.946E-01	(P	1.506E-01	5.91E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.837E-01	0.00E+00	G
		241.92	4.896E-01	}	3.762E-01	8.83E-02	G
BI-212	7.9324E-01						
		727.17	7.381E-01	(P	3.506E-01	1.53E-01	G K
		1620.56	1.030E+00	(P	7.215E-01	3.28E-01	G
		785.42	-2.487E-01	%	1.620E+00	4.72E-01	G
BI-214	4.5053E-01						
		609.32	4.284E-01	(P	7.173E-02	3.37E-02	G K
		1764.51	5.145E-01	(P	1.454E-01	7.60E-02	G
		1120.28	5.995E-01	+ P	3.532E-01	1.54E-01	G
RA-224	8.3910E-01						
							Derived Ave Activity
		241.00	8.391E-01	}(	1.189E+00	3.75E-01	G
RA-226	1.3532E+00						
		185.99	1.353E+00	*(P	1.119E+00	3.48E-01	G
AC-228	8.6818E-01						
		911.07	8.660E-01	(P	1.388E-01	7.11E-02	G K
		968.90	8.111E-01	(P	1.696E-01	7.87E-02	G
		338.40	9.564E-01	@(P	2.505E-01	1.02E-01	G
TH-227	-1.9155E-01						
		236.00	-1.916E-01	&(	3.719E-01	1.13E-01	G K
		256.25	8.792E-02	% P	4.867E-01	1.45E-01	G
PA-234	3.7597E-02						
		98.44	3.760E-02	%(P	2.135E-01	6.40E-02	G K
		946.00	3.173E-02	% P	1.650E-01	4.80E-02	G
		131.28	4.681E-02	& P	2.115E-01	6.36E-02	G
		94.67	-8.120E-02	% P	3.344E-01	1.00E-01	G
		883.24	-1.413E-02	%	2.602E-01	7.42E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          926.70 1.742E-03 &   3.090E-01 8.77E-02 G
                          569.26-5.135E-02 % P 3.237E-01 9.45E-02 G

TH-234       5.2596E-01
                           63.29 5.260E-01 &(P 6.437E+00 1.92E+00 G K
                           92.80 1.450E+00 % P 2.169E+00 6.60E-01 G
                           92.38 1.641E+00 % P 2.584E+00 7.85E-01 G

AM-241       2.7739E-02
                           59.54 2.774E-02 &(P 1.102E+00 3.28E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-2.3344E-02	-2.3903E-02	2.5720E-01	2.5720E-01	2.866E-01
K-40		1.6081E+01	1.6081E+01	1.2851E+00	1.5884E+00	
MN-54	#A	2.0145E-02	2.0227E-02	3.0605E-02	3.0628E-02	3.300E-02
CO-57	#B	2.3679E-04	2.3790E-04	4.4226E-02	4.4226E-02	4.926E-02

CO-60	#B	9.0265E-03	9.0324E-03	3.5521E-02	3.5525E-02	4.096E-02
Sr-85	#A	-1.3308E-02	-1.3570E-02	3.7997E-02	3.8005E-02	4.141E-02
Kr-85	#A	-3.0722E+02	-3.0722E+02	8.6026E+02	8.6045E+02	9.560E+02
Y-88	#B	-2.9812E-03	-3.0167E-03	2.3964E-02	2.3965E-02	2.742E-02
NB-94	#B	1.0422E-02	1.0422E-02	2.4540E-02	2.4547E-02	2.738E-02
Ag-108M	#B	1.9002E-03	1.9003E-03	2.8106E-02	2.8106E-02	3.265E-02
CD-109	#A	1.0912E+00	1.0943E+00	1.7258E+00	1.7268E+00	1.885E+00
SN-113	#B	6.5791E-03	6.6517E-03	3.3843E-02	3.3845E-02	3.789E-02
SB-125	#B	9.5800E-02	9.5920E-02	7.3715E-02	7.3925E-02	1.040E-01
I-131	#B	6.1383E-03	7.1831E-03	3.7085E-02	3.7087E-02	3.568E-02
CS-134	#B	1.5303E-02	1.5329E-02	1.3307E-02	1.3337E-02	3.645E-02
CS-137	#A	2.6863E-02	2.6866E-02	3.7102E-02	3.7135E-02	4.011E-02
CE-139	#A	1.0877E-03	1.0978E-03	3.7855E-02	3.7855E-02	4.204E-02
EU-152	#B	1.4582E-03	1.4586E-03	1.2911E-01	1.2911E-01	1.444E-01
EU-154	#B	-8.0203E-03	-8.0236E-03	8.6366E-02	8.6367E-02	9.642E-02
EU-155	#B	-2.8905E-02	-2.8925E-02	1.8243E-01	1.8243E-01	2.031E-01
HG-203	#B	1.5730E-02	1.6163E-02	3.6508E-02	3.6520E-02	3.922E-02
TL-208		2.7284E-01	2.7284E-01	5.4533E-02	5.6788E-02	
PB-212		8.4849E-01	8.4849E-01	8.5732E-02	9.8877E-02	
PB-214		4.8955E-01	4.8955E-01	1.0283E-01	1.0668E-01	
BI-212		7.9324E-01	7.9324E-01	4.5160E-01	4.5394E-01	
BI-214		4.5053E-01	4.5053E-01	1.0622E-01	1.0939E-01	
RA-224	A	8.3910E-01	8.3910E-01	1.1009E+00	1.1019E+00	
RA-226	#	1.3532E+00	1.3532E+00	1.0437E+00	1.0466E+00	1.119E+00
AC-228		8.6818E-01	8.6818E-01	1.4427E-01	1.5282E-01	
TH-227	#B	-1.9155E-01	-1.9155E-01	3.3886E-01	3.3904E-01	3.719E-01
PA-234	#B	3.7597E-02	3.7597E-02	1.9201E-01	1.9202E-01	2.135E-01
TH-234	#B	5.2596E-01	5.2596E-01	5.7550E+00	5.7551E+00	6.437E+00
AM-241	#A	2.7738E-02	2.7739E-02	9.8350E-01	9.8350E-01	1.102E+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) 2.0642511E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.0642511E+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_20JUL2006_1830.An1

Sample description
FSS-OOL-02-02-003-R

Spectrum Filename: C:\GammaVision\Spectra\103F_20JUL2006_1830.An1

Acquisition information
Start time: 20-Jul-2006 18:30:21
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: 1.6730E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6730E+03) =
5.9773E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	18-Jul-2006 21:06:00
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: 0.2614

***** S U M M A R Y O F P E A K 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.	20.95	0.99	9.134E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	1.209E+00	PB212
77.17	235.	12.32	0.99	1.018E-02	77.11	17.500	1.059E+00	PB212
					77.11	10.700	1.732E+00	PB214
89.88	80.	36.28	1.00	1.542E-02				
93.18	99.	28.15	1.00	1.659E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.40	177.	18.82	1.15	2.565E-02	185.99	3.280	1.576E+00	RA226
209.32	84.	38.46	0.85	2.471E-02				
238.79	1102.	3.55	1.09	2.320E-02	238.63	43.100	8.804E-01	PB212
242.02	151.	17.62	1.10	2.302E-02	241.00	3.900	1.360E+00	RA224
					241.92	7.470	7.115E-01	PB214
270.73	108.	21.79	0.86	2.149E-02				
277.11	72.	39.82	1.24	2.116E-02				
295.38	253.	10.09	0.89	2.024E-02	295.22	19.200	5.168E-01	PB214
300.20	90.	22.44	1.22	2.001E-02				
338.45	273.	10.80	1.02	1.830E-02	338.40	12.010	9.992E-01	AC228
352.08	389.	9.30	1.04	1.775E-02	351.99	37.100	4.698E-01	PB214
409.75	88.	28.20	1.06	1.574E-02				
463.39	84.	23.36	1.31	1.425E-02				
463.39	84.	23.36	1.31	1.425E-02	463.51	10.000	4.685E-01	SB125
510.85	211.	11.60	1.69	1.317E-02	510.72	22.500	5.015E-01	TL208
583.25	336.	8.42	1.48	1.184E-02	583.14	86.000	2.628E-01	TL208
609.55	321.	7.61	1.34	1.144E-02	609.32	46.090	4.819E-01	BI214
661.63	41.	29.33	1.50	1.072E-02	661.62	84.620	3.612E-02	CS137
727.60	99.	15.94	1.78	9.960E-03	727.17	11.800	6.767E-01	BI212
795.50	72.	21.44	1.56	9.304E-03				

795.50	72.	21.44	1.56	9.304E-03	795.76	85.400	7.305E-02	CS134
859.78	67.	23.45	0.84	8.773E-03				
911.51	229.	8.85	1.49	8.398E-03	911.07	29.000	7.487E-01	AC228
965.03	54.	21.91	1.54	8.050E-03	964.00	14.580	3.677E-01	EU152
969.55	124.	11.71	1.54	8.022E-03	968.90	17.460	7.126E-01	AC228
1120.82	113.	20.73	1.96	7.209E-03	1120.28	15.040	8.244E-01	BI214
1238.46	76.	23.34	1.73	6.700E-03				
1461.42	1217.	2.94	1.75	5.930E-03	1460.75	10.700	1.525E+01	K40
1765.25	87.	12.75	1.87	5.140E-03	1764.51	15.920	8.262E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
178.94	89.91	382.	80.	0.040	108.84	1.002	PB-214	lD
417.79	209.32	422.	84.	0.042	115.38	0.846	AC-228	s
540.61	270.73	214.	108.	0.054	65.37	0.863	AC-228	s
553.37	277.11	275.	97.	0.048	78.70	1.236	TL-208	
599.55	300.20	159.	90.	0.045	67.33	1.220	PB-212	
818.64	409.75	176.	88.	0.044	84.61	1.057	AC-228	s
1718.60	859.78	63.	67.	0.034	70.36	0.842	TL-208	s
1930.14	965.03	44.	53.	0.026	67.75	1.539	AC-228	D
2475.86	1238.46	78.	76.	0.038	70.02	1.731	CO-56	

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

This section based on library: FSS_Rev_1.Lib

********** I D E N T I F I E D P E A K S U M 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	321.	130.	0.065	62.52	0.993D
PB-212	153.39	77.11	305.	181.	0.091	38.79	0.995A
RA-226	371.89	186.36	618.	180.	0.090	58.33	1.500s
PB-212	476.91	238.88	498.	1210.	0.605	12.25	1.080
RA-224	482.72	241.78	718.	138.	0.069	86.12	1.500
PB-214	589.90	295.38	193.	249.	0.124	30.26	0.888
AC-228	676.05	338.45	222.	272.	0.136	32.41	1.020s
PB-214	703.30	352.08	284.	383.	0.192	27.90	1.037
SB-125	925.67	463.28	110.	75.	0.037	67.82	1.500
TL-208	1020.81	510.85	144.	184.	0.092	34.81	1.690s
TL-208	1165.60	583.25	145.	331.	0.166	25.26	1.482s
BI-214	1218.20	609.55	108.	315.	0.157	22.82	1.337
CS-137	1322.35	661.63	56.	41.	0.020	88.00	1.500s
BI-212	1454.27	727.60	60.	99.	0.049	47.82	1.781s
CS-134	1589.64	795.29	53.	39.	0.019	93.13	1.500
AC-228	1822.05	911.51	62.	226.	0.113	26.55	1.491
EU-152	1929.37	965.18	94.	40.	0.020	111.10	1.538
AC-228	1936.81	968.90	48.	123.	0.062	35.86	1.541D
BI-214	2240.62	1120.82	107.	111.	0.055	62.18	1.963s
K-40	2921.71	1461.42	34.	1198.	0.599	8.81	1.749
BI-214	3529.25	1765.25	12.	84.	0.042	38.24	1.866

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

***** S U M M A R Y O 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		6.9635E-02					
			477.56	6.963E-02	%(	3.384E-01 1.00E-01	G
K-40		1.5249E+01					
			1460.75	1.525E+01	(P	3.789E-01 4.55E-01	G
MN-54		1.7446E-03					
			834.81	1.745E-03	%(P	3.392E-02 9.62E-03	G
CO-57		-8.1966E-04					
			122.07	-8.197E-04	&(P	5.430E-02 1.61E-02	G K
			136.43	1.692E-02	%	4.145E-01 1.23E-01	G
CO-60		4.9903E-03					
			1332.51	4.990E-03	%(P	4.273E-02 1.20E-02	G K
			1173.23	1.706E-02	% P	5.077E-02 1.50E-02	G K
Sr-85		-1.9362E-02					
			514.00	-1.936E-02	&(	4.571E-02 1.38E-02	G
Kr-85		-4.3806E+02					
			513.99	-4.381E+02	&(	1.034E+03 3.12E+02	G
Y-88		-1.0396E-04					
			1836.01	-1.040E-04	%(P	2.702E-02 6.82E-03	G K
			898.02	-9.577E-03	% P	4.049E-02 1.18E-02	G
NB-94		-1.8099E-03					
			871.10	-1.810E-03	&(	3.545E-02 1.01E-02	G K
			702.50	4.250E-03	%	3.205E-02 9.26E-03	G K
Ag-108M		-1.8136E-02					
			722.95	-1.814E-02	&(	4.624E-02 1.39E-02	G K
			614.37	-1.023E-02	% P	4.187E-02 1.24E-02	G
			433.93	5.637E-03	&	3.198E-02 9.39E-03	G
CD-109		8.3473E-01					
			88.04	8.347E-01	%(	2.095E+00 6.34E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	1.7250E-02						
		391.71	1.725E-02	&(	4.814E-02	1.44E-02	G K
		255.04	-4.679E-01	%	1.736E+00	5.20E-01	G
SB-125	1.0293E-01						
		427.95	-5.268E-03	%(P	1.071E-01	3.12E-02	G K
		600.77	-5.393E-05	% P	2.039E-01	5.88E-02	G
		636.15	7.996E-02	& P	3.022E-01	8.92E-02	G
		463.51	4.232E-01	(P	2.931E-01	9.73E-02	G
		176.29	2.210E-01	&	5.419E-01	1.64E-01	G
I-131	1.0797E-05						
		364.48	1.080E-05	%(P	4.240E-02	1.23E-02	G K
		636.97	1.480E-01	%	5.747E-01	1.70E-01	G
		284.29	-2.447E-01	% P	7.046E-01	2.12E-01	G
CS-134	1.8840E-02						
		604.66	7.668E-04	&(	6.941E-02	2.05E-02	G K
		795.76	3.950E-02	(P	3.746E-02	1.23E-02	G
		569.29	-6.076E-03	& P	2.130E-01	6.06E-02	G
		801.84	-1.170E-01	% P	5.035E-01	1.47E-01	G
CS-137	3.6116E-02						
		661.62	3.612E-02	*(P	3.350E-02	1.10E-02	G
CE-139	0.0000E+00						
		165.85	0.000E+00	%(	5.024E-02	1.49E-02	G
EU-152	9.2432E-02						
		121.78	8.686E-04	&(P	1.539E-01	4.57E-02	G K
		344.30	6.629E-03	% P	1.287E-01	3.78E-02	G
		1408.08	1.005E-01	%	1.313E-01	4.28E-02	G
		964.00	2.761E-01	(P	3.289E-01	1.04E-01	G
		1112.07	-4.533E-02	%	3.713E-01	1.08E-01	G
		778.90	5.340E-02	&	2.740E-01	8.00E-02	G
EU-154	-2.1449E-03						
		123.10	-2.145E-03	&(	1.087E-01	3.23E-02	G K
		1274.80	-2.851E-02	&	1.426E-01	4.16E-02	G
		723.30	-1.157E-01	&	2.387E-01	7.24E-02	G
		1004.80	-5.384E-02	%	2.503E-01	7.33E-02	G
EU-155	1.0129E-01						
		86.45	1.013E-01	%(	2.531E-01	7.65E-02	G K
		105.31	6.856E-02	%	2.494E-01	7.50E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-1.2622E-02						
		279.17	-1.262E-02	&(P	4.892E-02	1.47E-02	G K
		72.87	1.405E+00	% P	2.216E+00	6.76E-01	G
		70.83	-1.401E-01	&	5.174E+00	1.54E+00	G
		82.50	-1.846E+00	%	4.317E+00	1.31E+00	G
TL-208	2.6278E-01						
		583.14	2.628E-01	@(P	4.658E-02	2.24E-02	G
		510.72	5.015E-01	+ P	1.598E-01	6.66E-02	G
PB-212	1.0008E+00						
		238.63	9.772E-01	(P	8.623E-02	4.03E-02	G K
							Energy duplication
		77.11	8.280E-01	} P	3.837E-01	1.07E-01	G
		74.81	1.208E+00	+ P	8.013E-01	2.58E-01	G
PB-214	4.8582E-01						
		351.99	4.698E-01	(P	9.962E-02	4.44E-02	G K
		295.22	5.168E-01	(P	1.402E-01	5.30E-02	G
							Energy duplication
		77.11	2.564E-01	} P	9.292E-01	2.57E-01	G
		241.92	3.019E-01	%	6.550E-01	1.99E-01	G
BI-212	6.7668E-01						
		727.17	6.767E-01	@(P	2.676E-01	1.08E-01	G K
		1620.56	3.870E-01	% P	9.473E-01	2.83E-01	G
		785.42	2.993E-01	%	2.148E+00	6.27E-01	G
BI-214	4.8187E-01						
		609.32	4.819E-01	(P	7.851E-02	3.74E-02	G K
		1764.51	8.262E-01	+ P	1.878E-01	1.09E-01	G
		1120.28	8.244E-01	+ P	3.796E-01	1.74E-01	G
RA-224	1.2407E+00						
		241.00	1.241E+00	(	1.145E+00	3.56E-01	G
RA-226	1.7238E+00						
		185.99	1.724E+00	*(P	1.137E+00	3.59E-01	G
AC-228	7.3482E-01						
		911.07	7.487E-01	(P	1.308E-01	6.73E-02	G K
		968.90	7.117E-01	(P	2.008E-01	8.52E-02	G
		338.40	9.992E-01	+ P	2.652E-01	1.08E-01	G
TH-227	-1.3157E-02						
		236.00	-1.316E-02	&(	5.024E-01	1.50E-01	G K
		256.25	-1.228E-01	% P	4.740E-01	1.42E-01	G

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

PA-234      -3.0873E-03
                            98.44-3.087E-03 %(P 2.319E-01 6.89E-02 G K
                           946.00 4.467E-02 & P 1.546E-01 4.54E-02 G
                           131.28 3.892E-02 & P 2.206E-01 6.61E-02 G
                            94.67-6.609E-02 % P 4.264E-01 1.28E-01 G
                           883.24 8.333E-03 %   3.030E-01 8.59E-02 G
                           926.70 8.809E-02 %   2.731E-01 8.06E-02 G
                           569.26-8.235E-03 & P 3.153E-01 8.97E-02 G

TH-234      -3.1943E-01
                            63.29-3.194E-01 %(P 7.027E+00 2.08E+00 G K
                            92.80 1.503E+00 % P 2.317E+00 7.04E-01 G
                            92.38 1.769E+00 % P 2.749E+00 8.35E-01 G

AM-241      -1.4795E-01
                            59.54-1.479E-01 &(P 1.196E+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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	6.7946E-02	6.9635E-02	2.9993E-01	2.9995E-01	3.302E-01
K-40		1.5249E+01	1.5249E+01	1.3643E+00	1.6264E+00	
MN-54	#A	1.7373E-03	1.7446E-03	2.8851E-02	2.8851E-02	3.378E-02
CO-57	#B	-8.1569E-04	-8.1966E-04	7.4621E-02	7.4621E-02	5.404E-02
CO-60	#B	4.9869E-03	4.9903E-03	3.6017E-02	3.6018E-02	4.270E-02
Sr-85	#A	-1.8975E-02	-1.9362E-02	4.1411E-02	4.1427E-02	4.480E-02
Kr-85	#A	-4.3806E+02	-4.3806E+02	9.3688E+02	9.3723E+02	1.034E+03
Y-88	#B	-1.0269E-04	-1.0396E-04	2.5762E-03	2.5762E-03	2.669E-02
NB-94	#B	-1.8099E-03	-1.8099E-03	3.0230E-02	3.0230E-02	3.545E-02
Ag-108M	#B	-1.8135E-02	-1.8136E-02	4.1685E-02	4.1698E-02	4.624E-02
CD-109	#A	8.3232E-01	8.3473E-01	1.9008E+00	1.9013E+00	2.089E+00
SN-113	#B	1.7055E-02	1.7250E-02	4.3326E-02	4.3337E-02	4.760E-02
SB-125	#B	1.0280E-01	1.0293E-01	7.0996E-02	7.1247E-02	1.070E-01
I-131	#B	9.1722E-06	1.0797E-05	3.6897E-02	3.6897E-02	3.602E-02
CS-134	#B	1.8807E-02	1.8840E-02	1.7586E-02	1.7620E-02	6.929E-02
CS-137	#	3.6112E-02	3.6116E-02	3.2871E-02	3.2938E-02	3.349E-02
CE-139	#A	0.0000E+00	0.0000E+00	4.4775E-02	4.4775E-02	4.976E-02
EU-152	#B	9.2406E-02	9.2432E-02	1.0409E-01	1.0421E-01	1.539E-01
EU-154	#B	-2.1440E-03	-2.1449E-03	9.6979E-02	9.6979E-02	1.087E-01
EU-155	#B	1.0122E-01	1.0129E-01	2.2964E-01	2.2971E-01	2.529E-01
HG-203	#B	-1.2272E-02	-1.2622E-02	4.4101E-02	4.4107E-02	4.756E-02
TL-208	#	2.6278E-01	2.6278E-01	6.7229E-02	6.8939E-02	
PB-212		1.0008E+00	1.0008E+00	1.2376E-01	1.3672E-01	
PB-214		4.8582E-01	4.8582E-01	1.0154E-01	1.0538E-01	
BI-212	#	6.7668E-01	6.7668E-01	3.2520E-01	3.2756E-01	
BI-214		4.8187E-01	4.8187E-01	1.1224E-01	1.1568E-01	
RA-224	#	1.2407E+00	1.2407E+00	1.0684E+00	1.0709E+00	1.145E+00
RA-226	#	1.7238E+00	1.7238E+00	1.0780E+00	1.0826E+00	1.137E+00
AC-228		7.3482E-01	7.3482E-01	1.6494E-01	1.7037E-01	
TH-227	#B	-1.3157E-02	-1.3157E-02	4.5022E-01	4.5022E-01	5.024E-01
PA-234	#B	-3.0873E-03	-3.0873E-03	7.4365E-01	7.4365E-01	2.319E-01
TH-234	#B	-3.1943E-01	-3.1943E-01	9.4104E+01	9.4104E+01	7.027E+00
AM-241	#A	-1.4795E-01	-1.4795E-01	1.0992E+00	1.0992E+00	1.196E+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_20JUL2006_1830.An1

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

Total Activity (1120.0 to 2000.7 keV) 1.8891876E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.8891876E+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_20JUL2006_1749.An1

Sample description
FSS-OOL-02-02-008-R

Spectrum Filename: C:\GammaVision\Spectra\107F_20JUL2006_1749.An1

Acquisition information

Start time:	20-Jul-2006 17:49:15
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:	1.5580E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.5580E+03) = 6.4185E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	18-Jul-2006 22:00:00
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: 0.1693

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.47	308.	13.75	1.18	2.842E-02	70.83	3.520	2.969E+00	HG203
					74.81	9.600	9.636E-01	PB212
77.19	634.	7.21	1.18	2.969E-02	77.11	17.500	1.062E+00	PB212
					77.11	10.700	1.724E+00	PB214
87.34	179.	32.35	1.50	3.284E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
92.97	187.	26.39	1.50	3.438E-02	92.38	2.570	1.845E+00	TH234
					92.80	3.000	1.576E+00	TH234
128.48	180.	27.98	0.82	3.817E-02				
185.90	254.	16.87	1.50	3.611E-02	185.99	3.280	1.861E+00	RA226
209.11	183.	20.49	1.24	3.430E-02				
238.79	1518.	2.99	1.30	3.188E-02	238.63	43.100	9.481E-01	PB212
241.75	238.	13.03	1.30	3.165E-02	241.00	3.900	1.652E+00	RA224
					241.92	7.470	8.677E-01	PB214
270.79	123.	26.57	1.03	2.940E-02				
277.72	65.	39.49	1.37	2.890E-02				
295.36	338.	7.54	1.34	2.767E-02	295.22	19.200	5.443E-01	PB214
300.59	117.	18.21	1.34	2.732E-02				
328.30	64.	41.36	1.00	2.559E-02				
338.65	373.	10.40	1.23	2.499E-02	338.40	12.010	1.069E+00	AC228
352.20	512.	6.27	1.29	2.425E-02	351.99	37.100	4.885E-01	PB214
409.15	38.	41.13	0.68	2.156E-02				
463.29	87.	21.84	1.56	1.953E-02				
463.29	87.	21.84	1.56	1.953E-02	463.51	10.000	3.753E-01	SB125
510.77	234.	10.43	1.41	1.808E-02	510.72	22.500	4.280E-01	TL208
583.52	484.	6.84	1.33	1.628E-02	583.14	86.000	2.968E-01	TL208
609.46	394.	7.72	1.43	1.574E-02	609.32	46.090	4.658E-01	BI214

662.63	91.	20.69	1.18	1.475E-02	661.62	84.620	6.098E-02	CS137
726.83	147.	15.47	1.69	1.375E-02	727.17	11.800	7.810E-01	BI212
785.96	62.	31.72	2.54	1.297E-02	785.42	2.000	2.058E+00	BI212
794.91	76.	21.20	1.33	1.285E-02				
794.91	76.	21.20	1.33	1.285E-02	795.76	85.400	5.980E-02	CS134
860.61	70.	23.70	1.37	1.211E-02				
911.46	391.	8.21	1.40	1.160E-02	911.07	29.000	9.965E-01	AC228
968.64	285.	9.24	2.03	1.109E-02	968.90	17.460	1.266E+00	AC228
1120.42	108.	23.58	2.23	9.969E-03	1120.28	15.040	6.208E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.16	1859.	2.35	2.23	8.189E-03	1460.75	10.700	1.835E+01	K40
1765.15	74.	12.72	1.98	7.082E-03	1764.51	15.920	5.653E-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	
148.62	74.67	741.	308.	0.154	41.24	1.177	BI-207	D
154.05	77.38	727.	634.	0.317	21.63	1.179	PB-214	D
256.62	128.48	825.	257.	0.129	50.96	0.817	AC-228	s
417.85	209.11	508.	183.	0.091	61.46	1.239	AC-228	s
477.22	238.77	274.	1518.	0.759	8.98	1.297	PB-212	D
483.14	241.73	361.	238.	0.119	39.09	1.299	PB-214	D
541.21	270.79	365.	123.	0.062	79.72	1.026	AC-228	s
555.07	277.72	266.	65.	0.032	113.51	1.374	NP-239	
600.56	300.47	256.	134.	0.067	62.55	1.188	PB-212	
656.21	328.30	250.	64.	0.032	124.08	1.001	RH-106M	
817.90	409.15	110.	38.	0.019	123.38	0.679	CS-138	s
1720.79	860.61	74.	70.	0.035	71.10	1.374	TL-208	s

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
HG-203	146.28	73.30	1687.	-190.	-0.095	94.29	1.500s
PB-212	149.33	74.83	1857.	259.	0.130	71.78	1.500
PB-212	153.89	77.11	1538.	547.	0.274	32.98	1.500D
PB-214	153.89	77.11	1543.	543.	0.271	32.98	1.500D
EU-155	174.34	87.34	1579.	179.	0.089	97.04	1.500
TH-234	185.60	92.97	1411.	187.	0.094	79.17	1.500
RA-226	371.43	185.90	633.	254.	0.127	50.62	1.503
PB-212	477.20	238.78	698.	1269.	0.634	12.02	1.500
RA-224	482.82	241.59	802.	176.	0.088	70.86	1.500
PB-214	483.57	241.97	919.	122.	0.061	107.47	1.500
PB-214	590.40	295.39	349.	318.	0.159	29.61	1.500
AC-228	676.91	338.65	337.	370.	0.185	31.20	1.227s
PB-214	703.85	352.12	223.	482.	0.241	18.70	1.500
SB-125	925.83	463.12	126.	87.	0.044	61.11	1.500s
TL-208	1021.13	510.77	163.	201.	0.100	31.28	1.405s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1166.58	583.50	212.	513.	0.256	21.79	1.334
BI-214	1218.51	609.46	160.	390.	0.195	23.15	1.429
CS-137	1322.82	661.62	79.	44.	0.022	89.79	1.594D
BI-212	1453.22	726.83	114.	146.	0.073	46.41	1.688s
BI-212	1571.48	785.96	102.	62.	0.031	95.15	2.540s
CS-134	1590.05	795.24	74.	65.	0.032	67.17	1.684
AC-228	1822.49	911.46	132.	387.	0.193	24.64	1.401
AC-228	1936.84	968.64	104.	283.	0.141	27.71	2.034
BI-214	2240.40	1120.42	144.	107.	0.054	70.73	2.228
K-40	2921.92	1461.16	22.	1854.	0.927	7.06	2.232
BI-214	3530.34	1765.35	7.	53.	0.026	45.49	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	MDA Value pCi/gm	COMMENTS
BE-7		9.0873E-02					
			477.56	9.087E-02	%(	2.760E-01 8.26E-02 G	
K-40		1.8353E+01					
			1460.75	1.835E+01	(P	2.408E-01 4.33E-01 G	
MN-54		2.1446E-02					
			834.81	2.145E-02	%(P	3.220E-02 9.97E-03 G	
CO-57		3.9875E-03					
			122.07	3.988E-03	%(P	3.910E-02 1.17E-02 G K	
			136.43	-7.607E-02	% P	3.109E-01 9.35E-02 G	
CO-60		-3.7228E-03					
			1332.51	-3.723E-03	%(P	3.372E-02 9.02E-03 G K	
			1173.23	3.824E-03	& P	4.329E-02 1.24E-02 G K	
Sr-85		-2.4710E-02					
			514.00	-2.471E-02	%(	3.754E-02 1.15E-02 G	
Kr-85		-5.9382E+02					
			513.99	-5.938E+02	%(P	8.551E+02 2.61E+02 G	
Y-88		-4.0157E-03					
			1836.01	-4.016E-03	%(P	2.302E-02 6.02E-03 G K	
			898.02	6.595E-03	% P	3.177E-02 9.22E-03 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	9.6351E-03						
		871.10	9.635E-03	%(P	3.061E-02	9.08E-03	G K
		702.50	2.607E-03	& P	3.524E-02	1.03E-02	G K
Ag-108M	1.4403E-03						
		722.95	1.440E-03	%(	2.809E-02	8.02E-03	G K
		614.37	-2.533E-02	%	4.054E-02	1.24E-02	G
		433.93	-6.228E-03	% P	3.222E-02	9.49E-03	G
CD-109	1.8138E-01						
		88.04	1.814E-01	%(P	1.375E+00	4.13E-01	G
SN-113	8.1382E-03						
		391.71	8.138E-03	%(P	4.517E-02	1.34E-02	G K
		255.04	2.300E-01	%	1.415E+00	4.22E-01	G
SB-125	9.5490E-02						
		427.95	-3.509E-03	%(P	1.010E-01	2.94E-02	G K
		600.77	-2.789E-03	% P	1.450E-01	4.13E-02	G
		636.15	3.370E-02	% P	2.453E-01	7.13E-02	G
		463.51	3.885E-01	@(P	2.451E-01	8.17E-02	G
		176.29	-7.871E-02	% P	4.881E-01	1.46E-01	G
I-131	5.8253E-03						
		364.48	5.825E-03	%(	3.791E-02	1.12E-02	G K
		636.97	-1.123E-01	%	4.957E-01	1.46E-01	G
		284.29	0.000E+00	&	5.578E-01	1.64E-01	G
CS-134	2.5521E-02						
		604.66	3.098E-03	%(P	3.400E-02	9.93E-03	G K
		795.76	5.115E-02	(P	3.394E-02	1.15E-02	G
		569.29	-2.912E-02	%	1.951E-01	5.73E-02	G
		801.84	-8.071E-02	& P	3.661E-01	1.07E-01	G
CS-137	3.0248E-02						
		661.62	3.025E-02	(P	3.070E-02	9.79E-03	G
CE-139	5.1333E-03						
		165.85	5.133E-03	&(P	3.960E-02	1.18E-02	G
EU-152	1.6761E-02						
		121.78	1.676E-02	%(P	1.194E-01	3.58E-02	G K
		344.30	3.103E-03	% P	9.128E-02	2.67E-02	G
		1408.08	-3.444E-03	% P	1.226E-01	3.27E-02	G
		964.00	-6.333E-02	% P	4.517E-01	1.34E-01	G
		1112.07	2.074E-02	% P	3.029E-01	8.73E-02	G
		778.90	-4.329E-02	% P	2.452E-01	7.15E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	-2.4749E-02						
		123.10	-2.475E-02	&(P	8.621E-02	2.60E-02	G K
		1274.80	-1.390E-02	% P	1.378E-01	4.00E-02	G
		723.30	-1.050E-01	& P	2.412E-01	7.28E-02	G
		1004.80	7.734E-02	% P	1.819E-01	5.47E-02	G
EU-155	1.4418E-01						
		86.45	1.442E-01	(	1.517E-01	4.66E-02	G K
		105.31	5.279E-02	% P	1.662E-01	5.01E-02	G
HG-203	-2.6830E-03						
		279.17	-2.683E-03	&(P	3.189E-02	9.39E-03	G K
		72.87	-3.840E-01	& P	1.133E+00	3.42E-01	G
		70.83	-1.832E+00	+	1.872E+00	5.76E-01	G
		82.50	-6.013E-01	%	2.305E+00	6.95E-01	G
TL-208	3.1734E-01						
		583.14	3.173E-01	(P	4.373E-02	2.33E-02	G
		510.72	4.280E-01	+ P	1.327E-01	5.21E-02	G
PB-212	8.3271E-01						
		238.63	8.005E-01	(P	7.938E-02	3.25E-02	G K
							Energy duplication
		77.11	9.176E-01	@(	3.108E-01	1.01E-01	G
		74.81	8.227E-01	&(P	6.453E-01	2.00E-01	G
PB-214	4.7888E-01						
		351.99	4.644E-01	(P	6.961E-02	2.93E-02	G K
		295.22	5.188E-01	(P	1.466E-01	5.19E-02	G
							Energy duplication
		77.11	1.488E+00	+ P	5.091E-01	1.65E-01	G
		241.92	4.483E-01	?(P	5.286E-01	1.62E-01	G
BI-212	7.8097E-01						
		727.17	7.810E-01	*(P	2.806E-01	1.22E-01	G K
		1620.56	-2.093E-02	& P	9.296E-01	2.44E-01	G
		785.42	2.058E+00	+ P	1.668E+00	6.67E-01	G
BI-214	4.5070E-01						
		609.32	4.658E-01	(P	7.378E-02	3.64E-02	G K
		1764.51	4.069E-01	?(P	1.174E-01	6.27E-02	G
		1120.28	6.208E-01	+ P	3.388E-01	1.48E-01	G
RA-224	1.2365E+00						
		241.00	1.237E+00	?(P	9.447E-01	2.96E-01	G
RA-226	1.8605E+00						
		185.99	1.861E+00	(	8.786E-01	3.14E-01	G

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

AC-228       1.0178E+00
                          911.07 9.965E-01  (P 1.451E-01 8.28E-02 G K
                          968.90 1.266E+00 + P 2.252E-01 1.18E-01 G
                          338.40 1.069E+00 @(P 2.549E-01 1.12E-01 G

TH-227      -2.2308E-01
                          236.00-2.231E-01 %(P 3.570E-01 1.09E-01 G K
                          256.25 7.093E-02 % P 3.814E-01 1.13E-01 G

PA-234       7.2227E-03
                           98.44 7.223E-03 %(  1.553E-01 4.64E-02 G K
                          946.00-1.779E-02 &   1.699E-01 4.91E-02 G
                          131.28-4.996E-02 &   1.847E-01 5.56E-02 G
                           94.67-9.709E-02 %   2.965E-01 8.95E-02 G
                          883.24 0.000E+00 &   3.113E-01 8.95E-02 G
                          926.70 9.415E-02 &   2.956E-01 8.78E-02 G
                          569.26-4.312E-02 %   2.889E-01 8.48E-02 G

TH-234       9.8953E-01
                           63.29 5.380E-01 %(P 1.871E+00 5.62E-01 G K
                           92.80 1.576E+00  (P 1.495E+00 4.60E-01 G
                           92.38-1.518E-01 % P 1.809E+00 5.40E-01 G

AM-241       4.9658E-02
                           59.54 4.966E-02 %(P 2.467E-01 7.41E-02 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
```

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	8.8744E-02	9.0873E-02	2.4770E-01	2.4776E-01	2.695E-01
K-40		1.8353E+01	1.8353E+01	1.2997E+00	1.6924E+00	
MN-54	#A	2.1360E-02	2.1446E-02	2.9905E-02	2.9932E-02	3.207E-02
CO-57	#B	3.9689E-03	3.9875E-03	3.5068E-02	3.5068E-02	3.891E-02
CO-60	#B	-3.7203E-03	-3.7228E-03	2.0358E-01	2.0358E-01	3.369E-02
Sr-85	#A	-2.4233E-02	-2.4710E-02	3.4588E-02	3.4618E-02	3.682E-02
Kr-85	#A	-5.9381E+02	-5.9382E+02	8.7705E+02	8.7775E+02	8.550E+02
Y-88	#B	-3.9683E-03	-4.0157E-03	3.0809E-02	3.0809E-02	2.275E-02
NB-94	#B	9.6351E-03	9.6351E-03	2.7249E-02	2.7255E-02	3.061E-02
Ag-108M	#B	1.4402E-03	1.4403E-03	2.4049E-02	2.4049E-02	2.809E-02
CD-109	#A	1.8088E-01	1.8138E-01	1.2394E+00	1.2394E+00	1.371E+00
SN-113	#B	8.0492E-03	8.1382E-03	4.0095E-02	4.0098E-02	4.467E-02
SB-125	#B	9.5370E-02	9.5490E-02	6.0229E-02	6.0492E-02	1.008E-01
I-131	#B	4.9769E-03	5.8253E-03	3.3621E-02	3.3622E-02	3.239E-02
CS-134	#B	2.5478E-02	2.5521E-02	1.7282E-02	1.7347E-02	3.394E-02
CS-137	A	3.0245E-02	3.0248E-02	2.9362E-02	2.9416E-02	
CE-139	#A	5.0863E-03	5.1333E-03	3.5520E-02	3.5521E-02	3.924E-02
EU-152	#B	1.6756E-02	1.6761E-02	1.0730E-01	1.0730E-01	1.193E-01
EU-154	#B	-2.4739E-02	-2.4749E-02	7.9820E-02	7.9832E-02	8.617E-02
EU-155	#A	1.4408E-01	1.4418E-01	1.3991E-01	1.4014E-01	1.516E-01
HG-203	#B	-2.6111E-03	-2.6830E-03	4.0812E-02	4.0812E-02	3.103E-02
TL-208		3.1734E-01	3.1734E-01	6.9772E-02	7.2245E-02	
PB-212	#	8.3271E-01	8.3271E-01	1.0134E-01	1.1264E-01	7.938E-02
PB-214	#	4.7888E-01	4.7888E-01	9.0518E-02	9.4834E-02	6.961E-02
BI-212		7.8097E-01	7.8097E-01	3.6563E-01	3.6852E-01	
BI-214		4.5070E-01	4.5070E-01	1.0550E-01	1.0880E-01	
RA-224	#	1.2365E+00	1.2365E+00	8.8729E-01	8.9029E-01	9.447E-01
RA-226		1.8605E+00	1.8605E+00	9.4171E-01	9.4810E-01	
AC-228		1.0178E+00	1.0178E+00	2.0423E-01	2.1290E-01	
TH-227	#B	-2.2308E-01	-2.2308E-01	3.2842E-01	3.2868E-01	3.570E-01
PA-234	#B	7.2227E-03	7.2227E-03	1.3925E-01	1.3925E-01	1.553E-01
TH-234	#B	9.8953E-01	9.8953E-01	8.6581E-01	8.6754E-01	1.871E+00
AM-241	#A	4.9657E-02	4.9658E-02	2.2237E-01	2.2238E-01	2.467E-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) 2.2810402E+01 pCi/gm
Total Decayed Activity (726.7 to 2000.1 keV) 2.2810410E+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_20JUL2006_1825.An1

Sample description
FSS-OOL-02-02-005-R

Spectrum Filename: C:\GammaVision\Spectra\107F_20JUL2006_1825.An1

Acquisition information
Start time: 20-Jul-2006 18:25:52
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: 1.5700E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5700E+03) =
6.3694E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	18-Jul-2006 21:30:00
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: 0.1863

***** S U M M A R Y O F P E A K 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	322.	13.17	1.18	2.842E-02				
74.30	322.	13.17	1.18	2.842E-02	74.81	9.600	9.999E-01	PB212
77.36	574.	7.35	1.18	2.984E-02	77.11	10.700	1.549E+00	PB214
					77.11	17.500	9.548E-01	PB212
87.15	195.	18.80	1.19	3.309E-02	86.45	32.740	1.565E-01	EU155
90.13	189.	18.99	1.19	3.384E-02	88.04	3.790	1.292E+00	CD109
93.05	232.	15.70	1.19	3.448E-02	92.38	2.570	2.186E+00	TH234
					92.80	3.000	1.769E+00	TH234
129.62	93.	40.88	1.03	3.819E-02				
154.07	144.	34.99	1.18	3.796E-02				
186.44	284.	16.88	1.00	3.607E-02	185.99	3.280	2.063E+00	RA226
209.53	136.	20.95	1.41	3.427E-02				
238.76	1416.	3.14	1.30	3.188E-02	238.63	43.100	8.767E-01	PB212
241.82	217.	14.73	1.30	3.164E-02	241.00	3.900	1.496E+00	RA224
					241.92	7.470	7.857E-01	PB214
270.73	119.	24.56	1.46	2.941E-02				
277.35	70.	31.39	1.29	2.892E-02				
295.36	331.	7.42	1.34	2.767E-02	295.22	19.200	5.293E-01	PB214
300.49	84.	23.53	1.34	2.733E-02				
327.99	68.	34.63	1.15	2.560E-02				
338.53	250.	14.02	1.15	2.500E-02	338.40	12.010	7.074E-01	AC228
352.07	532.	7.06	1.07	2.425E-02	351.99	37.100	5.039E-01	PB214
462.33	97.	21.76	1.20	1.957E-02				
462.33	97.	21.76	1.20	1.957E-02	463.51	10.000	4.135E-01	SB125
510.83	257.	13.03	1.21	1.808E-02	510.72	22.500	4.725E-01	TL208
583.41	529.	6.09	1.56	1.628E-02	583.14	86.000	3.222E-01	TL208
609.42	391.	8.35	1.66	1.574E-02	609.32	46.090	4.585E-01	BI214

661.96	81.	27.24	1.35	1.477E-02	661.62	84.620	5.321E-02	CS137
727.33	102.	15.63	1.52	1.374E-02	727.17	11.800	5.324E-01	BI212
795.31	38.	34.24	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
860.68	79.	21.50	2.18	1.211E-02				
911.58	357.	7.24	1.58	1.160E-02	911.07	29.000	9.015E-01	AC228
968.63	251.	11.40	1.43	1.109E-02	968.90	17.460	1.106E+00	AC228
1120.96	111.	18.21	1.36	9.965E-03	1120.28	15.040	6.321E-01	BI214
1237.53	91.	26.14	1.68	9.266E-03				
1461.21	1775.	2.53	2.00	8.189E-03	1460.75	10.700	1.739E+01	K40
1621.34	17.	32.55	1.14	7.569E-03	1620.56	2.750	7.029E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.75	92.	10.37	2.67	7.084E-03	1764.51	15.920	7.030E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
148.27	74.67	736.	322.	0.161	39.51	1.177	BI-207	D
154.39	77.72	603.	574.	0.287	22.04	1.180	PB-214	D
173.96	87.37	576.	195.	0.098	56.39	1.187	PB-214	D
179.93	90.36	550.	189.	0.095	56.97	1.189	PB-214	D
185.76	93.27	546.	232.	0.116	47.11	1.191	U-235	D
307.78	154.07	855.	144.	0.072	104.96	1.177	XE-138	
418.70	209.53	338.	136.	0.068	62.86	1.410	AC-228	
477.16	238.76	278.	1416.	0.708	9.41	1.297	PB-212	D
483.28	241.82	403.	217.	0.109	44.19	1.299	PB-214	D
541.09	270.73	305.	119.	0.059	73.68	1.459	AC-228	
600.49	300.43	244.	70.	0.035	109.06	1.057	PB-212	
655.60	327.99	218.	68.	0.034	103.90	1.146	AC-228	
1720.93	860.68	68.	78.	0.039	56.52	2.183	TL-208	s
2474.64	1237.53	130.	91.	0.046	78.43	1.684	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
HG-203	145.18	72.75	1655.	-156.	-0.078	113.54	1.500s
PB-212	149.30	74.81	1630.	351.	0.175	50.81	1.500s
PB-214	153.89	77.11	1454.	515.	0.258	33.72	1.500D
PB-212	153.89	77.11	1449.	520.	0.260	33.72	1.500D
EU-155	173.82	87.08	1436.	144.	0.072	114.24	1.500
TH-234	186.04	93.19	1325.	201.	0.100	72.46	1.500s
RA-226	372.53	186.44	718.	284.	0.142	50.64	1.001s
PB-212	477.20	238.78	791.	1163.	0.581	13.30	1.500
RA-224	483.19	241.78	874.	144.	0.072	88.93	1.500
PB-214	590.23	295.30	324.	301.	0.150	30.20	1.500
AC-228	676.68	338.53	329.	247.	0.123	42.05	1.152
PB-214	703.86	352.12	211.	498.	0.249	18.02	1.500
SB-125	925.82	463.11	121.	68.	0.034	74.12	1.500s
TL-208	1021.25	510.83	250.	223.	0.112	39.08	1.208s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1166.41	583.41	150.	524.	0.262	18.26	1.559
BI-214	1218.42	609.42	192.	386.	0.193	25.05	1.658
CS-137	1323.50	661.96	134.	77.	0.039	81.72	1.354s
BI-212	1454.24	727.33	70.	100.	0.050	46.88	1.515
CS-134	1590.18	795.31	67.	38.	0.019	102.71	1.684
AC-228	1822.72	911.58	95.	353.	0.176	21.71	1.576
AC-228	1936.82	968.63	134.	249.	0.124	34.20	1.429s
BI-214	2241.49	1120.96	86.	110.	0.055	54.63	1.360s
K-40	2922.02	1461.21	50.	1770.	0.885	7.60	1.998
BI-212	3242.31	1621.34	7.	17.	0.008	97.65	1.136s
BI-214	3529.15	1764.75	1.	92.	0.046	31.11	2.667s

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

***** S U M M A R Y O 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		4.8012E-02					
			477.56	4.801E-02	&(	2.949E-01 8.71E-02 G	
K-40		1.7386E+01					
			1460.75	1.739E+01	(P	3.493E-01 4.42E-01 G	
MN-54		-1.3585E-02					
			834.81	-1.359E-02	&(P	4.007E-02 1.20E-02 G	
CO-57		-9.8512E-04					
			122.07	-9.851E-04	%(P	3.921E-02 1.17E-02 G K	
			136.43	2.188E-02	& P	3.165E-01 9.45E-02 G	
CO-60		6.5052E-03					
			1332.51	6.505E-03	&(P	3.757E-02 1.07E-02 G K	
			1173.23	2.387E-02	% P	4.932E-02 1.49E-02 G K	
Sr-85		-1.8921E-02					
			514.00	-1.892E-02	%(	4.202E-02 1.27E-02 G	
Kr-85		-4.6142E+02					
			513.99	-4.614E+02	%(P	9.552E+02 2.88E+02 G	
Y-88		-2.1037E-03					
			1836.01	-2.104E-03	%(P	2.136E-02 5.31E-03 G K	
			898.02	-6.105E-03	% P	3.938E-02 1.14E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	5.5326E-03						
		871.10	5.533E-03	&(P	2.248E-02	6.54E-03	G K
		702.50	1.612E-03	& P	3.186E-02	9.21E-03	G K
Ag-108M	1.1942E-02						
		722.95	1.194E-02	&(	2.464E-02	7.48E-03	G K
		614.37	-2.420E-02	&	4.178E-02	1.28E-02	G
		433.93	9.564E-03	& P	2.473E-02	7.40E-03	G
CD-109	4.7845E-01						
		88.04	4.785E-01	%(P	1.239E+00	3.75E-01	G
SN-113	4.4299E-03						
		391.71	4.430E-03	%(P	4.604E-02	1.35E-02	G K
		255.04	2.353E-01	%	1.414E+00	4.22E-01	G
SB-125	6.1867E-02						
		427.95	-1.869E-02	%(P	9.893E-02	2.92E-02	G K
		600.77	1.235E-02	% P	1.669E-01	4.85E-02	G
		636.15	-2.850E-03	% P	2.574E-01	7.38E-02	G
		463.51	3.003E-01	@(P	2.379E-01	7.73E-02	G
		176.29	7.811E-02	% P	4.935E-01	1.48E-01	G
I-131	-2.4942E-03						
		364.48	-2.494E-03	&(	3.992E-02	1.17E-02	G K
		636.97	3.131E-03	%	4.921E-01	1.42E-01	G
		284.29	-1.053E-01	&	5.488E-01	1.64E-01	G
CS-134	1.4980E-02						
		604.66	2.169E-03	&(P	7.164E-02	2.13E-02	G K
		795.76	2.962E-02	(P	3.211E-02	1.03E-02	G
		569.29	8.560E-05	&	1.610E-01	4.61E-02	G
		801.84	6.954E-02	% P	2.951E-01	8.63E-02	G
CS-137	5.3214E-02						
		661.62	5.321E-02	*(P	3.898E-02	1.52E-02	G
CE-139	2.1183E-03						
		165.85	2.118E-03	%(P	3.876E-02	1.15E-02	G
EU-152	-2.2890E-03						
		121.78	-2.289E-03	%(P	1.139E-01	3.40E-02	G K
		344.30	-2.445E-02	& P	1.070E-01	3.18E-02	G
		1408.08	5.003E-02	% P	1.356E-01	4.01E-02	G
		964.00	-2.094E-01	% P	4.084E-01	1.24E-01	G
		1112.07	1.672E-01	% P	2.609E-01	8.07E-02	G
		778.90	-1.389E-02	& P	2.492E-01	7.16E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	2.9844E-03						
		123.10	2.984E-03	&(P	7.626E-02	2.27E-02	G K
		1274.80	-8.962E-04	% P	1.477E-01	4.26E-02	G
		723.30	3.896E-02	& P	1.372E-01	4.05E-02	G
		1004.80	-5.300E-02	% P	2.339E-01	6.89E-02	G
EU-155	1.1552E-01						
		86.45	1.155E-01	&(	1.436E-01	4.40E-02	G K
		105.31	4.485E-02	% P	1.682E-01	5.06E-02	G
HG-203	-1.0145E-02						
		279.17	-1.014E-02	&(P	3.726E-02	1.11E-02	G K
		72.87	-7.782E-01	% P	1.116E+00	3.40E-01	G
		70.83	-1.490E+00	&	1.842E+00	5.64E-01	G
		82.50	-9.168E-02	&	1.994E+00	5.96E-01	G
TL-208	3.2223E-01						
		583.14	3.222E-01	(P	3.668E-02	1.98E-02	G
		510.72	4.725E-01	+ P	1.615E-01	7.09E-02	G
PB-212	7.2804E-01						
		238.63	7.280E-01	(P	8.373E-02	3.27E-02	G K
							Energy duplication
		77.11	8.651E-01	+	2.996E-01	9.72E-02	G
		74.81	1.103E+00	+ P	6.005E-01	1.89E-01	G
PB-214	4.8003E-01						
		351.99	4.764E-01	(P	6.727E-02	2.89E-02	G K
		295.22	4.870E-01	(P	1.402E-01	4.98E-02	G
							Energy duplication
		77.11	1.402E+00	+ P	4.907E-01	1.59E-01	G
		241.92	3.756E-01	% P	5.396E-01	1.65E-01	G
BI-212	5.6465E-01						
		727.17	5.324E-01	(P	2.209E-01	8.43E-02	G K
		1620.56	7.029E-01	(P	6.220E-01	2.36E-01	G
		785.42	6.233E-01	% P	1.618E+00	4.84E-01	G
BI-214	4.5848E-01						
		609.32	4.585E-01	(P	7.972E-02	3.87E-02	G K
		1764.51	7.030E-01	+ P	5.625E-02	7.36E-02	G
		1120.28	6.321E-01	+ P	2.635E-01	1.16E-01	G
RA-224	1.0054E+00						
		241.00	1.005E+00	?(P	9.778E-01	3.03E-01	G
RA-226	2.0629E+00						
		185.99	2.063E+00	@(	9.275E-01	3.49E-01	G

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

AC-228       9.0148E-01
                          911.07 9.015E-01  (P 1.233E-01 6.61E-02 G K
                          968.90 1.106E+00 + P 2.520E-01 1.27E-01 G
                          338.40 7.074E-01 - P 2.501E-01 1.00E-01 G

TH-227      -1.5351E-01
                          236.00-1.535E-01 %(P 3.270E-01 9.91E-02 G K
                          256.25 6.150E-02 % P 4.152E-01 1.23E-01 G

PA-234      -1.0564E-02
                           98.44-1.056E-02 %(  1.298E-01 3.87E-02 G K
                          946.00 0.000E+00 %   2.207E-01 6.38E-02 G
                          131.28 7.529E-04 &   1.613E-01 4.80E-02 G
                           94.67-3.847E-02 %   2.746E-01 8.24E-02 G
                          883.24 5.587E-02 %   2.557E-01 7.49E-02 G
                          926.70-2.157E-02 %   2.981E-01 8.57E-02 G
                          569.26-5.610E-02 &   2.443E-01 7.20E-02 G

TH-234       1.2723E+00
                           63.29 9.638E-01 %(P 1.836E+00 5.56E-01 G K
                           92.80 1.673E+00  (P 1.438E+00 4.44E-01 G
                           92.38 1.196E-01 % P 1.703E+00 5.09E-01 G

AM-241      -2.8586E-02
                           59.54-2.859E-02 &(P 2.400E-01 7.19E-02 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
```

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	4.6860E-02	4.8012E-02	2.6118E-01	2.6120E-01	2.879E-01
K-40		1.7386E+01	1.7386E+01	1.3250E+00	1.6763E+00	
MN-54	#A	-1.3529E-02	-1.3585E-02	3.7500E-02	3.7509E-02	3.990E-02
CO-57	#B	-9.8040E-04	-9.8512E-04	4.0721E-02	4.0721E-02	3.902E-02
CO-60	#B	6.5008E-03	6.5052E-03	3.2167E-02	3.2170E-02	3.754E-02
Sr-85	#A	-1.8546E-02	-1.8921E-02	3.8156E-02	3.8172E-02	4.119E-02
Kr-85	#A	-4.6141E+02	-4.6142E+02	9.9766E+02	9.9804E+02	9.552E+02
Y-88	#B	-2.0782E-03	-2.1037E-03	4.7032E-02	4.7033E-02	2.110E-02
NB-94	#B	5.5326E-03	5.5326E-03	1.9609E-02	1.9612E-02	2.248E-02
Ag-108M	#B	1.1941E-02	1.1942E-02	2.2447E-02	2.2458E-02	2.464E-02
CD-109	#A	4.7708E-01	4.7845E-01	1.1241E+00	1.1244E+00	1.235E+00
SN-113	#B	4.3802E-03	4.4299E-03	4.0643E-02	4.0643E-02	4.553E-02
SB-125	#B	6.1787E-02	6.1867E-02	4.7751E-02	4.7891E-02	9.880E-02
I-131	#B	-2.1225E-03	-2.4942E-03	3.5212E-02	3.5213E-02	3.397E-02
CS-134	#B	1.4954E-02	1.4980E-02	1.5602E-02	1.5627E-02	7.152E-02
CS-137	#	5.3208E-02	5.3214E-02	4.5474E-02	4.5583E-02	
CE-139	#A	2.0984E-03	2.1183E-03	3.4648E-02	3.4648E-02	3.840E-02
EU-152	#B	-2.2883E-03	-2.2890E-03	1.1187E-01	1.1187E-01	1.139E-01
EU-154	#B	2.9831E-03	2.9844E-03	6.8147E-02	6.8148E-02	7.623E-02
EU-155	#A	1.1544E-01	1.1552E-01	1.3198E-01	1.3213E-01	1.435E-01
HG-203	#B	-9.8663E-03	-1.0145E-02	3.6819E-02	3.6823E-02	3.624E-02
TL-208		3.2223E-01	3.2223E-01	5.9341E-02	6.2318E-02	
PB-212	#	7.2804E-01	7.2804E-01	9.8112E-02	1.0712E-01	8.373E-02
PB-214	#	4.8003E-01	4.8003E-01	8.5572E-02	9.0146E-02	6.727E-02
BI-212		5.6465E-01	5.6465E-01	2.6811E-01	2.7018E-01	
BI-214		4.5848E-01	4.5848E-01	1.1613E-01	1.1924E-01	
RA-224	#	1.0054E+00	1.0054E+00	9.0788E-01	9.0982E-01	9.778E-01
RA-226	#	2.0629E+00	2.0629E+00	1.0446E+00	1.0517E+00	
AC-228		9.0148E-01	9.0148E-01	1.9809E-01	2.0512E-01	
TH-227	#B	-1.5351E-01	-1.5351E-01	2.9986E-01	2.9999E-01	3.270E-01
PA-234	#B	-1.0564E-02	-1.0564E-02	1.1623E-01	1.1623E-01	1.298E-01
TH-234	#B	1.2723E+00	1.2723E+00	1.0126E+00	1.0151E+00	1.836E+00
AM-241	#A	-2.8586E-02	-2.8586E-02	2.3033E-01	2.3033E-01	2.400E-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 2000.1 keV) 2.1748560E+01 pCi/gm
Total Decayed Activity (270.7 to 2000.1 keV) 2.1748573E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
DAT

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-02-02-010-F-S WET

Spectrum Filename: C:\GammaVision\Spectra\207F_27APRIL2006_0946.An1

Acquisition information
Start time: 27-Apr-2006 09:47:40
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: 2.0180E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0180E+03) =
4.9554E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	26-Apr-2006 21:12:00
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: 0.1317

***** S U M M A R Y O F P E A K 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	405.	11.94	1.18	2.849E-02	70.83	3.520	2.961E+00	HG203
					74.81	9.600	9.923E-01	PB212
77.06	404.	10.47	1.18	2.957E-02	77.11	17.500	8.180E-01	PB212
					77.11	10.700	1.328E+00	PB214
77.19	207.	27.38	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
87.08	211.	29.98	1.50	3.284E-02	86.45	32.740	1.316E-01	EU155
					88.04	3.790	1.121E+00	CD109
87.09	194.	30.27	1.50	3.327E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	1.030E+00	CD109
92.34	202.	27.71	1.44	3.428E-02				
92.34	202.	27.71	1.44	3.428E-02	92.80	3.000	PBC<MDA	TH234
186.04	182.	21.24	1.07	3.610E-02	185.99	3.280	1.026E+00	RA226
209.72	132.	29.74	1.40	3.425E-02				
238.68	1605.	3.14	1.30	3.189E-02	238.63	43.100	7.744E-01	PB212
					241.00	3.900	8.682E+00	RA224
241.44	243.	19.30	1.30	3.167E-02	241.92	7.470	6.840E-01	PB214
270.09	142.	25.83	1.33	2.946E-02				
277.25	120.	29.43	1.30	2.893E-02				
277.25	120.	29.43	1.30	2.893E-02	279.17	81.500	3.402E-02	HG203
295.29	318.	9.20	1.34	2.767E-02	295.22	19.200	3.951E-01	PB214
300.49	105.	22.48	1.34	2.733E-02				
327.99	99.	39.99	1.13	2.560E-02				
338.46	390.	10.85	1.53	2.500E-02	338.40	12.010	8.636E-01	AC228
351.84	721.	6.96	1.87	2.427E-02	351.99	37.100	5.326E-01	PB214
463.18	74.	29.17	1.50	1.953E-02	463.51	10.000	2.542E-01	SB125
510.94	255.	11.82	1.69	1.807E-02	510.72	22.500	3.643E-01	TL208

583.08	683.	5.83	1.75	1.629E-02	583.14	86.000	3.241E-01	TL208
609.20	505.	6.16	1.85	1.574E-02	609.32	46.090	4.625E-01	BI214
661.37	115.	27.37	1.08	1.478E-02	661.62	84.620	5.972E-02	CS137
727.07	122.	17.62	1.81	1.374E-02	727.17	11.800	4.993E-01	BI212
794.90	89.	25.40	1.40	1.285E-02				
794.90	89.	25.40	1.40	1.285E-02	795.76	85.400	5.418E-02	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
911.05	471.	7.77	2.23	1.161E-02	911.07	29.000	9.285E-01	AC228
963.96	82.	18.93	1.80	1.113E-02				
968.89	223.	8.48	1.80	1.109E-02	968.90	17.460	7.642E-01	AC228
1120.54	130.	16.74	1.89	9.968E-03	1120.28	15.040	5.775E-01	BI214
1460.56	2046.	2.32	2.15	8.192E-03	1460.75	10.700	1.560E+01	K40
1619.77	25.	28.07	2.77	7.569E-03	1620.56	2.750	8.074E-01	BI212
1764.37	92.	11.08	1.32	7.084E-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	
184.35	92.34	1303.	173.	0.087	91.40	1.436	PB-214	sM
419.07	209.72	618.	132.	0.066	89.22	1.403	NP-239	
539.82	270.09	466.	142.	0.071	77.49	1.329	AC-228	s
600.60	300.45	225.	105.	0.052	67.45	1.341	PB-212	lD
655.60	327.99	477.	99.	0.050	119.98	1.135	AC-228	
1927.62	964.05	77.	85.	0.042	54.93	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	149.29	74.81	994.	405.	0.203	35.83	1.178D
PB-212	153.89	77.11	1080.	404.	0.202	31.41	1.179A
PB-214	153.89	77.11	1867.	207.	0.104	82.13	1.500A
EU-155	173.82	87.08	1899.	211.	0.106	89.94	1.500s
CD-109	173.85	87.09	1628.	194.	0.097	90.81	1.500s
RA-226	371.72	186.04	622.	182.	0.091	63.73	1.065s
TH-227	471.85	236.11	1656.	-172.	-0.086	103.10	1.500s
PB-212	476.89	238.63	493.	1583.	0.792	9.48	1.297D
RA-224	477.03	238.70	777.	1580.	0.790	10.61	1.500s
PB-214	483.47	241.92	623.	206.	0.103	54.98	1.299D
HG-203	554.45	277.41	401.	78.	0.039	112.70	1.500s
PB-214	590.47	295.42	588.	421.	0.211	33.71	1.861s
AC-228	676.54	338.46	429.	387.	0.194	32.55	1.526
PB-214	703.29	351.84	466.	716.	0.358	20.89	1.866s
SB-125	925.95	463.18	216.	74.	0.037	87.50	1.500s
TL-208	1021.47	510.94	252.	221.	0.111	35.47	1.691s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1165.74	583.08	219.	678.	0.339	17.49	1.749s
BI-214	1217.99	609.20	164.	501.	0.251	18.47	1.853
CS-137	1322.31	661.37	223.	111.	0.056	82.12	1.080
BI-212	1453.72	727.07	119.	121.	0.060	52.87	1.806s
CS-134	1589.69	795.06	111.	54.	0.027	92.06	1.684s
AC-228	1821.66	911.05	189.	467.	0.233	23.32	2.232s
AC-228	1937.36	968.90	84.	221.	0.111	26.41	1.799D
BI-214	2240.64	1120.54	109.	129.	0.065	50.23	1.886s
K-40	2920.71	1460.56	46.	2041.	1.021	6.96	2.154
BI-212	3239.16	1619.77	9.	25.	0.013	84.21	2.766s
BI-214	3528.39	1764.37	4.	91.	0.046	33.25	1.323s

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

***** S U M M A R Y O 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		3.6540E-03					
			477.56	3.654E-03	%(	2.395E-01 6.99E-02	G
K-40		1.5597E+01					
			1460.75	1.560E+01	(P	2.615E-01 3.63E-01	G
MN-54		1.5185E-02					
			834.81	1.518E-02	&(P	2.879E-02 8.77E-03	G
CO-57		3.2265E-03					
			122.07	3.227E-03	%(P	3.614E-02 1.08E-02	G K
			136.43	1.399E-02	& P	2.807E-01 8.40E-02	G
CO-60		-3.7741E-03					
			1332.51	-3.774E-03	%(P	3.357E-02 9.36E-03	G K
			1173.23	1.347E-02	% P	3.953E-02 1.17E-02	G K
Sr-85		-1.5410E-02					
			514.00	-1.541E-02	%(	3.529E-02 1.07E-02	G
Kr-85		-3.7971E+02					
			513.99	-3.797E+02	%(P	8.133E+02 2.45E+02	G
Y-88		-2.4417E-03					
			1836.01	-2.442E-03	&(P	2.332E-02 6.27E-03	G K
			898.02	6.090E-03	% P	3.074E-02 9.00E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-2.0243E-03						
		871.10	-2.024E-03	&(P	2.593E-02	7.48E-03	G K
		702.50	-7.578E-03	& P	3.177E-02	9.43E-03	G K
Ag-108M	-1.5225E-02						
		722.95	-1.522E-02	%(	3.652E-02	1.10E-02	G K
		614.37	-2.530E-02	&	3.703E-02	1.14E-02	G
		433.93	-6.037E-03	% P	2.785E-02	8.25E-03	G
CD-109	1.0296E+00						
		88.04	1.030E+00	(P	1.014E+00	3.12E-01	G
SN-113	-8.5069E-04						
		391.71	-8.507E-04	&(P	4.197E-02	1.23E-02	G K
		255.04	-1.231E-01	%	1.201E+00	3.57E-01	G
SB-125	5.2618E-02						
		427.95	-1.549E-02	&(P	7.972E-02	2.36E-02	G K
		600.77	3.317E-02	% P	1.283E-01	3.80E-02	G
		636.15	3.238E-02	% P	2.256E-01	6.61E-02	G
		463.51	2.542E-01	*(P	2.442E-01	7.70E-02	G
		176.29	-7.422E-03	% P	3.924E-01	1.17E-01	G
I-131	-5.3361E-03						
		364.48	-5.336E-03	%(	2.942E-02	8.74E-03	G K
		636.97	0.000E+00	%	3.906E-01	1.13E-01	G
		284.29	1.383E-01	%	4.259E-01	1.28E-01	G
CS-134	1.3121E-02						
		604.66	-4.053E-03	%(P	6.879E-02	2.06E-02	G K
		795.76	3.275E-02	*(P	3.171E-02	1.01E-02	G
		569.29	2.421E-02	&	1.631E-01	4.80E-02	G
		801.84	-8.201E-02	% P	3.214E-01	9.51E-02	G
CS-137	5.9720E-02						
		661.62	5.972E-02	(P	3.870E-02	1.69E-02	G
CE-139	9.1312E-03						
		165.85	9.131E-03	%(P	3.577E-02	1.08E-02	G
EU-152	-8.3452E-05						
		121.78	-8.345E-05	%(P	1.054E-01	3.15E-02	G K
		344.30	-1.997E-02	% P	8.503E-02	2.53E-02	G
		1408.08	4.918E-02	& P	1.074E-01	3.23E-02	G
		964.00	-1.853E-02	& P	2.007E-01	5.81E-02	G
		1112.07	-9.126E-03	& P	2.448E-01	7.03E-02	G
		778.90	-3.109E-02	% P	2.268E-01	6.63E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	-9.1974E-03						
		123.10	-9.197E-03	&(P	6.068E-02	1.82E-02	G K
		1274.80	-2.105E-02	% P	9.884E-02	2.90E-02	G
		723.30	-3.112E-02	& P	1.684E-01	4.98E-02	G
		1004.80	1.564E-02	% P	1.460E-01	4.20E-02	G
EU-155	1.3158E-01						
		86.45	1.316E-01	(	1.282E-01	3.94E-02	G K
		105.31	5.014E-02	% P	1.457E-01	4.40E-02	G
HG-203	2.2325E-02						
		279.17	2.233E-02	&(P	2.763E-02	8.53E-03	G K
		72.87	-5.885E-01	& P	9.943E-01	3.02E-01	G
		70.83	-4.612E-01	%	1.472E+00	4.44E-01	G
		82.50	-5.167E-01	%	1.938E+00	5.84E-01	G
TL-208	3.3246E-01						
		583.14	3.241E-01	*(P	3.425E-02	1.90E-02	G
		510.72	3.643E-01	*(P	1.261E-01	4.96E-02	G
PB-212	7.8483E-01						
		238.63	7.714E-01	(P	5.170E-02	2.46E-02	G K
							Energy duplication
		77.11	5.221E-01	}	2.016E-01	5.47E-02	G
		74.81	9.923E-01	+ P	3.662E-01	1.20E-01	G
PB-214	5.3828E-01						
		351.99	5.326E-01	*(P	7.688E-02	3.73E-02	G K
		295.22	5.311E-01	*(P	1.458E-01	6.03E-02	G
							Energy duplication
		77.11	4.384E-01	} P	4.318E-01	1.20E-01	G
		241.92	5.848E-01	(P	3.372E-01	1.08E-01	G
BI-212	4.9930E-01						
		727.17	4.993E-01	*(P	2.212E-01	8.89E-02	G K
		1620.56	8.074E-01	+ P	5.345E-01	2.31E-01	G
		785.42	9.842E-01	% P	1.420E+00	4.39E-01	G
BI-214	4.8263E-01						
		609.32	4.625E-01	(P	5.757E-02	2.87E-02	G K
		1764.51	5.410E-01	@(P	7.071E-02	6.06E-02	G
		1120.28	5.775E-01	+ P	2.291E-01	9.74E-02	G
RA-224	8.5551E+00						
		241.00	8.555E+00	?(P	7.182E-01	3.03E-01	G
RA-226	1.0264E+00						
		185.99	1.026E+00	*(	6.723E-01	2.18E-01	G

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

AC-228       9.0952E-01
                          911.07 9.285E-01  (P 1.329E-01 7.28E-02 G K
                          968.90 7.646E-01 - P 1.569E-01 6.80E-02 G
                          338.40 8.636E-01  (P 2.212E-01 9.45E-02 G

TH-227      -3.2032E-01
                          236.00-3.203E-01 ?(P 3.582E-01 1.10E-01 G K
                          256.25-1.884E-02 % P 3.413E-01 1.01E-01 G

PA-234       2.5215E-02
                           98.44 2.521E-02 %(  1.300E-01 3.91E-02 G K
                          946.00-3.755E-03 %   1.591E-01 4.60E-02 G
                          131.28-3.244E-02 %   1.617E-01 4.87E-02 G
                           94.67-1.002E-01 %   2.336E-01 7.08E-02 G
                          883.24-5.333E-02 %   2.379E-01 7.01E-02 G
                          926.70 4.850E-02 &   2.379E-01 6.97E-02 G
                          569.26 3.584E-02 &   2.419E-01 7.12E-02 G

TH-234       2.1053E-01
                           63.29 2.105E-01 %(P 1.668E+00 5.00E-01 G K
                           92.80 8.506E-01 % P 1.275E+00 3.88E-01 G
                           92.38 1.594E-01 % P 1.408E+00 4.22E-01 G

AM-241       3.4786E-02
                           59.54 3.479E-02 %(P 2.043E-01 6.14E-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
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	3.6292E-03	3.6540E-03	2.0984E-01	2.0985E-01	2.379E-01
K-40		1.5597E+01	1.5597E+01	1.0885E+00	1.4260E+00	
MN-54	#A	1.5167E-02	1.5185E-02	2.6301E-02	2.6316E-02	2.876E-02
CO-57	#B	3.2222E-03	3.2265E-03	3.2483E-02	3.2483E-02	3.609E-02
CO-60	#B	-3.7734E-03	-3.7741E-03	2.0718E-01	2.0718E-01	3.356E-02
Sr-85	#A	-1.5323E-02	-1.5410E-02	3.2029E-02	3.2042E-02	3.510E-02
Kr-85	#A	-3.7971E+02	-3.7971E+02	8.4292E+02	8.4322E+02	8.133E+02
Y-88	#B	-2.4333E-03	-2.4417E-03	3.7196E-02	3.7196E-02	2.325E-02
NB-94	#B	-2.0243E-03	-2.0243E-03	2.4184E-02	2.4184E-02	2.593E-02
Ag-108M	#B	-1.5225E-02	-1.5225E-02	3.3055E-02	3.3068E-02	3.652E-02
CD-109		1.0288E+00	1.0296E+00	9.3649E-01	9.3823E-01	1.013E+00
SN-113	#B	-8.4801E-04	-8.5069E-04	1.3402E-01	1.3402E-01	4.184E-02
SB-125	#B	5.2599E-02	5.2618E-02	4.7790E-02	4.7891E-02	7.969E-02
I-131	#B	-5.1000E-03	-5.3361E-03	2.6223E-02	2.6225E-02	2.812E-02
CS-134	#B	1.3114E-02	1.3121E-02	1.2198E-02	1.2222E-02	6.875E-02
CS-137		5.9718E-02	5.9720E-02	5.0598E-02	5.0721E-02	
CE-139	#A	9.1071E-03	9.1312E-03	3.2293E-02	3.2298E-02	3.567E-02
EU-152	#B	-8.3445E-05	-8.3452E-05	2.6104E-02	2.6104E-02	1.054E-01
EU-154	#B	-9.1963E-03	-9.1974E-03	5.7338E-02	5.7341E-02	6.067E-02
EU-155	#	1.3155E-01	1.3158E-01	1.1835E-01	1.1857E-01	1.282E-01
HG-203	#A	2.2151E-02	2.2325E-02	2.5581E-02	2.5615E-02	2.741E-02
TL-208	#	3.3246E-01	3.3246E-01	5.8525E-02	6.1731E-02	
PB-212		7.8483E-01	7.8483E-01	7.5126E-02	8.8275E-02	
PB-214		5.3828E-01	5.3828E-01	1.1323E-01	1.1761E-01	
BI-212		4.9930E-01	4.9930E-01	2.6680E-01	2.6843E-01	
BI-214		4.8263E-01	4.8263E-01	8.9913E-02	9.4323E-02	
RA-224	#	8.5551E+00	8.5551E+00	9.0923E-01	1.0402E+00	7.182E-01
RA-226	#	1.0264E+00	1.0264E+00	6.5414E-01	6.5694E-01	
AC-228		9.0952E-01	9.0952E-01	1.8364E-01	1.9133E-01	
TH-227	#A	-3.2032E-01	-3.2032E-01	3.3078E-01	3.3132E-01	3.582E-01
PA-234	#B	2.5215E-02	2.5215E-02	1.1726E-01	1.1727E-01	1.300E-01
TH-234	#B	2.1053E-01	2.1053E-01	1.4996E+00	1.4997E+00	1.668E+00
AM-241	#A	3.4786E-02	3.4786E-02	1.8408E-01	1.8409E-01	2.043E-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) 2.1258478E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 2.1259306E+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_6SEP2006_1638.An1

Sample description
FSS-OOL-02-03-008-F-A

Spectrum Filename: C:\GammaVision\Spectra\101F_6SEP2006_1638.An1

Acquisition information
Start time: 06-Sep-2006 16:38:08
Live time: 2000
Real time: 2001
Dead time: 0.05 %
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: 1.8600E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8600E+03) =
5.3763E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-2006 07:35:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1653

***** 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
74.98	98.	27.55	1.50	1.654E-02	74.81	9.600	4.490E-01	PB212
75.11	106.	18.38	1.01	1.664E-02	74.81	9.600	4.624E-01	PB212
76.99	116.	24.06	1.50	1.720E-02	77.11	10.700	4.421E-01	PB214
					77.11	17.500	2.793E-01	PB212
77.07	141.	14.95	1.01	1.720E-02	77.11	10.700	5.571E-01	PB214
					77.11	17.500	3.406E-01	PB212
86.69	47.	40.34	1.01	1.912E-02	82.50	2.240	8.314E-01	HG203
					86.45	32.740	5.459E-02	EU155
93.29	77.	24.59	1.02	1.994E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.95	83.	30.31	1.19	1.858E-02				
185.95	83.	30.31	1.19	1.858E-02	185.99	3.280	9.846E-01	RA226
238.89	235.	7.78	1.12	1.557E-02	238.63	43.100	2.477E-01	PB212
242.01	56.	22.87	1.12	1.540E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	3.511E-01	PB214
295.18	80.	16.30	1.18	1.292E-02	295.22	19.200	2.291E-01	PB214
300.26	30.	38.02	1.42	1.272E-02				
338.67	38.	30.38	1.42	1.134E-02	338.40	12.010	PBC<MDA	AC228
351.90	180.	9.31	1.36	1.093E-02	351.99	37.100	3.191E-01	PB214
462.98	22.	38.64	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125
511.17	22.	27.87	1.50	7.590E-03	510.72	22.500	PBC<MDA	TL208
583.37	69.	15.12	1.19	6.682E-03	583.14	86.000	8.445E-02	TL208
609.48	117.	11.75	1.14	6.411E-03	609.32	46.090	2.849E-01	BI214
911.15	54.	17.80	1.10	4.446E-03	911.07	29.000	2.915E-01	AC228
969.12	26.	29.19	1.62	4.212E-03	968.90	17.460	2.557E-01	AC228
1120.77	40.	26.16	1.49	3.711E-03	1120.28	15.040	5.170E-01	BI214
1460.94	216.	6.80	1.88	2.942E-03	1460.75	10.700	4.932E+00	K40

1765.28	18.	23.57	1.17	2.481E-03	1764.51	15.920	3.230E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
149.79	75.15	138.	106.	0.053	55.13	1.005	PB-214	D
172.95	86.65	156.	47.	0.023	121.03	1.013	BI-207	lD
477.48	238.76	50.	235.	0.117	23.33	1.122	PB-212	D
600.26	300.26	50.	30.	0.015	114.05	1.419	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	149.54	74.98	359.	98.	0.049	82.64	1.499s
PB-214	153.79	77.11	166.	141.	0.071	44.85	1.006D
PB-212	153.79	77.11	330.	116.	0.058	72.17	1.499D
TH-234	185.63	93.03	355.	81.	0.041	91.13	1.499s
TH-234	185.61	93.01	348.	83.	0.042	93.07	1.499s
RA-226	372.19	186.27	204.	55.	0.028	117.16	1.499s
PB-212	477.30	238.80	163.	180.	0.090	36.07	1.499
PB-214	483.54	241.92	55.	56.	0.028	68.64	1.124D
PB-214	590.11	295.18	47.	78.	0.039	48.89	1.182
AC-228	676.63	338.42	57.	44.	0.022	80.24	1.499
PB-214	703.60	351.90	38.	178.	0.089	27.93	1.360s
SB-125	925.85	462.98	30.	22.	0.011	115.92	1.499
TL-208	1166.91	583.45	22.	60.	0.030	48.39	1.499s
BI-214	1218.99	609.48	25.	116.	0.058	35.25	1.137s
AC-228	1823.19	911.42	14.	31.	0.016	67.87	1.578
AC-228	1938.66	969.12	18.	26.	0.013	87.57	1.616s
BI-214	2242.14	1120.77	19.	40.	0.020	78.48	1.488s
K-40	2922.89	1460.94	2.	214.	0.107	20.41	1.884
BI-214	3532.00	1765.28	0.	18.	0.009	70.71	1.166s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		7.8287E-02					
			477.56	7.829E-02	&(	2.565E-01 7.54E-02	G
K-40		4.9318E+00					
			1460.75	4.932E+00	(P	2.249E-01 3.39E-01	G
MN-54		2.5568E-03					
			834.81	2.557E-03	&(P	2.676E-02 7.09E-03	G
CO-57		-6.3639E-03					
			122.07	-6.364E-03	%(	3.138E-02 9.33E-03	G K
			136.43	-6.249E-02	%	2.537E-01 7.57E-02	G
CO-60		1.4874E-02					
			1332.51	1.487E-02	&(P	3.394E-02 1.02E-02	G K
			1173.23	2.243E-04	% P	3.969E-02 1.04E-02	G K
Sr-85		-5.6587E-03					
			514.00	-5.659E-03	&(	3.507E-02 1.01E-02	G
Kr-85		-1.5642E+02					
			513.99	-1.564E+02	&(P	8.149E+02 2.33E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	2.259E-02 3.07E-03	G K
			898.02	2.933E-04	% P	3.477E-02 9.14E-03	G
NB-94		-3.1009E-03					
			871.10	-3.101E-03	%(P	3.345E-02 9.08E-03	G K
			702.50	6.317E-03	% P	3.049E-02 8.67E-03	G K
Ag-108M		0.0000E+00					
			722.95	0.000E+00	%(	6.026E-02 1.71E-02	G K
			614.37	-1.029E-02	& P	4.204E-02 1.22E-02	G
			433.93	3.561E-03	%	2.529E-02 7.16E-03	G
CD-109		1.3540E-01					
			88.04	1.354E-01	&(P	8.585E-01 2.55E-01	G
SN-113		3.6559E-04					
			391.71	3.656E-04	%(	3.387E-02 9.35E-03	G K
			255.04	-1.214E-01	% P	1.235E+00 3.59E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	4.7381E-02						
		427.95	-8.870E-04	%(P	1.048E-01	2.95E-02	G K
		600.77	-1.381E-03	% P	1.739E-01	4.76E-02	G
		636.15	5.375E-02	& P	2.624E-01	7.46E-02	G
		463.51	1.903E-01	(P	2.470E-01	7.84E-02	G
		176.29	3.067E-02	& P	4.103E-01	1.20E-01	G
I-131	-9.3131E-04						
		364.48	-9.313E-04	%(	3.170E-02	8.95E-03	G K
		636.97	4.975E-02	&	4.191E-01	1.17E-01	G
		284.29	7.759E-02	%	3.978E-01	1.16E-01	G
CS-134	-6.6258E-03						
		604.66	-6.626E-03	%(P	3.918E-02	1.12E-02	G K
		795.76	2.009E-02	% P	3.957E-02	1.21E-02	G
		569.29	4.487E-02	% P	1.631E-01	4.70E-02	G
		801.84	-5.042E-02	%	4.165E-01	1.16E-01	G
CS-137	6.3079E-03						
		661.62	6.308E-03	%(P	2.837E-02	7.89E-03	G
CE-139	1.9082E-04						
		165.85	1.908E-04	&(P	3.280E-02	9.57E-03	G
EU-152	-1.8904E-02						
		121.78	-1.890E-02	%(P	9.712E-02	2.88E-02	G K
		344.30	1.941E-02	% P	9.124E-02	2.65E-02	G
		1408.08	4.079E-02	% P	1.773E-01	4.92E-02	G
		964.00	-5.435E-03	% P	5.051E-01	1.43E-01	G
		1112.07	-2.635E-02	& P	3.319E-01	9.07E-02	G
		778.90	4.738E-02	& P	2.004E-01	5.65E-02	G
EU-154	-1.8176E-02						
		123.10	-1.818E-02	%(P	6.356E-02	1.89E-02	G K
		1274.80	1.448E-03	% P	1.033E-01	2.64E-02	G
		723.30	-1.906E-02	% P	1.783E-01	4.94E-02	G
		1004.80	-6.296E-04	& P	2.103E-01	5.54E-02	G
EU-155	6.5775E-02						
		86.45	6.577E-02	%(	1.073E-01	3.28E-02	G K
		105.31	2.858E-02	&	1.262E-01	3.76E-02	G
HG-203	-5.9496E-03						
		279.17	-5.950E-03	%(	3.252E-02	9.53E-03	G K
		72.87	-3.503E-01	& P	7.750E-01	2.34E-01	G
		70.83	-7.172E-01	&	1.353E+00	4.12E-01	G
		82.50	-3.628E-02	%	1.467E+00	4.31E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	7.5746E-02						
		583.14	7.575E-02	@(P	3.087E-02	1.27E-02	G
		510.72	9.332E-02	% P	1.558E-01	4.50E-02	G
PB-212	1.9460E-01						
		238.63	1.946E-01	(P	6.734E-02	2.42E-02	G K
							Energy duplication
		77.11	2.793E-01	+	2.108E-01	6.72E-02	G
		74.81	4.490E-01	& P	4.165E-01	1.30E-01	G
PB-214	3.2446E-01						
		351.99	3.191E-01	*(P	5.634E-02	3.00E-02	G K
		295.22	2.291E-01	- P	1.013E-01	3.82E-02	G
							Energy duplication
		77.11	5.571E-01	+ P	2.476E-01	8.55E-02	G
		241.92	3.510E-01	(P	2.362E-01	8.13E-02	G
BI-212	1.7830E-01						
		727.17	1.783E-01	%(P	2.835E-01	8.84E-02	G K
		1620.56	-8.324E-02	%	1.127E+00	2.76E-01	G
		785.42	6.196E-01	% P	1.389E+00	4.18E-01	G
BI-214	2.9467E-01						
		609.32	2.849E-01	@(P	6.406E-02	3.38E-02	G K
		1764.51	3.230E-01	(P	1.355E-01	7.81E-02	G
		1120.28	5.170E-01	+ P	3.017E-01	1.37E-01	G
RA-224	5.5554E-01						
		241.00	5.555E-01	&(P	7.752E-01	2.40E-01	G
RA-226	6.5738E-01						
		185.99	6.574E-01	*(	8.264E-01	2.57E-01	G
AC-228	2.1263E-01						
		911.07	1.767E-01	(P	1.117E-01	4.23E-02	G K
		968.90	2.557E-01	(P	2.197E-01	7.67E-02	G
		338.40	2.369E-01	(P	2.014E-01	6.65E-02	G
TH-227	-2.8757E-02						
		236.00	-2.876E-02	%(P	2.794E-01	8.20E-02	G K
		256.25	-1.969E-02	% P	3.646E-01	1.05E-01	G
PA-234	-1.5110E-03						
		98.44	-1.511E-03	%(	1.193E-01	3.51E-02	G K
		946.00	9.664E-03	&	1.886E-01	5.11E-02	G
		131.28	4.104E-03	%	1.445E-01	4.25E-02	G
		94.67	-6.217E-02	%	2.137E-01	6.41E-02	G
		883.24	-1.438E-02	%	2.514E-01	6.68E-02	G
		926.70	9.689E-02	%	2.826E-01	8.27E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 7.077E-02 %   2.397E-01 6.97E-02 G

TH-234       7.1778E-01
                           63.29 2.004E-01 %(P 1.392E+00 4.10E-01 G K
                           92.80 1.016E+00  (P 1.091E+00 3.39E-01 G
                           92.38 1.155E+00  (P 1.289E+00 3.98E-01 G

AM-241      -2.8692E-02
                           59.54-2.869E-02 %(P 1.998E-01 5.91E-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	7.7905E-02	7.8287E-02	2.2606E-01	2.2610E-01	2.553E-01
K-40		4.9318E+00	4.9318E+00	1.0174E+00	1.0549E+00	
MN-54	#A	2.5547E-03	2.5568E-03	2.1257E-02	2.1258E-02	2.674E-02
CO-57	#B	-6.3578E-03	-6.3639E-03	2.7991E-02	2.7994E-02	3.135E-02
CO-60	#B	1.4872E-02	1.4874E-02	3.0660E-02	3.0671E-02	3.394E-02

Sr-85	#A	-5.6359E-03	-5.6587E-03	3.0354E-02	3.0356E-02	3.493E-02
Kr-85	#A	-1.5641E+02	-1.5642E+02	9.8068E+02	9.8072E+02	8.149E+02
Y-88	#B	0.0000E+00	0.0000E+00	9.1953E-03	9.1969E-03	2.253E-02
NB-94	#B	-3.1009E-03	-3.1009E-03	3.1171E-02	3.1171E-02	3.345E-02
Ag-108M	#B	0.0000E+00	0.0000E+00	5.1245E-02	5.1245E-02	6.026E-02
CD-109	#A	1.3532E-01	1.3540E-01	7.6479E-01	7.6482E-01	8.580E-01
SN-113	#B	3.6476E-04	3.6559E-04	2.8057E-02	2.8057E-02	3.379E-02
SB-125	#B	4.7369E-02	4.7381E-02	5.8563E-02	5.8625E-02	1.048E-01
I-131	#B	-9.0151E-04	-9.3131E-04	2.6840E-02	2.6840E-02	3.069E-02
CS-134	#B	-6.6235E-03	-6.6258E-03	4.1612E-02	4.1614E-02	3.917E-02
CS-137	#A	6.3078E-03	6.3079E-03	2.3683E-02	2.3685E-02	2.837E-02
CE-139	#A	1.9045E-04	1.9082E-04	2.8725E-02	2.8725E-02	3.274E-02
EU-152	#B	-1.8903E-02	-1.8904E-02	9.5382E-02	9.5388E-02	9.712E-02
EU-154	#B	-1.8175E-02	-1.8176E-02	6.1913E-02	6.1921E-02	6.356E-02
EU-155	#B	6.5765E-02	6.5775E-02	9.8359E-02	9.8426E-02	1.073E-01
HG-203	#B	-5.9164E-03	-5.9496E-03	2.8605E-02	2.8607E-02	3.234E-02
TL-208	#	7.5746E-02	7.5746E-02	3.8103E-02	3.8343E-02	3.087E-02
PB-212	#	1.9460E-01	1.9460E-01	7.2587E-02	7.3415E-02	6.734E-02
PB-214		3.2446E-01	3.2446E-01	9.1624E-02	9.3440E-02	
BI-212	#B	1.7830E-01	1.7830E-01	2.6523E-01	2.6542E-01	2.835E-01
BI-214		2.9467E-01	2.9467E-01	1.0487E-01	1.0618E-01	
RA-224	#A	5.5554E-01	5.5554E-01	7.1856E-01	7.1925E-01	7.752E-01
RA-226	#A	6.5738E-01	6.5738E-01	7.7020E-01	7.7109E-01	8.264E-01
AC-228	#	2.1263E-01	2.1263E-01	1.0113E-01	1.0184E-01	1.117E-01
TH-227	#B	-2.8757E-02	-2.8757E-02	2.7879E-01	2.7879E-01	2.794E-01
PA-234	#B	-1.5110E-03	-1.5110E-03	1.0522E-01	1.0522E-01	1.193E-01
TH-234	#B	7.1778E-01	7.1778E-01	7.1746E-01	7.1857E-01	1.392E+00
AM-241	#A	-2.8692E-02	-2.8692E-02	2.0516E-01	2.0517E-01	1.998E-01

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

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

Total Activity (295.1 to 1999.1 keV) 5.5509315E+00 pCi/gm
Total Decayed Activity (295.1 to 1999.1 keV) 5.5509315E+00 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-02-03-001-F

Spectrum Filename: C:\GammaVision\Spectra\101F_6SEPT2006_0906.An1

Acquisition information

Start time:	06-Sep-2006 09:06:55
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:	1.6840E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.6840E+03) = 5.9382E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 14:44:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1150

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.10	159.	22.48	1.50	1.720E-02	77.11	10.700	6.925E-01	PB214
					77.11	17.500	PBC<MDA	PB212
77.10	163.	22.48	1.50	1.720E-02	77.11	10.700	6.925E-01	PB214
					77.11	17.500	4.333E-01	PB212
185.51	86.	28.04	0.97	1.861E-02				
185.51	86.	28.04	0.97	1.861E-02	185.99	3.280	1.138E+00	RA226
238.73	432.	5.73	1.12	1.557E-02	238.63	43.100	5.094E-01	PB212
241.80	78.	22.65	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
295.01	108.	16.39	1.40	1.293E-02				
295.01	108.	16.39	1.40	1.293E-02	295.22	19.200	3.423E-01	PB214
327.69	28.	40.95	0.98	1.171E-02				
338.16	96.	17.11	1.09	1.136E-02	338.40	12.010	5.552E-01	AC228
351.94	180.	11.86	1.33	1.093E-02				
351.94	180.	11.86	1.33	1.093E-02	351.99	37.100	3.525E-01	PB214
463.08	60.	24.83	0.96	8.349E-03				
463.08	60.	24.83	0.96	8.349E-03	463.51	10.000	5.636E-01	SB125
510.49	80.	21.07	1.81	7.594E-03				
510.49	80.	21.07	1.81	7.594E-03	510.72	22.500	3.006E-01	TL208
583.25	139.	11.29	1.27	6.683E-03	583.14	86.000	1.913E-01	TL208
609.19	153.	11.84	1.35	6.414E-03	609.32	46.090	4.124E-01	BI214
727.52	29.	29.27	1.09	5.441E-03	727.17	11.800	3.514E-01	BI212
911.16	96.	13.52	1.72	4.446E-03	911.07	29.000	5.883E-01	AC228
968.92	51.	31.05	1.51	4.212E-03	968.90	17.460	5.530E-01	AC228
1460.62	466.	4.83	1.67	2.943E-03	1460.75	10.700	1.183E+01	K40
1764.15	27.	19.25	3.16	2.481E-03	1764.51	15.920	5.396E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
477.16	238.65	91.	432.	0.216	17.19	1.122	PB-212	D

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
483.30	241.71	115.	78.	0.039	67.96	1.124	PB-214	D
655.16	327.69	55.	28.	0.014	122.85	0.984	AC-228	
1020.91	510.49	98.	42.	0.021	109.74	1.813	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	153.79	77.11	590.	159.	0.079	67.43	1.499D
PB-212	153.79	77.11	586.	163.	0.081	67.43	1.499D
RA-226	371.81	186.08	257.	72.	0.036	100.87	1.499s
PB-212	477.11	238.70	250.	372.	0.186	23.37	1.499
PB-214	590.07	295.16	119.	99.	0.049	54.61	1.499s
AC-228	676.10	338.16	73.	94.	0.047	51.34	1.088s
PB-214	703.95	352.08	70.	164.	0.082	31.34	1.499
SB-125	926.48	463.29	59.	39.	0.019	92.90	1.499s
TL-208	1166.47	583.23	36.	134.	0.067	31.49	1.499
BI-214	1218.42	609.19	51.	152.	0.076	35.51	1.350
BI-212	1455.19	727.52	20.	28.	0.014	87.80	1.086
AC-228	1822.68	911.16	23.	95.	0.047	40.56	1.724s
AC-228	1938.25	968.92	50.	51.	0.025	93.16	1.512
K-40	2922.26	1460.62	12.	464.	0.232	14.48	1.673
BI-214	3529.74	1764.15	0.	27.	0.013	57.74	3.164s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		6.5863E-02					
			477.56	6.586E-02	%(	3.218E-01	9.32E-02 G
K-40		1.1829E+01					
			1460.75	1.183E+01	(P	4.785E-01	5.74E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	5.3250E-03						
		834.81	5.325E-03	&(P	4.531E-02	1.27E-02	G
CO-57	-1.3930E-04						
		122.07	-1.393E-04	%(	4.217E-02	1.24E-02	G K
		136.43	-4.351E-03	&	3.012E-01	8.85E-02	G
CO-60	-2.1810E-04						
		1332.51	-2.181E-04	&(P	5.676E-02	1.51E-02	G K
		1173.23	6.687E-03	% P	6.214E-02	1.74E-02	G K
Sr-85	-3.7064E-03						
		514.00	-3.706E-03	%(	4.412E-02	1.27E-02	G
Kr-85	-2.3058E+02						
		513.99	-2.306E+02	%(P	9.797E+02	2.83E+02	G
Y-88	-3.1844E-03						
		1836.01	-3.184E-03	%(	4.122E-02	1.03E-02	G K
		898.02	-3.890E-03	% P	5.188E-02	1.44E-02	G
NB-94	5.8454E-03						
		871.10	5.845E-03	&(P	4.296E-02	1.20E-02	G K
		702.50	8.018E-03	& P	4.531E-02	1.30E-02	G K
Ag-108M	-1.4322E-02						
		722.95	-1.432E-02	%(	5.393E-02	1.58E-02	G K
		614.37	-2.262E-02	% P	5.500E-02	1.65E-02	G
		433.93	7.349E-03	%	3.383E-02	9.82E-03	G
CD-109	-5.7182E-03						
		88.04	-5.718E-03	%(P	1.338E+00	3.97E-01	G
SN-113	-1.7616E-05						
		391.71	-1.762E-05	%(	5.750E-02	1.64E-02	G K
		255.04	4.338E-01	% P	1.519E+00	4.52E-01	G
SB-125	9.3015E-02						
		427.95	-1.753E-03	&(P	1.143E-01	3.22E-02	G K
		600.77	4.787E-02	& P	1.734E-01	5.03E-02	G
		636.15	-6.785E-02	% P	3.444E-01	9.84E-02	G
		463.51	3.735E-01	(P	3.706E-01	1.20E-01	G
		176.29	-7.132E-02	& P	5.538E-01	1.63E-01	G
I-131	1.0637E-03						
		364.48	1.064E-03	%(	5.228E-02	1.51E-02	G K
		636.97	-1.309E-01	%	5.628E-01	1.63E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		284.29	-1.321E-01	%	6.742E-01	1.99E-01	G
CS-134	-4.3169E-03						
		604.66	-4.317E-03	%(P	3.711E-02	1.03E-02	G K
		795.76	1.217E-03	% P	5.358E-02	1.47E-02	G
		569.29	3.927E-02	& P	2.683E-01	7.70E-02	G
		801.84	-4.030E-02	&	4.867E-01	1.35E-01	G
CS-137	3.0197E-02						
		661.62	3.020E-02	%(P	5.120E-02	1.58E-02	G
CE-139	2.6088E-03						
		165.85	2.609E-03	%(P	4.262E-02	1.26E-02	G
EU-152	2.3096E-02						
		121.78	2.310E-02	%(P	1.160E-01	3.46E-02	G K
		344.30	2.853E-04	% P	1.162E-01	3.30E-02	G
		1408.08	-2.213E-03	% P	2.044E-01	5.13E-02	G
		964.00	-5.865E-02	& P	4.799E-01	1.37E-01	G
		1112.07	3.377E-03	% P	4.128E-01	1.12E-01	G
		778.90	-1.404E-02	& P	4.154E-01	1.17E-01	G
EU-154	1.2097E-02						
		123.10	1.210E-02	%(P	8.821E-02	2.62E-02	G K
		1274.80	-1.515E-04	% P	2.212E-01	6.15E-02	G
		723.30	-6.473E-02	% P	2.538E-01	7.38E-02	G
		1004.80	-1.550E-03	& P	2.836E-01	7.68E-02	G
EU-155	9.5671E-03						
		86.45	9.567E-03	&(	1.606E-01	4.78E-02	G K
		105.31	4.413E-03	&	1.863E-01	5.52E-02	G
HG-203	1.1216E-02						
		279.17	1.122E-02	%(	4.267E-02	1.27E-02	G K
		72.87	-2.916E-02	% P	7.682E-01	2.26E-01	G
		70.83	-1.623E-02	%	2.137E+00	6.36E-01	G
		82.50	-6.620E-02	%	2.087E+00	6.18E-01	G
TL-208	1.8660E-01						
		583.14	1.866E-01	(P	4.300E-02	1.99E-02	G
		510.72	1.025E-01	% P	2.210E-01	6.42E-02	G
PB-212	4.4112E-01						
		238.63	4.443E-01	(P	9.135E-02	3.52E-02	G K
							Energy duplication
		77.11	4.333E-01	(	3.080E-01	9.74E-02	G
		74.81	3.732E-01	& P	6.250E-01	1.90E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.2335E-01						
		351.99	3.254E-01	(P	8.242E-02	3.44E-02	G K
		295.22	3.194E-01	@(P	1.732E-01	5.92E-02	G
							Energy duplication
		77.11	6.925E-01	+ P	5.053E-01	1.59E-01	G
		241.92	-8.111E-02	% P	5.684E-01	1.68E-01	G
BI-212	3.5137E-01						
		727.17	3.514E-01	(P	2.934E-01	1.05E-01	G K
		1620.56	1.116E-01	&	1.306E+00	3.26E-01	G
		785.42	5.890E-01	% P	2.048E+00	5.96E-01	G
BI-214	4.4505E-01						
		609.32	4.124E-01	(P	9.781E-02	4.92E-02	G K
		1764.51	5.396E-01	(P	1.497E-01	1.06E-01	G
		1120.28	1.966E-01	& P	4.203E-01	1.27E-01	G
RA-224	6.0868E-01						
		241.00	6.087E-01	%(P	1.127E+00	3.43E-01	G
RA-226	9.4833E-01						
		185.99	9.483E-01	*(	1.020E+00	3.19E-01	G
AC-228	5.7097E-01						
		911.07	5.883E-01	@(P	1.573E-01	8.11E-02	G K
		968.90	5.530E-01	(P	3.903E-01	1.74E-01	G
		338.40	5.552E-01	@(P	2.498E-01	9.72E-02	G
TH-227	-1.8620E-01						
		236.00	-1.862E-01	%(P	3.974E-01	1.20E-01	G K
		256.25	-8.761E-02	% P	4.397E-01	1.29E-01	G
PA-234	-2.9547E-02						
		98.44	-2.955E-02	%(	1.509E-01	4.50E-02	G K
		946.00	-1.483E-02	%	2.868E-01	8.02E-02	G
		131.28	-3.886E-02	&	1.982E-01	5.92E-02	G
		94.67	-1.231E-01	%	2.938E-01	8.88E-02	G
		883.24	7.028E-02	&	3.816E-01	1.09E-01	G
		926.70	0.000E+00	%	5.672E-01	1.58E-01	G
		569.26	6.189E-02	&	3.965E-01	1.14E-01	G
TH-234	1.8874E-02						
		63.29	1.887E-02	%(P	1.959E+00	5.77E-01	G K
		92.80	8.152E-01	% P	1.458E+00	4.43E-01	G
		92.38	-7.030E-02	& P	1.713E+00	5.03E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	2.3427E-02						
		59.54	2.343E-02	%(P	1.987E-01	5.86E-02	G

(- This peak used in the nuclide activity average.

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

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	6.5212E-02	6.5863E-02	2.7953E-01	2.7956E-01	3.186E-01
K-40		1.1829E+01	1.1829E+01	1.7212E+00	1.8464E+00	
MN-54	#A	5.3160E-03	5.3250E-03	3.8054E-02	3.8055E-02	4.524E-02
CO-57	#B	-1.3903E-04	-1.3930E-04	3.7303E-02	3.7303E-02	4.209E-02
CO-60	#B	-2.1804E-04	-2.1810E-04	7.8625E-03	7.8625E-03	5.675E-02
Sr-85	#A	-3.6762E-03	-3.7064E-03	3.7980E-02	3.7980E-02	4.376E-02
Kr-85	#A	-2.3058E+02	-2.3058E+02	1.0955E+03	1.0956E+03	9.797E+02
Y-88	#B	-3.1686E-03	-3.1844E-03	3.0774E-02	3.0774E-02	4.101E-02
NB-94	#B	5.8453E-03	5.8454E-03	3.6070E-02	3.6071E-02	4.296E-02
Ag-108M	#B	-1.4322E-02	-1.4322E-02	4.7364E-02	4.7371E-02	5.393E-02
CD-109	#A	-5.7115E-03	-5.7182E-03	2.2464E+01	2.2464E+01	1.336E+00

SN-113	#B	-1.7534E-05	-1.7616E-05	4.9202E-02	4.9202E-02	5.724E-02
SB-125	#B	9.2966E-02	9.3015E-02	8.9630E-02	8.9784E-02	1.142E-01
I-131	#B	9.9573E-04	1.0637E-03	4.5240E-02	4.5240E-02	4.894E-02
CS-134	#B	-4.3139E-03	-4.3169E-03	4.4844E-02	4.4845E-02	3.708E-02
CS-137	#A	3.0196E-02	3.0197E-02	4.7276E-02	4.7307E-02	5.120E-02
CE-139	#A	2.5987E-03	2.6088E-03	3.7690E-02	3.7690E-02	4.245E-02
EU-152	#B	2.3093E-02	2.3096E-02	1.0370E-01	1.0371E-01	1.160E-01
EU-154	#B	1.2095E-02	1.2097E-02	7.8605E-02	7.8608E-02	8.820E-02
EU-155	#B	9.5643E-03	9.5671E-03	1.4347E-01	1.4347E-01	1.606E-01
HG-203	#B	1.1088E-02	1.1216E-02	3.8030E-02	3.8036E-02	4.219E-02
TL-208	#	1.8660E-01	1.8660E-01	5.9814E-02	6.0736E-02	4.300E-02
PB-212	#	4.4112E-01	4.4112E-01	1.0478E-01	1.0770E-01	9.135E-02
PB-214	#	3.2335E-01	3.2335E-01	1.0255E-01	1.0416E-01	8.242E-02
BI-212		3.5137E-01	3.5137E-01	3.1592E-01	3.1655E-01	
BI-214		4.4505E-01	4.4505E-01	1.5294E-01	1.5499E-01	
RA-224	#A	6.0868E-01	6.0868E-01	1.0291E+00	1.0297E+00	1.127E+00
RA-226	#A	9.4833E-01	9.4833E-01	9.5662E-01	9.5812E-01	1.020E+00
AC-228		5.7097E-01	5.7097E-01	2.2028E-01	2.2263E-01	
TH-227	#B	-1.8620E-01	-1.8620E-01	3.6876E-01	3.6891E-01	3.974E-01
PA-234	#B	-2.9547E-02	-2.9547E-02	1.3507E-01	1.3508E-01	1.509E-01
TH-234	#B	1.8874E-02	1.8874E-02	1.7321E+00	1.7321E+00	1.959E+00
AM-241	#A	2.3427E-02	2.3427E-02	1.7590E-01	1.7590E-01	1.987E-01

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

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

Total Activity (294.6 to 1999.1 keV) 1.3196764E+01 pCi/gm
Total Decayed Activity (294.6 to 1999.1 keV) 1.3196764E+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_6SEPT2006_0950.An1

Sample description
FSS-OOL-02-03-011-F

Spectrum Filename: C:\GammaVision\Spectra\101F_6SEPT2006_0950.An1

Acquisition information
Start time: 06-Sep-2006 09:50:50
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: 1.8350E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8350E+03) =
5.4496E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:28:00
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: 0.1196

***** S U M M A R Y O F P E A K 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.	14.19	1.00	1.654E-02	74.81	9.600	9.455E-01	PB212
77.07	249.	10.07	1.01	1.720E-02	77.11	10.700	1.017E+00	PB214
					77.11	17.500	6.310E-01	PB212
86.83	224.	11.77	0.85	1.915E-02				
89.71	62.	30.15	0.00	1.954E-02				
92.78	108.	33.58	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.78	124.	29.78	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.01	108.	28.00	1.40	1.858E-02	185.99	3.280	1.305E+00	RA226
238.78	615.	4.79	1.12	1.557E-02	238.63	43.100	6.678E-01	PB212
241.48	96.	21.34	1.12	1.542E-02	241.00	3.900	1.170E+00	RA224
					241.92	7.470	6.129E-01	PB214
270.30	89.	25.77	0.85	1.400E-02				
295.26	116.	15.09	1.02	1.292E-02	295.22	19.200	3.385E-01	PB214
300.41	44.	38.33	1.01	1.271E-02				
327.79	39.	40.29	0.78	1.170E-02				
338.22	181.	14.99	1.21	1.136E-02	338.40	12.010	9.671E-01	AC228
352.10	226.	8.75	1.33	1.092E-02	351.99	37.100	4.078E-01	PB214
408.95	51.	38.05	0.68	9.432E-03				
463.32	52.	24.42	1.03	8.345E-03				
463.32	52.	24.42	1.03	8.345E-03	463.51	10.000	4.448E-01	SB125
510.97	127.	14.83	1.17	7.587E-03	510.72	22.500	4.785E-01	TL208
583.10	174.	10.06	1.30	6.685E-03				
583.10	174.	10.06	1.30	6.685E-03	583.14	86.000	2.192E-01	TL208
609.29	156.	13.28	1.49	6.413E-03	609.32	46.090	3.849E-01	BI214
727.29	28.	38.17	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212

910.95	127.	12.20	1.78	4.447E-03	911.07	29.000	7.135E-01	AC228
968.56	96.	16.33	1.75	4.213E-03	968.90	17.460	9.521E-01	AC228
1120.68	36.	36.85	0.70	3.711E-03	1120.28	15.040	4.700E-01	BI214
1460.66	487.	4.64	2.24	2.943E-03	1460.75	10.700	1.134E+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	
540.33	270.30	166.	89.	0.044	77.30	0.845	AC-228	s
600.58	300.41	107.	44.	0.022	114.98	1.010	PB-212	
655.36	327.79	92.	39.	0.019	120.87	0.780	AC-228	
817.74	408.95	105.	51.	0.025	114.14	0.675	CS-138	s
1021.88	510.97	112.	80.	0.040	65.64	1.168	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	149.19	74.81	341.	204.	0.102	42.58	1.005D
PB-212	153.79	77.11	334.	249.	0.125	30.20	1.006A
EU-155	177.22	88.82	841.	-121.	-0.060	105.49	1.499
TH-234	185.13	92.78	744.	108.	0.054	100.73	1.499s
TH-234	185.15	92.78	691.	124.	0.062	89.34	1.499s
RA-226	371.70	186.02	395.	110.	0.055	81.90	1.499s
PB-212	476.96	238.63	132.	609.	0.304	14.37	1.122D
RA-224	482.53	241.42	387.	76.	0.038	114.59	1.499
PB-214	483.54	241.92	153.	65.	0.032	88.55	1.124D
PB-214	590.26	295.26	92.	114.	0.057	45.26	1.019
AC-228	676.23	338.22	176.	179.	0.090	44.96	1.205s
PB-214	703.99	352.10	78.	224.	0.112	26.26	1.325
SB-125	926.35	463.23	56.	52.	0.026	71.26	1.499
TL-208	1166.48	583.24	50.	171.	0.085	28.40	1.499
BI-214	1218.62	609.29	77.	154.	0.077	39.84	1.494s
BI-212	1454.74	727.29	47.	28.	0.014	114.51	1.499s
AC-228	1822.25	910.95	37.	125.	0.062	36.61	1.777
AC-228	1937.53	968.56	40.	95.	0.048	48.99	1.755
BI-214	2241.94	1120.68	40.	36.	0.018	110.55	0.705s
K-40	2922.33	1460.66	9.	485.	0.242	13.91	2.245

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

***** S U M M A R Y O 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		6.2572E-02					
			477.56	6.257E-02	%(	3.580E-01 1.04E-01	G
K-40		1.1340E+01					
			1460.75	1.134E+01	(P	3.936E-01 5.28E-01	G
MN-54		1.1923E-02					
			834.81	1.192E-02	%(P	4.463E-02 1.30E-02	G
CO-57		2.3411E-03					
			122.07	2.341E-03	%(	4.608E-02 1.37E-02	G K
			136.43	1.597E-03	%	3.487E-01 1.03E-01	G
CO-60		1.5112E-02					
			1332.51	1.511E-02	%(P	4.412E-02 1.29E-02	G K
			1173.23	-3.104E-04	% P	8.040E-02 2.27E-02	G K
Sr-85		5.5306E-03					
			514.00	5.531E-03	%(	4.739E-02 1.38E-02	G
Kr-85		1.0023E+02					
			513.99	1.002E+02	%(P	1.091E+03 3.15E+02	G
Y-88		-7.1856E-04					
			1836.01	-7.186E-04	%(	4.291E-02 1.06E-02	G K
			898.02	-8.582E-03	% P	5.543E-02 1.58E-02	G
NB-94		-6.0320E-03					
			871.10	-6.032E-03	%(P	4.631E-02 1.31E-02	G K
			702.50	7.867E-03	% P	4.217E-02 1.21E-02	G K
Ag-108M		-1.5360E-02					
			722.95	-1.536E-02	%(	6.216E-02 1.83E-02	G K
			614.37	-3.186E-04	% P	4.175E-02 1.16E-02	G
			433.93	9.263E-03	%	3.411E-02 1.00E-02	G
CD-109		-8.1156E-01					
			88.04	-8.116E-01	&(P	1.503E+00 4.57E-01	G
SN-113		6.8966E-03					
			391.71	6.897E-03	&(	5.746E-02 1.67E-02	G K
			255.04	1.235E-02	% P	1.787E+00 5.23E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.1881E-01						
		427.95	3.149E-03	%(P	1.040E-01	2.94E-02	G K
		600.77	-2.353E-02	% P	1.975E-01	5.60E-02	G
		636.15	8.700E-04	% P	3.277E-01	9.05E-02	G
		463.51	4.612E-01	(P	3.315E-01	1.13E-01	G
		176.29	1.333E-01	% P	6.040E-01	1.80E-01	G
I-131	6.7338E-03						
		364.48	6.734E-03	%(	4.549E-02	1.33E-02	G K
		636.97	3.084E-02	&	5.268E-01	1.47E-01	G
		284.29	1.033E-02	&	6.773E-01	1.98E-01	G
CS-134	-9.1390E-03						
		604.66	-9.139E-03	&(P	5.192E-02	1.51E-02	G K
		795.76	3.159E-02	% P	5.437E-02	1.68E-02	G
		569.29	5.871E-02	% P	2.571E-01	7.49E-02	G
		801.84	-6.715E-03	%	4.723E-01	1.30E-01	G
CS-137	-1.7792E-03						
		661.62	-1.779E-03	%(P	5.378E-02	1.50E-02	G
CE-139	-8.7669E-03						
		165.85	-8.767E-03	%(P	4.884E-02	1.46E-02	G
EU-152	1.2095E-03						
		121.78	1.209E-03	&(P	1.217E-01	3.59E-02	G K
		344.30	-3.256E-03	% P	1.273E-01	3.65E-02	G
		1408.08	-1.531E-04	% P	2.088E-01	5.37E-02	G
		964.00	1.566E-01	% P	4.645E-01	1.38E-01	G
		1112.07	-4.758E-02	% P	4.824E-01	1.37E-01	G
		778.90	-1.530E-02	% P	3.231E-01	8.97E-02	G
EU-154	-7.7882E-03						
		123.10	-7.788E-03	%(P	9.839E-02	2.92E-02	G K
		1274.80	-1.041E-02	& P	1.779E-01	4.95E-02	G
		723.30	-7.530E-02	% P	2.987E-01	8.77E-02	G
		1004.80	1.765E-02	% P	2.326E-01	6.36E-02	G
EU-155	-1.4229E-01						
		86.45	-1.423E-01	(	1.624E-01	5.00E-02	G K
		105.31	6.535E-02	%	1.899E-01	5.72E-02	G
HG-203	2.6147E-03						
		279.17	2.615E-03	&(	4.295E-02	1.26E-02	G K
		72.87	-2.573E-01	% P	1.191E+00	3.57E-01	G
		70.83	5.958E-02	&	2.462E+00	7.36E-01	G
		82.50	1.788E-02	%	2.370E+00	7.05E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.1887E-01						
		583.14	2.189E-01	(P	4.578E-02	2.10E-02	G
		510.72	1.107E-01	% P	2.414E-01	7.10E-02	G
PB-212	6.5719E-01						
		238.63	6.678E-01	(P	6.180E-02	3.23E-02	G K
							Energy duplication
		77.11	6.102E-01	}	2.150E-01	6.14E-02	G
		74.81	9.455E-01	+ P	4.118E-01	1.38E-01	G
PB-214	3.8755E-01						
		351.99	4.078E-01	(P	7.950E-02	3.60E-02	G K
		295.22	3.385E-01	(P	1.407E-01	5.19E-02	G
							Energy duplication
		77.11	0.000E+00	} P	5.110E-01	0.00E+00	G
		241.92	4.132E-01	(P	3.869E-01	1.23E-01	G
BI-212	3.2472E-01						
		727.17	3.247E-01	*(P	3.991E-01	1.27E-01	G K
		1620.56	-2.432E-01	%	1.948E+00	5.32E-01	G
		785.42	-4.664E-01	& P	2.437E+00	7.02E-01	G
BI-214	4.0586E-01						
		609.32	3.849E-01	@(P	1.083E-01	5.15E-02	G K
		1764.51	1.720E-01	% P	2.593E-01	8.41E-02	G
		1120.28	4.700E-01	(P	4.265E-01	1.75E-01	G
RA-224	9.2402E-01						
		241.00	9.240E-01	?(P	1.154E+00	3.56E-01	G
RA-226	1.3284E+00						
		185.99	1.328E+00	(	1.152E+00	3.63E-01	G
AC-228	8.3685E-01						
		911.07	7.135E-01	(P	1.775E-01	8.84E-02	G K
		968.90	9.521E-01	(P	3.220E-01	1.57E-01	G
		338.40	9.671E-01	@(P	3.486E-01	1.47E-01	G
TH-227	-2.0341E-01						
		236.00	-2.034E-01	&(P	4.589E-01	1.39E-01	G K
		256.25	-7.196E-03	% P	5.468E-01	1.60E-01	G
PA-234	-6.3114E-02						
		98.44	-6.311E-02	%(	1.765E-01	5.32E-02	G K
		946.00	-3.405E-02	%	2.517E-01	7.14E-02	G
		131.28	2.960E-02	&	2.013E-01	6.01E-02	G
		94.67	-6.080E-02	&	3.168E-01	9.49E-02	G
		883.24	-3.948E-03	%	3.527E-01	9.63E-02	G
		926.70	-2.506E-02	&	4.939E-01	1.39E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 9.157E-02 %   3.797E-01 1.11E-01 G

TH-234       1.2299E+00
                           63.29 7.859E-01 %(P 2.119E+00 6.38E-01 G K
                           92.80 1.528E+00  (P 1.545E+00 4.78E-01 G
                           92.38 1.555E+00  (P 1.874E+00 5.75E-01 G

AM-241       5.7620E-02
                           59.54 5.762E-02 &(P 2.665E-01 7.97E-02 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	6.1953E-02	6.2572E-02	3.1208E-01	3.1210E-01	3.544E-01
K-40		1.1340E+01	1.1340E+01	1.5845E+00	1.7091E+00	
MN-54	#A	1.1903E-02	1.1923E-02	3.8899E-02	3.8905E-02	4.455E-02
CO-57	#B	2.3365E-03	2.3411E-03	4.1050E-02	4.1051E-02	4.599E-02
CO-60	#B	1.5108E-02	1.5112E-02	3.8708E-02	3.8717E-02	4.411E-02

Sr-85	#A	5.4855E-03	5.5306E-03	4.1302E-02	4.1303E-02	4.700E-02
Kr-85	#A	1.0023E+02	1.0023E+02	9.4568E+02	9.4570E+02	1.091E+03
Y-88	#B	-7.1499E-04	-7.1856E-04	3.1703E-02	3.1703E-02	4.270E-02
NB-94	#B	-6.0320E-03	-6.0320E-03	4.2093E-02	4.2094E-02	4.631E-02
Ag-108M	#B	-1.5359E-02	-1.5360E-02	5.4832E-02	5.4839E-02	6.216E-02
CD-109	#A	-8.1061E-01	-8.1156E-01	1.3859E+00	1.3866E+00	1.501E+00
SN-113	#B	6.8648E-03	6.8966E-03	5.0156E-02	5.0157E-02	5.720E-02
SB-125	#F	1.1875E-01	1.1881E-01	8.7007E-02	8.7266E-02	1.040E-01
I-131	#B	6.3035E-03	6.7338E-03	3.9856E-02	3.9858E-02	4.258E-02
CS-134	#B	-9.1326E-03	-9.1390E-03	5.2974E-02	5.2976E-02	5.189E-02
CS-137	#A	-1.7791E-03	-1.7792E-03	2.8658E-01	2.8658E-01	5.378E-02
CE-139	#A	-8.7331E-03	-8.7669E-03	4.5270E-02	4.5273E-02	4.865E-02
EU-152	#B	1.2094E-03	1.2095E-03	1.0784E-01	1.0784E-01	1.217E-01
EU-154	#B	-7.7869E-03	-7.7882E-03	1.0737E-01	1.0737E-01	9.837E-02
EU-155	#A	-1.4224E-01	-1.4229E-01	1.5010E-01	1.5030E-01	1.624E-01
HG-203	#B	2.5851E-03	2.6147E-03	3.7653E-02	3.7653E-02	4.246E-02
TL-208	#	2.1887E-01	2.1887E-01	6.3025E-02	6.4227E-02	4.578E-02
PB-212		6.5719E-01	6.5719E-01	9.5385E-02	1.0236E-01	
PB-214		3.8755E-01	3.8755E-01	1.0267E-01	1.0498E-01	
BI-212	#A	3.2472E-01	3.2472E-01	3.8073E-01	3.8117E-01	3.991E-01
BI-214		4.0586E-01	4.0586E-01	1.6287E-01	1.6447E-01	
RA-224	#A	9.2402E-01	9.2402E-01	1.0689E+00	1.0701E+00	1.154E+00
RA-226	#	1.3284E+00	1.3284E+00	1.0880E+00	1.0906E+00	1.152E+00
AC-228		8.3685E-01	8.3685E-01	2.1405E-01	2.1921E-01	
TH-227	#B	-2.0341E-01	-2.0341E-01	4.2404E-01	4.2420E-01	4.589E-01
PA-234	#B	-6.3114E-02	-6.3114E-02	1.5973E-01	1.5977E-01	1.765E-01
TH-234	#B	1.2299E+00	1.2299E+00	1.1536E+00	1.1556E+00	2.119E+00
AM-241	#A	5.7619E-02	5.7620E-02	2.3924E-01	2.3926E-01	2.665E-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) 1.3627584E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.3627584E+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_6SEPT2006_1331.An1

Sample description
FSS-OOL-02-03-009-F

Spectrum Filename: C:\GammaVision\Spectra\101F_6SEPT2006_1331.An1

Acquisition information
Start time: 06-Sep-2006 13:31:38
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: 1.5710E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5710E+03) =
6.3654E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:14:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1305

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
63.29	80.	40.64	1.01	1.120E-02	63.29	3.900	PBC<MDA	TH234
74.84	127.	34.13	1.50	1.654E-02				
74.84	127.	34.13	1.50	1.654E-02	74.81	9.600	PBC<MDA	PB212
77.11	264.	16.17	1.50	1.720E-02	77.11	10.700	1.233E+00	PB214
					77.11	17.500	7.541E-01	PB212
77.11	268.	16.17	1.50	1.720E-02	77.11	10.700	1.233E+00	PB214
					77.11	17.500	7.647E-01	PB212
87.22	107.	23.32	1.01	1.923E-02	88.04	3.790	1.249E+00	CD109
90.08	68.	37.53	1.02	1.960E-02				
93.18	86.	29.04	1.02	1.995E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
					94.67	15.500	2.381E-01	PA234
186.08	90.	38.36	0.96	1.858E-02	185.99	3.280	1.270E+00	RA226
238.80	643.	4.70	1.12	1.557E-02	238.63	43.100	8.163E-01	PB212
238.92	372.	8.50	1.50	1.540E-02	238.63	43.100	PBC<MDA	PB212
241.49	98.	21.42	1.12	1.542E-02	241.00	3.900	1.382E+00	RA224
270.74	82.	30.78	1.30	1.398E-02				
295.32	137.	17.08	1.21	1.292E-02	295.22	19.200	4.678E-01	PB214
328.07	53.	33.91	1.36	1.169E-02				
338.47	151.	16.69	1.59	1.135E-02	338.40	12.010	9.404E-01	AC228
352.02	182.	12.38	0.99	1.092E-02	351.99	37.100	3.818E-01	PB214
463.48	56.	27.63	1.54	8.342E-03				
463.48	56.	27.63	1.54	8.342E-03	463.51	10.000	5.670E-01	SB125
510.42	117.	18.42	1.43	7.595E-03	510.72	22.500	5.076E-01	TL208
583.29	181.	9.04	1.11	6.683E-03	583.14	86.000	2.679E-01	TL208
609.59	131.	12.04	1.37	6.410E-03	609.32	46.090	3.780E-01	BI214
661.89	43.	33.93	1.30	5.935E-03	661.62	84.620	7.228E-02	CS137

727.56	26.	37.87	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
795.20	26.	34.00	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134
911.15	135.	12.27	1.76	4.446E-03	911.07	29.000	8.854E-01	AC228
968.75	108.	13.51	1.52	4.213E-03	968.90	17.460	1.255E+00	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1119.19	51.	23.90	2.17	3.711E-03	1120.28	15.040	7.832E-01	BI214
1460.87	559.	4.42	1.85	2.942E-03	1460.75	10.700	1.521E+01	K40
1764.38	12.	37.27	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	
179.73	90.21	291.	68.	0.034	112.60	1.016	PB-214	lD
477.30	238.78	134.	643.	0.322	14.09	1.122	PB-212	D
482.68	241.47	169.	98.	0.049	64.25	1.123	PB-214	D
541.21	270.74	192.	82.	0.041	92.34	1.301	AC-228	s
655.91	328.07	106.	53.	0.027	101.74	1.365	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	149.25	74.84	951.	127.	0.063	102.38	1.499
PB-214	153.79	77.11	806.	264.	0.132	48.51	1.499D
PB-212	153.79	77.11	803.	268.	0.134	48.51	1.499D
CD-109	175.66	88.04	286.	83.	0.041	92.18	1.014D
TH-234	185.81	93.12	650.	116.	0.058	88.91	1.499
TH-234	185.80	93.11	653.	96.	0.048	109.99	1.499
PA-234	185.83	93.13	485.	108.	0.054	91.06	1.499
RA-226	371.83	186.09	394.	91.	0.045	98.15	1.499s
PB-212	477.28	238.79	316.	518.	0.259	19.37	1.499
RA-224	482.96	241.63	364.	81.	0.041	104.03	1.499
PB-214	477.55	238.92	315.	372.	0.186	25.49	1.499
PB-214	590.61	295.43	159.	112.	0.056	54.40	1.499s
AC-228	676.73	338.47	154.	149.	0.075	50.08	1.585s
PB-214	703.92	352.06	97.	153.	0.077	35.87	1.499
SB-125	925.85	462.98	66.	40.	0.020	94.44	1.499s
TL-208	1020.66	510.36	113.	107.	0.053	53.66	1.437s
TL-208	1166.59	583.29	36.	179.	0.090	27.11	1.109
BI-214	1219.21	609.59	50.	130.	0.065	36.11	1.369
CS-137	1323.87	661.89	60.	42.	0.021	101.80	1.296
BI-212	1455.28	727.56	37.	26.	0.013	113.61	1.499s
CS-134	1590.62	795.20	27.	26.	0.013	102.01	1.502

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1822.64	911.15	38.	133.	0.066	36.82	1.764s
AC-228	1937.91	968.75	31.	107.	0.054	40.54	1.515
BI-214	2238.96	1119.19	31.	51.	0.025	71.70	2.170s
K-40	2922.76	1460.87	13.	557.	0.278	13.27	1.849
BI-214	3530.20	1764.38	5.	12.	0.006	111.80	2.106s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		1.3348E-01					
			477.56	1.335E-01	%(	4.472E-01 1.32E-01 G	
K-40		1.5207E+01					
			1460.75	1.521E+01	(P	5.397E-01 6.75E-01 G	
MN-54		-1.0822E-02					
			834.81	-1.082E-02	%(P	5.829E-02 1.67E-02 G	
CO-57		2.1337E-03					
			122.07	2.134E-03	%(	4.694E-02 1.39E-02 G K	
			136.43	1.059E-01	%	3.672E-01 1.10E-01 G	
CO-60		-3.7058E-03					
			1332.51	-3.706E-03	&(P	6.114E-02 1.66E-02 G K	
			1173.23	-8.854E-05	% P	6.924E-02 1.90E-02 G K	
Sr-85		-1.2987E-02					
			514.00	-1.299E-02	%(	5.776E-02 1.70E-02 G	
Kr-85		-3.2919E+02					
			513.99	-3.292E+02	%(P	1.328E+03 3.89E+02 G	
Y-88		-1.3117E-03					
			1836.01	-1.312E-03	%(	6.094E-02 1.57E-02 G K	
			898.02	-4.944E-04	& P	5.621E-02 1.53E-02 G	
NB-94		7.7788E-03					
			871.10	7.779E-03	%(P	5.120E-02 1.45E-02 G K	
			702.50	7.365E-05	& P	4.538E-02 1.25E-02 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	8.8301E-03						
		722.95	8.830E-03	%(	5.496E-02	1.57E-02	G K
		614.37	-3.409E-03	& P	5.860E-02	1.67E-02	G
		433.93	-8.238E-03	%	4.623E-02	1.35E-02	G
CD-109	9.7413E-01						
		88.04	9.741E-01	(P	9.593E-01	3.01E-01	G
SN-113	5.3022E-04						
		391.71	5.302E-04	%(	6.799E-02	1.95E-02	G K
		255.04	2.766E-02	& P	1.472E+00	4.24E-01	G
SB-125	8.8219E-02						
		427.95	-2.127E-02	&(P	1.590E-01	4.62E-02	G K
		600.77	8.813E-02	% P	1.659E-01	5.10E-02	G
		636.15	-4.559E-02	% P	4.399E-01	1.25E-01	G
		463.51	4.123E-01	@(P	4.177E-01	1.34E-01	G
		176.29	1.742E-02	% P	6.622E-01	1.95E-01	G
I-131	2.0651E-02						
		364.48	2.065E-02	%(	4.898E-02	1.48E-02	G K
		636.97	4.928E-04	%	6.218E-01	1.72E-01	G
		284.29	9.847E-03	%	7.364E-01	2.14E-01	G
CS-134	2.3650E-02						
		604.66	-7.247E-04	&(P	4.653E-02	1.29E-02	G K
		795.76	5.151E-02	(P	5.376E-02	1.78E-02	G
		569.29	1.781E-02	% P	3.005E-01	8.52E-02	G
		801.84	2.719E-03	&	4.835E-01	1.31E-01	G
CS-137	7.2280E-02						
		661.62	7.228E-02	(P	6.633E-02	2.51E-02	G
CE-139	6.0534E-03						
		165.85	6.053E-03	%(P	5.427E-02	1.61E-02	G
EU-152	-9.2001E-03						
		121.78	-9.200E-03	%(P	1.595E-01	4.73E-02	G K
		344.30	-1.560E-04	% P	1.301E-01	3.71E-02	G
		1408.08	8.299E-03	% P	2.368E-01	6.15E-02	G
		964.00	-7.208E-03	% P	6.058E-01	1.72E-01	G
		1112.07	1.484E-01	& P	4.247E-01	1.25E-01	G
		778.90	-3.840E-02	% P	4.139E-01	1.17E-01	G
EU-154	-9.9143E-04						
		123.10	-9.914E-04	&(P	1.089E-01	3.22E-02	G K
		1274.80	-7.335E-04	% P	2.015E-01	5.52E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-8.022E-02 % P 2.984E-01 8.73E-02 G
                         1004.80-5.364E-03 % P 2.483E-01 6.58E-02 G

EU-155      -2.6591E-02
                           86.45-2.659E-02 &(  1.386E-01 4.14E-02 G K
                          105.31-7.960E-02 %   2.061E-01 6.22E-02 G

HG-203       1.0562E-02
                          279.17 1.056E-02 %(  5.191E-02 1.54E-02 G K
                           72.87-3.967E-01 & P 1.305E+00 3.93E-01 G
                           70.83 7.699E-01 %   2.177E+00 6.57E-01 G
                           82.50-3.474E-01 &   2.685E+00 8.02E-01 G

TL-208       2.6788E-01
                          583.14 2.679E-01  (P 4.588E-02 2.45E-02 G
                          510.72 5.378E-01 + P 2.634E-01 1.11E-01 G

PB-212       6.9163E-01
                          238.63 6.633E-01  (P 1.096E-01 4.33E-02 G K
                                                          Energy duplication
                           77.11 7.647E-01  (  3.849E-01 1.24E-01 G
                           74.81 6.857E-01 &(P 7.933E-01 2.44E-01 G

PB-214       3.4714E-01
                          351.99 3.254E-01  (P 1.030E-01 3.94E-02 G K
                          295.22 3.892E-01  (P 2.129E-01 7.17E-02 G
                                                          Energy duplication
                           77.11 1.233E+00 + P 6.310E-01 2.02E-01 G
                          241.92 2.780E+00 + P 6.390E-01 2.37E-01 G

BI-212       3.4218E-01
                          727.17 3.422E-01 *(P 4.154E-01 1.33E-01 G K
                         1620.56 4.062E-01 %   1.226E+00 3.52E-01 G
                          785.42 5.274E-01 & P 2.885E+00 8.32E-01 G

BI-214       3.7803E-01
                          609.32 3.780E-01  (P 1.039E-01 4.59E-02 G K
                         1764.51 2.678E-01 - P 2.934E-01 1.03E-01 G
                         1120.28 7.832E-01 + P 4.428E-01 1.88E-01 G

RA-224       1.1605E+00
                          241.00 1.160E+00  (P 1.308E+00 4.06E-01 G

RA-226       1.2794E+00
                          185.99 1.279E+00 @(  1.344E+00 4.19E-01 G

AC-228       9.0152E-01
                          911.07 8.854E-01 @(P 2.104E-01 1.10E-01 G K
                          968.90 1.255E+00 + P 3.338E-01 1.71E-01 G
                          338.40 9.404E-01  (P 3.820E-01 1.59E-01 G
```

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.6010E-02
                          236.00-1.601E-02 %(P 3.974E-01 1.17E-01 G K
                          256.25 5.800E-02 % P 5.827E-01 1.71E-01 G

PA-234       8.5520E-02
                           98.44-4.633E-02 &(  1.992E-01 5.97E-02 G K
                          946.00 0.000E+00 %   3.576E-01 1.00E-01 G
                          131.28-2.032E-03 %   2.232E-01 6.61E-02 G
                           94.67 2.990E-01 &(  2.912E-01 9.08E-02 G
                          883.24-4.004E-03 %   4.006E-01 1.09E-01 G
                          926.70-5.839E-02 %   5.056E-01 1.42E-01 G
                          569.26 3.121E-02 %   4.439E-01 1.26E-01 G

TH-234       1.6557E+00
                                                          Energy duplication
                           63.29 1.675E+00 %(P 2.416E+00 7.38E-01 G K
                           92.80 1.379E+00  (P 1.755E+00 5.38E-01 G
                           92.38 1.949E+00  (P 2.049E+00 6.32E-01 G

AM-241      -1.4723E-01
                           59.54-1.472E-01 &(P 3.597E-01 1.09E-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
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - 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	1.3188E-01	1.3348E-01	3.9748E-01	3.9756E-01	4.418E-01
K-40		1.5207E+01	1.5207E+01	2.0261E+00	2.2008E+00	
MN-54	#A	-1.0799E-02	-1.0822E-02	5.7491E-02	5.7494E-02	5.817E-02
CO-57	#B	2.1286E-03	2.1337E-03	4.1668E-02	4.1669E-02	4.683E-02
CO-60	#B	-3.7045E-03	-3.7058E-03	5.6447E-02	5.6448E-02	6.112E-02
Sr-85	#A	-1.2859E-02	-1.2987E-02	5.1074E-02	5.1080E-02	5.719E-02
Kr-85	#A	-3.2919E+02	-3.2919E+02	1.4124E+03	1.4125E+03	1.328E+03
Y-88	#B	-1.3038E-03	-1.3117E-03	4.6955E-02	4.6955E-02	6.057E-02
NB-94	#B	7.7788E-03	7.7788E-03	4.3499E-02	4.3501E-02	5.120E-02
Ag-108M	#B	8.8300E-03	8.8301E-03	4.7232E-02	4.7235E-02	5.495E-02
CD-109		9.7274E-01	9.7413E-01	9.0301E-01	9.0463E-01	
SN-113	#B	5.2726E-04	5.3022E-04	5.8577E-02	5.8577E-02	6.761E-02
SB-125	#B	8.8163E-02	8.8219E-02	8.6332E-02	8.6475E-02	1.589E-01
I-131	#B	1.9061E-02	2.0651E-02	4.4260E-02	4.4275E-02	4.521E-02
CS-134	#B	2.3629E-02	2.3650E-02	2.4519E-02	2.4555E-02	4.649E-02
CS-137		7.2276E-02	7.2280E-02	7.5124E-02	7.5235E-02	
CE-139	#A	6.0252E-03	6.0534E-03	4.8362E-02	4.8363E-02	5.402E-02
EU-152	#B	-9.1988E-03	-9.2001E-03	1.8025E-01	1.8025E-01	1.595E-01
EU-154	#B	-9.9122E-04	-9.9143E-04	2.5031E+00	2.5031E+00	1.089E-01
EU-155	#B	-2.6582E-02	-2.6591E-02	1.2410E-01	1.2411E-01	1.385E-01
HG-203	#B	1.0417E-02	1.0562E-02	4.6139E-02	4.6143E-02	5.120E-02
TL-208		2.6788E-01	2.6788E-01	7.3592E-02	7.5132E-02	
PB-212	#	6.9163E-01	6.9163E-01	1.3553E-01	1.4105E-01	1.096E-01
PB-214	#	3.4714E-01	3.4714E-01	1.1479E-01	1.1646E-01	1.030E-01
BI-212	#A	3.4218E-01	3.4218E-01	3.9906E-01	3.9953E-01	4.154E-01
BI-214		3.7803E-01	3.7803E-01	1.3766E-01	1.3931E-01	
RA-224	#A	1.1605E+00	1.1605E+00	1.2179E+00	1.2197E+00	1.308E+00
RA-226	#A	1.2794E+00	1.2794E+00	1.2557E+00	1.2578E+00	1.344E+00
AC-228		9.0152E-01	9.0152E-01	2.8422E-01	2.8875E-01	
TH-227	#B	-1.6010E-02	-1.6010E-02	4.5798E-01	4.5798E-01	3.974E-01
PA-234	#B	8.5520E-02	8.5520E-02	7.7873E-02	7.8017E-02	1.992E-01
TH-234	#B	1.6557E+00	1.6557E+00	1.1123E+00	1.1161E+00	2.416E+00
AM-241	#A	-1.4723E-01	-1.4723E-01	3.3715E-01	3.3725E-01	3.597E-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 (270.6 to 1999.1 keV) 1.7799896E+01 pCi/gm
Total Decayed Activity (270.6 to 1999.1 keV) 1.7801285E+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_7SEP2006_0832.An1

Sample description
FSS-OOL-02-03-025-F

Spectrum Filename: C:\GammaVision\Spectra\101F_7SEP2006_0832.An1

Acquisition information
Start time: 07-Sep-2006 08:32:59
Live time: 2000
Real time: 2002
Dead time: 0.10 %
Detector ID: 1

Detector system
Det 101- DSPE-633

Calibration
Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration
Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.2930E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.2930E+03) =
7.7340E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-2006 08:30:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0580

***** S U M M A R Y O F P E A 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	243.	16.11	1.50	1.720E-02	77.11	10.700	1.380E+00	PB214
					77.11	17.500	8.441E-01	PB212
77.04	247.	16.11	1.50	1.720E-02	77.11	10.700	1.380E+00	PB214
					77.11	17.500	8.570E-01	PB212
90.16	65.	36.87	1.02	1.960E-02	88.04	3.790	PBC<MDA	CD109
93.07	87.	26.00	1.02	1.993E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.98	90.	34.69	0.88	2.110E-02				
185.93	102.	27.50	1.14	1.859E-02				
185.93	102.	27.50	1.14	1.859E-02	185.99	3.280	1.746E+00	RA226
238.76	522.	5.22	1.12	1.556E-02	238.63	43.100	8.038E-01	PB212
241.69	75.	24.59	1.12	1.541E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.39	76.	27.78	1.06	1.400E-02				
295.24	155.	14.94	1.03	1.292E-02	295.22	19.200	6.451E-01	PB214
338.36	104.	19.58	1.21	1.135E-02	338.40	12.010	7.776E-01	AC228
352.03	196.	8.85	1.20	1.092E-02	351.99	37.100	4.998E-01	PB214
462.88	42.	32.35	0.97	8.353E-03				
462.88	42.	32.35	0.97	8.353E-03	463.51	10.000	5.022E-01	SB125
511.01	100.	21.92	1.95	7.586E-03	510.72	22.500	5.163E-01	TL208
583.32	170.	11.13	1.06	6.683E-03	583.14	86.000	3.057E-01	TL208
609.14	150.	11.89	1.23	6.414E-03	609.32	46.090	5.272E-01	BI214
661.49	166.	10.23	1.28	5.939E-03	661.62	84.620	3.435E-01	CS137
725.81	39.	32.94	1.33	5.452E-03				
727.43	26.	36.70	1.50	5.443E-03	727.17	11.800	PBC<MDA	BI212
911.00	80.	14.94	1.14	4.447E-03	911.07	29.000	6.365E-01	AC228
969.01	72.	24.03	1.36	4.212E-03	968.90	17.460	1.016E+00	AC228

1119.81	54.	29.06	1.62	3.711E-03	1120.28	15.040	1.019E+00	BI214
1460.61	494.	4.67	1.64	2.943E-03	1460.75	10.700	1.631E+01	K40
1764.26	8.	39.45	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	
179.89	90.21	255.	65.	0.033	110.62	1.016	PB-214	lD
185.58	93.12	229.	79.	0.039	88.34	1.018	U-235	D
257.57	128.98	361.	83.	0.042	102.31	0.882	AC-228	
477.22	238.81	111.	522.	0.261	15.67	1.122	PB-212	D
483.08	241.74	133.	75.	0.038	73.78	1.124	PB-214	D
540.50	270.39	154.	76.	0.038	83.33	1.063	AC-228	s
925.65	462.88	56.	42.	0.021	97.05	0.974	CS-138	l
1451.78	725.81	42.	39.	0.020	98.81	1.331	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-214	153.79	77.11	671.	243.	0.122	48.32	1.499D
PB-212	153.79	77.11	667.	247.	0.123	48.32	1.499D
TH-234	185.65	93.03	553.	86.	0.043	112.40	1.499s
RA-226	371.39	185.87	333.	87.	0.043	95.13	1.499s
PB-212	477.28	238.79	277.	380.	0.190	23.64	1.499
RA-224	482.66	241.48	295.	64.	0.032	117.83	1.499s
PB-214	590.30	295.28	143.	127.	0.063	47.31	1.499s
AC-228	676.51	338.36	121.	101.	0.051	58.74	1.207
PB-214	703.95	352.08	130.	182.	0.091	34.19	1.499
TL-208	1021.88	510.97	124.	81.	0.041	66.97	1.939s
TL-208	1166.65	583.32	60.	168.	0.084	33.40	1.061s
BI-214	1218.32	609.14	48.	149.	0.075	35.66	1.231s
CS-137	1323.06	661.49	37.	165.	0.083	30.69	1.280s
BI-212	1455.02	727.43	37.	26.	0.013	110.09	1.499s
AC-228	1822.34	911.00	28.	79.	0.039	44.81	1.137s
AC-228	1938.43	969.01	57.	71.	0.036	72.09	1.359
BI-214	2240.21	1119.81	44.	54.	0.027	87.17	1.619s
K-40	2922.23	1460.61	12.	491.	0.246	14.01	1.640

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

***** S U M M A R Y O 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		1.4761E-01					
			477.56	1.476E-01	%(	5.399E-01 1.59E-01	G
K-40		1.6313E+01					
			1460.75	1.631E+01	(P	6.164E-01 7.65E-01	G
MN-54		-1.0116E-02					
			834.81	-1.012E-02	%(P	7.180E-02 2.04E-02	G
CO-57		1.5205E-02					
			122.07	1.521E-02	%(	5.563E-02 1.67E-02	G K
			136.43	-7.508E-03	%	3.771E-01 1.11E-01	G
CO-60		2.8395E-02					
			1332.51	2.840E-02	%(P	7.861E-02 2.32E-02	G K
			1173.23	3.125E-02	% P	7.934E-02 2.37E-02	G K
Sr-85		-2.3652E-02					
			514.00	-2.365E-02	&(	7.775E-02 2.32E-02	G
Kr-85		-5.7935E+02					
			513.99	-5.794E+02	&(P	1.784E+03 5.29E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	3.263E-02 4.43E-03	G K
			898.02	-1.302E-02	& P	7.468E-02 2.13E-02	G
NB-94		-6.9706E-03					
			871.10	-6.971E-03	&(P	6.576E-02 1.85E-02	G K
			702.50	-2.029E-03	% P	5.510E-02 1.53E-02	G K
Ag-108M		-1.3694E-02					
			722.95	-1.369E-02	%(	7.858E-02 2.28E-02	G K
			614.37	-1.128E-02	% P	6.221E-02 1.79E-02	G
			433.93	-1.033E-02	%	6.563E-02 1.92E-02	G
CD-109		2.2275E-01					
			88.04	2.227E-01	&(P	1.748E+00 5.22E-01	G
SN-113		4.0527E-03					
			391.71	4.053E-03	%(	7.260E-02 2.08E-02	G K
			255.04	-4.411E-01	% P	2.082E+00 6.15E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-1.2766E-03						
		427.95	-1.277E-03	&(P	2.074E-01	5.96E-02	G K
		600.77	-3.868E-03	% P	2.624E-01	7.23E-02	G
		636.15	8.491E-02	% P	4.983E-01	1.43E-01	G
		463.51	2.954E-01	% P	4.825E-01	1.48E-01	G
		176.29	-2.455E-01	% P	8.034E-01	2.40E-01	G
I-131	-1.3149E-02						
		364.48	-1.315E-02	&(	7.334E-02	2.16E-02	G K
		636.97	1.528E-01	%	8.184E-01	2.36E-01	G
		284.29	1.009E-01	%	7.439E-01	2.17E-01	G
CS-134	-2.0924E-02						
		604.66	-2.092E-02	%(P	7.317E-02	2.15E-02	G K
		795.76	-1.363E-02	& P	8.492E-02	2.43E-02	G
		569.29	9.158E-02	% P	2.891E-01	8.48E-02	G
		801.84	1.129E-02	&	5.216E-01	1.39E-01	G
CS-137	3.4349E-01						
		661.62	3.435E-01	@(P	6.451E-02	3.53E-02	G
CE-139	-1.2023E-04						
		165.85	-1.202E-04	&(P	5.576E-02	1.64E-02	G
EU-152	4.6259E-02						
		121.78	4.626E-02	%(P	1.657E-01	4.97E-02	G K
		344.30	4.837E-02	% P	1.563E-01	4.63E-02	G
		1408.08	1.161E-01	% P	2.008E-01	6.40E-02	G
		964.00	-9.789E-02	% P	5.147E-01	1.47E-01	G
		1112.07	-8.048E-02	% P	5.384E-01	1.52E-01	G
		778.90	-6.711E-02	% P	4.394E-01	1.24E-01	G
EU-154	-1.1151E-03						
		123.10	-1.115E-03	%(P	1.254E-01	3.70E-02	G K
		1274.80	-3.887E-02	% P	2.612E-01	7.43E-02	G
		723.30	-6.578E-02	& P	3.609E-01	1.04E-01	G
		1004.80	1.786E-01	% P	3.059E-01	9.55E-02	G
EU-155	1.2401E-01						
		86.45	1.240E-01	%(	2.101E-01	6.40E-02	G K
		105.31	5.769E-02	%	2.417E-01	7.24E-02	G
HG-203	3.0120E-02						
		279.17	3.012E-02	&(	5.103E-02	1.56E-02	G K
		72.87	-2.892E-01	& P	1.300E+00	3.89E-01	G
		70.83	-1.284E-01	&	2.683E+00	8.00E-01	G
		82.50	9.133E-02	%	3.224E+00	9.58E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.0566E-01						
		583.14	3.057E-01	@(P	7.048E-02	3.45E-02	G
		510.72	4.986E-01	+ P	3.335E-01	1.33E-01	G
PB-212	5.9221E-01						
		238.63	5.922E-01	(P	1.249E-01	4.74E-02	G K
							Energy duplication
		77.11	8.570E-01	+	4.272E-01	1.38E-01	G
		74.81	5.536E-01	& P	8.867E-01	2.70E-01	G
PB-214	4.9164E-01						
		351.99	4.701E-01	(P	1.442E-01	5.42E-02	G K
		295.22	5.333E-01	*(P	2.458E-01	8.53E-02	G
							Energy duplication
		77.11	1.380E+00	+ P	7.006E-01	2.26E-01	G
		241.92	-1.342E-02	% P	9.131E-01	2.70E-01	G
BI-212	4.3016E-01						
		727.17	4.302E-01	@(P	5.030E-01	1.62E-01	G K
		1620.56	4.171E-01	%	1.993E+00	5.46E-01	G
		785.42	1.706E-01	& P	2.992E+00	8.33E-01	G
BI-214	5.2720E-01						
		609.32	5.272E-01	@(P	1.236E-01	6.31E-02	G K
		1764.51	2.057E-01	% P	2.267E-01	8.57E-02	G
		1120.28	1.019E+00	+ P	6.268E-01	2.98E-01	G
RA-224	1.1160E+00						
		241.00	1.116E+00	&(P	1.434E+00	4.43E-01	G
RA-226	1.4838E+00						
		185.99	1.484E+00	(	1.505E+00	4.70E-01	G
AC-228	6.7782E-01						
		911.07	6.365E-01	(P	2.235E-01	9.73E-02	G K
		968.90	1.016E+00	+ P	5.364E-01	2.47E-01	G
		338.40	7.776E-01	(P	4.131E-01	1.56E-01	G
TH-227	1.0647E-02						
		236.00	1.065E-02	&(P	3.940E-01	1.15E-01	G K
		256.25	-1.883E-01	% P	7.024E-01	2.09E-01	G
PA-234	2.5079E-03						
		98.44	2.508E-03	%(	1.961E-01	5.79E-02	G K
		946.00	-1.677E-02	&	3.420E-01	9.49E-02	G
		131.28	1.696E-02	%	2.600E-01	7.71E-02	G
		94.67	-1.518E-01	%	3.881E-01	1.17E-01	G
		883.24	-2.836E-02	%	5.202E-01	1.44E-01	G
		926.70	-4.810E-03	%	6.980E-01	1.94E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.419E-01 %   4.259E-01 1.26E-01 G

TH-234       1.0461E+00
                           63.29 6.961E-01 %(P 2.815E+00 8.42E-01 G K
                           92.80 1.501E+00 *(P 1.967E+00 6.03E-01 G
                           92.38 1.700E+00 % P 2.338E+00 7.14E-01 G

AM-241       1.1171E-03
                           59.54 1.117E-03 %(P 3.658E-01 1.08E-01 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              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	1.4570E-01	1.4761E-01	4.7822E-01	4.7829E-01	5.329E-01
K-40		1.6313E+01	1.6313E+01	2.2966E+00	2.4746E+00	
MN-54	#A	-1.0093E-02	-1.0116E-02	7.3300E-02	7.3302E-02	7.164E-02
CO-57	#B	1.5166E-02	1.5205E-02	5.0014E-02	5.0021E-02	5.548E-02
CO-60	#B	2.8385E-02	2.8395E-02	6.9712E-02	6.9730E-02	7.859E-02

Sr-85	#A	-2.3400E-02	-2.3652E-02	6.9497E-02	6.9510E-02	7.692E-02
Kr-85	#A	-5.7935E+02	-5.7935E+02	1.8098E+03	1.8101E+03	1.784E+03
Y-88	#B	0.0000E+00	0.0000E+00	1.3281E-02	1.3284E-02	3.242E-02
NB-94	#B	-6.9706E-03	-6.9706E-03	6.0431E-02	6.0433E-02	6.576E-02
Ag-108M	#B	-1.3694E-02	-1.3694E-02	6.8266E-02	6.8270E-02	7.858E-02
CD-109	#A	2.2241E-01	2.2275E-01	1.5653E+00	1.5653E+00	1.746E+00
SN-113	#B	4.0283E-03	4.0527E-03	6.2479E-02	6.2480E-02	7.217E-02
SB-125	#B	-1.2757E-03	-1.2766E-03	1.1662E-01	1.1662E-01	2.073E-01
I-131	#B	-1.2060E-02	-1.3149E-02	6.4724E-02	6.4728E-02	6.727E-02
CS-134	#B	-2.0904E-02	-2.0924E-02	7.1283E-02	7.1293E-02	7.310E-02
CS-137	#	3.4347E-01	3.4349E-01	1.0598E-01	1.0775E-01	
CE-139	#A	-1.1963E-04	-1.2023E-04	1.6983E-01	1.6983E-01	5.548E-02
EU-152	#B	4.6252E-02	4.6259E-02	1.4899E-01	1.4901E-01	1.657E-01
EU-154	#B	-1.1148E-03	-1.1151E-03	2.0277E-01	2.0277E-01	1.254E-01
EU-155	#B	1.2396E-01	1.2401E-01	1.9204E-01	1.9217E-01	2.100E-01
HG-203	#B	2.9675E-02	3.0120E-02	4.6946E-02	4.6976E-02	5.027E-02
TL-208	#	3.0566E-01	3.0566E-01	1.0352E-01	1.0495E-01	
PB-212	#	5.9221E-01	5.9221E-01	1.4224E-01	1.4612E-01	1.249E-01
PB-214	#	4.9164E-01	4.9164E-01	1.4536E-01	1.4799E-01	1.442E-01
BI-212	#A	4.3016E-01	4.3016E-01	4.8572E-01	4.8632E-01	5.030E-01
BI-214	#	5.2720E-01	5.2720E-01	1.8938E-01	1.9170E-01	
RA-224	#A	1.1160E+00	1.1160E+00	1.3296E+00	1.3311E+00	1.434E+00
RA-226	#A	1.4838E+00	1.4838E+00	1.4115E+00	1.4140E+00	1.505E+00
AC-228		6.7782E-01	6.7782E-01	2.5599E-01	2.5884E-01	
TH-227	#B	1.0647E-02	1.0647E-02	3.4465E-01	3.4465E-01	3.940E-01
PA-234	#B	2.5079E-03	2.5079E-03	1.7359E-01	1.7359E-01	1.961E-01
TH-234	#B	1.0461E+00	1.0461E+00	1.2606E+00	1.2620E+00	2.815E+00
AM-241	#A	1.1171E-03	1.1171E-03	3.2462E-01	3.2462E-01	3.658E-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) 1.8166933E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.8166954E+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_6SEP2006_1641.An1

Sample description
FSS-OOL-02-03-004-F-S

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEP2006_1641.An1

Acquisition information
Start time: 06-Sep-2006 16:41:33
Live time: 2000
Real time: 2022
Dead time: 1.11 %
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: 2.0960E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0960E+03) =
4.7710E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

YAEC Chemistry Lab Spectrum name: 102F_6SEP2006_1641.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	05-Sep-2006 14:54:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.7364

***** S U M M A R Y O F P E A K 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	127.	25.29	1.10	8.973E-03	74.81	9.600	PBC<MDA	PB212
77.48	213.	14.30	1.10	9.783E-03	77.11	10.700	1.346E+00	PB214
					77.11	17.500	8.228E-01	PB212
128.76	68.	41.63	1.35	1.714E-02				
185.94	178.	20.92	1.96	1.627E-02				
185.94	178.	20.92	1.96	1.627E-02	185.99	3.280	2.092E+00	RA226
239.14	742.	4.46	1.22	1.379E-02	236.00	11.200	3.065E+00	TH227
					238.63	43.100	8.038E-01	PB212
242.09	94.	29.24	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.951E-01	PB214
295.78	105.	17.22	1.26	1.146E-02	295.22	19.200	3.083E-01	PB214
300.65	43.	35.21	1.26	1.128E-02				
328.49	38.	38.14	0.80	1.036E-02				
339.17	203.	16.39	1.10	1.004E-02	338.40	12.010	1.083E+00	AC228
352.51	221.	13.20	1.09	9.665E-03	351.99	37.100	3.961E-01	PB214
463.59	56.	35.64	1.56	7.364E-03	463.51	10.000	4.788E-01	SB125
511.12	110.	18.77	1.57	6.690E-03	510.72	22.500	4.725E-01	TL208
584.21	249.	10.50	1.58	5.880E-03	583.14	86.000	3.159E-01	TL208
610.28	172.	11.65	1.49	5.641E-03	609.32	46.090	4.254E-01	BI214
728.67	51.	24.58	1.42	4.785E-03	727.17	11.800	5.858E-01	BI212
913.01	135.	11.09	1.73	3.915E-03				
970.74	120.	15.08	1.23	3.712E-03				
1121.89	64.	27.27	1.59	3.279E-03	1120.28	15.040	8.370E-01	BI214
1463.42	632.	4.01	2.09	2.617E-03	1460.75	10.700	1.454E+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	
149.09	75.22	456.	127.	0.064	75.86	1.098	PB-214	D
154.53	77.94	358.	213.	0.107	42.91	1.100	PB-214	D

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
477.91	238.99	176.	742.	0.371	13.38	1.215	PB-212	D
483.81	241.95	332.	94.	0.047	87.73	1.217	PB-214	D
600.31	300.32	93.	35.	0.018	123.57	1.039	PB-212	M
656.65	328.49	86.	38.	0.019	114.41	0.805	RH-106M	sM
1826.17	913.01	32.	133.	0.067	31.53	1.734	AC-228	M
1941.69	970.74	46.	122.	0.061	35.90	1.228	AC-228	M
2244.92	1121.89	35.	42.	0.021	74.71	1.820	TA-182	D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.80	77.11	955.	220.	0.110	62.80	1.500D
PB-212	153.80	77.11	955.	220.	0.110	62.80	1.500D
RA-226	372.50	186.44	514.	93.	0.047	102.79	1.500s
TH-227	478.03	239.20	406.	498.	0.249	21.78	1.500s
PB-212	477.78	239.08	384.	632.	0.316	17.77	1.500
PB-214	591.18	295.76	195.	110.	0.055	61.20	1.500s
AC-228	677.77	339.05	149.	162.	0.081	39.76	1.500
PB-214	705.00	352.66	133.	186.	0.093	34.29	1.500
SB-125	928.21	464.23	93.	38.	0.019	114.36	1.500s
TL-208	1022.03	511.12	97.	110.	0.055	56.30	1.566s
TL-208	1168.26	584.21	106.	248.	0.124	31.49	1.576
BI-214	1220.41	610.28	67.	172.	0.086	34.94	1.486
BI-212	1457.29	728.67	42.	51.	0.026	73.73	1.423
BI-214	2240.95	1120.28	39.	39.	0.020	82.60	1.819D
K-40	2927.78	1463.43	4.	621.	0.311	12.11	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		1.4945E-02					
			477.56	1.494E-02	%(	3.367E-01 9.56E-02	G
K-40		1.4283E+01					
			1460.75	1.428E+01	(P	2.709E-01 5.76E-01	G
MN-54		-1.3487E-02					
			834.81	-1.349E-02	%(P	5.697E-02 1.66E-02	G
CO-57		-4.0626E-03					
			122.07	-4.063E-03	&(	5.481E-02 1.63E-02	G K
			136.43	-1.026E-02	&	4.403E-01 1.31E-01	G
CO-60		-8.2906E-03					
			1332.51	-8.291E-03	&(P	6.190E-02 1.74E-02	G K
			1173.23	-1.110E-02	&	7.612E-02 2.19E-02	G K
Sr-85		-1.6688E-02					
			514.00	-1.669E-02	%(	5.405E-02 1.61E-02	G
Kr-85		-3.9688E+02					
			513.99	-3.969E+02	%(	1.226E+03 3.66E+02	G
Y-88		-4.3381E-04					
			1836.01	-4.338E-04	%(P	3.779E-02 9.03E-03	G K
			898.02	1.120E-02	% P	4.439E-02 1.28E-02	G
NB-94		-1.1544E-02					
			871.10	-1.154E-02	%(	4.950E-02 1.44E-02	G K
			702.50	4.800E-03	%	5.056E-02 1.45E-02	G K
Ag-108M		1.4775E-02					
			722.95	1.477E-02	%(	5.398E-02 1.59E-02	G K
			614.37	-2.773E-02	% P	6.212E-02 1.87E-02	G
			433.93	-3.331E-03	%	4.305E-02 1.24E-02	G
CD-109		-7.9250E-02					
			88.04	-7.925E-02	%(P	2.035E+00 6.06E-01	G
SN-113		0.0000E+00					
			391.71	0.000E+00	%(	6.790E-02 1.97E-02	G K
			255.04	-2.236E-01	%	1.930E+00 5.71E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.3926E-02						
		427.95	9.326E-04	%(P	1.277E-01	3.64E-02	G K
		600.77	-8.555E-04	& P	2.266E-01	6.36E-02	G
		636.15	-1.346E-02	% P	3.583E-01	1.01E-01	G
		463.51	3.296E-01	@(P	4.184E-01	1.31E-01	G
		176.29	1.284E-01	% P	6.032E-01	1.80E-01	G
I-131	-4.6315E-03						
		364.48	-4.632E-03	&(	5.151E-02	1.50E-02	G K
		636.97	1.376E-01	%	5.393E-01	1.57E-01	G
		284.29	2.185E-01	%	6.763E-01	2.03E-01	G
CS-134	4.2274E-04						
		604.66	4.227E-04	%(	4.075E-02	1.14E-02	G K
		795.76	4.339E-02	%	6.316E-02	1.97E-02	G
		569.29	-5.543E-02	&	3.302E-01	9.65E-02	G
		801.84	-8.547E-04	% P	6.858E-01	1.94E-01	G
CS-137	-2.8736E-03						
		661.62	-2.874E-03	%(	5.287E-02	1.50E-02	G
CE-139	-2.5477E-03						
		165.85	-2.548E-03	&(P	5.287E-02	1.57E-02	G
EU-152	-1.9520E-02						
		121.78	-1.952E-02	&(P	1.662E-01	4.96E-02	G K
		344.30	1.180E-02	%	1.302E-01	3.79E-02	G
		1408.08	-1.966E-02	&	2.837E-01	7.83E-02	G
		964.00	2.478E-01	% P	3.370E-01	1.07E-01	G
		1112.07	1.995E-01	%	4.315E-01	1.31E-01	G
		778.90	-3.490E-02	% P	3.599E-01	1.02E-01	G
EU-154	3.1868E-02						
		123.10	3.187E-02	%(P	1.158E-01	3.48E-02	G K
		1274.80	-1.057E-02	%	1.647E-01	4.56E-02	G
		723.30	-1.513E-03	& P	2.809E-01	7.95E-02	G
		1004.80	1.744E-03	&	2.326E-01	6.24E-02	G
EU-155	-2.7734E-03						
		86.45	-2.773E-03	%(P	2.650E-01	7.90E-02	G K
		105.31	8.349E-03	%	2.362E-01	7.02E-02	G
HG-203	-8.5682E-03						
		279.17	-8.568E-03	&(P	5.379E-02	1.60E-02	G K
		72.87	-6.119E-01	&	2.017E+00	6.08E-01	G
		70.83	-4.261E-01	&	3.704E+00	1.11E+00	G
		82.50	-5.915E-01	&	3.988E+00	1.20E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.1590E-01						
		583.14	3.159E-01	(P	6.446E-02	3.33E-02	G
		510.72	4.725E-01	+	2.076E-01	8.88E-02	G
PB-212	6.8469E-01						
		238.63	6.847E-01	(	1.019E-01	4.05E-02	G K
							Energy duplication
		77.11	8.514E-01	+	5.665E-01	1.78E-01	G
		74.81	7.797E-01	& P	1.176E+00	3.59E-01	G
PB-214	3.2909E-01						
		351.99	3.332E-01	(P	1.015E-01	3.82E-02	G K
		295.22	3.212E-01	*(	1.987E-01	6.55E-02	G
							Energy duplication
		77.11	1.392E+00	+	9.266E-01	2.91E-01	G
		241.92	3.424E-01	%	6.704E-01	2.04E-01	G
BI-212	5.8581E-01						
		727.17	5.858E-01	(	3.734E-01	1.44E-01	G K
		1620.56	-2.415E-02	% P	1.821E+00	4.66E-01	G
		785.42	8.652E-01	% P	2.482E+00	7.37E-01	G
BI-214	4.4743E-01						
		609.32	4.254E-01	(	1.013E-01	4.96E-02	G K
		1764.51	-6.980E-02	& P	4.345E-01	1.22E-01	G
		1120.28	5.149E-01	(	4.165E-01	1.42E-01	G
RA-224	6.9723E-02						
		241.00	6.972E-02	%(P	1.309E+00	3.88E-01	G
RA-226	1.1247E+00						
		185.99	1.125E+00	*(P	1.310E+00	4.04E-01	G
AC-228	2.5658E-01						
		911.07	5.460E-03	%(P	2.153E-01	6.09E-02	G K
		968.90	-1.806E-02	% P	4.615E-01	1.33E-01	G
		338.40	8.630E-01	(	3.179E-01	1.14E-01	G
TH-227	2.0587E+00						
		236.00	2.059E+00	?(P	3.992E-01	1.50E-01	G K
		256.25	-5.685E-02	%	5.489E-01	1.62E-01	G
PA-234	-4.7914E-02						
		98.44	-4.791E-02	%(	2.502E-01	7.50E-02	G K
		946.00	-7.816E-02	%	2.948E-01	8.64E-02	G
		131.28	-4.370E-02	%	2.385E-01	7.14E-02	G
		94.67	1.892E-01	%	4.115E-01	1.25E-01	G
		883.24	4.200E-03	&	4.442E-01	1.24E-01	G
		926.70	-5.384E-02	%	4.633E-01	1.31E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-8.188E-02 &   4.894E-01 1.43E-01 G

TH-234       2.0765E+00
                           63.29 2.077E+00 %(P 4.522E+00 1.37E+00 G K
                           92.80 1.023E+00 &   2.415E+00 7.31E-01 G
                           92.38-1.377E-01 & P 2.560E+00 7.62E-01 G

AM-241       2.0205E-01
                           59.54 2.021E-01 &(  6.209E-01 1.87E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.4738E-02	1.4945E-02	2.8671E-01	2.8671E-01	3.320E-01
K-40		1.4283E+01	1.4283E+01	1.7294E+00	1.9061E+00	2.709E-01
MN-54	#A	-1.3455E-02	-1.3487E-02	5.2327E-02	5.2332E-02	5.684E-02
CO-57	#B	-4.0514E-03	-4.0626E-03	4.8962E-02	4.8963E-02	5.466E-02
CO-60	#B	-8.2874E-03	-8.2906E-03	5.4569E-02	5.4571E-02	6.188E-02

Sr-85	#A	-1.6498E-02	-1.6688E-02	4.8330E-02	4.8339E-02	5.343E-02
Kr-85	#A	-3.9687E+02	-3.9688E+02	1.0976E+03	1.0978E+03	1.226E+03
Y-88	#B	-4.3079E-04	-4.3381E-04	2.9706E-02	2.9706E-02	3.753E-02
NB-94	#B	-1.1544E-02	-1.1544E-02	4.3118E-02	4.3123E-02	4.950E-02
Ag-108M	#B	1.4775E-02	1.4775E-02	4.7608E-02	4.7616E-02	5.398E-02
CD-109	#A	-7.9120E-02	-7.9250E-02	3.0882E+00	3.0882E+00	2.032E+00
SN-113	#B	0.0000E+00	0.0000E+00	5.8951E-02	5.8951E-02	6.746E-02
SB-125	#B	8.3864E-02	8.3926E-02	9.9927E-02	1.0004E-01	1.276E-01
I-131	#B	-4.2217E-03	-4.6315E-03	4.5031E-02	4.5032E-02	4.695E-02
CS-134	#B	4.2232E-04	4.2274E-04	3.4299E-02	3.4299E-02	4.071E-02
CS-137	#A	-2.8734E-03	-2.8736E-03	4.4959E-02	4.4959E-02	5.286E-02
CE-139	#A	-2.5340E-03	-2.5477E-03	5.5413E-02	5.5414E-02	5.258E-02
EU-152	#B	-1.9517E-02	-1.9520E-02	1.6740E-01	1.6740E-01	1.662E-01
EU-154	#B	3.1860E-02	3.1868E-02	1.0441E-01	1.0442E-01	1.158E-01
EU-155	#B	-2.7722E-03	-2.7734E-03	6.1250E-01	6.1250E-01	2.649E-01
HG-203	#B	-8.4323E-03	-8.5682E-03	4.8548E-02	4.8550E-02	5.293E-02
TL-208		3.1590E-01	3.1590E-01	9.9627E-02	1.0119E-01	
PB-212	#	6.8469E-01	6.8469E-01	1.2165E-01	1.2757E-01	1.019E-01
PB-214	#	3.2909E-01	3.2909E-01	1.1308E-01	1.1458E-01	1.015E-01
BI-212		5.8581E-01	5.8581E-01	4.3189E-01	4.3314E-01	
BI-214		4.4743E-01	4.4743E-01	1.5632E-01	1.5832E-01	
RA-224	#A	6.9723E-02	6.9723E-02	1.1646E+00	1.1646E+00	1.309E+00
RA-226	#A	1.1247E+00	1.1247E+00	1.2115E+00	1.2131E+00	1.310E+00
AC-228	F	2.5658E-01	2.5658E-01	1.0203E-01	1.0304E-01	2.153E-01
TH-227	#	2.0587E+00	2.0587E+00	4.4872E-01	4.6335E-01	3.992E-01
PA-234	#B	-4.7914E-02	-4.7914E-02	2.2508E-01	2.2510E-01	2.502E-01
TH-234	#B	2.0765E+00	2.0765E+00	4.1107E+00	4.1123E+00	4.522E+00
AM-241	#A	2.0205E-01	2.0205E-01	5.6097E-01	5.6109E-01	6.208E-01

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

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

Total Activity (1460.5 to 1999.0 keV) 1.5888991E+01 pCi/gm
Total Decayed Activity (1460.5 to 1999.0 keV) 1.5888991E+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_6SEPT2006_0911.An1

Sample description
FSS-OOL-02-03-012-F

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEPT2006_0911.An1

Acquisition information
Start time: 06-Sep-2006 09:11:17
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: 1.7310E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7310E+03) =
5.7770E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:22:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.6834

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
76.35	255.	15.62	0.88	9.316E-03				
76.35	255.	15.62	0.88	9.316E-03	77.11	10.700	1.950E+00	PB214
					77.11	17.500	1.192E+00	PB212
88.20	90.	40.06	0.61	1.238E-02				
187.18	90.	32.37	1.67	1.621E-02	185.99	3.280	1.257E+00	RA226
239.33	427.	8.81	1.25	1.377E-02	238.63	43.100	5.597E-01	PB212
270.74	73.	29.20	1.73	1.241E-02				
295.74	100.	15.06	1.26	1.145E-02	295.22	19.200	3.541E-01	PB214
339.00	87.	18.15	1.93	1.004E-02	338.40	12.010	5.609E-01	AC228
352.51	139.	11.95	1.22	9.664E-03	351.99	37.100	3.018E-01	PB214
511.66	27.	40.13	1.50	6.695E-03	510.72	22.500	PBC<MDA	TL208
583.96	129.	13.03	1.39	5.882E-03	583.14	86.000	1.988E-01	TL208
610.13	118.	12.95	1.45	5.642E-03	609.32	46.090	3.541E-01	BI214
662.88	116.	12.37	0.83	5.220E-03	661.62	84.620	2.047E-01	CS137
728.21	19.	35.31	1.25	4.794E-03	727.17	11.800	PBC<MDA	BI212
912.67	86.	13.81	1.45	3.916E-03	911.07	29.000	5.901E-01	AC228
969.62	56.	20.51	0.87	3.718E-03	968.90	17.460	6.731E-01	AC228
1121.06	33.	29.63	1.75	3.283E-03	1120.28	15.040	5.154E-01	BI214
1463.03	389.	5.07	2.07	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	
175.98	88.20	504.	90.	0.045	120.17	0.608	PB-214	l
478.29	239.33	617.	100.	0.050	109.84	1.248	PB-212	s

541.12	270.74	131.	73.	0.036	75.33	1.734	AC-228	s
2926.97	1463.03	1.	388.	0.194	15.30	2.073	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	613.	130.	0.065	85.18	1.500D
PB-212	153.80	77.11	613.	130.	0.065	85.18	1.500D
RA-226	372.35	186.37	279.	63.	0.031	110.73	1.500s
PB-212	477.72	239.04	286.	304.	0.152	29.20	1.500s
PB-214	591.24	295.79	108.	90.	0.045	58.02	1.500s
AC-228	677.67	339.00	67.	87.	0.043	54.44	1.929s
PB-214	704.84	352.58	75.	141.	0.071	36.13	1.500
TL-208	1023.10	511.66	44.	27.	0.013	120.40	1.499s
TL-208	1168.00	584.08	41.	105.	0.053	38.81	1.499
BI-214	1220.12	610.13	40.	118.	0.059	38.84	1.455s
Ag-108M	1224.67	612.41	96.	-37.	-0.019	121.99	1.499s
CS-137	1325.65	662.88	30.	116.	0.058	37.12	0.828s
BI-212	1456.37	728.21	13.	19.	0.009	105.92	1.254
AC-228	1825.49	912.67	20.	86.	0.043	41.42	1.450
AC-228	1939.45	969.62	23.	56.	0.028	61.53	0.872s
BI-214	2242.52	1121.06	18.	33.	0.016	88.90	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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		9.2135E-02					
			477.56	9.213E-02	%(	3.201E-01 9.38E-02	G
K-40		3.6170E-02					
			1460.75	3.617E-02	%(P	2.383E-01 5.77E-02	G
MN-54		-5.7492E-03					
			834.81	-5.749E-03	&(P	5.082E-02 1.42E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	-1.7120E-02						
		122.07	-1.712E-02	%(	5.135E-02	1.54E-02	G K
		136.43	0.000E+00	%	4.144E-01	1.22E-01	G
CO-60	-2.1437E-04						
		1332.51	-2.144E-04	%(P	3.362E-02	7.86E-03	G K
		1173.23	-2.974E-03	&	7.350E-02	2.05E-02	G K
Sr-85	-4.8246E-03						
		514.00	-4.825E-03	&(	4.887E-02	1.41E-02	G
Kr-85	-1.1050E+02						
		513.99	-1.105E+02	&(	1.119E+03	3.22E+02	G
Y-88	-6.4256E-03						
		1836.01	-6.426E-03	%(P	5.414E-02	1.43E-02	G K
		898.02	9.779E-03	% P	5.072E-02	1.43E-02	G
NB-94	-1.3447E-03						
		871.10	-1.345E-03	%(	4.924E-02	1.35E-02	G K
		702.50	9.019E-03	&	4.627E-02	1.33E-02	G K
Ag-108M	1.1703E-02						
		722.95	1.170E-02	%(	3.913E-02	1.14E-02	G K
		614.37	-5.762E-02	+ P	7.454E-02	2.33E-02	G
		433.93	4.689E-03	%	4.392E-02	1.26E-02	G
CD-109	5.9566E-01						
		88.04	5.957E-01	%(P	1.950E+00	5.86E-01	G
SN-113	0.0000E+00						
		391.71	0.000E+00	&(	5.698E-02	1.61E-02	G K
		255.04	-2.603E-01	%	1.851E+00	5.45E-01	G
SB-125	-3.3102E-03						
		427.95	-3.310E-03	&(P	1.385E-01	3.90E-02	G K
		600.77	2.614E-02	% P	2.065E-01	5.82E-02	G
		636.15	4.131E-02	% P	3.069E-01	8.57E-02	G
		463.51	1.507E-01	% P	3.908E-01	1.16E-01	G
		176.29	-9.612E-02	% P	6.356E-01	1.88E-01	G
I-131	-2.5614E-04						
		364.48	-2.561E-04	%(	4.113E-02	1.16E-02	G K
		636.97	1.194E-01	%	5.215E-01	1.50E-01	G
		284.29	3.762E-02	&	6.154E-01	1.78E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	-4.3925E-03						
		604.66	-4.393E-03	&(	4.289E-02	1.21E-02	G K
		795.76	2.417E-02	%	5.704E-02	1.71E-02	G
		569.29	-9.098E-04	&	2.562E-01	7.09E-02	G
		801.84	-1.131E-01	% P	6.446E-01	1.85E-01	G
CS-137	2.0465E-01						
		661.62	2.047E-01	@(	4.981E-02	2.54E-02	G
CE-139	-3.4073E-03						
		165.85	-3.407E-03	%(P	4.696E-02	1.38E-02	G
EU-152	-7.0012E-02						
		121.78	-7.001E-02	%(P	1.610E-01	4.86E-02	G K
		344.30	-3.850E-03	&	1.481E-01	4.27E-02	G
		1408.08	-6.484E-03	%	2.256E-01	5.80E-02	G
		964.00	-4.863E-02	& P	4.491E-01	1.27E-01	G
		1112.07	0.000E+00	%	5.384E-01	1.49E-01	G
		778.90	5.095E-02	% P	3.677E-01	1.04E-01	G
EU-154	-9.1196E-03						
		123.10	-9.120E-03	&(P	1.051E-01	3.11E-02	G K
		1274.80	-2.749E-03	%	1.883E-01	5.12E-02	G
		723.30	-1.845E-03	% P	3.283E-01	9.27E-02	G
		1004.80	6.872E-02	%	3.082E-01	8.83E-02	G
EU-155	-3.6587E-03						
		86.45	-3.659E-03	%(P	1.751E-01	5.13E-02	G K
		105.31	-1.245E-02	&	2.496E-01	7.40E-02	G
HG-203	-3.0956E-03						
		279.17	-3.096E-03	&(P	4.283E-02	1.24E-02	G K
		72.87	-4.432E-01	&	1.965E+00	5.90E-01	G
		70.83	-1.371E+00	%	3.654E+00	1.10E+00	G
		82.50	-3.508E-01	%	3.610E+00	1.07E+00	G
TL-208	1.5734E-01						
		583.14	1.623E-01	(P	5.018E-02	2.11E-02	G
		510.72	1.385E-01	(	1.746E-01	5.56E-02	G
PB-212	3.9868E-01						
		238.63	3.987E-01	@(	1.069E-01	3.88E-02	G K
							Energy duplication
		77.11	6.064E-01	+	5.522E-01	1.72E-01	G
		74.81	5.937E-01	& P	1.173E+00	3.56E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.1160E-01						
		351.99	3.069E-01	(P	9.359E-02	3.71E-02	G K
		295.22	3.206E-01	(	1.811E-01	6.20E-02	G
							Energy duplication
		77.11	9.917E-01	+	9.031E-01	2.82E-01	G
		241.92	1.788E-01	%	6.510E-01	1.95E-01	G
BI-212	2.6220E-01						
		727.17	2.622E-01	(	2.693E-01	9.27E-02	G K
		1620.56	3.388E-01	% P	9.767E-01	2.74E-01	G
		785.42	-3.104E-03	% P	2.875E+00	8.00E-01	G
BI-214	3.5410E-01						
		609.32	3.541E-01	@(	9.638E-02	4.59E-02	G K
		1764.51	-1.910E-03	% P	1.624E-01	2.20E-02	G
		1120.28	5.154E-01	+	3.589E-01	1.53E-01	G
RA-224	3.1904E-01						
		241.00	3.190E-01	&(P	1.255E+00	3.75E-01	G
RA-226	9.1937E-01						
		185.99	9.194E-01	*(P	1.179E+00	3.63E-01	G
AC-228	6.0887E-01						
		911.07	5.901E-01	(P	1.618E-01	8.18E-02	G K
		968.90	6.731E-01	*(P	3.016E-01	1.38E-01	G
		338.40	5.609E-01	(	2.643E-01	1.02E-01	G
TH-227	2.5211E-02						
		236.00	2.521E-02	%(P	4.933E-01	1.46E-01	G K
		256.25	-1.448E-02	%	5.347E-01	1.55E-01	G
PA-234	1.3814E-02						
		98.44	1.381E-02	&(	2.418E-01	7.18E-02	G K
		946.00	-4.258E-02	&	3.300E-01	9.40E-02	G
		131.28	6.952E-02	&	1.786E-01	5.38E-02	G
		94.67	-3.776E-02	&	4.505E-01	1.34E-01	G
		883.24	8.307E-02	%	4.256E-01	1.22E-01	G
		926.70	8.249E-02	%	4.414E-01	1.25E-01	G
		569.26	-4.432E-03	&	3.689E-01	1.02E-01	G
TH-234	-1.2325E+00						
		63.29	-1.232E+00	%(P	3.976E+00	1.19E+00	G K
		92.80	6.452E-01	%	2.392E+00	7.19E-01	G
		92.38	4.121E-02	% P	2.689E+00	7.98E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	-1.0223E-01						
		59.54	-1.022E-01	%(	6.468E-01	1.93E-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	9.1251E-02	9.2135E-02	2.8128E-01	2.8133E-01	3.170E-01
K-40	A	3.6170E-02	3.6170E-02	1.7318E-01	1.7319E-01	2.383E-01
MN-54	#A	-5.7397E-03	-5.7492E-03	4.8878E-02	4.8880E-02	5.073E-02
CO-57	#B	-1.7087E-02	-1.7120E-02	4.6327E-02	4.6337E-02	5.126E-02
CO-60	#B	-2.1431E-04	-2.1437E-04	3.6693E-03	3.6694E-03	3.362E-02
Sr-85	#A	-4.7864E-03	-4.8246E-03	4.2171E-02	4.2172E-02	4.848E-02
Kr-85	#A	-1.1050E+02	-1.1050E+02	9.6585E+02	9.6587E+02	1.119E+03
Y-88	#B	-6.3946E-03	-6.4256E-03	4.3075E-02	4.3076E-02	5.387E-02
NB-94	#B	-1.3447E-03	-1.3447E-03	4.0400E-02	4.0400E-02	4.924E-02
Ag-108M	#B	1.1702E-02	1.1703E-02	3.4097E-02	3.4104E-02	3.913E-02
CD-109	#A	5.9499E-01	5.9566E-01	1.7584E+00	1.7587E+00	1.947E+00

SN-113	#B	0.0000E+00	0.0000E+00	4.8410E-02	4.8410E-02	5.672E-02
SB-125	#B	-3.3085E-03	-3.3102E-03	2.3425E-01	2.3425E-01	1.385E-01
I-131	#B	-2.4025E-04	-2.5614E-04	3.4779E-02	3.4779E-02	3.858E-02
CS-134	#B	-4.3895E-03	-4.3925E-03	3.6351E-02	3.6352E-02	4.286E-02
CS-137	#	2.0464E-01	2.0465E-01	7.5965E-02	7.6829E-02	
CE-139	#A	-3.3946E-03	-3.4073E-03	4.8120E-02	4.8120E-02	4.679E-02
EU-152	#B	-7.0005E-02	-7.0012E-02	1.5182E-01	1.5187E-01	1.609E-01
EU-154	#B	-9.1181E-03	-9.1196E-03	9.8264E-02	9.8265E-02	1.051E-01
EU-155	#B	-3.6576E-03	-3.6587E-03	4.3997E-01	4.3997E-01	1.751E-01
HG-203	#B	-3.0616E-03	-3.0956E-03	3.9133E-02	3.9133E-02	4.236E-02
TL-208	#	1.5734E-01	1.5734E-01	6.1300E-02	6.1933E-02	5.018E-02
PB-212	#	3.9868E-01	3.9868E-01	1.1643E-01	1.1856E-01	1.069E-01
PB-214	#	3.1160E-01	3.1160E-01	1.0657E-01	1.0799E-01	9.359E-02
BI-212	A	2.6220E-01	2.6220E-01	2.7772E-01	2.7811E-01	
BI-214		3.5410E-01	3.5410E-01	1.3754E-01	1.3897E-01	
RA-224	#A	3.1904E-01	3.1904E-01	1.1239E+00	1.1241E+00	1.255E+00
RA-226	#A	9.1937E-01	9.1937E-01	1.0903E+00	1.0915E+00	1.179E+00
AC-228		6.0887E-01	6.0887E-01	1.8688E-01	1.8997E-01	
TH-227	#B	2.5211E-02	2.5211E-02	4.3798E-01	4.3798E-01	4.933E-01
PA-234	#B	1.3814E-02	1.3814E-02	2.1543E-01	2.1543E-01	2.418E-01
TH-234	#B	-1.2325E+00	-1.2325E+00	3.6615E+00	3.6622E+00	3.976E+00
AM-241	#A	-1.0223E-01	-1.0223E-01	5.7849E-01	5.7852E-01	6.468E-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 (50.2 to 1999.0 keV) 1.4298100E+00 pCi/gm
Total Decayed Activity (50.2 to 1999.0 keV) 1.4298196E+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_6SEPT2006_0954.An1

Sample description
FSS-OOL-02-03-019-F

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEPT2006_0954.An1

Acquisition information
Start time: 06-Sep-2006 09:54:57
Live time: 2000
Real time: 2019
Dead time: 0.96 %
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: 1.9520E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9520E+03) =
5.1230E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 16:12:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5638

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.21	183.	22.74	1.50	9.541E-03	77.11	10.700	1.239E+00	PB214
					77.11	17.500	7.577E-01	PB212
77.21	183.	22.74	1.50	9.541E-03	77.11	10.700	1.239E+00	PB214
					77.11	17.500	7.577E-01	PB212
128.67	108.	31.06	0.80	1.714E-02				
186.99	162.	19.36	1.24	1.622E-02	185.99	3.280	2.042E+00	RA226
209.66	65.	31.19	0.76	1.517E-02				
239.05	541.	5.19	1.22	1.379E-02	238.63	43.100	6.293E-01	PB212
241.80	83.	28.14	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.613E-01	PB214
270.84	44.	41.08	0.97	1.240E-02				
295.81	129.	12.50	1.26	1.145E-02	295.22	19.200	4.064E-01	PB214
338.71	137.	20.61	1.61	1.005E-02	338.40	12.010	7.873E-01	AC228
352.54	205.	11.76	1.48	9.664E-03	351.99	37.100	3.949E-01	PB214
511.55	101.	17.95	1.67	6.684E-03	510.72	22.500	4.642E-01	TL208
584.13	179.	11.91	1.35	5.880E-03	583.14	86.000	2.444E-01	TL208
610.41	154.	11.85	1.48	5.640E-03	609.32	46.090	4.100E-01	BI214
728.50	57.	20.16	1.67	4.786E-03	727.17	11.800	6.976E-01	BI212
796.30	30.	34.25	1.16	4.417E-03	795.76	85.400	5.506E-02	CS134
912.55	109.	11.42	2.14	3.916E-03	911.07	29.000	6.621E-01	AC228
1463.07	484.	4.62	2.02	2.617E-03	1460.75	10.700	1.193E+01	K40
1767.30	23.	23.69	2.24	2.225E-03	1764.51	15.920	4.546E-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

418.94	209.66	173.	65.	0.032	93.57	0.765	NP-239	M

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
477.73	239.00	123.	541.	0.270	15.56	1.215	PB-212	D
483.22	241.75	229.	83.	0.041	84.41	1.217	PB-214	D
1825.25	912.55	15.	111.	0.056	31.94	2.145	AC-228	sM

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.80	77.11	772.	183.	0.091	68.23	1.500D
PB-212	153.80	77.11	772.	183.	0.091	68.23	1.500D
RA-226	372.40	186.40	408.	91.	0.045	94.54	1.500s
PB-212	477.67	239.02	334.	453.	0.227	22.17	1.500
PB-214	591.20	295.77	110.	144.	0.072	39.79	1.500
AC-228	677.29	338.81	142.	107.	0.054	55.39	1.500
PB-214	704.48	352.40	115.	187.	0.094	32.69	1.500s
TL-208	1022.88	511.55	65.	101.	0.051	53.84	1.669s
TL-208	1168.09	584.13	73.	179.	0.089	35.74	1.351s
BI-214	1220.68	610.41	53.	154.	0.077	35.54	1.485s
BI-212	1456.96	728.50	30.	57.	0.029	60.47	1.669s
CS-134	1591.67	795.82	22.	20.	0.010	120.60	1.601
K-40	2927.02	1463.05	5.	461.	0.230	14.12	2.042
BI-214	3536.06	1767.30	4.	23.	0.012	71.06	2.237s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-1.9433E-02					
			477.56	-1.943E-02	&(	3.553E-01 1.01E-01	G
K-40		1.1379E+01					
			1460.75	1.138E+01	(P	3.258E-01 5.36E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	-9.9865E-03						
		834.81	-9.986E-03	%(P	5.474E-02	1.57E-02	G
CO-57	-1.5524E-02						
		122.07	-1.552E-02	%(	5.710E-02	1.72E-02	G K
		136.43	-1.423E-01	%	4.087E-01	1.23E-01	G
CO-60	1.6478E-04						
		1332.51	1.648E-04	%(P	6.138E-02	1.66E-02	G K
		1173.23	-7.239E-03	&	6.092E-02	1.72E-02	G K
Sr-85	-7.7138E-03						
		514.00	-7.714E-03	&(	4.257E-02	1.24E-02	G
Kr-85	-1.7636E+02						
		513.99	-1.764E+02	&(	9.748E+02	2.84E+02	G
Y-88	-5.7303E-03						
		1836.01	-5.730E-03	%(P	4.867E-02	1.28E-02	G K
		898.02	-4.595E-03	& P	5.122E-02	1.41E-02	G
NB-94	1.8939E-03						
		871.10	1.894E-03	&(	4.458E-02	1.23E-02	G K
		702.50	9.314E-03	%	4.164E-02	1.20E-02	G K
Ag-108M	-4.6111E-03						
		722.95	-4.611E-03	%(	5.019E-02	1.42E-02	G K
		614.37	-2.876E-02	& P	6.741E-02	2.03E-02	G
		433.93	2.318E-03	%	3.524E-02	1.00E-02	G
CD-109	7.0730E-01						
		88.04	7.073E-01	%(P	1.887E+00	5.70E-01	G
SN-113	-1.4875E-02						
		391.71	-1.488E-02	%(	6.040E-02	1.78E-02	G K
		255.04	2.409E-01	%	1.591E+00	4.68E-01	G
SB-125	-4.2684E-03						
		427.95	-4.268E-03	%(P	1.308E-01	3.71E-02	G K
		600.77	4.009E-02	% P	1.926E-01	5.54E-02	G
		636.15	1.580E-01	% P	3.317E-01	1.01E-01	G
		463.51	2.070E-01	% P	4.022E-01	1.22E-01	G
		176.29	-6.130E-03	& P	6.296E-01	1.85E-01	G
I-131	3.5544E-03						
		364.48	3.554E-03	%(	4.348E-02	1.25E-02	G K
		636.97	2.445E-01	%	5.411E-01	1.63E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		284.29	-7.159E-03	&	6.275E-01	1.82E-01	G
CS-134	1.7255E-02						
		604.66	6.349E-04	%(	4.464E-02	1.26E-02	G K
		795.76	3.625E-02	(	4.476E-02	1.46E-02	G
		569.29	-6.652E-02	%	3.036E-01	8.88E-02	G
		801.84	1.708E-03	% P	5.648E-01	1.57E-01	G
CS-137	2.8503E-03						
		661.62	2.850E-03	&(	4.809E-02	1.35E-02	G
CE-139	1.5072E-02						
		165.85	1.507E-02	%(P	4.854E-02	1.46E-02	G
EU-152	-4.3785E-02						
		121.78	-4.379E-02	%(P	1.663E-01	4.99E-02	G K
		344.30	-1.924E-02	%	1.447E-01	4.24E-02	G
		1408.08	-5.470E-02	%	2.719E-01	7.70E-02	G
		964.00	-1.124E-01	% P	4.057E-01	1.18E-01	G
		1112.07	-5.045E-02	%	4.508E-01	1.27E-01	G
		778.90	-1.311E-02	% P	3.337E-01	9.22E-02	G
EU-154	-1.6313E-02						
		123.10	-1.631E-02	%(P	1.101E-01	3.28E-02	G K
		1274.80	-3.371E-02	%	1.933E-01	5.53E-02	G
		723.30	-1.216E-02	% P	2.420E-01	6.78E-02	G
		1004.80	-3.076E-02	%	2.596E-01	7.22E-02	G
EU-155	7.4696E-02						
		86.45	7.470E-02	&(P	2.403E-01	7.23E-02	G K
		105.31	6.795E-02	%	2.187E-01	6.57E-02	G
HG-203	2.6131E-02						
		279.17	2.613E-02	%(P	4.081E-02	1.26E-02	G K
		72.87	1.013E-01	%	1.873E+00	5.59E-01	G
		70.83	1.262E+00	%	3.061E+00	9.26E-01	G
		82.50	-4.741E-01	%	3.701E+00	1.11E+00	G
TL-208	2.4436E-01						
		583.14	2.444E-01	@(P	5.820E-02	2.92E-02	G
		510.72	4.642E-01	+	1.851E-01	8.34E-02	G
PB-212	5.2731E-01						
		238.63	5.273E-01	(	1.023E-01	3.90E-02	G K
							Energy duplication
		77.11	7.577E-01	+	5.482E-01	1.72E-01	G
		74.81	7.703E-01	& P	1.138E+00	3.47E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	3.9169E-01						
		351.99	3.606E-01	@(P	1.017E-01	3.94E-02	G K
		295.22	4.517E-01	(	1.620E-01	5.99E-02	G
							Energy duplication
		77.11	1.239E+00	+	8.966E-01	2.82E-01	G
		241.92	3.376E-01	%	6.478E-01	1.97E-01	G
BI-212	6.9755E-01						
		727.17	6.976E-01	*(	3.455E-01	1.41E-01	G K
		1620.56	-2.608E-01	% P	2.153E+00	5.81E-01	G
		785.42	3.495E-01	& P	2.429E+00	6.93E-01	G
BI-214	4.2145E-01						
		609.32	4.100E-01	*(	9.724E-02	4.86E-02	G K
		1764.51	4.546E-01	?(P	2.283E-01	1.08E-01	G
		1120.28	4.032E-03	&	4.660E-01	1.30E-01	G
RA-224	7.4382E-01						
		241.00	7.438E-01	%(P	1.215E+00	3.71E-01	G
RA-226	1.1795E+00						
		185.99	1.179E+00	*(P	1.257E+00	3.90E-01	G
AC-228	1.6874E-01						
		911.07	-1.590E-02	%(P	1.556E-01	4.31E-02	G K
		968.90	-5.783E-02	% P	3.837E-01	1.10E-01	G
		338.40	6.146E-01	(	3.342E-01	1.13E-01	G
TH-227	-1.1956E-01						
		236.00	-1.196E-01	&(P	4.393E-01	1.32E-01	G K
		256.25	1.219E-01	%	5.566E-01	1.65E-01	G
PA-234	3.0156E-02						
		98.44	3.016E-02	&(	2.331E-01	6.96E-02	G K
		946.00	-5.279E-02	%	2.931E-01	8.43E-02	G
		131.28	-2.426E-02	%	2.282E-01	6.80E-02	G
		94.67	-8.002E-02	%	4.114E-01	1.23E-01	G
		883.24	-1.428E-03	&	3.533E-01	9.56E-02	G
		926.70	-6.749E-02	%	4.906E-01	1.39E-01	G
		569.26	-9.849E-02	%	4.500E-01	1.32E-01	G
TH-234	6.0231E-01						
		63.29	6.023E-01	&(P	4.379E+00	1.31E+00	G K
		92.80	9.757E-01	%	2.289E+00	6.93E-01	G
		92.38	3.847E-01	& P	2.605E+00	7.79E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	1.1946E-01						
		59.54	1.195E-01	%(	5.748E-01	1.72E-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	-1.9248E-02	-1.9433E-02	3.0279E-01	3.0280E-01	3.519E-01
K-40		1.1379E+01	1.1379E+01	1.6072E+00	1.7294E+00	3.258E-01
MN-54	#A	-9.9701E-03	-9.9865E-03	5.0636E-02	5.0639E-02	5.465E-02
CO-57	#B	-1.5494E-02	-1.5524E-02	5.1457E-02	5.1465E-02	5.699E-02
CO-60	#B	1.6474E-04	1.6478E-04	4.9846E-02	4.9846E-02	6.136E-02
Sr-85	#A	-7.6532E-03	-7.7138E-03	3.7149E-02	3.7152E-02	4.223E-02
Kr-85	#A	-1.7636E+02	-1.7636E+02	8.5070E+02	8.5076E+02	9.748E+02
Y-88	#B	-5.7028E-03	-5.7303E-03	3.8783E-02	3.8784E-02	4.844E-02
NB-94	#B	1.8939E-03	1.8939E-03	3.6798E-02	3.6798E-02	4.458E-02
Ag-108M	#B	-4.6111E-03	-4.6111E-03	4.2561E-02	4.2562E-02	5.019E-02
CD-109	#A	7.0651E-01	7.0730E-01	1.7087E+00	1.7092E+00	1.885E+00

SN-113	#B	-1.4809E-02	-1.4875E-02	5.3497E-02	5.3504E-02	6.013E-02
SB-125	#B	-4.2663E-03	-4.2684E-03	6.0141E-01	6.0141E-01	1.307E-01
I-131	#B	3.3353E-03	3.5544E-03	3.7603E-02	3.7603E-02	4.080E-02
CS-134	#B	1.7243E-02	1.7255E-02	2.0810E-02	2.0832E-02	4.461E-02
CS-137	#A	2.8502E-03	2.8503E-03	4.0418E-02	4.0418E-02	4.808E-02
CE-139	#A	1.5016E-02	1.5072E-02	4.3722E-02	4.3730E-02	4.836E-02
EU-152	#B	-4.3780E-02	-4.3785E-02	1.5830E-01	1.5831E-01	1.662E-01
EU-154	#B	-1.6311E-02	-1.6313E-02	1.0098E-01	1.0099E-01	1.100E-01
EU-155	#B	7.4675E-02	7.4696E-02	2.1689E-01	2.1693E-01	2.402E-01
HG-203	#B	2.5846E-02	2.6131E-02	3.7684E-02	3.7712E-02	4.036E-02
TL-208	#	2.4436E-01	2.4436E-01	8.7540E-02	8.8607E-02	
PB-212	#	5.2731E-01	5.2731E-01	1.1691E-01	1.2060E-01	1.023E-01
PB-214	#	3.9169E-01	3.9169E-01	1.0094E-01	1.0330E-01	1.017E-01
BI-212	#	6.9755E-01	6.9755E-01	4.2180E-01	4.2362E-01	
BI-214	#	4.2145E-01	4.2145E-01	1.4979E-01	1.5164E-01	
RA-224	#A	7.4382E-01	7.4382E-01	1.1135E+00	1.1143E+00	1.215E+00
RA-226	#A	1.1795E+00	1.1795E+00	1.1697E+00	1.1716E+00	1.257E+00
AC-228	F	1.6874E-01	1.6874E-01	9.3466E-02	9.3944E-02	1.556E-01
TH-227	#B	-1.1956E-01	-1.1956E-01	4.0340E-01	4.0345E-01	4.393E-01
PA-234	#B	3.0156E-02	3.0156E-02	2.0875E-01	2.0876E-01	2.331E-01
TH-234	#B	6.0231E-01	6.0231E-01	3.9215E+00	3.9217E+00	4.379E+00
AM-241	#A	1.1946E-01	1.1946E-01	5.1552E-01	5.1556E-01	5.748E-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) 1.2911427E+01 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.2911427E+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_6SEPT2006_1035.An1

Sample description
FSS-OOL-02-03-004-F

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEPT2006_1035.An1

Acquisition information
Start time: 06-Sep-2006 10:35:26
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: 1.9810E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9810E+03) =
5.0480E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 14:54:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5412

***** S U M M A R Y O F P E A 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	218.	20.68	1.50	9.541E-03	77.11	10.700	1.455E+00	PB214
					77.11	17.500	8.896E-01	PB212
77.11	218.	20.68	1.50	9.541E-03	77.11	10.700	1.455E+00	PB214
					77.11	17.500	8.896E-01	PB212
84.54	114.	26.69	1.74	1.154E-02				
93.42	116.	37.18	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.972E+00	TH234
					94.67	15.500	3.720E-01	PA234
209.56	87.	31.21	0.92	1.518E-02				
239.19	820.	5.96	1.27	1.378E-02	238.63	43.100	9.404E-01	PB212
277.85	43.	39.65	1.55	1.212E-02				
295.48	110.	20.12	1.03	1.146E-02	295.22	19.200	3.421E-01	PB214
338.78	164.	17.02	1.40	1.005E-02	338.40	12.010	9.237E-01	AC228
352.46	203.	13.49	1.11	9.666E-03	351.99	37.100	3.857E-01	PB214
463.60	70.	21.19	1.76	7.363E-03	463.51	10.000	6.344E-01	SB125
511.85	124.	17.12	1.93	6.680E-03	510.72	22.500	5.615E-01	TL208
584.15	252.	8.94	1.21	5.880E-03	583.14	86.000	3.381E-01	TL208
610.10	142.	13.57	1.82	5.642E-03	609.32	46.090	3.715E-01	BI214
728.46	62.	23.17	1.16	4.786E-03	727.17	11.800	7.452E-01	BI212
796.61	30.	31.76	1.60	4.420E-03	795.76	85.400	5.344E-02	CS134
912.96	167.	10.36	1.78	3.915E-03				
970.01	116.	15.17	0.97	3.714E-03	968.90	17.460	1.215E+00	AC228
1122.19	46.	23.36	1.74	3.278E-03				
1463.17	624.	4.08	1.68	2.617E-03	1460.75	10.700	1.517E+01	K40
1767.77	30.	18.26	1.37	2.222E-03	1764.51	15.920	5.760E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.74	209.56	282.	87.	0.043	93.64	0.924	AC-228	M
478.01	239.19	1123.	158.	0.079	93.14	1.269	PB-212	M
1826.06	912.96	33.	170.	0.085	27.08	1.781	AC-228	sM
1940.23	970.01	116.	49.	0.024	103.04	0.966	AC-228	sM
2244.78	1122.19	31.	46.	0.023	68.13	1.744	TA-182	
3536.91	1767.77	0.	24.	0.012	60.88	2.239	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-214	153.80	77.11	905.	218.	0.109	62.03	1.500D
PB-212	153.80	77.11	905.	218.	0.109	62.03	1.500D
TH-234	186.41	93.42	867.	116.	0.058	111.54	1.500s
PB-212	477.83	239.10	463.	631.	0.315	18.78	1.500
PB-214	591.03	295.69	182.	114.	0.057	57.71	1.500
AC-228	677.49	338.91	168.	146.	0.073	45.24	1.500
PB-214	704.70	352.51	122.	180.	0.090	34.21	1.500
SB-125	927.58	463.92	58.	58.	0.029	66.14	1.500s
TL-208	1023.48	511.85	96.	124.	0.062	51.35	1.933s
TL-208	1168.12	584.15	73.	251.	0.126	26.81	1.206
BI-214	1220.06	610.10	67.	142.	0.071	40.71	1.816s
BI-212	1456.94	728.49	34.	42.	0.021	74.13	1.554
CS-134	1593.24	796.61	29.	30.	0.015	95.29	1.601s
AC-228	1941.04	970.42	50.	67.	0.033	57.89	1.718
K-40	2927.26	1463.18	24.	590.	0.295	12.84	2.042
BI-214	3530.48	1764.51	6.	14.	0.007	110.94	2.237D

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

***** S U M M A R Y O 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		-1.4572E-01					
			477.56	-1.457E-01	&(	4.845E-01 1.44E-01	G
K-40		1.4354E+01					
			1460.75	1.435E+01	(P	6.199E-01 6.14E-01	G
MN-54		-3.4432E-04					
			834.81	-3.443E-04	%(P	6.412E-02 1.81E-02	G
CO-57		1.9718E-03					
			122.07	1.972E-03	&(	5.724E-02 1.70E-02	G K
			136.43	2.694E-03	&	4.565E-01 1.36E-01	G
CO-60		8.9623E-03					
			1332.51	8.962E-03	%(P	5.099E-02 1.43E-02	G K
			1173.23	2.895E-04	&	7.756E-02 2.18E-02	G K
Sr-85		-1.4506E-02					
			514.00	-1.451E-02	&(	6.406E-02 1.90E-02	G
Kr-85		-3.3196E+02					
			513.99	-3.320E+02	&(	1.466E+03 4.34E+02	G
Y-88		3.9786E-03					
			1836.01	3.979E-03	%(P	5.660E-02 1.50E-02	G K
			898.02	4.855E-03	& P	5.850E-02 1.65E-02	G
NB-94		1.0331E-02					
			871.10	1.033E-02	&(	4.933E-02 1.42E-02	G K
			702.50	1.164E-02	%	4.736E-02 1.38E-02	G K
Ag-108M		-7.1865E-03					
			722.95	-7.187E-03	&(	5.329E-02 1.53E-02	G K
			614.37	-2.537E-02	% P	5.857E-02 1.76E-02	G
			433.93	-9.484E-03	%	4.502E-02 1.32E-02	G
CD-109		-3.6770E-01					
			88.04	-3.677E-01	%(P	2.286E+00 6.85E-01	G
SN-113		-3.1414E-03					
			391.71	-3.141E-03	&(	6.328E-02 1.83E-02	G K
			255.04	-5.747E-01	%	1.927E+00 5.77E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.4934E-01						
		427.95	1.771E-02	&(P	1.419E-01	4.12E-02	G K
		600.77	8.797E-02	% P	2.380E-01	7.10E-02	G
		636.15	6.393E-02	% P	3.434E-01	9.86E-02	G
		463.51	5.390E-01	*(P	3.549E-01	1.22E-01	G
		176.29	-2.365E-02	& P	6.732E-01	1.99E-01	G
I-131	7.6731E-03						
		364.48	7.673E-03	%(	5.452E-02	1.60E-02	G K
		636.97	4.919E-02	%	6.073E-01	1.72E-01	G
		284.29	-9.181E-02	%	7.109E-01	2.10E-01	G
CS-134	1.8232E-02						
		604.66	-1.258E-02	%(	5.880E-02	1.73E-02	G K
		795.76	5.344E-02	(	5.050E-02	1.70E-02	G
		569.29	6.157E-03	%	2.679E-01	7.56E-02	G
		801.84	-8.550E-02	% P	5.286E-01	1.51E-01	G
CS-137	-1.5716E-02						
		661.62	-1.572E-02	%(	6.302E-02	1.85E-02	G
CE-139	-8.9079E-05						
		165.85	-8.908E-05	%(P	5.525E-02	1.63E-02	G
EU-152	3.9231E-03						
		121.78	3.923E-03	&(P	1.677E-01	4.98E-02	G K
		344.30	6.259E-03	%	1.558E-01	4.54E-02	G
		1408.08	2.576E-02	%	2.204E-01	5.97E-02	G
		964.00	-7.558E-02	% P	4.316E-01	1.24E-01	G
		1112.07	-2.324E-03	&	5.591E-01	1.57E-01	G
		778.90	6.448E-02	& P	3.481E-01	9.98E-02	G
EU-154	-7.4028E-05						
		123.10	-7.403E-05	%(P	1.218E-01	3.61E-02	G K
		1274.80	0.000E+00	%	2.188E-01	6.10E-02	G
		723.30	-2.722E-02	& P	2.530E-01	7.20E-02	G
		1004.80	8.168E-02	%	2.688E-01	7.85E-02	G
EU-155	3.5660E-02						
		86.45	3.566E-02	%(P	2.631E-01	7.87E-02	G K
		105.31	1.191E-01	%	2.513E-01	7.62E-02	G
HG-203	-2.7877E-03						
		279.17	-2.788E-03	&(P	5.313E-02	1.56E-02	G K
		72.87	-5.146E-01	%	1.815E+00	5.46E-01	G
		70.83	-8.745E-01	&	3.661E+00	1.10E+00	G
		82.50	-2.051E+00	%	4.047E+00	1.23E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.3815E-01						
		583.14	3.381E-01	(P	5.723E-02	3.03E-02	G
		510.72	5.615E-01	+	2.190E-01	9.62E-02	G
PB-212	7.2293E-01						
		238.63	7.229E-01	(	1.181E-01	4.52E-02	G K
							Energy duplication
		77.11	8.896E-01	+	5.837E-01	1.84E-01	G
		74.81	7.139E-01	& P	1.227E+00	3.73E-01	G
PB-214	3.4542E-01						
		351.99	3.419E-01	(P	1.028E-01	3.91E-02	G K
		295.22	3.522E-01	(	2.033E-01	6.77E-02	G
							Energy duplication
		77.11	1.455E+00	+	9.546E-01	3.01E-01	G
		241.92	1.732E-01	%	7.737E-01	2.32E-01	G
BI-212	5.1065E-01						
		727.17	5.107E-01	(	3.583E-01	1.26E-01	G K
		1620.56	1.330E-01	% P	1.755E+00	4.59E-01	G
		785.42	-1.999E-01	% P	2.610E+00	7.39E-01	G
BI-214	3.7150E-01						
		609.32	3.715E-01	(	1.072E-01	5.05E-02	G K
		1764.51	2.624E-01	- P	2.736E-01	9.77E-02	G
		1120.28	3.045E-02	%	4.788E-01	1.36E-01	G
RA-224	3.9047E-01						
		241.00	3.905E-01	&(P	1.454E+00	4.36E-01	G
RA-226	7.1097E-01						
		185.99	7.110E-01	%(P	1.328E+00	4.03E-01	G
AC-228	3.6727E-01						
		911.07	-2.268E-02	%(P	2.135E-01	6.08E-02	G K
		968.90	7.024E-01	(P	3.743E-01	1.36E-01	G
		338.40	8.216E-01	(	3.564E-01	1.24E-01	G
TH-227	-1.8268E-01						
		236.00	-1.827E-01	%(P	4.973E-01	1.50E-01	G K
		256.25	1.220E-01	%	4.745E-01	1.41E-01	G
PA-234	6.1580E-03						
		98.44	6.158E-03	%(	2.498E-01	7.43E-02	G K
		946.00	-1.943E-02	&	2.947E-01	8.31E-02	G
		131.28	2.108E-03	&	2.490E-01	7.40E-02	G
		94.67	-2.054E-02	%	4.628E-01	1.38E-01	G
		883.24	8.309E-03	%	3.282E-01	8.87E-02	G
		926.70	3.018E-02	%	4.721E-01	1.32E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-7.816E-03 %   4.475E-01 1.27E-01 G

TH-234       1.2286E+00
                           63.29 6.563E-01 %(P 4.716E+00 1.41E+00 G K
                           92.80 1.972E+00 &(  2.386E+00 7.33E-01 G
                           92.38-2.794E-01 & P 2.799E+00 8.35E-01 G

AM-241      -1.2799E-01
                           59.54-1.280E-01 %(  6.512E-01 1.95E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-1.4418E-01	-1.4572E-01	4.3247E-01	4.3255E-01	4.794E-01
K-40		1.4354E+01	1.4354E+01	1.8429E+00	2.0112E+00	6.199E-01
MN-54	#A	-3.4370E-04	-3.4432E-04	2.3170E-02	2.3170E-02	6.400E-02
CO-57	#B	1.9677E-03	1.9718E-03	5.1028E-02	5.1028E-02	5.712E-02
CO-60	#B	8.9596E-03	8.9623E-03	4.2763E-02	4.2766E-02	5.097E-02

Sr-85	#A	-1.4379E-02	-1.4506E-02	5.6958E-02	5.6963E-02	6.350E-02
Kr-85	#A	-3.3196E+02	-3.3196E+02	1.3034E+03	1.3036E+03	1.466E+03
Y-88	#B	3.9574E-03	3.9786E-03	4.4895E-02	4.4896E-02	5.630E-02
NB-94	#B	1.0331E-02	1.0331E-02	4.2653E-02	4.2657E-02	4.933E-02
Ag-108M	#B	-7.1864E-03	-7.1865E-03	4.5781E-02	4.5783E-02	5.329E-02
CD-109	#A	-3.6724E-01	-3.6770E-01	2.3127E+00	2.3128E+00	2.283E+00
SN-113	#B	-3.1260E-03	-3.1414E-03	5.4903E-02	5.4903E-02	6.297E-02
SB-125	#F	1.4925E-01	1.4934E-01	1.0140E-01	1.0175E-01	1.418E-01
I-131	#B	7.1491E-03	7.6731E-03	4.7962E-02	4.7964E-02	5.080E-02
CS-134	#B	1.8219E-02	1.8232E-02	1.7373E-02	1.7403E-02	5.876E-02
CS-137	#A	-1.5715E-02	-1.5716E-02	5.5572E-02	5.5579E-02	6.302E-02
CE-139	#A	-8.8711E-05	-8.9079E-05	1.1583E-01	1.1583E-01	5.502E-02
EU-152	#B	3.9226E-03	3.9231E-03	1.4936E-01	1.4936E-01	1.677E-01
EU-154	#B	-7.4014E-05	-7.4028E-05	2.3081E-01	2.3081E-01	1.218E-01
EU-155	#B	3.5649E-02	3.5660E-02	2.3621E-01	2.3622E-01	2.630E-01
HG-203	#B	-2.7539E-03	-2.7877E-03	4.9053E-02	4.9053E-02	5.249E-02
TL-208		3.3815E-01	3.3815E-01	9.0813E-02	9.2774E-02	
PB-212	#	7.2293E-01	7.2293E-01	1.3574E-01	1.4167E-01	1.181E-01
PB-214	#	3.4542E-01	3.4542E-01	1.1593E-01	1.1754E-01	1.028E-01
BI-212		5.1065E-01	5.1065E-01	3.7853E-01	3.7961E-01	3.583E-01
BI-214		3.7150E-01	3.7150E-01	1.5124E-01	1.5267E-01	
RA-224	#A	3.9047E-01	3.9047E-01	1.3089E+00	1.3091E+00	1.454E+00
RA-226	#A	7.1096E-01	7.1097E-01	1.2094E+00	1.2100E+00	1.328E+00
AC-228	F	3.6727E-01	3.6727E-01	1.6616E-01	1.6743E-01	2.135E-01
TH-227	#B	-1.8268E-01	-1.8268E-01	4.5605E-01	4.5617E-01	4.973E-01
PA-234	#B	6.1580E-03	6.1580E-03	2.2297E-01	2.2297E-01	2.498E-01
TH-234	#B	1.2286E+00	1.2286E+00	1.3703E+00	1.3720E+00	4.716E+00
AM-241	#A	-1.2799E-01	-1.2799E-01	5.8490E-01	5.8495E-01	6.512E-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 (1767.8 to 1999.0 keV) 1.5941562E+01 pCi/gm
Total Decayed Activity (1767.8 to 1999.0 keV) 1.5941562E+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_6SEPT2006_1246.An1

Sample description
FSS-OOL-02-03-022-F

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEPT2006_1246.An1

Acquisition information
Start time: 06-Sep-2006 12:46:24
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: 1.7520E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7520E+03) =
5.7078E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 16:08:00
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: 0.6841

***** S U M M A R Y O F P E A K 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	109.	39.65	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.25	174.	25.35	1.50	9.541E-03	77.11	10.700	1.316E+00	PB214
					77.11	17.500	8.046E-01	PB212
77.25	174.	25.35	1.50	9.541E-03	77.11	10.700	1.316E+00	PB214
					77.11	17.500	8.046E-01	PB212
186.81	92.	33.15	1.45	1.623E-02	185.99	3.280	PBC<MDA	RA226
210.14	88.	30.09	0.90	1.515E-02				
239.14	591.	4.91	1.22	1.378E-02	238.63	43.100	7.667E-01	PB212
241.97	106.	24.08	1.22	1.365E-02	241.00	3.900	1.521E+00	RA224
					241.92	7.470	8.052E-01	PB214
270.32	76.	29.67	1.77	1.242E-02				
295.60	147.	14.09	1.50	1.145E-02	295.22	19.200	5.144E-01	PB214
328.66	40.	35.04	1.28	1.035E-02				
338.79	136.	15.20	1.20	1.005E-02	338.40	12.010	8.695E-01	AC228
352.58	224.	12.01	1.36	9.663E-03	351.99	37.100	4.810E-01	PB214
511.88	114.	18.01	1.47	6.680E-03	510.72	22.500	5.848E-01	TL208
584.17	177.	11.47	1.01	5.880E-03	583.14	86.000	2.695E-01	TL208
610.42	183.	11.62	1.60	5.640E-03	609.32	46.090	5.424E-01	BI214
662.78	245.	9.68	1.72	5.221E-03	661.62	84.620	4.267E-01	CS137
912.62	122.	11.99	1.70	3.916E-03	911.07	29.000	8.231E-01	AC228
969.62	112.	12.88	1.65	3.716E-03	968.90	17.460	1.330E+00	AC228
1121.81	52.	25.40	2.02	3.283E-03	1120.28	15.040	8.123E-01	BI214
1463.14	545.	4.34	2.32	2.617E-03	1460.75	10.700	1.498E+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	
419.90	210.14	268.	88.	0.044	90.26	0.899	NP-239	sM
477.92	239.08	126.	591.	0.296	14.73	1.215	PB-212	D
483.58	241.91	276.	106.	0.053	72.24	1.217	PB-214	D
540.28	270.32	176.	76.	0.038	89.02	1.767	AC-228	sM
657.18	328.76	98.	52.	0.026	96.73	0.747	LA-140	sM
1939.44	969.62	76.	60.	0.030	73.37	1.646	AC-228	M

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.33	74.88	931.	109.	0.054	118.95	1.500
PB-214	153.80	77.11	888.	174.	0.087	76.06	1.500D
PB-212	153.80	77.11	888.	174.	0.087	76.06	1.500D
RA-226	372.76	186.58	423.	73.	0.036	117.43	1.500s
PB-212	477.82	239.09	364.	517.	0.258	20.47	1.500
PB-214	591.19	295.77	163.	139.	0.069	46.59	1.500s
AC-228	677.55	338.94	153.	130.	0.065	48.23	1.500
PB-214	704.75	352.53	149.	206.	0.103	32.58	1.500
TL-208	1023.54	511.88	86.	114.	0.057	54.03	1.468s
TL-208	1168.18	584.17	70.	177.	0.088	34.41	1.010
BI-214	1220.69	610.42	73.	183.	0.092	34.87	1.604s
Ag-108M	1224.46	612.30	170.	-58.	-0.029	103.62	1.499s
CS-137	1325.46	662.78	81.	245.	0.122	29.04	1.722
AC-228	1825.69	912.78	24.	98.	0.049	36.89	1.679
AC-228	1940.49	970.14	28.	52.	0.026	59.33	1.718
BI-214	2244.01	1121.81	35.	52.	0.026	76.21	2.023
K-40	2927.21	1463.15	4.	519.	0.260	13.27	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		-3.0082E-02					
			477.56	-3.008E-02	%(	4.341E-01 1.24E-01	G
K-40		1.4280E+01					
			1460.75	1.428E+01	(P	3.446E-01 6.32E-01	G
MN-54		-3.8936E-04					
			834.81	-3.894E-04	&(P	5.752E-02 1.59E-02	G
CO-57		-1.4856E-02					
			122.07	-1.486E-02	%(	6.286E-02 1.88E-02	G K
			136.43	-1.987E-02	&	4.391E-01 1.30E-01	G
CO-60		1.1080E-02					
			1332.51	1.108E-02	&(P	4.395E-02 1.24E-02	G K
			1173.23	1.367E-02	&	8.038E-02 2.31E-02	G K
Sr-85		6.1053E-03					
			514.00	6.105E-03	&(	5.739E-02 1.67E-02	G
Kr-85		1.3922E+02					
			513.99	1.392E+02	&(	1.313E+03 3.81E+02	G
Y-88		-2.3848E-05					
			1836.01	-2.385E-05	&(P	2.678E-02 3.63E-03	G K
			898.02	1.236E-02	& P	6.537E-02 1.88E-02	G
NB-94		-3.8997E-03					
			871.10	-3.900E-03	&(	5.763E-02 1.62E-02	G K
			702.50	1.338E-02	&	4.735E-02 1.39E-02	G K
Ag-108M		9.4365E-03					
			722.95	9.437E-03	&(	6.413E-02 1.85E-02	G K
			614.37	-8.813E-02	+ P	9.661E-02 3.03E-02	G
			433.93	2.677E-02	%	5.192E-02 1.58E-02	G
CD-109		1.1603E-01					
			88.04	1.160E-01	%(P	2.476E+00 7.39E-01	G
SN-113		4.4284E-04					
			391.71	4.428E-04	%(	7.664E-02 2.21E-02	G K
			255.04	3.697E-01	&	2.140E+00 6.34E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-4.9518E-02						
		427.95	-4.952E-02	%(P	1.740E-01	5.14E-02	G K
		600.77	2.885E-02	% P	2.581E-01	7.37E-02	G
		636.15	7.133E-02	& P	4.432E-01	1.28E-01	G
		463.51	2.454E-01	& P	4.936E-01	1.49E-01	G
		176.29	1.088E-01	% P	7.579E-01	2.25E-01	G
I-131	-7.1667E-03						
		364.48	-7.167E-03	&(	6.397E-02	1.87E-02	G K
		636.97	0.000E+00	%	8.878E-01	2.52E-01	G
		284.29	1.614E-01	&	8.159E-01	2.42E-01	G
CS-134	-1.0343E-02						
		604.66	-1.034E-02	%(	5.584E-02	1.63E-02	G K
		795.76	4.021E-02	%	5.651E-02	1.79E-02	G
		569.29	1.004E-01	%	3.133E-01	9.29E-02	G
		801.84	5.407E-02	% P	5.892E-01	1.66E-01	G
CS-137	4.2672E-01						
		661.62	4.267E-01	(	7.792E-02	4.14E-02	G
CE-139	-2.4871E-04						
		165.85	-2.487E-04	%(P	5.669E-02	1.67E-02	G
EU-152	-4.3890E-02						
		121.78	-4.389E-02	%(P	1.853E-01	5.55E-02	G K
		344.30	2.300E-03	%	1.755E-01	5.10E-02	G
		1408.08	1.026E-01	&	2.901E-01	8.55E-02	G
		964.00	-1.585E-01	% P	5.052E-01	1.49E-01	G
		1112.07	-1.122E-01	%	6.112E-01	1.77E-01	G
		778.90	7.625E-02	& P	4.206E-01	1.21E-01	G
EU-154	-3.3640E-02						
		123.10	-3.364E-02	%(P	1.251E-01	3.75E-02	G K
		1274.80	-2.849E-03	&	1.895E-01	5.17E-02	G
		723.30	3.475E-02	& P	2.928E-01	8.38E-02	G
		1004.80	-2.477E-02	%	3.389E-01	9.45E-02	G
EU-155	-1.9712E-02						
		86.45	-1.971E-02	%(P	2.870E-01	8.54E-02	G K
		105.31	7.467E-02	%	2.759E-01	8.29E-02	G
HG-203	1.6977E-02						
		279.17	1.698E-02	%(P	5.623E-02	1.68E-02	G K
		72.87	-7.774E-01	%	2.129E+00	6.43E-01	G
		70.83	-8.735E-01	%	4.126E+00	1.24E+00	G
		82.50	-1.216E+00	%	4.382E+00	1.32E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.6951E-01						
		583.14	2.695E-01	(P	6.350E-02	3.10E-02	G
		510.72	5.848E-01	+	2.349E-01	1.06E-01	G
PB-212	7.0892E-01						
		238.63	6.701E-01	(	1.187E-01	4.57E-02	G K
							Energy duplication
		77.11	8.046E-01	(	6.539E-01	2.04E-01	G
		74.81	9.887E-01	& P	1.316E+00	4.03E-01	G
PB-214	4.5761E-01						
		351.99	4.429E-01	(P	1.279E-01	4.82E-02	G K
		295.22	4.861E-01	*(	2.178E-01	7.55E-02	G
							Energy duplication
		77.11	1.316E+00	+	1.070E+00	3.34E-01	G
							Energy duplication
		241.92	4.482E-01	%	7.468E-01	2.28E-01	G
BI-212	-1.5044E-02						
		727.17	-1.504E-02	&(	6.260E-01	1.79E-01	G K
		1620.56	-3.926E-02	& P	1.920E+00	4.77E-01	G
		785.42	-5.791E-01	% P	3.260E+00	9.45E-01	G
BI-214	5.4240E-01						
		609.32	5.424E-01	*(	1.259E-01	6.31E-02	G K
		1764.51	-1.887E-03	% P	3.651E-01	9.24E-02	G
		1120.28	8.123E-01	+	4.730E-01	2.07E-01	G
RA-224	9.7076E-01						
		241.00	9.708E-01	&(P	1.406E+00	4.31E-01	G
RA-226	1.0521E+00						
		185.99	1.052E+00	*(P	1.425E+00	4.37E-01	G
AC-228	6.8527E-01						
		911.07	6.639E-01	(P	1.731E-01	8.18E-02	G K
		968.90	6.223E-01	(P	3.228E-01	1.23E-01	G
		338.40	8.283E-01	(	3.849E-01	1.33E-01	G
TH-227	-6.6750E-03						
		236.00	-6.675E-03	&(P	6.156E-01	1.83E-01	G K
		256.25	-4.062E-02	%	6.503E-01	1.91E-01	G
PA-234	2.0971E-03						
		98.44	2.097E-03	%(	2.699E-01	8.02E-02	G K
		946.00	0.000E+00	%	3.270E-01	9.09E-02	G
		131.28	-2.384E-03	%	2.547E-01	7.55E-02	G
		94.67	4.666E-04	%	4.673E-01	1.39E-01	G
		883.24	3.612E-02	&	3.408E-01	9.35E-02	G
		926.70	-3.370E-02	&	5.482E-01	1.53E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.488E-01 %   4.645E-01 1.38E-01 G

TH-234       1.6371E+00
                           63.29 1.637E+00 %(P 5.122E+00 1.54E+00 G K
                           92.80 1.661E+00 %   2.723E+00 8.30E-01 G
                           92.38-5.208E-01 % P 2.688E+00 8.03E-01 G

AM-241       7.0167E-02
                           59.54 7.017E-02 %(  7.387E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	-2.9748E-02	-3.0082E-02	3.7295E-01	3.7295E-01	4.293E-01
K-40		1.4280E+01	1.4280E+01	1.8959E+00	2.0583E+00	3.446E-01
MN-54	#A	-3.8862E-04	-3.8936E-04	2.0366E-02	2.0366E-02	5.741E-02
CO-57	#B	-1.4823E-02	-1.4856E-02	5.6543E-02	5.6549E-02	6.272E-02
CO-60	#B	1.1077E-02	1.1080E-02	3.7081E-02	3.7086E-02	4.394E-02

Sr-85	#A	6.0494E-03	6.1053E-03	4.9994E-02	4.9995E-02	5.686E-02
Kr-85	#A	1.3922E+02	1.3922E+02	1.1436E+03	1.1436E+03	1.313E+03
Y-88	#B	-2.3715E-05	-2.3848E-05	1.4309E-04	1.4309E-04	2.663E-02
NB-94	#B	-3.8997E-03	-3.8997E-03	4.8490E-02	4.8490E-02	5.763E-02
Ag-108M	#B	9.4364E-03	9.4365E-03	5.5396E-02	5.5398E-02	6.413E-02
CD-109	#A	1.1588E-01	1.1603E-01	2.2162E+00	2.2162E+00	2.472E+00
SN-113	#B	4.4056E-04	4.4284E-04	6.6398E-02	6.6398E-02	7.625E-02
SB-125	#B	-4.9489E-02	-4.9518E-02	1.7600E-01	1.7603E-01	1.739E-01
I-131	#B	-6.6546E-03	-7.1667E-03	5.6176E-02	5.6177E-02	5.940E-02
CS-134	#B	-1.0334E-02	-1.0343E-02	4.8752E-02	4.8755E-02	5.579E-02
CS-137		4.2669E-01	4.2672E-01	1.2391E-01	1.2621E-01	
CE-139	#A	-2.4763E-04	-2.4871E-04	4.3887E-02	4.3887E-02	5.644E-02
EU-152	#B	-4.3884E-02	-4.3890E-02	1.7729E-01	1.7730E-01	1.853E-01
EU-154	#B	-3.3634E-02	-3.3640E-02	1.1418E-01	1.1419E-01	1.251E-01
EU-155	#B	-1.9705E-02	-1.9712E-02	5.7134E-01	5.7134E-01	2.869E-01
HG-203	#B	1.6761E-02	1.6977E-02	5.0444E-02	5.0453E-02	5.551E-02
TL-208		2.6951E-01	2.6951E-01	9.2953E-02	9.4176E-02	
PB-212	#	7.0892E-01	7.0892E-01	1.4512E-01	1.5048E-01	1.187E-01
PB-214	#	4.5761E-01	4.5761E-01	1.3015E-01	1.3266E-01	1.279E-01
BI-212	#B	-1.5044E-02	-1.5044E-02	5.3806E-01	5.3806E-01	6.260E-01
BI-214		5.4240E-01	5.4240E-01	1.8911E-01	1.9155E-01	
RA-224	#A	9.7076E-01	9.7076E-01	1.2930E+00	1.2942E+00	1.406E+00
RA-226	#A	1.0521E+00	1.0521E+00	1.3113E+00	1.3126E+00	1.425E+00
AC-228		6.8527E-01	6.8527E-01	1.9407E-01	1.9784E-01	1.731E-01
TH-227	#B	-6.6750E-03	-6.6750E-03	8.4225E-01	8.4225E-01	6.156E-01
PA-234	#B	2.0971E-03	2.0971E-03	2.4054E-01	2.4054E-01	2.699E-01
TH-234	#B	1.6371E+00	1.6371E+00	4.6272E+00	4.6281E+00	5.122E+00
AM-241	#A	7.0167E-02	7.0167E-02	6.6037E-01	6.6039E-01	7.387E-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) 1.6203827E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.6203850E+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_6SEPT2006_1326.An1

Sample description
FSS-OOL-02-03-010-F

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEPT2006_1326.An1

Acquisition information
Start time: 06-Sep-2006 13:26:30
Live time: 2000
Real time: 2016
Dead time: 0.78 %
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: 1.2830E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.2830E+03) =
7.7942E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:24:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.6860

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
76.06	152.	26.62	0.65	9.229E-03				
93.19	86.	39.25	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.276E+00	TH234
186.26	54.	34.55	1.43	1.625E-02	185.99	3.280	PBC<MDA	RA226
209.72	60.	30.87	1.29	1.517E-02				
239.10	372.	6.10	1.22	1.378E-02	238.63	43.100	6.589E-01	PB212
242.12	63.	25.35	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.551E-01	PB214
270.62	43.	35.41	1.12	1.241E-02				
277.89	37.	40.37	1.50	1.207E-02	279.17	81.500	PBC<MDA	HG203
295.85	81.	18.71	1.52	1.144E-02	295.22	19.200	3.866E-01	PB214
339.16	71.	27.09	1.02	1.004E-02	338.40	12.010	6.224E-01	AC228
352.38	187.	10.67	1.22	9.668E-03	351.99	37.100	5.474E-01	PB214
463.76	29.	32.72	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
511.86	96.	16.26	1.50	6.680E-03	510.72	22.500	6.748E-01	TL208
584.21	101.	14.52	1.58	5.880E-03	583.14	86.000	2.092E-01	TL208
610.28	98.	11.71	1.06	5.641E-03	609.32	46.090	3.980E-01	BI214
662.82	78.	20.29	1.66	5.221E-03	661.62	84.620	1.866E-01	CS137
728.22	24.	34.84	1.77	4.794E-03	727.17	11.800	4.469E-01	BI212
912.95	73.	14.20	0.92	3.915E-03				
969.89	73.	16.36	1.64	3.715E-03				
1121.93	42.	26.08	1.96	3.283E-03	1120.28	15.040	9.044E-01	BI214
1463.20	297.	5.80	1.46	2.617E-03				

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

Peak Centroid	Background	Net Area	Intensity	Uncert	FWHM	Suspected

Channel	Energy	Counts	Counts	Cts/Sec	3 Sigma %	keV	Nuclide	
151.70	76.06	549.	152.	0.076	79.85	0.653	PB-214	l
419.05	209.72	122.	60.	0.030	92.62	1.287	NP-239	M
477.83	239.10	72.	372.	0.186	18.31	1.215	PB-212	D

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
483.86	242.12	98.	63.	0.032	76.04	1.217	PB-214	D
540.89	270.62	88.	43.	0.022	106.22	1.119	AC-228	M
1826.03	912.95	11.	75.	0.037	39.69	0.924	-	sM
1939.98	969.89	18.	74.	0.037	42.82	1.641	AC-228	sM
2927.30	1463.20	1.	296.	0.148	17.54	1.464	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
TH-234	185.96	93.19	532.	86.	0.043	117.75	1.500s
PB-212	477.85	239.11	212.	340.	0.170	24.41	1.500
HG-203	555.44	277.89	94.	37.	0.019	121.11	1.500s
PB-214	591.15	295.75	86.	88.	0.044	54.94	1.500s
AC-228	677.86	339.09	79.	58.	0.029	76.58	1.500
PB-214	704.57	352.44	58.	162.	0.081	30.79	1.500s
SB-125	927.26	463.76	37.	29.	0.015	98.16	1.500s
TL-208	1023.50	511.86	40.	96.	0.048	48.79	1.502s
TL-208	1168.25	584.21	38.	101.	0.050	43.55	1.581
BI-214	1220.40	610.28	16.	98.	0.049	35.12	1.056
CS-137	1325.53	662.82	42.	78.	0.039	60.88	1.662s
BI-212	1456.40	728.22	17.	24.	0.012	104.51	1.774
BI-214	2244.25	1121.93	22.	42.	0.021	78.25	1.959s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-7.1768E-02					
			477.56	-7.177E-02	%(	4.282E-01 1.22E-01	G
K-40		4.8800E-02					
			1460.75	4.880E-02	%(P	6.229E-01 1.63E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
MN-54	-1.4277E-03						
		834.81	-1.428E-03	&(P	6.813E-02	1.86E-02	G
CO-57	9.5991E-03						
		122.07	9.599E-03	%(	5.787E-02	1.72E-02	G K
		136.43	-1.069E-01	%	4.938E-01	1.47E-01	G
CO-60	-2.8924E-04						
		1332.51	-2.892E-04	%(P	7.183E-02	1.87E-02	G K
		1173.23	-3.168E-03	%	9.207E-02	2.54E-02	G K
Sr-85	1.1844E-02						
		514.00	1.184E-02	&(	5.906E-02	1.72E-02	G
Kr-85	2.7025E+02						
		513.99	2.703E+02	&(	1.350E+03	3.92E+02	G
Y-88	-3.2578E-05						
		1836.01	-3.258E-05	%(P	3.658E-02	4.96E-03	G K
		898.02	-1.417E-02	& P	7.814E-02	2.20E-02	G
NB-94	-2.7022E-03						
		871.10	-2.702E-03	%(	6.151E-02	1.68E-02	G K
		702.50	-1.646E-03	&	5.481E-02	1.50E-02	G K
Ag-108M	-6.0808E-03						
		722.95	-6.081E-03	%(	5.931E-02	1.65E-02	G K
		614.37	-3.220E-02	& P	7.484E-02	2.25E-02	G
		433.93	-5.014E-03	%	5.072E-02	1.44E-02	G
CD-109	8.0049E-01						
		88.04	8.005E-01	&(P	2.498E+00	7.51E-01	G
SN-113	2.2602E-02						
		391.71	2.260E-02	%(	6.193E-02	1.84E-02	G K
		255.04	2.352E-01	%	2.281E+00	6.67E-01	G
SB-125	1.5192E-01						
		427.95	6.231E-02	%(P	1.528E-01	4.56E-02	G K
		600.77	6.586E-02	& P	3.071E-01	8.87E-02	G
		636.15	5.211E-02	% P	4.184E-01	1.17E-01	G
		463.51	4.172E-01	*(P	4.425E-01	1.44E-01	G
		176.29	3.301E-02	& P	8.001E-01	2.35E-01	G
I-131	3.9670E-03						
		364.48	3.967E-03	%(	5.557E-02	1.58E-02	G K
		636.97	-1.287E-01	&	6.960E-01	1.97E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		284.29	2.295E-01	%	4.771E-01	1.45E-01	G
CS-134	7.8200E-03						
		604.66	7.820E-03	&(	5.748E-02	1.63E-02	G K
		795.76	2.207E-02	%	7.463E-02	2.18E-02	G
		569.29	-4.193E-02	%	3.383E-01	9.59E-02	G
		801.84	-1.507E-01	% P	8.378E-01	2.40E-01	G
CS-137	1.8662E-01						
		661.62	1.866E-01	*(	7.799E-02	3.79E-02	G
CE-139	-3.7880E-03						
		165.85	-3.788E-03	&(P	5.775E-02	1.70E-02	G
EU-152	3.7327E-02						
		121.78	3.733E-02	%(P	1.680E-01	5.00E-02	G K
		344.30	-2.196E-02	%	1.619E-01	4.68E-02	G
		1408.08	1.099E-02	%	3.469E-01	9.13E-02	G
		964.00	-4.018E-02	% P	5.018E-01	1.38E-01	G
		1112.07	-2.113E-02	%	4.835E-01	1.29E-01	G
		778.90	-4.534E-02	% P	5.200E-01	1.46E-01	G
EU-154	2.0151E-02						
		123.10	2.015E-02	%(P	1.148E-01	3.40E-02	G K
		1274.80	0.000E+00	&	1.826E-01	4.71E-02	G
		723.30	6.181E-03	% P	2.637E-01	7.12E-02	G
		1004.80	-3.474E-02	%	3.344E-01	9.11E-02	G
EU-155	-1.6758E-02						
		86.45	-1.676E-02	%(P	3.050E-01	9.02E-02	G K
		105.31	-9.508E-02	&	2.604E-01	7.84E-02	G
HG-203	4.0207E-02						
		279.17	4.021E-02	&(P	5.195E-02	1.63E-02	G K
		72.87	1.733E-01	%	2.451E+00	7.30E-01	G
		70.83	-1.108E+00	%	4.491E+00	1.35E+00	G
		82.50	-5.786E-01	&	5.079E+00	1.51E+00	G
TL-208	2.0917E-01						
		583.14	2.092E-01	(P	6.569E-02	3.05E-02	G
		510.72	6.748E-01	+	2.263E-01	1.10E-01	G
PB-212	6.0103E-01						
		238.63	6.010E-01	(	1.249E-01	4.89E-02	G K
							Energy duplication
		77.11	3.378E-01	%	7.642E-01	2.31E-01	G
		74.81	6.411E-01	% P	1.475E+00	4.46E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	4.5745E-01						
		351.99	4.762E-01	*(P	1.124E-01	4.90E-02	G K
		295.22	4.213E-01	(	2.197E-01	7.72E-02	G
							Energy duplication
		77.11	5.524E-01	%	1.250E+00	3.78E-01	G
		241.92	5.150E-01	%	7.597E-01	2.34E-01	G
BI-212	4.4686E-01						
		727.17	4.469E-01	(	4.082E-01	1.56E-01	G K
		1620.56	-5.362E-02	% P	2.622E+00	6.51E-01	G
		785.42	1.176E+00	% P	2.841E+00	8.51E-01	G
BI-214	3.9805E-01						
		609.32	3.980E-01	(	8.542E-02	4.67E-02	G K
		1764.51	-5.051E-02	% P	5.459E-01	1.46E-01	G
		1120.28	9.044E-01	+	5.198E-01	2.36E-01	G
RA-224	9.5039E-01						
		241.00	9.504E-01	%(P	1.457E+00	4.47E-01	G
RA-226	1.0615E+00						
		185.99	1.061E+00	%(P	1.549E+00	4.75E-01	G
AC-228	1.3763E-01						
		911.07	-1.316E-02	%(P	2.679E-01	7.41E-02	G K
		968.90	-8.865E-03	% P	5.050E-01	1.40E-01	G
		338.40	5.017E-01	(	3.850E-01	1.28E-01	G
TH-227	-2.4064E-01						
		236.00	-2.406E-01	&(P	5.700E-01	1.72E-01	G K
		256.25	1.887E-01	&	6.919E-01	2.06E-01	G
PA-234	-8.1503E-03						
		98.44	-8.150E-03	&(	2.964E-01	8.77E-02	G K
		946.00	-3.675E-02	%	3.155E-01	8.73E-02	G
		131.28	-3.594E-02	&	2.675E-01	7.94E-02	G
		94.67	-2.285E-01	%	5.834E-01	1.76E-01	G
		883.24	5.367E-02	%	4.505E-01	1.24E-01	G
		926.70	0.000E+00	%	5.087E-01	1.34E-01	G
		569.26	-6.146E-02	%	5.012E-01	1.42E-01	G
TH-234	1.7972E+00						
		63.29	1.429E+00	%(P	5.639E+00	1.69E+00	G K
		92.80	2.276E+00	(	2.902E+00	8.93E-01	G
		92.38	2.271E-01	% P	3.443E+00	1.02E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	-5.9172E-02						
		59.54	-5.917E-02	% (	7.996E-01	2.37E-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:
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	-7.0918E-02	-7.1768E-02	3.6713E-01	3.6715E-01	4.232E-01
K-40	A	4.8800E-02	4.8800E-02	4.8955E-01	4.8956E-01	6.229E-01
MN-54	#A	-1.4247E-03	-1.4277E-03	1.2213E-01	1.2213E-01	6.799E-02
CO-57	#B	9.5765E-03	9.5991E-03	5.1495E-02	5.1498E-02	5.773E-02
CO-60	#B	-2.8914E-04	-2.8924E-04	8.7189E-03	8.7189E-03	7.181E-02
Sr-85	#A	1.1728E-02	1.1844E-02	5.1492E-02	5.1497E-02	5.848E-02
Kr-85	#A	2.7025E+02	2.7025E+02	1.1771E+03	1.1772E+03	1.350E+03
Y-88	#B	-3.2384E-05	-3.2578E-05	1.9547E-04	1.9548E-04	3.637E-02
NB-94	#B	-2.7022E-03	-2.7022E-03	5.0257E-02	5.0257E-02	6.151E-02
Ag-108M	#B	-6.0807E-03	-6.0808E-03	4.9400E-02	4.9401E-02	5.931E-02
CD-109	#A	7.9937E-01	8.0049E-01	2.2532E+00	2.2537E+00	2.494E+00

SN-113	#B	2.2478E-02	2.2602E-02	5.5312E-02	5.5327E-02	6.159E-02
SB-125	#B	1.5182E-01	1.5192E-01	1.5704E-01	1.5727E-01	1.527E-01
I-131	#B	3.6650E-03	3.9670E-03	4.7457E-02	4.7457E-02	5.134E-02
CS-134	#B	7.8134E-03	7.8200E-03	4.9033E-02	4.9035E-02	5.743E-02
CS-137	#	1.8661E-01	1.8662E-01	1.1361E-01	1.1409E-01	
CE-139	#A	-3.7705E-03	-3.7880E-03	6.0873E-02	6.0874E-02	5.748E-02
EU-152	#B	3.7322E-02	3.7327E-02	1.4999E-01	1.5001E-01	1.680E-01
EU-154	#B	2.0146E-02	2.0151E-02	1.0203E-01	1.0203E-01	1.147E-01
EU-155	#B	-1.6752E-02	-1.6758E-02	1.1215E+00	1.1215E+00	3.049E-01
HG-203	#A	3.9661E-02	4.0207E-02	4.8815E-02	4.8868E-02	5.125E-02
TL-208		2.0917E-01	2.0917E-01	9.1468E-02	9.2218E-02	
PB-212	#	6.0103E-01	6.0103E-01	1.4672E-01	1.5055E-01	1.249E-01
PB-214	#	4.5745E-01	4.5745E-01	1.4116E-01	1.4348E-01	1.124E-01
BI-212		4.4686E-01	4.4686E-01	4.6700E-01	4.6767E-01	
BI-214		3.9805E-01	3.9805E-01	1.3981E-01	1.4158E-01	
RA-224	#A	9.5039E-01	9.5039E-01	1.3405E+00	1.3415E+00	1.457E+00
RA-226	#A	1.0615E+00	1.0615E+00	1.4236E+00	1.4249E+00	1.549E+00
AC-228	B	1.3763E-01	1.3763E-01	1.0540E-01	1.0568E-01	2.679E-01
TH-227	#B	-2.4064E-01	-2.4064E-01	5.2459E-01	5.2477E-01	5.700E-01
PA-234	#B	-8.1503E-03	-8.1503E-03	2.6300E-01	2.6300E-01	2.964E-01
TH-234	#B	1.7972E+00	1.7972E+00	2.1161E+00	2.1184E+00	5.639E+00
AM-241	#A	-5.9172E-02	-5.9172E-02	7.1049E-01	7.1049E-01	7.996E-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) 1.3783158E+00 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.3783267E+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_6SEPT2006_1405.An1

Sample description
FSS-OOL-02-03-002-F

Spectrum Filename: C:\GammaVision\Spectra\102F_6SEPT2006_1405.An1

Acquisition information
Start time: 06-Sep-2006 14:27:10
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: 1.9920E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9920E+03) =
5.0201E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5924

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.21	150.	27.33	1.50	9.541E-03	77.11	17.500	6.109E-01	PB212
					77.11	10.700	9.992E-01	PB214
77.21	150.	27.33	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	9.992E-01	PB214
239.57	531.	7.98	1.04	1.376E-02	238.63	43.100	6.054E-01	PB212
295.83	115.	14.42	1.26	1.144E-02	295.22	19.200	3.533E-01	PB214
300.39	44.	33.09	1.26	1.128E-02				
328.58	43.	41.65	0.86	1.035E-02				
338.75	144.	16.51	1.30	1.005E-02	338.40	12.010	8.063E-01	AC228
352.56	196.	13.24	1.30	9.663E-03	351.99	37.100	3.698E-01	PB214
463.47	36.	32.59	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
511.85	84.	20.45	1.48	6.680E-03	510.72	22.500	3.783E-01	TL208
584.16	162.	12.16	1.35	5.880E-03	583.14	86.000	2.159E-01	TL208
610.51	130.	10.74	1.30	5.639E-03	609.32	46.090	3.397E-01	BI214
727.59	48.	26.11	1.74	4.794E-03	727.17	11.800	5.780E-01	BI212
912.79	128.	12.33	1.55	3.915E-03	911.07	29.000	7.633E-01	AC228
970.43	92.	21.38	1.29	3.713E-03				
1463.26	570.	4.24	2.03	2.617E-03				
1767.59	20.	22.36	1.50	2.222E-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	
478.76	239.57	797.	106.	0.053	116.25	1.038	PB-212	sM
600.44	300.42	86.	44.	0.022	99.27	1.258	PB-212	lD

656.83	328.58	113.	43.	0.021	124.94	0.856	RH-106M	M
1941.06	970.43	54.	101.	0.051	42.76	1.294	AC-228	M
2927.43	1463.26	2.	571.	0.286	12.59	2.031	K-40	M
3536.65	1767.59	0.	20.	0.010	67.08	1.499	XE-138	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	153.80	77.11	769.	150.	0.075	81.99	1.500D
PB-214	153.80	77.11	769.	150.	0.075	81.99	1.500D
PB-212	477.78	239.08	372.	369.	0.184	27.15	1.500
PB-214	591.27	295.81	134.	128.	0.064	46.59	1.500
AC-228	677.70	339.01	138.	124.	0.062	48.28	1.500
PB-214	704.96	352.64	131.	157.	0.079	38.95	1.500
SB-125	926.69	463.47	59.	36.	0.018	97.76	1.500s
TL-208	1023.47	511.85	66.	84.	0.042	61.36	1.481s
TL-208	1168.16	584.16	63.	161.	0.081	36.48	1.347
BI-214	1220.87	610.51	29.	130.	0.065	32.22	1.297
BI-212	1455.14	727.59	41.	48.	0.024	78.32	1.737s
AC-228	1825.79	912.82	18.	107.	0.054	33.47	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	Nuclide Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		0.0000E+00					
			477.56	0.000E+00	%(	3.579E-01 1.01E-01 G	
K-40		-3.8742E-02					
			1460.75	-3.874E-02	%(P	9.103E-01 2.58E-01 G	
MN-54		-1.3828E-02					
			834.81	-1.383E-02	%(P	6.534E-02 1.91E-02 G	
CO-57		-1.2957E-05					
			122.07	-1.296E-05	&(	5.027E-02 1.49E-02 G	K
			136.43	8.517E-02	&	4.315E-01 1.29E-01 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-60	1.9503E-03						
		1332.51	1.950E-03	%(P	5.670E-02	1.54E-02	G K
		1173.23	-1.282E-02	&	6.977E-02	2.01E-02	G K
Sr-85	-7.6634E-03						
		514.00	-7.663E-03	&(	5.134E-02	1.50E-02	G
Kr-85	-1.7716E+02						
		513.99	-1.772E+02	&(	1.173E+03	3.43E+02	G
Y-88	4.1328E-03						
		1836.01	4.133E-03	&(P	3.637E-02	9.16E-03	G K
		898.02	1.224E-02	% P	5.423E-02	1.56E-02	G
NB-94	4.8612E-05						
		871.10	4.861E-05	&(	3.776E-02	1.01E-02	G K
		702.50	4.718E-03	&	4.584E-02	1.30E-02	G K
Ag-108M	-1.1888E-02						
		722.95	-1.189E-02	%(	6.081E-02	1.77E-02	G K
		614.37	-3.595E-02	% P	6.542E-02	2.00E-02	G
		433.93	6.972E-03	&	3.511E-02	1.02E-02	G
CD-109	-3.4393E-02						
		88.04	-3.439E-02	%(P	2.032E+00	6.04E-01	G
SN-113	1.6716E-02						
		391.71	1.672E-02	%(	5.247E-02	1.56E-02	G K
		255.04	-2.085E-01	%	1.827E+00	5.39E-01	G
SB-125	8.2177E-02						
		427.95	-3.071E-03	%(P	1.110E-01	3.11E-02	G K
		600.77	-7.759E-03	% P	2.503E-01	7.09E-02	G
		636.15	-6.432E-02	& P	4.180E-01	1.21E-01	G
		463.51	3.345E-01	*(P	3.539E-01	1.14E-01	G
		176.29	1.550E-01	& P	5.549E-01	1.66E-01	G
I-131	4.6960E-03						
		364.48	4.696E-03	%(	4.387E-02	1.27E-02	G K
		636.97	6.845E-02	%	5.599E-01	1.59E-01	G
		284.29	-1.848E-02	%	6.462E-01	1.88E-01	G
CS-134	9.4550E-03						
		604.66	9.455E-03	&(	3.877E-02	1.13E-02	G K
		795.76	2.360E-02	%	6.112E-02	1.83E-02	G
		569.29	4.356E-03	%	2.511E-01	7.04E-02	G
		801.84	-2.801E-02	% P	5.583E-01	1.56E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	-1.7154E-03						
		661.62	-1.715E-03	%(	5.602E-02	1.58E-02	G
CE-139	-3.1257E-04						
		165.85	-3.126E-04	%(P	4.519E-02	1.33E-02	G
EU-152	1.8216E-02						
		121.78	1.822E-02	%(P	1.363E-01	4.05E-02	G K
		344.30	-1.715E-02	&	1.533E-01	4.49E-02	G
		1408.08	6.838E-03	%	2.007E-01	5.20E-02	G
		964.00	2.529E-01	& P	3.355E-01	1.07E-01	G
		1112.07	-1.959E-02	&	4.624E-01	1.29E-01	G
		778.90	4.832E-02	% P	3.942E-01	1.13E-01	G
EU-154	-5.1527E-03						
		123.10	-5.153E-03	&(P	1.105E-01	3.28E-02	G K
		1274.80	-2.871E-02	&	1.880E-01	5.35E-02	G
		723.30	-5.961E-02	% P	2.781E-01	8.10E-02	G
		1004.80	-3.777E-02	&	3.147E-01	8.90E-02	G
EU-155	1.1133E-01						
		86.45	1.113E-01	%(P	2.283E-01	6.92E-02	G K
		105.31	5.469E-04	%	1.968E-01	5.81E-02	G
HG-203	7.5652E-03						
		279.17	7.565E-03	%(P	4.660E-02	1.38E-02	G K
		72.87	-5.670E-01	%	1.950E+00	5.87E-01	G
		70.83	1.651E-01	%	3.073E+00	9.14E-01	G
		82.50	-1.287E+00	%	3.621E+00	1.09E+00	G
TL-208	2.1588E-01						
		583.14	2.159E-01	(P	5.309E-02	2.64E-02	G
		510.72	3.783E-01	+	1.827E-01	7.75E-02	G
PB-212	4.2022E-01						
		238.63	4.202E-01	(	1.056E-01	3.80E-02	G K
							Energy duplication
		77.11	6.109E-01	+	5.361E-01	1.67E-01	G
		74.81	6.167E-01	& P	1.138E+00	3.46E-01	G
PB-214	3.3047E-01						
		351.99	2.973E-01	(P	1.060E-01	3.87E-02	G K
		295.22	3.945E-01	(	1.743E-01	6.13E-02	G
							Energy duplication
		77.11	9.992E-01	+	8.768E-01	2.73E-01	G
		241.92	3.257E-01	&	6.475E-01	1.97E-01	G

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

BI-212       5.7802E-01
                          727.17 5.780E-01 @(  3.895E-01 1.51E-01 G K
                         1620.56-2.457E-01 & P 2.089E+00 5.62E-01 G
                          785.42 1.337E-01 & P 2.161E+00 6.02E-01 G

BI-214       3.3975E-01
                          609.32 3.397E-01  (  7.199E-02 3.66E-02 G K
                         1764.51-1.660E-03 % P 1.411E-01 1.91E-02 G
                         1120.28-1.787E-01 &   5.546E-01 1.65E-01 G

RA-224       6.9728E-01
                          241.00 6.973E-01 %(P 1.218E+00 3.71E-01 G

RA-226       7.3768E-01
                          185.99 7.377E-01 %(P 1.198E+00 3.65E-01 G

AC-228       6.5573E-01
                          911.07 6.384E-01  (P 1.348E-01 7.14E-02 G K
                          968.90-9.706E-02 % P 4.296E-01 1.26E-01 G
                          338.40 6.975E-01  (  3.223E-01 1.12E-01 G

TH-227       3.3889E-03
                          236.00 3.389E-03 %(P 4.892E-01 1.45E-01 G K
                          256.25-9.422E-02 %   5.928E-01 1.76E-01 G

PA-234       9.1931E-04
                           98.44 9.193E-04 &(  2.149E-01 6.37E-02 G K
                          946.00 1.084E-02 &   1.820E-01 4.89E-02 G
                          131.28-3.824E-02 &   2.179E-01 6.51E-02 G
                           94.67-8.923E-02 %   4.194E-01 1.26E-01 G
                          883.24 1.206E-01 %   4.676E-01 1.37E-01 G
                          926.70-1.181E-03 %   4.069E-01 1.10E-01 G
                          569.26 3.683E-03 %   3.733E-01 1.05E-01 G

TH-234       1.6495E+00
                           63.29 1.650E+00 %(P 4.147E+00 1.25E+00 G K
                           92.80 1.419E+00 %   2.143E+00 6.55E-01 G
                           92.38 1.571E+00 % P 2.586E+00 7.88E-01 G

AM-241      -2.8388E-02
                           59.54-2.839E-02 &(  5.024E-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:
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	0.0000E+00	0.0000E+00	3.0281E-01	3.0281E-01	3.533E-01
K-40	#A	-3.8742E-02	-3.8742E-02	9.3410E-01	9.3411E-01	9.103E-01
MN-54	#A	-1.3798E-02	-1.3828E-02	6.0072E-02	6.0077E-02	6.520E-02
CO-57	#B	-1.2925E-05	-1.2957E-05	4.4601E-02	4.4601E-02	5.014E-02
CO-60	#B	1.9496E-03	1.9503E-03	4.6130E-02	4.6130E-02	5.668E-02
Sr-85	#A	-7.5832E-03	-7.6634E-03	4.4981E-02	4.4983E-02	5.080E-02
Kr-85	#A	-1.7716E+02	-1.7716E+02	1.0281E+03	1.0281E+03	1.173E+03
Y-88	#B	4.1065E-03	4.1328E-03	2.7470E-02	2.7471E-02	3.614E-02
NB-94	#B	4.8612E-05	4.8612E-05	3.0285E-02	3.0285E-02	3.776E-02
Ag-108M	#B	-1.1887E-02	-1.1888E-02	5.3119E-02	5.3123E-02	6.081E-02
CD-109	#A	-3.4341E-02	-3.4393E-02	7.9029E+00	7.9029E+00	2.028E+00
SN-113	#B	1.6617E-02	1.6716E-02	4.6768E-02	4.6777E-02	5.216E-02
SB-125	#B	8.2121E-02	8.2177E-02	8.3756E-02	8.3883E-02	1.109E-01
I-131	#B	4.3140E-03	4.6960E-03	3.8089E-02	3.8090E-02	4.030E-02
CS-134	#B	9.4465E-03	9.4550E-03	3.3857E-02	3.3862E-02	3.874E-02
CS-137	#A	-1.7153E-03	-1.7154E-03	4.7472E-02	4.7472E-02	5.602E-02
CE-139	#A	-3.1102E-04	-3.1257E-04	2.2628E-01	2.2628E-01	4.497E-02
EU-152	#B	1.8214E-02	1.8216E-02	1.2157E-01	1.2158E-01	1.363E-01
EU-154	#B	-5.1516E-03	-5.1527E-03	1.0649E-01	1.0649E-01	1.105E-01
EU-155	#B	1.1129E-01	1.1133E-01	2.0754E-01	2.0764E-01	2.282E-01

HG-203 #B	7.4552E-03	7.5652E-03	4.1277E-02	4.1279E-02	4.592E-02

TL-208	2.1588E-01	2.1588E-01	7.8962E-02	7.9886E-02	
PB-212 #	4.2022E-01	4.2022E-01	1.1409E-01	1.1650E-01	1.056E-01
PB-214 #	3.3047E-01	3.3047E-01	1.0044E-01	1.0214E-01	1.060E-01
BI-212 #	5.7802E-01	5.7802E-01	4.5273E-01	4.5389E-01	
BI-214	3.3975E-01	3.3975E-01	1.0948E-01	1.1113E-01	
RA-224 #A	6.9728E-01	6.9728E-01	1.1131E+00	1.1138E+00	1.218E+00
RA-226 #A	7.3768E-01	7.3768E-01	1.0956E+00	1.0964E+00	1.198E+00
AC-228	6.5573E-01	6.5573E-01	1.9276E-01	1.9624E-01	1.348E-01
TH-227 #B	3.3889E-03	3.3889E-03	4.3479E-01	4.3479E-01	4.892E-01
PA-234 #B	9.1931E-04	9.1931E-04	1.9100E-01	1.9100E-01	2.149E-01
TH-234 #B	1.6495E+00	1.6495E+00	3.7584E+00	3.7595E+00	4.147E+00
AM-241 #A	-2.8388E-02	-2.8388E-02	4.4569E-01	4.4569E-01	5.024E-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 (1767.3 to 1999.0 keV) 1.7893720E+00 pCi/gm
Total Decayed Activity (1767.3 to 1999.0 keV) 1.7893720E+00 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-02-03-024-F

Spectrum Filename: C:\GammaVision\Spectra\102F_7SEP2006_0835.An1

Acquisition information

Start time:	07-Sep-2006 08:36:02
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:	1.4070E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.4070E+03) = 7.1073E+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	06-Sep-2006 08:20:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.6868

***** S U M M A R Y O F P E A 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	191.	20.85	1.50	9.541E-03	77.11	17.500	1.097E+00	PB212
					77.11	10.700	1.794E+00	PB214
77.17	191.	20.85	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.794E+00	PB214
186.29	96.	30.11	1.02	1.625E-02	185.99	3.280	1.639E+00	RA226
209.67	67.	35.25	1.02	1.517E-02				
239.04	627.	4.73	1.22	1.379E-02	238.63	43.100	1.011E+00	PB212
242.17	102.	19.25	1.22	1.365E-02	241.00	3.900	1.806E+00	RA224
					241.92	7.470	9.567E-01	PB214
270.48	60.	30.43	1.32	1.242E-02				
295.76	136.	17.19	1.33	1.145E-02	295.22	19.200	5.951E-01	PB214
329.20	66.	27.92	1.74	1.033E-02				
338.56	176.	13.87	1.35	1.006E-02	338.40	12.010	1.399E+00	AC228
352.11	230.	9.90	1.13	9.675E-03	351.99	37.100	6.142E-01	PB214
463.36	45.	30.68	0.72	7.367E-03				
463.36	45.	30.68	0.72	7.367E-03	463.51	10.000	5.671E-01	SB125
511.40	97.	15.19	1.52	6.686E-03	510.72	22.500	6.185E-01	TL208
584.11	171.	14.36	1.64	5.881E-03	583.14	86.000	3.235E-01	TL208
610.26	134.	12.06	1.35	5.641E-03	609.32	46.090	4.958E-01	BI214
662.76	92.	14.16	1.65	5.221E-03	661.62	84.620	1.993E-01	CS137
728.75	59.	23.47	1.19	4.785E-03	727.17	11.800	9.949E-01	BI212
912.78	113.	11.83	1.50	3.916E-03	911.07	29.000	9.540E-01	AC228
969.37	90.	17.89	0.93	3.716E-03				
970.66	53.	21.68	1.72	3.718E-03	968.90	17.460	7.848E-01	AC228
1121.92	55.	31.40	1.72	3.283E-03	1120.28	15.040	1.062E+00	BI214
1463.04	484.	4.60	1.95	2.617E-03	1460.75	10.700	1.657E+01	K40

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.96	209.67	206.	67.	0.034	105.75	1.023	NP-239	M
477.71	238.96	127.	627.	0.313	14.20	1.215	PB-212	D
483.96	242.09	140.	102.	0.051	57.74	1.217	PB-214	D
540.61	270.48	122.	60.	0.030	91.28	1.323	AC-228	M
591.18	295.76	220.	64.	0.032	105.11	1.331	PB-214	M
658.06	329.20	100.	66.	0.033	83.76	1.740	LA-140	sM
676.79	338.56	203.	93.	0.047	71.91	1.349	AC-228	sM
1938.94	969.37	98.	37.	0.019	123.31	0.932	AC-228	sM

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	153.80	77.11	695.	191.	0.095	62.56	1.500D
PB-214	153.80	77.11	695.	191.	0.095	62.56	1.500D
RA-226	371.97	186.18	331.	91.	0.046	85.96	1.500s
PB-212	477.70	239.04	334.	552.	0.276	18.99	1.500
RA-224	483.65	242.01	311.	94.	0.047	84.02	1.500
PB-214	483.69	242.03	332.	84.	0.042	97.96	1.500
PB-214	591.43	295.89	126.	72.	0.036	74.74	1.500
AC-228	677.56	338.94	123.	93.	0.047	59.06	1.500
PB-214	704.49	352.40	122.	179.	0.089	34.45	1.500s
SB-125	927.54	463.90	55.	30.	0.015	112.89	1.500s
TL-208	1022.58	511.40	48.	97.	0.049	45.56	1.515s
TL-208	1168.05	584.11	108.	171.	0.085	43.08	1.639
BI-214	1220.38	610.26	48.	134.	0.067	36.19	1.345
CS-137	1325.42	662.76	32.	92.	0.046	42.49	1.655
BI-212	1456.81	728.43	36.	33.	0.016	93.61	1.554
AC-228	1825.35	912.60	31.	93.	0.046	40.13	1.679
AC-228	1941.53	970.66	40.	53.	0.027	65.03	1.718
BI-214	2244.23	1121.92	54.	55.	0.027	94.20	1.718s
K-40	2927.08	1463.09	3.	465.	0.233	13.99	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		-1.1949E-01					
			477.56	-1.195E-01	%(	5.548E-01 1.62E-01	G
K-40		1.5939E+01					
			1460.75	1.594E+01	(P	3.729E-01 7.44E-01	G
MN-54		1.4185E-02					
			834.81	1.418E-02	%(P	6.672E-02 1.92E-02	G
CO-57		9.3447E-04					
			122.07	9.345E-04	&(	6.885E-02 2.04E-02	G K
			136.43	2.324E-03	&	4.608E-01 1.36E-01	G
CO-60		6.4962E-03					
			1332.51	6.496E-03	&(P	7.608E-02 2.08E-02	G K
			1173.23	-1.529E-02	%	1.035E-01 2.97E-02	G K
Sr-85		-2.6939E-02					
			514.00	-2.694E-02	%(	7.847E-02 2.35E-02	G
Kr-85		-6.1522E+02					
			513.99	-6.152E+02	%(	1.792E+03 5.36E+02	G
Y-88		-1.0070E-02					
			1836.01	-1.007E-02	%(P	7.352E-02 1.98E-02	G K
			898.02	-1.377E-03	% P	7.075E-02 1.91E-02	G
NB-94		0.0000E+00					
			871.10	0.000E+00	%(	9.460E-02 2.68E-02	G K
			702.50	-1.574E-02	&	6.846E-02 2.00E-02	G K
Ag-108M		-2.9448E-03					
			722.95	-2.945E-03	&(	6.591E-02 1.84E-02	G K
			614.37	-3.992E-02	% P	8.242E-02 2.50E-02	G
			433.93	-4.924E-03	%	6.002E-02 1.73E-02	G
CD-109		1.5240E+00					
			88.04	1.524E+00	&(P	2.652E+00 8.07E-01	G
SN-113		9.9856E-03					
			391.71	9.986E-03	&(	7.574E-02 2.20E-02	G K
			255.04	3.802E-02	%	2.377E+00 6.93E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.6219E-01						
		427.95	8.572E-02	%(P	1.694E-01	5.14E-02	G K
		600.77	9.282E-03	% P	2.842E-01	7.92E-02	G
		636.15	-3.988E-02	% P	5.176E-01	1.46E-01	G
		463.51	3.886E-01	(P	4.877E-01	1.54E-01	G
		176.29	-2.307E-01	% P	8.470E-01	2.52E-01	G
I-131	-1.2106E-03						
		364.48	-1.211E-03	&(	6.492E-02	1.86E-02	G K
		636.97	-6.713E-02	&	8.349E-01	2.35E-01	G
		284.29	-1.029E-01	%	9.177E-01	2.69E-01	G
CS-134	7.2768E-04						
		604.66	7.277E-04	&(	6.328E-02	1.78E-02	G K
		795.76	4.491E-02	%	7.087E-02	2.22E-02	G
		569.29	9.542E-02	%	3.574E-01	1.05E-01	G
		801.84	-1.273E-03	% P	1.123E+00	3.20E-01	G
CS-137	1.9926E-01						
		661.62	1.993E-01	(	6.328E-02	2.83E-02	G
CE-139	-1.9999E-03						
		165.85	-2.000E-03	%(P	6.651E-02	1.96E-02	G
EU-152	-5.9360E-03						
		121.78	-5.936E-03	&(P	1.972E-01	5.82E-02	G K
		344.30	-5.440E-02	%	1.924E-01	5.72E-02	G
		1408.08	-2.191E-02	%	3.509E-01	9.47E-02	G
		964.00	2.221E-01	& P	5.556E-01	1.66E-01	G
		1112.07	-1.101E-01	%	6.401E-01	1.83E-01	G
		778.90	1.110E-02	% P	3.819E-01	1.03E-01	G
EU-154	7.2008E-03						
		123.10	7.201E-03	%(P	1.452E-01	4.30E-02	G K
		1274.80	-2.024E-02	%	2.673E-01	7.48E-02	G
		723.30	-2.844E-02	% P	3.465E-01	9.80E-02	G
		1004.80	1.780E-02	%	4.128E-01	1.14E-01	G
EU-155	1.7520E-01						
		86.45	1.752E-01	&(P	3.224E-01	9.79E-02	G K
		105.31	1.492E-03	%	3.162E-01	9.36E-02	G
HG-203	-1.0899E-03						
		279.17	-1.090E-03	%(P	6.035E-02	1.75E-02	G K
		72.87	-7.134E-01	%	2.643E+00	7.95E-01	G
		70.83	-2.013E+00	%	4.969E+00	1.50E+00	G
		82.50	-1.449E+00	%	5.164E+00	1.55E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.2346E-01						
		583.14	3.235E-01	(P	9.714E-02	4.66E-02	G
		510.72	6.185E-01	+	2.231E-01	9.40E-02	G
PB-212	8.9055E-01						
		238.63	8.906E-01	(	1.418E-01	5.64E-02	G K
							Energy duplication
		77.11	1.097E+00	+	7.224E-01	2.29E-01	G
		74.81	1.014E+00	& P	1.503E+00	4.59E-01	G
PB-214	4.7792E-01						
		351.99	4.779E-01	@(P	1.451E-01	5.50E-02	G K
		295.22	3.156E-01	-	2.402E-01	7.86E-02	G
							Energy duplication
		77.11	1.794E+00	+	1.181E+00	3.74E-01	G
		241.92	7.882E-01	+	8.246E-01	2.57E-01	G
BI-212	5.5605E-01						
		727.17	5.560E-01	&(	5.197E-01	1.74E-01	G K
		1620.56	-3.492E-01	% P	2.835E+00	7.60E-01	G
		785.42	1.083E+00	% P	3.024E+00	8.97E-01	G
BI-214	4.9576E-01						
		609.32	4.958E-01	(	1.286E-01	5.99E-02	G K
		1764.51	-7.893E-02	% P	5.858E-01	1.62E-01	G
		1120.28	1.062E+00	+	7.213E-01	3.34E-01	G
RA-224	1.6959E+00						
		241.00	1.696E+00	&(P	1.526E+00	4.81E-01	G
RA-226	1.6386E+00						
		185.99	1.639E+00	*(P	1.575E+00	4.93E-01	G
AC-228	7.7561E-01						
		911.07	7.836E-01	(P	2.424E-01	1.05E-01	G K
		968.90	7.848E-01	(P	4.744E-01	1.70E-01	G
		338.40	7.430E-01	(	4.316E-01	1.46E-01	G
TH-227	3.1017E-02						
		236.00	3.102E-02	%(P	7.470E-01	2.22E-01	G K
		256.25	-1.922E-01	%	7.777E-01	2.32E-01	G
PA-234	1.1851E-01						
		98.44	1.185E-01	&(	3.166E-01	9.55E-02	G K
		946.00	0.000E+00	%	4.264E-01	1.19E-01	G
		131.28	3.942E-02	&	2.827E-01	8.42E-02	G
		94.67	-2.084E-01	%	5.737E-01	1.73E-01	G
		883.24	-5.290E-02	%	5.716E-01	1.60E-01	G
		926.70	-2.103E-02	%	6.058E-01	1.67E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.415E-01 %   5.298E-01 1.55E-01 G

TH-234       2.6321E+00
                           63.29 2.632E+00 %(P 5.673E+00 1.72E+00 G K
                           92.80 2.036E+00 %   3.059E+00 9.35E-01 G
                           92.38-2.133E-01 & P 3.752E+00 1.12E+00 G

AM-241      -1.3555E-01
                           59.54-1.356E-01 &(  8.542E-01 2.55E-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	-1.1793E-01	-1.1949E-01	4.8735E-01	4.8740E-01	5.476E-01
K-40		1.5939E+01	1.5939E+01	2.2308E+00	2.4034E+00	3.729E-01
MN-54	#A	1.4153E-02	1.4185E-02	5.7619E-02	5.7624E-02	6.657E-02
CO-57	#B	9.3205E-04	9.3447E-04	6.1076E-02	6.1076E-02	6.867E-02
CO-60	#B	6.4939E-03	6.4962E-03	6.2440E-02	6.2441E-02	7.605E-02

Sr-85	#A	-2.6650E-02	-2.6939E-02	7.0396E-02	7.0412E-02	7.763E-02
Kr-85	#A	-6.1522E+02	-6.1522E+02	1.6077E+03	1.6080E+03	1.792E+03
Y-88	#B	-1.0004E-02	-1.0070E-02	5.9648E-02	5.9651E-02	7.304E-02
NB-94	#B	0.0000E+00	0.0000E+00	8.0319E-02	8.0319E-02	9.460E-02
Ag-108M	#B	-2.9447E-03	-2.9448E-03	5.5110E-02	5.5110E-02	6.591E-02
CD-109	#A	1.5217E+00	1.5240E+00	2.4219E+00	2.4234E+00	2.648E+00
SN-113	#B	9.9250E-03	9.9856E-03	6.5880E-02	6.5882E-02	7.528E-02
SB-125	#B	1.6208E-01	1.6219E-01	1.7479E-01	1.7503E-01	1.693E-01
I-131	#B	-1.1096E-03	-1.2106E-03	5.5840E-02	5.5840E-02	5.950E-02
CS-134	#B	7.2700E-04	7.2768E-04	5.3447E-02	5.3447E-02	6.322E-02
CS-137		1.9924E-01	1.9926E-01	8.4672E-02	8.5407E-02	
CE-139	#A	-1.9897E-03	-1.9999E-03	8.0455E-02	8.0455E-02	6.617E-02
EU-152	#B	-5.9351E-03	-5.9360E-03	3.1662E-01	3.1662E-01	1.972E-01
EU-154	#B	7.1992E-03	7.2008E-03	1.2906E-01	1.2906E-01	1.452E-01
EU-155	#B	1.7514E-01	1.7520E-01	2.9377E-01	2.9393E-01	3.223E-01
HG-203	#B	-1.0737E-03	-1.0899E-03	6.2245E-02	6.2245E-02	5.945E-02
TL-208		3.2346E-01	3.2346E-01	1.3968E-01	1.4086E-01	
PB-212	#	8.9055E-01	8.9055E-01	1.6907E-01	1.7630E-01	1.418E-01
PB-214	#	4.7792E-01	4.7792E-01	1.6499E-01	1.6715E-01	1.451E-01
BI-212		5.5605E-01	5.5605E-01	5.2052E-01	5.2146E-01	5.197E-01
BI-214		4.9576E-01	4.9576E-01	1.7943E-01	1.8158E-01	
RA-224	#	1.6959E+00	1.6959E+00	1.4424E+00	1.4456E+00	1.526E+00
RA-226	#	1.6386E+00	1.6386E+00	1.4775E+00	1.4804E+00	1.575E+00
AC-228		7.7561E-01	7.7561E-01	2.4987E-01	2.5363E-01	2.424E-01
TH-227	#B	3.1017E-02	3.1017E-02	6.6616E-01	6.6617E-01	7.470E-01
PA-234	#B	1.1851E-01	1.1851E-01	2.8664E-01	2.8671E-01	3.166E-01
TH-234	#B	2.6321E+00	2.6321E+00	5.1570E+00	5.1591E+00	5.673E+00
AM-241	#A	-1.3555E-01	-1.3555E-01	7.6500E-01	7.6504E-01	8.542E-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) 1.8288874E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.8288887E+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_6SEP2006_1631.An1

Sample description
FSS-OOL-02-03-008-F-S-A

Spectrum Filename: C:\GammaVision\Spectra\103F_6SEP2006_1631.An1

Acquisition information
Start time: 06-Sep-2006 16:31:22
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: 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	06-Sep-2006 07:35:00
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. 11 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2646

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
186.08	92.	27.82	1.50	2.566E-02	185.99	3.280	PBC<MDA	RA226
238.86	306.	7.08	1.09	2.319E-02	238.63	43.100	2.134E-01	PB212
241.91	58.	27.41	1.10	2.303E-02	241.00	3.900	4.633E-01	RA224
					241.92	7.470	2.424E-01	PB214
295.45	132.	13.66	1.26	2.024E-02	295.22	19.200	2.380E-01	PB214
338.76	79.	21.52	1.08	1.829E-02	338.40	12.010	2.570E-01	AC228
352.10	272.	9.04	1.16	1.775E-02	351.99	37.100	2.931E-01	PB214
511.38	103.	15.75	1.65	1.316E-02	510.72	22.500	1.865E-01	TL208
583.42	144.	13.00	1.06	1.184E-02	583.14	86.000	9.928E-02	TL208
609.66	180.	9.90	1.55	1.143E-02	609.32	46.090	2.386E-01	BI214
727.55	45.	28.12	1.50	9.961E-03	727.17	11.800	2.750E-01	BI212
911.56	104.	12.40	1.67	8.398E-03	911.07	29.000	2.980E-01	AC228
969.30	69.	19.23	1.18	8.023E-03	968.90	17.460	3.552E-01	AC228
1120.45	77.	19.55	1.40	7.211E-03	1120.28	15.040	5.020E-01	BI214
1461.63	397.	5.21	1.66	5.929E-03	1460.75	10.700	4.320E+00	K40
1765.03	25.	18.90	1.38	5.142E-03	1764.51	15.920	2.190E-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 Centroid Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
482.97	241.77	95.	58.	0.029	82.24	1.095	PB-214	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
RA-226	371.75	186.30	310.	73.	0.036	91.34	1.500s
PB-212	476.94	238.89	279.	281.	0.140	32.20	0.957
PB-214	590.04	295.45	95.	128.	0.064	40.97	1.259
AC-228	676.67	338.76	85.	78.	0.039	64.56	1.084s
PB-214	703.34	352.10	113.	266.	0.133	27.11	1.164
TL-208	1021.53	511.21	82.	46.	0.023	55.91	1.500s
TL-208	1166.22	583.56	44.	117.	0.059	35.06	1.500s
BI-214	1218.41	609.66	57.	174.	0.087	29.71	1.546
BI-212	1454.16	727.55	40.	45.	0.022	84.35	1.497
AC-228	1822.14	911.56	21.	100.	0.050	37.20	1.673
AC-228	1937.62	969.30	32.	69.	0.034	57.69	1.177
BI-214	2239.88	1120.45	36.	75.	0.038	58.65	1.401s
K-40	2922.14	1461.63	27.	378.	0.189	15.62	1.665
BI-214	3528.82	1765.03	3.	25.	0.012	56.69	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	Code	MDA Value pCi/gm	COMMENTS
BE-7		5.4255E-02					
			477.56	5.425E-02	&(	1.673E-01	4.95E-02 G
K-40		4.3195E+00					
			1460.75	4.320E+00	(P	3.066E-01	2.36E-01 G
MN-54		-9.0444E-04					
			834.81	-9.044E-04	&(P	2.423E-02	6.69E-03 G
CO-57		-7.1075E-03					
			122.07	-7.107E-03	%(P	3.575E-02	1.07E-02 G K
			136.43	0.000E+00	&	2.845E-01	8.41E-02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-60	-5.3208E-04						
		1332.51	-5.321E-04	&(P	2.735E-02	7.08E-03	G K
		1173.23	-1.760E-03	& P	2.357E-02	5.98E-03	G K
Sr-85	-4.8504E-03						
		514.00	-4.850E-03	%(	2.834E-02	8.31E-03	G
Kr-85	-1.1191E+02						
		513.99	-1.119E+02	%(	6.514E+02	1.91E+02	G
Y-88	-9.2388E-05						
		1836.01	-9.239E-05	%(P	3.227E-02	8.57E-03	G K
		898.02	3.211E-03	% P	2.057E-02	5.71E-03	G
NB-94	5.8536E-03						
		871.10	5.854E-03	&(	1.941E-02	5.65E-03	G K
		702.50	6.711E-03	%	1.675E-02	5.00E-03	G K
Ag-108M	-7.0664E-04						
		722.95	-7.066E-04	&(	2.226E-02	6.14E-03	G K
		614.37	-1.313E-02	% P	3.148E-02	9.47E-03	G
		433.93	4.868E-03	&	1.853E-02	5.43E-03	G
CD-109	2.0570E-01						
		88.04	2.057E-01	%(	1.238E+00	3.69E-01	G
SN-113	-2.0278E-07						
		391.71	-2.028E-07	%(	3.011E-02	8.57E-03	G K
		255.04	-3.693E-01	%	1.047E+00	3.14E-01	G
SB-125	-5.1415E-03						
		427.95	-5.142E-03	%(P	5.918E-02	1.69E-02	G K
		600.77	-1.549E-04	& P	1.126E-01	3.14E-02	G
		636.15	-4.286E-03	& P	1.696E-01	4.63E-02	G
		463.51	1.196E-01	% P	2.045E-01	6.27E-02	G
		176.29	-6.453E-02	%	3.706E-01	1.10E-01	G
I-131	1.0952E-02						
		364.48	1.095E-02	%(P	1.873E-02	5.76E-03	G K
		636.97	0.000E+00	&	3.089E-01	8.61E-02	G
		284.29	-1.888E-03	% P	4.005E-01	1.17E-01	G
CS-134	-9.4237E-03						
		604.66	-9.424E-03	&(	2.843E-02	8.46E-03	G K
		795.76	1.126E-02	% P	2.444E-02	7.39E-03	G
		569.29	5.562E-02	% P	1.110E-01	3.35E-02	G
		801.84	-4.900E-02	% P	2.536E-01	6.99E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	2.4269E-03						
		661.62	2.427E-03	%(P	2.329E-02	6.49E-03	G
CE-139	5.2130E-04						
		165.85	5.213E-04	%(	2.956E-02	8.69E-03	G
EU-152	-2.1736E-02						
		121.78	-2.174E-02	&(P	1.019E-01	3.04E-02	G K
		344.30	1.151E-02	% P	7.399E-02	2.16E-02	G
		1408.08	-1.646E-03	&	1.093E-01	2.87E-02	G
		964.00	3.253E-02	% P	1.668E-01	4.75E-02	G
		1112.07	-4.116E-02	%	2.110E-01	6.05E-02	G
		778.90	1.044E-02	%	1.261E-01	3.43E-02	G
EU-154	-1.0961E-03						
		123.10	-1.096E-03	%(	7.309E-02	2.16E-02	G K
		1274.80	1.284E-02	%	6.286E-02	1.77E-02	G
		723.30	0.000E+00	&	2.111E-01	6.10E-02	G
		1004.80	-1.123E-02	&	1.448E-01	4.04E-02	G
EU-155	4.8759E-05						
		86.45	4.876E-05	&(	1.480E-01	4.36E-02	G K
		105.31	-1.521E-02	%	1.405E-01	4.16E-02	G
HG-203	4.4062E-03						
		279.17	4.406E-03	%(P	2.726E-02	8.04E-03	G K
		72.87	-2.559E-01	& P	1.446E+00	4.31E-01	G
		70.83	-7.404E-03	%	2.299E+00	6.74E-01	G
		82.50	-2.113E-01	%	2.078E+00	6.14E-01	G
TL-208	8.9552E-02						
		583.14	8.344E-02	@(P	2.403E-02	1.01E-02	G
		510.72	1.129E-01	*(P	1.101E-01	3.32E-02	G
PB-212	2.0362E-01						
		238.63	2.036E-01	(P	5.842E-02	2.28E-02	G K
							Energy duplication
		77.11	4.107E-03	} P	3.883E-01	8.64E-02	G
		74.81	3.892E-01	% P	8.112E-01	2.46E-01	G
PB-214	2.9308E-01						
		351.99	2.931E-01	(P	5.745E-02	2.71E-02	G K
		295.22	2.380E-01	- P	8.991E-02	3.36E-02	G
							Energy duplication
		77.11	2.147E-01	} P	6.351E-01	1.36E-01	G
		241.92	1.672E-01	%	3.506E-01	1.06E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	2.7502E-01						
		727.17	2.750E-01	(P	1.993E-01	7.82E-02	G K
		1620.56	1.567E-01	% P	6.981E-01	1.93E-01	G
		785.42	4.107E-02	%	1.122E+00	3.11E-01	G
BI-214	2.3358E-01						
		609.32	2.386E-01	(P	5.230E-02	2.45E-02	G K
		1764.51	2.190E-01	(P	9.866E-02	4.69E-02	G
		1120.28	5.020E-01	+ P	2.047E-01	1.01E-01	G
RA-224	4.1135E-01						
		241.00	4.114E-01	&(	6.487E-01	1.99E-01	G
RA-226	6.2585E-01						
		185.99	6.258E-01	@(P	7.299E-01	2.25E-01	G
AC-228	3.0663E-01						
		911.07	2.980E-01	(P	7.140E-02	3.82E-02	G K
		968.90	3.552E-01	(P	1.511E-01	6.85E-02	G
		338.40	2.570E-01	*(P	1.507E-01	5.61E-02	G
TH-227	-2.0858E-02						
		236.00	-2.086E-02	&(	1.810E-01	5.32E-02	G K
		256.25	-1.250E-01	% P	3.003E-01	9.05E-02	G
PA-234	-2.1135E-02						
		98.44	-2.114E-02	%(P	1.398E-01	4.14E-02	G K
		946.00	8.142E-03	% P	1.033E-01	2.83E-02	G
		131.28	-9.281E-04	% P	1.364E-01	4.02E-02	G
		94.67	-2.140E-02	& P	2.557E-01	7.57E-02	G
		883.24	5.133E-02	%	1.686E-01	4.92E-02	G
		926.70	-2.395E-02	%	2.019E-01	5.65E-02	G
		569.26	8.249E-02	% P	1.646E-01	4.96E-02	G
TH-234	-7.8753E-01						
		63.29	-7.875E-01	&(P	4.355E+00	1.28E+00	G K
		92.80	4.920E-01	% P	1.414E+00	4.21E-01	G
		92.38	7.603E-01	% P	1.666E+00	4.99E-01	G
AM-241	-1.7649E-03						
		59.54	-1.765E-03	%(P	6.976E-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:
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	5.3993E-02	5.4255E-02	1.4842E-01	1.4846E-01	1.665E-01
K-40		4.3195E+00	4.3195E+00	7.0796E-01	7.5106E-01	
MN-54	#A	-9.0369E-04	-9.0444E-04	3.8955E-02	3.8955E-02	2.421E-02
CO-57	#B	-7.1007E-03	-7.1075E-03	3.3434E-02	3.3436E-02	3.572E-02
CO-60	#B	-5.3201E-04	-5.3208E-04	3.0317E-02	3.0317E-02	2.735E-02
Sr-85	#A	-4.8311E-03	-4.8504E-03	2.4919E-02	2.4921E-02	2.823E-02
Kr-85	#A	-1.1191E+02	-1.1191E+02	5.7272E+02	5.7276E+02	6.514E+02
Y-88	#B	-9.2164E-05	-9.2388E-05	3.2379E-03	3.2379E-03	3.219E-02
NB-94	#B	5.8536E-03	5.8536E-03	1.6963E-02	1.6966E-02	1.941E-02
Ag-108M	#B	-7.0664E-04	-7.0664E-04	1.8429E-02	1.8429E-02	2.226E-02
CD-109	#A	2.0558E-01	2.0570E-01	1.1057E+00	1.1058E+00	1.237E+00
SN-113	#B	-2.0232E-07	-2.0278E-07	2.5705E-02	2.5705E-02	3.005E-02
SB-125	#B	-5.1402E-03	-5.1415E-03	5.1818E-02	5.1819E-02	5.917E-02
I-131	#B	1.0606E-02	1.0952E-02	1.7272E-02	1.7284E-02	1.813E-02
CS-134	#B	-9.4205E-03	-9.4237E-03	2.5391E-02	2.5397E-02	2.842E-02
CS-137	#A	2.4268E-03	2.4269E-03	1.9476E-02	1.9476E-02	2.329E-02
CE-139	#A	5.2032E-04	5.2130E-04	2.6080E-02	2.6080E-02	2.950E-02
EU-152	#B	-2.1735E-02	-2.1736E-02	1.0004E-01	1.0005E-01	1.019E-01
EU-154	#B	-1.0960E-03	-1.0961E-03	6.4732E-02	6.4732E-02	7.309E-02
EU-155	#B	4.8752E-05	4.8759E-05	1.3086E-01	1.3086E-01	1.480E-01

HG-203 #B	4.3818E-03	4.4062E-03	2.4120E-02	2.4122E-02	2.711E-02

TL-208 #	8.9552E-02	8.9552E-02	3.2549E-02	3.2962E-02	2.403E-02
PB-212	2.0362E-01	2.0362E-01	6.8356E-02	6.9371E-02	
PB-214	2.9308E-01	2.9308E-01	8.1150E-02	8.2914E-02	
BI-212	2.7502E-01	2.7502E-01	2.3456E-01	2.3510E-01	
BI-214	2.3358E-01	2.3358E-01	7.1976E-02	7.3243E-02	
RA-224 #A	4.1135E-01	4.1135E-01	5.9633E-01	5.9680E-01	6.487E-01
RA-226 #A	6.2585E-01	6.2585E-01	6.7356E-01	6.7454E-01	7.299E-01
AC-228	3.0663E-01	3.0663E-01	9.7540E-02	9.9151E-02	
TH-227 #B	-2.0858E-02	-2.0858E-02	1.5956E-01	1.5957E-01	1.810E-01
PA-234 #B	-2.1135E-02	-2.1135E-02	1.4418E-01	1.4418E-01	1.398E-01
TH-234 #B	-7.8753E-01	-7.8753E-01	7.4407E+00	7.4408E+00	4.355E+00
AM-241 #A	-1.7648E-03	-1.7649E-03	2.4367E-01	2.4367E-01	6.976E-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

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

Total Activity (50.4 to 2000.7 keV) 5.6314464E+00 pCi/gm
Total Decayed Activity (50.4 to 2000.7 keV) 5.6314464E+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: 103F_6SEPT2006_1021.An1

Sample description
FSS-OOL-02-03-016-F

Spectrum Filename: C:\GammaVision\Spectra\103F_6SEPT2006_1021.An1

Acquisition information
Start time: 06-Sep-2006 10:21:26
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: 1.8960E+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	05-Sep-2006 15:49:00
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. 14 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
74.91	109.	23.07	0.99	9.052E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	8.903E-01	PB212
77.21	157.	13.97	0.99	1.011E-02	77.11	17.500	7.956E-01	PB212
					77.11	10.700	1.301E+00	PB214
92.79	142.	29.43	1.49	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.21	117.	27.24	1.05	2.439E-02				
186.40	176.	20.16	1.48	2.565E-02	185.99	3.280	1.376E+00	RA226
209.54	132.	27.97	1.01	2.470E-02				
238.87	992.	4.83	0.99	2.319E-02	238.63	43.100	6.985E-01	PB212
270.82	103.	22.25	1.36	2.148E-02				
295.37	213.	9.79	1.13	2.025E-02	295.22	19.200	3.824E-01	PB214
300.11	69.	26.06	1.13	2.002E-02				
338.69	223.	13.42	1.18	1.829E-02	338.40	12.010	7.196E-01	AC228
352.09	329.	7.16	1.20	1.775E-02	351.99	37.100	3.501E-01	PB214
409.23	63.	40.24	0.76	1.575E-02				
463.67	71.	24.26	1.25	1.424E-02	463.51	10.000	3.500E-01	SB125
511.08	149.	18.16	1.50	1.317E-02	510.72	22.500	2.932E-01	TL208
583.39	310.	6.90	1.47	1.184E-02	583.14	86.000	2.135E-01	TL208
609.54	230.	9.34	1.56	1.144E-02	609.32	46.090	3.027E-01	BI214
661.86	181.	15.66	1.54	1.072E-02	661.62	84.620	1.412E-01	CS137
726.79	92.	16.03	1.26	9.969E-03	727.17	11.800	5.516E-01	BI212
795.34	30.	33.67	1.68	9.305E-03				
795.34	30.	33.67	1.68	9.305E-03	795.76	85.400	PBC<MDA	CS134
860.27	74.	20.66	1.11	8.770E-03				
911.57	250.	8.76	1.18	8.398E-03	911.07	29.000	7.212E-01	AC228
965.17	35.	34.23	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152

968.44	147.	13.99	1.52	8.029E-03	968.90	17.460	7.480E-01	AC228
1120.81	94.	20.90	1.99	7.209E-03	1120.28	15.040	6.033E-01	BI214
1461.41	877.	3.48	1.95	5.930E-03	1460.75	10.700	9.638E+00	K40
1621.23	14.	34.46	0.72	5.488E-03	1620.56	2.750	6.733E-01	BI212
1765.30	52.	15.01	2.07	5.142E-03	1764.51	15.920	4.565E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.25	209.54	470.	132.	0.066	83.90	1.011	AC-228	
540.79	270.82	192.	103.	0.052	66.76	1.362	AC-228	s
599.16	300.00	218.	76.	0.038	97.18	1.178	PB-212	
817.60	409.23	207.	63.	0.032	120.71	0.761	AC-228	
1719.57	860.27	51.	74.	0.037	61.99	1.113	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	279.	109.	0.054	69.22	0.993D
PB-212	153.39	77.11	274.	157.	0.079	41.90	0.995A
TH-234	185.33	93.08	804.	101.	0.050	104.31	1.500s
TH-234	184.77	92.80	788.	102.	0.051	102.32	1.500D
RA-226	371.14	185.99	565.	116.	0.058	81.51	1.500s
PB-212	476.84	238.84	504.	887.	0.444	15.40	0.983
PB-214	589.67	295.26	213.	184.	0.092	41.80	0.915
AC-228	676.53	338.69	225.	222.	0.111	40.25	1.182s
PB-214	703.32	352.09	113.	324.	0.162	21.48	1.204
SB-125	925.77	463.32	117.	75.	0.038	69.00	1.500s
TL-208	1021.28	511.08	197.	122.	0.061	54.47	1.495s
TL-208	1165.87	583.39	63.	305.	0.153	20.69	1.474
BI-214	1218.18	609.54	96.	224.	0.112	28.03	1.562
CS-137	1322.81	661.86	153.	180.	0.090	46.97	1.541
BI-212	1452.66	726.79	50.	91.	0.046	48.10	1.262s
CS-134	1589.66	795.30	52.	31.	0.016	111.21	1.500
AC-228	1822.18	911.57	65.	247.	0.123	26.29	1.182
EU-152	1929.36	965.17	57.	35.	0.018	102.70	1.538
AC-228	1935.90	968.44	73.	147.	0.074	41.96	1.524
BI-214	2240.60	1120.81	80.	92.	0.046	62.69	1.986s
K-40	2921.68	1461.41	34.	858.	0.429	10.43	1.948
BI-212	3241.26	1621.23	3.	14.	0.007	103.39	0.723s
BI-214	3529.35	1765.30	7.	52.	0.026	45.03	2.068s

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

***** S U M M A R Y O 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		1.1312E-01					
			477.56	1.131E-01	%(	2.800E-01	8.43E-02 G
K-40		9.6377E+00					
			1460.75	9.638E+00	(P	3.343E-01	3.42E-01 G
MN-54		-2.9352E-03					
			834.81	-2.935E-03	&(P	3.156E-02	9.02E-03 G
CO-57		1.0411E-02					
			122.07	1.041E-02	&(P	4.466E-02	1.34E-02 G K
			136.43	-3.862E-02	&	3.523E-01	1.05E-01 G
CO-60		-2.8268E-03					
			1332.51	-2.827E-03	%(P	3.340E-02	8.85E-03 G K
			1173.23	-2.725E-03	% P	3.789E-02	1.05E-02 G K
Sr-85		-7.6450E-03					
			514.00	-7.645E-03	%(	3.676E-02	1.09E-02 G
Kr-85		-1.7553E+02					
			513.99	-1.755E+02	%(	8.417E+02	2.50E+02 G
Y-88		-3.3661E-03					
			1836.01	-3.366E-03	%(P	2.859E-02	7.78E-03 G K
			898.02	-2.374E-05	& P	2.914E-02	8.07E-03 G
NB-94		-5.0956E-03					
			871.10	-5.096E-03	%(	3.364E-02	9.75E-03 G K
			702.50	1.070E-02	%	2.435E-02	7.34E-03 G K
Ag-108M		-8.9804E-03					
			722.95	-8.980E-03	%(	3.779E-02	1.11E-02 G K
			614.37	-3.450E-03	& P	3.290E-02	9.53E-03 G
			433.93	4.157E-03	%	3.284E-02	9.65E-03 G
CD-109		1.2042E+00					
			88.04	1.204E+00	&(	1.637E+00	5.02E-01 G
SN-113		-8.6265E-03					
			391.71	-8.626E-03	%(	4.390E-02	1.30E-02 G K
			255.04	5.862E-01	%	1.233E+00	3.74E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0679E-01						
		427.95	1.602E-02	%(P	8.989E-02	2.65E-02	G K
		600.77	1.512E-02	% P	1.657E-01	4.81E-02	G
		636.15	6.588E-02	% P	1.975E-01	5.84E-02	G
		463.51	3.755E-01	@(P	2.659E-01	8.78E-02	G
		176.29	1.059E-02	%	5.190E-01	1.54E-01	G
I-131	1.0756E-02						
		364.48	1.076E-02	%(P	2.992E-02	8.95E-03	G K
		636.97	1.160E-01	&	3.085E-01	9.20E-02	G
		284.29	1.204E-03	% P	4.879E-01	1.43E-01	G
CS-134	9.7076E-03						
		604.66	-6.397E-03	&(	3.507E-02	1.03E-02	G K
		795.76	2.811E-02	(P	3.264E-02	1.05E-02	G
		569.29	2.139E-02	& P	1.863E-01	5.39E-02	G
		801.84	-6.322E-02	% P	3.744E-01	1.07E-01	G
CS-137	1.4118E-01						
		661.62	1.412E-01	(P	4.745E-02	2.23E-02	G
CE-139	1.4173E-03						
		165.85	1.417E-03	%(	3.401E-02	1.01E-02	G
EU-152	9.0671E-02						
		121.78	2.976E-02	&(P	1.308E-01	3.92E-02	G K
		344.30	-4.398E-04	% P	9.693E-02	2.82E-02	G
		1408.08	0.000E+00	&	1.717E-01	4.76E-02	G
		964.00	2.128E-01	&(P	2.301E-01	7.40E-02	G
		1112.07	7.953E-02	%	2.114E-01	6.30E-02	G
		778.90	-3.859E-02	%	2.305E-01	6.69E-02	G
EU-154	2.1385E-02						
		123.10	2.139E-02	&(	8.635E-02	2.59E-02	G K
		1274.80	0.000E+00	%	1.210E-01	3.42E-02	G
		723.30	-4.913E-02	%	1.780E-01	5.27E-02	G
		1004.80	4.315E-02	&	1.250E-01	3.68E-02	G
EU-155	1.3613E-01						
		86.45	1.361E-01	%(	2.076E-01	6.34E-02	G K
		105.31	6.044E-02	%	2.012E-01	6.06E-02	G
HG-203	-1.6204E-05						
		279.17	-1.620E-05	&(P	3.753E-02	1.10E-02	G K
		72.87	2.695E-01	% P	1.868E+00	5.59E-01	G
		70.83	-2.443E-01	%	3.156E+00	9.38E-01	G
		82.50	-2.253E-01	%	3.414E+00	1.02E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.1354E-01						
		583.14	2.135E-01	(P	2.774E-02	1.49E-02	G
		510.72	2.932E-01	+ P	1.638E-01	6.49E-02	G
PB-212	6.3231E-01						
		238.63	6.323E-01	(P	7.650E-02	3.29E-02	G K
							Energy duplication
		77.11	6.323E-01	} P	3.218E-01	8.83E-02	G
		74.81	8.903E-01	+ P	6.607E-01	2.11E-01	G
PB-214	3.4599E-01						
		351.99	3.501E-01	(P	5.664E-02	2.55E-02	G K
		295.22	3.380E-01	(P	1.296E-01	4.81E-02	G
							Energy duplication
		77.11	1.537E-02	} P	7.698E-01	1.99E-01	G
		241.92	1.518E-02	%	3.641E-01	1.07E-01	G
BI-212	5.7462E-01						
		727.17	5.516E-01	*(P	2.161E-01	8.89E-02	G K
		1620.56	6.733E-01	(P	4.926E-01	2.33E-01	G
		785.42	-3.443E-01	%	1.672E+00	4.90E-01	G
BI-214	3.0272E-01						
		609.32	3.027E-01	(P	6.541E-02	2.91E-02	G K
		1764.51	4.565E-01	+ P	1.276E-01	7.28E-02	G
		1120.28	6.033E-01	+ P	2.920E-01	1.29E-01	G
RA-224	5.5377E-01						
		241.00	5.538E-01	%(	9.516E-01	2.90E-01	G
RA-226	9.8495E-01						
		185.99	9.850E-01	*(P	9.610E-01	2.97E-01	G
AC-228	7.2886E-01						
		911.07	7.212E-01	(P	1.182E-01	6.41E-02	G K
		968.90	7.480E-01	(P	2.162E-01	1.05E-01	G
		338.40	7.196E-01	@(P	2.355E-01	9.71E-02	G
TH-227	-1.2811E-03						
		236.00	-1.281E-03	&(	2.768E-01	8.18E-02	G K
		256.25	1.621E-01	& P	3.439E-01	1.04E-01	G
PA-234	-2.9613E-03						
		98.44	-2.961E-03	%(P	1.934E-01	5.74E-02	G K
		946.00	2.740E-02	& P	1.519E-01	4.39E-02	G
		131.28	-5.491E-02	% P	1.898E-01	5.71E-02	G
		94.67	1.341E-02	% P	3.517E-01	1.05E-01	G
		883.24	1.006E-01	%	1.841E-01	5.67E-02	G
		926.70	-3.131E-02	%	3.137E-01	9.01E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 3.172E-02 & P 2.761E-01 7.99E-02 G

TH-234       1.2485E+00
                           63.29 7.732E-01 &(P 5.586E+00 1.66E+00 G K
                                                          Energy duplication
                           92.80 1.470E+00 *(P 1.928E+00 5.88E-01 G
                           92.38 1.711E+00 *(P 2.293E+00 6.99E-01 G

AM-241      -2.5116E-01
                           59.54-2.512E-01 %(P 1.012E+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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	1.1200E-01	1.1312E-01	2.5287E-01	2.5295E-01	2.772E-01
K-40		9.6377E+00	9.6377E+00	1.0270E+00	1.1696E+00	
MN-54	#A	-2.9302E-03	-2.9352E-03	3.2858E-02	3.2859E-02	3.151E-02
CO-57	#B	1.0391E-02	1.0411E-02	4.0195E-02	4.0199E-02	4.457E-02

CO-60	#B	-2.8260E-03	-2.8268E-03	1.0573E+00	1.0573E+00	3.339E-02

Sr-85	#A	-7.5821E-03	-7.6450E-03	3.2691E-02	3.2694E-02	3.646E-02
Kr-85	#A	-1.7553E+02	-1.7553E+02	7.4859E+02	7.4866E+02	8.417E+02
Y-88	#B	-3.3492E-03	-3.3661E-03	2.4638E-02	2.4639E-02	2.845E-02
NB-94	#B	-5.0956E-03	-5.0956E-03	2.9253E-02	2.9255E-02	3.364E-02
Ag-108M	#B	-8.9803E-03	-8.9804E-03	3.3431E-02	3.3435E-02	3.779E-02
CD-109	#A	1.2028E+00	1.2042E+00	1.5058E+00	1.5072E+00	1.635E+00
SN-113	#B	-8.5865E-03	-8.6265E-03	3.8964E-02	3.8967E-02	4.369E-02
SB-125	#F	1.0673E-01	1.0679E-01	7.4939E-02	7.5195E-02	8.984E-02
I-131	#B	1.0063E-02	1.0756E-02	2.6859E-02	2.6866E-02	2.799E-02
CS-134	#B	9.7007E-03	9.7076E-03	1.0826E-02	1.0840E-02	3.504E-02
CS-137		1.4117E-01	1.4118E-01	6.6821E-02	6.7322E-02	
CE-139	#A	1.4118E-03	1.4173E-03	3.0189E-02	3.0189E-02	3.388E-02
EU-152	#B	9.0661E-02	9.0671E-02	9.4565E-02	9.4699E-02	1.308E-01
EU-154	#B	2.1381E-02	2.1385E-02	7.7703E-02	7.7712E-02	8.633E-02
EU-155	#B	1.3609E-01	1.3613E-01	1.9028E-01	1.9043E-01	2.076E-01
HG-203	#B	-1.6019E-05	-1.6204E-05	2.5550E-03	2.5550E-03	3.710E-02
TL-208		2.1354E-01	2.1354E-01	4.4812E-02	4.6495E-02	
PB-212		6.3231E-01	6.3231E-01	9.8673E-02	1.0528E-01	
PB-214		3.4599E-01	3.4599E-01	7.5614E-02	7.8236E-02	
BI-212		5.7462E-01	5.7462E-01	2.7791E-01	2.7991E-01	
BI-214		3.0272E-01	3.0272E-01	8.7298E-02	8.9050E-02	
RA-224	#A	5.5377E-01	5.5377E-01	8.6979E-01	8.7038E-01	9.516E-01
RA-226	#	9.8495E-01	9.8495E-01	8.9219E-01	8.9402E-01	9.610E-01
AC-228		7.2886E-01	7.2886E-01	1.5576E-01	1.6140E-01	
TH-227	#B	-1.2811E-03	-1.2811E-03	2.4536E-01	2.4536E-01	2.768E-01
PA-234	#B	-2.9613E-03	-2.9613E-03	5.4476E-01	5.4476E-01	1.934E-01
TH-234	#B	1.2485E+00	1.2485E+00	1.4990E+00	1.5006E+00	5.586E+00
AM-241	#A	-2.5116E-01	-2.5116E-01	9.2292E-01	9.2303E-01	1.012E+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) 1.2576909E+01 pCi/gm
Total Decayed Activity (86.4 to 2000.7 keV) 1.2576916E+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_6SEPT2006_1107.An1

Sample description
FSS-OOL-02-03-014-F

Spectrum Filename: C:\GammaVision\Spectra\103F_6SEPT2006_1107.An1

Acquisition information
Start time: 06-Sep-2006 11:07:48
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: 1.4800E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.4800E+03) =
6.7568E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:44:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2630

***** S U M M A R Y O F P E A K 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	116.	21.20	0.99	9.052E-03	74.81	9.600	1.216E+00	PB212
77.19	88.	23.05	0.99	1.011E-02	77.11	17.500	6.335E-01	PB212
					77.11	10.700	1.036E+00	PB214
93.20	98.	33.29	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
186.40	122.	25.97	1.08	2.565E-02	185.99	3.280	PBC<MDA	RA226
209.80	116.	29.20	0.97	2.469E-02				
238.81	884.	3.86	1.09	2.319E-02	238.63	43.100	7.966E-01	PB212
242.03	126.	18.30	1.10	2.302E-02	241.00	3.900	1.281E+00	RA224
					241.92	7.470	6.703E-01	PB214
270.47	73.	29.92	1.44	2.150E-02				
277.07	56.	35.44	0.71	2.116E-02				
295.37	172.	11.58	1.13	2.024E-02	295.22	19.200	3.950E-01	PB214
300.16	51.	30.35	1.13	2.001E-02				
338.45	183.	12.41	1.23	1.830E-02	338.40	12.010	7.573E-01	AC228
352.07	257.	9.61	1.20	1.775E-02	351.99	37.100	3.485E-01	PB214
463.44	60.	30.68	1.02	1.425E-02				
463.44	60.	30.68	1.02	1.425E-02	463.51	10.000	3.734E-01	SB125
511.33	164.	15.10	1.27	1.316E-02	510.72	22.500	4.215E-01	TL208
583.43	303.	9.17	1.41	1.184E-02	583.14	86.000	2.678E-01	TL208
609.61	189.	12.82	1.31	1.143E-02	609.32	46.090	3.168E-01	BI214
661.93	203.	12.86	1.39	1.072E-02	661.62	84.620	2.029E-01	CS137
727.26	79.	24.61	1.32	9.964E-03	727.17	11.800	6.065E-01	BI212
795.61	45.	34.98	1.04	9.303E-03				
795.61	45.	34.98	1.04	9.303E-03	795.76	85.400	5.155E-02	CS134
861.61	60.	22.37	1.25	8.759E-03				

911.64	280.	8.24	1.55	8.397E-03	911.07	29.000	1.037E+00	AC228
964.94	35.	32.49	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152
968.34	185.	9.80	1.52	8.029E-03	968.90	17.460	1.206E+00	AC228
1120.84	50.	24.80	1.27	7.209E-03	1120.28	15.040	4.008E-01	BI214
1461.43	971.	3.30	1.99	5.930E-03	1460.75	10.700	1.370E+01	K40
1621.49	15.	28.61	0.97	5.488E-03	1620.56	2.750	8.867E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1765.39	32.	16.90	1.54	5.142E-03	1764.51	15.920	3.539E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.77	209.80	395.	116.	0.058	87.60	0.971	NP-239	s
540.09	270.47	185.	73.	0.037	89.77	1.437	AC-228	s
553.29	277.07	158.	56.	0.028	104.12	0.709	TL-208	
599.44	300.15	157.	49.	0.024	119.93	1.008	PB-212	
1590.28	795.61	67.	43.	0.021	93.38	1.038	CS-134	s
1722.27	861.61	42.	60.	0.030	59.76	1.245	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	261.	116.	0.058	63.61	0.993D
PB-212	153.39	77.11	263.	88.	0.044	69.14	0.995A
PA-234	185.57	93.20	485.	98.	0.049	99.86	1.500s
RA-226	371.93	186.38	535.	114.	0.057	81.08	1.500s
PB-212	476.42	238.63	151.	873.	0.437	11.56	1.093D
PB-214	483.00	241.92	249.	71.	0.035	79.16	1.095A
PB-214	589.86	295.36	257.	174.	0.087	49.56	1.123
AC-228	676.04	338.45	147.	182.	0.091	37.24	1.230
PB-214	703.28	352.07	147.	251.	0.126	28.82	1.198
SB-125	925.71	463.29	123.	56.	0.028	91.46	1.500
TL-208	1021.78	511.33	154.	137.	0.068	45.31	1.266s
TL-208	1165.97	583.43	131.	299.	0.149	27.51	1.405
BI-214	1218.31	609.61	124.	183.	0.091	38.45	1.310
CS-137	1322.94	661.93	127.	202.	0.101	38.59	1.385
BI-212	1453.59	727.26	93.	78.	0.039	73.84	1.324s
AC-228	1822.31	911.64	66.	277.	0.138	24.71	1.553
EU-152	1928.90	964.94	51.	35.	0.018	97.48	1.538s
AC-228	1935.69	968.34	44.	185.	0.093	29.39	1.520s
BI-214	2240.66	1120.84	42.	48.	0.024	74.41	1.274
K-40	2921.73	1461.43	33.	952.	0.476	9.89	1.988
BI-212	3241.80	1621.49	1.	15.	0.007	85.84	0.971s
BI-214	3529.54	1765.39	3.	32.	0.016	50.71	1.542

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		2.2981E-01					
			477.56	2.298E-01	%(	3.082E-01 9.62E-02	G
K-40		1.3699E+01					
			1460.75	1.370E+01	(P	4.224E-01 4.61E-01	G
MN-54		-1.2580E-03					
			834.81	-1.258E-03	%(P	2.979E-02 8.21E-03	G
CO-57		-3.7048E-03					
			122.07	-3.705E-03	&(P	5.008E-02 1.49E-02	G K
			136.43	-4.226E-03	&	3.924E-01 1.16E-01	G
CO-60		1.2795E-02					
			1332.51	1.279E-02	%(P	3.999E-02 1.15E-02	G K
			1173.23	8.933E-03	% P	5.021E-02 1.45E-02	G K
Sr-85		-8.1266E-03					
			514.00	-8.127E-03	%(	4.713E-02 1.39E-02	G
Kr-85		-1.8620E+02					
			513.99	-1.862E+02	%(	1.079E+03 3.19E+02	G
Y-88		5.1046E-03					
			1836.01	5.105E-03	%(P	1.843E-02 5.08E-03	G K
			898.02	2.381E-03	% P	3.969E-02 1.12E-02	G
NB-94		-4.8989E-04					
			871.10	-4.899E-04	&(	2.775E-02 7.59E-03	G K
			702.50	1.382E-02	%	3.363E-02 1.01E-02	G K
Ag-108M		1.0730E-03					
			722.95	1.073E-03	&(	7.119E-02 2.08E-02	G K
			614.37	-1.109E-02	% P	4.436E-02 1.31E-02	G
			433.93	-1.636E-05	%	3.447E-02 9.91E-03	G
CD-109		1.1925E+00					
			88.04	1.193E+00	%(	1.940E+00 5.92E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-1.0680E-02						
		391.71	-1.068E-02	%(	5.176E-02	1.53E-02	G K
		255.04	2.950E-01	&	1.709E+00	5.08E-01	G
SB-125	8.4758E-02						
		427.95	-6.871E-03	&(P	1.175E-01	3.42E-02	G K
		600.77	3.654E-02	& P	2.062E-01	6.04E-02	G
		636.15	3.040E-02	% P	2.195E-01	6.21E-02	G
		463.51	3.560E-01	(P	3.485E-01	1.11E-01	G
		176.29	1.550E-01	%	5.738E-01	1.72E-01	G
I-131	1.9528E-02						
		364.48	1.953E-02	&(P	4.222E-02	1.28E-02	G K
		636.97	9.225E-02	%	4.611E-01	1.34E-01	G
		284.29	5.806E-03	% P	6.350E-01	1.86E-01	G
CS-134	-4.4038E-03						
		604.66	-4.404E-03	%(	4.304E-02	1.25E-02	G K
		795.76	2.349E-03	% P	4.915E-02	1.41E-02	G
		569.29	3.671E-02	% P	2.249E-01	6.53E-02	G
		801.84	-5.402E-02	% P	4.546E-01	1.29E-01	G
CS-137	2.0290E-01						
		661.62	2.029E-01	(P	5.566E-02	2.63E-02	G
CE-139	6.8415E-04						
		165.85	6.842E-04	%(	5.028E-02	1.49E-02	G
EU-152	8.3521E-02						
		121.78	-1.206E-02	&(P	1.561E-01	4.64E-02	G K
		344.30	-2.723E-03	& P	1.306E-01	3.82E-02	G
		1408.08	3.319E-02	&	1.366E-01	3.88E-02	G
		964.00	2.752E-01	(P	2.792E-01	9.08E-02	G
		1112.07	4.733E-02	&	3.343E-01	9.61E-02	G
		778.90	1.058E-01	%	2.522E-01	7.58E-02	G
EU-154	3.2236E-02						
		123.10	3.224E-02	%(	1.107E-01	3.33E-02	G K
		1274.80	2.050E-02	%	1.045E-01	2.99E-02	G
		723.30	-4.672E-02	&	2.426E-01	7.14E-02	G
		1004.80	-3.739E-03	%	1.745E-01	4.77E-02	G
EU-155	1.5474E-02						
		86.45	1.547E-02	&(	2.256E-01	6.71E-02	G K
		105.31	6.027E-02	%	1.949E-01	5.85E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-2.0770E-05						
		279.17	-2.077E-05	&(P	4.282E-02	1.26E-02	G K
		72.87	-4.129E-01	% P	2.251E+00	6.74E-01	G
		70.83	-3.359E-01	%	4.568E+00	1.36E+00	G
		82.50	-7.506E-01	%	3.690E+00	1.10E+00	G
TL-208	2.6783E-01						
		583.14	2.678E-01	(P	5.028E-02	2.49E-02	G
		510.72	4.215E-01	+ P	1.866E-01	7.61E-02	G
PB-212	7.9724E-01						
		238.63	7.972E-01	(P	5.481E-02	3.12E-02	G K
							Energy duplication
		77.11	4.523E-01	} P	4.040E-01	1.04E-01	G
		74.81	1.216E+00	+ P	8.199E-01	2.65E-01	G
PB-214	3.7599E-01						
		351.99	3.485E-01	(P	8.199E-02	3.42E-02	G K
		295.22	4.078E-01	(P	1.819E-01	6.90E-02	G
							Energy duplication
		77.11	2.073E-01	} P	9.646E-01	2.46E-01	G
		241.92	3.760E-01	}	4.047E-01	9.92E-02	G
BI-212	6.5948E-01						
		727.17	6.065E-01	@(P	3.698E-01	1.50E-01	G K
		1620.56	8.867E-01	(P	4.909E-01	2.55E-01	G
		785.42	0.000E+00	%	2.193E+00	6.25E-01	G
BI-214	3.4086E-01						
		609.32	3.168E-01	(P	9.459E-02	4.21E-02	G K
		1764.51	3.539E-01	(P	1.243E-01	6.60E-02	G
		1120.28	4.008E-01	(P	2.782E-01	1.03E-01	G
RA-224	9.7093E-01						
							Derived Ave Activity
		241.00	9.709E-01	}(	1.318E+00	4.17E-01	G
RA-226	1.2327E+00						
		185.99	1.233E+00	*(P	1.199E+00	3.71E-01	G
AC-228	1.1005E+00						
		911.07	1.037E+00	(P	1.524E-01	8.65E-02	G K
		968.90	1.206E+00	@(P	2.187E-01	1.18E-01	G
		338.40	7.573E-01	- P	2.457E-01	9.46E-02	G
TH-227	6.3831E-02						
		236.00	6.383E-02	%(	2.925E-01	8.72E-02	G K
		256.25	4.545E-02	& P	5.189E-01	1.53E-01	G

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

PA-234       1.2650E-01
                           98.44-3.648E-03 %(P 2.119E-01 6.26E-02 G K
                          946.00 3.102E-04 & P 2.047E-01 5.75E-02 G
                          131.28 3.149E-03 & P 2.169E-01 6.43E-02 G
                           94.67 3.373E-01  (P 3.632E-01 1.13E-01 G
                          883.24 1.049E-01 &   2.462E-01 7.40E-02 G
                          926.70 3.757E-04 %   3.270E-01 9.10E-02 G
                          569.26 3.896E-02 % P 3.272E-01 9.43E-02 G

TH-234       1.2339E+00
                           63.29 1.234E+00 %(P 6.980E+00 2.08E+00 G K
                           92.80 1.277E+00 % P 2.289E+00 6.92E-01 G
                           92.38 1.504E+00 & P 2.717E+00 8.22E-01 G

AM-241      -2.6294E-01
                           59.54-2.629E-01 %(P 1.237E+00 3.70E-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	2.2741E-01	2.2981E-01	2.8875E-01	2.8906E-01	3.050E-01
K-40		1.3699E+01	1.3699E+01	1.3811E+00	1.5938E+00	
MN-54	#A	-1.2557E-03	-1.2580E-03	4.4769E-02	4.4770E-02	2.974E-02
CO-57	#B	-3.6972E-03	-3.7048E-03	4.9614E-02	4.9614E-02	4.998E-02
CO-60	#B	1.2791E-02	1.2795E-02	3.4585E-02	3.4593E-02	3.998E-02
Sr-85	#A	-8.0567E-03	-8.1266E-03	4.1785E-02	4.1787E-02	4.672E-02
Kr-85	#A	-1.8620E+02	-1.8620E+02	9.5637E+02	9.5643E+02	1.079E+03
Y-88	#B	5.0778E-03	5.1046E-03	1.5236E-02	1.5239E-02	1.833E-02
NB-94	#B	-4.8989E-04	-4.8989E-04	2.2775E-02	2.2775E-02	2.775E-02
Ag-108M	#B	1.0730E-03	1.0730E-03	6.2403E-02	6.2403E-02	7.119E-02
CD-109	#A	1.1911E+00	1.1925E+00	1.7762E+00	1.7774E+00	1.938E+00
SN-113	#B	-1.0628E-02	-1.0680E-02	4.5889E-02	4.5893E-02	5.151E-02
SB-125	#B	8.4711E-02	8.4758E-02	7.9303E-02	7.9455E-02	1.175E-01
I-131	#B	1.8214E-02	1.9528E-02	3.8311E-02	3.8328E-02	3.938E-02
CS-134	#B	-4.4005E-03	-4.4038E-03	3.7606E-02	3.7607E-02	4.300E-02
CS-137		2.0289E-01	2.0290E-01	7.8835E-02	7.9711E-02	
CE-139	#A	6.8137E-04	6.8415E-04	4.4719E-02	4.4719E-02	5.007E-02
EU-152	#B	8.3511E-02	8.3521E-02	8.2672E-02	8.2802E-02	1.560E-01
EU-154	#B	3.2230E-02	3.2236E-02	9.9784E-02	9.9800E-02	1.106E-01
EU-155	#B	1.5469E-02	1.5474E-02	2.0119E-01	2.0119E-01	2.255E-01
HG-203	#B	-2.0522E-05	-2.0770E-05	2.9038E-03	2.9038E-03	4.231E-02
TL-208		2.6783E-01	2.6783E-01	7.4746E-02	7.6347E-02	
PB-212		7.9724E-01	7.9724E-01	9.3451E-02	1.0429E-01	
PB-214		3.7599E-01	3.7599E-01	1.1079E-01	1.1292E-01	
BI-212		6.5948E-01	6.5948E-01	3.7501E-01	3.7696E-01	
BI-214		3.4086E-01	3.4086E-01	1.1753E-01	1.1918E-01	
RA-224	A	9.7093E-01	9.7093E-01	1.2246E+00	1.2259E+00	
RA-226	#	1.2327E+00	1.2327E+00	1.1134E+00	1.1157E+00	1.199E+00
AC-228		1.1005E+00	1.1005E+00	2.1245E-01	2.2185E-01	
TH-227	#B	6.3831E-02	6.3831E-02	2.6157E-01	2.6159E-01	2.925E-01
PA-234	#B	1.2650E-01	1.2650E-01	1.2676E-01	1.2695E-01	2.119E-01
TH-234	#B	1.2339E+00	1.2339E+00	6.2409E+00	6.2413E+00	6.980E+00
AM-241	#A	-2.6293E-01	-2.6294E-01	1.1289E+00	1.1290E+00	1.237E+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 (270.4 to 2000.7 keV) 1.8414619E+01 pCi/gm
Total Decayed Activity (270.4 to 2000.7 keV) 1.8414629E+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_6SEPT2006_1147.An1

Sample description
FSS-OOL-02-03-021-F

Spectrum Filename: C:\GammaVision\Spectra\103F_6SEPT2006_1147.An1

Acquisition information
Start time: 06-Sep-2006 11:47:21
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: 1.8780E+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	05-Sep-2006 15:56:00
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: 0.2837

***** S U M M A R Y O F P E A K 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	93.	27.09	0.99	9.052E-03	74.81	9.600	7.682E-01	PB212
77.20	148.	15.05	0.99	1.011E-02	77.11	17.500	7.799E-01	PB212
186.25	141.	21.69	1.03	2.566E-02	185.99	3.280	1.098E+00	RA226
209.60	63.	40.93	1.59	2.470E-02				
238.80	859.	4.01	1.09	2.319E-02	238.63	43.100	6.096E-01	PB212
241.81	127.	18.12	1.09	2.303E-02	241.00	3.900	1.012E+00	RA224
					241.92	7.470	5.294E-01	PB214
270.65	114.	26.90	1.23	2.149E-02				
277.47	59.	38.42	0.87	2.114E-02				
277.47	59.	38.42	0.87	2.114E-02	279.17	81.500	PBC<MDA	HG203
295.43	200.	13.10	1.12	2.024E-02	295.22	19.200	3.629E-01	PB214
338.51	185.	15.82	1.03	1.830E-02	338.40	12.010	6.021E-01	AC228
352.16	317.	9.56	1.08	1.775E-02	351.99	37.100	3.399E-01	PB214
409.84	47.	35.69	1.56	1.573E-02				
463.21	57.	28.73	1.07	1.425E-02				
463.21	57.	28.73	1.07	1.425E-02	463.51	10.000	2.816E-01	SB125
511.04	156.	13.26	1.34	1.317E-02	510.72	22.500	3.133E-01	TL208
583.40	301.	9.35	1.57	1.184E-02	583.14	86.000	2.094E-01	TL208
609.57	290.	8.86	1.28	1.144E-02	609.32	46.090	3.874E-01	BI214
661.92	238.	10.63	1.62	1.072E-02	661.62	84.620	1.877E-01	CS137
727.77	76.	19.51	1.68	9.958E-03	727.17	11.800	4.651E-01	BI212
795.15	39.	30.89	1.50	9.301E-03	795.76	85.400	3.503E-02	CS134
860.65	54.	25.66	1.26	8.767E-03				
911.45	226.	11.24	1.73	8.399E-03	911.07	29.000	6.569E-01	AC228
964.56	29.	40.29	1.54	8.052E-03				
969.48	129.	10.88	1.54	8.022E-03	968.90	17.460	6.603E-01	AC228
1120.80	93.	19.23	1.88	7.209E-03	1120.28	15.040	6.018E-01	BI214

1461.41	1126.	3.02	2.07	5.930E-03	1460.75	10.700	1.256E+01	K40
1765.04	60.	12.91	1.76	5.141E-03	1764.51	15.920	4.987E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.36	209.60	301.	63.	0.032	122.80	1.587	NP-239	s
540.45	270.65	308.	114.	0.057	80.69	1.226	AC-228	s
818.82	409.84	111.	47.	0.023	107.08	1.558	AC-228	s
1720.35	860.65	46.	54.	0.027	76.98	1.263	TL-208	s
1929.39	964.63	43.	39.	0.019	86.69	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	292.	93.	0.046	81.26	0.993D
PB-212	153.39	77.11	309.	148.	0.074	45.14	0.995A
RA-226	371.66	186.25	394.	128.	0.064	65.07	1.032s
PB-212	476.80	238.82	563.	833.	0.417	17.14	0.984
RA-224	482.56	241.70	583.	118.	0.059	90.79	1.500
PB-214	482.61	241.73	277.	58.	0.029	121.59	1.494s
HG-203	553.57	277.21	233.	59.	0.030	116.22	1.500
PB-214	590.00	295.43	216.	196.	0.098	39.31	1.120s
AC-228	676.16	338.51	225.	184.	0.092	47.47	1.028
PB-214	703.46	352.16	220.	311.	0.156	28.67	1.079
SB-125	925.63	463.26	124.	51.	0.025	99.35	1.500s
TL-208	1021.19	511.04	127.	129.	0.065	39.79	1.336s
TL-208	1165.90	583.40	137.	296.	0.148	28.05	1.574s
BI-214	1218.23	609.57	119.	284.	0.142	26.59	1.283
CS-137	1322.93	661.92	116.	237.	0.118	31.90	1.619
BI-212	1454.61	727.77	59.	76.	0.038	58.53	1.679s
CS-134	1589.36	795.15	52.	39.	0.019	92.66	1.500s
AC-228	1821.93	911.45	99.	222.	0.111	33.73	1.734s
AC-228	1936.81	968.90	34.	129.	0.064	32.71	1.541D
BI-214	2240.57	1120.80	64.	91.	0.045	57.70	1.882
K-40	2921.70	1461.41	28.	1108.	0.554	9.07	2.068
BI-214	3528.84	1765.04	3.	57.	0.028	38.73	1.756

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

***** S U M M A R Y O 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		7.9774E-02					
			477.56	7.977E-02	%(	2.865E-01 8.52E-02	G
K-40		1.2557E+01					
			1460.75	1.256E+01	(P	3.119E-01 3.86E-01	G
MN-54		1.4237E-03					
			834.81	1.424E-03	&(P	3.784E-02 1.09E-02	G
CO-57		6.0991E-03					
			122.07	6.099E-03	%(P	4.620E-02 1.38E-02	G K
			136.43	-2.029E-02	&	3.575E-01 1.07E-01	G
CO-60		-1.5808E-03					
			1332.51	-1.581E-03	%(P	3.797E-02 1.03E-02	G K
			1173.23	4.555E-03	& P	4.512E-02 1.29E-02	G K
Sr-85		-1.4269E-02					
			514.00	-1.427E-02	%(	3.888E-02 1.17E-02	G
Kr-85		-3.2644E+02					
			513.99	-3.264E+02	%(	8.896E+02 2.67E+02	G
Y-88		-4.7172E-04					
			1836.01	-4.717E-04	%(P	2.202E-02 5.51E-03	G K
			898.02	4.256E-03	& P	2.896E-02 8.25E-03	G
NB-94		-3.5296E-04					
			871.10	-3.530E-04	&(	3.088E-02 8.71E-03	G K
			702.50	1.045E-03	&	3.021E-02 8.63E-03	G K
Ag-108M		-3.6395E-03					
			722.95	-3.639E-03	&(	3.064E-02 8.81E-03	G K
			614.37	-1.259E-02	% P	3.759E-02 1.12E-02	G
			433.93	-2.999E-04	%	3.127E-02 9.06E-03	G
CD-109		6.9652E-01					
			88.04	6.965E-01	%(	1.649E+00 4.99E-01	G
SN-113		8.6328E-03					
			391.71	8.633E-03	&(	4.373E-02 1.29E-02	G K
			255.04	3.875E-01	%	1.412E+00 4.23E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	4.9945E-02						
		427.95	-1.982E-02	%(P	1.083E-01	3.20E-02	G K
		600.77	-5.196E-03	% P	1.327E-01	3.77E-02	G
		636.15	7.410E-02	& P	2.671E-01	7.89E-02	G
		463.51	2.565E-01	@(P	2.756E-01	8.71E-02	G
		176.29	1.437E-02	%	3.953E-01	1.17E-01	G
I-131	-1.4416E-02						
		364.48	-1.442E-02	%(P	3.848E-02	1.15E-02	G K
		636.97	-2.349E-03	&	4.371E-01	1.25E-01	G
		284.29	-1.096E-01	% P	4.986E-01	1.48E-01	G
CS-134	2.0273E-02						
		604.66	7.359E-03	%(	2.400E-02	7.10E-03	G K
		795.76	3.503E-02	(P	3.300E-02	1.08E-02	G
		569.29	-2.605E-02	& P	2.193E-01	6.36E-02	G
		801.84	-1.007E-01	% P	3.585E-01	1.04E-01	G
CS-137	1.8766E-01						
		661.62	1.877E-01	(P	4.202E-02	2.01E-02	G
CE-139	-1.1072E-03						
		165.85	-1.107E-03	&(	4.219E-02	1.25E-02	G
EU-152	1.8376E-02						
		121.78	1.838E-02	%(P	1.318E-01	3.94E-02	G K
		344.30	-3.192E-02	% P	1.105E-01	3.30E-02	G
		1408.08	2.390E-02	%	1.438E-01	4.07E-02	G
		964.00	-8.398E-02	% P	2.568E-01	7.60E-02	G
		1112.07	1.038E-01	&	2.279E-01	6.89E-02	G
		778.90	9.184E-02	%	1.694E-01	5.20E-02	G
EU-154	-2.0281E-03						
		123.10	-2.028E-03	&(	9.862E-02	2.93E-02	G K
		1274.80	-1.042E-02	%	1.009E-01	2.86E-02	G
		723.30	4.326E-03	%	1.586E-01	4.53E-02	G
		1004.80	-6.699E-02	&	2.125E-01	6.30E-02	G
EU-155	1.4722E-02						
		86.45	1.472E-02	%(	1.558E-01	4.62E-02	G K
		105.31	4.069E-02	%	1.970E-01	5.90E-02	G
HG-203	2.5111E-02						
		279.17	2.511E-02	&(P	3.137E-02	9.73E-03	G K
		72.87	-7.899E-01	& P	2.028E+00	6.13E-01	G
		70.83	-3.986E-02	%	2.739E+00	8.08E-01	G
		82.50	-4.501E-01	&	3.470E+00	1.04E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.0937E-01						
		583.14	2.094E-01	*(P	4.039E-02	1.99E-02	G
		510.72	3.133E-01	+ P	1.341E-01	5.02E-02	G
PB-212	5.9965E-01						
		238.63	5.997E-01	(P	8.151E-02	3.48E-02	G K
							Energy duplication
		77.11	5.997E-01	} P	3.441E-01	9.02E-02	G
		74.81	7.682E-01	+ P	6.821E-01	2.15E-01	G
PB-214	3.4776E-01						
		351.99	3.399E-01	(P	7.845E-02	3.31E-02	G K
		295.22	3.629E-01	@(P	1.318E-01	4.86E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.078E-01	0.00E+00	G
		241.92	2.435E-01	-	3.357E-01	9.86E-02	G
BI-212	4.6513E-01						
		727.17	4.651E-01	(P	2.356E-01	9.14E-02	G K
		1620.56	1.620E-01	& P	1.011E+00	2.81E-01	G
		785.42	6.463E-01	%	1.444E+00	4.36E-01	G
BI-214	3.8737E-01						
		609.32	3.874E-01	(P	7.313E-02	3.51E-02	G K
		1764.51	4.987E-01	+ P	9.792E-02	6.81E-02	G
		1120.28	6.018E-01	+ P	2.659E-01	1.18E-01	G
RA-224	9.4694E-01						
		241.00	9.469E-01	(	9.214E-01	2.87E-01	G
RA-226	1.0979E+00						
		185.99	1.098E+00	(P	8.133E-01	2.62E-01	G
AC-228	6.4677E-01						
		911.07	6.569E-01	@(P	1.446E-01	7.50E-02	G K
		968.90	6.606E-01	(P	1.542E-01	7.21E-02	G
		338.40	6.021E-01	(P	2.378E-01	9.59E-02	G
TH-227	-8.7598E-02						
		236.00	-8.760E-02	%(	3.321E-01	9.97E-02	G K
		256.25	-7.708E-02	& P	4.548E-01	1.35E-01	G
PA-234	7.3137E-02						
		98.44	7.314E-02	%(P	2.011E-01	6.07E-02	G K
		946.00	4.676E-02	% P	1.377E-01	4.08E-02	G
		131.28	-4.745E-02	% P	1.981E-01	5.95E-02	G
		94.67	4.398E-02	& P	3.678E-01	1.10E-01	G
		883.24	1.035E-01	&	1.638E-01	5.15E-02	G
		926.70	1.398E-02	%	2.904E-01	8.23E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.853E-02 & P 3.250E-01 9.42E-02 G

TH-234      -1.0658E+00
                           63.29-1.066E+00 %(P 6.174E+00 1.84E+00 G K
                           92.80 8.323E-01 % P 1.973E+00 5.94E-01 G
                           92.38 7.780E-01 % P 2.350E+00 7.05E-01 G

AM-241       8.1141E-02
                           59.54 8.114E-02 %(P 1.001E+00 2.98E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	7.8922E-02	7.9774E-02	2.5555E-01	2.5560E-01	2.834E-01
K-40		1.2557E+01	1.2557E+01	1.1579E+00	1.3683E+00	
MN-54	#A	1.4211E-03	1.4237E-03	3.2596E-02	3.2596E-02	3.777E-02
CO-57	#B	6.0862E-03	6.0991E-03	4.1412E-02	4.1413E-02	4.611E-02
CO-60	#B	-1.5803E-03	-1.5808E-03	1.0011E-01	1.0011E-01	3.796E-02

Sr-85	#A	-1.4143E-02	-1.4269E-02	3.5057E-02	3.5067E-02	3.854E-02
Kr-85	#A	-3.2644E+02	-3.2644E+02	8.0216E+02	8.0239E+02	8.896E+02
Y-88	#B	-4.6919E-04	-4.7172E-04	2.4524E-02	2.4524E-02	2.190E-02
NB-94	#B	-3.5296E-04	-3.5296E-04	2.6120E-02	2.6120E-02	3.088E-02
Ag-108M	#B	-3.6394E-03	-3.6395E-03	2.6435E-02	2.6436E-02	3.064E-02
CD-109	#A	6.9564E-01	6.9652E-01	1.4970E+00	1.4975E+00	1.647E+00
SN-113	#B	8.5899E-03	8.6328E-03	3.8806E-02	3.8809E-02	4.351E-02
SB-125	#B	4.9917E-02	4.9945E-02	5.0867E-02	5.0950E-02	1.082E-01
I-131	#B	-1.3424E-02	-1.4416E-02	3.6495E-02	3.6505E-02	3.583E-02
CS-134	#B	2.0257E-02	2.0273E-02	1.8828E-02	1.8864E-02	2.399E-02
CS-137		1.8765E-01	1.8766E-01	6.0217E-02	6.1195E-02	
CE-139	#A	-1.1026E-03	-1.1072E-03	3.7600E-02	3.7600E-02	4.201E-02
EU-152	#B	1.8374E-02	1.8376E-02	1.1806E-01	1.1807E-01	1.317E-01
EU-154	#B	-2.0277E-03	-2.0281E-03	8.8010E-02	8.8010E-02	9.860E-02
EU-155	#B	1.4717E-02	1.4722E-02	1.3871E-01	1.3871E-01	1.557E-01
HG-203	#A	2.4804E-02	2.5111E-02	2.9203E-02	2.9240E-02	3.099E-02
TL-208	#	2.0937E-01	2.0937E-01	5.9572E-02	6.0799E-02	
PB-212		5.9965E-01	5.9965E-01	1.0427E-01	1.0993E-01	
PB-214		3.4776E-01	3.4776E-01	8.6274E-02	8.8605E-02	
BI-212		4.6513E-01	4.6513E-01	2.7400E-01	2.7533E-01	
BI-214		3.8737E-01	3.8737E-01	1.0536E-01	1.0774E-01	
RA-224		9.4694E-01	9.4694E-01	8.5971E-01	8.6147E-01	9.214E-01
RA-226	#	1.0979E+00	1.0979E+00	7.8645E-01	7.8903E-01	
AC-228		6.4677E-01	6.4677E-01	1.4503E-01	1.4982E-01	
TH-227	#B	-8.7598E-02	-8.7598E-02	2.9921E-01	2.9925E-01	3.321E-01
PA-234	#B	7.3137E-02	7.3137E-02	1.8202E-01	1.8206E-01	2.011E-01
TH-234	#B	-1.0658E+00	-1.0658E+00	8.8747E+00	8.8749E+00	6.174E+00
AM-241	#A	8.1140E-02	8.1141E-02	8.9338E-01	8.9339E-01	1.001E+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) 1.7445951E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.7445963E+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_6SEPT2006_1259.An1

Sample description
FSS-OOL-02-03-017-F

Spectrum Filename: C:\GammaVision\Spectra\103F_6SEPT2006_1259.An1

Acquisition information
Start time: 06-Sep-2006 12:59:18
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: 2.0310E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0310E+03) =
4.9237E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:58:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2863

***** S U M M A R Y O F P E A K 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	102.	24.01	0.99	9.052E-03	74.81	9.600	7.835E-01	PB212
77.20	100.	21.79	0.99	1.011E-02	77.11	17.500	5.467E-01	PB212
					77.11	10.700	8.942E-01	PB214
87.25	93.	40.87	0.99	1.442E-02	86.45	32.740	1.335E-01	EU155
93.17	81.	40.32	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.18	96.	34.52	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.27	83.	37.22	1.41	2.439E-02				
186.37	144.	25.46	1.32	2.565E-02	185.99	3.280	1.036E+00	RA226
209.59	112.	27.61	1.16	2.470E-02				
238.82	867.	4.00	1.09	2.319E-02	238.63	43.100	5.688E-01	PB212
241.28	101.	28.04	1.09	2.306E-02	241.00	3.900	7.481E-01	RA224
					241.92	7.470	3.914E-01	PB214
270.61	73.	32.14	1.01	2.149E-02				
277.11	53.	34.16	1.23	2.116E-02				
277.11	53.	34.16	1.23	2.116E-02	279.17	81.500	PBC<MDA	HG203
295.32	178.	17.24	0.96	2.024E-02	295.22	19.200	2.974E-01	PB214
338.35	201.	15.93	0.85	1.830E-02	338.40	12.010	6.061E-01	AC228
352.04	382.	9.64	1.18	1.775E-02	351.99	37.100	3.797E-01	PB214
463.37	93.	24.42	1.01	1.425E-02				
463.37	93.	24.42	1.01	1.425E-02	463.51	10.000	4.268E-01	SB125
510.88	202.	13.50	1.62	1.317E-02	510.72	22.500	3.940E-01	TL208
583.49	305.	8.31	1.37	1.184E-02	583.14	86.000	1.967E-01	TL208
609.51	252.	9.42	1.34	1.144E-02	609.32	46.090	3.101E-01	BI214
661.96	274.	10.12	1.48	1.072E-02	661.62	84.620	2.000E-01	CS137
727.10	80.	19.34	1.48	9.965E-03	727.17	11.800	4.522E-01	BI212

768.56	38.	25.98	1.42	9.553E-03				
795.45	36.	35.11	0.75	9.304E-03				
795.45	36.	35.11	0.75	9.304E-03	795.76	85.400	2.977E-02	CS134
860.57	45.	24.10	1.43	8.767E-03				
911.68	231.	8.38	1.38	8.397E-03	911.07	29.000	6.206E-01	AC228
965.20	32.	38.43	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152
968.30	189.	11.04	1.52	8.029E-03	968.90	17.460	8.948E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.70	94.	22.56	1.08	7.210E-03	1120.28	15.040	5.675E-01	BI214
1461.47	942.	3.31	2.07	5.930E-03	1460.75	10.700	9.676E+00	K40
1621.68	12.	36.80	1.55	5.488E-03	1620.56	2.750	5.271E-01	BI212
1765.49	43.	15.87	1.77	5.142E-03	1764.51	15.920	3.457E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
173.67	87.25	582.	93.	0.046	122.60	0.989	PB-214	l
418.33	209.59	368.	112.	0.056	82.84	1.162	NP-239	
540.37	270.61	220.	73.	0.037	96.42	1.012	AC-228	
1535.71	768.32	57.	56.	0.028	79.69	1.024	BI-214	M
1720.19	860.57	31.	45.	0.022	72.30	1.432	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	271.	102.	0.051	72.02	0.993D
PB-212	153.39	77.11	289.	100.	0.050	65.36	0.995A
TH-234	185.54	93.18	729.	96.	0.048	103.55	1.500s
RA-226	371.79	186.31	578.	129.	0.064	75.49	1.500s
PB-212	476.94	238.89	545.	821.	0.411	16.96	0.980
RA-224	482.70	241.77	582.	96.	0.048	110.46	1.500
HG-203	554.09	277.47	196.	63.	0.032	101.40	1.500
PB-214	589.79	295.32	286.	174.	0.087	51.72	0.961
AC-228	675.85	338.35	268.	200.	0.100	47.78	0.847
PB-214	703.22	352.04	283.	376.	0.188	28.92	1.178s
SB-125	925.72	463.30	137.	60.	0.030	89.83	1.500s
TL-208	1020.87	510.88	177.	176.	0.088	40.50	1.618s
TL-208	1166.07	583.49	110.	301.	0.151	24.92	1.366
BI-214	1218.11	609.51	107.	246.	0.123	28.27	1.343
CS-137	1323.00	661.96	122.	273.	0.136	30.37	1.476
BI-212	1453.27	727.10	58.	80.	0.040	58.01	1.484s
CS-134	1589.94	795.44	42.	31.	0.016	103.35	1.500s
AC-228	1822.39	911.68	53.	227.	0.114	25.15	1.382
EU-152	1929.42	965.20	62.	32.	0.016	115.29	1.538s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1935.61	968.30	65.	188.	0.094	33.11	1.519s
BI-214	2240.38	1120.70	83.	93.	0.046	67.67	1.075s
K-40	2921.81	1461.47	30.	923.	0.462	9.93	2.066
BI-212	3242.17	1621.68	3.	12.	0.006	110.40	1.548
BI-214	3529.73	1765.49	5.	43.	0.021	47.61	1.769

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

***** S U M M A R Y O 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		9.8010E-02					
			477.56	9.801E-02	%(	2.343E-01 7.06E-02 G	
K-40		9.6764E+00					
			1460.75	9.676E+00	(P	2.956E-01 3.27E-01 G	
MN-54		-9.3042E-05					
			834.81	-9.304E-05	%(P	2.389E-02 6.62E-03 G	
CO-57		4.6569E-04					
			122.07	4.657E-04	%(P	3.394E-02 1.00E-02 G K	
			136.43	1.203E-02	&	3.321E-01 9.89E-02 G	
CO-60		-1.0935E-03					
			1332.51	-1.093E-03	&(P	3.215E-02 8.66E-03 G K	
			1173.23	-2.992E-03	% P	4.878E-02 1.39E-02 G K	
Sr-85		-1.1131E-02					
			514.00	-1.113E-02	%(	3.582E-02 1.07E-02 G	
Kr-85		-2.5456E+02					
			513.99	-2.546E+02	%(	8.192E+02 2.45E+02 G	
Y-88		-1.1064E-03					
			1836.01	-1.106E-03	%(P	2.018E-02 5.13E-03 G K	
			898.02	-6.044E-03	% P	3.343E-02 9.65E-03 G	
NB-94		5.6589E-03					
			871.10	5.659E-03	%(	2.151E-02 6.26E-03 G K	
			702.50	-1.200E-04	&	1.949E-02 5.39E-03 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-6.5577E-03						
		722.95	-6.558E-03	%(	3.544E-02	1.04E-02	G K
		614.37	-1.720E-02	% P	3.255E-02	9.92E-03	G
		433.93	7.124E-03	&	2.817E-02	8.36E-03	G
CD-109	2.1869E-01						
		88.04	2.187E-01	%(	1.555E+00	4.65E-01	G
SN-113	1.0992E-02						
		391.71	1.099E-02	%(	3.855E-02	1.15E-02	G K
		255.04	-3.230E-01	%	1.218E+00	3.64E-01	G
SB-125	5.7941E-02						
		427.95	-1.647E-02	%(P	9.225E-02	2.72E-02	G K
		600.77	3.060E-02	% P	1.411E-01	4.14E-02	G
		636.15	-4.820E-02	% P	2.827E-01	8.26E-02	G
		463.51	2.782E-01	*(P	2.672E-01	8.51E-02	G
		176.29	7.523E-02	%	4.622E-01	1.38E-01	G
I-131	3.9344E-03						
		364.48	3.934E-03	%(P	3.479E-02	1.02E-02	G K
		636.97	-7.467E-02	%	4.482E-01	1.31E-01	G
		284.29	1.182E-01	& P	4.733E-01	1.41E-01	G
CS-134	1.1785E-02						
		604.66	-7.586E-04	%(	3.220E-02	9.31E-03	G K
		795.76	2.612E-02	(P	2.771E-02	9.02E-03	G
		569.29	3.727E-02	& P	1.582E-01	4.63E-02	G
		801.84	-6.465E-02	& P	2.620E-01	7.41E-02	G
CS-137	2.0000E-01						
		661.62	2.000E-01	(P	3.978E-02	2.04E-02	G
CE-139	8.5182E-03						
		165.85	8.518E-03	&(	3.615E-02	1.08E-02	G
EU-152	6.0636E-02						
		121.78	7.798E-04	%(P	9.516E-02	2.81E-02	G K
		344.30	-2.064E-02	% P	1.067E-01	3.17E-02	G
		1408.08	6.722E-03	%	9.550E-02	2.54E-02	G
		964.00	1.807E-01	(P	2.233E-01	7.06E-02	G
		1112.07	-7.242E-02	&	2.919E-01	8.59E-02	G
		778.90	5.922E-03	&	1.790E-01	5.02E-02	G
EU-154	1.3123E-03						
		123.10	1.312E-03	%(	8.816E-02	2.62E-02	G K
		1274.80	7.903E-03	%	7.977E-02	2.24E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-3.427E-03 %   1.723E-01 4.96E-02 G
                         1004.80 6.497E-03 &   1.334E-01 3.69E-02 G

EU-155       1.1363E-01
                           86.45 1.136E-01 %(  1.941E-01 5.91E-02 G K
                          105.31 1.224E-02 &   1.905E-01 5.67E-02 G

HG-203       2.4771E-02
                          279.17 2.477E-02 &(P 2.669E-02 8.38E-03 G K
                           72.87-5.581E-01 % P 1.762E+00 5.31E-01 G
                           70.83-1.489E+00 &   3.273E+00 9.92E-01 G
                           82.50-3.547E-01 &   3.138E+00 9.37E-01 G

TL-208       1.9667E-01
                          583.14 1.967E-01  (P 3.368E-02 1.66E-02 G
                          510.72 3.940E-01 + P 1.454E-01 6.13E-02 G

PB-212       5.4656E-01
                          238.63 5.465E-01  (P 7.418E-02 3.14E-02 G K
                                                          Energy duplication
                           77.11 3.750E-01 } P 3.078E-01 8.17E-02 G
                           74.81 7.835E-01 + P 6.078E-01 1.94E-01 G

PB-214       3.7970E-01
                          351.99 3.797E-01 @(P 8.195E-02 3.72E-02 G K
                          295.22 2.974E-01 - P 1.396E-01 5.25E-02 G
                                                          Energy duplication
                           77.11 2.273E-01 } P 7.415E-01 1.73E-01 G
                          241.92 2.773E-01 %   4.517E-01 1.38E-01 G

BI-212       4.6632E-01
                          727.17 4.522E-01 @(P 2.163E-01 8.80E-02 G K
                         1620.56 5.271E-01  (P 4.780E-01 1.95E-01 G
                          785.42 6.144E-01 %   1.120E+00 3.44E-01 G

BI-214       3.1924E-01
                          609.32 3.101E-01  (P 6.433E-02 3.00E-02 G K
                         1764.51 3.457E-01  (P 1.106E-01 5.91E-02 G
                         1120.28 5.675E-01 + P 2.778E-01 1.31E-01 G

RA-224       7.1321E-01
                          241.00 7.132E-01  (  8.516E-01 2.63E-01 G

RA-226       1.0174E+00
                          185.99 1.017E+00 *(P 9.066E-01 2.82E-01 G

AC-228       6.1632E-01
                          911.07 6.206E-01  (P 9.984E-02 5.28E-02 G K
                          968.90 8.948E-01 + P 1.906E-01 9.88E-02 G
                          338.40 6.061E-01  (P 2.391E-01 9.70E-02 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227       2.7094E-03
                          236.00 2.709E-03 %(  3.835E-01 1.14E-01 G K
                          256.25-1.061E-01 % P 4.061E-01 1.22E-01 G

PA-234       3.7168E-02
                           98.44 3.717E-02 %(P 1.863E-01 5.58E-02 G K
                          946.00 2.943E-02 % P 1.326E-01 3.85E-02 G
                          131.28-4.440E-02 % P 1.900E-01 5.70E-02 G
                           94.67-9.169E-02 & P 3.353E-01 1.01E-01 G
                          883.24-2.023E-04 %   1.991E-01 5.51E-02 G
                          926.70 2.481E-02 %   2.139E-01 6.04E-02 G
                          569.26 5.524E-02 & P 2.346E-01 6.86E-02 G

TH-234       1.1886E+00
                           63.29 1.108E+00 %(P 5.067E+00 1.51E+00 G K
                           92.80 1.293E+00  (P 1.733E+00 5.28E-01 G
                           92.38 1.281E+00 % P 2.075E+00 6.29E-01 G

AM-241      -3.2460E-01
                           59.54-3.246E-01 %(P 9.724E-01 2.93E-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	9.6902E-02	9.8010E-02	2.1176E-01	2.1184E-01	2.317E-01
K-40		9.6764E+00	9.6764E+00	9.7991E-01	1.1295E+00	
MN-54	#A	-9.2861E-05	-9.3042E-05	4.1234E-02	4.1234E-02	2.385E-02
CO-57	#B	4.6464E-04	4.6569E-04	3.0098E-02	3.0098E-02	3.386E-02
CO-60	#B	-1.0931E-03	-1.0935E-03	5.9793E-02	5.9793E-02	3.214E-02
Sr-85	#A	-1.1027E-02	-1.1131E-02	3.2152E-02	3.2158E-02	3.549E-02
Kr-85	#A	-2.5456E+02	-2.5456E+02	7.3533E+02	7.3548E+02	8.192E+02
Y-88	#B	-1.1001E-03	-1.1064E-03	1.7942E-02	1.7942E-02	2.007E-02
NB-94	#B	5.6589E-03	5.6589E-03	1.8767E-02	1.8770E-02	2.151E-02
Ag-108M	#B	-6.5577E-03	-6.5577E-03	3.1160E-02	3.1162E-02	3.544E-02
CD-109	#A	2.1840E-01	2.1869E-01	1.3944E+00	1.3945E+00	1.553E+00
SN-113	#B	1.0934E-02	1.0992E-02	3.4452E-02	3.4458E-02	3.835E-02
SB-125	#B	5.7907E-02	5.7941E-02	5.3164E-02	5.3270E-02	9.219E-02
I-131	#B	3.6483E-03	3.9344E-03	3.0680E-02	3.0681E-02	3.226E-02
CS-134	#B	1.1775E-02	1.1785E-02	1.2213E-02	1.2232E-02	3.217E-02
CS-137		1.9999E-01	2.0000E-01	6.1043E-02	6.2137E-02	
CE-139	#A	8.4807E-03	8.5182E-03	3.2497E-02	3.2501E-02	3.599E-02
EU-152	#B	6.0628E-02	6.0636E-02	7.1100E-02	7.1179E-02	9.515E-02
EU-154	#B	1.3120E-03	1.3123E-03	7.8599E-02	7.8599E-02	8.814E-02
EU-155	#B	1.1359E-01	1.1363E-01	1.7736E-01	1.7747E-01	1.940E-01
HG-203	#A	2.4450E-02	2.4771E-02	2.5133E-02	2.5174E-02	2.634E-02
TL-208		1.9667E-01	1.9667E-01	4.9701E-02	5.0996E-02	
PB-212		5.4656E-01	5.4656E-01	9.4042E-02	9.9251E-02	
PB-214		3.7970E-01	3.7970E-01	1.1147E-01	1.1363E-01	
BI-212		4.6632E-01	4.6632E-01	2.7218E-01	2.7352E-01	
BI-214		3.1924E-01	3.1924E-01	9.2616E-02	9.4452E-02	
RA-224	A	7.1321E-01	7.1321E-01	7.8780E-01	7.8889E-01	8.516E-01
RA-226	#	1.0174E+00	1.0174E+00	8.4528E-01	8.4735E-01	9.066E-01
AC-228		6.1632E-01	6.1632E-01	1.5733E-01	1.6135E-01	
TH-227	#B	2.7094E-03	2.7094E-03	3.4300E-01	3.4300E-01	3.835E-01
PA-234	#B	3.7168E-02	3.7168E-02	1.6740E-01	1.6741E-01	1.863E-01
TH-234	#B	1.1886E+00	1.1886E+00	1.4574E+00	1.4589E+00	5.067E+00
AM-241	#A	-3.2460E-01	-3.2460E-01	8.8745E-01	8.8763E-01	9.724E-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) 1.3114371E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 1.3114383E+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_6SEPT2006_1343.An1

Sample description
FSS-OOL-02-03-007-F

Spectrum Filename: C:\GammaVision\Spectra\103F_6SEPT2006_1343.An1

Acquisition information

Start time:	06-Sep-2006 13:42:57
Live time:	2000
Real time:	2001
Dead time:	0.07 %
Detector ID:	4

Detector system
Det 103 - DSPE-471

Calibration

Filename:	D3_1LSa.Clb

Detector_103 1.0 Liter Sand Geometry

Energy Calibration

Created:	08-Aug-2005 11:09:41
Zero offset:	0.409 keV
Gain:	0.500 keV/channel
Quadratic:	1.092E-08 keV/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:	1.2460E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.2460E+03) = 8.0257E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:03:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3727

***** S U M M A R Y O F P E A K 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	55.	38.64	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
77.27	111.	20.75	0.99	1.011E-02	77.11	17.500	9.140E-01	PB212
					77.11	10.700	1.495E+00	PB214
92.47	103.	31.26	1.48	1.634E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.29	185.	19.49	1.46	2.566E-02	185.99	3.280	2.220E+00	RA226
209.62	92.	29.01	1.23	2.470E-02				
238.85	667.	4.48	1.09	2.319E-02	238.63	43.100	7.110E-01	PB212
241.86	127.	15.78	1.10	2.303E-02	241.00	3.900	1.530E+00	RA224
					241.92	7.470	8.004E-01	PB214
270.51	108.	24.01	1.48	2.150E-02				
295.34	189.	13.91	0.90	2.024E-02	295.22	19.200	5.151E-01	PB214
328.00	56.	29.74	1.27	1.874E-02				
338.56	142.	16.81	1.14	1.829E-02	338.40	12.010	6.948E-01	AC228
352.10	338.	7.70	1.19	1.775E-02	351.99	37.100	5.481E-01	PB214
463.20	57.	33.44	1.68	1.425E-02				
463.20	57.	33.44	1.68	1.425E-02	463.51	10.000	4.253E-01	SB125
511.00	119.	15.65	1.73	1.317E-02	510.72	22.500	3.379E-01	TL208
583.50	228.	9.89	1.31	1.184E-02	583.14	86.000	2.382E-01	TL208
609.54	240.	9.04	1.40	1.144E-02	609.32	46.090	4.812E-01	BI214
661.86	174.	11.78	1.37	1.072E-02	661.62	84.620	2.063E-01	CS137
727.62	53.	20.58	1.51	9.960E-03	727.17	11.800	4.843E-01	BI212
911.60	157.	11.38	1.62	8.398E-03	911.07	29.000	6.839E-01	AC228
964.89	28.	37.39	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152
969.57	121.	15.41	1.22	8.022E-03	968.90	17.460	9.323E-01	AC228
1120.87	94.	15.43	0.90	7.209E-03	1120.28	15.040	9.230E-01	BI214
1461.52	625.	4.10	1.98	5.930E-03	1460.75	10.700	1.037E+01	K40

1765.34	48.	15.91	1.41	5.140E-03	1764.51	15.920	5.953E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.40	209.62	272.	92.	0.046	87.04	1.230	NP-239	s
540.17	270.51	207.	108.	0.054	72.04	1.481	AC-228	s
655.14	328.00	107.	56.	0.028	89.22	1.265	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	222.	55.	0.027	115.93	0.993D
PB-212	153.39	77.11	212.	111.	0.055	62.24	0.995A
RA-226	372.04	186.44	419.	109.	0.054	75.30	1.500s
PB-212	476.84	238.84	457.	625.	0.312	20.21	0.972
RA-224	482.74	241.79	422.	111.	0.056	83.51	1.500
PB-214	483.51	242.18	446.	84.	0.042	111.71	1.500
PB-214	589.82	295.34	189.	185.	0.092	41.73	0.901
AC-228	676.27	338.56	159.	141.	0.070	50.42	1.140s
PB-214	703.45	352.16	158.	352.	0.176	23.91	1.195s
SB-125	925.34	463.11	111.	52.	0.026	92.78	1.500s
TL-208	1021.15	511.02	103.	63.	0.031	52.18	1.500s
TL-208	1166.10	583.50	70.	179.	0.090	28.98	1.500
BI-214	1218.17	609.54	79.	234.	0.117	27.13	1.397s
CS-137	1322.80	661.86	83.	173.	0.086	35.33	1.371
BI-212	1454.31	727.62	30.	53.	0.026	61.75	1.508
AC-228	1822.23	911.60	57.	154.	0.077	34.13	1.624
EU-152	1928.80	964.89	43.	28.	0.014	112.17	1.538
AC-228	1938.14	969.57	63.	120.	0.060	46.22	1.220
BI-214	2240.71	1120.87	33.	92.	0.046	46.29	0.904s
K-40	2921.91	1461.52	28.	607.	0.303	12.31	1.981
BI-214	3529.43	1765.34	6.	45.	0.022	47.74	1.408s

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

***** S U M M A R Y O 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		1.4034E-01					
			477.56	1.403E-01	%(	3.255E-01	9.81E-02 G
K-40		1.0366E+01					
			1460.75	1.037E+01	(P	4.700E-01	4.38E-01 G
MN-54		4.4392E-03					
			834.81	4.439E-03	%(P	3.647E-02	1.03E-02 G
CO-57		1.7406E-02					
			122.07	1.741E-02	&(P	5.270E-02	1.58E-02 G K
			136.43	1.414E-02	%	4.254E-01	1.26E-01 G
CO-60		-4.5233E-03					
			1332.51	-4.523E-03	&(P	4.578E-02	1.19E-02 G K
			1173.23	1.880E-02	% P	4.854E-02	1.43E-02 G K
Sr-85		-1.0613E-02					
			514.00	-1.061E-02	&(	4.852E-02	1.43E-02 G
Kr-85		-2.4257E+02					
			513.99	-2.426E+02	&(	1.109E+03	3.28E+02 G
Y-88		-5.6541E-03					
			1836.01	-5.654E-03	%(P	3.717E-02	1.01E-02 G K
			898.02	2.328E-03	% P	3.911E-02	1.08E-02 G
NB-94		-3.7535E-03					
			871.10	-3.753E-03	%(	3.277E-02	9.18E-03 G K
			702.50	1.968E-03	%	3.427E-02	9.64E-03 G K
Ag-108M		-2.1644E-02					
			722.95	-2.164E-02	%(	5.314E-02	1.60E-02 G K
			614.37	-1.497E-02	% P	4.937E-02	1.47E-02 G
			433.93	-5.795E-03	&	4.393E-02	1.29E-02 G
CD-109		9.2188E-01					
			88.04	9.219E-01	%(	2.253E+00	6.81E-01 G
SN-113		-2.6324E-03					
			391.71	-2.632E-03	%(	5.830E-02	1.69E-02 G K
			255.04	-2.133E-01	%	1.979E+00	5.86E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.6577E-02						
		427.95	-4.894E-03	%(P	1.227E-01	3.54E-02	G K
		600.77	6.403E-02	% P	1.905E-01	5.66E-02	G
		636.15	-1.300E-02	% P	2.982E-01	8.32E-02	G
		463.51	3.969E-01	@(P	3.944E-01	1.26E-01	G
		176.29	-1.348E-01	%	6.634E-01	1.98E-01	G
I-131	-3.0774E-03						
		364.48	-3.077E-03	%(P	4.872E-02	1.41E-02	G K
		636.97	1.041E-01	&	4.830E-01	1.40E-01	G
		284.29	2.381E-03	% P	5.344E-01	1.54E-01	G
CS-134	-1.4858E-02						
		604.66	-1.486E-02	&(	4.635E-02	1.38E-02	G K
		795.76	2.907E-02	% P	4.462E-02	1.39E-02	G
		569.29	-2.929E-02	% P	2.421E-01	6.87E-02	G
		801.84	-2.050E-02	% P	4.566E-01	1.25E-01	G
CS-137	2.0634E-01						
		661.62	2.063E-01	(P	5.411E-02	2.45E-02	G
CE-139	-1.8639E-03						
		165.85	-1.864E-03	&(	3.962E-02	1.16E-02	G
EU-152	1.1872E-01						
		121.78	4.863E-02	%(P	1.546E-01	4.64E-02	G K
		344.30	-2.278E-04	% P	1.384E-01	4.02E-02	G
		1408.08	-2.043E-02	&	1.984E-01	5.49E-02	G
		964.00	2.593E-01	(P	3.088E-01	9.88E-02	G
		1112.07	-5.545E-02	&	3.483E-01	9.98E-02	G
		778.90	2.768E-02	%	2.535E-01	7.14E-02	G
EU-154	-2.0145E-02						
		123.10	-2.015E-02	&(	1.223E-01	3.65E-02	G K
		1274.80	0.000E+00	&	1.464E-01	4.06E-02	G
		723.30	8.848E-03	%	1.330E-01	3.65E-02	G
		1004.80	-1.385E-02	%	1.864E-01	5.12E-02	G
EU-155	1.0793E-01						
		86.45	1.079E-01	%(	2.740E-01	8.28E-02	G K
		105.31	6.751E-02	&	2.676E-01	8.02E-02	G
HG-203	-5.6274E-03						
		279.17	-5.627E-03	&(P	4.782E-02	1.41E-02	G K
		72.87	-1.628E-01	% P	2.301E+00	6.83E-01	G
		70.83	-9.273E-02	&	5.323E+00	1.58E+00	G
		82.50	-1.202E+00	%	4.480E+00	1.35E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.9906E-01						
		583.14	1.909E-01	(P	4.434E-02	1.89E-02	G
		510.72	2.303E-01	*(P	1.832E-01	5.70E-02	G
PB-212	6.7815E-01						
		238.63	6.775E-01	(P	1.110E-01	4.65E-02	G K
							Energy duplication
		77.11	6.782E-01	} P	4.324E-01	1.41E-01	G
		74.81	6.809E-01	(P	9.013E-01	2.78E-01	G
PB-214	5.5460E-01						
		351.99	5.802E-01	@(P	1.008E-01	4.70E-02	G K
		295.22	5.151E-01	(P	1.864E-01	7.33E-02	G
							Energy duplication
		77.11	0.000E+00	} P	1.024E+00	0.00E+00	G
		241.92	5.289E-01	(	6.375E-01	1.97E-01	G
BI-212	4.8429E-01						
		727.17	4.843E-01	(P	2.624E-01	1.01E-01	G K
		1620.56	3.986E-01	% P	1.123E+00	3.28E-01	G
		785.42	9.812E-01	%	1.724E+00	5.32E-01	G
BI-214	5.1049E-01						
		609.32	4.812E-01	@(P	9.081E-02	4.47E-02	G K
		1764.51	5.953E-01	(P	1.880E-01	1.02E-01	G
		1120.28	9.230E-01	+ P	2.935E-01	1.45E-01	G
RA-224	1.3389E+00						
		241.00	1.339E+00	(	1.187E+00	3.73E-01	G
RA-226	1.4014E+00						
		185.99	1.401E+00	*(P	1.264E+00	3.94E-01	G
AC-228	6.8709E-01						
		911.07	6.839E-01	(P	1.692E-01	7.95E-02	G K
		968.90	9.323E-01	+ P	3.062E-01	1.44E-01	G
		338.40	6.948E-01	@(P	3.035E-01	1.18E-01	G
TH-227	-1.1769E-01						
		236.00	-1.177E-01	%(	3.981E-01	1.19E-01	G K
		256.25	2.833E-02	& P	5.829E-01	1.72E-01	G
PA-234	2.9206E-02						
		98.44	2.921E-02	%(P	2.418E-01	7.19E-02	G K
		946.00	-1.865E-02	% P	2.078E-01	5.87E-02	G
		131.28	-6.266E-02	% P	2.493E-01	7.47E-02	G
		94.67	-1.418E-01	% P	4.667E-01	1.40E-01	G
		883.24	-2.880E-04	&	2.973E-01	8.16E-02	G
		926.70	1.173E-03	%	3.705E-01	1.03E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.115E-02 % P 3.661E-01 1.03E-01 G

TH-234       1.0619E+00
                           63.29 1.062E+00 %(P 7.981E+00 2.37E+00 G K
                           92.80 1.635E+00 % P 2.445E+00 7.43E-01 G
                           92.38 1.999E+00 % P 2.927E+00 8.90E-01 G

AM-241       1.0357E-01
                           59.54 1.036E-01 %(P 1.318E+00 3.91E-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	1.3863E-01	1.4034E-01	2.9433E-01	2.9445E-01	3.215E-01
K-40		1.0366E+01	1.0366E+01	1.3150E+00	1.4461E+00	
MN-54	#A	4.4299E-03	4.4392E-03	3.0929E-02	3.0931E-02	3.640E-02
CO-57	#B	1.7364E-02	1.7406E-02	4.7531E-02	4.7541E-02	5.257E-02
CO-60	#B	-4.5218E-03	-4.5233E-03	1.8822E-01	1.8822E-01	4.576E-02

Sr-85	#A	-1.0507E-02	-1.0613E-02	4.3043E-02	4.3048E-02	4.803E-02
Kr-85	#A	-2.4257E+02	-2.4257E+02	9.8362E+02	9.8372E+02	1.109E+03
Y-88	#B	-5.6194E-03	-5.6541E-03	3.1698E-02	3.1700E-02	3.694E-02
NB-94	#B	-3.7535E-03	-3.7535E-03	2.7535E-02	2.7536E-02	3.277E-02
Ag-108M	#B	-2.1643E-02	-2.1644E-02	4.7929E-02	4.7945E-02	5.314E-02
CD-109	#A	9.2055E-01	9.2188E-01	2.0433E+00	2.0440E+00	2.250E+00
SN-113	#B	-2.6175E-03	-2.6324E-03	5.0748E-02	5.0748E-02	5.796E-02
SB-125	#B	9.6515E-02	9.6577E-02	9.1800E-02	9.1971E-02	1.226E-01
I-131	#B	-2.8368E-03	-3.0774E-03	6.1846E-02	6.1846E-02	4.491E-02
CS-134	#B	-1.4845E-02	-1.4858E-02	4.1404E-02	4.1413E-02	4.631E-02
CS-137		2.0633E-01	2.0634E-01	7.3496E-02	7.4466E-02	
CE-139	#A	-1.8550E-03	-1.8639E-03	3.4905E-02	3.4905E-02	3.943E-02
EU-152	#B	1.1870E-01	1.1872E-01	1.3575E-01	1.3591E-01	1.546E-01
EU-154	#B	-2.0141E-02	-2.0145E-02	1.0946E-01	1.0947E-01	1.222E-01
EU-155	#B	1.0789E-01	1.0793E-01	2.4827E-01	2.4834E-01	2.739E-01
HG-203	#B	-5.5489E-03	-5.6274E-03	4.2706E-02	4.2707E-02	4.715E-02
TL-208	#	1.9906E-01	1.9906E-01	5.9082E-02	6.0201E-02	4.434E-02
PB-212		6.7815E-01	6.7815E-01	1.3968E-01	1.4512E-01	
PB-214		5.5460E-01	5.5460E-01	1.3472E-01	1.3851E-01	
BI-212		4.8429E-01	4.8429E-01	3.0185E-01	3.0316E-01	
BI-214		5.1049E-01	5.1049E-01	1.4234E-01	1.4539E-01	
RA-224		1.3389E+00	1.3389E+00	1.1181E+00	1.1208E+00	1.187E+00
RA-226	#	1.4014E+00	1.4014E+00	1.1809E+00	1.1837E+00	1.264E+00
AC-228		6.8709E-01	6.8709E-01	2.1173E-01	2.1545E-01	
TH-227	#B	-1.1769E-01	-1.1769E-01	3.5837E-01	3.5844E-01	3.981E-01
PA-234	#B	2.9206E-02	2.9206E-02	2.1567E-01	2.1568E-01	2.418E-01
TH-234	#B	1.0619E+00	1.0619E+00	7.1141E+00	7.1144E+00	7.981E+00
AM-241	#A	1.0357E-01	1.0357E-01	1.1720E+00	1.1720E+00	1.318E+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) 1.4826134E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 1.4826145E+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_6SEPT2006_1538.An1

Sample description
FSS-OOL-02-03-007-F-RC

Spectrum Filename: C:\GammaVision\Spectra\103F_6SEPT2006_1538.An1

Acquisition information
Start time: 06-Sep-2006 15:38:15
Live time: 2000
Real time: 2001
Dead time: 0.07 %
Detector ID: 4

Detector system
Det 103 - DSPE-471

Calibration
Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration
Created: 08-Aug-2005 11:09:41
Zero offset: 0.409 keV
Gain: 0.500 keV/channel
Quadratic: 1.092E-08 keV/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: 1.2460E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.2460E+03) =
8.0257E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:03:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3190

***** S U M M A R Y O F P E A K 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	56.	37.78	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
77.23	110.	1.89	0.99	1.011E-02	77.11	17.500	9.841E-01	PB212
					77.11	10.700	1.610E+00	PB214
87.35	82.	40.66	1.50	1.472E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	1.599E+00	CD109
93.11	73.	37.64	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.13	71.	38.92	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.27	152.	20.90	0.94	2.566E-02	185.99	3.280	1.785E+00	RA226
238.84	675.	4.48	1.09	2.319E-02	238.63	43.100	7.192E-01	PB212
241.75	131.	15.63	1.09	2.303E-02	241.00	3.900	1.582E+00	RA224
					241.92	7.470	8.276E-01	PB214
295.46	217.	10.00	1.11	2.024E-02	295.22	19.200	5.941E-01	PB214
301.19	92.	23.22	1.04	1.996E-02				
338.46	157.	15.84	1.12	1.830E-02	338.40	12.010	7.708E-01	AC228
352.13	326.	8.79	1.26	1.775E-02	351.99	37.100	5.269E-01	PB214
410.15	48.	34.42	1.56	1.573E-02				
463.25	74.	28.49	1.09	1.425E-02				
463.25	74.	28.49	1.09	1.425E-02	463.51	10.000	5.510E-01	SB125
510.98	116.	15.77	0.85	1.317E-02	510.72	22.500	3.254E-01	TL208
583.22	216.	9.69	1.29	1.184E-02	583.14	86.000	2.254E-01	TL208
609.55	236.	8.57	1.36	1.144E-02	609.32	46.090	4.730E-01	BI214
661.88	215.	9.87	1.35	1.072E-02	661.62	84.620	2.558E-01	CS137
727.82	67.	22.71	1.63	9.958E-03	727.17	11.800	6.171E-01	BI212
795.28	27.	34.49	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
911.71	140.	10.54	1.32	8.397E-03	911.07	29.000	6.105E-01	AC228

968.47	141.	11.72	1.58	8.028E-03	968.90	17.460	1.087E+00	AC228
1120.76	67.	26.15	1.42	7.210E-03	1120.28	15.040	6.510E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1408.55	14.	41.05	1.81	6.096E-03	1408.08	21.210	PBC<MDA	EU152
1461.52	596.	4.17	1.78	5.930E-03	1460.75	10.700	9.866E+00	K40
1765.28	43.	15.32	2.08	5.142E-03	1764.51	15.920	5.714E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
601.53	301.19	141.	92.	0.046	69.66	1.037	PB-212	s
819.42	410.15	90.	48.	0.024	103.27	1.556	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	225.	56.	0.028	113.35	0.993D
PB-212	153.39	77.11	214.	110.	0.055	5.67	0.995A
CD-109	173.86	87.35	517.	82.	0.041	121.99	1.500s
RA-226	371.87	186.35	436.	108.	0.054	77.10	1.500s
PB-212	476.92	238.88	441.	617.	0.309	19.67	0.948
RA-224	482.72	241.78	398.	128.	0.064	71.46	1.500
PB-214	482.65	241.75	214.	63.	0.031	101.49	1.212
PB-214	590.07	295.46	125.	213.	0.106	30.01	1.114
AC-228	676.06	338.46	173.	156.	0.078	47.52	1.120
PB-214	703.41	352.13	182.	320.	0.160	26.38	1.257
SB-125	925.57	463.22	99.	43.	0.022	104.67	1.500s
TL-208	1021.08	510.98	104.	89.	0.044	47.31	0.847s
TL-208	1165.53	583.22	78.	212.	0.106	29.07	1.286s
BI-214	1218.20	609.55	71.	230.	0.115	25.72	1.360
CS-137	1322.84	661.88	71.	214.	0.107	29.61	1.352s
BI-212	1454.72	727.82	51.	67.	0.033	68.14	1.633
CS-134	1589.62	795.28	29.	27.	0.013	103.48	1.500s
AC-228	1822.45	911.71	35.	137.	0.069	31.62	1.322
AC-228	1935.96	968.47	37.	140.	0.070	35.17	1.582s
BI-214	2240.49	1120.76	62.	65.	0.033	78.45	1.416s
EU-152	2815.99	1408.55	9.	14.	0.007	123.15	1.812
K-40	2921.90	1461.52	26.	577.	0.289	12.52	1.776
BI-214	3529.32	1765.28	5.	43.	0.022	45.97	2.080

s - Peak fails shape tests.
D - Peak area deconvoluted.

A Derived peak area.

***** S U M M A R Y O 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		7.0899E-02					
			477.56	7.090E-02	&(	3.785E-01 1.11E-01	G
K-40		9.8657E+00					
			1460.75	9.866E+00	(P	4.493E-01 4.25E-01	G
MN-54		-4.7639E-05					
			834.81	-4.764E-05	%(P	3.958E-02 1.10E-02	G
CO-57		-1.0156E-02					
			122.07	-1.016E-02	%(P	5.536E-02 1.65E-02	G K
			136.43	-1.138E-01	%	4.074E-01 1.22E-01	G
CO-60		-8.8152E-03					
			1332.51	-8.815E-03	%(P	4.704E-02 1.26E-02	G K
			1173.23	9.428E-03	% P	4.510E-02 1.28E-02	G K
Sr-85		-1.3351E-02					
			514.00	-1.335E-02	%(	4.913E-02 1.46E-02	G
Kr-85		-3.0471E+02					
			513.99	-3.047E+02	%(	1.122E+03 3.34E+02	G
Y-88		-6.5872E-04					
			1836.01	-6.587E-04	%(P	3.512E-02 8.87E-03	G K
			898.02	6.689E-03	% P	3.745E-02 1.06E-02	G
NB-94		1.2399E-03					
			871.10	1.240E-03	%(	3.921E-02 1.09E-02	G K
			702.50	-8.571E-03	%	4.198E-02 1.22E-02	G K
Ag-108M		-1.1368E-02					
			722.95	-1.137E-02	&(	4.930E-02 1.45E-02	G K
			614.37	-2.070E-02	% P	4.564E-02 1.38E-02	G
			433.93	8.067E-03	&	4.008E-02 1.18E-02	G
CD-109		1.5993E+00					
			88.04	1.599E+00	&(	2.115E+00 6.50E-01	G
SN-113		-1.3233E-02					
			391.71	-1.323E-02	%(	6.350E-02 1.88E-02	G K
			255.04	2.378E-01	%	1.827E+00 5.40E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.3560E-02						
		427.95	-1.259E-02	&(P	1.262E-01	3.67E-02	G K
		600.77	5.355E-03	& P	2.262E-01	6.47E-02	G
		636.15	4.262E-03	& P	3.084E-01	8.63E-02	G
		463.51	3.286E-01	@(P	3.740E-01	1.18E-01	G
		176.29	7.925E-02	&	6.239E-01	1.85E-01	G
I-131	7.9013E-03						
		364.48	7.901E-03	%(P	4.593E-02	1.35E-02	G K
		636.97	4.597E-02	%	4.798E-01	1.36E-01	G
		284.29	2.407E-03	& P	6.507E-01	1.90E-01	G
CS-134	1.3380E-02						
		604.66	-6.635E-03	%(	4.495E-02	1.31E-02	G K
		795.76	3.625E-02	*(P	3.795E-02	1.25E-02	G
		569.29	-8.160E-02	% P	2.629E-01	7.70E-02	G
		801.84	-7.453E-02	% P	4.304E-01	1.20E-01	G
CS-137	2.5583E-01						
		661.62	2.558E-01	@(P	5.017E-02	2.54E-02	G
CE-139	1.1137E-03						
		165.85	1.114E-03	%(	5.237E-02	1.55E-02	G
EU-152	3.2134E-02						
		121.78	-2.964E-02	%(P	1.620E-01	4.83E-02	G K
		344.30	-2.278E-04	% P	1.650E-01	4.82E-02	G
		1408.08	1.173E-01	(	1.431E-01	4.81E-02	G
		964.00	5.043E-03	% P	4.230E-01	1.21E-01	G
		1112.07	2.744E-02	%	4.003E-01	1.14E-01	G
		778.90	-9.323E-03	%	2.587E-01	7.18E-02	G
EU-154	-2.3055E-02						
		123.10	-2.306E-02	%(	1.089E-01	3.25E-02	G K
		1274.80	3.145E-02	%	8.790E-02	2.59E-02	G
		723.30	-6.180E-02	%	2.431E-01	7.17E-02	G
		1004.80	2.921E-02	&	2.399E-01	6.80E-02	G
EU-155	1.5856E-01						
		86.45	1.586E-01	&(	2.725E-01	8.30E-02	G K
		105.31	-4.249E-02	%	2.765E-01	8.25E-02	G
HG-203	-1.8984E-02						
		279.17	-1.898E-02	%(P	5.373E-02	1.62E-02	G K
		72.87	-8.437E-01	% P	1.737E+00	5.26E-01	G
		70.83	8.592E-02	&	4.904E+00	1.45E+00	G
		82.50	1.138E+00	&	3.285E+00	9.88E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2539E-01						
		583.14	2.254E-01	@(P	4.679E-02	2.23E-02	G
		510.72	3.254E-01	+ P	1.839E-01	6.67E-02	G
PB-212	6.7524E-01						
		238.63	6.693E-01	(P	1.091E-01	4.48E-02	G K
							Energy duplication
		77.11	6.752E-01	} P	4.347E-01	1.28E-02	G
		74.81	7.019E-01	(P	9.057E-01	2.80E-01	G
PB-214	5.4978E-01						
		351.99	5.269E-01	(P	1.080E-01	4.72E-02	G K
		295.22	5.941E-01	(P	1.529E-01	6.06E-02	G
							Energy duplication
		77.11	0.000E+00	} P	1.051E+00	0.00E+00	G
		241.92	3.948E-01	-	4.474E-01	1.34E-01	G
BI-212	6.1711E-01						
		727.17	6.171E-01	(P	3.322E-01	1.41E-01	G K
		1620.56	5.022E-01	& P	1.255E+00	3.73E-01	G
		785.42	2.261E-01	%	1.887E+00	5.38E-01	G
BI-214	4.9825E-01						
		609.32	4.730E-01	(P	8.639E-02	4.17E-02	G K
		1764.51	5.714E-01	(P	1.722E-01	9.42E-02	G
		1120.28	6.510E-01	+ P	3.937E-01	1.75E-01	G
RA-224	1.5375E+00						
		241.00	1.537E+00	(	1.153E+00	3.66E-01	G
RA-226	1.3919E+00						
		185.99	1.392E+00	*(P	1.288E+00	4.01E-01	G
AC-228	6.5740E-01						
		911.07	6.105E-01	(P	1.346E-01	6.59E-02	G K
		968.90	1.087E+00	+ P	2.390E-01	1.28E-01	G
		338.40	7.708E-01	(P	3.156E-01	1.23E-01	G
TH-227	2.4148E-05						
		236.00	2.415E-05	&(	3.702E-01	1.09E-01	G K
		256.25	-1.830E-02	% P	4.841E-01	1.41E-01	G
PA-234	9.0312E-03						
		98.44	9.031E-03	%(P	2.456E-01	7.27E-02	G K
		946.00	1.936E-02	% P	1.826E-01	5.12E-02	G
		131.28	1.380E-02	% P	2.297E-01	6.81E-02	G
		94.67	-8.354E-02	% P	4.766E-01	1.42E-01	G
		883.24	2.742E-02	&	2.597E-01	7.22E-02	G
		926.70	5.810E-03	%	3.508E-01	9.70E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.210E-01 % P 3.897E-01 1.14E-01 G

TH-234      -1.1032E-01
                           63.29-1.103E-01 %(P 6.853E+00 2.01E+00 G K
                           92.80 1.595E+00 % P 2.460E+00 7.46E-01 G
                           92.38 1.836E+00 & P 2.943E+00 8.92E-01 G

AM-241       8.3263E-02
                           59.54 8.326E-02 %(P 1.347E+00 3.99E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	6.9962E-02	7.0899E-02	3.3313E-01	3.3316E-01	3.735E-01
K-40		9.8657E+00	9.8657E+00	1.2752E+00	1.3980E+00	
MN-54	#A	-4.7531E-05	-4.7639E-05	4.1103E-02	4.1103E-02	3.949E-02
CO-57	#B	-1.0130E-02	-1.0156E-02	5.1862E-02	5.1865E-02	5.521E-02
CO-60	#B	-8.8119E-03	-8.8152E-03	1.1703E-01	1.1703E-01	4.703E-02

Sr-85	#A	-1.3206E-02	-1.3351E-02	4.3823E-02	4.3830E-02	4.860E-02
Kr-85	#A	-3.0471E+02	-3.0471E+02	1.0006E+03	1.0008E+03	1.122E+03
Y-88	#B	-6.5435E-04	-6.5872E-04	4.0837E-02	4.0837E-02	3.488E-02
NB-94	#B	1.2399E-03	1.2399E-03	3.2832E-02	3.2833E-02	3.921E-02
Ag-108M	#B	-1.1368E-02	-1.1368E-02	4.3366E-02	4.3371E-02	4.930E-02
CD-109	#A	1.5968E+00	1.5993E+00	1.9510E+00	1.9530E+00	2.112E+00
SN-113	#B	-1.3152E-02	-1.3233E-02	5.6352E-02	5.6357E-02	6.311E-02
SB-125	#B	7.3509E-02	7.3560E-02	7.9273E-02	7.9388E-02	1.261E-01
I-131	#B	7.2334E-03	7.9013E-03	4.0431E-02	4.0434E-02	4.205E-02
CS-134	#B	1.3368E-02	1.3380E-02	1.3892E-02	1.3913E-02	4.491E-02
CS-137	#	2.5582E-01	2.5583E-01	7.6248E-02	7.7682E-02	
CE-139	#A	1.1079E-03	1.1137E-03	4.6444E-02	4.6444E-02	5.210E-02
EU-152	#B	3.2129E-02	3.2134E-02	3.9573E-02	3.9613E-02	1.620E-01
EU-154	#B	-2.3050E-02	-2.3055E-02	9.7590E-02	9.7598E-02	1.089E-01
EU-155	#B	1.5850E-01	1.5856E-01	2.4908E-01	2.4924E-01	2.723E-01
HG-203	#B	-1.8697E-02	-1.8984E-02	4.8601E-02	4.8613E-02	5.292E-02
TL-208	#	2.2539E-01	2.2539E-01	6.6847E-02	6.8116E-02	
PB-212		6.7524E-01	6.7524E-01	1.3542E-01	1.4098E-01	
PB-214		5.4978E-01	5.4978E-01	1.1185E-01	1.1631E-01	
BI-212		6.1711E-01	6.1711E-01	4.2363E-01	4.2514E-01	
BI-214		4.9825E-01	4.9825E-01	1.3177E-01	1.3490E-01	
RA-224		1.5375E+00	1.5375E+00	1.0986E+00	1.1022E+00	1.153E+00
RA-226	#	1.3919E+00	1.3919E+00	1.2018E+00	1.2045E+00	1.288E+00
AC-228		6.5740E-01	6.5740E-01	1.8995E-01	1.9375E-01	
TH-227	#B	2.4148E-05	2.4148E-05	3.2683E-01	3.2683E-01	3.702E-01
PA-234	#B	9.0312E-03	9.0312E-03	2.1809E-01	2.1809E-01	2.456E-01
TH-234	#B	-1.1032E-01	-1.1032E-01	1.1041E+01	1.1041E+01	6.853E+00
AM-241	#A	8.3263E-02	8.3263E-02	1.1976E+00	1.1977E+00	1.347E+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) 1.4882130E+01 pCi/gm
Total Decayed Activity (86.9 to 2000.7 keV) 1.4882147E+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_7SEP2006_0827.An1

Sample description
FSS-OOL-02-03-008-F

Spectrum Filename: C:\GammaVision\Spectra\103F_7SEP2006_0827.An1

Acquisition information
Start time: 07-Sep-2006 08:27:46
Live time: 2000
Real time: 2001
Dead time: 0.07 %
Detector ID: 4

Detector system
Det 103 - DSPE-471

Calibration
Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration
Created: 08-Aug-2005 11:09:41
Zero offset: 0.409 keV
Gain: 0.500 keV/channel
Quadratic: 1.092E-08 keV/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: 1.8420E+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.

YAEC Chemistry Lab Spectrum name: 103F_7SEP2006_0827.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-2006 07:45:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2202

***** S U M M A R Y O F P E A K 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	68.	29.32	0.99	9.052E-03	74.81	9.600	5.781E-01	PB212
77.29	76.	2.35	0.99	1.011E-02	77.11	17.500	4.875E-01	PB212
					77.11	10.700	7.973E-01	PB214
128.87	68.	38.26	1.02	2.435E-02				
186.14	94.	32.67	1.06	2.566E-02	185.99	3.280	PBC<MDA	RA226
210.00	71.	35.20	0.75	2.468E-02				
238.76	574.	4.98	1.09	2.320E-02	238.63	43.100	4.124E-01	PB212
241.78	97.	20.33	1.09	2.303E-02	241.00	3.900	7.927E-01	RA224
					241.92	7.470	4.148E-01	PB214
295.33	178.	10.51	1.13	2.025E-02	295.22	19.200	3.290E-01	PB214
300.05	55.	27.69	1.13	2.002E-02				
338.56	127.	17.97	0.95	1.829E-02	338.40	12.010	4.189E-01	AC228
352.02	281.	8.18	1.09	1.775E-02	351.99	37.100	3.068E-01	PB214
511.26	116.	17.59	1.41	1.316E-02	510.72	22.500	2.221E-01	TL208
583.52	201.	10.24	1.18	1.184E-02	583.14	86.000	1.414E-01	TL208
609.59	188.	8.79	1.32	1.144E-02	609.32	46.090	2.520E-01	BI214
727.26	62.	24.20	1.05	9.964E-03	727.17	11.800	3.869E-01	BI212
794.49	29.	33.15	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
860.48	37.	36.64	0.86	8.768E-03				
911.28	187.	9.80	1.55	8.400E-03	911.07	29.000	5.542E-01	AC228
969.26	64.	18.70	1.67	8.024E-03	968.90	17.460	3.343E-01	AC228
1121.30	61.	29.24	0.88	7.207E-03	1120.28	15.040	3.984E-01	BI214
1461.29	880.	3.41	2.06	5.930E-03	1460.75	10.700	9.960E+00	K40
1765.05	39.	19.55	0.73	5.141E-03	1764.51	15.920	3.184E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
256.92	128.87	270.	86.	0.043	87.62	1.015	AC-228	s
419.16	210.00	239.	71.	0.035	105.59	0.746	NP-239	s
599.13	299.99	137.	49.	0.025	114.10	1.300	TH-227	
1719.99	860.48	49.	37.	0.018	109.93	0.865	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	188.	68.	0.034	87.97	0.993D
PB-212	153.39	77.11	202.	76.	0.038	7.04	0.995A
PB-212	476.62	238.73	375.	430.	0.215	24.23	1.003
RA-224	482.73	241.79	419.	93.	0.046	98.72	1.500
PB-214	482.82	241.83	413.	78.	0.039	115.75	1.500s
PB-214	589.69	295.27	193.	175.	0.088	43.34	1.131
AC-228	676.14	338.50	147.	115.	0.058	52.11	1.500
PB-214	703.19	352.02	114.	275.	0.138	24.55	1.085
TL-208	1021.62	511.26	121.	90.	0.045	52.76	1.411s
TL-208	1166.14	583.52	76.	196.	0.098	30.72	1.181
BI-214	1218.27	609.59	45.	181.	0.091	26.38	1.316
Ag-108M	1222.59	611.75	115.	-46.	-0.023	108.00	1.500s
BI-212	1453.60	727.26	48.	62.	0.031	72.60	1.055
CS-134	1588.04	794.49	32.	29.	0.014	99.46	1.500s
AC-228	1822.10	911.54	48.	147.	0.073	30.84	1.505s
AC-228	1937.49	969.24	48.	65.	0.033	58.06	1.541
BI-214	2241.57	1121.30	69.	59.	0.029	87.73	0.876s
K-40	2921.44	1461.29	24.	862.	0.431	10.23	2.061
BI-214	3528.86	1765.05	8.	36.	0.018	58.64	0.728s

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

***** S U M M A R Y O 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		3.3052E-02					
			477.56	3.305E-02	%(	1.722E-01 4.98E-02	G
K-40		9.9595E+00					
			1460.75	9.960E+00	(P	2.969E-01 3.47E-01	G
MN-54		3.1801E-03					
			834.81	3.180E-03	&(P	3.167E-02 9.07E-03	G
CO-57		-4.3941E-03					
			122.07	-4.394E-03	%(P	3.266E-02 9.68E-03	G K
			136.43	-5.745E-02	%	3.180E-01 9.51E-02	G
CO-60		-8.6887E-03					
			1332.51	-8.689E-03	&(P	3.884E-02 1.08E-02	G K
			1173.23	1.612E-04	% P	3.461E-02 9.53E-03	G K
Sr-85		-6.6399E-03					
			514.00	-6.640E-03	%(	3.268E-02 9.65E-03	G
Kr-85		-1.5348E+02					
			513.99	-1.535E+02	%(	7.463E+02 2.20E+02	G
Y-88		6.8639E-03					
			1836.01	6.864E-03	%(P	1.825E-02 5.36E-03	G K
			898.02	9.145E-03	% P	2.505E-02 7.40E-03	G
NB-94		1.0645E-04					
			871.10	1.064E-04	&(	2.450E-02 6.75E-03	G K
			702.50	5.045E-03	%	2.772E-02 8.05E-03	G K
Ag-108M		-6.6355E-03					
			722.95	-6.636E-03	%(	3.145E-02 9.18E-03	G K
			614.37	-3.298E-02	+ P	3.756E-02 1.18E-02	G
			433.93	-9.860E-04	&	2.470E-02 7.09E-03	G
CD-109		3.6876E-01					
			88.04	3.688E-01	%(	1.454E+00 4.36E-01	G
SN-113		2.3959E-03					
			391.71	2.396E-03	&(	3.914E-02 1.14E-02	G K
			255.04	-8.284E-02	&	9.800E-01 2.87E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-1.7983E-03						
		427.95	-1.798E-03	%(P	8.662E-02	2.50E-02	G K
		600.77	6.493E-02	& P	1.216E-01	3.72E-02	G
		636.15	3.874E-02	& P	1.938E-01	5.58E-02	G
		463.51	9.691E-02	% P	2.485E-01	7.44E-02	G
		176.29	1.603E-01	%	4.433E-01	1.34E-01	G
I-131	-1.0448E-02						
		364.48	-1.045E-02	%(P	3.264E-02	9.71E-03	G K
		636.97	-4.962E-02	%	3.552E-01	1.02E-01	G
		284.29	-1.438E-01	% P	4.858E-01	1.45E-01	G
CS-134	9.3764E-03						
		604.66	-5.727E-03	%(	2.808E-02	8.21E-03	G K
		795.76	2.664E-02	*(P	2.670E-02	8.86E-03	G
		569.29	1.761E-02	& P	1.683E-01	4.83E-02	G
		801.84	-4.398E-02	% P	2.927E-01	8.13E-02	G
CS-137	-9.7655E-03						
		661.62	-9.766E-03	&(P	2.978E-02	8.68E-03	G
CE-139	7.5334E-04						
		165.85	7.533E-04	&(	3.574E-02	1.06E-02	G
EU-152	-4.9821E-04						
		121.78	-4.982E-04	%(P	1.128E-01	3.33E-02	G K
		344.30	-1.156E-02	& P	9.326E-02	2.74E-02	G
		1408.08	0.000E+00	%	1.186E-01	3.13E-02	G
		964.00	-8.461E-03	% P	2.604E-01	7.38E-02	G
		1112.07	2.653E-03	%	2.630E-01	7.38E-02	G
		778.90	0.000E+00	%	2.150E-01	6.03E-02	G
EU-154	1.6980E-02						
		123.10	1.698E-02	&(	8.039E-02	2.40E-02	G K
		1274.80	2.821E-02	%	8.090E-02	2.39E-02	G
		723.30	-3.290E-02	%	1.556E-01	4.55E-02	G
		1004.80	6.167E-02	&	1.525E-01	4.56E-02	G
EU-155	4.1112E-02						
		86.45	4.111E-02	%(	1.857E-01	5.56E-02	G K
		105.31	5.400E-02	&	1.748E-01	5.25E-02	G
HG-203	-2.2036E-03						
		279.17	-2.204E-03	%(P	3.347E-02	9.85E-03	G K
		72.87	-2.316E-01	% P	1.547E+00	4.61E-01	G
		70.83	-8.496E-01	%	3.129E+00	9.39E-01	G
		82.50	-3.697E-01	&	2.690E+00	8.01E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.4137E-01						
		583.14	1.414E-01	(P	3.115E-02	1.48E-02	G
		510.72	2.221E-01	+ P	1.337E-01	5.07E-02	G
PB-212	3.1575E-01						
		238.63	3.157E-01	(P	6.817E-02	2.62E-02	G K
							Energy duplication
		77.11	3.157E-01	} P	2.860E-01	7.41E-03	G
		74.81	5.781E-01	+ P	5.616E-01	1.77E-01	G
PB-214	3.1697E-01						
		351.99	3.068E-01	(P	5.833E-02	2.56E-02	G K
		295.22	3.305E-01	(P	1.272E-01	4.89E-02	G
							Energy duplication
		77.11	2.376E-01	} P	6.450E-01	1.67E-01	G
		241.92	3.325E-01	(	4.157E-01	1.28E-01	G
BI-212	3.8687E-01						
		727.17	3.869E-01	(P	2.183E-01	9.44E-02	G K
		1620.56	-9.361E-02	% P	1.006E+00	2.73E-01	G
		785.42	8.142E-01	%	1.212E+00	3.80E-01	G
BI-214	2.6908E-01						
		609.32	2.520E-01	(P	4.721E-02	2.30E-02	G K
		1764.51	3.184E-01	(P	1.459E-01	6.80E-02	G
		1120.28	3.984E-01	+ P	2.803E-01	1.20E-01	G
RA-224	7.5605E-01						
		241.00	7.560E-01	(	8.000E-01	2.49E-01	G
RA-226	5.5060E-01						
		185.99	5.506E-01	%(P	8.459E-01	2.57E-01	G
AC-228	4.2545E-01						
		911.07	4.422E-01	*(P	1.049E-01	4.65E-02	G K
		968.90	3.426E-01	- P	1.831E-01	6.65E-02	G
		338.40	3.851E-01	(P	1.979E-01	6.75E-02	G
TH-227	-9.8095E-02						
		236.00	-9.810E-02	%(	3.039E-01	9.14E-02	G K
		256.25	-5.559E-02	% P	3.609E-01	1.07E-01	G
PA-234	2.5272E-03						
		98.44	2.527E-03	%(P	1.771E-01	5.25E-02	G K
		946.00	-3.552E-03	% P	1.329E-01	3.68E-02	G
		131.28	-4.769E-02	% P	1.711E-01	5.14E-02	G
		94.67	1.698E-01	& P	2.747E-01	8.39E-02	G
		883.24	-4.435E-02	%	2.281E-01	6.58E-02	G
		926.70	-3.736E-02	%	2.279E-01	6.49E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 2.610E-02 & P 2.495E-01 7.16E-02 G

TH-234       1.1608E+00
                           63.29 1.161E+00 %(P 4.627E+00 1.38E+00 G K
                           92.80 6.180E-01 % P 1.701E+00 5.09E-01 G
                           92.38 7.478E-01 & P 2.011E+00 6.02E-01 G

AM-241      -2.1479E-01
                           59.54-2.148E-01 %(P 8.324E-01 2.49E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	3.2613E-02	3.3052E-02	1.4926E-01	1.4928E-01	1.699E-01
K-40		9.9595E+00	9.9595E+00	1.0412E+00	1.1910E+00	
MN-54	#A	3.1729E-03	3.1801E-03	2.7201E-02	2.7201E-02	3.159E-02
CO-57	#B	-4.3825E-03	-4.3941E-03	3.1221E-02	3.1222E-02	3.257E-02
CO-60	#B	-8.6855E-03	-8.6887E-03	6.7696E-02	6.7697E-02	3.883E-02

Sr-85	#A	-6.5672E-03	-6.6399E-03	2.8940E-02	2.8943E-02	3.232E-02
Kr-85	#A	-1.5347E+02	-1.5348E+02	6.6107E+02	6.6113E+02	7.463E+02
Y-88	#B	6.8180E-03	6.8639E-03	1.6070E-02	1.6075E-02	1.813E-02
NB-94	#B	1.0645E-04	1.0645E-04	2.0243E-02	2.0243E-02	2.450E-02
Ag-108M	#B	-6.6354E-03	-6.6355E-03	2.7528E-02	2.7531E-02	3.145E-02
CD-109	#A	3.6818E-01	3.6876E-01	1.3084E+00	1.3085E+00	1.452E+00
SN-113	#B	2.3811E-03	2.3959E-03	3.4120E-02	3.4120E-02	3.890E-02
SB-125	#B	-1.7970E-03	-1.7983E-03	8.0258E-02	8.0258E-02	8.656E-02
I-131	#B	-9.5601E-03	-1.0448E-02	3.1403E-02	3.1409E-02	2.987E-02
CS-134	#B	9.3676E-03	9.3764E-03	9.3544E-03	9.3703E-03	2.805E-02
CS-137	#A	-9.7649E-03	-9.7655E-03	3.2788E-02	3.2793E-02	2.978E-02
CE-139	#A	7.4944E-04	7.5334E-04	3.1700E-02	3.1700E-02	3.555E-02
EU-152	#B	-4.9813E-04	-4.9821E-04	2.8960E-01	2.8960E-01	1.128E-01
EU-154	#B	1.6976E-02	1.6980E-02	7.2110E-02	7.2116E-02	8.037E-02
EU-155	#B	4.1096E-02	4.1112E-02	1.6688E-01	1.6690E-01	1.856E-01
HG-203	#B	-2.1701E-03	-2.2036E-03	2.9995E-02	2.9996E-02	3.296E-02
TL-208		1.4137E-01	1.4137E-01	4.4381E-02	4.5134E-02	
PB-212		3.1575E-01	3.1575E-01	7.8645E-02	8.0753E-02	
PB-214		3.1697E-01	3.1697E-01	7.9418E-02	8.1522E-02	
BI-212		3.8687E-01	3.8687E-01	2.8309E-01	2.8398E-01	
BI-214		2.6908E-01	2.6908E-01	7.3512E-02	7.5154E-02	
RA-224	A	7.5605E-01	7.5605E-01	7.4635E-01	7.4764E-01	8.000E-01
RA-226	#A	5.5060E-01	5.5060E-01	7.7125E-01	7.7191E-01	8.459E-01
AC-228	#	4.2545E-01	4.2545E-01	1.3048E-01	1.3280E-01	1.049E-01
TH-227	#B	-9.8095E-02	-9.8095E-02	2.7434E-01	2.7439E-01	3.039E-01
PA-234	#B	2.5272E-03	2.5272E-03	1.5736E-01	1.5736E-01	1.771E-01
TH-234	#B	1.1608E+00	1.1608E+00	4.1377E+00	4.1382E+00	4.627E+00
AM-241	#A	-2.1479E-01	-2.1479E-01	7.5964E-01	7.5973E-01	8.324E-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 (93.4 to 2000.7 keV) 1.2145614E+01 pCi/gm
Total Decayed Activity (93.4 to 2000.7 keV) 1.2145614E+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: 107F_6SEP2006_1634.An1

Sample description
FSS-OOL-02-03-008-F-S

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEP2006_1634.An1

Acquisition information
Start time: 06-Sep-2006 16:34:57
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: 1.9120E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9120E+03) =
5.2301E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-2006 07:45:00
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. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1598

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
76.27	569.	10.21	2.24	2.919E-02	72.87	6.400	2.293E+00	HG203
					74.81	9.600	1.460E+00	PB212
					77.11	17.500	7.771E-01	PB212
					77.11	10.700	1.260E+00	PB214
92.71	142.	27.78	2.21	3.436E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.82	86.	37.61	1.50	3.610E-02	185.99	3.280	PBC<MDA	RA226
238.78	550.	6.31	1.30	3.187E-02	238.63	43.100	2.748E-01	PB212
241.38	163.	20.16	1.30	3.166E-02	241.00	3.900	9.202E-01	RA224
					241.92	7.470	4.839E-01	PB214
269.74	80.	40.98	1.61	2.948E-02				
295.31	182.	16.57	1.95	2.767E-02	295.22	19.200	2.358E-01	PB214
338.59	146.	18.63	2.02	2.499E-02	338.40	12.010	3.361E-01	AC228
352.10	394.	8.28	1.92	2.425E-02	351.99	37.100	3.058E-01	PB214
463.11	47.	31.36	1.50	1.953E-02	463.51	10.000	PBC<MDA	SB125
511.22	126.	20.00	2.26	1.807E-02	510.72	22.500	1.597E-01	TL208
583.48	225.	10.30	1.92	1.628E-02	583.14	86.000	1.113E-01	TL208
609.54	294.	8.39	2.12	1.574E-02	609.32	46.090	2.822E-01	BI214
727.65	38.	35.33	1.64	1.374E-02	727.17	11.800	PBC<MDA	BI212
769.24	69.	26.92	0.68	1.317E-02				
795.32	30.	31.72	1.68	1.284E-02	795.76	85.400	1.937E-02	CS134
911.70	174.	11.92	2.06	1.160E-02	911.07	29.000	3.560E-01	AC228
968.20	155.	13.76	2.04	1.110E-02	968.90	17.460	5.575E-01	AC228
1120.62	56.	25.67	1.90	9.970E-03	1120.28	15.040	2.652E-01	BI214
1461.09	1138.	3.01	2.21	8.190E-03	1460.75	10.700	9.136E+00	K40
1764.90	53.	16.32	2.29	7.084E-03	1764.51	15.920	3.345E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
152.20	76.27	1235.	270.	0.135	58.17	2.245	BI-207	s
477.18	238.89	328.	550.	0.275	18.93	1.297	PB-212	D
482.40	241.49	460.	163.	0.082	60.48	1.299	PB-214	D
539.12	269.74	319.	80.	0.040	122.93	1.610	AC-228	s
703.81	352.10	501.	86.	0.043	115.21	1.916	PB-214	s
1218.65	609.54	308.	76.	0.038	103.60	2.118	BI-214	s
1538.04	769.24	76.	69.	0.035	80.77	0.683	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	153.89	77.11	1042.	232.	0.116	62.19	1.500D
PB-214	153.89	77.11	1046.	227.	0.114	62.19	1.500D
TH-234	185.52	92.93	895.	122.	0.061	101.06	1.500s
TH-234	185.53	92.93	883.	109.	0.054	100.45	1.500s
RA-226	371.29	185.82	481.	86.	0.043	112.82	1.500s
PB-212	477.16	238.76	652.	523.	0.261	23.72	1.500s
PB-214	590.34	295.36	273.	164.	0.082	47.21	1.500s
AC-228	676.80	338.59	201.	143.	0.071	55.90	2.023s
PB-214	703.79	352.09	190.	303.	0.152	25.33	1.500s
SB-125	925.81	463.11	99.	47.	0.023	94.09	1.500s
TL-208	1022.03	511.22	174.	92.	0.046	60.00	2.259s
TL-208	1166.54	583.48	105.	221.	0.110	30.89	1.920s
BI-214	1218.69	609.56	94.	232.	0.116	25.89	1.558s
BI-212	1454.88	727.65	80.	38.	0.019	106.00	1.638s
CS-134	1590.22	795.32	32.	30.	0.015	95.16	1.684
AC-228	1822.96	911.70	71.	170.	0.085	35.76	2.060s
AC-228	1935.96	968.20	77.	153.	0.076	41.29	2.044s
BI-214	2240.81	1120.62	80.	56.	0.028	77.01	1.897s
K-40	2921.77	1461.09	15.	1133.	0.566	9.04	2.209
BI-214	3529.44	1764.90	13.	53.	0.027	48.95	2.291s

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

***** S U M M A R Y O 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		-4.6173E-05						
			477.56	-4.617E-05	%(	1.668E-01	4.77E-02	G
K-40		9.1357E+00						
			1460.75	9.136E+00	(P	1.680E-01	2.76E-01	G
MN-54		9.0916E-05						
			834.81	9.092E-05	&(P	2.194E-02	6.18E-03	G
CO-57		4.7936E-03						
			122.07	4.794E-03	%(P	2.610E-02	7.81E-03	G K
			136.43	1.374E-02	% P	1.951E-01	5.80E-02	G
CO-60		4.5004E-03						
			1332.51	4.500E-03	&(P	2.323E-02	6.48E-03	G K
			1173.23	5.620E-03	& P	3.044E-02	8.74E-03	G K
Sr-85		-7.3834E-03						
			514.00	-7.383E-03	&(	2.683E-02	8.00E-03	G
Kr-85		-1.9717E+02						
			513.99	-1.972E+02	&(P	6.215E+02	1.84E+02	G
Y-88		-8.2795E-04						
			1836.01	-8.279E-04	%(P	1.606E-02	3.80E-03	G K
			898.02	-3.857E-03	% P	2.425E-02	6.87E-03	G
NB-94		-3.3118E-03						
			871.10	-3.312E-03	%(P	1.964E-02	5.64E-03	G K
			702.50	1.321E-03	& P	1.957E-02	5.57E-03	G K
Ag-108M		-4.0443E-03						
			722.95	-4.044E-03	%(	2.907E-02	8.49E-03	G K
			614.37	-9.498E-03	%	2.683E-02	8.03E-03	G
			433.93	7.202E-03	& P	1.567E-02	4.72E-03	G
CD-109		4.6292E-01						
			88.04	4.629E-01	%(P	7.590E-01	2.31E-01	G
SN-113		-4.8242E-03						
			391.71	-4.824E-03	%(P	2.820E-02	8.22E-03	G K
			255.04	-5.538E-02	%	8.672E-01	2.55E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.2659E-02						
		427.95	1.327E-02	%(P	5.008E-02	1.47E-02	G K
		600.77	-2.205E-03	% P	1.034E-01	2.92E-02	G
		636.15	3.015E-02	% P	1.486E-01	4.30E-02	G
		463.51	1.692E-01	*(P	1.775E-01	5.63E-02	G
		176.29	-4.237E-02	% P	3.467E-01	1.03E-01	G
I-131	4.1467E-03						
		364.48	4.147E-03	%(	1.987E-02	5.85E-03	G K
		636.97	0.000E+00	&	2.839E-01	8.07E-02	G
		284.29	-1.706E-02	%	3.079E-01	9.04E-02	G
CS-134	6.2612E-03						
		604.66	-5.212E-03	&(P	2.333E-02	6.86E-03	G K
		795.76	1.937E-02	(P	1.881E-02	6.25E-03	G
		569.29	2.519E-02	%	1.231E-01	3.61E-02	G
		801.84	-3.641E-02	% P	2.428E-01	6.99E-02	G
CS-137	-6.0570E-04						
		661.62	-6.057E-04	&(P	1.954E-02	5.33E-03	G
CE-139	4.1404E-03						
		165.85	4.140E-03	%(P	2.615E-02	7.80E-03	G
EU-152	3.8785E-03						
		121.78	3.878E-03	%(P	6.574E-02	1.95E-02	G K
		344.30	-1.425E-04	& P	5.964E-02	1.72E-02	G
		1408.08	3.502E-02	% P	8.673E-02	2.57E-02	G
		964.00	-3.633E-03	& P	2.371E-01	6.84E-02	G
		1112.07	2.679E-02	% P	1.904E-01	5.47E-02	G
		778.90	3.141E-02	% P	1.631E-01	4.74E-02	G
EU-154	5.4153E-03						
		123.10	5.415E-03	%(P	4.168E-02	1.24E-02	G K
		1274.80	-2.674E-02	& P	7.590E-02	2.25E-02	G
		723.30	-2.123E-02	& P	1.385E-01	4.05E-02	G
		1004.80	1.756E-02	& P	1.495E-01	4.30E-02	G
EU-155	2.8092E-02						
		86.45	2.809E-02	%(	9.806E-02	2.95E-02	G K
		105.31	4.437E-03	% P	1.041E-01	3.09E-02	G
HG-203	3.4218E-03						
		279.17	3.422E-03	%(P	2.319E-02	6.86E-03	G K
		72.87	3.549E-01	% P	5.611E-01	1.71E-01	G
		70.83	-4.249E-01	%	1.180E+00	3.56E-01	G
		82.50	-3.040E-01	%	1.392E+00	4.18E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.1132E-01						
		583.14	1.113E-01	(P	2.550E-02	1.17E-02	G
		510.72	1.597E-01	+ P	1.115E-01	4.37E-02	G
PB-212	2.8265E-01						
		238.63	2.687E-01	*(P	6.258E-02	2.19E-02	G K
							Energy duplication
		77.11	3.170E-01	*(	2.091E-01	6.57E-02	G
		74.81	1.629E-01	% P	4.360E-01	1.32E-01	G
PB-214	2.3157E-01						
		351.99	2.383E-01	*(P	5.261E-02	2.05E-02	G K
		295.22	2.185E-01	(P	1.060E-01	3.53E-02	G
							Energy duplication
		77.11	5.079E-01	+ P	3.427E-01	1.07E-01	G
		241.92	2.262E-02	& P	4.127E-01	1.23E-01	G
BI-212	1.6735E-01						
		727.17	1.673E-01	*(P	1.932E-01	6.11E-02	G K
		1620.56	-1.705E-02	% P	5.483E-01	1.34E-01	G
		785.42	5.916E-02	% P	1.180E+00	3.37E-01	G
BI-214	2.3546E-01						
		609.32	2.258E-01	*(P	4.662E-02	1.98E-02	G K
		1764.51	3.345E-01	+ P	1.221E-01	5.55E-02	G
		1120.28	2.652E-01	@(P	2.091E-01	6.91E-02	G
RA-224	3.9555E-01						
		241.00	3.955E-01	&(P	7.523E-01	2.28E-01	G
RA-226	5.1405E-01						
		185.99	5.141E-01	*(	6.265E-01	1.93E-01	G
AC-228	3.5017E-01						
		911.07	3.560E-01	*(P	8.838E-02	4.35E-02	G K
		968.90	5.575E-01	+ P	1.594E-01	7.78E-02	G
		338.40	3.361E-01	*(P	1.620E-01	6.40E-02	G
TH-227	-1.6268E-01						
		236.00	-1.627E-01	%(P	2.723E-01	8.30E-02	G K
		256.25	3.623E-02	% P	2.621E-01	7.74E-02	G
PA-234	9.3829E-03						
		98.44	9.383E-03	%(	9.918E-02	2.96E-02	G K
		946.00	-2.542E-02	&	1.199E-01	3.50E-02	G
		131.28	-1.698E-02	&	1.145E-01	3.42E-02	G
		94.67	-1.064E-01	&	1.946E-01	5.92E-02	G
		883.24	-3.073E-02	%	1.699E-01	4.91E-02	G
		926.70	0.000E+00	%	2.301E-01	6.52E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 3.734E-02 %   1.826E-01 5.35E-02 G

TH-234       6.8152E-01
                           63.29 4.385E-01 %(P 1.176E+00 3.53E-01 G K
                           92.80 7.463E-01  (P 9.674E-01 2.95E-01 G
                           92.38 9.746E-01  (P 1.140E+00 3.50E-01 G

AM-241      -4.1955E-03
                           59.54-4.195E-03 &(P 1.611E-01 4.79E-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	-4.5953E-05	-4.6173E-05	1.4299E-01	1.4299E-01	1.661E-01
K-40		9.1357E+00	9.1357E+00	8.2930E-01	9.8937E-01	
MN-54	#A	9.0841E-05	9.0916E-05	1.8546E-02	1.8546E-02	2.192E-02
CO-57	#B	4.7891E-03	4.7936E-03	2.3422E-02	2.3424E-02	2.607E-02
CO-60	#B	4.4998E-03	4.5004E-03	1.9437E-02	1.9439E-02	2.323E-02

Sr-85	#A	-7.3544E-03	-7.3834E-03	2.4001E-02	2.4005E-02	2.672E-02
Kr-85	#A	-1.9717E+02	-1.9717E+02	7.2957E+02	7.2967E+02	6.215E+02
Y-88	#B	-8.2597E-04	-8.2795E-04	1.1228E+00	1.1228E+00	1.602E-02
NB-94	#B	-3.3118E-03	-3.3118E-03	1.7752E-02	1.7753E-02	1.964E-02
Ag-108M	#B	-4.0443E-03	-4.0443E-03	2.5482E-02	2.5483E-02	2.907E-02
CD-109	#A	4.6266E-01	4.6292E-01	6.9419E-01	6.9466E-01	7.586E-01
SN-113	#B	-4.8135E-03	-4.8242E-03	3.5912E-02	3.5914E-02	2.814E-02
SB-125	#F	5.2646E-02	5.2659E-02	5.2530E-02	5.2622E-02	5.007E-02
I-131	#B	4.0172E-03	4.1467E-03	1.7565E-02	1.7566E-02	1.925E-02
CS-134	#B	6.2590E-03	6.2612E-03	6.0627E-03	6.0740E-03	2.332E-02
CS-137	#A	-6.0569E-04	-6.0570E-04	2.9896E-02	2.9896E-02	1.954E-02
CE-139	#A	4.1327E-03	4.1404E-03	2.3410E-02	2.3411E-02	2.610E-02
EU-152	#B	3.8783E-03	3.8785E-03	5.8465E-02	5.8465E-02	6.574E-02
EU-154	#B	5.4149E-03	5.4153E-03	3.7104E-02	3.7105E-02	4.168E-02
EU-155	#B	2.8088E-02	2.8092E-02	8.8595E-02	8.8609E-02	9.804E-02
HG-203	#B	3.4031E-03	3.4218E-03	2.0572E-02	2.0573E-02	2.307E-02
TL-208	#	1.1132E-01	1.1132E-01	3.5095E-02	3.5706E-02	
PB-212	#	2.8265E-01	2.8265E-01	6.9050E-02	7.1039E-02	6.258E-02
PB-214	#	2.3157E-01	2.3157E-01	5.9642E-02	6.1190E-02	5.261E-02
BI-212	#A	1.6735E-01	1.6735E-01	1.8334E-01	1.8360E-01	1.932E-01
BI-214	#	2.3546E-01	2.3546E-01	6.2101E-02	6.3639E-02	4.662E-02
RA-224	#A	3.9555E-01	3.9555E-01	6.8532E-01	6.8572E-01	7.523E-01
RA-226	#A	5.1405E-01	5.1405E-01	5.7995E-01	5.8075E-01	6.265E-01
AC-228	#	3.5017E-01	3.5017E-01	1.1888E-01	1.2067E-01	
TH-227	#B	-1.6268E-01	-1.6268E-01	2.5052E-01	2.5070E-01	2.723E-01
PA-234	#B	9.3829E-03	9.3829E-03	8.8721E-02	8.8722E-02	9.918E-02
TH-234	#B	6.8152E-01	6.8152E-01	6.5899E-01	6.6007E-01	1.176E+00
AM-241	#A	-4.1955E-03	-4.1955E-03	2.0887E-01	2.0887E-01	1.611E-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) 9.5971994E+00 pCi/gm
Total Decayed Activity (269.7 to 2000.1 keV) 9.5971994E+00 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-02-03-003-F

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEPT2006_0902.An1

Acquisition information
Start time: 06-Sep-2006 09:02:49
Live time: 2000
Real time: 2004
Dead time: 0.19 %
Detector ID: 2

Detector system
Det 107- DSPE- 634

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

Energy Calibration
Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0150E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0150E+03) =
4.9628E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 14:48:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 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
74.83	326.	14.30	1.18	2.842E-02	74.81	9.600	7.895E-01	PB212
77.09	456.	11.50	1.18	2.949E-02	77.11	10.700	9.554E-01	PB214
					77.11	17.500	5.903E-01	PB212
86.69	226.	29.13	1.27	3.291E-02	86.45	32.740	1.413E-01	EU155
					88.04	3.790	1.204E+00	CD109
92.67	139.	35.31	1.97	3.436E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.78	177.	24.22	1.28	3.612E-02	185.99	3.280	1.001E+00	RA226
209.26	195.	22.22	1.48	3.429E-02				
239.19	1607.	3.92	2.07	3.185E-02	238.63	43.100	7.763E-01	PB212
242.04	151.	24.97	1.30	3.163E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	4.273E-01	PB214
270.72	138.	25.66	1.52	2.941E-02				
294.99	282.	14.15	1.87	2.769E-02	295.22	19.200	3.502E-01	PB214
338.70	272.	12.39	1.79	2.499E-02	338.40	12.010	6.012E-01	AC228
352.05	502.	6.62	1.90	2.426E-02	351.99	37.100	3.703E-01	PB214
463.26	130.	18.93	1.16	1.954E-02				
463.26	130.	18.93	1.16	1.954E-02	463.51	10.000	4.364E-01	SB125
511.25	228.	16.16	2.46	1.807E-02	510.72	22.500	3.205E-01	TL208
583.20	428.	7.88	2.24	1.629E-02	583.14	86.000	2.025E-01	TL208
609.37	448.	7.65	2.48	1.574E-02	609.32	46.090	4.097E-01	BI214
727.40	105.	17.02	2.70	1.374E-02	727.17	11.800	4.339E-01	BI212
795.43	98.	26.29	1.67	1.284E-02				
795.43	98.	26.29	1.67	1.284E-02	795.76	85.400	5.997E-02	CS134
911.01	389.	7.59	2.59	1.161E-02	911.07	29.000	7.661E-01	AC228
967.87	269.	10.28	1.96	1.110E-02	968.90	17.460	9.244E-01	AC228
1120.24	68.	26.18	1.90	9.970E-03	1120.28	15.040	3.029E-01	BI214

1460.86	2200.	2.17	2.65	8.190E-03	1460.75	10.700	1.680E+01	K40
1764.83	48.	17.18	2.29	7.084E-03	1764.51	15.920	2.875E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
173.05	86.69	1527.	226.	0.113	87.38	1.271	BI-207	l
418.15	209.26	650.	195.	0.098	66.65	1.480	AC-228	s
541.07	270.72	416.	138.	0.069	67.51	1.521	AC-228	s
1218.31	609.37	473.	165.	0.082	60.78	2.484	BI-214	s

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.29	74.81	928.	321.	0.161	42.98	1.178D
PB-212	153.89	77.11	955.	416.	0.208	26.46	1.179A
TH-234	185.51	92.92	1605.	144.	0.072	114.43	1.500s
RA-226	371.21	185.78	690.	177.	0.088	72.65	1.282s
TH-227	470.95	235.66	1508.	-217.	-0.109	78.61	1.500s
PB-212	476.89	238.63	575.	1058.	0.529	13.08	1.297D
PB-214	483.47	241.92	645.	151.	0.075	74.90	1.299D
PB-214	589.61	294.99	473.	277.	0.139	42.45	1.871s
AC-228	677.01	338.70	313.	269.	0.135	37.17	1.788s
PB-214	703.72	352.05	237.	497.	0.248	19.87	1.900s
SB-125	925.79	463.10	161.	93.	0.047	63.31	1.500s
TL-208	1022.10	511.25	310.	194.	0.097	48.49	2.464s
TL-208	1165.99	583.20	207.	423.	0.211	23.65	2.236s
BI-214	1218.60	609.51	187.	314.	0.157	24.63	1.558s
BI-212	1454.38	727.40	86.	105.	0.052	51.06	2.701s
CS-134	1589.73	795.08	95.	53.	0.027	86.89	1.684s
AC-228	1821.58	911.01	116.	385.	0.192	22.78	2.593s
AC-228	1935.30	967.87	140.	267.	0.133	30.83	1.956s
BI-214	2240.05	1120.24	128.	68.	0.034	78.54	1.897s
K-40	2921.32	1460.86	23.	2196.	1.098	6.51	2.646s
BI-214	3529.32	1764.83	12.	48.	0.024	51.53	2.291s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		4.8833E-02					
			477.56	4.883E-02	%(	2.258E-01 6.70E-02	G
K-40		1.6801E+01					
			1460.75	1.680E+01	*(P	1.930E-01 3.65E-01	G
MN-54		1.1981E-02					
			834.81	1.198E-02	%(P	2.791E-02 8.41E-03	G
CO-57		-3.9274E-03					
			122.07	-3.927E-03	%(P	3.152E-02 9.44E-03	G K
			136.43	4.812E-02	% P	2.712E-01 8.14E-02	G
CO-60		-1.3126E-02					
			1332.51	-1.313E-02	&(P	3.555E-02 1.03E-02	G K
			1173.23	-3.615E-03	& P	3.902E-02 1.11E-02	G K
Sr-85		-1.3851E-02					
			514.00	-1.385E-02	&(	3.452E-02 1.04E-02	G
Kr-85		-3.4309E+02					
			513.99	-3.431E+02	&(P	7.936E+02 2.39E+02	G
Y-88		2.6963E-03					
			1836.01	2.696E-03	&(P	1.731E-02 4.65E-03	G K
			898.02	-1.225E-03	& P	2.935E-02 8.35E-03	G
NB-94		-7.6390E-04					
			871.10	-7.639E-04	%(P	2.547E-02 7.29E-03	G K
			702.50	-9.603E-04	& P	2.831E-02 8.21E-03	G K
Ag-108M		-1.5123E-02					
			722.95	-1.512E-02	%(	3.789E-02 1.14E-02	G K
			614.37	-2.016E-02	%	3.632E-02 1.11E-02	G
			433.93	-5.971E-03	% P	2.513E-02 7.43E-03	G
CD-109		6.4293E-01					
			88.04	6.429E-01	&(P	9.702E-01 2.96E-01	G
SN-113		-5.2653E-03					
			391.71	-5.265E-03	&(P	3.479E-02 1.02E-02	G K
			255.04	-1.753E-01	%	1.153E+00 3.44E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.3273E-02						
		427.95	3.049E-03	%(P	7.269E-02	2.12E-02	G K
		600.77	-2.462E-02	% P	1.337E-01	3.91E-02	G
		636.15	4.745E-02	% P	1.854E-01	5.47E-02	G
		463.51	3.207E-01	*(P	2.122E-01	6.97E-02	G
		176.29	-8.894E-03	% P	4.206E-01	1.25E-01	G
I-131	7.7191E-04						
		364.48	7.719E-04	%(	2.428E-02	7.08E-03	G K
		636.97	7.801E-05	%	3.260E-01	9.36E-02	G
		284.29	2.685E-03	%	2.915E-01	8.51E-02	G
CS-134	-1.4506E-02						
		604.66	-1.451E-02	%(P	3.335E-02	1.01E-02	G K
		795.76	3.254E-02	+ P	2.940E-02	9.52E-03	G
		569.29	5.971E-03	%	1.595E-01	4.64E-02	G
		801.84	1.157E-03	% P	3.183E-01	9.16E-02	G
CS-137	1.4054E-02						
		661.62	1.405E-02	%(P	3.139E-02	9.44E-03	G
CE-139	4.8627E-05						
		165.85	4.863E-05	&(P	3.175E-02	9.45E-03	G
EU-152	-1.4891E-02						
		121.78	-1.489E-02	&(P	1.004E-01	3.01E-02	G K
		344.30	-2.608E-03	% P	8.764E-02	2.58E-02	G
		1408.08	2.173E-02	& P	8.736E-02	2.49E-02	G
		964.00	-5.235E-02	& P	2.914E-01	8.62E-02	G
		1112.07	5.020E-02	& P	2.549E-01	7.49E-02	G
		778.90	-1.265E-05	% P	1.757E-01	5.00E-02	G
EU-154	-1.6579E-03						
		123.10	-1.658E-03	%(P	7.292E-02	2.18E-02	G K
		1274.80	-1.366E-02	& P	1.137E-01	3.31E-02	G
		723.30	-7.479E-02	% P	1.812E-01	5.46E-02	G
		1004.80	8.552E-03	& P	1.873E-01	5.42E-02	G
EU-155	6.6051E-02						
		86.45	6.605E-02	%(	1.224E-01	3.72E-02	G K
		105.31	4.055E-02	% P	1.344E-01	4.05E-02	G
HG-203	-4.0022E-03						
		279.17	-4.002E-03	&(P	3.015E-02	8.96E-03	G K
		72.87	-3.790E-01	% P	9.082E-01	2.75E-01	G
		70.83	-1.910E-01	&	1.520E+00	4.57E-01	G
		82.50	-8.009E-01	%	1.856E+00	5.62E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.0248E-01						
		583.14	2.025E-01	*(P	3.340E-02	1.61E-02	G
		510.72	3.205E-01	+ P	1.396E-01	6.08E-02	G
PB-212	5.3871E-01						
		238.63	5.162E-01	(P	5.583E-02	2.28E-02	G K
							Energy duplication
		77.11	5.387E-01	}	1.901E-01	4.75E-02	G
		74.81	7.881E-01	+ P	3.546E-01	1.14E-01	G
PB-214	3.7090E-01						
		351.99	3.703E-01	*(P	5.549E-02	2.48E-02	G K
		295.22	3.502E-01	*(P	1.313E-01	5.03E-02	G
							Energy duplication
		77.11	7.735E-02	} P	3.957E-01	1.12E-01	G
		241.92	4.273E-01	(P	3.437E-01	1.08E-01	G
BI-212	4.3388E-01						
		727.17	4.339E-01	*(P	1.900E-01	7.48E-02	G K
		1620.56	-8.499E-02	% P	7.378E-01	2.00E-01	G
		785.42	5.035E-01	% P	1.111E+00	3.35E-01	G
BI-214	2.9236E-01						
		609.32	2.906E-01	*(P	6.146E-02	2.42E-02	G K
		1764.51	2.875E-01	(P	1.123E-01	5.03E-02	G
		1120.28	3.029E-01	(P	2.478E-01	8.03E-02	G
RA-224	-3.3116E-02						
		241.00	-3.312E-02	%(P	8.725E-01	2.60E-01	G
RA-226	1.0013E+00						
		185.99	1.001E+00	*(	7.087E-01	2.42E-01	G
AC-228	8.2562E-01						
		911.07	7.661E-01	*(P	1.056E-01	5.88E-02	G K
		968.90	9.244E-01	*(P	2.003E-01	9.57E-02	G
		338.40	6.012E-01	- P	1.901E-01	7.54E-02	G
TH-227	-4.0515E-01						
		236.00	-4.052E-01	?(P	3.425E-01	1.06E-01	G K
		256.25	1.633E-02	% P	3.538E-01	1.05E-01	G
PA-234	1.2327E-02						
		98.44	1.233E-02	&(	1.273E-01	3.81E-02	G K
		946.00	-1.929E-02	&	1.565E-01	4.57E-02	G
		131.28	-5.147E-02	%	1.524E-01	4.60E-02	G
		94.67	-6.895E-02	&	2.364E-01	7.13E-02	G
		883.24	6.772E-02	%	1.820E-01	5.44E-02	G
		926.70	6.686E-03	%	2.901E-01	8.39E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 8.011E-03 %   2.365E-01 6.88E-02 G

TH-234       8.1535E-01
                           63.29 6.321E-01 %(P 1.475E+00 4.45E-01 G K
                           92.80 8.740E-01 % P 1.219E+00 3.71E-01 G
                           92.38 1.093E+00  (P 1.441E+00 4.40E-01 G

AM-241       3.5156E-02
                           59.54 3.516E-02 %(P 1.898E-01 5.70E-02 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	4.8354E-02	4.8833E-02	2.0090E-01	2.0093E-01	2.236E-01
K-40	#	1.6801E+01	1.6801E+01	1.0953E+00	1.4780E+00	
MN-54	#A	1.1961E-02	1.1981E-02	2.5235E-02	2.5245E-02	2.786E-02
CO-57	#B	-3.9197E-03	-3.9274E-03	2.9141E-02	2.9142E-02	3.145E-02
CO-60	#B	-1.3123E-02	-1.3126E-02	4.8372E-02	4.8378E-02	3.554E-02

Sr-85	#A	-1.3738E-02	-1.3851E-02	3.1255E-02	3.1266E-02	3.424E-02
Kr-85	#A	-3.4309E+02	-3.4309E+02	8.3277E+02	8.3302E+02	7.936E+02
Y-88	#B	2.6830E-03	2.6963E-03	1.3937E-02	1.3938E-02	1.722E-02
NB-94	#B	-7.6390E-04	-7.6390E-04	2.6709E-02	2.6709E-02	2.547E-02
Ag-108M	#B	-1.5123E-02	-1.5123E-02	3.4257E-02	3.4269E-02	3.789E-02
CD-109	#A	6.4218E-01	6.4293E-01	8.8765E-01	8.8837E-01	9.691E-01
SN-113	#B	-5.2412E-03	-5.2653E-03	4.2572E-02	4.2573E-02	3.463E-02
SB-125	#F	8.3229E-02	8.3273E-02	5.4310E-02	5.4532E-02	7.265E-02
I-131	#B	7.2294E-04	7.7191E-04	2.1242E-02	2.1242E-02	2.274E-02
CS-134	#B	-1.4495E-02	-1.4506E-02	3.1162E-02	3.1173E-02	3.333E-02
CS-137	#A	1.4054E-02	1.4054E-02	2.8309E-02	2.8321E-02	3.139E-02
CE-139	#A	4.8441E-05	4.8627E-05	2.8350E-02	2.8350E-02	3.163E-02
EU-152	#B	-1.4890E-02	-1.4891E-02	9.1338E-02	9.1342E-02	1.003E-01
EU-154	#B	-1.6576E-03	-1.6579E-03	8.7033E-02	8.7033E-02	7.291E-02
EU-155	#B	6.6032E-02	6.6051E-02	1.1162E-01	1.1168E-01	1.224E-01
HG-203	#B	-3.9572E-03	-4.0022E-03	3.2419E-02	3.2420E-02	2.981E-02
TL-208	#	2.0248E-01	2.0248E-01	4.8410E-02	4.9865E-02	
PB-212		5.3871E-01	5.3871E-01	7.1510E-02	7.8269E-02	
PB-214		3.7090E-01	3.7090E-01	7.4446E-02	7.7602E-02	
BI-212	#	4.3388E-01	4.3388E-01	2.2424E-01	2.2570E-01	
BI-214	#	2.9236E-01	2.9236E-01	7.3001E-02	7.5015E-02	6.146E-02
RA-224	#A	-3.3116E-02	-3.3116E-02	1.6810E+00	1.6810E+00	8.725E-01
RA-226	#	1.0013E+00	1.0013E+00	7.2749E-01	7.2989E-01	
AC-228	#	8.2562E-01	8.2562E-01	1.5970E-01	1.6698E-01	
TH-227	#A	-4.0515E-01	-4.0515E-01	3.1888E-01	3.1978E-01	3.425E-01
PA-234	#B	1.2327E-02	1.2327E-02	1.1443E-01	1.1444E-01	1.273E-01
TH-234	#B	8.1535E-01	8.1535E-01	9.8475E-01	9.8579E-01	1.475E+00
AM-241	#A	3.5156E-02	3.5156E-02	1.7096E-01	1.7097E-01	1.898E-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 2000.1 keV) 2.0174171E+01 pCi/gm
Total Decayed Activity (270.7 to 2000.1 keV) 2.0174171E+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_6SEPT2006_0946.An1

Sample description
FSS-ool-02-03-013-f

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEPT2006_0946.An1

Acquisition information
Start time: 06-Sep-2006 09:46:34
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: 1.2250E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.2250E+03) =
8.1633E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:30:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1831

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
75.09	202.	16.94	1.18	2.844E-02	74.81	9.600	7.973E-01	PB212
77.32	315.	12.77	1.18	2.950E-02	77.11	17.500	6.723E-01	PB212
					77.11	10.700	1.083E+00	PB214
186.04	174.	18.98	1.36	3.610E-02	185.99	3.280	1.616E+00	RA226
209.24	111.	26.01	1.14	3.429E-02				
239.06	1064.	5.38	1.68	3.186E-02	238.63	43.100	8.408E-01	PB212
					241.00	3.900	9.468E+00	RA224
242.10	94.	30.79	1.30	3.163E-02	241.92	7.470	PBC<MDA	PB214
271.00	62.	39.00	0.86	2.939E-02				
295.32	220.	15.49	1.71	2.767E-02	295.22	19.200	4.477E-01	PB214
338.40	214.	15.08	2.07	2.500E-02	338.40	12.010	7.762E-01	AC228
352.01	401.	9.44	2.20	2.426E-02	351.99	37.100	4.853E-01	PB214
462.44	78.	27.75	1.61	1.956E-02				
462.44	78.	27.75	1.61	1.956E-02	463.51	10.000	4.250E-01	SB125
511.03	146.	17.88	1.87	1.807E-02	510.72	22.500	3.041E-01	TL208
583.33	312.	9.57	1.85	1.629E-02	583.14	86.000	2.425E-01	TL208
609.15	265.	9.73	1.97	1.575E-02	609.32	46.090	3.963E-01	BI214
661.74	356.	8.74	1.92	1.477E-02	661.62	84.620	3.115E-01	CS137
726.83	82.	20.62	2.03	1.375E-02	727.17	11.800	5.491E-01	BI212
911.29	254.	8.75	2.27	1.161E-02	911.07	29.000	8.185E-01	AC228
968.16	196.	12.07	2.16	1.110E-02	968.90	17.460	1.105E+00	AC228
1119.96	74.	20.48	1.30	9.970E-03	1120.28	15.040	5.431E-01	BI214
1460.95	1114.	3.07	2.57	8.190E-03	1460.75	10.700	1.397E+01	K40
1764.87	52.	14.91	1.86	7.082E-03	1764.51	15.920	5.048E-01	BI214

********** U N I D E N T I F I E D P E A K S U 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	209.24	301.	111.	0.056	78.02	1.138	AC-228	s
541.64	271.00	206.	62.	0.031	117.00	0.858	AC-228	s
924.47	462.44	126.	78.	0.039	83.26	1.608	CS-138	l

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.29	74.81	486.	198.	0.099	50.74	1.178D
PB-212	153.89	77.11	553.	194.	0.097	47.32	1.180A
PB-214	153.89	77.11	799.	116.	0.058	103.73	1.500A
RA-226	372.14	186.25	464.	127.	0.063	76.93	1.500s
TH-227	471.00	235.68	888.	-131.	-0.065	100.34	1.500s
PB-212	476.89	238.63	340.	686.	0.343	15.71	1.297D
RA-224	477.29	238.83	526.	643.	0.321	19.14	1.500s
PB-214	483.47	241.92	389.	94.	0.047	92.37	1.299D
PB-214	590.27	295.32	299.	216.	0.108	46.47	1.706s
AC-228	676.42	338.40	241.	211.	0.106	45.23	2.067s
PB-214	703.63	352.01	263.	396.	0.198	28.32	2.195s
TL-208	1021.65	511.03	182.	112.	0.056	53.63	1.871s
TL-208	1166.24	583.33	134.	308.	0.154	28.72	1.855s
BI-214	1217.89	609.15	112.	261.	0.130	29.18	1.975s
CS-137	1323.06	661.74	140.	353.	0.176	26.22	1.923s
BI-212	1453.23	726.83	69.	81.	0.040	61.87	2.030s
AC-228	1822.14	911.29	64.	250.	0.125	26.25	2.271s
AC-228	1935.89	968.16	80.	194.	0.097	36.21	2.156s
BI-214	2239.48	1119.96	49.	74.	0.037	61.45	1.299s
K-40	2921.50	1460.95	16.	1110.	0.555	9.22	2.566s
BI-214	3529.39	1764.87	3.	52.	0.026	44.72	1.863

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

***** S U M M A R Y O 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		3.3768E-02					
			477.56	3.377E-02	&(	2.945E-01	8.58E-02 G
K-40		1.3966E+01					
			1460.75	1.397E+01	*(P	2.719E-01	4.31E-01 G
MN-54		1.6577E-02					
			834.81	1.658E-02	%(P	3.524E-02	1.07E-02 G
CO-57		-2.2959E-03					
			122.07	-2.296E-03	&(P	4.120E-02	1.23E-02 G K
			136.43	-4.072E-04	& P	3.242E-01	9.61E-02 G
CO-60		8.1200E-03					
			1332.51	8.120E-03	%(P	3.672E-02	1.03E-02 G K
			1173.23	-6.713E-03	& P	4.260E-02	1.16E-02 G K
Sr-85		-1.2432E-02					
			514.00	-1.243E-02	%(	4.133E-02	1.23E-02 G
Kr-85		-3.2780E+02					
			513.99	-3.278E+02	%(P	9.537E+02	2.83E+02 G
Y-88		-1.3221E-03					
			1836.01	-1.322E-03	%(P	3.755E-02	9.84E-03 G K
			898.02	5.083E-03	% P	3.242E-02	9.21E-03 G
NB-94		-8.2807E-03					
			871.10	-8.281E-03	%(P	3.338E-02	9.76E-03 G K
			702.50	1.112E-02	& P	2.732E-02	8.18E-03 G K
Ag-108M		-6.9971E-03					
			722.95	-6.997E-03	&(	3.575E-02	1.04E-02 G K
			614.37	-2.024E-02	%	4.166E-02	1.26E-02 G
			433.93	1.180E-03	% P	3.395E-02	9.82E-03 G
CD-109		1.3729E-01					
			88.04	1.373E-01	%(P	1.322E+00	3.95E-01 G
SN-113		8.8576E-03					
			391.71	8.858E-03	%(P	4.402E-02	1.29E-02 G K
			255.04	-2.028E-01	%	1.491E+00	4.42E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-1.1964E-03						
		427.95	-1.196E-03	&(P	1.072E-01	3.10E-02	G K
		600.77	1.262E-02	& P	1.504E-01	4.29E-02	G
		636.15	-4.076E-02	& P	2.647E-01	7.63E-02	G
		463.51	1.967E-01	% P	3.170E-01	9.70E-02	G
		176.29	-1.149E-01	% P	5.284E-01	1.58E-01	G
I-131	-5.1816E-03						
		364.48	-5.182E-03	&(	3.831E-02	1.13E-02	G K
		636.97	-3.049E-02	&	3.824E-01	1.09E-01	G
		284.29	-7.280E-02	%	5.249E-01	1.55E-01	G
CS-134	-1.1014E-02						
		604.66	-1.101E-02	&(P	4.080E-02	1.21E-02	G K
		795.76	1.626E-02	% P	3.525E-02	1.06E-02	G
		569.29	2.594E-02	&	1.760E-01	5.10E-02	G
		801.84	-9.452E-02	% P	3.839E-01	1.12E-01	G
CS-137	3.1153E-01						
		661.62	3.115E-01	*(P	5.106E-02	2.75E-02	G
CE-139	2.1747E-03						
		165.85	2.175E-03	%(P	4.075E-02	1.21E-02	G
EU-152	1.2861E-02						
		121.78	1.286E-02	&(P	1.150E-01	3.43E-02	G K
		344.30	-1.537E-02	% P	1.090E-01	3.20E-02	G
		1408.08	-5.154E-03	% P	1.421E-01	3.74E-02	G
		964.00	-5.091E-03	& P	3.889E-01	1.13E-01	G
		1112.07	-5.409E-02	% P	2.951E-01	8.49E-02	G
		778.90	-3.341E-03	% P	2.786E-01	7.89E-02	G
EU-154	1.1044E-02						
		123.10	1.104E-02	&(P	8.552E-02	2.55E-02	G K
		1274.80	-1.152E-02	% P	1.158E-01	3.27E-02	G
		723.30	-4.813E-02	& P	2.300E-01	6.78E-02	G
		1004.80	2.923E-02	& P	2.105E-01	6.05E-02	G
EU-155	6.3851E-02						
		86.45	6.385E-02	%(	1.532E-01	4.64E-02	G K
		105.31	3.750E-02	& P	1.597E-01	4.79E-02	G
HG-203	1.3055E-02						
		279.17	1.306E-02	%(P	3.489E-02	1.05E-02	G K
		72.87	-5.921E-01	& P	1.153E+00	3.50E-01	G
		70.83	1.591E-01	&	1.545E+00	4.61E-01	G
		82.50	-1.157E+00	%	1.870E+00	5.71E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5527E-01						
		583.14	2.425E-01	*(P	4.462E-02	2.36E-02	G
		510.72	3.041E-01	*(P	1.778E-01	7.07E-02	G
PB-212	5.5055E-01						
		238.63	5.506E-01	(P	7.112E-02	2.95E-02	G K
							Energy duplication
		77.11	4.135E-01	}	2.394E-01	6.52E-02	G
		74.81	7.987E-01	+ P	4.252E-01	1.38E-01	G
PB-214	4.6872E-01						
		351.99	4.853E-01	*(P	9.597E-02	4.64E-02	G K
		295.22	4.477E-01	*(P	1.730E-01	7.08E-02	G
							Energy duplication
		77.11	4.060E-01	} P	4.687E-01	1.40E-01	G
		241.92	4.406E-01	(P	4.416E-01	1.38E-01	G
BI-212	5.4906E-01						
		727.17	5.491E-01	(P	2.823E-01	1.15E-01	G K
		1620.56	2.116E-02	% P	1.029E+00	2.68E-01	G
		785.42	7.089E-01	% P	1.462E+00	4.41E-01	G
BI-214	4.4738E-01						
		609.32	3.963E-01	*(P	7.921E-02	3.92E-02	G K
		1764.51	5.048E-01	(P	1.105E-01	7.66E-02	G
		1120.28	5.431E-01	*(P	2.604E-01	1.13E-01	G
RA-224	5.7334E+00						
		241.00	5.733E+00	?(P	9.780E-01	3.67E-01	G
RA-226	1.1803E+00						
		185.99	1.180E+00	*(	9.608E-01	3.03E-01	G
AC-228	8.0609E-01						
		911.07	8.185E-01	*(P	1.313E-01	7.29E-02	G K
		968.90	1.105E+00	+ P	2.528E-01	1.35E-01	G
		338.40	7.762E-01	*(P	2.756E-01	1.19E-01	G
TH-227	-4.0125E-01						
		236.00	-4.013E-01	?(P	4.343E-01	1.34E-01	G K
		256.25	-4.860E-02	& P	4.164E-01	1.22E-01	G
PA-234	-4.0475E-02						
		98.44	-4.047E-02	&(	1.438E-01	4.32E-02	G K
		946.00	0.000E+00	%	2.134E-01	6.07E-02	G
		131.28	-1.122E-02	&	1.699E-01	5.05E-02	G
		94.67	3.025E-03	%	2.827E-01	8.41E-02	G
		883.24	1.617E-02	&	2.657E-01	7.51E-02	G
		926.70	7.261E-02	&	2.339E-01	6.86E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 3.834E-02 &   2.610E-01 7.56E-02 G

TH-234       4.6603E-01
                           63.29 4.660E-01 %(P 1.861E+00 5.56E-01 G K
                           92.80 7.334E-01 % P 1.523E+00 4.60E-01 G
                           92.38 6.541E-01 % P 1.840E+00 5.54E-01 G

AM-241       1.6606E-03
                           59.54 1.661E-03 %(P 2.379E-01 7.06E-02 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	3.3436E-02	3.3768E-02	2.5750E-01	2.5751E-01	2.916E-01
K-40	#	1.3966E+01	1.3966E+01	1.2925E+00	1.5333E+00	
MN-54	#A	1.6549E-02	1.6577E-02	3.1987E-02	3.2002E-02	3.518E-02
CO-57	#B	-2.2914E-03	-2.2959E-03	3.9892E-02	3.9892E-02	4.112E-02
CO-60	#B	8.1178E-03	8.1200E-03	3.0949E-02	3.0953E-02	3.671E-02

Sr-85	#A	-1.2331E-02	-1.2432E-02	3.7045E-02	3.7052E-02	4.100E-02
Kr-85	#A	-3.2779E+02	-3.2780E+02	1.1022E+03	1.1024E+03	9.537E+02
Y-88	#B	-1.3156E-03	-1.3221E-03	4.8038E-02	4.8038E-02	3.737E-02
NB-94	#B	-8.2807E-03	-8.2807E-03	3.0163E-02	3.0167E-02	3.338E-02
Ag-108M	#B	-6.9970E-03	-6.9971E-03	3.1272E-02	3.1275E-02	3.575E-02
CD-109	#A	1.3713E-01	1.3729E-01	1.1861E+00	1.1861E+00	1.320E+00
SN-113	#B	8.8171E-03	8.8576E-03	3.8846E-02	3.8850E-02	4.382E-02
SB-125	#B	-1.1958E-03	-1.1964E-03	2.6153E-01	2.6153E-01	1.072E-01
I-131	#B	-4.8523E-03	-5.1816E-03	3.3787E-02	3.3788E-02	3.587E-02
CS-134	#B	-1.1007E-02	-1.1014E-02	3.8825E-02	3.8831E-02	4.078E-02
CS-137	#	3.1152E-01	3.1153E-01	8.2497E-02	8.4524E-02	
CE-139	#A	2.1664E-03	2.1747E-03	3.6277E-02	3.6278E-02	4.059E-02
EU-152	#B	1.2859E-02	1.2861E-02	1.0280E-01	1.0280E-01	1.150E-01
EU-154	#B	1.1042E-02	1.1044E-02	7.6544E-02	7.6547E-02	8.551E-02
EU-155	#B	6.3832E-02	6.3851E-02	1.3905E-01	1.3910E-01	1.531E-01
HG-203	#B	1.2908E-02	1.3055E-02	3.1454E-02	3.1463E-02	3.450E-02
TL-208	#	2.5527E-01	2.5527E-01	7.4405E-02	7.5917E-02	
PB-212		5.5055E-01	5.5055E-01	8.8462E-02	9.4249E-02	
PB-214		4.6872E-01	4.6872E-01	1.3446E-01	1.3728E-01	
BI-212		5.4906E-01	5.4906E-01	3.4513E-01	3.4665E-01	
BI-214		4.4738E-01	4.4738E-01	1.2313E-01	1.2593E-01	
RA-224	#	5.7334E+00	5.7334E+00	1.1013E+00	1.1522E+00	9.780E-01
RA-226	#	1.1803E+00	1.1803E+00	9.0803E-01	9.1071E-01	9.608E-01
AC-228	#	8.0609E-01	8.0609E-01	2.1407E-01	2.1930E-01	
TH-227	#A	-4.0125E-01	-4.0125E-01	4.0346E-01	4.0416E-01	4.343E-01
PA-234	#B	-4.0475E-02	-4.0475E-02	1.2965E-01	1.2967E-01	1.438E-01
TH-234	#B	4.6603E-01	4.6603E-01	1.6694E+00	1.6696E+00	1.861E+00
AM-241	#A	1.6606E-03	1.6606E-03	2.1194E-01	2.1194E-01	2.379E-01

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

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

Total Activity (270.7 to 2000.1 keV) 1.7354483E+01 pCi/gm
Total Decayed Activity (270.7 to 2000.1 keV) 1.7354498E+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_6SEPT2006_1026.An1

Sample description
FSS-OOL-02-03-005-F

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEPT2006_1026.An1

Acquisition information
Start time: 06-Sep-2006 10:27:44
Live time: 2000
Real time: 2003
Dead time: 0.14 %
Detector ID: 2

Detector system
Det 107- DSPE- 634

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

Energy Calibration
Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8480E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8480E+03) =
5.4113E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:04:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 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
75.13	211.	27.87	1.50	2.849E-02	74.81	9.600	5.647E-01	PB212
76.86	367.	15.62	1.50	2.957E-02				
76.86	367.	15.62	1.50	2.957E-02	77.11	10.700	8.470E-01	PB214
					77.11	17.500	5.179E-01	PB212
76.86	371.	15.62	1.50	2.957E-02				
76.86	371.	15.62	1.50	2.957E-02	77.11	10.700	8.470E-01	PB214
					77.11	17.500	5.246E-01	PB212
87.31	121.	41.10	1.50	3.307E-02	86.45	32.740	8.260E-02	EU155
					88.04	3.790	PBC<MDA	CD109
93.37	135.	33.77	2.05	3.450E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.45	112.	38.46	0.95	3.819E-02				
185.69	270.	17.11	2.30	3.612E-02	185.99	3.280	1.667E+00	RA226
209.60	166.	21.16	1.66	3.426E-02				
239.25	1372.	4.83	1.81	3.184E-02	238.63	43.100	7.214E-01	PB212
					241.92	7.470	4.241E+00	PB214
269.93	84.	34.26	1.30	2.947E-02				
295.37	245.	10.50	1.34	2.767E-02	295.22	19.200	3.315E-01	PB214
300.20	79.	25.00	1.34	2.735E-02				
338.49	222.	14.14	1.69	2.500E-02	338.40	12.010	5.337E-01	AC228
352.12	545.	6.86	1.61	2.425E-02	351.99	37.100	4.386E-01	PB214
463.42	43.	41.48	1.50	1.953E-02	463.51	10.000	PBC<MDA	SB125
510.82	206.	15.79	2.49	1.808E-02	510.72	22.500	3.098E-01	TL208
583.12	452.	6.47	1.87	1.629E-02	583.14	86.000	2.336E-01	TL208
609.37	445.	6.11	2.06	1.574E-02	609.32	46.090	4.441E-01	BI214
661.85	209.	12.45	1.93	1.477E-02	661.62	84.620	1.202E-01	CS137
718.39	29.	37.28	1.64	1.380E-02	723.30	19.700	PBC<MDA	EU154

726.96	129.	19.66	2.28	1.375E-02	727.17	11.800	5.741E-01	BI212
794.45	44.	29.13	1.68	1.284E-02	795.76	85.400	2.938E-02	CS134
911.33	300.	8.88	2.14	1.161E-02	911.07	29.000	6.431E-01	AC228
968.09	223.	12.39	1.96	1.110E-02	968.90	17.460	8.335E-01	AC228
1120.98	124.	15.82	1.71	9.965E-03	1120.28	15.040	6.014E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.02	1226.	2.93	2.32	8.190E-03	1460.75	10.700	1.019E+01	K40
1764.81	103.	10.71	1.72	7.084E-03	1764.51	15.920	6.686E-01	BI214

********** 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	
174.28	87.31	1030.	121.	0.061	123.30	1.501	BI-207	l
418.84	209.60	442.	166.	0.083	63.47	1.657	NP-239	s
478.13	239.25	1735.	432.	0.216	43.36	1.814	PB-212	s
539.49	269.93	302.	84.	0.042	102.79	1.302	AC-228	s
599.81	300.09	268.	88.	0.044	93.44	1.608	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	149.29	74.81	1694.	211.	0.106	83.61	1.500D
PB-214	153.89	77.11	1500.	367.	0.183	46.85	1.500D
PB-212	153.89	77.11	1496.	371.	0.186	46.85	1.500D
TH-234	185.64	92.99	1267.	142.	0.071	103.39	1.500s
TH-234	185.62	92.98	1231.	131.	0.065	101.14	1.500s
RA-226	371.02	185.69	666.	270.	0.135	51.34	2.303s
TH-227	471.28	235.82	1270.	-146.	-0.073	106.90	1.500s
PB-212	477.14	238.76	970.	871.	0.436	17.88	1.500s
PB-214	590.31	295.34	364.	251.	0.125	36.66	1.500s
AC-228	676.59	338.49	277.	219.	0.110	42.41	1.686s
PB-214	703.82	352.10	270.	468.	0.234	20.07	1.500s
TL-208	1021.24	510.82	232.	172.	0.086	47.36	2.495s
TL-208	1165.82	583.12	120.	447.	0.224	19.40	1.873s
BI-214	1218.33	609.37	102.	441.	0.220	18.33	2.061s
CS-137	1323.27	661.85	134.	205.	0.103	37.35	1.927s
EU-154	1436.35	718.39	45.	29.	0.014	111.85	1.636s
BI-212	1453.49	726.96	136.	127.	0.064	58.98	2.280s
CS-134	1588.46	794.45	62.	44.	0.022	87.39	1.684s
AC-228	1822.22	911.33	100.	296.	0.148	26.65	2.143s
AC-228	1935.75	968.09	110.	221.	0.110	37.16	1.960s
BI-214	2241.52	1120.98	74.	123.	0.062	47.47	1.713s
K-40	2921.64	1461.02	19.	1221.	0.611	8.79	2.317s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3529.27	1764.81	5.	103.	0.052	32.12	1.724s

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

***** S U M M A R Y O 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		5.2865E-02					
			477.56	5.287E-02	&(	2.248E-01 6.66E-02	G
K-40		1.0190E+01					
			1460.75	1.019E+01	@(P	1.909E-01 3.00E-01	G
MN-54		1.0906E-02					
			834.81	1.091E-02	%(P	2.598E-02 7.81E-03	G
CO-57		-8.9606E-03					
			122.07	-8.961E-03	&(P	3.342E-02 1.01E-02	G K
			136.43	-2.921E-02	% P	2.551E-01 7.63E-02	G
CO-60		-6.5210E-03					
			1332.51	-6.521E-03	&(P	3.097E-02 8.57E-03	G K
			1173.23	6.371E-03	% P	3.303E-02 9.53E-03	G K
Sr-85		-1.5603E-02					
			514.00	-1.560E-02	%(	3.046E-02 9.26E-03	G
Kr-85		-3.8539E+02					
			513.99	-3.854E+02	%(P	7.014E+02 2.12E+02	G
Y-88		2.9203E-04					
			1836.01	2.920E-04	%(P	2.170E-02 5.64E-03	G K
			898.02	2.352E-03	% P	2.708E-02 7.73E-03	G
NB-94		2.6453E-03					
			871.10	2.645E-03	%(P	1.996E-02 5.69E-03	G K
			702.50	2.754E-03	% P	2.082E-02 6.00E-03	G K
Ag-108M		-9.2181E-03					
			722.95	-9.218E-03	&(	3.767E-02 1.12E-02	G K
			614.37	-2.389E-02	%	3.502E-02 1.08E-02	G
			433.93	-8.149E-04	% P	2.215E-02 6.36E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	6.2972E-01						
		88.04	6.297E-01	%(P	9.837E-01	3.00E-01	G
SN-113	1.2488E-02						
		391.71	1.249E-02	&(P	3.484E-02	1.04E-02	G K
		255.04	-1.887E-02	&	1.115E+00	3.29E-01	G
SB-125	1.0259E-02						
		427.95	1.026E-02	&(P	7.391E-02	2.17E-02	G K
		600.77	-2.450E-03	& P	1.159E-01	3.29E-02	G
		636.15	3.719E-02	& P	2.121E-01	6.20E-02	G
		463.51	1.628E-01	% P	2.337E-01	7.19E-02	G
		176.29	8.307E-02	% P	3.942E-01	1.18E-01	G
I-131	1.1859E-02						
		364.48	1.186E-02	%(	2.897E-02	8.74E-03	G K
		636.97	8.483E-02	%	3.201E-01	9.45E-02	G
		284.29	-1.026E-01	&	4.137E-01	1.24E-01	G
CS-134	1.3579E-02						
		604.66	-2.480E-04	%(P	6.127E-02	1.82E-02	G K
		795.76	2.938E-02	(P	2.639E-02	8.66E-03	G
		569.29	3.103E-03	&	1.681E-01	4.87E-02	G
		801.84	-1.755E-03	% P	4.000E-01	1.16E-01	G
CS-137	1.2021E-01						
		661.62	1.202E-01	*(P	3.309E-02	1.52E-02	G
CE-139	-1.2307E-04						
		165.85	-1.231E-04	%(P	2.353E-02	6.94E-03	G
EU-152	-2.3628E-02						
		121.78	-2.363E-02	%(P	9.992E-02	3.00E-02	G K
		344.30	-1.077E-03	% P	8.354E-02	2.44E-02	G
		1408.08	5.627E-02	% P	1.010E-01	3.10E-02	G
		964.00	3.216E-02	& P	2.712E-01	7.95E-02	G
		1112.07	3.640E-02	& P	2.366E-01	6.87E-02	G
		778.90	-8.149E-03	% P	2.091E-01	6.00E-02	G
EU-154	1.6565E-02						
		123.10	-1.312E-02	%(P	6.349E-02	1.90E-02	G K
		1274.80	-1.382E-02	% P	9.545E-02	2.76E-02	G
		723.30	7.753E-02	&(P	9.170E-02	2.94E-02	G
		1004.80	5.934E-03	& P	1.486E-01	4.22E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	8.0162E-02						
		86.45	8.016E-02	%(	1.204E-01	3.67E-02	G K
		105.31	-1.559E-03	% P	1.406E-01	4.19E-02	G
HG-203	-2.2815E-04						
		279.17	-2.281E-04	&(P	3.024E-02	8.91E-03	G K
		72.87	-1.414E-01	% P	8.732E-01	2.62E-01	G
		70.83	-6.356E-01	&	1.414E+00	4.29E-01	G
		82.50	-7.679E-01	%	1.687E+00	5.11E-01	G
TL-208	2.3356E-01						
		583.14	2.336E-01	*(P	2.801E-02	1.53E-02	G
		510.72	3.098E-01	+ P	1.324E-01	5.85E-02	G
PB-212	4.9255E-01						
		238.63	4.635E-01	*(P	7.865E-02	2.81E-02	G K
							Energy duplication
		77.11	5.246E-01	*(	2.585E-01	8.19E-02	G
							Energy duplication
		74.81	5.647E-01	&(P	5.199E-01	1.60E-01	G
PB-214	3.6839E-01						
		351.99	3.804E-01	*(P	6.438E-02	2.57E-02	G K
		295.22	3.451E-01	*(P	1.260E-01	4.29E-02	G
							Energy duplication
		77.11	8.470E-01	+ P	4.234E-01	1.34E-01	G
		241.92	-3.618E-02	% P	5.253E-01	1.57E-01	G
BI-212	5.7409E-01						
		727.17	5.741E-01	*(P	2.570E-01	1.14E-01	G K
		1620.56	-1.764E-02	& P	6.096E-01	1.52E-01	G
		785.42	6.814E-02	& P	1.331E+00	3.82E-01	G
BI-214	4.4413E-01						
		609.32	4.441E-01	*(P	5.024E-02	2.74E-02	G K
		1764.51	6.686E-01	+ P	8.443E-02	7.22E-02	G
		1120.28	6.014E-01	+ P	2.083E-01	9.59E-02	G
RA-224	2.9817E-01						
		241.00	2.982E-01	&(P	9.452E-01	2.85E-01	G
RA-226	1.6674E+00						
		185.99	1.667E+00	*(	7.594E-01	2.85E-01	G
AC-228	6.1110E-01						
		911.07	6.431E-01	*(P	1.071E-01	5.80E-02	G K
		968.90	8.335E-01	+ P	1.950E-01	1.04E-01	G
		338.40	5.337E-01	*(P	1.954E-01	7.66E-02	G

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

TH-227      -2.9626E-01
                          236.00-2.963E-01 ?(P 3.432E-01 1.05E-01 G K
                          256.25-4.266E-03 & P 3.172E-01 9.31E-02 G

PA-234       4.7757E-02
                           98.44 4.776E-02 &(  1.211E-01 3.66E-02 G K
                          946.00-2.906E-03 &   1.319E-01 3.75E-02 G
                          131.28 1.505E-03 &   1.442E-01 4.30E-02 G
                           94.67 1.189E-03 %   1.961E-01 5.84E-02 G
                          883.24-2.347E-04 %   1.555E-01 4.30E-02 G
                          926.70-2.898E-02 %   1.874E-01 5.37E-02 G
                          569.26 4.599E-03 &   2.491E-01 7.23E-02 G

TH-234       8.0906E-01
                           63.29 4.756E-01 %(P 1.522E+00 4.58E-01 G K
                           92.80 9.270E-01 *(P 1.178E+00 3.60E-01 G
                           92.38 1.177E+00 *(P 1.399E+00 4.29E-01 G

AM-241       1.5723E-03
                           59.54 1.572E-03 %(P 1.802E-01 5.37E-02 G
   ( - This peak used in the nuclide activity average.

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

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

R - Coincidence Corrected C - Coincidence Peak
H - 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	5.2313E-02	5.2865E-02	1.9989E-01	1.9992E-01	2.224E-01
K-40	#	1.0190E+01	1.0190E+01	8.9866E-01	1.0816E+00	
MN-54	#A	1.0886E-02	1.0906E-02	2.3435E-02	2.3444E-02	2.593E-02
CO-57	#B	-8.9421E-03	-8.9606E-03	3.0593E-02	3.0597E-02	3.335E-02
CO-60	#B	-6.5191E-03	-6.5210E-03	7.3414E-02	7.3415E-02	3.096E-02
Sr-85	#A	-1.5469E-02	-1.5603E-02	2.7774E-02	2.7790E-02	3.019E-02
Kr-85	#A	-3.8539E+02	-3.8539E+02	7.3636E+02	7.3671E+02	7.014E+02
Y-88	#B	2.9050E-04	2.9203E-04	1.6933E-02	1.6933E-02	2.159E-02
NB-94	#B	2.6453E-03	2.6453E-03	1.7084E-02	1.7085E-02	1.996E-02
Ag-108M	#B	-9.2180E-03	-9.2181E-03	3.3580E-02	3.3584E-02	3.767E-02
CD-109	#A	6.2895E-01	6.2972E-01	8.9972E-01	9.0040E-01	9.825E-01
SN-113	#B	1.2427E-02	1.2488E-02	3.1315E-02	3.1324E-02	3.467E-02
SB-125	#B	1.0253E-02	1.0259E-02	6.5065E-02	6.5067E-02	7.386E-02
I-131	#B	1.1061E-02	1.1859E-02	2.6217E-02	2.6226E-02	2.702E-02
CS-134	#B	1.3569E-02	1.3579E-02	1.2010E-02	1.2037E-02	6.123E-02
CS-137	#	1.2020E-01	1.2021E-01	4.5668E-02	4.6217E-02	
CE-139	#A	-1.2257E-04	-1.2307E-04	1.0937E-01	1.0937E-01	2.343E-02
EU-152	#B	-2.3625E-02	-2.3628E-02	9.0816E-02	9.0825E-02	9.991E-02
EU-154	#B	1.6562E-02	1.6565E-02	1.8814E-02	1.8836E-02	6.348E-02
EU-155	#B	8.0137E-02	8.0162E-02	1.1016E-01	1.1025E-01	1.203E-01
HG-203	#B	-2.2542E-04	-2.2815E-04	9.4340E-02	9.4340E-02	2.988E-02
TL-208	#	2.3356E-01	2.3356E-01	4.5775E-02	4.7808E-02	
PB-212	#	4.9255E-01	4.9255E-01	8.9678E-02	9.4279E-02	7.865E-02
PB-214	#	3.6839E-01	3.6839E-01	7.4730E-02	7.7833E-02	6.438E-02
BI-212	#	5.7409E-01	5.7409E-01	3.4205E-01	3.4373E-01	
BI-214	#	4.4413E-01	4.4413E-01	8.2195E-02	8.6279E-02	
RA-224	#A	2.9817E-01	2.9817E-01	8.5483E-01	8.5501E-01	9.452E-01
RA-226	#	1.6674E+00	1.6674E+00	8.5598E-01	8.6163E-01	
AC-228	#	6.1110E-01	6.1110E-01	1.5528E-01	1.5942E-01	
TH-227	#A	-2.9626E-01	-2.9626E-01	3.1730E-01	3.1778E-01	3.432E-01
PA-234	#B	4.7757E-02	4.7757E-02	1.0984E-01	1.0987E-01	1.211E-01
TH-234	#B	8.0906E-01	8.0906E-01	8.8351E-01	8.8465E-01	1.522E+00
AM-241	#A	1.5723E-03	1.5723E-03	1.6099E-01	1.6099E-01	1.802E-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) 1.3840111E+01 pCi/gm
Total Decayed Activity (50.2 to 2000.1 keV) 1.3840118E+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_6SEPT2006_1112.An1

Sample description
FSS-OOL-02-03-006-F

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEPT2006_1112.An1

Acquisition information
Start time: 06-Sep-2006 11:12:17
Live time: 2000
Real time: 2003
Dead time: 0.14 %
Detector ID: 2

Detector system
Det 107- DSPE- 634

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

Energy Calibration
Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.7070E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7070E+03) =
5.8582E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:13:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1292

***** S U M M A R Y O F P E A K 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	283.	14.80	1.18	2.849E-02	74.81	9.600	8.188E-01	PB212
77.01	243.	16.31	1.18	2.957E-02	77.11	17.500	6.150E-01	PB212
					77.11	10.700	9.940E-01	PB214
77.13	147.	32.34	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
83.96	110.	31.60	1.18	3.215E-02				
88.04	150.	25.41	1.19	3.330E-02	86.45	32.740	1.104E-01	EU155
					88.04	3.790	PBC<MDA	CD109
92.92	190.	19.68	1.19	3.444E-02	92.38	2.570	1.633E+00	TH234
					92.80	3.000	PBC<MDA	TH234
129.02	142.	33.53	1.07	3.818E-02				
186.25	163.	30.16	0.81	3.608E-02	185.99	3.280	1.088E+00	RA226
209.93	144.	27.38	0.84	3.423E-02				
239.10	1588.	4.46	1.77	3.186E-02	238.63	43.100	9.052E-01	PB212
242.03	183.	19.61	1.30	3.163E-02	241.00	3.900	1.175E+00	RA224
					241.92	7.470	6.148E-01	PB214
270.14	125.	25.04	1.53	2.945E-02				
277.14	68.	35.54	1.19	2.894E-02				
295.30	276.	11.39	1.51	2.767E-02	295.22	19.200	4.038E-01	PB214
328.17	79.	29.36	1.25	2.559E-02				
338.58	285.	13.44	1.74	2.499E-02	338.40	12.010	7.434E-01	AC228
352.04	445.	7.67	1.64	2.426E-02	351.99	37.100	3.870E-01	PB214
463.75	87.	29.99	1.09	1.952E-02	463.51	10.000	3.411E-01	SB125
511.33	196.	14.62	2.04	1.806E-02	510.72	22.500	3.149E-01	TL208
583.52	469.	7.57	1.96	1.628E-02	583.14	86.000	2.626E-01	TL208
600.57	30.	37.64	1.55	1.584E-02	600.77	18.400	PBC<MDA	SB125
					604.66	97.600	PBC<MDA	CS134

609.43	370.	9.53	1.90	1.574E-02	609.32	46.090	3.990E-01	BI214
661.83	518.	7.10	2.19	1.477E-02	661.62	84.620	3.256E-01	CS137
727.40	78.	18.65	1.64	1.380E-02	727.17	11.800	3.758E-01	BI212
727.87	125.	16.72	0.83	1.374E-02	727.17	11.800	6.088E-01	BI212
795.33	79.	18.24	2.01	1.284E-02				
795.33	79.	18.24	2.01	1.284E-02	795.76	85.400	5.656E-02	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
911.11	360.	8.07	2.18	1.161E-02	911.07	29.000	8.362E-01	AC228
968.71	269.	9.80	2.18	1.109E-02	968.90	17.460	1.090E+00	AC228
1121.33	89.	22.36	1.29	9.970E-03	1120.28	15.040	4.705E-01	BI214
1460.95	1647.	2.51	2.58	8.190E-03	1460.75	10.700	1.484E+01	K40
1764.85	89.	11.65	2.42	7.084E-03	1764.51	15.920	6.255E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
175.75	88.18	651.	150.	0.075	76.24	1.187	PB-214	lD
419.50	209.93	564.	144.	0.072	82.13	0.835	NP-239	s
539.90	270.14	342.	125.	0.062	75.13	1.533	AC-228	s
655.96	328.17	206.	79.	0.039	88.09	1.248	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
HG-203	133.41	66.87	807.	-103.	-0.052	120.61	1.500
PB-212	149.29	74.81	761.	283.	0.141	44.39	1.178D
PB-212	153.89	77.11	806.	243.	0.122	48.94	1.179A
PB-214	153.89	77.11	1353.	147.	0.074	97.03	1.500A
TH-234	185.93	93.13	1416.	147.	0.073	97.98	1.500s
RA-226	372.14	186.25	831.	163.	0.081	90.47	0.809s
TH-227	471.82	236.09	1487.	-160.	-0.080	104.99	1.500s
PB-212	476.89	238.63	493.	1031.	0.516	12.82	1.297D
PB-214	483.47	241.92	567.	183.	0.092	58.83	1.299D
PB-214	590.23	295.30	300.	271.	0.136	34.16	1.513s
AC-228	676.78	338.58	362.	282.	0.141	40.32	1.740s
PB-214	703.23	351.81	411.	515.	0.257	26.97	1.673s
SB-125	925.83	463.12	159.	53.	0.026	103.71	1.500
TL-208	1022.26	511.33	211.	162.	0.081	43.85	2.038s
TL-208	1166.63	583.52	193.	465.	0.232	22.72	1.958s
CS-134	1200.73	600.57	50.	30.	0.015	112.92	1.555s
BI-214	1218.43	609.43	212.	366.	0.183	28.59	1.903s
CS-137	1323.24	661.83	202.	514.	0.257	21.30	2.190s
Ag-108M	1454.38	727.40	67.	78.	0.039	55.94	1.635s
BI-212	1455.32	727.87	107.	125.	0.062	50.17	0.827s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	1589.98	795.21	64.	68.	0.034	61.11	1.684s
AC-228	1821.78	911.11	119.	356.	0.178	24.22	2.183s
AC-228	1936.98	968.71	114.	267.	0.133	29.39	2.182s
BI-214	2242.22	1121.33	91.	89.	0.045	67.08	1.292s
K-40	2921.50	1460.95	22.	1643.	0.821	7.52	2.583s
BI-214	3529.36	1764.85	5.	89.	0.045	34.96	2.415

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

***** S U M M A R Y O 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		-6.8849E-02					
			477.56	-6.885E-02	&(	2.823E-01 8.40E-02	G
K-40		1.4838E+01					
			1460.75	1.484E+01	@(P	2.234E-01 3.73E-01	G
MN-54		1.8324E-03					
			834.81	1.832E-03	%(P	2.799E-02 8.03E-03	G
CO-57		-1.1420E-02					
			122.07	-1.142E-02	%(P	3.575E-02 1.08E-02	G K
			136.43	6.146E-02	% P	2.814E-01 8.45E-02	G
CO-60		7.3480E-03					
			1332.51	7.348E-03	%(P	2.804E-02 7.99E-03	G K
			1173.23	-1.581E-02	& P	4.658E-02 1.36E-02	G K
Sr-85		-1.8760E-02					
			514.00	-1.876E-02	&(	3.767E-02 1.14E-02	G
Kr-85		-4.5943E+02					
			513.99	-4.594E+02	&(P	8.658E+02 2.62E+02	G
Y-88		-1.6557E-03					
			1836.01	-1.656E-03	%(P	1.684E-02 3.98E-03	G K
			898.02	-1.199E-03	% P	2.953E-02 8.27E-03	G
NB-94		4.3766E-03					
			871.10	4.377E-03	%(P	2.907E-02 8.45E-03	G K
			702.50	9.916E-03	& P	2.577E-02 7.72E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	4.9595E-02						
		722.95	4.960E-02	&(	2.595E-02	9.25E-03	G K
		614.37	-3.075E-02	%	4.165E-02	1.29E-02	G
		433.93	-6.277E-04	% P	2.607E-02	7.52E-03	G
CD-109	6.1514E-01						
		88.04	6.151E-01	%(P	1.120E+00	3.40E-01	G
SN-113	9.9140E-04						
		391.71	9.914E-04	&(P	3.788E-02	1.10E-02	G K
		255.04	-1.942E-02	%	1.233E+00	3.64E-01	G
SB-125	6.0582E-02						
		427.95	8.920E-03	%(P	8.565E-02	2.51E-02	G K
		600.77	5.269E-03	& P	1.420E-01	4.09E-02	G
		636.15	3.903E-02	& P	2.273E-01	6.65E-02	G
		463.51	2.135E-01	(P	2.492E-01	7.78E-02	G
		176.29	-1.903E-02	& P	4.284E-01	1.27E-01	G
I-131	1.0664E-02						
		364.48	1.066E-02	&(	3.053E-02	9.16E-03	G K
		636.97	1.786E-01	%	3.430E-01	1.05E-01	G
		284.29	-1.430E-03	&	3.513E-01	1.03E-01	G
CS-134	3.1058E-02						
		604.66	1.523E-02	&(P	1.831E-02	5.83E-03	G K
		795.76	4.915E-02	(P	2.884E-02	1.01E-02	G
		569.29	1.673E-02	%	1.764E-01	5.15E-02	G
		801.84	-5.566E-02	% P	3.363E-01	9.81E-02	G
CS-137	3.2560E-01						
		661.62	3.256E-01	*(P	4.366E-02	2.33E-02	G
CE-139	6.7059E-03						
		165.85	6.706E-03	%(P	3.573E-02	1.07E-02	G
EU-152	-3.3783E-02						
		121.78	-3.378E-02	%(P	1.078E-01	3.25E-02	G K
		344.30	-3.150E-02	% P	1.034E-01	3.10E-02	G
		1408.08	6.720E-02	% P	1.155E-01	3.56E-02	G
		964.00	-3.309E-03	& P	3.143E-01	9.14E-02	G
		1112.07	3.524E-02	& P	2.655E-01	7.70E-02	G
		778.90	-3.841E-02	& P	2.340E-01	6.83E-02	G
EU-154	-5.6253E-04						
		123.10	-5.625E-04	%(P	7.530E-02	2.24E-02	G K
		1274.80	-3.269E-02	% P	1.186E-01	3.50E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-1.289E-03 & P 2.657E-01 7.82E-02 G
                         1004.80-3.084E-02 % P 1.789E-01 5.20E-02 G

EU-155       8.6001E-02
                           86.45 8.600E-02 %(  1.351E-01 4.12E-02 G K
                          105.31 4.642E-02 % P 1.564E-01 4.71E-02 G

HG-203      -6.7693E-03
                          279.17-6.769E-03 &(P 3.416E-02 1.02E-02 G K
                           72.87-3.217E-01 % P 9.035E-01 2.73E-01 G
                           70.83-8.942E-01 +   1.172E+00 3.59E-01 G
                           82.50-7.056E-01 %   1.964E+00 5.94E-01 G

TL-208       2.7343E-01
                          583.14 2.626E-01 *(P 3.815E-02 2.01E-02 G
                          510.72 3.149E-01 *(P 1.370E-01 5.56E-02 G

PB-212       5.9991E-01
                          238.63 5.938E-01  (P 6.114E-02 2.58E-02 G K
                                                          Energy duplication
                           77.11 3.721E-01 }   2.065E-01 6.07E-02 G
                           74.81 8.188E-01 + P 3.799E-01 1.23E-01 G

PB-214       4.3612E-01
                          351.99 4.528E-01 *(P 8.551E-02 4.11E-02 G K
                          295.22 4.038E-01 *(P 1.243E-01 4.68E-02 G
                                                          Energy duplication
                           77.11 3.684E-01 } P 4.355E-01 1.19E-01 G
                          241.92 6.148E-01 + P 3.807E-01 1.22E-01 G

BI-212       6.0882E-01
                          727.17 6.088E-01 *(P 2.489E-01 1.03E-01 G K
                         1620.56 3.308E-01 % P 7.574E-01 2.26E-01 G
                          785.42 7.058E-01 % P 1.476E+00 4.46E-01 G

BI-214       4.1658E-01
                          609.32 3.990E-01 *(P 7.705E-02 3.85E-02 G K
                         1764.51 6.255E-01 + P 9.141E-02 7.36E-02 G
                         1120.28 4.705E-01  (P 2.489E-01 1.06E-01 G

RA-224       2.8898E-01
                          241.00 2.890E-01 %(P 1.089E+00 3.28E-01 G

RA-226       1.0877E+00
                          185.99 1.088E+00 *(  9.164E-01 3.28E-01 G

AC-228       8.0901E-01
                          911.07 8.362E-01 *(P 1.261E-01 6.83E-02 G K
                          968.90 1.090E+00 + P 2.147E-01 1.08E-01 G
                          338.40 7.434E-01 *(P 2.409E-01 1.01E-01 G
```

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-3.5278E-01						
		236.00	-3.528E-01	?(P	4.016E-01	1.23E-01	G K
		256.25	-6.569E-02	& P	3.863E-01	1.15E-01	G
PA-234	3.3010E-02						
		98.44	3.301E-02	%(	1.365E-01	4.10E-02	G K
		946.00	5.459E-04	&	1.516E-01	4.31E-02	G
		131.28	-1.673E-02	&	1.620E-01	4.85E-02	G
		94.67	4.338E-02	%	1.908E-01	5.72E-02	G
		883.24	5.843E-02	%	2.003E-01	5.90E-02	G
		926.70	-2.987E-02	%	2.865E-01	8.29E-02	G
		569.26	2.481E-02	%	2.616E-01	7.64E-02	G
TH-234	8.3407E-01						
		63.29	6.088E-01	&(P	1.642E+00	4.95E-01	G K
		92.80	1.127E+00	*(P	1.367E+00	4.17E-01	G
		92.38	-1.099E-01	% P	1.625E+00	4.85E-01	G
AM-241	2.9013E-02						
		59.54	2.901E-02	%(P	2.249E-01	6.74E-02	G

(- This peak used in the nuclide activity average.

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

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-6.8109E-02	-6.8849E-02	2.5199E-01	2.5202E-01	2.792E-01
K-40	#	1.4838E+01	1.4838E+01	1.1185E+00	1.4209E+00	
MN-54	#A	1.8290E-03	1.8324E-03	2.4093E-02	2.4093E-02	2.794E-02
CO-57	#B	-1.1396E-02	-1.1420E-02	3.2710E-02	3.2716E-02	3.567E-02
CO-60	#B	7.3458E-03	7.3480E-03	2.3980E-02	2.3984E-02	2.803E-02
Sr-85	#A	-1.8594E-02	-1.8760E-02	3.4308E-02	3.4326E-02	3.733E-02
Kr-85	#A	-4.5943E+02	-4.5943E+02	8.9697E+02	8.9738E+02	8.658E+02
Y-88	#B	-1.6468E-03	-1.6557E-03	4.4014E-02	4.4014E-02	1.675E-02
NB-94	#B	4.3766E-03	4.3766E-03	2.5350E-02	2.5351E-02	2.907E-02
Ag-108M	#	4.9595E-02	4.9595E-02	2.7744E-02	2.7898E-02	2.595E-02
CD-109	#A	6.1436E-01	6.1514E-01	1.0215E+00	1.0220E+00	1.119E+00
SN-113	#B	9.8644E-04	9.9140E-04	3.3111E-02	3.3111E-02	3.769E-02
SB-125	#B	6.0548E-02	6.0582E-02	6.6188E-02	6.6285E-02	8.561E-02
I-131	#B	9.9253E-03	1.0664E-02	2.7487E-02	2.7495E-02	2.842E-02
CS-134	#	3.1034E-02	3.1058E-02	1.9127E-02	1.9215E-02	1.829E-02
CS-137	#	3.2559E-01	3.2560E-01	6.9839E-02	7.2439E-02	
CE-139	#A	6.6778E-03	6.7059E-03	3.2125E-02	3.2127E-02	3.558E-02
EU-152	#B	-3.3778E-02	-3.3783E-02	9.8096E-02	9.8114E-02	1.078E-01
EU-154	#B	-5.6243E-04	-5.6253E-04	1.9928E-01	1.9928E-01	7.529E-02
EU-155	#B	8.5973E-02	8.6001E-02	1.2353E-01	1.2362E-01	1.351E-01
HG-203	#B	-6.6859E-03	-6.7693E-03	3.4798E-02	3.4801E-02	3.374E-02
TL-208	#	2.7343E-01	2.7343E-01	6.2719E-02	6.4764E-02	
PB-212		5.9991E-01	5.9991E-01	7.8085E-02	8.5747E-02	
PB-214		4.3612E-01	4.3612E-01	9.6243E-02	9.9630E-02	
BI-212	#	6.0882E-01	6.0882E-01	3.0860E-01	3.1068E-01	
BI-214		4.1658E-01	4.1658E-01	1.2052E-01	1.2301E-01	
RA-224	#A	2.8898E-01	2.8898E-01	9.8332E-01	9.8347E-01	1.089E+00
RA-226	#	1.0877E+00	1.0877E+00	9.8404E-01	9.8613E-01	
AC-228		8.0901E-01	8.0901E-01	1.9245E-01	1.9829E-01	
TH-227	#A	-3.5278E-01	-3.5278E-01	3.7102E-01	3.7160E-01	4.016E-01
PA-234	#B	3.3010E-02	3.3010E-02	1.2314E-01	1.2316E-01	1.365E-01
TH-234	#B	8.3407E-01	8.3407E-01	9.2700E-01	9.2815E-01	1.642E+00
AM-241	#A	2.9013E-02	2.9013E-02	2.0223E-01	2.0224E-01	2.249E-01

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

H - Halflife limit exceeded

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

Total Activity (269.7 to 2000.1 keV) 1.9394897E+01 pCi/gm
Total Decayed Activity (269.7 to 2000.1 keV) 1.9394917E+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_6SEPT2006_1152.An1

Sample description
FSS-OOL-02-03-018-F

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEPT2006_1152.An1

Acquisition information
Start time: 06-Sep-2006 11:53:20
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: 1.8310E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8310E+03) =
5.4615E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 16:27:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.3095

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
75.46	311.	16.30	1.18	2.863E-02	74.81	9.600	8.290E-01	PB212
77.06	503.	10.33	1.18	2.939E-02	77.11	17.500	7.170E-01	PB212
					77.11	10.700	1.162E+00	PB214
87.27	214.	31.38	1.45	3.306E-02	86.45	32.740	1.470E-01	EU155
					88.04	3.790	1.253E+00	CD109
93.61	131.	35.27	1.14	3.455E-02	92.80	3.000	PBC<MDA	TH234
186.11	266.	16.79	1.51	3.609E-02	185.99	3.280	1.661E+00	RA226
209.60	124.	28.08	1.24	3.426E-02				
239.24	1766.	3.72	1.61	3.185E-02	238.63	43.100	9.398E-01	PB212
242.01	201.	18.53	1.30	3.163E-02	241.00	3.900	1.198E+00	RA224
					241.92	7.470	6.269E-01	PB214
270.41	165.	20.76	1.28	2.943E-02				
295.31	243.	10.82	1.34	2.767E-02	295.22	19.200	3.306E-01	PB214
300.45	82.	27.79	1.34	2.733E-02				
329.43	104.	30.17	1.12	2.552E-02				
338.85	406.	10.43	2.03	2.498E-02	338.40	12.010	9.912E-01	AC228
352.19	555.	8.22	1.79	2.425E-02	351.99	37.100	4.506E-01	PB214
408.90	77.	37.89	1.07	2.157E-02				
463.55	96.	28.92	1.24	1.953E-02	463.51	10.000	3.513E-01	SB125
510.99	280.	10.45	1.78	1.807E-02	510.72	22.500	4.473E-01	TL208
583.47	529.	6.58	1.93	1.628E-02	583.14	86.000	2.764E-01	TL208
609.39	387.	8.56	2.17	1.574E-02	609.32	46.090	3.897E-01	BI214
727.52	147.	19.42	1.73	1.374E-02	723.30	19.700	3.977E-01	EU154
					727.17	11.800	6.627E-01	BI212
795.59	51.	30.45	1.68	1.284E-02	795.76	85.400	3.428E-02	CS134
911.08	421.	7.79	2.43	1.161E-02	911.07	29.000	9.142E-01	AC228
964.86	57.	24.09	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152

969.27	233.	8.49	1.80	1.109E-02	968.90	17.460	8.805E-01	AC228
1120.04	101.	18.28	1.96	9.971E-03	1120.28	15.040	4.928E-01	BI214
1460.97	1852.	2.41	2.54	8.190E-03	1460.75	10.700	1.556E+01	K40
1587.93	82.	18.97	1.18	7.688E-03				
1620.83	26.	26.78	1.68	7.569E-03	1620.56	2.750	9.076E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.05	92.	12.27	1.76	7.085E-03	1764.51	15.920	5.936E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
174.20	87.27	1593.	214.	0.107	94.15	1.454	BI-207	l
418.83	209.60	493.	124.	0.062	84.25	1.236	NP-239	s
540.44	270.41	389.	165.	0.083	62.28	1.276	AC-228	s
600.40	300.39	290.	77.	0.038	104.76	0.826	PB-212	sM
658.48	329.43	313.	104.	0.052	90.51	1.117	TH-227	s
817.40	408.90	258.	77.	0.038	113.66	1.068	CS-138	s
1929.66	964.69	72.	51.	0.025	82.83	1.797	AC-228	D
3175.47	1587.93	32.	82.	0.041	56.91	1.177	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	948.	339.	0.170	41.27	1.178D
PB-212	153.89	77.11	958.	365.	0.183	32.15	1.179A
PB-214	153.89	77.11	1560.	167.	0.083	95.81	1.500A
RA-226	371.99	186.17	818.	192.	0.096	66.94	1.500s
PB-212	476.89	238.63	509.	1266.	0.633	11.14	1.297D
PB-214	483.47	241.92	602.	201.	0.100	55.60	1.299D
PB-214	590.12	295.25	338.	237.	0.119	40.04	1.745s
AC-228	677.29	338.84	387.	395.	0.197	31.11	2.029s
PB-214	703.99	352.19	406.	549.	0.275	24.65	1.788s
SB-125	926.47	463.44	181.	70.	0.035	84.79	1.500s
TL-208	1021.57	510.99	208.	247.	0.123	31.34	1.779s
TL-208	1166.52	583.47	194.	525.	0.262	19.74	1.927s
BI-214	1218.36	609.39	192.	383.	0.192	25.69	2.167s
BI-212	1454.61	727.52	172.	146.	0.073	58.27	1.728s
CS-134	1590.75	795.59	97.	51.	0.025	91.35	1.684s
AC-228	1821.72	911.08	141.	417.	0.208	23.38	2.433s
AC-228	1937.36	968.90	86.	226.	0.113	26.21	1.799D
BI-214	2239.65	1120.04	81.	100.	0.050	54.85	1.962s
K-40	2921.53	1460.97	36.	1848.	0.924	7.23	2.540s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3241.28	1620.83	7.	26.	0.013	80.35	1.685
BI-214	3527.74	1764.05	8.	91.	0.045	36.82	1.759s

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

***** S U M M A R Y O 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		4.6714E-02					
			477.56	4.671E-02	&(	2.337E-01 6.91E-02	G
K-40		1.5560E+01					
			1460.75	1.556E+01	*(P	2.590E-01 3.76E-01	G
MN-54		1.4070E-02					
			834.81	1.407E-02	%(P	2.817E-02 8.56E-03	G
CO-57		-4.3424E-03					
			122.07	-4.342E-03	&(P	3.070E-02 9.18E-03	G K
			136.43	-9.132E-02	% P	3.017E-01 9.10E-02	G
CO-60		5.9531E-03					
			1332.51	5.953E-03	&(P	2.955E-02 8.42E-03	G K
			1173.23	1.626E-02	% P	3.722E-02 1.11E-02	G K
Sr-85		-1.9902E-02					
			514.00	-1.990E-02	&(	3.833E-02 1.16E-02	G
Kr-85		-4.8399E+02					
			513.99	-4.840E+02	&(P	8.806E+02 2.67E+02	G
Y-88		-3.7640E-03					
			1836.01	-3.764E-03	%(P	2.468E-02 6.69E-03	G K
			898.02	3.049E-03	% P	3.183E-02 9.18E-03	G
NB-94		1.6757E-03					
			871.10	1.676E-03	&(P	2.877E-02 8.29E-03	G K
			702.50	-3.841E-03	% P	3.112E-02 9.10E-03	G K
Ag-108M		9.6985E-03					
			722.95	9.699E-03	%(	2.357E-02 7.08E-03	G K
			614.37	-1.980E-02	&	3.840E-02 1.17E-02	G
			433.93	-8.483E-03	% P	2.923E-02 8.69E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	6.8130E-01						
		88.04	6.813E-01	%(P	1.075E+00	3.28E-01	G
SN-113	1.4205E-03						
		391.71	1.420E-03	&(P	4.341E-02	1.28E-02	G K
		255.04	1.728E-01	%	1.132E+00	3.37E-01	G
SB-125	6.5323E-02						
		427.95	-2.676E-03	&(P	7.797E-02	2.26E-02	G K
		600.77	1.729E-02	& P	1.060E-01	3.07E-02	G
		636.15	-5.937E-02	& P	2.506E-01	7.40E-02	G
		463.51	2.666E-01	(P	2.472E-01	7.84E-02	G
		176.29	8.654E-02	% P	4.439E-01	1.33E-01	G
I-131	6.8683E-03						
		364.48	6.868E-03	%(	2.974E-02	8.85E-03	G K
		636.97	-2.555E-02	%	3.955E-01	1.15E-01	G
		284.29	-6.129E-02	%	4.427E-01	1.32E-01	G
CS-134	8.9172E-03						
		604.66	-1.327E-02	&(P	2.989E-02	9.02E-03	G K
		795.76	3.428E-02	(P	3.280E-02	1.05E-02	G
		569.29	2.427E-03	&	1.325E-01	3.79E-02	G
		801.84	-4.823E-02	& P	3.499E-01	1.02E-01	G
CS-137	1.4888E-02						
		661.62	1.489E-02	%(P	3.671E-02	1.10E-02	G
CE-139	-1.5437E-03						
		165.85	-1.544E-03	%(P	3.557E-02	1.06E-02	G
EU-152	-1.5242E-02						
		121.78	-1.524E-02	%(P	1.068E-01	3.20E-02	G K
		344.30	-5.223E-03	% P	1.017E-01	3.00E-02	G
		1408.08	2.025E-02	% P	1.216E-01	3.46E-02	G
		964.00	-6.775E-02	% P	3.321E-01	9.86E-02	G
		1112.07	2.407E-02	% P	2.744E-01	7.95E-02	G
		778.90	-1.789E-03	% P	2.189E-01	6.27E-02	G
EU-154	1.5948E-02						
		123.10	1.595E-02	&(P	7.695E-02	2.31E-02	G K
		1274.80	-3.333E-03	% P	1.093E-01	3.13E-02	G
		723.30	-1.076E-03	% P	1.748E-01	5.08E-02	G
		1004.80	-1.444E-02	% P	1.984E-01	5.74E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	8.7766E-02						
		86.45	8.777E-02	%(	1.356E-01	4.13E-02	G K
		105.31	3.003E-02	% P	1.518E-01	4.56E-02	G
HG-203	1.2394E-02						
		279.17	1.239E-02	%(P	2.862E-02	8.65E-03	G K
		72.87	-2.989E-02	% P	1.091E+00	3.28E-01	G
		70.83	7.205E-01	&	1.331E+00	4.05E-01	G
		82.50	-6.955E-02	%	1.878E+00	5.62E-01	G
TL-208	2.7640E-01						
		583.14	2.764E-01	*(P	3.565E-02	1.84E-02	G
		510.72	4.473E-01	+ P	1.270E-01	5.31E-02	G
PB-212	7.0662E-01						
		238.63	6.800E-01	(P	5.787E-02	2.56E-02	G K
							Energy duplication
		77.11	5.207E-01	}	2.096E-01	5.58E-02	G
		74.81	9.159E-01	+ P	3.943E-01	1.27E-01	G
PB-214	4.5061E-01						
		351.99	4.506E-01	*(P	7.918E-02	3.74E-02	G K
		295.22	3.295E-01	- P	1.227E-01	4.48E-02	G
							Energy duplication
		77.11	3.887E-01	} P	4.356E-01	1.24E-01	G
		241.92	6.269E-01	+ P	3.657E-01	1.17E-01	G
BI-212	7.0900E-01						
		727.17	6.627E-01	*(P	2.908E-01	1.30E-01	G K
		1620.56	9.076E-01	(P	5.456E-01	2.48E-01	G
		785.42	4.884E-01	% P	1.550E+00	4.61E-01	G
BI-214	3.8967E-01						
		609.32	3.897E-01	*(P	6.843E-02	3.37E-02	G K
		1764.51	5.936E-01	+ P	1.056E-01	7.36E-02	G
		1120.28	4.928E-01	+ P	2.196E-01	9.09E-02	G
RA-224	3.1129E-01						
		241.00	3.113E-01	%(P	1.040E+00	3.14E-01	G
RA-226	1.1941E+00						
		185.99	1.194E+00	*(	8.476E-01	2.66E-01	G
AC-228	9.0943E-01						
		911.07	9.142E-01	*(P	1.273E-01	7.20E-02	G K
		968.90	8.597E-01	(P	1.754E-01	7.58E-02	G
		338.40	9.703E-01	*(P	2.320E-01	1.01E-01	G

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

TH-227      -1.4256E-01
                          236.00-1.426E-01 %(P 3.164E-01 9.58E-02 G K
                          256.25-4.088E-03 % P 3.976E-01 1.18E-01 G

PA-234       2.3484E-02
                           98.44 2.348E-02 %(  1.394E-01 4.19E-02 G K
                          946.00-2.532E-02 %   1.859E-01 5.45E-02 G
                          131.28-2.198E-02 &   1.595E-01 4.78E-02 G
                           94.67-1.259E-01 %   2.398E-01 7.28E-02 G
                          883.24 1.904E-02 %   1.888E-01 5.40E-02 G
                          926.70-2.737E-02 %   2.587E-01 7.48E-02 G
                          569.26 2.890E-03 &   1.885E-01 5.38E-02 G

TH-234       6.4374E-01
                           63.29 6.437E-01 %(P 1.614E+00 4.87E-01 G K
                           92.80 9.503E-01 % P 1.356E+00 4.13E-01 G
                           92.38-6.358E-01 & P 1.419E+00 4.28E-01 G

AM-241      -9.5880E-02
                           59.54-9.588E-02 %(P 2.154E-01 6.52E-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	4.6226E-02	4.6714E-02	2.0726E-01	2.0728E-01	2.312E-01
K-40	#	1.5560E+01	1.5560E+01	1.1282E+00	1.4551E+00	
MN-54	#A	1.4045E-02	1.4070E-02	2.5666E-02	2.5680E-02	2.812E-02
CO-57	#B	-4.3334E-03	-4.3424E-03	2.8352E-02	2.8353E-02	3.064E-02
CO-60	#B	5.9514E-03	5.9531E-03	2.5247E-02	2.5250E-02	2.954E-02
Sr-85	#A	-1.9731E-02	-1.9902E-02	3.4950E-02	3.4969E-02	3.800E-02
Kr-85	#A	-4.8398E+02	-4.8399E+02	9.0013E+02	9.0058E+02	8.806E+02
Y-88	#B	-3.7442E-03	-3.7640E-03	3.2391E-02	3.2391E-02	2.455E-02
NB-94	#B	1.6757E-03	1.6757E-03	2.4857E-02	2.4857E-02	2.877E-02
Ag-108M	#B	9.6984E-03	9.6985E-03	2.1254E-02	2.1262E-02	2.357E-02
CD-109	#A	6.8046E-01	6.8130E-01	9.8287E-01	9.8359E-01	1.074E+00
SN-113	#B	1.4135E-03	1.4205E-03	3.8272E-02	3.8272E-02	4.320E-02
SB-125	#B	6.5287E-02	6.5323E-02	5.7598E-02	5.7727E-02	7.793E-02
I-131	#B	6.4050E-03	6.8683E-03	2.6542E-02	2.6545E-02	2.773E-02
CS-134	#B	8.9105E-03	8.9172E-03	8.2300E-03	8.2468E-03	2.987E-02
CS-137	#A	1.4887E-02	1.4888E-02	3.3012E-02	3.3024E-02	3.671E-02
CE-139	#A	-1.5374E-03	-1.5437E-03	3.5506E-02	3.5506E-02	3.543E-02
EU-152	#B	-1.5240E-02	-1.5242E-02	9.7247E-02	9.7250E-02	1.068E-01
EU-154	#B	1.5945E-02	1.5948E-02	6.9363E-02	6.9368E-02	7.694E-02
EU-155	#B	8.7738E-02	8.7766E-02	1.2400E-01	1.2410E-01	1.356E-01
HG-203	#B	1.2245E-02	1.2394E-02	2.5940E-02	2.5950E-02	2.828E-02
TL-208	#	2.7640E-01	2.7640E-01	5.5033E-02	5.7403E-02	
PB-212		7.0662E-01	7.0662E-01	7.9710E-02	8.9974E-02	
PB-214		4.5061E-01	4.5061E-01	1.1210E-01	1.1521E-01	
BI-212		7.0900E-01	7.0900E-01	3.5747E-01	3.5992E-01	
BI-214	#	3.8967E-01	3.8967E-01	1.0122E-01	1.0381E-01	
RA-224	#A	3.1129E-01	3.1129E-01	9.4081E-01	9.4099E-01	1.040E+00
RA-226	#	1.1941E+00	1.1941E+00	7.9935E-01	8.0245E-01	8.476E-01
AC-228		9.0943E-01	9.0943E-01	1.4355E-01	1.5327E-01	
TH-227	#B	-1.4256E-01	-1.4256E-01	2.8979E-01	2.8991E-01	3.164E-01
PA-234	#B	2.3484E-02	2.3484E-02	1.2560E-01	1.2560E-01	1.394E-01
TH-234	#B	6.4374E-01	6.4374E-01	1.4610E+00	1.4614E+00	1.614E+00
AM-241	#A	-9.5880E-02	-9.5880E-02	1.9902E-01	1.9910E-01	2.154E-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) 1.9001726E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.9001726E+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_6SEPT2006_1255.An1

Sample description
FSS-OOL-02-03-015-F

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEPT2006_1255.An1

Acquisition information
Start time: 06-Sep-2006 12:55:40
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: 1.9140E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9140E+03) =
5.2247E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 15:50:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1514

***** S U M M A R Y O F P E A K 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	200.	27.61	1.50	2.849E-02				
74.84	200.	27.61	1.50	2.849E-02	74.81	9.600	5.167E-01	PB212
77.10	300.	17.36	1.50	2.957E-02	77.11	10.700	6.702E-01	PB214
					77.11	17.500	4.098E-01	PB212
77.10	305.	17.36	1.50	2.957E-02	77.11	10.700	6.702E-01	PB214
					77.11	17.500	4.162E-01	PB212
93.30	118.	31.37	1.57	3.449E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.03	184.	21.89	1.97	3.610E-02	185.99	3.280	1.098E+00	RA226
238.74	763.	4.96	1.30	3.189E-02	238.63	43.100	3.838E-01	PB212
					241.00	3.900	4.344E+00	RA224
241.98	151.	19.84	1.30	3.163E-02	241.92	7.470	PBC<MDA	PB214
295.36	183.	12.64	1.34	2.767E-02	295.22	19.200	2.368E-01	PB214
300.64	59.	30.89	1.34	2.732E-02				
338.51	203.	15.62	1.75	2.500E-02	338.40	12.010	4.702E-01	AC228
352.02	486.	7.23	1.97	2.426E-02	351.99	37.100	3.774E-01	PB214
463.17	39.	41.38	1.50	1.953E-02	463.51	10.000	PBC<MDA	SB125
511.01	144.	17.24	2.23	1.807E-02	510.72	22.500	1.915E-01	TL208
583.23	284.	7.65	1.91	1.629E-02	583.14	86.000	1.410E-01	TL208
609.35	343.	7.32	1.87	1.574E-02	609.32	46.090	3.292E-01	BI214
662.18	200.	14.30	1.92	1.476E-02	661.62	84.620	1.107E-01	CS137
727.54	116.	15.79	1.15	1.374E-02	727.17	11.800	5.003E-01	BI212
768.46	52.	32.32	1.15	1.318E-02				
795.16	35.	34.67	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
860.64	79.	23.35	1.86	1.211E-02				
911.43	224.	10.21	1.99	1.160E-02	911.07	29.000	4.601E-01	AC228
967.38	206.	10.66	2.02	1.111E-02	968.90	17.460	7.428E-01	AC228

1120.30	92.	17.72	2.34	9.970E-03	1120.28	15.040	4.347E-01	BI214
1460.96	990.	3.28	2.47	8.190E-03	1460.75	10.700	7.934E+00	K40
1764.86	75.	11.47	1.20	7.084E-03	1764.51	15.920	4.702E-01	BI214

********** U N I D E N T I F I E D P E A K S U 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	238.72	334.	763.	0.382	14.87	1.297	PB-212	D
483.59	241.96	374.	151.	0.076	59.52	1.299	PB-214	D
600.77	300.58	165.	56.	0.028	107.48	1.029	PB-212	
1536.49	768.46	76.	52.	0.026	81.69	1.151	BI-214	
1720.84	860.64	70.	79.	0.039	70.05	1.865	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	149.36	74.84	1488.	200.	0.100	82.82	1.500s
PB-214	153.89	77.11	1256.	300.	0.150	52.09	1.500D
PB-212	153.89	77.11	1251.	305.	0.153	52.09	1.500D
RA-226	371.71	186.03	534.	184.	0.092	65.66	1.967s
PB-212	477.08	238.72	747.	750.	0.375	18.50	1.500s
RA-224	477.21	238.79	581.	698.	0.349	18.48	1.500s
PB-214	590.25	295.31	310.	183.	0.091	45.25	1.500s
AC-228	676.63	338.51	247.	200.	0.100	46.87	1.751s
PB-214	703.67	352.03	206.	404.	0.202	20.87	1.500s
TL-208	1021.62	511.01	169.	110.	0.055	51.73	2.226s
TL-208	1166.05	583.23	74.	280.	0.140	22.94	1.909s
BI-214	1218.28	609.35	97.	338.	0.169	21.96	1.868s
CS-137	1323.94	662.18	140.	196.	0.098	42.90	1.918s
BI-212	1454.64	727.54	66.	115.	0.057	47.36	1.147s
CS-134	1589.89	795.16	57.	35.	0.017	104.01	1.684
AC-228	1822.42	911.43	83.	219.	0.110	30.64	1.991s
AC-228	1934.33	967.38	71.	204.	0.102	31.97	2.020s
BI-214	2240.18	1120.30	54.	92.	0.046	53.16	2.340s
K-40	2921.52	1460.96	19.	985.	0.492	9.85	2.470s
BI-214	3529.36	1764.86	1.	75.	0.038	34.41	1.200s

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

***** S U M M A R Y O 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		3.6925E-02					
			477.56	3.692E-02	%(	1.666E-01 4.90E-02	G
K-40		7.9339E+00					
			1460.75	7.934E+00	*(P	1.860E-01 2.62E-01	G
MN-54		2.1146E-03					
			834.81	2.115E-03	%(P	1.869E-02 5.30E-03	G
CO-57		-8.8552E-03					
			122.07	-8.855E-03	%(P	3.032E-02 9.13E-03	G K
			136.43	1.091E-02	% P	2.321E-01 6.91E-02	G
CO-60		3.6931E-03					
			1332.51	3.693E-03	%(P	2.226E-02 6.14E-03	G K
			1173.23	1.355E-02	% P	3.055E-02 9.10E-03	G K
Sr-85		-1.2189E-02					
			514.00	-1.219E-02	%(	2.823E-02 8.53E-03	G
Kr-85		-3.0675E+02					
			513.99	-3.068E+02	%(P	6.501E+02 1.95E+02	G
Y-88		-3.9780E-03					
			1836.01	-3.978E-03	%(P	2.295E-02 6.23E-03	G K
			898.02	-9.958E-04	& P	2.497E-02 6.96E-03	G
NB-94		-3.7874E-03					
			871.10	-3.787E-03	&(P	2.341E-02 6.78E-03	G K
			702.50	4.233E-03	% P	2.225E-02 6.50E-03	G K
Ag-108M		-1.1035E-02					
			722.95	-1.103E-02	%(	3.154E-02 9.44E-03	G K
			614.37	-1.692E-02	%	3.197E-02 9.74E-03	G
			433.93	5.438E-03	% P	2.209E-02 6.53E-03	G
CD-109		2.7014E-01					
			88.04	2.701E-01	%(P	8.883E-01 2.68E-01	G
SN-113		-3.9362E-04					
			391.71	-3.936E-04	%(P	3.044E-02 8.79E-03	G K
			255.04	7.684E-02	&	1.053E+00 3.12E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-1.8557E-02						
		427.95	-1.856E-02	&(P	6.985E-02	2.06E-02	G K
		600.77	5.229E-02	% P	8.705E-02	2.67E-02	G
		636.15	-3.397E-02	& P	2.015E-01	5.87E-02	G
		463.51	1.413E-01	% P	2.035E-01	6.27E-02	G
		176.29	4.819E-02	% P	3.307E-01	9.85E-02	G
I-131	4.2265E-04						
		364.48	4.227E-04	%(	2.706E-02	7.90E-03	G K
		636.97	-4.905E-02	&	3.202E-01	9.33E-02	G
		284.29	4.707E-03	%	3.953E-01	1.16E-01	G
CS-134	-1.2103E-02						
		604.66	-1.210E-02	%(P	2.976E-02	8.95E-03	G K
		795.76	2.229E-02	+ P	2.444E-02	7.85E-03	G
		569.29	-1.482E-02	%	1.302E-01	3.78E-02	G
		801.84	9.748E-02	% P	2.385E-01	7.16E-02	G
CS-137	1.1070E-01						
		661.62	1.107E-01	@(P	3.268E-02	1.61E-02	G
CE-139	6.6371E-03						
		165.85	6.637E-03	%(P	2.817E-02	8.45E-03	G
EU-152	-2.6807E-02						
		121.78	-2.681E-02	%(P	8.631E-02	2.60E-02	G K
		344.30	-1.970E-02	% P	6.606E-02	1.96E-02	G
		1408.08	4.947E-02	% P	9.933E-02	3.01E-02	G
		964.00	9.882E-04	& P	2.718E-01	7.89E-02	G
		1112.07	-2.212E-02	% P	1.636E-01	4.62E-02	G
		778.90	5.797E-03	% P	1.683E-01	4.78E-02	G
EU-154	-1.9863E-02						
		123.10	-1.986E-02	%(P	6.265E-02	1.89E-02	G K
		1274.80	-1.763E-02	% P	8.903E-02	2.59E-02	G
		723.30	-5.152E-02	% P	1.444E-01	4.32E-02	G
		1004.80	2.851E-02	& P	1.382E-01	4.02E-02	G
EU-155	4.1094E-02						
		86.45	4.109E-02	%(	1.009E-01	3.05E-02	G K
		105.31	-2.311E-03	& P	1.074E-01	3.19E-02	G
HG-203	5.3382E-03						
		279.17	5.338E-03	&(P	2.376E-02	7.07E-03	G K
		72.87	-2.631E-01	& P	7.967E-01	2.40E-01	G
		70.83	9.300E-03	%	1.324E+00	3.96E-01	G
		82.50	-6.140E-02	%	1.573E+00	4.70E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	1.4099E-01						
		583.14	1.410E-01	*(P	2.160E-02	1.10E-02	G
		510.72	1.915E-01	+ P	1.097E-01	4.31E-02	G
PB-212	3.9413E-01						
		238.63	3.851E-01	*(P	6.680E-02	2.42E-02	G K
							Energy duplication
		77.11	4.162E-01	*(	2.286E-01	7.23E-02	G
		74.81	5.167E-01	+ P	4.710E-01	1.45E-01	G
PB-214	3.1731E-01						
		351.99	3.173E-01	*(P	5.464E-02	2.24E-02	G K
		295.22	2.428E-01	- P	1.126E-01	3.75E-02	G
							Energy duplication
		77.11	6.702E-01	+ P	3.745E-01	1.18E-01	G
		241.92	-1.447E-02	% P	4.495E-01	1.34E-01	G
BI-212	5.0031E-01						
		727.17	5.003E-01	*(P	1.767E-01	7.99E-02	G K
		1620.56	5.771E-02	% P	6.379E-01	1.70E-01	G
		785.42	-2.003E-03	% P	1.185E+00	3.36E-01	G
BI-214	3.2917E-01						
		609.32	3.292E-01	*(P	4.724E-02	2.44E-02	G K
		1764.51	4.702E-01	+ P	4.614E-02	5.46E-02	G
		1120.28	4.347E-01	+ P	1.735E-01	7.78E-02	G
RA-224	3.9830E+00						
		241.00	3.983E+00	&(P	6.570E-01	2.46E-01	G
RA-226	1.0983E+00						
		185.99	1.098E+00	*(	6.581E-01	2.40E-01	G
AC-228	4.6305E-01						
		911.07	4.601E-01	(P	9.453E-02	4.79E-02	G K
		968.90	7.428E-01	+ P	1.533E-01	8.00E-02	G
		338.40	4.702E-01	*(P	1.786E-01	7.46E-02	G
TH-227	-1.8273E-01						
		236.00	-1.827E-01	%(P	2.923E-01	8.91E-02	G K
		256.25	-7.534E-03	& P	3.124E-01	9.17E-02	G
PA-234	3.2075E-03						
		98.44	3.207E-03	&(	9.165E-02	2.72E-02	G K
		946.00	1.120E-02	%	1.144E-01	3.27E-02	G
		131.28	-2.314E-02	&	1.305E-01	3.91E-02	G
		94.67	4.086E-03	%	1.717E-01	5.11E-02	G
		883.24	-9.372E-03	&	1.735E-01	4.91E-02	G
		926.70	-3.425E-02	%	2.117E-01	6.12E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.967E-02 %   2.019E-01 5.93E-02 G

TH-234       1.1677E-01
                           63.29 1.168E-01 %(P 1.340E+00 3.99E-01 G K
                           92.80 7.582E-01 % P 1.053E+00 3.21E-01 G
                           92.38-9.798E-02 % P 1.247E+00 3.71E-01 G

AM-241       5.1299E-02
                           59.54 5.130E-02 &(P 1.554E-01 4.68E-02 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	3.6506E-02	3.6925E-02	1.4685E-01	1.4687E-01	1.647E-01
K-40	#	7.9339E+00	7.9339E+00	7.8529E-01	9.1446E-01	
MN-54	#A	2.1104E-03	2.1146E-03	1.5912E-02	1.5913E-02	1.865E-02
CO-57	#B	-8.8352E-03	-8.8552E-03	2.7752E-02	2.7756E-02	3.025E-02
CO-60	#B	3.6920E-03	3.6931E-03	1.8411E-02	1.8412E-02	2.225E-02

Sr-85	#A	-1.2075E-02	-1.2189E-02	2.5584E-02	2.5595E-02	2.796E-02
Kr-85	#A	-3.0675E+02	-3.0675E+02	6.9977E+02	7.0001E+02	6.501E+02
Y-88	#B	-3.9553E-03	-3.9780E-03	2.8804E-02	2.8805E-02	2.282E-02
NB-94	#B	-3.7874E-03	-3.7874E-03	2.1205E-02	2.1206E-02	2.341E-02
Ag-108M	#B	-1.1035E-02	-1.1035E-02	2.8332E-02	2.8339E-02	3.154E-02
CD-109	#A	2.6978E-01	2.7014E-01	8.0340E-01	8.0354E-01	8.871E-01
SN-113	#B	-3.9154E-04	-3.9362E-04	6.7481E-02	6.7481E-02	3.028E-02
SB-125	#B	-1.8546E-02	-1.8557E-02	7.3676E-02	7.3685E-02	6.980E-02
I-131	#B	3.9181E-04	4.2265E-04	2.3688E-02	2.3688E-02	2.508E-02
CS-134	#B	-1.2093E-02	-1.2103E-02	2.7938E-02	2.7947E-02	2.974E-02
CS-137	#	1.1069E-01	1.1070E-01	4.8343E-02	4.8783E-02	
CE-139	#A	6.6077E-03	6.6371E-03	2.5342E-02	2.5345E-02	2.805E-02
EU-152	#B	-2.6803E-02	-2.6807E-02	7.8508E-02	7.8522E-02	8.630E-02
EU-154	#B	-1.9859E-02	-1.9863E-02	5.8042E-02	5.8052E-02	6.264E-02
EU-155	#B	4.1080E-02	4.1094E-02	9.1596E-02	9.1624E-02	1.009E-01
HG-203	#B	5.2689E-03	5.3382E-03	2.1199E-02	2.1201E-02	2.345E-02
TL-208	#	1.4099E-01	1.4099E-01	3.2864E-02	3.3903E-02	
PB-212	#	3.9413E-01	3.9413E-01	7.4424E-02	7.7979E-02	6.680E-02
PB-214	#	3.1731E-01	3.1731E-01	6.7066E-02	6.9635E-02	5.464E-02
BI-212	#	5.0031E-01	5.0031E-01	2.3961E-01	2.4142E-01	
BI-214		3.2917E-01	3.2917E-01	7.3219E-02	7.5756E-02	
RA-224	#	3.9830E+00	3.9830E+00	7.3836E-01	7.7493E-01	6.570E-01
RA-226	#	1.0983E+00	1.0983E+00	7.2117E-01	7.2408E-01	
AC-228	#	4.6305E-01	4.6305E-01	1.3185E-01	1.3466E-01	
TH-227	#B	-1.8273E-01	-1.8273E-01	2.6889E-01	2.6911E-01	2.923E-01
PA-234	#B	3.2075E-03	3.2075E-03	8.1628E-02	8.1628E-02	9.165E-02
TH-234	#B	1.1677E-01	1.1677E-01	1.1975E+00	1.1975E+00	1.340E+00
AM-241	#A	5.1299E-02	5.1299E-02	1.4050E-01	1.4053E-01	1.554E-01

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

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

Total Activity (277.7 to 2000.1 keV) 1.0576407E+01 pCi/gm
Total Decayed Activity (277.7 to 2000.1 keV) 1.0576414E+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_6SEPT2006_1336.An1

Sample description
FSS-OOL-02-03-020-F

Spectrum Filename: C:\GammaVision\Spectra\107F_6SEPT2006_1336.An1

Acquisition information

Start time:	06-Sep-2006 13:38:25
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:	2.0150E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.0150E+03) = 4.9628E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	05-Sep-2006 16:20:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1438

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
76.05	780.	9.17	1.80	2.910E-02	74.81	9.600	1.902E+00	PB212
					77.11	17.500	1.010E+00	PB212
					77.11	10.700	1.642E+00	PB214
87.92	142.	33.69	1.03	3.323E-02	86.45	32.740	8.886E-02	EU155
					88.04	3.790	PBC<MDA	CD109
93.42	110.	39.18	2.18	3.451E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.29	212.	19.61	1.82	3.608E-02	185.99	3.280	1.203E+00	RA226
209.34	90.	31.47	1.34	3.428E-02				
238.77	872.	4.82	1.30	3.187E-02	238.63	43.100	4.176E-01	PB212
241.66	189.	17.50	1.30	3.164E-02	241.00	3.900	1.015E+00	RA224
					241.92	7.470	5.335E-01	PB214
270.00	93.	29.67	1.11	2.946E-02				
295.38	235.	10.55	1.34	2.767E-02	295.22	19.200	2.914E-01	PB214
300.76	91.	22.92	1.34	2.731E-02				
338.29	251.	12.27	1.84	2.501E-02	338.40	12.010	5.525E-01	AC228
351.91	457.	8.95	1.80	2.426E-02	351.99	37.100	3.367E-01	PB214
463.09	58.	31.77	1.50	1.953E-02	463.51	10.000	PBC<MDA	SB125
510.85	190.	16.99	2.38	1.808E-02	510.72	22.500	2.577E-01	TL208
583.36	412.	6.73	1.94	1.629E-02	583.14	86.000	1.953E-01	TL208
601.00	27.	34.02	1.55	1.584E-02	600.77	18.400	PBC<MDA	SB125
					604.66	97.600	PBC<MDA	CS134
609.47	372.	8.04	2.27	1.574E-02	609.32	46.090	3.402E-01	BI214
661.86	347.	9.82	2.28	1.477E-02	661.62	84.620	1.841E-01	CS137
727.67	89.	19.41	1.58	1.374E-02	727.17	11.800	3.673E-01	BI212
795.16	37.	33.04	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
911.37	319.	8.50	1.93	1.161E-02	911.07	29.000	6.275E-01	AC228

968.73	214.	12.36	1.62	1.109E-02	968.90	17.460	7.350E-01	AC228
1120.29	115.	18.12	1.13	9.970E-03	1120.28	15.040	5.104E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.03	1314.	2.88	2.58	8.190E-03	1460.75	10.700	1.002E+01	K40
1621.10	22.	23.41	0.81	7.569E-03	1620.56	2.750	7.249E-01	BI212
1764.70	65.	13.17	1.42	7.084E-03	1764.51	15.920	3.890E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
175.50	87.92	939.	142.	0.071	101.06	1.025	PB-214	l
418.33	209.34	356.	90.	0.045	94.40	1.339	AC-228	
539.63	270.00	277.	93.	0.046	89.01	1.108	AC-228	s
600.89	300.63	304.	106.	0.053	86.43	1.728	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	149.29	74.81	706.	229.	0.115	52.04	1.178D
PB-212	153.89	77.11	716.	231.	0.115	44.16	1.179A
PB-214	153.89	77.11	1193.	136.	0.068	105.49	1.500A
TH-234	185.86	93.10	1242.	129.	0.064	112.09	1.500s
RA-226	372.22	186.29	586.	212.	0.106	58.83	1.816s
TH-227	471.59	235.98	1227.	-135.	-0.068	113.25	1.500s
PB-212	476.89	238.63	406.	848.	0.424	14.08	1.297D
PB-214	483.47	241.92	470.	174.	0.087	56.95	1.299D
PB-214	590.13	295.26	241.	249.	0.124	33.44	1.629s
AC-228	676.19	338.29	243.	247.	0.124	36.80	1.836s
PB-214	703.43	351.91	343.	452.	0.226	26.86	1.804s
SB-125	925.78	463.09	161.	58.	0.029	95.32	1.500s
TL-208	1021.29	510.85	247.	156.	0.078	50.97	2.377s
TL-208	1166.30	583.36	120.	408.	0.204	20.19	1.945s
CS-134	1201.58	601.00	29.	27.	0.013	102.06	1.555
BI-214	1218.53	609.47	150.	368.	0.184	24.12	2.271s
Ag-108M	1224.17	612.30	253.	-62.	-0.031	114.85	1.561s
CS-137	1323.30	661.86	180.	343.	0.172	29.45	2.285s
BI-212	1454.91	727.67	81.	89.	0.044	58.23	1.581s
CS-134	1589.89	795.16	60.	37.	0.019	99.11	1.684s
AC-228	1822.30	911.37	93.	315.	0.157	25.51	1.929s
AC-228	1937.02	968.73	111.	212.	0.106	37.08	1.617s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2240.15	1120.29	85.	114.	0.057	54.36	1.133s
K-40	2921.65	1461.03	28.	1309.	0.654	8.63	2.579s
BI-212	3241.82	1621.10	3.	22.	0.011	70.24	0.809s
BI-214	3529.05	1764.70	4.	65.	0.033	39.52	1.422s

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

***** S U M M A R Y O 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		6.0371E-02					
			477.56	6.037E-02	&(	2.032E-01 6.06E-02	G
K-40		1.0015E+01					
			1460.75	1.002E+01	@(P	2.099E-01 2.89E-01	G
MN-54		4.2588E-04					
			834.81	4.259E-04	%(P	2.734E-02 7.86E-03	G
CO-57		-1.3114E-04					
			122.07	-1.311E-04	%(P	2.725E-02 8.10E-03	G K
			136.43	1.482E-03	& P	2.381E-01 7.09E-02	G
CO-60		8.7903E-03					
			1332.51	8.790E-03	%(P	2.527E-02 7.35E-03	G K
			1173.23	-9.020E-03	& P	3.459E-02 9.93E-03	G K
Sr-85		-1.3889E-02					
			514.00	-1.389E-02	%(	3.082E-02 9.33E-03	G
Kr-85		-3.4353E+02					
			513.99	-3.435E+02	%(P	7.084E+02 2.13E+02	G
Y-88		-1.6647E-03					
			1836.01	-1.665E-03	%(P	1.614E-02 3.99E-03	G K
			898.02	-9.483E-04	% P	2.240E-02 6.20E-03	G
NB-94		5.3798E-03					
			871.10	5.380E-03	%(P	2.245E-02 6.58E-03	G K
			702.50	3.003E-03	& P	2.153E-02 6.25E-03	G K
Ag-108M		-1.6638E-02					
			722.95	-1.664E-02	%(	3.455E-02 1.05E-02	G K
			614.37	-2.956E-02	&	3.647E-02 1.13E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	2.802E-04	& P	2.355E-02	6.84E-03	G
CD-109	5.2575E-01						
		88.04	5.257E-01	%(P	8.664E-01	2.64E-01	G
SN-113	-1.9396E-04						
		391.71	-1.940E-04	%(P	2.945E-02	8.52E-03	G K
		255.04	1.924E-01	%	1.006E+00	3.00E-01	G
SB-125	3.7299E-02						
		427.95	-1.781E-02	%(P	6.331E-02	1.87E-02	G K
		600.77	-2.529E-02	% P	1.146E-01	3.34E-02	G
		636.15	2.083E-03	& P	1.844E-01	5.27E-02	G
		463.51	2.004E-01	(P	2.124E-01	6.68E-02	G
		176.29	-2.729E-03	& P	3.866E-01	1.15E-01	G
I-131	7.4517E-03						
		364.48	7.452E-03	%(	2.356E-02	7.04E-03	G K
		636.97	4.022E-02	%	2.737E-01	7.93E-02	G
		284.29	-5.615E-02	%	3.817E-01	1.13E-01	G
CS-134	1.6809E-02						
		604.66	1.154E-02	(P	1.217E-02	4.00E-03	G K
		795.76	2.282E-02	*(P	2.369E-02	7.65E-03	G
		569.29	5.218E-02	%	1.353E-01	4.06E-02	G
		801.84	-3.927E-02	% P	2.627E-01	7.61E-02	G
CS-137	1.8408E-01						
		661.62	1.841E-01	*(P	3.499E-02	1.83E-02	G
CE-139	-6.7795E-04						
		165.85	-6.780E-04	&(P	2.870E-02	8.53E-03	G
EU-152	1.4428E-02						
		121.78	1.443E-02	%(P	8.641E-02	2.59E-02	G K
		344.30	-7.558E-03	% P	7.899E-02	2.33E-02	G
		1408.08	-2.662E-03	% P	1.418E-01	3.97E-02	G
		964.00	6.048E-02	& P	2.350E-01	6.97E-02	G
		1112.07	2.119E-02	& P	1.861E-01	5.33E-02	G
		778.90	-2.427E-02	& P	1.702E-01	4.91E-02	G
EU-154	-3.4381E-04						
		123.10	-3.438E-04	&(P	6.359E-02	1.89E-02	G K
		1274.80	-2.922E-03	% P	7.745E-02	2.18E-02	G
		723.30	-7.544E-04	% P	9.631E-02	2.71E-02	G
		1004.80	-3.350E-02	% P	1.526E-01	4.46E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	5.8552E-02						
		86.45	5.855E-02	&(	1.071E-01	3.26E-02	G K
		105.31	-5.478E-03	% P	1.260E-01	3.76E-02	G
HG-203	1.0202E-02						
		279.17	1.020E-02	%(P	2.444E-02	7.37E-03	G K
		72.87	-1.822E-01	% P	7.078E-01	2.13E-01	G
		70.83	-6.166E-02	%	8.227E-01	2.45E-01	G
		82.50	-4.105E-01	%	1.519E+00	4.57E-01	G
TL-208	1.9530E-01						
		583.14	1.953E-01	*(P	2.574E-02	1.33E-02	G
		510.72	2.577E-01	+ P	1.251E-01	5.32E-02	G
PB-212	4.3323E-01						
		238.63	4.137E-01	(P	4.713E-02	1.98E-02	G K
							Energy duplication
		77.11	2.992E-01	}	1.651E-01	4.40E-02	G
		74.81	5.624E-01	+ P	3.101E-01	9.92E-02	G
PB-214	3.2902E-01						
		351.99	3.367E-01	*(P	6.634E-02	3.05E-02	G K
		295.22	3.141E-01	*(P	9.475E-02	3.56E-02	G
							Energy duplication
		77.11	2.893E-01	} P	3.469E-01	1.02E-01	G
		241.92	4.946E-01	+ P	2.944E-01	9.47E-02	G
BI-212	3.6729E-01						
		727.17	3.673E-01	(P	1.849E-01	7.24E-02	G K
		1620.56	7.249E-01	+ P	3.248E-01	1.74E-01	G
		785.42	5.832E-01	% P	1.040E+00	3.18E-01	G
BI-214	3.5273E-01						
		609.32	3.402E-01	*(P	5.525E-02	2.77E-02	G K
		1764.51	3.890E-01	*(P	6.867E-02	5.19E-02	G
		1120.28	5.104E-01	+ P	2.041E-01	9.32E-02	G
RA-224	2.9722E-01						
		241.00	2.972E-01	&(P	8.285E-01	2.50E-01	G
RA-226	1.2029E+00						
		185.99	1.203E+00	*(	6.540E-01	2.36E-01	G
AC-228	6.6789E-01						
		911.07	6.275E-01	*(P	9.494E-02	5.41E-02	G K
		968.90	7.350E-01	@(P	1.792E-01	9.18E-02	G
		338.40	5.525E-01	- P	1.682E-01	6.86E-02	G

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

TH-227      -2.5190E-01
                          236.00-2.519E-01 ?(P 3.095E-01 9.49E-02 G K
                          256.25 3.682E-02 % P 2.997E-01 8.88E-02 G

PA-234      -4.0183E-02
                           98.44-4.018E-02 &(  9.771E-02 2.95E-02 G K
                          946.00 4.143E-02 %   1.093E-01 3.27E-02 G
                          131.28-9.694E-03 %   1.328E-01 3.97E-02 G
                           94.67-1.038E-01 %   2.055E-01 6.24E-02 G
                          883.24 5.381E-03 %   1.763E-01 4.99E-02 G
                          926.70-2.374E-02 %   1.952E-01 5.60E-02 G
                          569.26 7.729E-02 %   2.005E-01 6.02E-02 G

TH-234       5.3112E-01
                           63.29 2.361E-01 %(P 1.389E+00 4.15E-01 G K
                           92.80 7.520E-01 % P 1.075E+00 3.27E-01 G
                           92.38 9.789E-01  (P 1.271E+00 3.88E-01 G

AM-241       5.1523E-03
                           59.54 5.152E-03 %(P 1.726E-01 5.15E-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		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	5.9679E-02	6.0371E-02	1.8169E-01	1.8172E-01	2.008E-01
K-40	#	1.0015E+01	1.0015E+01	8.6756E-01	1.0500E+00	
MN-54	#A	4.2505E-04	4.2588E-04	2.3571E-02	2.3571E-02	2.728E-02
CO-57	#B	-1.3084E-04	-1.3114E-04	6.1765E-02	6.1765E-02	2.719E-02
CO-60	#B	8.7875E-03	8.7903E-03	2.2061E-02	2.2067E-02	2.526E-02
Sr-85	#A	-1.3758E-02	-1.3889E-02	2.7985E-02	2.7997E-02	3.053E-02
Kr-85	#A	-3.4353E+02	-3.4353E+02	7.4449E+02	7.4476E+02	7.084E+02
Y-88	#B	-1.6552E-03	-1.6647E-03	3.4380E-02	3.4380E-02	1.605E-02
NB-94	#B	5.3798E-03	5.3798E-03	1.9747E-02	1.9750E-02	2.245E-02
Ag-108M	#B	-1.6637E-02	-1.6638E-02	3.1435E-02	3.1450E-02	3.455E-02
CD-109	#A	5.2503E-01	5.2575E-01	7.9172E-01	7.9226E-01	8.653E-01
SN-113	#B	-1.9292E-04	-1.9396E-04	4.0587E-02	4.0587E-02	2.929E-02
SB-125	#B	3.7276E-02	3.7299E-02	3.7267E-02	3.7332E-02	6.328E-02
I-131	#B	6.9026E-03	7.4517E-03	2.1125E-02	2.1130E-02	2.182E-02
CS-134	#	1.6795E-02	1.6809E-02	1.2160E-02	1.2201E-02	1.216E-02
CS-137	#	1.8407E-01	1.8408E-01	5.4779E-02	5.5847E-02	
CE-139	#A	-6.7493E-04	-6.7795E-04	3.2131E-02	3.2131E-02	2.857E-02
EU-152	#B	1.4426E-02	1.4428E-02	7.7682E-02	7.7686E-02	8.640E-02
EU-154	#B	-3.4375E-04	-3.4381E-04	3.0549E-01	3.0549E-01	6.358E-02
EU-155	#B	5.8532E-02	5.8552E-02	9.7691E-02	9.7745E-02	1.071E-01
HG-203	#B	1.0068E-02	1.0202E-02	2.2120E-02	2.2128E-02	2.412E-02
TL-208	#	1.9530E-01	1.9530E-01	3.9865E-02	4.1501E-02	
PB-212		4.3323E-01	4.3323E-01	6.2142E-02	6.7204E-02	
PB-214		3.2902E-01	3.2902E-01	7.1645E-02	7.4233E-02	
BI-212		3.6729E-01	3.6729E-01	2.1697E-01	2.1805E-01	
BI-214		3.5273E-01	3.5273E-01	8.2736E-02	8.5319E-02	
RA-224	#A	2.9722E-01	2.9722E-01	7.5025E-01	7.5046E-01	8.285E-01
RA-226	#	1.2029E+00	1.2029E+00	7.0772E-01	7.1127E-01	
AC-228	#	6.6789E-01	6.6789E-01	1.5201E-01	1.5705E-01	
TH-227	#A	-2.5190E-01	-2.5190E-01	2.8585E-01	2.8624E-01	3.095E-01
PA-234	#B	-4.0183E-02	-4.0183E-02	8.8649E-02	8.8677E-02	9.771E-02
TH-234	#B	5.3112E-01	5.3112E-01	6.3225E-01	6.3293E-01	1.389E+00
AM-241	#A	5.1523E-03	5.1523E-03	1.5447E-01	1.5447E-01	1.726E-01

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

H - Halflife limit exceeded

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

Total Activity (269.7 to 2000.1 keV) 1.3747947E+01 pCi/gm
Total Decayed Activity (269.7 to 2000.1 keV) 1.3747958E+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_7SEP2006_0829.An1

Sample description
FSS-OOL-02-03-023-F

Spectrum Filename: C:\GammaVision\Spectra\107F_7SEP2006_0829.An1

Acquisition information
Start time: 07-Sep-2006 08:29:52
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: 1.5080E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5080E+03) =
6.6313E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-2006 08:10:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 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
74.75	303.	14.38	1.18	2.842E-02				
74.75	303.	14.38	1.18	2.842E-02	74.81	9.600	9.809E-01	PB212
77.04	420.	11.00	1.18	2.950E-02				
77.04	420.	11.00	1.18	2.950E-02	77.11	17.500	7.280E-01	PB212
					77.11	10.700	1.177E+00	PB214
87.45	204.	30.92	0.70	3.311E-02	86.45	32.740	1.703E-01	EU155
					88.04	3.790	1.451E+00	CD109
93.30	131.	35.81	1.75	3.449E-02	92.80	3.000	PBC<MDA	TH234
186.47	236.	19.55	2.46	3.607E-02	185.99	3.280	1.789E+00	RA226
209.71	122.	29.50	1.67	3.425E-02				
239.28	1505.	4.01	2.01	3.184E-02	238.63	43.100	9.711E-01	PB212
					241.00	3.900	1.089E+01	RA224
295.34	229.	15.19	1.48	2.767E-02	295.22	19.200	3.789E-01	PB214
328.69	151.	19.88	1.74	2.556E-02				
338.55	283.	11.42	1.98	2.499E-02	338.40	12.010	8.343E-01	AC228
351.88	520.	6.59	1.98	2.426E-02				
351.88	520.	6.59	1.98	2.426E-02	351.99	37.100	5.127E-01	PB214
463.48	47.	41.23	1.50	1.953E-02	463.51	10.000	PBC<MDA	SB125
510.94	214.	15.04	2.76	1.808E-02	510.72	22.500	4.721E-01	TL208
583.29	444.	7.92	2.38	1.629E-02	583.14	86.000	2.811E-01	TL208
609.47	381.	7.32	2.23	1.574E-02	609.32	46.090	4.651E-01	BI214
661.93	329.	9.80	2.03	1.477E-02	661.62	84.620	2.336E-01	CS137
727.47	155.	18.25	2.08	1.374E-02	727.17	11.800	8.483E-01	BI212
785.13	46.	40.03	1.04	1.297E-02	785.42	2.000	PBC<MDA	BI212
795.63	51.	26.68	1.68	1.284E-02	795.76	85.400	4.206E-02	CS134
860.99	93.	20.81	1.62	1.211E-02				
911.33	341.	10.06	2.41	1.161E-02	911.07	29.000	8.965E-01	AC228

968.04	293.	9.11	2.14	1.110E-02	964.00	14.580	1.616E+00	EU152
					968.90	17.460	1.344E+00	AC228
1120.35	90.	18.00	2.08	9.970E-03	1120.28	15.040	5.350E-01	BI214
1460.96	1667.	2.51	2.56	8.190E-03	1460.75	10.700	1.700E+01	K40
1764.94	90.	11.20	2.16	7.084E-03	1764.51	15.920	7.152E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
149.17	74.67	800.	303.	0.152	43.15	1.178	BI-207	D
153.74	76.95	860.	420.	0.210	33.01	1.179	PB-214	D
174.56	87.45	1401.	204.	0.102	92.76	0.700	PB-214	l
419.05	209.71	487.	122.	0.061	88.50	1.669	NP-239	s
656.99	328.69	250.	151.	0.075	59.64	1.744	LA-140	s
703.37	351.88	634.	120.	0.060	92.93	1.979	PB-214	s
1721.54	860.99	88.	93.	0.046	52.96	1.617	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	2020.	208.	0.104	92.32	1.500s
PB-212	153.89	77.11	1717.	378.	0.189	49.04	1.500D
PB-214	153.89	77.11	1721.	373.	0.186	49.04	1.500D
RA-226	372.59	186.47	679.	236.	0.118	58.66	2.461s
TH-227	470.03	235.20	1235.	-146.	-0.073	105.58	1.500s
PB-212	477.17	238.77	962.	958.	0.479	16.49	1.500s
RA-224	477.35	238.86	804.	871.	0.435	17.10	1.500s
PB-214	590.47	295.43	399.	204.	0.102	45.43	1.500s
AC-228	676.71	338.55	265.	280.	0.140	34.26	1.979s
PB-214	703.71	352.05	293.	395.	0.197	23.45	1.500s
TL-208	1021.46	510.94	306.	214.	0.107	45.11	2.756s
TL-208	1166.16	583.29	208.	439.	0.220	23.75	2.380s
BI-214	1218.52	609.47	132.	377.	0.188	21.97	2.228s
CS-137	1323.44	661.93	191.	326.	0.163	29.40	2.033s
BI-212	1454.87	727.65	153.	143.	0.071	58.73	2.064s
BI-212	1569.83	785.13	98.	46.	0.023	120.09	1.038s
CS-134	1590.82	795.63	71.	51.	0.026	80.04	1.684s
AC-228	1822.22	911.33	168.	337.	0.168	30.19	2.413s
AC-228	1935.64	968.04	97.	291.	0.145	27.33	2.142s
BI-214	2240.26	1120.35	65.	90.	0.045	54.00	2.075s
K-40	2921.52	1460.96	23.	1662.	0.831	7.53	2.560s
BI-214	3529.54	1764.94	4.	90.	0.045	33.59	2.157s

s - Peak fails shape tests.
D - Peak area deconvoluted.

A Derived peak area.

***** S U M M A R Y O 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		-9.6072E-02					
			477.56	-9.607E-02	&(	2.911E-01 8.71E-02	G
K-40		1.6996E+01					
			1460.75	1.700E+01	*(P	2.549E-01 4.28E-01	G
MN-54		5.3889E-03					
			834.81	5.389E-03	&(P	3.741E-02 1.09E-02	G
CO-57		5.1072E-03					
			122.07	5.107E-03	%(P	4.067E-02 1.22E-02	G K
			136.43	-4.428E-02	& P	3.149E-01 9.43E-02	G
CO-60		-7.0033E-03					
			1332.51	-7.003E-03	%(P	3.736E-02 1.03E-02	G K
			1173.23	1.074E-02	& P	4.625E-02 1.35E-02	G K
Sr-85		-1.3245E-02					
			514.00	-1.325E-02	%(	4.366E-02 1.31E-02	G
Kr-85		-3.3713E+02					
			513.99	-3.371E+02	%(P	1.002E+03 2.99E+02	G
Y-88		-4.0411E-03					
			1836.01	-4.041E-03	%(P	2.254E-02 5.84E-03	G K
			898.02	-8.782E-03	& P	4.294E-02 1.25E-02	G
NB-94		3.8182E-03					
			871.10	3.818E-03	%(P	2.814E-02 8.10E-03	G K
			702.50	-2.879E-03	% P	3.154E-02 9.12E-03	G K
Ag-108M		-1.8035E-02					
			722.95	-1.804E-02	%(	4.605E-02 1.39E-02	G K
			614.37	-2.698E-02	&	4.654E-02 1.42E-02	G
			433.93	-7.439E-03	& P	2.513E-02 7.39E-03	G
CD-109		6.8257E-01					
			88.04	6.826E-01	%(P	1.232E+00 3.75E-01	G
SN-113		-9.1129E-03					
			391.71	-9.113E-03	%(P	4.864E-02 1.44E-02	G K
			255.04	-2.566E-01	%	1.412E+00 4.21E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-7.0605E-03						
		427.95	-7.061E-03	&(P	9.853E-02	2.87E-02	G K
		600.77	-6.951E-03	& P	1.698E-01	4.88E-02	G
		636.15	-6.290E-02	& P	2.965E-01	8.73E-02	G
		463.51	2.159E-01	% P	3.065E-01	9.43E-02	G
		176.29	9.075E-02	& P	4.897E-01	1.47E-01	G
I-131	-6.2553E-03						
		364.48	-6.255E-03	&(	3.812E-02	1.13E-02	G K
		636.97	-9.780E-02	%	4.674E-01	1.38E-01	G
		284.29	-5.194E-02	&	4.587E-01	1.36E-01	G
CS-134	1.3695E-02						
		604.66	-1.113E-02	%(P	4.402E-02	1.31E-02	G K
		795.76	4.206E-02	*(P	3.425E-02	1.13E-02	G
		569.29	8.987E-03	&	2.034E-01	5.91E-02	G
		801.84	-1.048E-01	% P	3.620E-01	1.07E-01	G
CS-137	2.3364E-01						
		661.62	2.336E-01	*(P	4.813E-02	2.32E-02	G
CE-139	-2.8817E-03						
		165.85	-2.882E-03	%(P	4.012E-02	1.20E-02	G
EU-152	-1.5184E-03						
		121.78	-1.518E-03	&(P	1.092E-01	3.25E-02	G K
		344.30	1.425E-02	% P	9.080E-02	2.68E-02	G
		1408.08	1.621E-02	% P	1.458E-01	4.09E-02	G
		964.00	-2.112E-01	& P	4.405E-01	1.34E-01	G
		1112.07	-4.661E-02	& P	3.554E-01	1.04E-01	G
		778.90	4.946E-02	% P	1.923E-01	5.62E-02	G
EU-154	1.2339E-02						
		123.10	1.234E-02	%(P	8.028E-02	2.40E-02	G K
		1274.80	-9.329E-04	% P	1.228E-01	3.49E-02	G
		723.30	-1.459E-03	& P	2.997E-01	8.82E-02	G
		1004.80	-5.602E-03	& P	1.838E-01	5.20E-02	G
EU-155	9.1456E-02						
		86.45	9.146E-02	%(	1.546E-01	4.70E-02	G K
		105.31	4.876E-02	% P	1.611E-01	4.85E-02	G
HG-203	-4.7270E-04						
		279.17	-4.727E-04	%(P	3.605E-02	1.06E-02	G K
		72.87	6.087E-03	% P	1.134E+00	3.40E-01	G
		70.83	-5.241E-02	&	2.216E+00	6.65E-01	G
		82.50	-9.681E-01	%	2.359E+00	7.14E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8110E-01						
		583.14	2.811E-01	*(P	4.468E-02	2.25E-02	G
		510.72	4.721E-01	+ P	1.854E-01	8.22E-02	G
PB-212	6.3967E-01						
		238.63	6.247E-01	*(P	9.599E-02	3.49E-02	G K
							Energy duplication
		77.11	6.539E-01	*(	3.390E-01	1.07E-01	G
		74.81	6.808E-01	*(P	6.949E-01	2.13E-01	G
PB-214	3.7624E-01						
		351.99	3.929E-01	*(P	8.215E-02	3.11E-02	G K
		295.22	3.440E-01	*(P	1.615E-01	5.32E-02	G
							Energy duplication
		77.11	1.056E+00	+ P	5.552E-01	1.75E-01	G
		241.92	-3.629E-01	% P	6.338E-01	1.93E-01	G
BI-212	7.8974E-01						
		727.17	7.897E-01	*(P	3.336E-01	1.56E-01	G K
		1620.56	-1.008E-01	% P	1.121E+00	3.07E-01	G
		785.42	1.587E+00	+ P	1.688E+00	6.53E-01	G
BI-214	4.8229E-01						
		609.32	4.651E-01	*(P	6.958E-02	3.45E-02	G K
		1764.51	7.152E-01	+ P	9.556E-02	8.09E-02	G
		1120.28	5.350E-01	*(P	2.416E-01	9.73E-02	G
RA-224	6.3094E+00						
		241.00	6.309E+00	&(P	9.772E-01	3.61E-01	G
RA-226	1.7890E+00						
		185.99	1.789E+00	*(	9.392E-01	3.50E-01	G
AC-228	8.7828E-01						
		911.07	8.965E-01	*(P	1.681E-01	9.14E-02	G K
		968.90	1.344E+00	+ P	2.254E-01	1.23E-01	G
		338.40	8.343E-01	*(P	2.346E-01	9.64E-02	G
TH-227	-3.6281E-01						
		236.00	-3.628E-01	?(P	4.149E-01	1.27E-01	G K
		256.25	3.247E-02	& P	4.305E-01	1.27E-01	G
PA-234	-5.8595E-02						
		98.44	-5.859E-02	&(	1.462E-01	4.42E-02	G K
		946.00	-1.760E-02	&	1.758E-01	5.08E-02	G
		131.28	8.228E-02	&	1.543E-01	4.69E-02	G
		94.67	-1.201E-01	%	2.712E-01	8.22E-02	G
		883.24	3.289E-02	&	2.106E-01	6.05E-02	G
		926.70	-3.269E-03	%	3.136E-01	8.94E-02	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.341E-02 &   3.015E-01 8.76E-02 G

TH-234       3.9101E-01
                           63.29 3.910E-01 %(P 2.062E+00 6.18E-01 G K
                           92.80 9.383E-01 % P 1.522E+00 4.62E-01 G
                           92.38-3.348E-01 % P 1.758E+00 5.26E-01 G

AM-241       7.4175E-04
                           59.54 7.417E-04 %(P 2.685E-01 8.02E-02 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-9.4816E-02	-9.6072E-02	2.6142E-01	2.6148E-01	2.873E-01
K-40	#	1.6996E+01	1.6996E+01	1.2831E+00	1.6291E+00	
MN-54	#A	5.3767E-03	5.3889E-03	3.2779E-02	3.2781E-02	3.733E-02
CO-57	#B	5.0939E-03	5.1072E-03	3.6514E-02	3.6515E-02	4.056E-02
CO-60	#B	-7.0008E-03	-7.0033E-03	1.0588E-01	1.0588E-01	3.735E-02

Sr-85	#A	-1.3102E-02	-1.3245E-02	3.9275E-02	3.9283E-02	4.319E-02
Kr-85	#A	-3.3713E+02	-3.3713E+02	1.1025E+03	1.1026E+03	1.002E+03
Y-88	#B	-4.0145E-03	-4.0411E-03	3.0255E-02	3.0256E-02	2.239E-02
NB-94	#B	3.8182E-03	3.8182E-03	2.4297E-02	2.4298E-02	2.814E-02
Ag-108M	#B	-1.8035E-02	-1.8035E-02	4.1581E-02	4.1594E-02	4.605E-02
CD-109	#A	6.8151E-01	6.8257E-01	1.1240E+00	1.1246E+00	1.230E+00
SN-113	#B	-9.0575E-03	-9.1129E-03	5.5457E-02	5.5459E-02	4.835E-02
SB-125	#B	-7.0556E-03	-7.0605E-03	1.5637E-01	1.5637E-01	9.846E-02
I-131	#B	-5.7317E-03	-6.2553E-03	3.3874E-02	3.3876E-02	3.493E-02
CS-134	#B	1.3682E-02	1.3695E-02	1.1074E-02	1.1104E-02	4.398E-02
CS-137	#	2.3363E-01	2.3364E-01	6.9442E-02	7.0800E-02	
CE-139	#A	-2.8670E-03	-2.8817E-03	3.8534E-02	3.8535E-02	3.992E-02
EU-152	#B	-1.5182E-03	-1.5184E-03	1.1296E-01	1.1296E-01	1.092E-01
EU-154	#B	1.2336E-02	1.2339E-02	7.2092E-02	7.2095E-02	8.026E-02
EU-155	#B	9.1421E-02	9.1456E-02	1.4115E-01	1.4124E-01	1.545E-01
HG-203	#B	-4.6563E-04	-4.7270E-04	1.0568E+00	1.0568E+00	3.551E-02
TL-208	#	2.8110E-01	2.8110E-01	6.7457E-02	6.9470E-02	
PB-212	#	6.3967E-01	6.3967E-01	1.0721E-01	1.1368E-01	9.599E-02
PB-214	#	3.7624E-01	3.7624E-01	8.9355E-02	9.2076E-02	8.215E-02
BI-212	#	7.8974E-01	7.8974E-01	4.6800E-01	4.7032E-01	
BI-214	#	4.8229E-01	4.8229E-01	1.0717E-01	1.1089E-01	
RA-224	#	6.3094E+00	6.3094E+00	1.0819E+00	1.1443E+00	9.772E-01
RA-226	#	1.7890E+00	1.7890E+00	1.0494E+00	1.0547E+00	
AC-228	#	8.7828E-01	8.7828E-01	2.0293E-01	2.0946E-01	
TH-227	#A	-3.6281E-01	-3.6281E-01	3.8376E-01	3.8436E-01	4.149E-01
PA-234	#B	-5.8595E-02	-5.8595E-02	1.3263E-01	1.3267E-01	1.462E-01
TH-234	#B	3.9101E-01	3.9101E-01	1.8554E+00	1.8555E+00	2.062E+00
AM-241	#A	7.4174E-04	7.4175E-04	2.4066E-01	2.4066E-01	2.685E-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 2000.1 keV) 2.1450184E+01 pCi/gm
Total Decayed Activity (87.2 to 2000.1 keV) 2.1450201E+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_18AUG2006_1155.An1

Sample description
FSS-OOL-02-04-003-F-S

Spectrum Filename: C:\GammaVision\Spectra\101F_18AUG2006_1155.An1

Acquisition information
Start time: 18-Aug-2006 11:55:58
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: 1.9190E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9190E+03) =
5.2110E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 14:00:00
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: 0.0960

***** S U M M A R Y O F P E A K 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	199.	24.05	1.50	1.654E-02	70.83	3.520	2.668E+00	HG203
					74.81	9.600	8.825E-01	PB212
77.09	310.	15.41	1.50	1.720E-02	77.11	10.700	1.185E+00	PB214
					77.11	17.500	7.247E-01	PB212
77.09	314.	15.41	1.50	1.720E-02	77.11	10.700	1.185E+00	PB214
					77.11	17.500	7.334E-01	PB212
87.11	114.	25.40	1.01	1.920E-02	86.45	32.740	1.286E-01	EU155
					88.04	3.790	PBC<MDA	CD109
90.64	73.	38.06	1.02	1.966E-02				
92.90	119.	23.95	1.02	1.991E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.31	90.	41.34	1.67	2.109E-02				
185.93	139.	20.44	0.92	1.859E-02				
185.93	139.	20.44	0.92	1.859E-02	185.99	3.280	1.608E+00	RA226
209.04	73.	36.07	1.03	1.723E-02				
238.71	808.	4.08	1.12	1.558E-02				
238.71	808.	4.08	1.12	1.558E-02	238.63	43.100	8.413E-01	PB212
241.62	128.	18.09	1.12	1.542E-02	241.00	3.900	1.485E+00	RA224
					241.92	7.470	PBC<MDA	PB214
269.98	109.	25.16	1.15	1.402E-02				
295.05	172.	16.07	1.10	1.293E-02				
295.05	172.	16.07	1.10	1.293E-02	295.22	19.200	4.824E-01	PB214
300.44	77.	25.62	0.88	1.271E-02				
328.16	77.	28.82	1.49	1.169E-02				
338.24	169.	16.76	1.09	1.135E-02	338.40	12.010	8.618E-01	AC228
351.91	286.	10.24	1.18	1.093E-02				
351.91	286.	10.24	1.18	1.093E-02	351.99	37.100	4.926E-01	PB214

462.62	79.	24.25	1.45	8.357E-03				
462.62	79.	24.25	1.45	8.357E-03	463.51	10.000	6.551E-01	SB125
510.38	129.	14.00	1.42	7.595E-03	510.72	22.500	4.650E-01	TL208
583.16	233.	9.55	1.43	6.684E-03	583.14	86.000	2.820E-01	TL208
609.19	207.	9.85	1.57	6.414E-03	609.32	46.090	4.901E-01	BI214
727.81	78.	23.14	1.49	5.439E-03	727.17	11.800	8.434E-01	BI212
795.14	31.	26.23	1.50	5.016E-03	795.76	85.400	5.048E-02	CS134
911.01	155.	13.10	1.71	4.447E-03	911.07	29.000	8.341E-01	AC228
967.69	111.	14.27	2.31	4.217E-03	968.90	17.460	1.056E+00	AC228
1120.01	61.	24.87	1.34	3.711E-03	1120.28	15.040	7.661E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1460.47	632.	4.05	1.87	2.943E-03	1460.75	10.700	1.409E+01	K40

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
173.79	87.14	363.	114.	0.057	76.19	1.014	PB-214	lD
180.86	90.68	353.	73.	0.037	114.18	1.016	PB-214	lD
185.46	92.94	359.	110.	0.055	78.82	1.018	TH-234	D
258.22	129.31	537.	95.	0.047	108.46	1.666	AC-228	s
417.76	209.04	282.	73.	0.036	108.22	1.032	AC-228	s
477.11	238.58	139.	808.	0.404	12.24	1.122	PB-212	D
482.93	241.49	203.	128.	0.064	54.26	1.124	PB-214	D
539.68	269.98	240.	109.	0.055	75.49	1.151	AC-228	s
600.64	300.44	132.	77.	0.039	71.54	0.883	PB-212	s
656.10	328.16	162.	77.	0.039	86.46	1.490	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	149.05	74.74	1109.	199.	0.099	72.14	1.499
PB-214	153.79	77.11	1014.	310.	0.155	46.23	1.499D
PB-212	153.79	77.11	1011.	314.	0.157	46.23	1.499D
TH-234	186.14	93.28	819.	136.	0.068	85.84	1.499s
TH-234	186.10	93.26	855.	137.	0.069	89.81	1.499s
RA-226	371.79	186.07	429.	116.	0.058	81.00	1.499s
PB-212	477.14	238.72	394.	655.	0.327	17.20	1.499
RA-224	482.62	241.46	427.	121.	0.060	77.08	1.499
PB-214	590.50	295.37	193.	145.	0.073	47.04	1.499
AC-228	676.26	338.24	200.	167.	0.083	50.29	1.094
PB-214	703.63	351.92	121.	243.	0.122	26.90	1.499
SB-125	925.95	463.03	82.	61.	0.031	71.64	1.499
TL-208	1020.70	510.38	86.	113.	0.056	42.01	1.419s
TL-208	1166.32	583.16	84.	230.	0.115	28.64	1.430
BI-214	1218.42	609.19	68.	206.	0.103	29.56	1.571
BI-212	1455.78	727.81	65.	77.	0.038	69.41	1.488s
CS-134	1590.50	795.14	18.	31.	0.015	78.69	1.502s
AC-228	1822.36	911.01	61.	153.	0.076	39.29	1.714s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1935.79	967.69	41.	110.	0.055	42.82	2.310s
BI-214	2240.61	1120.01	46.	61.	0.030	74.61	1.335s
K-40	2921.96	1460.47	9.	630.	0.315	12.15	1.868

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

***** S U M M A R Y O 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		1.5452E-01					
			477.56	1.545E-01	%(	4.275E-01 1.28E-01 G	
K-40		1.4087E+01					
			1460.75	1.409E+01	(P	3.764E-01 5.72E-01 G	
MN-54		7.6133E-03					
			834.81	7.613E-03	%(P	4.494E-02 1.28E-02 G	
CO-57		1.4710E-04					
			122.07	1.471E-04	&(	4.950E-02 1.47E-02 G K	
			136.43	-4.311E-03	%	4.054E-01 1.20E-01 G	
CO-60		-8.9327E-04					
			1332.51	-8.933E-04	%(P	5.261E-02 1.42E-02 G K	
			1173.23	1.365E-02	% P	5.813E-02 1.68E-02 G K	
Sr-85		-2.3858E-02					
			514.00	-2.386E-02	%(	5.569E-02 1.68E-02 G	
Kr-85		-5.7100E+02					
			513.99	-5.710E+02	%(P	1.278E+03 3.84E+02 G	
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	4.942E-02 1.25E-02 G K	
			898.02	7.951E-03	& P	5.396E-02 1.54E-02 G	
NB-94		-9.0407E-03					
			871.10	-9.041E-03	%(P	5.184E-02 1.49E-02 G K	
			702.50	-8.774E-03	% P	5.288E-02 1.54E-02 G K	
Ag-108M		-2.7530E-03					
			722.95	-2.753E-03	%(	5.974E-02 1.71E-02 G K	
			614.37	-6.473E-04	% P	4.875E-02 1.38E-02 G	
			433.93	-2.624E-06	%	4.523E-02 1.30E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	2.6235E-02						
		88.04	2.623E-02	&(P	1.481E+00	4.42E-01	G
SN-113	1.0801E-02						
		391.71	1.080E-02	&(	6.298E-02	1.85E-02	G K
		255.04	-3.639E-01	% P	1.864E+00	5.54E-01	G
SB-125	1.4451E-01						
		427.95	1.900E-02	%(P	1.312E-01	3.83E-02	G K
		600.77	4.342E-02	& P	2.132E-01	6.19E-02	G
		636.15	-1.138E-01	% P	4.251E-01	1.25E-01	G
		463.51	5.160E-01	(P	3.787E-01	1.26E-01	G
		176.29	7.689E-02	% P	5.487E-01	1.63E-01	G
I-131	5.5327E-04						
		364.48	5.533E-04	%(	4.383E-02	1.26E-02	G K
		636.97	6.326E-04	%	6.268E-01	1.76E-01	G
		284.29	-7.046E-02	&	6.859E-01	2.02E-01	G
CS-134	2.8114E-02						
		604.66	8.542E-03	&(P	3.702E-02	1.07E-02	G K
		795.76	5.048E-02	(P	3.712E-02	1.34E-02	G
		569.29	-2.969E-03	% P	3.049E-01	8.68E-02	G
		801.84	-2.201E-02	%	5.148E-01	1.44E-01	G
CS-137	-1.7638E-03						
		661.62	-1.764E-03	%(P	4.913E-02	1.37E-02	G
CE-139	-5.8992E-03						
		165.85	-5.899E-03	&(P	5.025E-02	1.50E-02	G
EU-152	9.6310E-04						
		121.78	9.631E-04	&(P	1.439E-01	4.27E-02	G K
		344.30	2.767E-02	% P	1.329E-01	3.92E-02	G
		1408.08	-1.942E-03	& P	1.637E-01	4.02E-02	G
		964.00	1.208E-01	% P	4.741E-01	1.39E-01	G
		1112.07	7.553E-02	& P	4.571E-01	1.31E-01	G
		778.90	9.739E-02	% P	3.159E-01	9.28E-02	G
EU-154	-7.5132E-04						
		123.10	-7.513E-04	%(P	1.031E-01	3.06E-02	G K
		1274.80	-2.718E-02	& P	1.929E-01	5.51E-02	G
		723.30	4.276E-02	% P	2.164E-01	6.25E-02	G
		1004.80	-1.564E-02	% P	2.872E-01	7.99E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.1217E-01						
		86.45	1.122E-01	%(	1.686E-01	5.15E-02	G K
		105.31	5.743E-02	%	2.030E-01	6.11E-02	G
HG-203	-9.0567E-03						
		279.17	-9.057E-03	&(	5.268E-02	1.56E-02	G K
		72.87	-6.203E-02	% P	1.103E+00	3.29E-01	G
		70.83	-8.171E-01	%	2.017E+00	6.10E-01	G
		82.50	-6.368E-01	&	2.619E+00	7.88E-01	G
TL-208	2.8202E-01						
		583.14	2.820E-01	(P	5.557E-02	2.72E-02	G
		510.72	4.650E-01	+ P	1.896E-01	7.43E-02	G
PB-212	7.0027E-01						
		238.63	6.868E-01	(P	9.985E-02	3.98E-02	G K
							Energy duplication
		77.11	7.334E-01	(	3.528E-01	1.13E-01	G
		74.81	8.825E-01	& P	7.003E-01	2.18E-01	G
PB-214	4.1865E-01						
		351.99	4.222E-01	(P	9.369E-02	3.82E-02	G K
		295.22	4.118E-01	(P	1.917E-01	6.54E-02	G
							Energy duplication
		77.11	1.185E+00	+ P	5.781E-01	1.85E-01	G
		241.92	-4.274E-02	% P	7.858E-01	2.34E-01	G
BI-212	8.4339E-01						
		727.17	8.434E-01	@(P	4.419E-01	1.97E-01	G K
		1620.56	4.826E-01	&	1.338E+00	3.92E-01	G
		785.42	5.611E-01	% P	2.146E+00	6.25E-01	G
BI-214	4.9008E-01						
		609.32	4.901E-01	(P	9.822E-02	4.85E-02	G K
		1764.51	1.306E-01	% P	2.567E-01	7.87E-02	G
		1120.28	7.661E-01	+ P	4.342E-01	1.92E-01	G
RA-224	1.4121E+00						
		241.00	1.412E+00	(P	1.158E+00	3.65E-01	G
RA-226	1.3356E+00						
		185.99	1.336E+00	@(	1.147E+00	3.61E-01	G
AC-228	9.0603E-01						
		911.07	8.341E-01	*(P	2.140E-01	1.11E-01	G K
		968.90	1.056E+00	*(P	3.107E-01	1.52E-01	G
		338.40	8.618E-01	(P	3.546E-01	1.46E-01	G

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

TH-227      -2.6907E-01
                          236.00-2.691E-01 %(P 4.684E-01 1.43E-01 G K
                          256.25-1.320E-01 & P 5.427E-01 1.61E-01 G

PA-234       5.7608E-02
                           98.44 5.761E-02 %(  1.773E-01 5.34E-02 G K
                          946.00 1.001E-01 &   2.064E-01 6.28E-02 G
                          131.28-7.384E-03 &   2.201E-01 6.55E-02 G
                           94.67-1.852E-01 %   3.309E-01 1.01E-01 G
                          883.24-6.226E-02 %   3.541E-01 1.01E-01 G
                          926.70-9.423E-02 %   5.016E-01 1.45E-01 G
                          569.26 0.000E+00 %   4.508E-01 1.29E-01 G

TH-234       1.2314E+00
                           63.29 5.091E-01 %(P 2.196E+00 6.58E-01 G K
                           92.80 1.618E+00 *(P 1.639E+00 5.06E-01 G
                           92.38 1.876E+00 *(P 1.879E+00 5.80E-01 G

AM-241      -8.6008E-03
                           59.54-8.601E-03 %(P 3.091E-01 9.20E-02 G
   ( - This peak used in the nuclide activity average.

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

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.5270E-01	1.5452E-01	3.8390E-01	3.8400E-01	4.224E-01
K-40		1.4087E+01	1.4087E+01	1.7171E+00	1.8926E+00	
MN-54	#A	7.5979E-03	7.6133E-03	3.8511E-02	3.8513E-02	4.485E-02
CO-57	#B	1.4676E-04	1.4710E-04	4.4110E-02	4.4110E-02	4.938E-02
CO-60	#B	-8.9298E-04	-8.9327E-04	6.5714E-02	6.5714E-02	5.259E-02
Sr-85	#A	-2.3626E-02	-2.3858E-02	5.0427E-02	5.0445E-02	5.515E-02
Kr-85	#A	-5.7099E+02	-5.7100E+02	1.2608E+03	1.2612E+03	1.278E+03
Y-88	#B	0.0000E+00	0.0000E+00	3.7635E-02	3.7636E-02	4.912E-02
NB-94	#B	-9.0407E-03	-9.0407E-03	4.6806E-02	4.6809E-02	5.184E-02
Ag-108M	#B	-2.7529E-03	-2.7530E-03	5.1223E-02	5.1223E-02	5.974E-02
CD-109	#A	2.6198E-02	2.6235E-02	1.3256E+00	1.3256E+00	1.479E+00
SN-113	#B	1.0742E-02	1.0801E-02	5.5566E-02	5.5570E-02	6.264E-02
SB-125	#F	1.4442E-01	1.4451E-01	1.0598E-01	1.0629E-01	1.312E-01
I-131	#B	5.1135E-04	5.5327E-04	3.7772E-02	3.7772E-02	4.051E-02
CS-134	#B	2.8090E-02	2.8114E-02	2.2424E-02	2.2481E-02	3.699E-02
CS-137	#A	-1.7637E-03	-1.7638E-03	2.3452E-01	2.3452E-01	4.913E-02
CE-139	#A	-5.8721E-03	-5.8992E-03	4.7178E-02	4.7179E-02	5.002E-02
EU-152	#B	9.6297E-04	9.6310E-04	1.2817E-01	1.2817E-01	1.438E-01
EU-154	#B	-7.5117E-04	-7.5132E-04	1.6759E-01	1.6759E-01	1.031E-01
EU-155	#B	1.1213E-01	1.1217E-01	1.5449E-01	1.5461E-01	1.686E-01
HG-203	#B	-8.9344E-03	-9.0567E-03	4.6940E-02	4.6943E-02	5.197E-02
TL-208		2.8202E-01	2.8202E-01	8.1603E-02	8.3145E-02	
PB-212	#	7.0027E-01	7.0027E-01	1.2160E-01	1.2787E-01	9.985E-02
PB-214	#	4.1865E-01	4.1865E-01	1.1354E-01	1.1598E-01	9.369E-02
BI-212	#	8.4339E-01	8.4339E-01	5.9053E-01	5.9245E-01	
BI-214		4.9008E-01	4.9008E-01	1.4563E-01	1.4824E-01	
RA-224	#	1.4121E+00	1.4121E+00	1.0949E+00	1.0978E+00	1.158E+00
RA-226	#	1.3356E+00	1.3356E+00	1.0818E+00	1.0844E+00	1.147E+00
AC-228		9.0603E-01	9.0603E-01	2.3462E-01	2.4014E-01	
TH-227	#B	-2.6907E-01	-2.6907E-01	4.3341E-01	4.3368E-01	4.684E-01
PA-234	#B	5.7608E-02	5.7608E-02	1.6029E-01	1.6032E-01	1.773E-01
TH-234	#B	1.2314E+00	1.2314E+00	1.1414E+00	1.1435E+00	2.196E+00
AM-241	#A	-8.6008E-03	-8.6008E-03	4.4488E-01	4.4488E-01	3.091E-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) 1.6608416E+01 pCi/gm
Total Decayed Activity (269.6 to 1999.1 keV) 1.6608416E+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_18AUG2006_1254.An1

Sample description
FSS-OOL-02-04-010-F-S

Spectrum Filename: C:\GammaVision\Spectra\101F_18AUG2006_1254.An1

Acquisition information
Start time: 18-Aug-2006 12:54:15
Live time: 2000
Real time: 2002
Dead time: 0.10 %
Detector ID: 1

Detector system
Det 101- DSPE-633

Calibration
Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration
Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8760E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8760E+03) =
5.3305E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 14:39:00
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: 0.0557

***** S U M M A R Y O F P E A K 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	132.	34.85	1.50	1.654E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
77.12	289.	16.15	1.50	1.720E-02	77.11	10.700	1.130E+00	PB214
					77.11	17.500	6.910E-01	PB212
77.12	293.	16.15	1.50	1.720E-02	77.11	10.700	1.130E+00	PB214
					77.11	17.500	6.999E-01	PB212
93.24	152.	19.04	1.02	1.997E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.758E+00	TH234
186.36	129.	24.84	1.18	1.856E-02	185.99	3.280	1.529E+00	RA226
208.65	79.	39.15	1.25	1.725E-02				
238.79	783.	4.21	1.12	1.557E-02	238.63	43.100	8.341E-01	PB212
238.81	443.	7.47	1.50	1.540E-02	238.63	43.100	PBC<MDA	PB212
241.61	89.	24.51	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
270.80	86.	24.23	1.70	1.398E-02				
294.94	172.	15.79	0.91	1.293E-02				
294.94	172.	15.79	0.91	1.293E-02	295.22	19.200	4.952E-01	PB214
300.21	50.	30.85	1.09	1.272E-02				
328.67	49.	39.34	1.52	1.167E-02				
338.33	159.	15.34	1.15	1.135E-02	338.40	12.010	8.308E-01	AC228
352.04	302.	9.28	1.22	1.092E-02	351.99	37.100	5.325E-01	PB214
462.16	64.	31.51	1.61	8.366E-03				
462.16	64.	31.51	1.61	8.366E-03	463.51	10.000	5.422E-01	SB125
510.69	126.	15.03	1.38	7.591E-03	510.72	22.500	4.655E-01	TL208
583.22	256.	9.09	1.33	6.684E-03	583.14	86.000	3.178E-01	TL208
609.16	205.	9.86	1.26	6.414E-03	609.32	46.090	4.974E-01	BI214
727.23	57.	19.65	1.21	5.443E-03	727.17	11.800	6.328E-01	BI212
794.67	68.	20.82	1.07	5.022E-03				

911.24	127.	10.40	1.55	4.446E-03	911.07	29.000	7.001E-01	AC228
969.00	128.	13.77	1.76	4.212E-03	968.90	17.460	1.243E+00	AC228
1088.69	27.	34.55	0.90	3.804E-03				
1120.34	56.	21.97	1.95	3.711E-03	1120.28	15.040	7.243E-01	BI214
1460.66	658.	3.99	2.14	2.943E-03	1460.75	10.700	1.500E+01	K40
1764.41	37.	16.44	0.92	2.481E-03	1764.51	15.920	6.667E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
416.98	208.65	351.	79.	0.040	117.45	1.250	LU-177	s
477.27	238.76	151.	783.	0.392	12.62	1.122	PB-212	D
482.91	241.58	192.	89.	0.044	73.54	1.124	PB-214	D
541.33	270.80	150.	86.	0.043	72.70	1.698	AC-228	s
600.16	300.21	94.	50.	0.025	92.57	1.091	PB-212	
657.12	328.67	129.	49.	0.024	118.01	1.521	LA-140	s
1589.56	794.67	37.	69.	0.034	52.31	1.070	AC-228	s
2177.93	1088.69	24.	27.	0.014	103.64	0.904	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	148.89	74.66	1082.	132.	0.066	104.56	1.499s
PB-214	153.79	77.11	973.	289.	0.144	48.44	1.499D
PB-212	153.79	77.11	969.	293.	0.146	48.44	1.499D
TH-234	185.56	92.99	917.	139.	0.070	88.45	1.499s
TH-234	185.53	92.98	868.	151.	0.076	82.54	1.499s
RA-226	371.80	186.07	461.	101.	0.050	95.05	1.499s
PB-212	477.28	238.79	379.	568.	0.284	18.98	1.499
PB-214	477.32	238.81	328.	443.	0.221	22.42	1.499s
PB-214	590.31	295.28	186.	140.	0.070	47.71	1.499
AC-228	676.45	338.33	159.	157.	0.079	46.02	1.152
PB-214	703.81	352.01	124.	261.	0.130	25.71	1.499
SB-125	925.86	462.98	72.	47.	0.023	85.37	1.499s
TL-208	1021.33	510.69	92.	110.	0.055	45.08	1.378s
TL-208	1166.44	583.22	86.	254.	0.127	27.27	1.325
BI-214	1218.35	609.16	65.	204.	0.102	29.58	1.259s
BI-212	1454.61	727.23	31.	56.	0.028	58.94	1.206
AC-228	1822.83	911.24	23.	125.	0.063	31.20	1.546
AC-228	1938.42	969.00	47.	127.	0.063	41.30	1.764
BI-214	2241.26	1120.34	32.	56.	0.028	65.92	1.945
K-40	2922.33	1460.66	10.	656.	0.328	11.96	2.142
BI-214	3530.26	1764.41	0.	37.	0.018	49.32	0.916s

s - Peak fails shape tests.
D - Peak area deconvoluted.

A Derived peak area.

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-9.2997E-03					
			477.56	-9.300E-03	%(	3.657E-01 1.04E-01	G
K-40		1.5000E+01					
			1460.75	1.500E+01	(P	4.055E-01 6.00E-01	G
MN-54		-5.2789E-04					
			834.81	-5.279E-04	%(P	4.747E-02 1.31E-02	G
CO-57		-1.1266E-02					
			122.07	-1.127E-02	&(	4.915E-02 1.47E-02	G K
			136.43	1.082E-01	%	3.480E-01 1.05E-01	G
CO-60		2.2389E-02					
			1332.51	2.239E-02	%(P	5.754E-02 1.71E-02	G K
			1173.23	-1.147E-02	% P	7.972E-02 2.30E-02	G K
Sr-85		-1.9563E-02					
			514.00	-1.956E-02	%(	5.597E-02 1.68E-02	G
Kr-85		-4.7317E+02					
			513.99	-4.732E+02	%(P	1.284E+03 3.83E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	6.807E-02 1.81E-02	G K
			898.02	-1.313E-03	% P	4.802E-02 1.32E-02	G
NB-94		1.5080E-03					
			871.10	1.508E-03	%(P	5.022E-02 1.40E-02	G K
			702.50	6.263E-03	% P	4.421E-02 1.27E-02	G K
Ag-108M		-1.0195E-02					
			722.95	-1.020E-02	%(	6.013E-02 1.75E-02	G K
			614.37	-7.813E-03	& P	5.102E-02 1.48E-02	G
			433.93	1.166E-02	%	4.499E-02 1.33E-02	G
CD-109		-4.4111E-01					
			88.04	-4.411E-01	&(P	1.580E+00 4.76E-01	G
SN-113		-1.4466E-02					
			391.71	-1.447E-02	%(	6.087E-02 1.80E-02	G K
			255.04	-4.203E-01	% P	1.945E+00 5.79E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.2904E-01						
		427.95	3.572E-02	%(P	1.170E-01	3.47E-02	G K
		600.77	5.047E-03	& P	2.875E-01	8.24E-02	G
		636.15	-2.970E-03	& P	5.101E-01	1.46E-01	G
		463.51	4.053E-01	&(P	3.649E-01	1.19E-01	G
		176.29	-1.318E-02	& P	6.060E-01	1.79E-01	G
I-131	1.2637E-02						
		364.48	1.264E-02	%(	4.992E-02	1.48E-02	G K
		636.97	-2.243E-03	&	6.727E-01	1.90E-01	G
		284.29	-2.477E-04	%	5.794E-01	1.68E-01	G
CS-134	-8.2970E-03						
		604.66	-8.297E-03	%(P	4.780E-02	1.38E-02	G K
		795.76	-2.498E-03	% P	4.820E-02	1.33E-02	G
		569.29	-6.139E-03	% P	2.794E-01	7.90E-02	G
		801.84	-3.816E-02	%	5.031E-01	1.41E-01	G
CS-137	-1.6444E-03						
		661.62	-1.644E-03	&(P	5.609E-02	1.57E-02	G
CE-139	-1.2894E-02						
		165.85	-1.289E-02	%(P	5.022E-02	1.51E-02	G
EU-152	-2.5987E-02						
		121.78	-2.599E-02	%(P	1.495E-01	4.47E-02	G K
		344.30	4.074E-02	% P	1.405E-01	4.18E-02	G
		1408.08	3.773E-03	% P	1.984E-01	5.12E-02	G
		964.00	-3.464E-03	% P	3.970E-01	1.10E-01	G
		1112.07	-1.544E-02	% P	5.079E-01	1.43E-01	G
		778.90	1.072E-01	% P	2.887E-01	8.57E-02	G
EU-154	1.3027E-02						
		123.10	1.303E-02	%(P	1.052E-01	3.14E-02	G K
		1274.80	-7.540E-03	% P	1.557E-01	4.27E-02	G
		723.30	-1.443E-01	% P	3.364E-01	1.01E-01	G
		1004.80	-4.759E-02	% P	3.589E-01	1.03E-01	G
EU-155	-1.1042E-02						
		86.45	-1.104E-02	%(	1.781E-01	5.32E-02	G K
		105.31	2.590E-02	%	1.700E-01	5.07E-02	G
HG-203	1.4809E-02						
		279.17	1.481E-02	%(	4.933E-02	1.48E-02	G K
		72.87	-1.379E-01	% P	1.215E+00	3.64E-01	G
		70.83	1.648E-02	%	1.540E+00	4.56E-01	G
		82.50	-8.438E-01	%	2.628E+00	7.93E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.1781E-01						
		583.14	3.178E-01	(P	5.766E-02	2.92E-02	G
		510.72	4.655E-01	+ P	1.996E-01	8.01E-02	G
PB-212	6.3068E-01						
		238.63	6.096E-01	(P	1.002E-01	3.90E-02	G K
							Energy duplication
		77.11	6.999E-01	(	3.536E-01	1.13E-01	G
		74.81	5.991E-01	?(P	7.077E-01	2.17E-01	G
PB-214	4.4416E-01						
		351.99	4.633E-01	(P	9.704E-02	4.00E-02	G K
		295.22	4.071E-01	(P	1.923E-01	6.56E-02	G
							Energy duplication
		77.11	1.130E+00	+ P	5.794E-01	1.85E-01	G
		241.92	2.771E+00	+ P	5.451E-01	2.07E-01	G
BI-212	6.3281E-01						
		727.17	6.328E-01	(P	3.194E-01	1.26E-01	G K
		1620.56	4.278E-01	%	1.192E+00	3.48E-01	G
		785.42	9.176E-01	% P	1.738E+00	5.33E-01	G
BI-214	4.9741E-01						
		609.32	4.974E-01	@(P	9.811E-02	4.93E-02	G K
		1764.51	6.667E-01	+ P	1.344E-01	1.11E-01	G
		1120.28	7.243E-01	+ P	3.746E-01	1.60E-01	G
RA-224	7.7445E-01						
		241.00	7.744E-01	%(P	1.208E+00	3.69E-01	G
RA-226	1.1932E+00						
		185.99	1.193E+00	(	1.215E+00	3.78E-01	G
AC-228	7.3841E-01						
		911.07	7.001E-01	(P	1.391E-01	7.39E-02	G K
		968.90	1.243E+00	+ P	3.398E-01	1.72E-01	G
		338.40	8.308E-01	(P	3.246E-01	1.29E-01	G
TH-227	-1.6804E-01						
		236.00	-1.680E-01	&(P	4.498E-01	1.36E-01	G K
		256.25	6.477E-04	% P	6.190E-01	1.82E-01	G
PA-234	-8.6181E-02						
		98.44	-8.618E-02	&(	1.861E-01	5.64E-02	G K
		946.00	5.695E-02	%	2.288E-01	6.63E-02	G
		131.28	-7.922E-04	&	2.140E-01	6.36E-02	G
		94.67	9.856E-03	%	3.207E-01	9.55E-02	G
		883.24	1.509E-02	%	3.589E-01	9.91E-02	G
		926.70	-2.854E-02	&	4.462E-01	1.25E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-9.699E-03 %   4.131E-01 1.17E-01 G

TH-234       1.3549E+00
                           63.29 5.867E-01 %(P 2.213E+00 6.64E-01 G K
                           92.80 1.828E+00 *(P 1.690E+00 5.23E-01 G
                           92.38 1.968E+00 &(P 2.031E+00 6.26E-01 G

AM-241       2.8819E-03
                           59.54 2.882E-03 &(P 3.025E-01 8.99E-02 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-9.1884E-03	-9.2997E-03	3.1259E-01	3.1259E-01	3.614E-01
K-40		1.5000E+01	1.5000E+01	1.8002E+00	1.9897E+00	
MN-54	#A	-5.2680E-04	-5.2789E-04	4.5515E-01	4.5515E-01	4.737E-02
CO-57	#B	-1.1239E-02	-1.1266E-02	4.4226E-02	4.4231E-02	4.904E-02
CO-60	#B	2.2381E-02	2.2389E-02	5.1407E-02	5.1423E-02	5.752E-02

Sr-85	#A	-1.9370E-02	-1.9563E-02	5.0290E-02	5.0302E-02	5.542E-02
Kr-85	#A	-4.7316E+02	-4.7317E+02	1.2838E+03	1.2841E+03	1.284E+03
Y-88	#B	0.0000E+00	0.0000E+00	5.4449E-02	5.4449E-02	6.766E-02
NB-94	#B	1.5080E-03	1.5080E-03	4.2095E-02	4.2095E-02	5.022E-02
Ag-108M	#B	-1.0195E-02	-1.0195E-02	5.2447E-02	5.2450E-02	6.013E-02
CD-109	#A	-4.4048E-01	-4.4111E-01	1.4574E+00	1.4576E+00	1.577E+00
SN-113	#B	-1.4386E-02	-1.4466E-02	5.3990E-02	5.3997E-02	6.053E-02
SB-125	#F	1.2896E-01	1.2904E-01	1.1356E-01	1.1379E-01	1.169E-01
I-131	#B	1.1666E-02	1.2637E-02	4.4389E-02	4.4395E-02	4.609E-02
CS-134	#B	-8.2899E-03	-8.2970E-03	4.9194E-02	4.9197E-02	4.776E-02
CS-137	#A	-1.6443E-03	-1.6444E-03	3.6508E-01	3.6508E-01	5.609E-02
CE-139	#A	-1.2834E-02	-1.2894E-02	4.6223E-02	4.6229E-02	4.998E-02
EU-152	#B	-2.5984E-02	-2.5987E-02	1.4389E-01	1.4389E-01	1.494E-01
EU-154	#B	1.3025E-02	1.3027E-02	9.4182E-02	9.4185E-02	1.052E-01
EU-155	#B	-1.1038E-02	-1.1042E-02	1.5965E-01	1.5966E-01	1.780E-01
HG-203	#B	1.4606E-02	1.4809E-02	4.4286E-02	4.4294E-02	4.865E-02
TL-208		3.1781E-01	3.1781E-01	8.7484E-02	8.9308E-02	
PB-212	#	6.3068E-01	6.3068E-01	1.2099E-01	1.2613E-01	1.002E-01
PB-214	#	4.4416E-01	4.4416E-01	1.1505E-01	1.1776E-01	9.704E-02
BI-212		6.3281E-01	6.3281E-01	3.7749E-01	3.7918E-01	
BI-214		4.9741E-01	4.9741E-01	1.4793E-01	1.5058E-01	
RA-224	#A	7.7445E-01	7.7445E-01	1.1083E+00	1.1091E+00	1.208E+00
RA-226	#A	1.1932E+00	1.1932E+00	1.1342E+00	1.1362E+00	1.215E+00
AC-228		7.3841E-01	7.3841E-01	2.0820E-01	2.1234E-01	
TH-227	#B	-1.6804E-01	-1.6804E-01	4.1559E-01	4.1570E-01	4.498E-01
PA-234	#B	-8.6181E-02	-8.6181E-02	1.6921E-01	1.6928E-01	1.861E-01
TH-234	#B	1.3549E+00	1.3549E+00	1.1640E+00	1.1664E+00	2.213E+00
AM-241	#A	2.8819E-03	2.8819E-03	2.6972E-01	2.6972E-01	3.025E-01

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

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

Total Activity (270.6 to 1999.1 keV) 1.7186491E+01 pCi/gm
Total Decayed Activity (270.6 to 1999.1 keV) 1.7186491E+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_18AUG2006_1345.An1

Sample description
FSS-OOL-02-04-010-F

Spectrum Filename: C:\GammaVision\Spectra\101F_18AUG2006_1345.An1

Acquisition information

Start time:	18-Aug-2006 13:45:48
Live time:	2000
Real time:	2002
Dead time:	0.11 %
Detector ID:	1

Detector system
Det 101- DSPE-633

Calibration

Filename:	D1_1LSa.Clb

Detector 101 1.0 Liter Marinelli Sand

Energy Calibration

Created:	03-Sep-2004 08:50:48
Zero offset:	0.244 keV
Gain:	0.500 keV/channel
Quadratic:	-2.493E-08 keV/channel^2

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine:	Env32 G53W4.20
Start channel:	100 (50.23keV)
Stop channel:	4000 (1999.11keV)
Peak rejection level:	41.667%
Peak search sensitivity:	3
Sample Size:	1.8760E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8760E+03) = 5.3305E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 14:39:00
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: 0.1062

***** S U M M A R Y O F P E A K 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	141.	24.06	1.00	1.651E-02				
74.34	141.	24.06	1.00	1.651E-02	74.81	9.600	PBC<MDA	PB212
77.30	364.	9.09	1.01	1.735E-02	77.11	17.500	8.710E-01	PB212
					77.11	10.700	1.410E+00	PB214
87.22	125.	22.31	1.01	1.925E-02	86.45	32.740	1.435E-01	EU155
89.60	82.	32.87	1.02	1.956E-02	88.04	3.790	PBC<MDA	CD109
93.21	136.	20.68	1.02	1.996E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.92	120.	27.42	0.87	1.859E-02				
185.92	120.	27.42	0.87	1.859E-02	185.99	3.280	1.424E+00	RA226
238.81	742.	4.39	1.12	1.557E-02	238.63	43.100	7.899E-01	PB212
242.06	99.	21.59	1.12	1.539E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
295.40	163.	11.45	1.16	1.291E-02	295.22	19.200	4.678E-01	PB214
300.31	65.	23.27	1.16	1.271E-02				
328.30	44.	37.69	0.90	1.169E-02				
338.60	158.	15.28	1.05	1.134E-02	338.40	12.010	8.213E-01	AC228
351.99	268.	9.94	1.15	1.092E-02				
351.99	268.	9.94	1.15	1.092E-02	351.99	37.100	4.731E-01	PB214
461.72	63.	29.74	1.02	8.373E-03				
510.88	137.	14.06	1.76	7.588E-03	510.72	22.500	5.102E-01	TL208
583.14	220.	11.18	1.31	6.685E-03	583.14	86.000	2.727E-01	TL208
609.36	182.	9.86	1.53	6.412E-03	609.32	46.090	4.396E-01	BI214
727.39	67.	19.63	1.34	5.441E-03	727.17	11.800	7.427E-01	BI212
768.13	44.	29.10	0.66	5.179E-03				
794.75	30.	31.52	1.50	5.016E-03	795.76	85.400	5.000E-02	CS134
911.21	145.	11.47	1.80	4.446E-03	911.07	29.000	7.973E-01	AC228

968.81	122.	18.35	1.21	4.212E-03	968.90	17.460	1.190E+00	AC228
1120.25	54.	27.47	2.07	3.711E-03	1120.28	15.040	6.985E-01	BI214
1460.87	661.	4.02	2.02	2.942E-03	1460.75	10.700	1.507E+01	K40
1764.71	30.	19.83	1.51	2.481E-03	1764.51	15.920	5.409E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
148.25	74.72	509.	141.	0.071	72.17	1.004	BI-207	D
154.16	77.67	366.	364.	0.182	27.28	1.007	PB-214	D
174.01	87.48	323.	125.	0.062	66.92	1.014	PB-214	lD
178.78	89.86	319.	82.	0.041	98.61	1.015	PB-214	lD
477.32	238.79	152.	746.	0.373	13.03	1.122	PB-212	D
483.83	242.04	172.	105.	0.052	60.69	1.124	PB-214	D
600.47	300.36	112.	60.	0.030	86.23	0.943	PB-212	s
656.38	328.30	110.	44.	0.022	113.07	0.900	RH-106M	
923.34	461.72	96.	63.	0.032	89.21	1.025	CS-138	l
1536.45	768.13	42.	44.	0.022	87.30	0.660	BI-214	sM

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.23	74.83	1108.	167.	0.084	84.71	1.499s
PB-212	153.79	77.11	971.	337.	0.168	42.54	1.499D
PB-214	153.79	77.11	975.	333.	0.166	42.54	1.499D
TH-234	185.77	93.09	875.	134.	0.067	89.48	1.499s
TH-234	185.74	93.08	850.	138.	0.069	88.79	1.499s
RA-226	372.12	186.23	471.	104.	0.052	93.55	1.499s
PB-212	477.29	238.80	429.	605.	0.303	18.72	1.499
PB-214	590.65	295.45	209.	159.	0.080	44.66	1.499
AC-228	676.98	338.60	159.	155.	0.078	45.84	1.055
PB-214	703.78	351.99	124.	241.	0.121	27.23	1.499D
TL-208	1021.70	510.88	94.	121.	0.060	42.18	1.764s
TL-208	1166.28	583.14	112.	218.	0.109	33.54	1.311
BI-214	1218.76	609.36	57.	180.	0.090	29.58	1.533
BI-212	1454.94	727.39	40.	66.	0.033	58.89	1.343s
CS-134	1589.73	794.75	30.	30.	0.015	94.57	1.502s
AC-228	1822.77	911.21	40.	143.	0.071	34.41	1.798s
AC-228	1937.31	968.45	78.	132.	0.066	50.58	1.216
BI-214	2241.09	1120.25	44.	54.	0.027	82.41	2.070s
K-40	2922.76	1460.87	15.	659.	0.329	12.07	2.019

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3530.85	1764.71	2.	30.	0.015	59.48	1.510

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

***** S U M M A R Y O 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		-7.6613E-02					
			477.56	-7.661E-02	%(	4.279E-01 1.25E-01	G
K-40		1.5071E+01					
			1460.75	1.507E+01	(P	4.788E-01 6.09E-01	G
MN-54		1.4615E-02					
			834.81	1.462E-02	%(P	4.923E-02 1.45E-02	G
CO-57		-3.7478E-03					
			122.07	-3.748E-03	%(	4.848E-02 1.44E-02	G K
			136.43	1.958E-02	%	4.047E-01 1.20E-01	G
CO-60		1.2443E-02					
			1332.51	1.244E-02	%(P	4.661E-02 1.34E-02	G K
			1173.23	1.911E-02	& P	5.862E-02 1.73E-02	G K
Sr-85		-1.5998E-02					
			514.00	-1.600E-02	%(	5.771E-02 1.72E-02	G
Kr-85		-3.9167E+02					
			513.99	-3.917E+02	%(P	1.323E+03 3.92E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	6.809E-02 1.82E-02	G K
			898.02	1.877E-03	& P	4.919E-02 1.36E-02	G
NB-94		5.6706E-03					
			871.10	5.671E-03	%(P	4.441E-02 1.25E-02	G K
			702.50	1.051E-03	% P	5.019E-02 1.42E-02	G K
Ag-108M		-1.8786E-02					
			722.95	-1.879E-02	%(	6.631E-02 1.96E-02	G K
			614.37	-6.883E-03	% P	5.298E-02 1.53E-02	G
			433.93	-1.193E-02	%	4.457E-02 1.32E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	3.9215E-02						
		88.04	3.921E-02	%(P	1.486E+00	4.43E-01	G
SN-113	1.9777E-02						
		391.71	1.978E-02	%(	6.425E-02	1.92E-02	G K
		255.04	-6.235E-01	% P	1.916E+00	5.75E-01	G
SB-125	5.6467E-02						
		427.95	5.647E-02	%(P	1.182E-01	3.58E-02	G K
		600.77	2.562E-05	& P	2.626E-01	7.47E-02	G
		636.15	-3.278E-02	& P	4.076E-01	1.16E-01	G
		463.51	2.568E-01	% P	4.242E-01	1.30E-01	G
		176.29	-2.359E-01	% P	6.470E-01	1.94E-01	G
I-131	2.1882E-03						
		364.48	2.188E-03	&(	5.383E-02	1.56E-02	G K
		636.97	1.040E-01	&	5.575E-01	1.61E-01	G
		284.29	1.208E-01	&	6.606E-01	1.96E-01	G
CS-134	2.4213E-02						
		604.66	1.653E-03	%(P	3.504E-02	9.75E-03	G K
		795.76	5.000E-02	(P	4.783E-02	1.60E-02	G
		569.29	-3.884E-02	% P	2.704E-01	7.78E-02	G
		801.84	-1.580E-01	%	5.610E-01	1.65E-01	G
CS-137	4.4102E-03						
		661.62	4.410E-03	%(P	5.168E-02	1.47E-02	G
CE-139	-2.7712E-03						
		165.85	-2.771E-03	&(P	5.064E-02	1.50E-02	G
EU-152	-2.8001E-03						
		121.78	-2.800E-03	%(P	1.438E-01	4.27E-02	G K
		344.30	1.299E-02	% P	1.399E-01	4.08E-02	G
		1408.08	5.010E-02	& P	2.456E-01	6.93E-02	G
		964.00	-5.389E-03	% P	8.690E-01	2.54E-01	G
		1112.07	-6.387E-02	& P	4.508E-01	1.28E-01	G
		778.90	9.229E-02	% P	3.211E-01	9.39E-02	G
EU-154	-1.0404E-02						
		123.10	-1.040E-02	%(P	1.007E-01	3.00E-02	G K
		1274.80	-1.360E-04	% P	2.371E-01	6.69E-02	G
		723.30	-9.284E-02	% P	3.065E-01	9.07E-02	G
		1004.80	-6.681E-02	% P	3.444E-01	9.96E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	9.7876E-02						
		86.45	9.788E-02	%(	1.685E-01	5.13E-02	G K
		105.31	6.788E-02	%	2.014E-01	6.07E-02	G
HG-203	1.4035E-03						
		279.17	1.404E-03	%(	5.032E-02	1.48E-02	G K
		72.87	-6.281E-01	% P	1.165E+00	3.54E-01	G
		70.83	-3.061E-01	&	2.208E+00	6.62E-01	G
		82.50	-8.868E-01	%	2.618E+00	7.90E-01	G
TL-208	2.7270E-01						
		583.14	2.727E-01	(P	6.530E-02	3.08E-02	G
		510.72	5.102E-01	+ P	2.020E-01	8.13E-02	G
PB-212	6.6971E-01						
		238.63	6.496E-01	(P	1.064E-01	4.10E-02	G K
							Energy duplication
		77.11	8.055E-01	+	3.540E-01	1.14E-01	G
		74.81	7.598E-01	?(P	7.161E-01	2.21E-01	G
PB-214	4.4023E-01						
							Energy duplication
		351.99	4.285E-01	*(P	9.698E-02	3.92E-02	G K
		295.22	4.629E-01	(P	2.035E-01	6.97E-02	G
							Energy duplication
		77.11	1.303E+00	+ P	5.800E-01	1.87E-01	G
		241.92	-8.102E-03	% P	7.674E-01	2.28E-01	G
BI-212	7.4272E-01						
		727.17	7.427E-01	*(P	3.600E-01	1.47E-01	G K
		1620.56	6.447E-01	%	1.605E+00	4.78E-01	G
		785.42	6.035E-01	% P	2.242E+00	6.55E-01	G
BI-214	4.6564E-01						
		609.32	4.396E-01	(P	9.206E-02	4.36E-02	G K
		1764.51	5.409E-01	(P	1.793E-01	1.09E-01	G
		1120.28	6.985E-01	+ P	4.334E-01	1.93E-01	G
RA-224	9.0645E-01						
		241.00	9.064E-01	%(P	1.273E+00	3.91E-01	G
RA-226	1.2257E+00						
		185.99	1.226E+00	@(	1.227E+00	3.82E-01	G
AC-228	8.0435E-01						
		911.07	7.973E-01	(P	1.803E-01	9.27E-02	G K
		968.90	1.289E+00	+ P	4.307E-01	2.18E-01	G
		338.40	8.213E-01	(P	3.244E-01	1.27E-01	G

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

TH-227      -2.1050E-01
                          236.00-2.105E-01 %(P 4.962E-01 1.50E-01 G K
                          256.25-1.472E-02 & P 5.989E-01 1.76E-01 G

PA-234      -5.7605E-02
                           98.44-5.760E-02 %(  1.643E-01 4.95E-02 G K
                          946.00-3.398E-02 &   2.774E-01 7.91E-02 G
                          131.28-4.653E-02 &   2.223E-01 6.67E-02 G
                           94.67 8.208E-03 %   2.589E-01 7.68E-02 G
                          883.24 1.353E-01 %   3.637E-01 1.08E-01 G
                          926.70 9.603E-02 %   3.967E-01 1.15E-01 G
                          569.26-5.307E-02 %   3.995E-01 1.15E-01 G

TH-234       1.3087E+00
                           63.29 6.438E-01 %(P 2.183E+00 6.55E-01 G K
                           92.80 1.671E+00  (P 1.672E+00 5.17E-01 G
                           92.38 1.895E+00 &(P 1.984E+00 6.11E-01 G

AM-241      -3.7281E-02
                           59.54-3.728E-02 %(P 3.028E-01 9.04E-02 G
   ( - This peak used in the nuclide activity average.

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

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-7.5661E-02	-7.6613E-02	3.7608E-01	3.7611E-01	4.226E-01
K-40		1.5071E+01	1.5071E+01	1.8261E+00	2.0149E+00	
MN-54	#A	1.4584E-02	1.4615E-02	4.3355E-02	4.3363E-02	4.913E-02
CO-57	#B	-3.7386E-03	-3.7478E-03	4.3309E-02	4.3309E-02	4.836E-02
CO-60	#B	1.2439E-02	1.2443E-02	4.0098E-02	4.0105E-02	4.660E-02
Sr-85	#A	-1.5834E-02	-1.5998E-02	5.1516E-02	5.1523E-02	5.711E-02
Kr-85	#A	-3.9167E+02	-3.9167E+02	1.3453E+03	1.3455E+03	1.323E+03
Y-88	#B	0.0000E+00	0.0000E+00	5.4461E-02	5.4462E-02	6.766E-02
NB-94	#B	5.6706E-03	5.6706E-03	3.7621E-02	3.7623E-02	4.441E-02
Ag-108M	#B	-1.8786E-02	-1.8786E-02	5.8912E-02	5.8921E-02	6.631E-02
CD-109	#A	3.9157E-02	3.9215E-02	1.3302E+00	1.3302E+00	1.484E+00
SN-113	#B	1.9663E-02	1.9777E-02	5.7472E-02	5.7483E-02	6.388E-02
SB-125	#B	5.6430E-02	5.6467E-02	1.0744E-01	1.0749E-01	1.181E-01
I-131	#B	2.0139E-03	2.1882E-03	4.6950E-02	4.6950E-02	4.954E-02
CS-134	#B	2.4192E-02	2.4213E-02	2.3220E-02	2.3261E-02	3.501E-02
CS-137	#A	4.4099E-03	4.4102E-03	4.3980E-02	4.3981E-02	5.168E-02
CE-139	#A	-2.7578E-03	-2.7712E-03	5.0245E-02	5.0245E-02	5.039E-02
EU-152	#B	-2.7997E-03	-2.8001E-03	2.5202E-01	2.5202E-01	1.438E-01
EU-154	#B	-1.0401E-02	-1.0404E-02	1.0430E-01	1.0431E-01	1.007E-01
EU-155	#B	9.7840E-02	9.7876E-02	1.5391E-01	1.5400E-01	1.684E-01
HG-203	#B	1.3835E-03	1.4035E-03	4.4280E-02	4.4280E-02	4.960E-02
TL-208		2.7270E-01	2.7270E-01	9.2463E-02	9.3738E-02	
PB-212	#	6.6971E-01	6.6971E-01	1.2665E-01	1.3218E-01	1.064E-01
PB-214	#	4.4023E-01	4.4023E-01	1.1632E-01	1.1895E-01	9.698E-02
BI-212	#	7.4272E-01	7.4272E-01	4.4187E-01	4.4386E-01	
BI-214		4.6564E-01	4.6564E-01	1.3858E-01	1.4106E-01	
RA-224	#A	9.0645E-01	9.0645E-01	1.1718E+00	1.1730E+00	1.273E+00
RA-226	#A	1.2257E+00	1.2257E+00	1.1467E+00	1.1488E+00	1.227E+00
AC-228		8.0435E-01	8.0435E-01	2.3369E-01	2.3807E-01	
TH-227	#B	-2.1050E-01	-2.1050E-01	4.5785E-01	4.5800E-01	4.962E-01
PA-234	#B	-5.7605E-02	-5.7605E-02	1.4855E-01	1.4858E-01	1.643E-01
TH-234	#B	1.3087E+00	1.3087E+00	1.2139E+00	1.2161E+00	2.183E+00
AM-241	#A	-3.7281E-02	-3.7281E-02	3.0295E-01	3.0296E-01	3.028E-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 (246.1 to 1999.1 keV) 1.7356400E+01 pCi/gm
Total Decayed Activity (246.1 to 1999.1 keV) 1.7356400E+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_18AUG2006_1425.An1

Sample description
FSS-OOL-02-04-009-F

Spectrum Filename: C:\GammaVision\Spectra\101F_18AUG2006_1425.An1

Acquisition information
Start time: 18-Aug-2006 14:25:41
Live time: 2000
Real time: 2002
Dead time: 0.10 %
Detector ID: 1

Detector system
Det 101- DSPE-633

Calibration
Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration
Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9040E+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	17-Aug-2006 14:50:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0768

***** S U M M A R Y O F P E A K 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	185.	26.52	1.50	1.654E-02				
74.77	185.	26.52	1.50	1.654E-02	74.81	9.600	8.284E-01	PB212
77.07	324.	15.14	1.50	1.720E-02	77.11	17.500	7.631E-01	PB212
					77.11	10.700	1.234E+00	PB214
77.07	320.	15.14	1.50	1.720E-02	77.11	17.500	7.543E-01	PB212
					77.11	10.700	1.234E+00	PB214
87.06	141.	21.95	1.01	1.923E-02	86.45	32.740	1.596E-01	EU155
90.02	145.	20.41	1.02	1.961E-02	88.04	3.790	PBC<MDA	CD109
93.21	172.	17.66	1.02	1.996E-02	92.38	2.570	2.236E+00	TH234
					92.80	3.000	1.967E+00	TH234
129.01	147.	26.03	0.83	2.110E-02				
185.85	159.	23.42	1.10	1.859E-02	185.99	3.280	1.851E+00	RA226
209.76	136.	23.18	1.05	1.719E-02				
238.79	860.	3.97	1.12	1.556E-02	238.63	43.100	9.028E-01	PB212
241.97	126.	18.68	1.12	1.539E-02	241.00	3.900	1.476E+00	RA224
					241.92	7.470	PBC<MDA	PB214
270.27	106.	23.30	1.48	1.400E-02				
295.47	180.	10.97	1.16	1.291E-02	295.22	19.200	5.104E-01	PB214
300.12	52.	30.50	1.16	1.272E-02				
327.70	90.	27.76	1.31	1.171E-02				
338.32	194.	11.71	1.05	1.135E-02	338.40	12.010	9.987E-01	AC228
352.18	318.	7.97	0.96	1.092E-02	351.99	37.100	5.539E-01	PB214
462.71	68.	28.67	1.36	8.356E-03				
462.71	68.	28.67	1.36	8.356E-03	463.51	10.000	5.666E-01	SB125
510.68	110.	17.50	1.32	7.591E-03	510.72	22.500	3.893E-01	TL208
583.42	261.	8.79	1.19	6.681E-03	583.14	86.000	3.191E-01	TL208
609.26	197.	9.85	1.50	6.413E-03	609.32	46.090	4.697E-01	BI214

727.27	82.	18.46	0.93	5.442E-03	727.17	11.800	8.964E-01	BI212
795.65	26.	36.90	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134
860.51	51.	31.31	1.70	4.677E-03				
911.30	178.	9.72	1.63	4.446E-03	911.07	29.000	9.684E-01	AC228
968.23	137.	13.06	1.82	4.215E-03	968.90	17.460	1.313E+00	AC228
1121.73	59.	24.57	0.83	3.711E-03	1120.28	15.040	7.531E-01	BI214
1460.75	658.	4.00	1.86	2.942E-03	1460.75	10.700	1.477E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1620.55	16.	25.00	0.75	2.682E-03	1620.56	2.750	1.540E+00	BI212
1764.25	31.	20.53	1.45	2.482E-03	1764.51	15.920	5.545E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
173.69	87.33	406.	141.	0.070	65.84	1.014	PB-214	lD
179.62	90.30	367.	145.	0.073	61.24	1.016	PB-214	lD
257.62	129.01	546.	170.	0.085	62.81	0.834	AC-228	
419.20	209.76	340.	136.	0.068	69.55	1.046	NP-239	
477.29	238.85	153.	860.	0.430	11.91	1.122	PB-212	D
483.65	242.03	214.	126.	0.063	56.05	1.124	PB-214	D
540.26	270.27	200.	106.	0.053	69.90	1.481	AC-228	s
599.95	300.10	132.	53.	0.026	102.86	1.486	PB-212	s
655.18	327.70	196.	90.	0.045	83.28	1.312	AC-228	s
1721.32	860.51	53.	51.	0.025	74.04	1.704	TL-208	
3529.94	1764.25	3.	31.	0.016	61.59	1.451	BI-214	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	149.10	74.77	1187.	185.	0.093	79.55	1.499s
PB-212	153.79	77.11	1038.	324.	0.162	45.41	1.499D
PB-214	153.79	77.11	1042.	320.	0.160	45.41	1.499D
TH-234	185.90	93.16	1031.	163.	0.081	81.31	1.499s
TH-234	185.87	93.14	998.	164.	0.082	81.61	1.499s
RA-226	371.35	185.85	472.	159.	0.079	70.25	1.101s
PB-212	477.26	238.78	512.	723.	0.361	17.17	1.499
RA-224	483.20	241.75	601.	102.	0.051	105.26	1.499
PB-214	590.65	295.45	228.	163.	0.082	45.20	1.499
AC-228	676.42	338.32	131.	192.	0.096	35.14	1.053
PB-214	703.87	352.04	130.	274.	0.137	25.06	1.499s
SB-125	925.87	462.99	85.	44.	0.022	96.33	1.499
TL-208	1021.31	510.68	105.	94.	0.047	52.51	1.318s
TL-208	1166.84	583.42	94.	258.	0.129	26.36	1.190
BI-214	1218.56	609.26	67.	196.	0.098	29.56	1.498
BI-212	1454.68	727.27	53.	81.	0.041	55.37	0.934s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	1591.53	795.65	34.	26.	0.013	110.70	1.502s
AC-228	1822.94	911.30	45.	176.	0.088	29.16	1.634
AC-228	1936.88	968.23	56.	136.	0.068	39.17	1.824s
BI-214	2244.05	1121.73	49.	59.	0.030	73.72	0.831s
K-40	2922.52	1460.75	10.	655.	0.328	12.00	1.862
BI-212	3242.33	1620.55	0.	16.	0.008	75.00	0.750s

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

***** S U M M A R Y O 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		-5.5725E-02					
			477.56	-5.572E-02	&(	4.383E-01 1.28E-01	G
K-40		1.4773E+01					
			1460.75	1.477E+01	(P	3.879E-01 5.93E-01	G
MN-54		2.8289E-02					
			834.81	2.829E-02	%(P	5.008E-02 1.54E-02	G
CO-57		-5.4628E-03					
			122.07	-5.463E-03	&(	5.247E-02 1.57E-02	G K
			136.43	4.980E-02	&	3.750E-01 1.12E-01	G
CO-60		1.3614E-03					
			1332.51	1.361E-03	%(P	6.378E-02 1.76E-02	G K
			1173.23	1.400E-02	& P	5.782E-02 1.67E-02	G K
Sr-85		-2.4968E-02					
			514.00	-2.497E-02	&(	5.996E-02 1.81E-02	G
Kr-85		-5.9614E+02					
			513.99	-5.961E+02	&(P	1.374E+03 4.13E+02	G
Y-88		-5.1361E-03					
			1836.01	-5.136E-03	%(	5.330E-02 1.43E-02	G K
			898.02	-1.130E-02	% P	5.452E-02 1.57E-02	G
NB-94		1.1491E-02					
			871.10	1.149E-02	%(P	4.263E-02 1.24E-02	G K
			702.50	8.205E-03	& P	4.144E-02 1.20E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-7.7375E-04						
		722.95	-7.737E-04	%(	5.400E-02	1.52E-02	G K
		614.37	-1.136E-03	% P	5.740E-02	1.64E-02	G
		433.93	-1.747E-03	%	4.370E-02	1.26E-02	G
CD-109	1.4567E-01						
		88.04	1.457E-01	&(P	1.554E+00	4.65E-01	G
SN-113	0.0000E+00						
		391.71	0.000E+00	&(	6.343E-02	1.83E-02	G K
		255.04	2.315E-01	& P	2.096E+00	6.21E-01	G
SB-125	1.0367E-01						
		427.95	1.198E-02	&(P	1.305E-01	3.78E-02	G K
		600.77	6.857E-02	% P	2.297E-01	6.78E-02	G
		636.15	1.182E-01	% P	2.959E-01	8.83E-02	G
		463.51	3.751E-01	(P	3.898E-01	1.24E-01	G
		176.29	-2.035E-02	& P	6.705E-01	1.98E-01	G
I-131	-2.1999E-03						
		364.48	-2.200E-03	&(	5.485E-02	1.60E-02	G K
		636.97	2.241E-01	%	4.450E-01	1.36E-01	G
		284.29	-1.228E-01	%	6.978E-01	2.07E-01	G
CS-134	2.0262E-02						
		604.66	5.027E-04	%(P	1.039E-01	3.06E-02	G K
		795.76	4.284E-02	*(P	4.970E-02	1.61E-02	G
		569.29	6.487E-02	% P	2.574E-01	7.54E-02	G
		801.84	-3.077E-02	%	5.469E-01	1.54E-01	G
CS-137	1.7162E-02						
		661.62	1.716E-02	&(P	5.083E-02	1.50E-02	G
CE-139	2.0064E-04						
		165.85	2.006E-04	%(P	5.210E-02	1.54E-02	G
EU-152	5.8739E-04						
		121.78	5.874E-04	%(P	1.130E-01	3.34E-02	G K
		344.30	1.086E-03	& P	1.435E-01	4.16E-02	G
		1408.08	1.732E-02	% P	2.286E-01	6.17E-02	G
		964.00	-8.785E-02	& P	4.736E-01	1.37E-01	G
		1112.07	-3.527E-03	& P	4.987E-01	1.40E-01	G
		778.90	-8.988E-02	% P	4.045E-01	1.18E-01	G
EU-154	-3.0823E-02						
		123.10	-3.082E-02	%(P	1.081E-01	3.25E-02	G K
		1274.80	8.419E-03	% P	1.619E-01	4.47E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-2.396E-03 % P 4.754E-01 1.39E-01 G
                         1004.80 1.759E-02 % P 2.594E-01 7.18E-02 G

EU-155       6.3223E-02
                           86.45 6.322E-02 %(  1.826E-01 5.51E-02 G K
                          105.31 1.501E-02 %   2.052E-01 6.12E-02 G

HG-203       1.3203E-02
                          279.17 1.320E-02 %(  4.742E-02 1.42E-02 G K
                           72.87-4.760E-01 % P 1.245E+00 3.76E-01 G
                           70.83 1.065E-01 &   1.609E+00 4.79E-01 G
                           82.50-5.024E-01 %   2.647E+00 7.95E-01 G

TL-208       3.3362E-01
                          583.14 3.191E-01  (P 5.900E-02 2.83E-02 G
                          510.72 3.893E-01 *(P 2.100E-01 7.98E-02 G

PB-212       7.7255E-01
                          238.63 7.639E-01  (P 1.143E-01 4.41E-02 G K
                                                          Energy duplication
                           77.11 7.631E-01  (  3.604E-01 1.16E-01 G
                           74.81 8.284E-01 ?(P 7.297E-01 2.26E-01 G

PB-214       4.7591E-01
                          351.99 4.806E-01 @(P 9.788E-02 4.04E-02 G K
                          295.22 4.669E-01  (P 2.091E-01 7.11E-02 G
                                                          Energy duplication
                           77.11 1.234E+00 + P 5.905E-01 1.89E-01 G
                          241.92 1.921E-02 % P 8.427E-01 2.51E-01 G

BI-212       8.9645E-01
                          727.17 8.964E-01 *(P 4.044E-01 1.67E-01 G K
                         1620.56 1.540E+00 +   7.093E-01 3.85E-01 G
                          785.42 5.103E-02 % P 2.776E+00 7.86E-01 G

BI-214       4.6968E-01
                          609.32 4.697E-01  (P 9.838E-02 4.65E-02 G K
                         1764.51 1.883E-01 % P 3.141E-01 9.86E-02 G
                         1120.28 7.531E-01 + P 4.484E-01 1.86E-01 G

RA-224       1.2039E+00
                          241.00 1.204E+00  (P 1.378E+00 4.25E-01 G

RA-226       1.8515E+00
                          185.99 1.851E+00 *(  1.210E+00 4.33E-01 G

AC-228       9.7725E-01
                          911.07 9.684E-01  (P 1.871E-01 9.52E-02 G K
                          968.90 1.313E+00 + P 3.624E-01 1.72E-01 G
                          338.40 9.987E-01  (P 2.920E-01 1.18E-01 G
```

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -3.2490E-01
                          236.00-3.249E-01 %(P 5.320E-01 1.62E-01 G K
                          256.25-2.253E-02 % P 6.068E-01 1.78E-01 G

PA-234      -8.6588E-02
                           98.44-8.659E-02 &(  1.742E-01 5.29E-02 G K
                          946.00-5.379E-02 &   2.892E-01 8.37E-02 G
                          131.28-6.862E-02 %   2.304E-01 6.94E-02 G
                           94.67-1.613E-01 %   3.494E-01 1.06E-01 G
                          883.24 0.000E+00 %   4.065E-01 1.13E-01 G
                          926.70-1.457E-02 &   4.793E-01 1.34E-01 G
                          569.26 1.360E-01 %   3.729E-01 1.11E-01 G

TH-234       1.6715E+00
                           63.29 1.062E+00 %(P 2.236E+00 6.77E-01 G K
                           92.80 1.956E+00  (P 1.783E+00 5.52E-01 G
                           92.38 2.264E+00 &(P 2.119E+00 6.55E-01 G

AM-241       3.7491E-02
                           59.54 3.749E-02 %(P 2.329E-01 6.94E-02 G
   ( - This peak used in the nuclide activity average.

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

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-5.5018E-02	-5.5725E-02	3.8344E-01	3.8345E-01	4.327E-01
K-40		1.4773E+01	1.4773E+01	1.7795E+00	1.9655E+00	
MN-54	#A	2.8227E-02	2.8289E-02	4.6126E-02	4.6154E-02	4.997E-02
CO-57	#B	-5.4490E-03	-5.4628E-03	4.7008E-02	4.7009E-02	5.234E-02
CO-60	#B	1.3609E-03	1.3614E-03	5.2799E-02	5.2799E-02	6.376E-02
Sr-85	#A	-2.4706E-02	-2.4968E-02	5.4246E-02	5.4264E-02	5.933E-02
Kr-85	#A	-5.9613E+02	-5.9614E+02	1.3511E+03	1.3515E+03	1.374E+03
Y-88	#B	-5.1034E-03	-5.1361E-03	4.2767E-02	4.2768E-02	5.296E-02
NB-94	#B	1.1491E-02	1.1491E-02	3.7181E-02	3.7186E-02	4.263E-02
Ag-108M	#B	-7.7373E-04	-7.7375E-04	4.5739E-02	4.5739E-02	5.400E-02
CD-109	#A	1.4545E-01	1.4567E-01	1.3951E+00	1.3951E+00	1.551E+00
SN-113	#B	0.0000E+00	0.0000E+00	5.4957E-02	5.4957E-02	6.305E-02
SB-125	#B	1.0360E-01	1.0367E-01	1.0315E-01	1.0331E-01	1.304E-01
I-131	#B	-2.0211E-03	-2.1999E-03	4.7906E-02	4.7906E-02	5.040E-02
CS-134	#B	2.0243E-02	2.0262E-02	2.2793E-02	2.2822E-02	1.038E-01
CS-137	#A	1.7161E-02	1.7162E-02	4.5097E-02	4.5107E-02	5.083E-02
CE-139	#A	1.9965E-04	2.0064E-04	4.6317E-02	4.6317E-02	5.184E-02
EU-152	#B	5.8730E-04	5.8739E-04	1.0006E-01	1.0006E-01	1.130E-01
EU-154	#B	-3.0816E-02	-3.0823E-02	1.0241E-01	1.0243E-01	1.081E-01
EU-155	#B	6.3199E-02	6.3223E-02	1.6544E-01	1.6547E-01	1.826E-01
HG-203	#B	1.3012E-02	1.3203E-02	4.2488E-02	4.2495E-02	4.673E-02
TL-208		3.3362E-01	3.3362E-01	8.8764E-02	9.0743E-02	
PB-212	#	7.7255E-01	7.7255E-01	1.3381E-01	1.4075E-01	1.143E-01
PB-214	#	4.7591E-01	4.7591E-01	1.2010E-01	1.2308E-01	9.788E-02
BI-212		8.9645E-01	8.9645E-01	5.0054E-01	5.0309E-01	
BI-214		4.6968E-01	4.6968E-01	1.3964E-01	1.4214E-01	
RA-224	#A	1.2039E+00	1.2039E+00	1.2762E+00	1.2780E+00	1.378E+00
RA-226	#	1.8515E+00	1.8515E+00	1.3006E+00	1.3048E+00	
AC-228		9.7725E-01	9.7725E-01	2.2562E-01	2.3228E-01	
TH-227	#B	-3.2490E-01	-3.2490E-01	4.9176E-01	4.9210E-01	5.320E-01
PA-234	#B	-8.6588E-02	-8.6588E-02	1.5863E-01	1.5870E-01	1.742E-01
TH-234	#B	1.6715E+00	1.6715E+00	1.2607E+00	1.2641E+00	2.236E+00
AM-241	#A	3.7491E-02	3.7491E-02	2.0815E-01	2.0816E-01	2.329E-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) 1.9301184E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.9301186E+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_18AUG2006_1515.An1

Sample description
FSS-OOL-02-04-006-F

Spectrum Filename: C:\GammaVision\Spectra\101F_18AUG2006_1515.An1

Acquisition information
Start time: 18-Aug-2006 15:15:26
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: 1.7670E+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	17-Aug-2006 14:30:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0942

***** S U M M A R Y O F P E A K 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	214.	14.59	1.00	1.656E-02	74.81	9.600	1.005E+00	PB212
77.73	204.	17.13	1.01	1.737E-02	77.11	10.700	8.336E-01	PB214
					77.11	17.500	5.191E-01	PB212
87.24	120.	37.74	1.50	1.910E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
93.19	150.	28.32	1.50	1.989E-02	92.38	2.570	2.247E+00	TH234
					92.80	3.000	1.920E+00	TH234
128.64	99.	35.79	0.86	2.110E-02				
186.05	176.	17.54	1.36	1.858E-02	185.99	3.280	2.208E+00	RA226
209.48	84.	40.99	1.04	1.720E-02				
238.75	844.	4.01	1.12	1.556E-02	238.63	43.100	9.544E-01	PB212
241.51	127.	18.35	1.12	1.542E-02	241.00	3.900	1.608E+00	RA224
270.39	86.	23.53	0.78	1.400E-02				
295.00	165.	15.14	1.00	1.293E-02				
295.00	165.	15.14	1.00	1.293E-02	295.22	19.200	5.044E-01	PB214
300.59	69.	32.24	1.10	1.271E-02				
327.98	68.	36.59	1.03	1.170E-02				
338.43	172.	14.98	1.12	1.135E-02	338.40	12.010	9.527E-01	AC228
351.96	278.	9.94	1.40	1.093E-02				
351.96	278.	9.94	1.40	1.093E-02	351.99	37.100	5.218E-01	PB214
462.88	38.	38.24	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125
510.69	103.	16.75	1.36	7.591E-03	510.72	22.500	3.877E-01	TL208
582.97	238.	9.76	1.46	6.686E-03	583.14	86.000	3.140E-01	TL208
609.16	235.	8.79	1.31	6.414E-03	609.32	46.090	6.052E-01	BI214
727.58	88.	21.32	1.56	5.440E-03	727.17	11.800	1.040E+00	BI212
911.02	158.	13.18	1.38	4.447E-03	911.07	29.000	9.272E-01	AC228
968.63	115.	16.24	1.51	4.213E-03	968.90	17.460	1.188E+00	AC228

1119.98	80.	18.85	1.60	3.712E-03	1120.28	15.040	1.098E+00	BI214
1460.60	699.	3.84	2.11	2.943E-03	1460.75	10.700	1.692E+01	K40
1764.22	33.	17.41	1.75	2.481E-03	1764.51	15.920	6.304E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
149.35	74.89	380.	214.	0.107	43.78	1.005	PB-214	D
155.04	77.73	511.	204.	0.102	51.39	1.007	PB-214	D
418.64	209.48	408.	84.	0.042	122.97	1.039	AC-228	
477.20	238.83	150.	843.	0.422	12.02	1.122	PB-212	D
540.51	270.39	154.	86.	0.043	70.58	0.777	AC-228	s
600.93	300.59	165.	69.	0.035	86.68	1.101	PB-212	s
655.73	327.98	194.	68.	0.034	109.78	1.029	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	149.03	74.73	1093.	165.	0.082	85.38	1.499s
PB-214	153.79	77.11	943.	291.	0.145	47.48	1.499D
PB-212	153.79	77.11	939.	294.	0.147	47.48	1.499D
EU-155	174.05	87.24	963.	120.	0.060	113.22	1.499s
TH-234	185.97	93.19	904.	150.	0.075	84.96	1.499s
RA-226	371.76	186.05	338.	176.	0.088	52.63	1.356s
PB-212	477.25	238.77	386.	744.	0.372	15.54	1.499
RA-224	481.70	241.00	477.	103.	0.052	93.67	1.123D
PB-214	590.47	295.36	203.	130.	0.065	52.65	1.499
AC-228	676.64	338.43	166.	170.	0.085	44.94	1.118
PB-214	703.80	352.00	128.	238.	0.119	27.73	1.499
SB-125	925.65	462.88	95.	38.	0.019	114.72	1.499s
TL-208	1021.32	510.69	87.	87.	0.043	50.25	1.359s
TL-208	1165.95	582.97	97.	236.	0.118	29.27	1.460
BI-214	1218.36	609.16	65.	234.	0.117	26.38	1.308s
BI-212	1455.32	727.58	67.	87.	0.044	63.96	1.563s
AC-228	1822.38	911.02	75.	156.	0.078	39.54	1.377
AC-228	1937.68	968.63	66.	114.	0.057	48.73	1.507
BI-214	2240.55	1119.98	41.	80.	0.040	56.56	1.598s
K-40	2922.21	1460.60	9.	696.	0.348	11.51	2.114
BI-214	3529.87	1764.22	0.	33.	0.016	52.22	1.749

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

***** S U M M A R Y O 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		-7.9828E-02						
			477.56	-7.983E-02	%(	4.634E-01	1.36E-01	G
K-40		1.6916E+01						
			1460.75	1.692E+01	(P	3.974E-01	6.51E-01	G
MN-54		-3.3658E-03						
			834.81	-3.366E-03	%(P	4.322E-02	1.19E-02	G
CO-57		-6.2904E-03						
			122.07	-6.290E-03	%(	4.362E-02	1.30E-02	G K
			136.43	6.989E-02	%	4.016E-01	1.20E-01	G
CO-60		1.6659E-02						
			1332.51	1.666E-02	%(P	5.727E-02	1.66E-02	G K
			1173.23	-9.589E-03	& P	7.889E-02	2.26E-02	G K
Sr-85		-1.2317E-02						
			514.00	-1.232E-02	%(	5.804E-02	1.71E-02	G
Kr-85		-3.0875E+02						
			513.99	-3.087E+02	%(P	1.331E+03	3.91E+02	G
Y-88		5.6318E-03						
			1836.01	5.632E-03	%(	4.543E-02	1.19E-02	G K
			898.02	-1.572E-03	% P	5.346E-02	1.48E-02	G
NB-94		-2.2040E-04						
			871.10	-2.204E-04	%(P	6.092E-02	1.71E-02	G K
			702.50	1.856E-02	% P	4.108E-02	1.24E-02	G K
Ag-108M		-8.0651E-03						
			722.95	-8.065E-03	&(	5.868E-02	1.69E-02	G K
			614.37	-2.102E-02	% P	6.272E-02	1.87E-02	G
			433.93	-1.690E-03	&	4.825E-02	1.39E-02	G
CD-109		-8.2835E-02						
			88.04	-8.284E-02	&(P	1.663E+00	4.97E-01	G
SN-113		1.4755E-03						
			391.71	1.476E-03	%(	5.694E-02	1.63E-02	G K
			255.04	-1.884E-01	& P	1.551E+00	4.55E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.7691E-02						
		427.95	1.316E-02	&(P	1.460E-01	4.24E-02	G K
		600.77	7.947E-02	% P	1.910E-01	5.72E-02	G
		636.15	-7.593E-02	% P	4.354E-01	1.26E-01	G
		463.51	3.479E-01	*(P	4.418E-01	1.38E-01	G
		176.29	1.262E-01	% P	6.535E-01	1.95E-01	G
I-131	1.1523E-03						
		364.48	1.152E-03	&(	5.163E-02	1.49E-02	G K
		636.97	-1.329E-01	%	7.076E-01	2.06E-01	G
		284.29	1.098E-02	%	7.869E-01	2.31E-01	G
CS-134	-2.1138E-02						
		604.66	-2.114E-02	%(P	6.243E-02	1.86E-02	G K
		795.76	-8.524E-04	% P	5.878E-02	1.63E-02	G
		569.29	-5.879E-02	% P	3.311E-01	9.64E-02	G
		801.84	-9.331E-02	%	6.395E-01	1.84E-01	G
CS-137	2.3669E-02						
		661.62	2.367E-02	%(P	5.348E-02	1.61E-02	G
CE-139	-3.2190E-03						
		165.85	-3.219E-03	%(P	4.296E-02	1.27E-02	G
EU-152	-5.5788E-03						
		121.78	-5.579E-03	%(P	1.446E-01	4.29E-02	G K
		344.30	-2.843E-02	% P	1.568E-01	4.61E-02	G
		1408.08	7.990E-02	% P	2.385E-01	6.96E-02	G
		964.00	1.677E-01	% P	4.970E-01	1.48E-01	G
		1112.07	-9.735E-02	% P	5.517E-01	1.59E-01	G
		778.90	-1.515E-02	% P	4.331E-01	1.23E-01	G
EU-154	3.7332E-03						
		123.10	3.733E-03	&(P	1.009E-01	2.99E-02	G K
		1274.80	-3.400E-02	& P	2.020E-01	5.79E-02	G
		723.30	-4.028E-02	& P	2.837E-01	8.17E-02	G
		1004.80	-1.013E-01	% P	4.228E-01	1.24E-01	G
EU-155	1.4663E-01						
		86.45	1.466E-01	(	1.802E-01	5.53E-02	G K
		105.31	6.697E-02	%	2.141E-01	6.45E-02	G
HG-203	-1.4719E-02						
		279.17	-1.472E-02	%(	5.716E-02	1.71E-02	G K
		72.87	-7.826E-02	% P	1.308E+00	3.91E-01	G
		70.83	-8.121E-01	%	2.380E+00	7.19E-01	G
		82.50	-1.378E-01	&	2.747E+00	8.20E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.2927E-01						
		583.14	3.140E-01	(P	6.465E-02	3.09E-02	G
		510.72	3.877E-01	(P	2.072E-01	7.70E-02	G
PB-212	8.1560E-01						
		238.63	8.478E-01	(P	1.075E-01	4.43E-02	G K
							Energy duplication
		77.11	7.481E-01	(	3.696E-01	1.18E-01	G
		74.81	7.942E-01	?(P	7.550E-01	2.33E-01	G
PB-214	4.3228E-01						
		351.99	4.489E-01	(P	1.046E-01	4.18E-02	G K
		295.22	4.001E-01	(P	2.129E-01	7.12E-02	G
							Energy duplication
		77.11	1.208E+00	+ P	6.057E-01	1.94E-01	G
		241.92	3.399E-02	% P	6.682E-01	1.98E-01	G
BI-212	1.0398E+00						
		727.17	1.040E+00	@(P	4.854E-01	2.23E-01	G K
		1620.56	4.752E-01	&	1.705E+00	4.86E-01	G
		785.42	6.212E-02	% P	3.006E+00	8.52E-01	G
BI-214	6.1167E-01						
		609.32	6.052E-01	@(P	1.043E-01	5.35E-02	G K
		1764.51	6.304E-01	(P	1.427E-01	1.11E-01	G
		1120.28	1.098E+00	+ P	4.454E-01	2.08E-01	G
RA-224	1.3120E+00						
		241.00	1.312E+00	(P	1.326E+00	4.12E-01	G
RA-226	2.2083E+00						
		185.99	2.208E+00	(	1.109E+00	3.88E-01	G
AC-228	1.0104E+00						
		911.07	9.272E-01	(P	2.549E-01	1.24E-01	G K
		968.90	1.188E+00	(P	4.210E-01	1.94E-01	G
		338.40	9.527E-01	(P	3.523E-01	1.45E-01	G
TH-227	-2.7496E-01						
		236.00	-2.750E-01	%(P	5.496E-01	1.67E-01	G K
		256.25	-9.561E-02	& P	6.049E-01	1.79E-01	G
PA-234	3.0625E-03						
		98.44	3.062E-03	%(	1.951E-01	5.80E-02	G K
		946.00	-3.355E-02	&	3.078E-01	8.78E-02	G
		131.28	-3.426E-02	%	2.462E-01	7.37E-02	G
		94.67	-1.428E-01	%	3.716E-01	1.12E-01	G
		883.24	-8.436E-02	%	3.981E-01	1.15E-01	G
		926.70	-7.425E-02	%	4.949E-01	1.41E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-8.282E-02 %   4.896E-01 1.43E-01 G

TH-234       1.4569E+00
                           63.29 1.101E+00 %(P 2.342E+00 7.08E-01 G K
                           92.80 1.920E+00  (P 1.831E+00 5.66E-01 G
                           92.38-2.106E-01 % P 2.221E+00 6.59E-01 G

AM-241       1.1546E-02
                           59.54 1.155E-02 &(P 3.006E-01 8.93E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	-7.8766E-02	-7.9828E-02	4.0729E-01	4.0731E-01	4.573E-01
K-40		1.6916E+01	1.6916E+01	1.9529E+00	2.1743E+00	
MN-54	#A	-3.3581E-03	-3.3658E-03	5.3316E-02	5.3317E-02	4.312E-02
CO-57	#B	-6.2738E-03	-6.2904E-03	3.8973E-02	3.8974E-02	4.350E-02
CO-60	#B	1.6653E-02	1.6659E-02	4.9920E-02	4.9928E-02	5.725E-02

Sr-85	#A	-1.2182E-02	-1.2317E-02	5.1420E-02	5.1425E-02	5.740E-02
Kr-85	#A	-3.0875E+02	-3.0875E+02	1.4056E+03	1.4057E+03	1.331E+03
Y-88	#B	5.5942E-03	5.6318E-03	3.5747E-02	3.5749E-02	4.513E-02
NB-94	#B	-2.2040E-04	-2.2040E-04	1.3685E-02	1.3685E-02	6.092E-02
Ag-108M	#B	-8.0650E-03	-8.0651E-03	5.0730E-02	5.0732E-02	5.868E-02
CD-109	#A	-8.2704E-02	-8.2835E-02	1.6784E+00	1.6784E+00	1.661E+00
SN-113	#B	1.4664E-03	1.4755E-03	4.8997E-02	4.8997E-02	5.658E-02
SB-125	#B	9.7622E-02	9.7691E-02	1.1635E-01	1.1648E-01	1.459E-01
I-131	#B	1.0543E-03	1.1523E-03	4.4715E-02	4.4715E-02	4.724E-02
CS-134	#B	-2.1118E-02	-2.1138E-02	5.9834E-02	5.9846E-02	6.237E-02
CS-137	#A	2.3667E-02	2.3669E-02	4.8217E-02	4.8235E-02	5.348E-02
CE-139	#A	-3.2023E-03	-3.2190E-03	4.2041E-02	4.2042E-02	4.274E-02
EU-152	#B	-5.5779E-03	-5.5788E-03	1.8285E-01	1.8285E-01	1.445E-01
EU-154	#B	3.7323E-03	3.7332E-03	8.9745E-02	8.9745E-02	1.008E-01
EU-155	#A	1.4657E-01	1.4663E-01	1.6602E-01	1.6622E-01	1.802E-01
HG-203	#B	-1.4495E-02	-1.4719E-02	5.1227E-02	5.1234E-02	5.629E-02
TL-208		3.2927E-01	3.2927E-01	9.7357E-02	9.9119E-02	
PB-212	#	8.1560E-01	8.1560E-01	1.2781E-01	1.3587E-01	1.075E-01
PB-214	#	4.3228E-01	4.3228E-01	1.2089E-01	1.2333E-01	1.046E-01
BI-212	#	1.0398E+00	1.0398E+00	6.7021E-01	6.7278E-01	
BI-214		6.1167E-01	6.1167E-01	1.6212E-01	1.6576E-01	
RA-224	A	1.3120E+00	1.3120E+00	1.2374E+00	1.2396E+00	
RA-226	#	2.2083E+00	2.2083E+00	1.1623E+00	1.1690E+00	
AC-228		1.0104E+00	1.0104E+00	2.6260E-01	2.6873E-01	
TH-227	#B	-2.7496E-01	-2.7496E-01	5.0721E-01	5.0744E-01	5.496E-01
PA-234	#B	3.0625E-03	3.0625E-03	1.7407E-01	1.7407E-01	1.951E-01
TH-234	#B	1.4569E+00	1.4569E+00	1.2888E+00	1.2913E+00	2.342E+00
AM-241	#A	1.1546E-02	1.1546E-02	2.6796E-01	2.6796E-01	3.006E-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 (270.1 to 1999.1 keV) 2.3427864E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 2.3427868E+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_18AUG2006_1601.An1

Sample description
FSS-OOL-02-04-015-F

Spectrum Filename: C:\GammaVision\Spectra\101F_18AUG2006_1601.An1

Acquisition information

Start time:	18-Aug-2006 16:01:32
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:	1.7190E+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	17-Aug-2006 15:27:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0440

***** S U M M A R Y O F P E A K 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	190.	16.69	1.00	1.651E-02				
74.72	190.	16.69	1.00	1.651E-02	74.81	9.600	9.142E-01	PB212
77.82	152.	21.90	1.01	1.739E-02	77.11	10.700	6.349E-01	PB214
					77.11	17.500	3.979E-01	PB212
86.93	107.	40.17	1.50	1.910E-02				
86.93	107.	40.17	1.50	1.910E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
89.86	87.	28.96	1.02	1.960E-02				
93.30	121.	22.23	1.02	1.998E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.83	84.	39.49	0.77	2.110E-02				
186.09	153.	23.29	1.24	1.858E-02	185.99	3.280	1.972E+00	RA226
238.79	914.	5.39	1.11	1.557E-02	238.63	43.100	1.064E+00	PB212
240.94	106.	28.82	1.12	1.545E-02	241.00	3.900	1.384E+00	RA224
					241.92	7.470	PBC<MDA	PB214
270.45	92.	22.73	1.84	1.399E-02				
277.16	53.	37.21	1.15	1.369E-02				
295.15	123.	15.45	0.78	1.292E-02				
295.15	123.	15.45	0.78	1.292E-02	295.22	19.200	3.841E-01	PB214
300.20	42.	39.73	1.18	1.272E-02				
327.59	56.	32.53	1.30	1.171E-02				
338.50	166.	16.52	1.05	1.135E-02	338.40	12.010	9.447E-01	AC228
351.98	256.	7.49	1.20	1.093E-02				
351.98	256.	7.49	1.20	1.093E-02	351.99	37.100	4.922E-01	PB214
409.82	36.	35.14	1.25	9.412E-03				
463.06	32.	41.53	1.50	8.342E-03				
463.06	32.	41.53	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125

510.66	122.	16.03	1.60	7.591E-03	510.72	22.500	4.864E-01	TL208
583.24	189.	10.87	1.38	6.683E-03	583.14	86.000	2.558E-01	TL208
609.36	151.	11.58	1.15	6.412E-03	609.32	46.090	3.981E-01	BI214
727.17	51.	20.54	1.09	5.443E-03	727.17	11.800	6.208E-01	BI212
794.69	23.	40.10	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134
860.74	44.	25.42	1.41	4.676E-03				
910.95	134.	14.79	1.44	4.447E-03	911.07	29.000	8.074E-01	AC228
968.82	153.	13.15	0.97	4.212E-03	968.90	17.460	1.628E+00	AC228
1120.37	45.	27.24	0.96	3.711E-03	1120.28	15.040	6.271E-01	BI214
1159.62	33.	37.85	1.34	3.601E-03				
1460.70	729.	3.74	1.73	2.943E-03	1460.75	10.700	1.814E+01	K40
1764.29	9.	39.83	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	
179.30	90.17	271.	87.	0.043	86.89	1.016	PB-214	lD
257.28	128.83	459.	87.	0.044	108.94	0.774	AC-228	s
477.16	238.79	138.	748.	0.374	12.83	1.122	PB-212	D
540.63	270.45	151.	92.	0.046	68.18	1.840	AC-228	s
554.05	277.16	144.	53.	0.026	104.78	1.151	TL-208	s
600.14	300.20	116.	42.	0.021	116.85	1.179	PB-212	s
654.95	327.59	112.	56.	0.028	97.58	1.302	AC-228	s
819.48	409.82	62.	36.	0.018	105.41	1.253	AC-228	
1721.77	860.74	32.	44.	0.022	76.25	1.412	TL-208	
2319.88	1159.62	37.	33.	0.016	113.56	1.340	-	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	148.86	74.65	937.	163.	0.082	80.20	1.499
PB-214	153.79	77.11	848.	286.	0.143	46.00	1.499D
PB-212	153.79	77.11	844.	290.	0.145	46.00	1.499D
EU-155	173.44	86.93	868.	107.	0.053	120.52	1.499
TH-234	185.38	92.90	765.	156.	0.078	73.53	1.499s
TH-234	185.38	92.90	767.	141.	0.070	83.42	1.499s
RA-226	371.77	186.05	411.	139.	0.070	66.92	1.499
PB-212	477.15	238.72	447.	546.	0.273	20.57	1.499
RA-224	481.70	241.00	421.	106.	0.053	86.45	1.123D
PB-214	590.26	295.26	206.	113.	0.056	59.99	1.499
AC-228	676.79	338.50	191.	164.	0.082	49.56	1.051s
PB-214	703.74	351.97	109.	241.	0.121	26.41	1.499
TL-208	1021.26	510.66	105.	106.	0.053	48.10	1.600s
TL-208	1166.50	583.24	78.	187.	0.094	32.61	1.380
BI-214	1218.75	609.36	60.	150.	0.075	34.73	1.153
BI-212	1454.50	727.17	29.	51.	0.025	61.62	1.091
CS-134	1589.61	794.69	34.	23.	0.012	120.31	1.502
AC-228	1822.25	910.95	69.	132.	0.066	44.36	1.445
AC-228	1938.05	968.82	57.	152.	0.076	39.46	0.969s
BI-214	2241.33	1120.37	36.	45.	0.022	81.72	0.965s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2922.42	1460.70	5.	727.	0.363	11.21	1.729

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

***** S U M M A R Y O 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		-2.4838E-02					
			477.56	-2.484E-02	&(	3.724E-01 1.06E-01	G
K-40		1.8143E+01					
			1460.75	1.814E+01	(P	3.375E-01 6.80E-01	G
MN-54		1.3196E-02					
			834.81	1.320E-02	&(P	5.706E-02 1.66E-02	G
CO-57		-6.3154E-04					
			122.07	-6.315E-04	&(	5.359E-02 1.59E-02	G K
			136.43	-1.559E-03	&	3.168E-01 9.33E-02	G
CO-60		-5.9484E-04					
			1332.51	-5.948E-04	%(P	6.242E-02 1.69E-02	G K
			1173.23	3.196E-02	% P	8.242E-02 2.47E-02	G K
Sr-85		-2.9541E-02					
			514.00	-2.954E-02	%(	6.864E-02 2.07E-02	G
Kr-85		-7.0301E+02					
			513.99	-7.030E+02	%(P	1.572E+03 4.73E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	7.433E-02 1.98E-02	G K
			898.02	1.607E-02	& P	6.476E-02 1.89E-02	G
NB-94		-3.0769E-04					
			871.10	-3.077E-04	&(P	5.702E-02 1.59E-02	G K
			702.50	1.621E-02	% P	4.753E-02 1.41E-02	G K
Ag-108M		-1.6898E-03					
			722.95	-1.690E-03	%(	1.082E-01 3.16E-02	G K
			614.37	2.772E-03	& P	5.600E-02 1.60E-02	G
			433.93	-2.510E-03	%	4.700E-02 1.35E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-3.6191E-01						
		88.04	-3.619E-01	&(P	1.645E+00	4.94E-01	G
SN-113	-9.0334E-03						
		391.71	-9.033E-03	&(	7.196E-02	2.11E-02	G K
		255.04	-2.710E-01	% P	2.053E+00	6.07E-01	G
SB-125	-9.6022E-04						
		427.95	-9.602E-04	%(P	1.628E-01	4.69E-02	G K
		600.77	-2.782E-02	& P	3.152E-01	9.11E-02	G
		636.15	-7.653E-02	& P	4.202E-01	1.21E-01	G
		463.51	3.031E-01	% P	4.233E-01	1.32E-01	G
		176.29	-7.030E-02	% P	6.868E-01	2.03E-01	G
I-131	1.8062E-02						
		364.48	1.806E-02	%(	4.702E-02	1.41E-02	G K
		636.97	3.323E-03	%	6.983E-01	1.96E-01	G
		284.29	-1.046E-01	%	6.811E-01	2.01E-01	G
CS-134	2.1107E-02						
		604.66	1.885E-03	%(P	1.040E-01	3.05E-02	G K
		795.76	4.308E-02	(P	5.510E-02	1.76E-02	G
		569.29	5.828E-02	& P	2.949E-01	8.58E-02	G
		801.84	6.900E-03	%	4.121E-01	1.11E-01	G
CS-137	1.8565E-02						
		661.62	1.857E-02	%(P	6.130E-02	1.81E-02	G
CE-139	-7.6905E-03						
		165.85	-7.691E-03	%(P	5.732E-02	1.71E-02	G
EU-152	-1.4123E-02						
		121.78	-1.412E-02	&(P	1.525E-01	4.54E-02	G K
		344.30	3.965E-03	% P	1.568E-01	4.55E-02	G
		1408.08	3.319E-02	% P	2.434E-01	6.67E-02	G
		964.00	3.436E-01	% P	4.696E-01	1.47E-01	G
		1112.07	2.126E-01	% P	4.591E-01	1.39E-01	G
		778.90	-1.157E-03	% P	3.441E-01	9.45E-02	G
EU-154	4.1430E-03						
		123.10	4.143E-03	%(P	1.150E-01	3.42E-02	G K
		1274.80	1.319E-02	% P	1.539E-01	4.23E-02	G
		723.30	-1.314E-01	% P	3.889E-01	1.16E-01	G
		1004.80	-7.585E-03	% P	3.416E-01	9.50E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.3441E-01						
		86.45	1.344E-01	(	1.761E-01	5.40E-02	G K
		105.31	3.216E-02	%	2.254E-01	6.74E-02	G
HG-203	-9.1668E-04						
		279.17	-9.167E-04	&(	4.621E-02	1.35E-02	G K
		72.87	-4.142E-01	% P	1.304E+00	3.93E-01	G
		70.83	-9.212E-01	%	1.534E+00	4.68E-01	G
		82.50	-8.894E-01	&	2.762E+00	8.33E-01	G
TL-208	2.5576E-01						
		583.14	2.558E-01	(P	5.998E-02	2.82E-02	G
		510.72	4.864E-01	+ P	2.326E-01	8.98E-02	G
PB-212	6.9229E-01						
		238.63	6.399E-01	(P	1.186E-01	4.44E-02	G K
							Energy duplication
		77.11	7.574E-01	(	3.606E-01	1.16E-01	G
		74.81	8.089E-01	&(P	7.197E-01	2.23E-01	G
PB-214	4.6748E-01						
		351.99	4.675E-01	(P	9.974E-02	4.15E-02	G K
		295.22	3.569E-01	- P	2.207E-01	7.25E-02	G
							Energy duplication
		77.11	1.223E+00	+ P	5.910E-01	1.90E-01	G
		241.92	3.193E-01	% P	7.453E-01	2.25E-01	G
BI-212	6.2083E-01						
		727.17	6.208E-01	(P	3.418E-01	1.29E-01	G K
		1620.56	2.111E-01	%	1.794E+00	4.81E-01	G
		785.42	9.226E-01	% P	2.459E+00	7.32E-01	G
BI-214	3.9815E-01						
		609.32	3.981E-01	(P	1.035E-01	4.64E-02	G K
		1764.51	1.822E-01	% P	2.130E-01	7.61E-02	G
		1120.28	6.271E-01	+ P	4.346E-01	1.72E-01	G
RA-224	1.3841E+00						
		241.00	1.384E+00	(P	1.283E+00	4.02E-01	G
RA-226	1.7933E+00						
		185.99	1.793E+00	(	1.254E+00	4.00E-01	G
AC-228	8.4760E-01						
		911.07	8.074E-01	(P	2.518E-01	1.21E-01	G K
		968.90	1.628E+00	+ P	4.041E-01	2.15E-01	G
		338.40	9.447E-01	@(P	3.872E-01	1.58E-01	G

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

TH-227      -5.1906E-02
                          236.00-5.191E-02 &(P 3.512E-01 1.04E-01 G K
                          256.25 1.616E-02 & P 6.301E-01 1.85E-01 G

PA-234       3.6183E-02
                           98.44 3.618E-02 &(  1.884E-01 5.64E-02 G K
                          946.00 0.000E+00 &   3.660E-01 1.04E-01 G
                          131.28-5.804E-02 %   2.276E-01 6.83E-02 G
                           94.67-1.443E-01 %   3.623E-01 1.10E-01 G
                          883.24-8.012E-04 &   3.717E-01 1.01E-01 G
                          926.70 1.081E-01 &   4.808E-01 1.39E-01 G
                          569.26 9.129E-02 &   4.356E-01 1.27E-01 G

TH-234       1.3326E+00
                           63.29 2.251E-01 &(P 2.532E+00 7.54E-01 G K
                           92.80 1.853E+00  (P 1.735E+00 5.38E-01 G
                           92.38 2.406E+00 &(P 2.028E+00 6.31E-01 G

AM-241       4.4734E-04
                           59.54 4.473E-04 &(P 3.313E-01 9.84E-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	-2.4510E-02	-2.4838E-02	3.1886E-01	3.1886E-01	3.675E-01
K-40		1.8143E+01	1.8143E+01	2.0399E+00	2.2830E+00	
MN-54	#A	1.3166E-02	1.3196E-02	4.9790E-02	4.9796E-02	5.693E-02
CO-57	#B	-6.2988E-04	-6.3154E-04	4.7742E-02	4.7742E-02	5.345E-02
CO-60	#B	-5.9462E-04	-5.9484E-04	1.0762E-01	1.0762E-01	6.239E-02
Sr-85	#A	-2.9220E-02	-2.9541E-02	6.2187E-02	6.2210E-02	6.789E-02
Kr-85	#A	-7.0300E+02	-7.0301E+02	1.5400E+03	1.5406E+03	1.572E+03
Y-88	#B	0.0000E+00	0.0000E+00	5.9459E-02	5.9459E-02	7.384E-02
NB-94	#B	-3.0769E-04	-3.0769E-04	3.1384E-01	3.1384E-01	5.702E-02
Ag-108M	#B	-1.6898E-03	-1.6898E-03	9.4700E-02	9.4700E-02	1.082E-01
CD-109	#A	-3.6134E-01	-3.6191E-01	1.5244E+00	1.5246E+00	1.642E+00
SN-113	#B	-8.9778E-03	-9.0334E-03	6.3237E-02	6.3239E-02	7.152E-02
SB-125	#B	-9.5955E-04	-9.6022E-04	9.1727E-02	9.1727E-02	1.626E-01
I-131	#B	1.6536E-02	1.8062E-02	4.2306E-02	4.2318E-02	4.304E-02
CS-134	#B	2.1087E-02	2.1107E-02	2.5846E-02	2.5874E-02	1.039E-01
CS-137	#A	1.8564E-02	1.8565E-02	5.4231E-02	5.4241E-02	6.130E-02
CE-139	#A	-7.6509E-03	-7.6905E-03	5.3504E-02	5.3505E-02	5.703E-02
EU-152	#B	-1.4121E-02	-1.4123E-02	1.5685E-01	1.5685E-01	1.525E-01
EU-154	#B	4.1421E-03	4.1430E-03	1.0253E-01	1.0253E-01	1.149E-01
EU-155	#A	1.3436E-01	1.3441E-01	1.6199E-01	1.6216E-01	1.760E-01
HG-203	#B	-9.0282E-04	-9.1668E-04	4.0368E-02	4.0369E-02	4.551E-02
TL-208		2.5576E-01	2.5576E-01	8.4452E-02	8.5679E-02	
PB-212	#	6.9229E-01	6.9229E-01	1.4400E-01	1.4921E-01	1.186E-01
PB-214	#	4.6748E-01	4.6748E-01	1.2447E-01	1.2724E-01	9.974E-02
BI-212		6.2083E-01	6.2083E-01	3.8767E-01	3.8925E-01	
BI-214		3.9815E-01	3.9815E-01	1.3929E-01	1.4109E-01	
RA-224		1.3841E+00	1.3841E+00	1.2047E+00	1.2072E+00	
RA-226	#	1.7933E+00	1.7933E+00	1.2000E+00	1.2043E+00	1.254E+00
AC-228		8.4760E-01	8.4760E-01	2.8574E-01	2.8972E-01	
TH-227	#B	-5.1906E-02	-5.1906E-02	3.3602E-01	3.3603E-01	3.512E-01
PA-234	#B	3.6183E-02	3.6183E-02	1.6925E-01	1.6926E-01	1.884E-01
TH-234	#B	1.3326E+00	1.3326E+00	1.0481E+00	1.0507E+00	2.532E+00
AM-241	#A	4.4734E-04	4.4734E-04	2.9535E-01	2.9535E-01	3.313E-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) 2.1649271E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 2.1649271E+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_18AUG2006_1637.An1

Sample description
FSS-OOL-02-04-017-F

Spectrum Filename: C:\GammaVision\Spectra\101F_18AUG2006_1637.An1

Acquisition information

Start time:	18-Aug-2006 16:37:58
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:	1.8620E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8620E+03) = 5.3706E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 16:02:00
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: 0.1367

***** S U M M A R Y O F P E A K 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	183.	24.58	1.50	1.654E-02	70.83	3.520	2.535E+00	HG203
					74.81	9.600	8.370E-01	PB212
77.13	308.	14.57	1.50	1.720E-02	77.11	17.500	7.416E-01	PB212
					77.11	10.700	1.198E+00	PB214
77.13	304.	14.57	1.50	1.720E-02	77.11	17.500	7.327E-01	PB212
					77.11	10.700	1.198E+00	PB214
86.96	127.	35.34	1.50	1.910E-02	86.45	32.740	PBC<MDA	EU155
93.00	138.	29.57	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.679E+00	TH234
93.03	127.	31.45	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.19	118.	27.59	0.99	1.857E-02	185.99	3.280	1.399E+00	RA226
208.93	76.	37.28	1.15	1.724E-02				
238.75	709.	4.54	1.12	1.557E-02	238.63	43.100	7.602E-01	PB212
241.78	111.	21.28	1.12	1.541E-02	241.00	3.900	1.329E+00	RA224
					241.92	7.470	PBC<MDA	PB214
271.29	105.	24.35	0.81	1.395E-02				
295.42	131.	15.26	1.04	1.291E-02	295.22	19.200	3.789E-01	PB214
300.48	66.	31.91	0.77	1.271E-02				
327.77	49.	31.02	1.19	1.170E-02				
338.37	154.	16.67	1.34	1.135E-02	338.40	12.010	8.094E-01	AC228
352.03	259.	9.22	1.14	1.092E-02	351.99	37.100	4.609E-01	PB214
409.38	34.	40.09	0.82	9.422E-03				
462.51	50.	36.78	1.03	8.359E-03				
462.51	50.	36.78	1.03	8.359E-03	463.51	10.000	4.253E-01	SB125
511.13	106.	19.01	1.66	7.585E-03	510.72	22.500	3.840E-01	TL208
583.06	209.	8.82	1.23	6.685E-03	583.14	86.000	2.611E-01	TL208

609.28	188.	10.96	1.27	6.413E-03	609.32	46.090	4.582E-01	BI214
726.98	58.	24.30	1.32	5.444E-03				
726.98	58.	24.30	1.32	5.444E-03	727.17	11.800	6.421E-01	BI212
768.03	32.	33.98	1.57	5.179E-03				
911.29	163.	12.75	1.23	4.446E-03	911.07	29.000	9.069E-01	AC228
964.82	32.	27.00	1.61	4.228E-03	964.00	14.580	PBC<MDA	EU152
968.94	72.	16.49	1.62	4.212E-03	968.90	17.460	7.056E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.70	51.	29.36	0.71	3.711E-03	1120.28	15.040	6.660E-01	BI214
1460.62	620.	4.17	1.84	2.943E-03	1460.75	10.700	1.425E+01	K40
1763.82	29.	21.62	0.97	2.481E-03	1764.51	15.920	5.284E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
417.53	208.93	313.	76.	0.038	111.83	1.149	AC-228	s
477.21	238.74	163.	709.	0.354	13.61	1.122	PB-212	D
542.30	271.29	194.	105.	0.052	63.72	0.810	PA-234	s
600.72	300.48	148.	66.	0.033	95.72	0.768	PB-212	
655.31	327.77	91.	49.	0.024	93.05	1.186	AC-228	s
818.60	409.38	70.	34.	0.017	120.27	0.820	AC-228	
1536.25	768.03	36.	32.	0.016	101.95	1.568	BI-214	
1930.11	964.82	22.	32.	0.016	81.65	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
HG-203	146.38	73.41	987.	-127.	-0.064	108.00	1.499s
PB-212	149.22	74.83	983.	183.	0.092	73.73	1.499
PB-212	153.79	77.11	850.	308.	0.154	43.70	1.499D
PB-214	153.79	77.11	854.	304.	0.152	43.70	1.499D
EU-155	173.50	86.96	940.	127.	0.063	106.03	1.499s
TH-234	185.64	93.03	884.	127.	0.064	94.34	1.499s
TH-234	185.59	93.00	843.	138.	0.069	88.70	1.499s
RA-226	372.21	186.28	428.	111.	0.056	83.83	1.499s
PB-212	477.13	238.71	475.	578.	0.289	20.04	1.499
RA-224	481.70	241.00	448.	91.	0.045	103.20	1.123D
PB-214	590.53	295.39	191.	130.	0.065	51.45	1.499
AC-228	676.52	338.37	177.	152.	0.076	50.02	1.335
PB-214	703.75	351.98	112.	242.	0.121	26.43	1.499
SB-125	925.84	462.97	66.	45.	0.023	85.56	1.499
TL-208	1022.21	511.13	111.	90.	0.045	57.03	1.657s
TL-208	1166.13	583.06	49.	207.	0.103	26.45	1.231
BI-214	1218.60	609.28	72.	187.	0.093	32.87	1.267
BI-212	1454.01	726.93	44.	42.	0.021	80.50	1.499s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1822.93	911.29	66.	161.	0.081	38.25	1.232
AC-228	1938.21	968.90	36.	71.	0.036	49.50	1.616D
BI-214	2241.98	1120.70	50.	51.	0.026	88.07	0.708s
K-40	2922.25	1460.62	16.	618.	0.309	12.52	1.836s
BI-214	3529.08	1763.82	3.	29.	0.014	64.85	0.975s

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

***** S U M M A R Y O 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		8.3058E-02					
			477.56	8.306E-02	&(	4.080E-01 1.20E-01	G
K-40		1.4251E+01					
			1460.75	1.425E+01	@(P	4.892E-01 5.97E-01	G
MN-54		-8.8432E-04					
			834.81	-8.843E-04	&(P	3.693E-02 9.88E-03	G
CO-57		-1.0818E-02					
			122.07	-1.082E-02	%(	4.921E-02 1.48E-02	G K
			136.43	4.280E-02	%	4.007E-01 1.20E-01	G
CO-60		-1.9727E-04					
			1332.51	-1.973E-04	%(P	5.488E-02 1.48E-02	G K
			1173.23	3.818E-02	% P	6.027E-02 1.88E-02	G K
Sr-85		-2.3165E-02					
			514.00	-2.316E-02	&(	6.220E-02 1.87E-02	G
Kr-85		-5.5530E+02					
			513.99	-5.553E+02	&(P	1.425E+03 4.27E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	8.218E-02 2.24E-02	G K
			898.02	1.371E-02	& P	4.726E-02 1.38E-02	G
NB-94		2.5386E-03					
			871.10	2.539E-03	&(P	5.019E-02 1.41E-02	G K
			702.50	-6.716E-03	% P	4.837E-02 1.39E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-2.2962E-02						
		722.95	-2.296E-02	&(	6.697E-02	2.00E-02	G K
		614.37	-1.534E-02	% P	5.353E-02	1.58E-02	G
		433.93	-1.504E-02	%	5.232E-02	1.56E-02	G
CD-109	1.7650E-02						
		88.04	1.765E-02	&(P	1.470E+00	4.38E-01	G
SN-113	1.0714E-03						
		391.71	1.071E-03	%(	6.205E-02	1.79E-02	G K
		255.04	4.895E-01	& P	1.854E+00	5.53E-01	G
SB-125	7.4594E-02						
		427.95	-3.275E-02	%(P	1.501E-01	4.42E-02	G K
		600.77	-5.277E-02	% P	2.482E-01	7.24E-02	G
		636.15	-4.652E-02	% P	2.912E-01	8.22E-02	G
		463.51	3.923E-01	(P	3.536E-01	1.15E-01	G
		176.29	-1.298E-01	% P	6.684E-01	1.99E-01	G
I-131	2.7726E-04						
		364.48	2.773E-04	%(	4.356E-02	1.25E-02	G K
		636.97	0.000E+00	%	7.163E-01	2.03E-01	G
		284.29	1.240E-01	%	6.698E-01	1.98E-01	G
CS-134	-1.4357E-03						
		604.66	-1.436E-03	%(P	4.380E-02	1.23E-02	G K
		795.76	-1.760E-03	% P	7.375E-02	2.10E-02	G
		569.29	-3.226E-02	& P	2.721E-01	7.79E-02	G
		801.84	-1.115E-01	%	5.692E-01	1.65E-01	G
CS-137	1.9702E-02						
		661.62	1.970E-02	&(P	4.973E-02	1.48E-02	G
CE-139	-1.3275E-02						
		165.85	-1.328E-02	&(P	4.753E-02	1.43E-02	G
EU-152	-2.9860E-02						
		121.78	-2.986E-02	%(P	1.512E-01	4.53E-02	G K
		344.30	1.857E-02	& P	1.382E-01	4.05E-02	G
		1408.08	7.245E-02	% P	2.030E-01	5.94E-02	G
		964.00	2.816E-01	% P	4.495E-01	1.39E-01	G
		1112.07	-1.522E-02	% P	4.011E-01	1.11E-01	G
		778.90	-2.306E-02	& P	3.848E-01	1.09E-01	G
EU-154	1.6701E-02						
		123.10	1.670E-02	%(P	1.066E-01	3.19E-02	G K
		1274.80	1.968E-02	% P	1.921E-01	5.43E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-1.056E-01 % P 3.191E-01 9.49E-02 G
                         1004.80-3.448E-02 % P 2.955E-01 8.34E-02 G

EU-155       1.4723E-01
                           86.45 1.472E-01  (  1.691E-01 5.20E-02 G K
                          105.31 1.005E-01 %   1.929E-01 5.86E-02 G

HG-203       2.2283E-02
                          279.17 2.228E-02 %(  4.168E-02 1.27E-02 G K
                           72.87-3.292E-01 & P 1.206E+00 3.63E-01 G
                           70.83-1.763E+00 +   2.064E+00 6.35E-01 G
                           82.50-5.123E-01 %   2.291E+00 6.87E-01 G

TL-208       2.6111E-01
                          583.14 2.611E-01  (P 4.468E-02 2.33E-02 G
                          510.72 3.840E-01 + P 2.198E-01 8.60E-02 G

PB-212       6.5838E-01
                          238.63 6.246E-01  (P 1.127E-01 4.22E-02 G K
                                                          Energy duplication
                           77.11 7.416E-01  (  3.341E-01 1.08E-01 G
                           74.81 8.370E-01 & P 6.800E-01 2.12E-01 G

PB-214       4.1568E-01
                          351.99 4.340E-01  (P 9.297E-02 3.85E-02 G K
                          295.22 3.803E-01  (P 1.964E-01 6.61E-02 G
                                                          Energy duplication
                           77.11 1.198E+00 + P 5.476E-01 1.77E-01 G
                          241.92 3.441E-02 % P 7.995E-01 2.38E-01 G

BI-212       4.7151E-01
                          727.17 4.715E-01 *(P 3.807E-01 1.29E-01 G K
                         1620.56 8.149E-01 %   1.527E+00 4.76E-01 G
                          785.42 7.127E-01 % P 2.519E+00 7.40E-01 G

BI-214       4.7621E-01
                          609.32 4.582E-01  (P 1.040E-01 5.05E-02 G K
                         1764.51 5.284E-01  (P 2.038E-01 1.16E-01 G
                         1120.28 6.660E-01 + P 4.628E-01 1.97E-01 G

RA-224       1.0913E+00
                          241.00 1.091E+00  (P 1.221E+00 3.78E-01 G

RA-226       1.3247E+00
                          185.99 1.325E+00 @(  1.180E+00 3.70E-01 G

AC-228       8.7833E-01
                          911.07 9.069E-01  (P 2.281E-01 1.17E-01 G K
                          968.90 7.052E-01 - P 3.009E-01 1.18E-01 G
                          338.40 8.094E-01  (P 3.445E-01 1.37E-01 G
```

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

TH-227      -1.0926E-01
                          236.00-1.093E-01 %(P 4.857E-01 1.45E-01 G K
                          256.25 1.050E-01 % P 5.380E-01 1.60E-01 G

PA-234      -6.6693E-03
                           98.44-6.669E-03 %(  1.830E-01 5.45E-02 G K
                          946.00-2.571E-02 &   2.904E-01 8.25E-02 G
                          131.28 2.336E-02 &   2.096E-01 6.25E-02 G
                           94.67-6.583E-02 &   3.377E-01 1.01E-01 G
                          883.24 5.556E-02 &   3.852E-01 1.09E-01 G
                          926.70 1.394E-01 %   3.859E-01 1.14E-01 G
                          569.26-1.029E-02 &   4.197E-01 1.19E-01 G

TH-234       1.3713E+00
                           63.29 8.464E-01 %(P 2.095E+00 6.32E-01 G K
                           92.80 1.679E+00  (P 1.678E+00 5.19E-01 G
                           92.38 1.809E+00  (P 2.009E+00 6.17E-01 G

AM-241       5.3941E-03
                           59.54 5.394E-03 %(P 2.956E-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

- -

***** S U 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	8.1961E-02	8.3058E-02	3.5901E-01	3.5905E-01	4.026E-01
K-40	#	1.4251E+01	1.4251E+01	1.7906E+00	1.9633E+00	
MN-54	#A	-8.8231E-04	-8.8432E-04	1.7867E-01	1.7867E-01	3.685E-02
CO-57	#B	-1.0789E-02	-1.0818E-02	4.4253E-02	4.4257E-02	4.908E-02
CO-60	#B	-1.9720E-04	-1.9727E-04	7.6709E-03	7.6709E-03	5.486E-02
Sr-85	#A	-2.2912E-02	-2.3165E-02	5.6068E-02	5.6083E-02	6.153E-02
Kr-85	#A	-5.5530E+02	-5.5530E+02	1.4077E+03	1.4080E+03	1.425E+03
Y-88	#B	0.0000E+00	0.0000E+00	6.7230E-02	6.7230E-02	8.163E-02
NB-94	#B	2.5386E-03	2.5386E-03	4.2219E-02	4.2220E-02	5.019E-02
Ag-108M	#B	-2.2962E-02	-2.2962E-02	5.9940E-02	5.9954E-02	6.697E-02
CD-109	#A	1.7622E-02	1.7650E-02	1.3139E+00	1.3139E+00	1.467E+00
SN-113	#B	1.0648E-03	1.0714E-03	5.3741E-02	5.3741E-02	6.167E-02
SB-125	#B	7.4541E-02	7.4594E-02	6.5874E-02	6.6008E-02	1.500E-01
I-131	#B	2.5381E-04	2.7726E-04	3.7412E-02	3.7412E-02	3.988E-02
CS-134	#B	-1.4344E-03	-1.4357E-03	1.0972E-01	1.0972E-01	4.376E-02
CS-137	#A	1.9701E-02	1.9702E-02	4.4490E-02	4.4504E-02	4.973E-02
CE-139	#A	-1.3207E-02	-1.3275E-02	4.3747E-02	4.3753E-02	4.728E-02
EU-152	#B	-2.9856E-02	-2.9860E-02	1.4448E-01	1.4449E-01	1.512E-01
EU-154	#B	1.6697E-02	1.6701E-02	9.5617E-02	9.5621E-02	1.066E-01
EU-155	#A	1.4717E-01	1.4723E-01	1.5611E-01	1.5632E-01	1.690E-01
HG-203	#B	2.1946E-02	2.2283E-02	3.8097E-02	3.8118E-02	4.105E-02
TL-208		2.6111E-01	2.6111E-01	6.9861E-02	7.1402E-02	
PB-212	#	6.5838E-01	6.5838E-01	1.3333E-01	1.3842E-01	1.127E-01
PB-214	#	4.1568E-01	4.1568E-01	1.1076E-01	1.1323E-01	9.297E-02
BI-212	#	4.7151E-01	4.7151E-01	3.8571E-01	3.8663E-01	3.807E-01
BI-214		4.7621E-01	4.7621E-01	1.5747E-01	1.5975E-01	
RA-224	A	1.0913E+00	1.0913E+00	1.1351E+00	1.1368E+00	
RA-226	#	1.3247E+00	1.3247E+00	1.1104E+00	1.1129E+00	1.180E+00
AC-228		8.7833E-01	8.7833E-01	2.8023E-01	2.8459E-01	
TH-227	#B	-1.0926E-01	-1.0926E-01	4.5103E-01	4.5107E-01	4.857E-01
PA-234	#B	-6.6693E-03	-6.6693E-03	1.6337E-01	1.6337E-01	1.830E-01
TH-234	#B	1.3713E+00	1.3713E+00	1.2023E+00	1.2047E+00	2.095E+00
AM-241	#A	5.3941E-03	5.3941E-03	2.6347E-01	2.6347E-01	2.956E-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) 1.6957663E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 1.6957663E+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_18AUG2006_1151.An1

Sample description
FSS-OOL-02-04-015-F-S

Spectrum Filename: C:\GammaVision\Spectra\102F_18AUG2006_1151.An1

Acquisition information
Start time: 18-Aug-2006 11:51:53
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: 1.8060E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8060E+03) =
5.5371E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 15:27:00
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: 0.6043

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.19	185.	23.57	1.50	9.541E-03	77.11	17.500	8.283E-01	PB212
					77.11	10.700	1.355E+00	PB214
77.19	185.	23.57	1.50	9.541E-03	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	1.355E+00	PB214
93.36	113.	38.66	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.113E+00	TH234
186.14	119.	30.04	1.03	1.626E-02	185.99	3.280	1.606E+00	RA226
209.37	83.	29.39	1.08	1.519E-02				
239.17	693.	6.27	1.23	1.378E-02	238.63	43.100	8.715E-01	PB212
					241.92	7.470	5.084E+00	PB214
270.99	73.	34.36	1.12	1.240E-02				
277.95	53.	40.75	1.08	1.212E-02				
295.69	146.	11.64	1.25	1.146E-02	295.22	19.200	4.970E-01	PB214
300.97	54.	27.34	1.26	1.127E-02				
328.00	56.	41.24	1.03	1.037E-02				
338.72	122.	18.89	1.46	1.005E-02	338.40	12.010	7.587E-01	AC228
352.50	257.	12.22	1.14	9.665E-03	351.99	37.100	5.345E-01	PB214
462.87	105.	16.64	1.16	7.375E-03				
462.87	105.	16.64	1.16	7.375E-03	463.51	10.000	1.048E+00	SB125
511.65	98.	17.77	1.82	6.683E-03	510.72	22.500	4.853E-01	TL208
584.19	216.	10.88	1.39	5.880E-03	583.14	86.000	3.185E-01	TL208
610.15	215.	9.63	1.31	5.642E-03	609.32	46.090	6.167E-01	BI214
912.50	145.	13.32	1.65	3.917E-03	911.07	29.000	9.524E-01	AC228
969.56	114.	16.83	1.31	3.716E-03	968.90	17.460	1.314E+00	AC228
1122.06	51.	26.92	1.53	3.279E-03	1120.28	15.040	7.759E-01	BI214
1462.82	548.	4.39	1.65	2.618E-03	1460.75	10.700	1.462E+01	K40

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
418.37	209.37	230.	83.	0.041	88.18	1.079	AC-228 sM
541.62	270.99	200.	73.	0.037	103.08	1.119	AC-228 sM
555.55	277.95	154.	61.	0.030	94.81	1.078	NP-239 M
600.78	300.56	108.	58.	0.029	88.93	0.989	PB-212 sM
655.67	328.00	169.	56.	0.028	123.72	1.035	AC-228 M
1939.33	969.56	126.	50.	0.025	104.00	1.309	AC-228 M

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	153.80	77.11	857.	185.	0.092	70.72	1.500D
PB-214	153.80	77.11	857.	185.	0.092	70.72	1.500D
TH-234	186.29	93.36	896.	113.	0.056	115.97	1.500s
RA-226	372.13	186.26	425.	92.	0.046	95.00	1.500s
PB-212	477.60	238.99	367.	533.	0.267	20.04	1.500
PB-214	591.00	295.67	177.	121.	0.061	53.94	1.500s
AC-228	677.14	338.73	129.	111.	0.055	52.06	1.500
PB-214	704.57	352.44	75.	246.	0.123	24.20	1.500
SB-125	926.86	463.56	85.	63.	0.031	70.99	1.500s
TL-208	1023.09	511.65	70.	98.	0.049	53.32	1.822s
TL-208	1168.21	584.19	84.	216.	0.108	32.63	1.393s
BI-214	1220.15	610.15	62.	215.	0.107	28.88	1.312
AC-228	1825.27	912.57	41.	108.	0.054	38.21	1.679
AC-228	1941.13	970.46	52.	64.	0.032	60.95	1.718
BI-214	2244.51	1122.06	41.	51.	0.026	80.75	1.530
K-40	2926.73	1462.91	9.	512.	0.256	13.47	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	Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-6.7462E-02					
			477.56	-6.746E-02	%(	4.675E-01 1.36E-01	G
K-40		1.3668E+01					
			1460.75	1.367E+01	(P	4.376E-01 6.14E-01	G
MN-54		-8.5243E-03					
			834.81	-8.524E-03	%(P	5.317E-02 1.51E-02	G
CO-57		7.5022E-03					
			122.07	7.502E-03	%(	5.890E-02 1.76E-02	G K
			136.43	5.039E-02	%	4.772E-01 1.42E-01	G
CO-60		1.3104E-02					
			1332.51	1.310E-02	%(P	6.329E-02 1.80E-02	G K
			1173.23	1.454E-03	%	5.935E-02 1.62E-02	G K
Sr-85		-1.1736E-02					
			514.00	-1.174E-02	&(	6.157E-02 1.81E-02	G
Kr-85		-2.6790E+02					
			513.99	-2.679E+02	&(	1.408E+03 4.14E+02	G
Y-88		-2.3133E-05					
			1836.01	-2.313E-05	%(P	9.573E-02 2.61E-02	G K
			898.02	1.500E-02	& P	6.944E-02 2.01E-02	G
NB-94		-6.1427E-03					
			871.10	-6.143E-03	%(	5.225E-02 1.47E-02	G K
			702.50	1.264E-02	&	5.288E-02 1.54E-02	G K
Ag-108M		-1.8893E-03					
			722.95	-1.889E-03	%(	8.000E-02 2.29E-02	G K
			614.37	-2.755E-02	% P	7.429E-02 2.22E-02	G
			433.93	-4.988E-03	%	5.373E-02 1.56E-02	G
CD-109		-9.1944E-02					
			88.04	-9.194E-02	%(P	2.371E+00 7.07E-01	G
SN-113		1.4166E-02					
			391.71	1.417E-02	%(	6.194E-02 1.82E-02	G K
			255.04	-2.424E-01	&	2.210E+00 6.53E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.5413E-01						
		427.95	-8.659E-03	%(P	1.586E-01	4.55E-02	G K
		600.77	-2.134E-02	% P	2.692E-01	7.67E-02	G
		636.15	-8.432E-04	& P	5.610E-01	1.60E-01	G
		463.51	6.360E-01	*(P	4.631E-01	1.54E-01	G
		176.29	9.700E-02	& P	6.968E-01	2.07E-01	G
I-131	1.2574E-02						
		364.48	1.257E-02	%(	5.142E-02	1.52E-02	G K
		636.97	-4.220E-02	%	7.410E-01	2.10E-01	G
		284.29	7.318E-03	%	7.236E-01	2.11E-01	G
CS-134	-7.5509E-03						
		604.66	-7.551E-03	%(	5.738E-02	1.66E-02	G K
		795.76	3.076E-02	%	5.527E-02	1.70E-02	G
		569.29	9.950E-02	%	2.528E-01	7.56E-02	G
		801.84	1.394E-01	% P	5.536E-01	1.61E-01	G
CS-137	-3.3394E-03						
		661.62	-3.339E-03	%(	6.232E-02	1.77E-02	G
CE-139	7.8781E-03						
		165.85	7.878E-03	&(P	5.640E-02	1.68E-02	G
EU-152	1.4299E-02						
		121.78	1.430E-02	%(P	1.565E-01	4.65E-02	G K
		344.30	-7.904E-03	%	1.683E-01	4.90E-02	G
		1408.08	7.764E-02	%	2.699E-01	7.80E-02	G
		964.00	-9.957E-03	& P	3.477E-01	9.42E-02	G
		1112.07	4.864E-02	%	5.274E-01	1.49E-01	G
		778.90	4.066E-04	& P	4.278E-01	1.19E-01	G
EU-154	-2.5500E-02						
		123.10	-2.550E-02	%(P	1.208E-01	3.61E-02	G K
		1274.80	-1.674E-02	%	2.132E-01	5.98E-02	G
		723.30	6.067E-02	% P	2.662E-01	7.74E-02	G
		1004.80	-7.921E-02	&	3.952E-01	1.14E-01	G
EU-155	1.7469E-01						
		86.45	1.747E-01	%(P	2.700E-01	8.23E-02	G K
		105.31	9.731E-02	%	2.691E-01	8.12E-02	G
HG-203	-6.7801E-03						
		279.17	-6.780E-03	%(P	4.326E-02	1.27E-02	G K
		72.87	-6.216E-01	&	2.243E+00	6.75E-01	G
		70.83	-6.804E-01	%	3.927E+00	1.18E+00	G
		82.50	-7.445E-01	%	3.648E+00	1.09E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.1847E-01						
		583.14	3.185E-01	@(P	6.725E-02	3.48E-02	G
		510.72	4.853E-01	+	2.075E-01	8.64E-02	G
PB-212	6.7055E-01						
		238.63	6.705E-01	(	1.158E-01	4.48E-02	G K
							Energy duplication
		77.11	8.283E-01	+	6.233E-01	1.95E-01	G
		74.81	7.296E-01	& P	1.327E+00	4.03E-01	G
PB-214	5.1332E-01						
		351.99	5.133E-01	(P	8.980E-02	4.15E-02	G K
		295.22	4.121E-01	-	2.200E-01	7.41E-02	G
							Energy duplication
		77.11	1.355E+00	+	1.019E+00	3.19E-01	G
		241.92	2.714E-02	%	7.005E-01	2.07E-01	G
BI-212	3.1875E-01						
		727.17	3.188E-01	%(	5.118E-01	1.58E-01	G K
		1620.56	2.694E-02	% P	1.534E+00	3.70E-01	G
		785.42	-3.531E-01	% P	2.815E+00	8.04E-01	G
BI-214	6.5587E-01						
		609.32	6.167E-01	(	1.136E-01	5.94E-02	G K
		1764.51	-4.780E-02	% P	4.377E-01	1.19E-01	G
		1120.28	7.759E-01	(	4.921E-01	2.09E-01	G
RA-224	7.5328E-01						
		241.00	7.533E-01	%(P	1.419E+00	4.31E-01	G
RA-226	1.2931E+00						
		185.99	1.293E+00	(P	1.385E+00	4.29E-01	G
AC-228	7.1236E-01						
		911.07	7.097E-01	(P	2.140E-01	9.06E-02	G K
		968.90	7.359E-01	(P	4.197E-01	1.50E-01	G
		338.40	6.845E-01	(	3.441E-01	1.19E-01	G
TH-227	1.2775E-02						
		236.00	1.278E-02	&(P	3.863E-01	1.14E-01	G K
		256.25	8.999E-03	&	6.864E-01	2.02E-01	G
PA-234	-7.0795E-02						
		98.44	-7.079E-02	&(	2.742E-01	8.24E-02	G K
		946.00	-2.806E-02	&	2.369E-01	6.59E-02	G
		131.28	-6.052E-02	%	2.556E-01	7.66E-02	G
		94.67	-2.945E-02	&	5.101E-01	1.52E-01	G
		883.24	1.947E-02	&	4.133E-01	1.14E-01	G
		926.70	4.186E-03	&	4.298E-01	1.16E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.474E-01 %   3.748E-01 1.12E-01 G

TH-234       1.1753E+00
                           63.29 4.543E-01 &(P 4.671E+00 1.39E+00 G K
                           92.80 2.113E+00  (  2.661E+00 8.17E-01 G
                           92.38-1.427E-01 & P 3.341E+00 9.97E-01 G

AM-241      -1.7022E-02
                           59.54-1.702E-02 &(  6.149E-01 1.82E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-6.6722E-02	-6.7462E-02	4.0804E-01	4.0806E-01	4.624E-01
K-40		1.3668E+01	1.3668E+01	1.8418E+00	1.9951E+00	4.376E-01
MN-54	#A	-8.5083E-03	-8.5243E-03	4.9562E-02	4.9565E-02	5.307E-02
CO-57	#B	7.4858E-03	7.5022E-03	5.2678E-02	5.2679E-02	5.877E-02
CO-60	#B	1.3100E-02	1.3104E-02	5.4019E-02	5.4024E-02	6.327E-02

Sr-85	#A	-1.1630E-02	-1.1736E-02	5.4353E-02	5.4357E-02	6.101E-02
Kr-85	#A	-2.6790E+02	-2.6790E+02	1.2433E+03	1.2434E+03	1.408E+03
Y-88	#B	-2.3006E-05	-2.3133E-05	1.0297E-03	1.0297E-03	9.520E-02
NB-94	#B	-6.1427E-03	-6.1427E-03	4.4209E-02	4.4211E-02	5.225E-02
Ag-108M	#B	-1.8893E-03	-1.8893E-03	6.8812E-02	6.8812E-02	8.000E-02
CD-109	#A	-9.1824E-02	-9.1944E-02	3.5986E+00	3.5986E+00	2.368E+00
SN-113	#B	1.4094E-02	1.4166E-02	5.4664E-02	5.4670E-02	6.162E-02
SB-125	#B	1.5404E-01	1.5413E-01	1.1212E-01	1.1245E-01	1.585E-01
I-131	#B	1.1685E-02	1.2574E-02	4.5539E-02	4.5545E-02	4.779E-02
CS-134	#B	-7.5450E-03	-7.5509E-03	4.9840E-02	4.9842E-02	5.733E-02
CS-137	#A	-3.3392E-03	-3.3394E-03	5.3048E-02	5.3048E-02	6.232E-02
CE-139	#A	7.8444E-03	7.8781E-03	5.0362E-02	5.0364E-02	5.615E-02
EU-152	#B	1.4298E-02	1.4299E-02	1.3938E-01	1.3938E-01	1.565E-01
EU-154	#B	-2.5495E-02	-2.5500E-02	1.1034E-01	1.1035E-01	1.208E-01
EU-155	#B	1.7463E-01	1.7469E-01	2.4697E-01	2.4716E-01	2.699E-01
HG-203	#B	-6.6949E-03	-6.7801E-03	3.8900E-02	3.8902E-02	4.272E-02
TL-208	#	3.1847E-01	3.1847E-01	1.0412E-01	1.0564E-01	
PB-212	#	6.7055E-01	6.7055E-01	1.3435E-01	1.3952E-01	1.158E-01
PB-214	#	5.1332E-01	5.1332E-01	1.2443E-01	1.2772E-01	8.980E-02
BI-212	#B	3.1875E-01	3.1875E-01	4.7511E-01	4.7544E-01	5.118E-01
BI-214		6.5587E-01	6.5587E-01	1.8941E-01	1.9295E-01	
RA-224	#A	7.5328E-01	7.5328E-01	1.2935E+00	1.2942E+00	1.419E+00
RA-226	#A	1.2931E+00	1.2931E+00	1.2879E+00	1.2899E+00	1.385E+00
AC-228		7.1236E-01	7.1236E-01	2.1098E-01	2.1473E-01	2.140E-01
TH-227	#B	1.2775E-02	1.2775E-02	3.4056E-01	3.4056E-01	3.863E-01
PA-234	#B	-7.0795E-02	-7.0795E-02	2.4719E-01	2.4722E-01	2.742E-01
TH-234	#B	1.1753E+00	1.1753E+00	1.3630E+00	1.3646E+00	4.671E+00
AM-241	#A	-1.7022E-02	-1.7022E-02	5.4601E-01	5.4601E-01	6.149E-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) 1.5355085E+01 pCi/gm
Total Decayed Activity (50.2 to 1999.0 keV) 1.5355085E+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_18AUG2006_1258.An1

Sample description
FSS-OOL-02-04-014-F

Spectrum Filename: C:\GammaVision\Spectra\102F_18AUG2006_1258.An1

Acquisition information
Start time: 18-Aug-2006 12:58:48
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: 1.9730E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9730E+03) =
5.0684E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	17-Aug-2006 15:23:00
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: 0.6900

***** S U M M A R Y O F P E A K 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	118.	39.80	1.50	8.847E-03				
74.94	118.	39.80	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.25	203.	23.74	1.50	9.541E-03	77.11	10.700	1.363E+00	PB214
					77.11	17.500	8.335E-01	PB212
77.25	203.	23.74	1.50	9.541E-03	77.11	10.700	1.363E+00	PB214
					77.11	17.500	8.335E-01	PB212
93.09	117.	39.46	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.998E+00	TH234
129.21	63.	41.32	1.28	1.716E-02				
186.20	86.	32.14	1.21	1.626E-02	185.99	3.280	PBC<MDA	RA226
209.74	96.	32.77	1.02	1.517E-02				
239.08	780.	4.23	1.22	1.378E-02	238.63	43.100	8.980E-01	PB212
242.65	110.	20.92	1.22	1.362E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.363E-01	PB214
270.54	69.	33.54	1.34	1.242E-02				
295.78	154.	11.82	1.26	1.145E-02	295.22	19.200	4.785E-01	PB214
300.49	49.	33.70	1.26	1.128E-02				
328.17	69.	33.27	1.16	1.037E-02				
338.80	190.	15.18	1.36	1.005E-02	338.40	12.010	1.076E+00	AC228
352.62	291.	10.22	1.46	9.662E-03	351.99	37.100	5.536E-01	PB214
463.72	71.	24.81	1.88	7.361E-03	463.51	10.000	6.500E-01	SB125
511.55	137.	14.73	2.02	6.684E-03	510.72	22.500	6.229E-01	TL208
					513.99	0.004	3.280E+03	Kr85
					514.00	99.270	1.434E-01	Sr85
584.17	242.	8.02	1.44	5.880E-03	583.14	86.000	3.267E-01	TL208
610.24	168.	9.64	1.35	5.641E-03	609.32	46.090	4.414E-01	BI214
728.47	88.	25.32	1.63	4.786E-03	727.17	11.800	1.069E+00	BI212

912.55	140.	11.38	1.14	3.916E-03	911.07	29.000	8.417E-01	AC228
970.40	121.	16.01	2.10	3.713E-03				
1121.29	49.	33.97	1.54	3.281E-03	1120.28	15.040	6.797E-01	BI214
1463.06	659.	3.95	2.15	2.617E-03	1460.75	10.700	1.609E+01	K40

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
258.01	129.21	327.	63.	0.032	123.95	1.278	AC-228	l
419.09	209.74	362.	96.	0.048	98.32	1.019	NP-239	M
477.78	239.11	154.	780.	0.390	12.68	1.215	PB-212	D
484.94	242.68	208.	110.	0.055	62.77	1.218	XE-138	D
540.72	270.54	193.	69.	0.034	100.62	1.344	AC-228	sM
600.63	300.47	109.	49.	0.024	101.10	1.258	PB-212	lD
656.02	328.17	166.	69.	0.035	99.81	1.156	AC-228	sM
1941.01	970.40	82.	100.	0.050	48.56	2.099	AC-228	sM

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.46	74.94	1104.	118.	0.059	119.40	1.500s
PB-214	153.80	77.11	1062.	203.	0.102	71.22	1.500D
PB-212	153.80	77.11	1062.	203.	0.102	71.22	1.500D
TH-234	185.77	93.09	1001.	117.	0.058	118.38	1.500
RA-226	372.38	186.39	538.	90.	0.045	108.77	1.500
PB-212	477.76	239.07	487.	677.	0.338	18.01	1.500s
RA-224	483.57	241.97	537.	97.	0.049	104.39	1.500
PB-214	591.04	295.69	201.	147.	0.074	47.68	1.500
AC-228	677.26	338.79	174.	159.	0.079	42.51	1.500
PB-214	704.84	352.58	144.	267.	0.133	26.46	1.500
SB-125	927.46	463.86	73.	49.	0.024	83.11	1.500s
TL-208	1022.88	511.55	90.	137.	0.068	44.18	2.025s
TL-208	1168.16	584.17	54.	242.	0.121	24.07	1.438
BI-214	1220.34	610.24	39.	168.	0.084	28.93	1.351
BI-212	1456.90	728.47	96.	88.	0.044	75.96	1.635s
AC-228	1825.67	912.77	27.	123.	0.061	32.32	1.679
BI-214	2242.98	1121.29	57.	49.	0.024	101.90	1.537
K-40	2927.02	1463.05	11.	641.	0.320	12.05	2.042

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-9.8140E-02					
			477.56	-9.814E-02	%(	4.636E-01 1.36E-01	G
K-40		1.5649E+01					
			1460.75	1.565E+01	(P	4.445E-01 6.29E-01	G
MN-54		-5.1221E-03					
			834.81	-5.122E-03	&(P	5.520E-02 1.56E-02	G
CO-57		7.0949E-03					
			122.07	7.095E-03	&(	5.891E-02 1.76E-02	G K
			136.43	-3.616E-02	%	4.911E-01 1.46E-01	G
CO-60		1.6629E-03					
			1332.51	1.663E-03	&(P	6.403E-02 1.75E-02	G K
			1173.23	2.594E-03	%	7.051E-02 1.98E-02	G K
Sr-85		9.6516E-04					
			514.00	9.652E-04	&(	5.723E-02 1.65E-02	G
Kr-85		2.2703E+01					
			513.99	2.270E+01	&(	1.308E+03 3.78E+02	G
Y-88		-2.1182E-05					
			1836.01	-2.118E-05	&(P	5.431E-02 1.38E-02	G K
			898.02	-8.278E-04	% P	5.611E-02 1.54E-02	G
NB-94		1.8920E-02					
			871.10	1.892E-02	%(	4.580E-02 1.37E-02	G K
			702.50	1.475E-02	&	4.343E-02 1.29E-02	G K
Ag-108M		2.0424E-02					
			722.95	2.042E-02	%(	5.603E-02 1.67E-02	G K
			614.37	-9.469E-03	% P	5.413E-02 1.57E-02	G
			433.93	1.575E-02	%	4.325E-02 1.29E-02	G
CD-109		2.2020E-01					
			88.04	2.202E-01	%(P	2.270E+00 6.79E-01	G
SN-113		1.1287E-02					
			391.71	1.129E-02	%(	5.526E-02 1.62E-02	G K
			255.04	2.332E-01	%	1.573E+00 4.63E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.5489E-01						
		427.95	5.414E-02	%(P	1.290E-01	3.87E-02	G K
		600.77	-5.552E-02	& P	2.877E-01	8.40E-02	G
		636.15	-1.091E-01	% P	5.389E-01	1.58E-01	G
		463.51	4.531E-01	(P	3.964E-01	1.30E-01	G
		176.29	-1.398E-01	% P	6.705E-01	2.00E-01	G
I-131	9.2853E-03						
		364.48	9.285E-03	&(	5.070E-02	1.49E-02	G K
		636.97	1.872E-01	%	7.567E-01	2.22E-01	G
		284.29	-2.836E-01	%	8.139E-01	2.45E-01	G
CS-134	1.5280E-02						
		604.66	1.528E-02	%(	4.502E-02	1.34E-02	G K
		795.76	4.403E-02	%	6.421E-02	2.01E-02	G
		569.29	1.128E-01	%	2.962E-01	8.87E-02	G
		801.84	1.051E-01	% P	5.413E-01	1.56E-01	G
CS-137	1.7246E-02						
		661.62	1.725E-02	&(	5.748E-02	1.70E-02	G
CE-139	-4.1955E-03						
		165.85	-4.196E-03	&(P	5.992E-02	1.78E-02	G
EU-152	-3.1788E-03						
		121.78	-3.179E-03	&(P	1.710E-01	5.07E-02	G K
		344.30	-3.159E-02	&	1.617E-01	4.78E-02	G
		1408.08	0.000E+00	&	2.578E-01	6.84E-02	G
		964.00	-9.723E-02	% P	4.364E-01	1.27E-01	G
		1112.07	-1.144E-01	%	5.287E-01	1.54E-01	G
		778.90	1.233E-02	& P	5.714E-01	1.64E-01	G
EU-154	1.7917E-02						
		123.10	1.792E-02	&(P	1.166E-01	3.48E-02	G K
		1274.80	2.059E-02	%	1.993E-01	5.63E-02	G
		723.30	-1.619E-03	% P	3.756E-01	1.08E-01	G
		1004.80	3.009E-03	&	3.861E-01	1.08E-01	G
EU-155	4.7904E-02						
		86.45	4.790E-02	%(P	2.758E-01	8.27E-02	G K
		105.31	-2.472E-03	&	2.528E-01	7.51E-02	G
HG-203	2.6492E-02						
		279.17	2.649E-02	%(P	4.884E-02	1.49E-02	G K
		72.87	-6.241E-01	%	2.049E+00	6.18E-01	G
		70.83	1.541E+00	&	2.564E+00	7.83E-01	G
		82.50	-9.749E-01	%	4.008E+00	1.20E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.2667E-01						
		583.14	3.267E-01	(P	5.014E-02	2.63E-02	G
		510.72	6.229E-01	+	2.133E-01	9.19E-02	G
PB-212	7.9477E-01						
		238.63	7.790E-01	@(	1.214E-01	4.68E-02	G K
							Energy duplication
		77.11	8.335E-01	@(	6.341E-01	1.98E-01	G
		74.81	9.522E-01	& P	1.271E+00	3.89E-01	G
PB-214	4.9150E-01						
		351.99	5.084E-01	(P	1.118E-01	4.49E-02	G K
		295.22	4.589E-01	(	2.140E-01	7.29E-02	G
							Energy duplication
		77.11	1.363E+00	+	1.037E+00	3.24E-01	G
		241.92	5.315E-01	%	7.756E-01	2.37E-01	G
BI-212	1.0691E+00						
		727.17	1.069E+00	*(	5.848E-01	2.71E-01	G K
		1620.56	-3.487E-02	& P	1.705E+00	4.24E-01	G
		785.42	-3.562E-01	& P	2.817E+00	8.08E-01	G
BI-214	4.4140E-01						
		609.32	4.414E-01	(	8.388E-02	4.26E-02	G K
		1764.51	-8.743E-02	% P	4.133E-01	1.17E-01	G
		1120.28	6.797E-01	+	5.256E-01	2.31E-01	G
RA-224	1.2457E+00						
		241.00	1.246E+00	(P	1.420E+00	4.39E-01	G
RA-226	1.1495E+00						
		185.99	1.150E+00	(P	1.423E+00	4.38E-01	G
AC-228	7.8701E-01						
		911.07	7.399E-01	(P	1.612E-01	7.99E-02	G K
		968.90	2.200E-01	% P	3.715E-01	1.15E-01	G
		338.40	9.007E-01	(	3.638E-01	1.28E-01	G
TH-227	-1.5365E-01						
		236.00	-1.537E-01	%(P	4.882E-01	1.47E-01	G K
		256.25	8.237E-03	&	5.976E-01	1.75E-01	G
PA-234	-7.1872E-02						
		98.44	-7.187E-02	%(	2.659E-01	8.00E-02	G K
		946.00	-4.884E-05	&	2.850E-01	7.91E-02	G
		131.28	6.724E-03	&	2.460E-01	7.31E-02	G
		94.67	-1.217E-01	%	4.941E-01	1.49E-01	G
		883.24	-7.111E-02	%	5.149E-01	1.48E-01	G
		926.70	-2.631E-02	%	6.486E-01	1.85E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.672E-01 %   4.391E-01 1.31E-01 G

TH-234       1.4333E+00
                           63.29 9.992E-01 %(P 4.900E+00 1.47E+00 G K
                           92.80 1.998E+00  (  2.571E+00 7.88E-01 G
                           92.38 1.921E-02 % P 3.069E+00 9.15E-01 G

AM-241      -1.8858E-01
                           59.54-1.886E-01 &(  7.447E-01 2.24E-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	-9.7001E-02	-9.8140E-02	4.0919E-01	4.0923E-01	4.583E-01
K-40		1.5649E+01	1.5649E+01	1.8863E+00	2.0807E+00	4.445E-01
MN-54	#A	-5.1119E-03	-5.1221E-03	5.3689E-02	5.3690E-02	5.509E-02
CO-57	#B	7.0785E-03	7.0949E-03	5.2743E-02	5.2744E-02	5.877E-02
CO-60	#B	1.6623E-03	1.6629E-03	5.2635E-02	5.2635E-02	6.401E-02

Sr-85	#A	9.5592E-04	9.6516E-04	4.9615E-02	4.9615E-02	5.668E-02
Kr-85	#A	2.2703E+01	2.2703E+01	1.1344E+03	1.1344E+03	1.308E+03
Y-88	#B	-2.1059E-05	-2.1182E-05	5.4435E-04	5.4435E-04	5.400E-02
NB-94	#B	1.8920E-02	1.8920E-02	4.1186E-02	4.1199E-02	4.580E-02
Ag-108M	#B	2.0424E-02	2.0424E-02	5.0109E-02	5.0122E-02	5.603E-02
CD-109	#A	2.1989E-01	2.2020E-01	2.0373E+00	2.0374E+00	2.267E+00
SN-113	#B	1.1226E-02	1.1287E-02	4.8578E-02	4.8582E-02	5.496E-02
SB-125	#F	1.5479E-01	1.5489E-01	1.3281E-01	1.3309E-01	1.289E-01
I-131	#B	8.5922E-03	9.2853E-03	4.4672E-02	4.4675E-02	4.691E-02
CS-134	#B	1.5267E-02	1.5280E-02	4.0116E-02	4.0125E-02	4.498E-02
CS-137	#A	1.7245E-02	1.7246E-02	5.0932E-02	5.0942E-02	5.748E-02
CE-139	#A	-4.1765E-03	-4.1955E-03	5.9395E-02	5.9395E-02	5.964E-02
EU-152	#B	-3.1783E-03	-3.1788E-03	3.4239E-01	3.4239E-01	1.710E-01
EU-154	#B	1.7914E-02	1.7917E-02	1.0444E-01	1.0444E-01	1.166E-01
EU-155	#B	4.7887E-02	4.7904E-02	2.4810E-01	2.4811E-01	2.757E-01
HG-203	#B	2.6140E-02	2.6492E-02	4.4645E-02	4.4669E-02	4.819E-02
TL-208		3.2667E-01	3.2667E-01	7.8763E-02	8.0868E-02	
PB-212	#	7.9477E-01	7.9477E-01	1.4311E-01	1.4989E-01	1.214E-01
PB-214	#	4.9150E-01	4.9150E-01	1.3022E-01	1.3311E-01	1.118E-01
BI-212	#	1.0691E+00	1.0691E+00	8.1204E-01	8.1426E-01	
BI-214		4.4140E-01	4.4140E-01	1.2771E-01	1.3009E-01	
RA-224	#A	1.2457E+00	1.2457E+00	1.3159E+00	1.3178E+00	1.420E+00
RA-226	#A	1.1495E+00	1.1495E+00	1.3127E+00	1.3143E+00	1.423E+00
AC-228		7.8701E-01	7.8701E-01	2.1029E-01	2.1488E-01	1.612E-01
TH-227	#B	-1.5365E-01	-1.5365E-01	4.4762E-01	4.4771E-01	4.882E-01
PA-234	#B	-7.1872E-02	-7.1872E-02	2.3998E-01	2.4001E-01	2.659E-01
TH-234	#B	1.4333E+00	1.4333E+00	1.6967E+00	1.6986E+00	4.900E+00
AM-241	#A	-1.8857E-01	-1.8858E-01	6.7145E-01	6.7153E-01	7.447E-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) 1.8273663E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.8273663E+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_18AUG2006_1339.An1

Sample description
FSS-OOL-02-04-012-F

Spectrum Filename: C:\GammaVision\Spectra\102F_18AUG2006_1339.An1

Acquisition information
Start time: 18-Aug-2006 13:39:27
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: 1.8560E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8560E+03) =
5.3879E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 14:55:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.7449

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.35	175.	25.98	1.50	9.541E-03	77.11	10.700	1.248E+00	PB214
					77.11	17.500	7.629E-01	PB212
77.35	175.	25.98	1.50	9.541E-03	77.11	10.700	1.248E+00	PB214
					77.11	17.500	7.629E-01	PB212
93.57	94.	34.75	0.91	1.348E-02	92.80	3.000	1.704E+00	TH234
186.20	108.	30.63	1.51	1.626E-02	185.99	3.280	1.416E+00	RA226
209.89	66.	38.91	0.60	1.516E-02				
239.09	745.	4.34	1.22	1.379E-02	238.63	43.100	9.117E-01	PB212
241.71	100.	26.80	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.174E-01	PB214
270.98	58.	35.55	1.43	1.240E-02				
295.69	138.	14.35	1.33	1.145E-02	295.22	19.200	4.558E-01	PB214
328.55	88.	29.76	1.61	1.035E-02				
338.90	168.	15.04	1.38	1.005E-02	338.40	12.010	1.011E+00	AC228
352.56	244.	10.21	1.35	9.663E-03	351.99	37.100	4.944E-01	PB214
463.10	50.	33.43	1.12	7.371E-03				
463.10	50.	33.43	1.12	7.371E-03	463.51	10.000	4.813E-01	SB125
512.07	113.	17.59	1.54	6.678E-03	510.72	22.500	5.462E-01	TL208
584.15	236.	9.98	1.13	5.880E-03	583.14	86.000	3.386E-01	TL208
610.26	178.	11.88	1.64	5.641E-03	609.32	46.090	4.991E-01	BI214
728.59	78.	20.60	1.56	4.786E-03	727.17	11.800	9.988E-01	BI212
796.43	29.	35.37	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
912.84	156.	11.79	1.51	3.915E-03	911.07	29.000	1.000E+00	AC228
970.28	110.	17.99	0.73	3.713E-03	968.90	17.460	1.238E+00	AC228
1121.82	35.	30.05	1.33	3.283E-03	1120.28	15.040	5.161E-01	BI214
1463.13	574.	4.17	2.28	2.617E-03	1460.75	10.700	1.490E+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
419.40	209.89	266.	66.	0.033	116.74	0.597	NP-239 sM
477.82	239.02	150.	745.	0.373	13.02	1.215	PB-212 D
483.04	241.63	313.	100.	0.050	80.41	1.217	PB-214 D
541.61	270.98	164.	58.	0.029	106.65	1.435	AC-228 M
656.77	328.55	179.	88.	0.044	89.28	1.614	RH-106M sM
1940.76	970.28	116.	59.	0.029	87.01	0.734	AC-228 sM

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.80	77.11	945.	175.	0.087	77.93	1.500D
PB-212	153.80	77.11	945.	175.	0.087	77.93	1.500D
RA-226	372.41	186.40	447.	80.	0.040	111.13	1.500s
PB-212	477.81	239.09	410.	622.	0.311	18.32	1.500
PB-214	591.31	295.83	173.	135.	0.068	48.73	1.500s
AC-228	677.45	338.89	128.	143.	0.071	41.99	1.500
PB-214	705.06	352.69	97.	220.	0.110	27.69	1.500s
SB-125	927.33	463.79	64.	41.	0.020	91.69	1.500s
TL-208	1023.91	512.07	94.	113.	0.056	52.76	1.538s
TL-208	1168.14	584.15	84.	236.	0.118	29.95	1.135
BI-214	1220.37	610.26	78.	178.	0.089	35.64	1.642
Ag-108M	1224.62	612.38	154.	-47.	-0.024	120.17	1.499s
SB-125	1279.95	640.03	11.	15.	0.008	118.93	1.499s
BI-212	1457.14	728.59	49.	78.	0.039	61.79	1.562s
CS-134	1592.88	796.43	39.	29.	0.015	106.11	1.601
AC-228	1825.98	912.92	41.	125.	0.062	34.56	1.679
AC-228	1941.16	970.48	52.	52.	0.026	72.60	1.718
BI-214	2244.05	1121.82	27.	35.	0.018	90.14	1.329
K-40	2927.25	1463.17	17.	544.	0.272	13.25	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		1.1875E-01					
			477.56	1.187E-01	&(	3.584E-01 1.06E-01	G
K-40		1.4112E+01					
			1460.75	1.411E+01	(P	5.627E-01 6.23E-01	G
MN-54		2.6491E-02					
			834.81	2.649E-02	&(P	4.786E-02 1.47E-02	G
CO-57		-1.4121E-03					
			122.07	-1.412E-03	&(	6.231E-02 1.85E-02	G K
			136.43	5.648E-03	&	4.218E-01 1.25E-01	G
CO-60		-7.9660E-03					
			1332.51	-7.966E-03	&(P	7.620E-02 2.15E-02	G K
			1173.23	-7.291E-03	&	7.817E-02 2.22E-02	G K
Sr-85		-5.9888E-04					
			514.00	-5.989E-04	&(	5.268E-02 1.51E-02	G
Kr-85		-1.3290E+01					
			513.99	-1.329E+01	&(	1.204E+03 3.45E+02	G
Y-88		4.6553E-03					
			1836.01	4.655E-03	%(P	2.808E-02 6.96E-03	G K
			898.02	4.942E-03	& P	6.342E-02 1.78E-02	G
NB-94		4.2674E-03					
			871.10	4.267E-03	%(	4.196E-02 1.16E-02	G K
			702.50	1.134E-05	%	5.456E-02 1.53E-02	G K
Ag-108M		-1.4660E-02					
			722.95	-1.466E-02	%(	6.074E-02 1.78E-02	G K
			614.37	-6.774E-02	& P	8.687E-02 2.70E-02	G
			433.93	3.793E-03	%	4.726E-02 1.36E-02	G
CD-109		1.0641E+00					
			88.04	1.064E+00	%(P	2.222E+00 6.74E-01	G
SN-113		-8.8554E-05					
			391.71	-8.855E-05	%(	6.993E-02 2.01E-02	G K
			255.04	-3.834E-01	%	2.164E+00 6.43E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3163E-01						
		427.95	2.041E-02	%(P	1.444E-01	4.19E-02	G K
		600.77	-9.660E-04	% P	2.853E-01	8.08E-02	G
		636.15	1.833E-01	?(P	2.171E-01	7.30E-02	G
		463.51	4.030E-01	(P	3.953E-01	1.28E-01	G
		176.29	-5.092E-02	% P	7.303E-01	2.16E-01	G
I-131	6.9020E-03						
		364.48	6.902E-03	%(	5.073E-02	1.48E-02	G K
		636.97	-1.877E-01	%	7.431E-01	2.18E-01	G
		284.29	0.000E+00	&	8.262E-01	2.42E-01	G
CS-134	2.6488E-02						
		604.66	0.000E+00	&(	6.057E-02	1.73E-02	G K
		795.76	5.676E-02	(	6.168E-02	2.01E-02	G
		569.29	6.516E-02	&	2.872E-01	8.38E-02	G
		801.84	-3.815E-03	% P	6.055E-01	1.68E-01	G
CS-137	-2.8141E-03						
		661.62	-2.814E-03	%(	5.793E-02	1.64E-02	G
CE-139	1.6594E-04						
		165.85	1.659E-04	&(P	4.922E-02	1.45E-02	G
EU-152	-1.2993E-03						
		121.78	-1.299E-03	%(P	1.793E-01	5.32E-02	G K
		344.30	9.781E-03	%	1.309E-01	3.78E-02	G
		1408.08	0.000E+00	&	2.197E-01	5.62E-02	G
		964.00	-9.755E-02	% P	4.893E-01	1.42E-01	G
		1112.07	4.919E-02	%	4.793E-01	1.35E-01	G
		778.90	3.202E-02	% P	4.309E-01	1.22E-01	G
EU-154	-1.0707E-02						
		123.10	-1.071E-02	%(P	1.251E-01	3.72E-02	G K
		1274.80	-4.072E-02	%	1.958E-01	5.63E-02	G
		723.30	-7.136E-02	% P	2.778E-01	8.12E-02	G
		1004.80	4.956E-02	%	3.591E-01	1.02E-01	G
EU-155	5.5534E-03						
		86.45	5.553E-03	%(P	2.332E-01	6.92E-02	G K
		105.31	4.357E-02	%	2.742E-01	8.20E-02	G
HG-203	8.9421E-03						
		279.17	8.942E-03	%(P	5.280E-02	1.56E-02	G K
		72.87	-6.546E-01	&	2.209E+00	6.66E-01	G
		70.83	5.909E-02	%	4.472E+00	1.33E+00	G
		82.50	-5.365E-01	%	4.307E+00	1.29E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.3864E-01						
		583.14	3.386E-01	(P	6.543E-02	3.39E-02	G
		510.72	5.462E-01	+	2.315E-01	9.62E-02	G
PB-212	7.6145E-01						
		238.63	7.609E-01	(	1.188E-01	4.65E-02	G K
							Energy duplication
		77.11	7.629E-01	*(	6.365E-01	1.98E-01	G
		74.81	8.841E-01	& P	1.300E+00	3.97E-01	G
PB-214	4.4592E-01						
		351.99	4.454E-01	@(P	9.840E-02	4.12E-02	G K
		295.22	4.468E-01	@(	2.118E-01	7.26E-02	G
							Energy duplication
		77.11	1.248E+00	+	1.041E+00	3.24E-01	G
		241.92	5.043E-01	%	7.582E-01	2.32E-01	G
BI-212	9.9877E-01						
		727.17	9.988E-01	*(	4.564E-01	2.06E-01	G K
		1620.56	3.045E-01	% P	1.651E+00	4.45E-01	G
		785.42	8.923E-02	% P	3.199E+00	9.08E-01	G
BI-214	5.0332E-01						
		609.32	4.991E-01	(	1.223E-01	5.94E-02	G K
		1764.51	-9.081E-02	% P	4.576E-01	1.29E-01	G
		1120.28	5.161E-01	(	3.970E-01	1.55E-01	G
RA-224	1.0185E+00						
		241.00	1.019E+00	&(P	1.420E+00	4.36E-01	G
RA-226	1.0859E+00						
		185.99	1.086E+00	@(P	1.382E+00	4.25E-01	G
AC-228	8.1617E-01						
		911.07	7.980E-01	(P	2.090E-01	9.21E-02	G K
		968.90	5.780E-01	- P	4.077E-01	1.40E-01	G
		338.40	8.601E-01	(	3.343E-01	1.20E-01	G
TH-227	-3.0671E-01						
		236.00	-3.067E-01	&(P	5.663E-01	1.72E-01	G K
		256.25	-9.488E-02	%	5.988E-01	1.77E-01	G
PA-234	7.2712E-02						
		98.44	7.271E-02	%(	2.643E-01	7.95E-02	G K
		946.00	1.651E-03	%	2.738E-01	7.53E-02	G
		131.28	-2.250E-03	&	2.660E-01	7.90E-02	G
		94.67	-1.463E-01	%	5.202E-01	1.57E-01	G
		883.24	-1.438E-03	&	3.928E-01	1.07E-01	G
		926.70	-1.244E-01	%	5.468E-01	1.59E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 9.723E-02 &   4.256E-01 1.24E-01 G

TH-234       1.6671E+00
                           63.29 1.667E+00 %(P 4.623E+00 1.39E+00 G K
                           92.80 3.876E-02 %   2.687E+00 8.01E-01 G
                           92.38-1.177E+00 & P 2.844E+00 8.59E-01 G

AM-241      -6.0897E-02
                           59.54-6.090E-02 &(  5.507E-01 1.63E-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	1.1730E-01	1.1875E-01	3.1884E-01	3.1891E-01	3.540E-01
K-40		1.4112E+01	1.4112E+01	1.8702E+00	2.0310E+00	5.627E-01
MN-54	#A	2.6435E-02	2.6491E-02	4.4174E-02	4.4199E-02	4.776E-02
CO-57	#B	-1.4087E-03	-1.4121E-03	5.5536E-02	5.5536E-02	6.216E-02
CO-60	#B	-7.9633E-03	-7.9660E-03	6.7683E-02	6.7684E-02	7.617E-02

Sr-85	#A	-5.9284E-04	-5.9888E-04	4.5281E-02	4.5281E-02	5.215E-02
Kr-85	#A	-1.3290E+01	-1.3290E+01	1.0347E+03	1.0347E+03	1.204E+03
Y-88	#B	4.6267E-03	4.6553E-03	2.0865E-02	2.0867E-02	2.791E-02
NB-94	#B	4.2674E-03	4.2674E-03	3.4800E-02	3.4801E-02	4.196E-02
Ag-108M	#B	-1.4660E-02	-1.4660E-02	5.3293E-02	5.3300E-02	6.074E-02
CD-109	#A	1.0625E+00	1.0641E+00	2.0212E+00	2.0220E+00	2.219E+00
SN-113	#B	-8.8051E-05	-8.8554E-05	6.0440E-02	6.0440E-02	6.953E-02
SB-125	#B	1.3154E-01	1.3163E-01	1.2527E-01	1.2549E-01	1.443E-01
I-131	#B	6.3606E-03	6.9020E-03	4.4355E-02	4.4357E-02	4.675E-02
CS-134	#B	2.6465E-02	2.6488E-02	2.8105E-02	2.8145E-02	6.052E-02
CS-137	#A	-2.8139E-03	-2.8141E-03	4.9107E-02	4.9107E-02	5.793E-02
CE-139	#A	1.6515E-04	1.6594E-04	4.3478E-02	4.3478E-02	4.898E-02
EU-152	#B	-1.2991E-03	-1.2993E-03	2.7968E-01	2.7968E-01	1.793E-01
EU-154	#B	-1.0704E-02	-1.0707E-02	1.1638E-01	1.1638E-01	1.251E-01
EU-155	#B	5.5514E-03	5.5534E-03	2.0770E-01	2.0770E-01	2.331E-01
HG-203	#B	8.8169E-03	8.9421E-03	4.6865E-02	4.6867E-02	5.206E-02
TL-208		3.3864E-01	3.3864E-01	1.0161E-01	1.0337E-01	
PB-212	#	7.6145E-01	7.6145E-01	1.3949E-01	1.4588E-01	1.188E-01
PB-214	#	4.4592E-01	4.4592E-01	1.2370E-01	1.2621E-01	9.840E-02
BI-212	#	9.9877E-01	9.9877E-01	6.1712E-01	6.1966E-01	
BI-214		5.0332E-01	5.0332E-01	1.7939E-01	1.8160E-01	
RA-224	#A	1.0185E+00	1.0185E+00	1.3069E+00	1.3081E+00	1.420E+00
RA-226	#A	1.0859E+00	1.0859E+00	1.2745E+00	1.2760E+00	1.382E+00
AC-228		8.1617E-01	8.1617E-01	2.2210E-01	2.2678E-01	2.090E-01
TH-227	#B	-3.0671E-01	-3.0671E-01	5.2103E-01	5.2132E-01	5.663E-01
PA-234	#B	7.2712E-02	7.2712E-02	2.3842E-01	2.3846E-01	2.643E-01
TH-234	#B	1.6671E+00	1.6671E+00	4.1828E+00	4.1838E+00	4.623E+00
AM-241	#A	-6.0896E-02	-6.0897E-02	4.9035E-01	4.9037E-01	5.507E-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) 1.6768969E+01 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.6768969E+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_18AUG2006_1415.An1

Sample description
FSS-OOL-02-04-004-F

Spectrum Filename: C:\GammaVision\Spectra\102F_18AUG2006_1415.An1

Acquisition information
Start time: 18-Aug-2006 14:15:59
Live time: 2000
Real time: 2022
Dead time: 1.11 %
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: 2.0010E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0010E+03) =
4.9975E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 13:45:00
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: 0.5808

***** S U M M A R Y O F P E A K 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	141.	21.53	1.10	8.847E-03	74.81	9.600	1.122E+00	PB212
77.17	137.	20.21	1.10	9.541E-03	77.11	17.500	7.284E-01	PB212
					77.11	10.700	1.191E+00	PB214
129.23	84.	40.77	1.28	1.716E-02				
186.23	77.	40.71	1.16	1.626E-02	185.99	3.280	PBC<MDA	RA226
209.70	81.	30.13	1.72	1.517E-02				
239.11	652.	4.78	1.22	1.378E-02	238.63	43.100	7.405E-01	PB212
242.73	91.	21.66	1.22	1.362E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.014E-01	PB214
271.01	51.	33.49	0.71	1.240E-02				
295.74	123.	13.55	1.26	1.145E-02	295.22	19.200	3.762E-01	PB214
301.00	40.	38.85	1.26	1.126E-02				
328.68	49.	35.12	1.57	1.035E-02				
339.30	150.	16.33	1.04	1.003E-02	338.40	12.010	8.384E-01	AC228
352.56	221.	12.02	1.03	9.663E-03	351.99	37.100	4.153E-01	PB214
464.22	37.	37.66	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
479.50	46.	39.96	0.81	7.122E-03				
511.53	110.	17.58	1.57	6.684E-03	510.72	22.500	4.932E-01	TL208
568.49	29.	37.61	1.50	6.027E-03	569.26	10.400	3.102E-01	PA234
					569.29	15.430	2.093E-01	CS134
568.49	29.	37.61	1.50	6.027E-03	569.26	10.400	PBC<MDA	PA234
					569.29	15.430	2.093E-01	CS134
584.08	209.	10.88	1.44	5.881E-03	583.14	86.000	2.784E-01	TL208
610.36	130.	11.84	0.97	5.640E-03	609.32	46.090	3.377E-01	BI214
727.81	57.	23.73	1.72	4.790E-03	727.17	11.800	6.805E-01	BI212
796.38	31.	37.60	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
912.89	152.	9.82	1.44	3.915E-03				

970.43	92.	17.79	2.02	3.713E-03	968.90	17.460	9.568E-01	AC228
1463.25	610.	4.07	2.00	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	
258.06	129.23	452.	108.	0.054	88.64	1.281	AC-228	s
419.01	209.70	234.	81.	0.041	90.40	1.719	NP-239	s
541.67	271.01	117.	51.	0.026	100.46	0.711	AC-228	s
601.43	300.89	150.	66.	0.033	97.72	1.428	PB-212	sM
657.02	328.68	108.	49.	0.025	105.35	1.574	LA-140	sM
958.76	479.50	94.	42.	0.021	109.24	0.806	W-187	s
1825.91	912.89	21.	156.	0.078	27.03	1.441	AC-228	M
1941.08	970.43	53.	94.	0.047	44.88	2.023	AC-228	M
2927.42	1463.25	-1.	613.	0.306	12.10	2.005	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	149.20	74.81	412.	141.	0.071	64.58	1.098D
PB-212	153.80	77.11	504.	137.	0.068	60.64	1.100A
PB-212	476.89	238.63	163.	651.	0.325	14.41	1.215D
PB-214	483.47	241.92	330.	101.	0.051	81.83	1.217D
PB-214	590.90	295.62	113.	119.	0.060	48.24	1.356s
AC-228	677.70	339.01	146.	119.	0.060	51.03	1.500
PB-214	704.80	352.56	152.	221.	0.110	36.06	1.034
SB-125	928.19	464.22	89.	37.	0.019	112.97	1.500s
TL-208	1022.85	511.53	88.	110.	0.055	52.74	1.569s
PA-234	1136.80	568.49	44.	29.	0.014	112.84	1.499s
CS-134	1136.80	568.49	44.	29.	0.014	112.84	1.499s
TL-208	1167.99	584.08	86.	209.	0.104	32.64	1.442
BI-214	1220.57	610.36	45.	130.	0.065	35.53	0.971s
BI-212	1455.58	727.81	45.	57.	0.029	71.20	1.725
CS-134	1592.79	796.38	53.	31.	0.016	112.81	1.601s

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

***** S U M M A R Y O 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		4.2933E-02					
			477.56	4.293E-02	&(	3.689E-01 1.06E-01	G
K-40		-7.3497E-02					
			1460.75	-7.350E-02	%(P	6.874E-01 1.93E-01	G
MN-54		5.3548E-03					
			834.81	5.355E-03	&(P	5.161E-02 1.46E-02	G
CO-57		8.8009E-03					
			122.07	8.801E-03	&(	5.683E-02 1.70E-02	G K
			136.43	7.713E-02	&	4.273E-01 1.28E-01	G
CO-60		1.0426E-02					
			1332.51	1.043E-02	%(P	6.406E-02 1.82E-02	G K
			1173.23	8.870E-03	&	8.080E-02 2.32E-02	G K
Sr-85		-1.5884E-02					
			514.00	-1.588E-02	&(	5.767E-02 1.71E-02	G
Kr-85		-3.6290E+02					
			513.99	-3.629E+02	&(	1.317E+03 3.91E+02	G
Y-88		-1.3026E-03					
			1836.01	-1.303E-03	%(P	5.205E-02 1.33E-02	G K
			898.02	6.884E-03	% P	5.266E-02 1.48E-02	G
NB-94		1.9418E-03					
			871.10	1.942E-03	%(	6.709E-02 1.91E-02	G K
			702.50	1.098E-02	&	3.669E-02 1.07E-02	G K
Ag-108M		-1.0382E-02					
			722.95	-1.038E-02	%(	6.317E-02 1.83E-02	G K
			614.37	-4.338E-02	% P	6.630E-02 2.05E-02	G
			433.93	1.600E-02	%	4.560E-02 1.36E-02	G
CD-109		6.5029E-01					
			88.04	6.503E-01	%(P	2.056E+00 6.19E-01	G
SN-113		9.8121E-03					
			391.71	9.812E-03	&(	6.154E-02 1.80E-02	G K
			255.04	-5.347E-02	%	2.085E+00 6.13E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	6.1709E-02						
		427.95	-3.281E-02	%(P	1.558E-01	4.57E-02	G K
		600.77	-1.960E-02	& P	2.658E-01	7.61E-02	G
		636.15	-3.044E-02	& P	4.588E-01	1.31E-01	G
		463.51	3.415E-01	(P	4.276E-01	1.34E-01	G
		176.29	1.614E-01	% P	6.910E-01	2.07E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	%(	4.832E-02	1.39E-02	G K
		636.97	1.184E-01	&	7.826E-01	2.27E-01	G
		284.29	-1.341E-01	&	7.468E-01	2.21E-01	G
CS-134	4.0308E-02						
		604.66	2.540E-04	%(	4.436E-02	1.25E-02	G K
		795.76	5.556E-02	*(	6.534E-02	2.09E-02	G
		569.29	2.093E-01	*(	2.450E-01	7.87E-02	G
		801.84	-8.953E-04	% P	7.646E-01	2.17E-01	G
CS-137	8.2792E-03						
		661.62	8.279E-03	&(	5.709E-02	1.65E-02	G
CE-139	-8.6251E-03						
		165.85	-8.625E-03	%(P	5.681E-02	1.69E-02	G
EU-152	2.4384E-02						
		121.78	2.438E-02	&(P	1.704E-01	5.09E-02	G K
		344.30	-4.460E-02	%	1.578E-01	4.70E-02	G
		1408.08	-2.540E-02	&	2.871E-01	7.93E-02	G
		964.00	-1.343E-02	& P	4.924E-01	1.39E-01	G
		1112.07	1.596E-01	%	4.797E-01	1.42E-01	G
		778.90	-9.215E-02	% P	4.203E-01	1.22E-01	G
EU-154	1.1054E-02						
		123.10	1.105E-02	&(P	1.176E-01	3.50E-02	G K
		1274.80	-1.716E-02	&	2.037E-01	5.75E-02	G
		723.30	-6.478E-02	% P	3.019E-01	8.82E-02	G
		1004.80	-4.855E-02	%	2.982E-01	8.48E-02	G
EU-155	-6.5696E-03						
		86.45	-6.570E-03	&(P	2.754E-01	8.20E-02	G K
		105.31	7.546E-02	%	2.529E-01	7.61E-02	G
HG-203	2.4566E-02						
		279.17	2.457E-02	%(P	4.300E-02	1.31E-02	G K
		72.87	-1.028E+00	&	2.147E+00	6.51E-01	G
		70.83	8.394E-02	%	3.814E+00	1.14E+00	G
		82.50	-8.907E-01	%	4.216E+00	1.27E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7837E-01						
		583.14	2.784E-01	(P	6.130E-02	3.04E-02	G
		510.72	4.932E-01	+	2.081E-01	8.68E-02	G
PB-212	7.3562E-01						
		238.63	7.385E-01	(	7.068E-02	3.55E-02	G K
							Energy duplication
		77.11	5.535E-01	}	4.341E-01	1.12E-01	G
		74.81	1.122E+00	+ P	7.736E-01	2.47E-01	G
PB-214	3.9838E-01						
		351.99	4.153E-01	(P	1.132E-01	5.01E-02	G K
		295.22	3.657E-01	(	1.601E-01	5.89E-02	G
							Energy duplication
		77.11	1.941E-01	}	9.459E-01	2.30E-01	G
		241.92	6.696E-01	+	5.783E-01	1.83E-01	G
BI-212	6.8047E-01						
		727.17	6.805E-01	(	4.055E-01	1.62E-01	G K
		1620.56	-3.438E-02	% P	7.551E-01	1.02E-01	G
		785.42	5.096E-02	% P	2.533E+00	7.09E-01	G
BI-214	3.3770E-01						
		609.32	3.377E-01	(	8.793E-02	4.01E-02	G K
		1764.51	-4.326E-02	% P	4.438E-01	1.22E-01	G
		1120.28	-9.833E-02	&	5.430E-01	1.58E-01	G
RA-224	2.3876E-01						
		241.00	2.388E-01	%(P	1.243E+00	3.71E-01	G
RA-226	9.3748E-01						
		185.99	9.375E-01	%(P	1.308E+00	4.01E-01	G
AC-228	1.6145E-01						
		911.07	-4.805E-02	%(P	2.125E-01	6.18E-02	G K
		968.90	-2.574E-02	% P	3.494E-01	9.88E-02	G
		338.40	6.673E-01	(	3.304E-01	1.14E-01	G
TH-227	-1.6051E-01						
		236.00	-1.605E-01	%(P	4.625E-01	1.39E-01	G K
		256.25	1.724E-01	%	5.413E-01	1.62E-01	G
PA-234	9.7994E-02						
		98.44	1.008E-02	%(	2.508E-01	7.47E-02	G K
		946.00	-5.405E-02	%	2.835E-01	8.17E-02	G
		131.28	-5.892E-02	%	2.534E-01	7.60E-02	G
		94.67	-1.197E-01	%	4.560E-01	1.37E-01	G
		883.24	6.890E-02	%	2.579E-01	7.36E-02	G
		926.70	-6.221E-02	&	5.019E-01	1.43E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 3.102E-01 *(  3.631E-01 1.17E-01 G

TH-234      -4.1314E-01
                           63.29-4.131E-01 %(P 3.780E+00 1.12E+00 G K
                           92.80 1.504E+00 %   2.413E+00 7.36E-01 G
                           92.38 1.685E+00 & P 2.885E+00 8.78E-01 G

AM-241       4.1967E-02
                           59.54 4.197E-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	4.2368E-02	4.2933E-02	3.1865E-01	3.1866E-01	3.641E-01
K-40	#A	-7.3497E-02	-7.3497E-02	6.3847E-01	6.3848E-01	6.874E-01
MN-54	#A	5.3427E-03	5.3548E-03	4.3874E-02	4.3875E-02	5.149E-02
CO-57	#B	8.7778E-03	8.8009E-03	5.0944E-02	5.0946E-02	5.668E-02
CO-60	#B	1.0422E-02	1.0426E-02	5.4495E-02	5.4498E-02	6.404E-02

Sr-85	#A	-1.5711E-02	-1.5884E-02	5.1412E-02	5.1420E-02	5.704E-02
Kr-85	#A	-3.6290E+02	-3.6290E+02	1.1740E+03	1.1742E+03	1.317E+03
Y-88	#B	-1.2940E-03	-1.3026E-03	4.1281E-02	4.1281E-02	5.170E-02
NB-94	#B	1.9418E-03	1.9418E-03	5.7247E-02	5.7248E-02	6.709E-02
Ag-108M	#B	-1.0382E-02	-1.0382E-02	5.5026E-02	5.5029E-02	6.317E-02
CD-109	#A	6.4927E-01	6.5029E-01	1.8582E+00	1.8586E+00	2.053E+00
SN-113	#B	9.7519E-03	9.8121E-03	5.4033E-02	5.4036E-02	6.117E-02
SB-125	#B	6.1666E-02	6.1709E-02	7.2609E-02	7.2692E-02	1.557E-01
I-131	#B	0.0000E+00	0.0000E+00	4.1598E-02	4.1598E-02	4.425E-02
CS-134	#B	4.0270E-02	4.0308E-02	4.5473E-02	4.5530E-02	4.432E-02
CS-137	#A	8.2786E-03	8.2792E-03	4.9377E-02	4.9380E-02	5.709E-02
CE-139	#A	-8.5808E-03	-8.6251E-03	5.3478E-02	5.3480E-02	5.652E-02
EU-152	#B	2.4381E-02	2.4384E-02	1.5266E-01	1.5267E-01	1.703E-01
EU-154	#B	1.1052E-02	1.1054E-02	1.0509E-01	1.0509E-01	1.176E-01
EU-155	#B	-6.5671E-03	-6.5696E-03	1.8785E+00	1.8785E+00	2.753E-01
HG-203	#B	2.4196E-02	2.4566E-02	3.9431E-02	3.9455E-02	4.235E-02
TL-208		2.7837E-01	2.7837E-01	9.1039E-02	9.2370E-02	
PB-212		7.3562E-01	7.3562E-01	1.0603E-01	1.1379E-01	
PB-214		3.9838E-01	3.9838E-01	1.2004E-01	1.2210E-01	
BI-212		6.8047E-01	6.8047E-01	4.8449E-01	4.8599E-01	
BI-214		3.3770E-01	3.3770E-01	1.1997E-01	1.2146E-01	
RA-224	#A	2.3876E-01	2.3876E-01	1.1118E+00	1.1119E+00	1.243E+00
RA-226	#A	9.3748E-01	9.3748E-01	1.2022E+00	1.2033E+00	1.308E+00
AC-228	B	1.6145E-01	1.6145E-01	8.2386E-02	8.2882E-02	2.125E-01
TH-227	#B	-1.6051E-01	-1.6051E-01	4.2429E-01	4.2439E-01	4.625E-01
PA-234	#B	9.7994E-02	9.7994E-02	1.1058E-01	1.1071E-01	2.508E-01
TH-234	#B	-4.1314E-01	-4.1314E-01	3.5712E+00	3.5713E+00	3.780E+00
AM-241	#A	4.1966E-02	4.1967E-02	5.8906E-01	5.8906E-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 (270.7 to 1999.0 keV) 2.5919888E+00 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 2.5919888E+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_18AUG2006_1518.An1

Sample description
FSS-OOL-02-04-013-F

Spectrum Filename: C:\GammaVision\Spectra\102F_18AUG2006_1518.An1

Acquisition information
Start time: 18-Aug-2006 15:18:29
Live time: 2000
Real time: 2022
Dead time: 1.09 %
Detector ID: 3

Detector system
Det 102 - DSPP-468

Calibration
Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration
Created: 15-Jan-2005 03:09:29
Zero offset: 0.220 keV
Gain: 0.500 keV/channel
Quadratic: -6.435E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8240E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8240E+03) =
5.4825E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 15:10:00
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. 14 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.7644

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.16	216.	20.35	1.50	9.541E-03	77.11	10.700	1.568E+00	PB214
					77.11	17.500	9.588E-01	PB212
77.16	216.	20.35	1.50	9.541E-03	77.11	10.700	1.568E+00	PB214
					77.11	17.500	9.588E-01	PB212
89.63	77.	38.07	1.11	1.270E-02	88.04	3.790	PBC<MDA	CD109
93.69	109.	27.15	1.11	1.350E-02	92.80	3.000	2.014E+00	TH234
186.39	124.	23.75	1.06	1.625E-02	185.99	3.280	1.663E+00	RA226
209.70	68.	41.09	1.33	1.517E-02				
239.10	599.	4.81	1.22	1.379E-02	238.63	43.100	7.458E-01	PB212
242.17	100.	20.50	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.230E-01	PB214
270.51	50.	36.76	1.69	1.242E-02				
295.73	120.	16.41	1.18	1.145E-02	295.22	19.200	4.032E-01	PB214
338.80	176.	15.42	1.69	1.005E-02	338.40	12.010	1.082E+00	AC228
352.61	241.	12.73	1.27	9.662E-03	351.99	37.100	4.969E-01	PB214
464.16	69.	25.11	1.31	7.354E-03	463.51	10.000	6.831E-01	SB125
511.60	94.	20.13	1.12	6.684E-03	510.72	22.500	4.623E-01	TL208
584.14	215.	10.44	1.55	5.880E-03	583.14	86.000	3.145E-01	TL208
610.48	156.	11.25	1.33	5.639E-03	609.32	46.090	4.436E-01	BI214
728.44	52.	27.45	1.11	4.786E-03	727.17	11.800	6.771E-01	BI212
795.49	38.	24.74	0.69	4.421E-03				
912.70	124.	11.63	1.91	3.916E-03				
969.62	98.	15.39	1.16	3.716E-03	968.90	17.460	1.124E+00	AC228
1122.46	26.	36.31	1.82	3.283E-03	1120.28	15.040	PBC<MDA	BI214
1463.22	587.	4.17	2.08	2.617E-03	1460.75	10.700	1.550E+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	
178.84	89.65	391.	77.	0.038	114.22	1.109	PB-214	lD
419.02	209.70	290.	68.	0.034	123.27	1.332	NP-239	M
477.84	239.05	116.	599.	0.299	14.44	1.215	PB-212	D
483.97	242.12	158.	100.	0.050	61.51	1.217	PB-214	D
540.66	270.51	135.	50.	0.025	110.29	1.691	AC-228	sM
704.91	352.61	352.	74.	0.037	113.73	1.271	PB-214	
1590.99	795.49	35.	24.	0.012	119.86	0.693	CS-134	sM
1825.54	912.70	25.	127.	0.064	31.42	1.909	AC-228	sM
1939.44	969.62	36.	100.	0.050	39.49	1.158	AC-228	sM

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.80	77.11	858.	216.	0.108	61.04	1.500D
PB-212	153.80	77.11	858.	216.	0.108	61.04	1.500D
TH-234	185.92	93.17	815.	132.	0.066	95.48	1.500s
RA-226	372.54	186.47	399.	91.	0.046	93.14	1.500s
PB-212	477.86	239.12	389.	500.	0.250	21.44	1.500
PB-214	591.32	295.83	163.	127.	0.064	50.13	1.500
AC-228	677.29	338.81	146.	142.	0.071	44.03	1.500
PB-214	704.76	352.54	115.	167.	0.084	35.67	1.500
SB-125	927.48	463.86	57.	64.	0.032	61.17	1.500
TL-208	1022.99	511.60	88.	94.	0.047	60.39	1.115s
TL-208	1168.12	584.14	81.	215.	0.107	31.32	1.546
BI-214	1220.81	610.48	56.	156.	0.078	33.74	1.328
BI-212	1456.84	728.44	48.	52.	0.026	82.36	1.106
BI-214	2245.31	1122.46	32.	26.	0.013	108.93	1.819s
K-40	2927.33	1463.21	13.	572.	0.286	12.83	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		1.3231E-02					
			477.56	1.323E-02	%(	3.700E-01 1.05E-01	G
K-40		1.5105E+01					
			1460.75	1.510E+01	(P	5.184E-01 6.46E-01	G
MN-54		-9.5833E-03					
			834.81	-9.583E-03	&(P	5.929E-02 1.70E-02	G
CO-57		-1.4131E-02					
			122.07	-1.413E-02	%(	5.830E-02 1.75E-02	G K
			136.43	2.978E-02	&	4.458E-01 1.32E-01	G
CO-60		-1.8444E-03					
			1332.51	-1.844E-03	%(P	6.472E-02 1.76E-02	G K
			1173.23	-1.531E-02	%	7.874E-02 2.28E-02	G K
Sr-85		-5.5241E-04					
			514.00	-5.524E-04	&(	5.606E-02 1.61E-02	G
Kr-85		-1.0793E+01					
			513.99	-1.079E+01	&(	1.280E+03 3.68E+02	G
Y-88		-2.2928E-05					
			1836.01	-2.293E-05	%(P	9.488E-02 2.59E-02	G K
			898.02	-1.212E-03	% P	6.473E-02 1.79E-02	G
NB-94		3.7233E-04					
			871.10	3.723E-04	%(	4.308E-02 1.16E-02	G K
			702.50	-7.321E-03	%	5.362E-02 1.54E-02	G K
Ag-108M		-6.5839E-03					
			722.95	-6.584E-03	&(	6.459E-02 1.85E-02	G K
			614.37	-3.953E-02	% P	8.170E-02 2.48E-02	G
			433.93	9.223E-03	&	4.969E-02 1.46E-02	G
CD-109		-4.1285E-01					
			88.04	-4.129E-01	%(P	2.374E+00 7.11E-01	G
SN-113		-1.3130E-02					
			391.71	-1.313E-02	&(	7.472E-02 2.20E-02	G K
			255.04	-3.468E-01	%	2.030E+00 6.01E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.4701E-01						
		427.95	-1.984E-02	%(P	1.578E-01	4.57E-02	G K
		600.77	-5.841E-02	% P	2.735E-01	7.97E-02	G
		636.15	1.857E-02	% P	3.213E-01	8.87E-02	G
		463.51	6.409E-01	(P	3.825E-01	1.34E-01	G
		176.29	1.577E-01	% P	5.319E-01	1.59E-01	G
I-131	-1.1614E-02						
		364.48	-1.161E-02	&(	6.273E-02	1.85E-02	G K
		636.97	2.257E-02	%	5.777E-01	1.60E-01	G
		284.29	1.169E-01	%	5.828E-01	1.72E-01	G
CS-134	1.3296E-02						
		604.66	1.330E-02	%(	4.106E-02	1.21E-02	G K
		795.76	2.704E-02	%	5.733E-02	1.74E-02	G
		569.29	5.931E-02	%	2.809E-01	8.17E-02	G
		801.84	-5.859E-02	& P	5.964E-01	1.68E-01	G
CS-137	-2.5782E-04						
		661.62	-2.578E-04	&(	5.901E-02	1.65E-02	G
CE-139	6.4045E-03						
		165.85	6.405E-03	%(P	5.667E-02	1.68E-02	G
EU-152	-3.7025E-02						
		121.78	-3.703E-02	%(P	1.734E-01	5.19E-02	G K
		344.30	4.664E-02	%	1.176E-01	3.53E-02	G
		1408.08	-6.596E-02	%	3.475E-01	9.92E-02	G
		964.00	1.541E-01	% P	4.385E-01	1.30E-01	G
		1112.07	2.685E-02	%	5.004E-01	1.40E-01	G
		778.90	5.090E-02	& P	3.084E-01	8.69E-02	G
EU-154	-3.4460E-02						
		123.10	-3.446E-02	%(P	1.168E-01	3.51E-02	G K
		1274.80	7.050E-03	%	2.046E-01	5.67E-02	G
		723.30	-4.073E-02	% P	3.005E-01	8.64E-02	G
		1004.80	7.617E-03	%	2.741E-01	7.42E-02	G
EU-155	1.0884E-02						
		86.45	1.088E-02	&(P	2.823E-01	8.42E-02	G K
		105.31	5.220E-02	%	2.563E-01	7.67E-02	G
HG-203	1.3518E-02						
		279.17	1.352E-02	%(P	5.306E-02	1.58E-02	G K
		72.87	-6.779E-01	%	2.239E+00	6.75E-01	G
		70.83	3.695E-01	&	3.889E+00	1.16E+00	G
		82.50	-7.620E-01	%	4.167E+00	1.25E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.1445E-01						
		583.14	3.145E-01	(P	6.531E-02	3.29E-02	G
		510.72	4.623E-01	+	2.283E-01	9.32E-02	G
PB-212	6.2294E-01						
		238.63	6.229E-01	(	1.178E-01	4.45E-02	G K
							Energy duplication
		77.11	9.588E-01	+	6.179E-01	1.95E-01	G
		74.81	8.792E-01	& P	1.298E+00	3.96E-01	G
PB-214	3.7344E-01						
		351.99	3.450E-01	(P	1.088E-01	4.11E-02	G K
		295.22	4.284E-01	(	2.091E-01	7.16E-02	G
							Energy duplication
		77.11	1.568E+00	+	1.011E+00	3.19E-01	G
		241.92	4.142E-01	%	7.511E-01	2.29E-01	G
BI-212	6.7709E-01						
		727.17	6.771E-01	(	4.596E-01	1.86E-01	G K
		1620.56	-5.806E-02	% P	2.106E+00	5.41E-01	G
		785.42	5.939E-01	% P	2.450E+00	7.11E-01	G
BI-214	4.3137E-01						
		609.32	4.436E-01	(	1.070E-01	5.00E-02	G K
		1764.51	-1.812E-03	% P	1.541E-01	2.09E-02	G
		1120.28	3.939E-01	?(	4.381E-01	1.43E-01	G
RA-224	9.8137E-01						
		241.00	9.814E-01	&(P	1.387E+00	4.25E-01	G
RA-226	1.2681E+00						
		185.99	1.268E+00	*(P	1.330E+00	4.13E-01	G
AC-228	2.0876E-01						
		911.07	-6.507E-02	%(P	2.241E-01	6.57E-02	G K
		968.90	-1.432E-02	% P	4.157E-01	1.17E-01	G
		338.40	8.700E-01	(	3.617E-01	1.28E-01	G
TH-227	1.3814E-02						
		236.00	1.381E-02	&(P	5.886E-01	1.75E-01	G K
		256.25	2.087E-01	&	5.542E-01	1.67E-01	G
PA-234	-1.1135E-01						
		98.44	-1.114E-01	%(	2.532E-01	7.67E-02	G K
		946.00	3.341E-03	&	2.808E-01	7.74E-02	G
		131.28	2.467E-03	&	2.524E-01	7.49E-02	G
		94.67	2.784E-04	%	4.956E-01	1.48E-01	G
		883.24	-1.001E-01	&	4.560E-01	1.32E-01	G
		926.70	-1.377E-02	&	5.103E-01	1.41E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 8.792E-02 %   4.164E-01 1.21E-01 G

TH-234       7.2376E-01
                           63.29-5.992E-01 %(P 5.136E+00 1.53E+00 G K
                           92.80 2.444E+00 @(  2.515E+00 7.78E-01 G
                           92.38 1.366E-01 & P 2.977E+00 8.87E-01 G

AM-241       2.0797E-01
                           59.54 2.080E-01 %(  6.941E-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
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - 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	1.3059E-02	1.3231E-02	3.1363E-01	3.1363E-01	3.652E-01
K-40		1.5105E+01	1.5105E+01	1.9381E+00	2.1153E+00	5.184E-01
MN-54	#A	-9.5619E-03	-9.5833E-03	5.5123E-02	5.5126E-02	5.916E-02
CO-57	#B	-1.4094E-02	-1.4131E-02	5.2431E-02	5.2437E-02	5.815E-02
CO-60	#B	-1.8437E-03	-1.8444E-03	6.5823E-02	6.5823E-02	6.469E-02

Sr-85	#A	-5.4650E-04	-5.5241E-04	4.8298E-02	4.8298E-02	5.546E-02
Kr-85	#A	-1.0793E+01	-1.0793E+01	1.1027E+03	1.1027E+03	1.280E+03
Y-88	#B	-2.2779E-05	-2.2928E-05	1.0206E-03	1.0206E-03	9.426E-02
NB-94	#B	3.7233E-04	3.7233E-04	3.4824E-02	3.4824E-02	4.308E-02
Ag-108M	#B	-6.5838E-03	-6.5839E-03	5.5524E-02	5.5526E-02	6.459E-02
CD-109	#A	-4.1222E-01	-4.1285E-01	2.3914E+00	2.3915E+00	2.370E+00
SN-113	#B	-1.3050E-02	-1.3130E-02	6.5942E-02	6.5946E-02	7.427E-02
SB-125	#B	1.4691E-01	1.4701E-01	9.2106E-02	9.2475E-02	1.577E-01
I-131	#B	-1.0650E-02	-1.1614E-02	5.5494E-02	5.5498E-02	5.751E-02
CS-134	#B	1.3283E-02	1.3296E-02	3.6355E-02	3.6362E-02	4.102E-02
CS-137	#A	-2.5781E-04	-2.5782E-04	4.9636E-02	4.9636E-02	5.901E-02
CE-139	#A	6.3721E-03	6.4045E-03	5.0549E-02	5.0550E-02	5.639E-02
EU-152	#B	-3.7020E-02	-3.7025E-02	1.6711E-01	1.6712E-01	1.734E-01
EU-154	#B	-3.4453E-02	-3.4460E-02	1.0660E-01	1.0662E-01	1.168E-01
EU-155	#B	1.0880E-02	1.0884E-02	2.5252E-01	2.5252E-01	2.822E-01
HG-203	#B	1.3317E-02	1.3518E-02	4.7409E-02	4.7415E-02	5.227E-02
TL-208		3.1445E-01	3.1445E-01	9.8660E-02	1.0023E-01	
PB-212	#	6.2294E-01	6.2294E-01	1.3356E-01	1.3806E-01	1.178E-01
PB-214	#	3.7344E-01	3.7344E-01	1.1497E-01	1.1686E-01	1.088E-01
BI-212		6.7709E-01	6.7709E-01	5.5762E-01	5.5892E-01	
BI-214		4.3137E-01	4.3137E-01	1.4553E-01	1.4753E-01	
RA-224	#A	9.8137E-01	9.8137E-01	1.2763E+00	1.2775E+00	1.387E+00
RA-226	#A	1.2681E+00	1.2681E+00	1.2388E+00	1.2408E+00	1.330E+00
AC-228	B	2.0876E-01	2.0876E-01	9.1916E-02	9.2659E-02	2.241E-01
TH-227	#B	1.3814E-02	1.3814E-02	5.2471E-01	5.2472E-01	5.886E-01
PA-234	#B	-1.1135E-01	-1.1135E-01	2.3000E-01	2.3009E-01	2.532E-01
TH-234	#B	7.2376E-01	7.2376E-01	6.9105E-01	6.9221E-01	5.136E+00
AM-241	#A	2.0796E-01	2.0797E-01	6.2629E-01	6.2640E-01	6.941E-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) 1.6736654E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.6736654E+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_18AUG2006_1644.An1

Sample description
FSS-OOL-02-04-019-F

Spectrum Filename: C:\GammaVision\Spectra\102F_18AUG2006_1644.An1

Acquisition information
Start time: 18-Aug-2006 16:44:29
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: 1.8970E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8970E+03) =
5.2715E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 16:05:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.5680

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.13	172.	25.51	1.50	9.541E-03	77.11	10.700	1.197E+00	PB214
					77.11	17.500	7.318E-01	PB212
77.13	172.	25.51	1.50	9.541E-03	77.11	10.700	1.197E+00	PB214
					77.11	17.500	7.318E-01	PB212
186.34	98.	26.06	1.24	1.625E-02	185.99	3.280	1.249E+00	RA226
209.62	95.	33.24	1.18	1.518E-02				
239.10	596.	4.87	1.22	1.379E-02	238.63	43.100	7.136E-01	PB212
242.23	96.	20.63	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.735E-01	PB214
270.35	63.	33.33	1.06	1.242E-02				
295.82	118.	13.82	1.26	1.145E-02	295.22	19.200	3.831E-01	PB214
300.97	42.	33.27	1.26	1.126E-02				
338.90	135.	14.33	1.47	1.005E-02	338.40	12.010	7.960E-01	AC228
352.53	203.	11.94	1.22	9.664E-03	351.99	37.100	4.020E-01	PB214
511.72	112.	16.75	1.04	6.682E-03	510.72	22.500	5.297E-01	TL208
584.41	226.	9.68	1.47	5.878E-03	583.14	86.000	3.180E-01	TL208
610.37	151.	11.11	1.29	5.640E-03	609.32	46.090	4.137E-01	BI214
728.75	56.	23.02	1.57	4.785E-03	727.17	11.800	7.052E-01	BI212
796.35	30.	34.97	0.84	4.417E-03	795.76	85.400	5.743E-02	CS134
912.92	130.	11.42	1.75	3.915E-03				
969.84	98.	18.78	1.94	3.715E-03				
1121.39	42.	25.31	1.14	3.283E-03	1120.28	15.040	5.987E-01	BI214
1463.41	549.	4.27	1.79	2.617E-03	1460.75	10.700	1.394E+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	Background	Net Area	Intensity	Uncert	FWHM	Suspected

Channel	Energy	Counts	Counts	Cts/Sec	3 Sigma %	keV	Nuclide	
418.85	209.62	335.	95.	0.048	99.72	1.184	NP-239	sM
477.82	239.05	123.	596.	0.298	14.60	1.215	PB-212	D

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
484.08	242.18	150.	96.	0.048	61.88	1.217	PB-214	D
540.34	270.35	160.	63.	0.032	99.98	1.064	AC-228	M
601.30	300.82	134.	57.	0.028	106.80	1.284	PB-212	M
1592.73	796.35	31.	30.	0.015	104.91	0.843	PA-234	l
1825.98	912.92	27.	132.	0.066	31.01	1.752	AC-228	M
1939.90	969.84	57.	100.	0.050	43.89	1.941	AC-228	M

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.80	77.11	871.	172.	0.086	76.52	1.500D
PB-212	153.80	77.11	871.	172.	0.086	76.52	1.500D
RA-226	372.29	186.34	256.	94.	0.047	78.19	1.236
PB-212	477.79	239.08	379.	508.	0.254	21.00	1.500
PB-214	591.29	295.82	152.	118.	0.059	52.12	1.500s
AC-228	677.68	339.00	139.	137.	0.068	44.60	1.500
PB-214	704.76	352.54	95.	192.	0.096	30.41	1.500
TL-208	1023.22	511.72	80.	112.	0.056	50.25	1.042
TL-208	1168.65	584.41	73.	226.	0.113	29.03	1.473s
BI-214	1220.59	610.37	47.	151.	0.076	33.33	1.292
BI-212	1457.66	728.85	42.	37.	0.018	89.37	1.554
BI-214	2243.17	1121.39	26.	42.	0.021	75.94	1.136s
K-40	2927.77	1463.43	4.	537.	0.268	13.05	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		1.2686E-01					
			477.56	1.269E-01	&(	3.372E-01 1.01E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	1.3641E+01						
		1460.75	1.364E+01	(P	3.174E-01	5.93E-01	G
MN-54	-5.3535E-03						
		834.81	-5.354E-03	&(P	5.878E-02	1.67E-02	G
CO-57	-4.6607E-03						
		122.07	-4.661E-03	%(	5.677E-02	1.69E-02	G K
		136.43	-1.001E-02	%	4.241E-01	1.26E-01	G
CO-60	1.8475E-02						
		1332.51	1.848E-02	%(P	5.329E-02	1.56E-02	G K
		1173.23	-1.363E-02	%	8.591E-02	2.48E-02	G K
Sr-85	-7.3376E-04						
		514.00	-7.338E-04	%(	5.086E-02	1.46E-02	G
Kr-85	-1.5276E+01						
		513.99	-1.528E+01	%(	1.161E+03	3.32E+02	G
Y-88	7.0866E-03						
		1836.01	7.087E-03	&(P	3.699E-02	9.76E-03	G K
		898.02	2.311E-03	% P	5.058E-02	1.38E-02	G
NB-94	-6.9725E-03						
		871.10	-6.973E-03	&(	5.695E-02	1.62E-02	G K
		702.50	1.995E-02	%	3.991E-02	1.22E-02	G K
Ag-108M	-1.7987E-03						
		722.95	-1.799E-03	&(	6.731E-02	1.92E-02	G K
		614.37	-2.151E-02	% P	6.207E-02	1.85E-02	G
		433.93	-1.032E-02	&	4.588E-02	1.35E-02	G
CD-109	1.1652E+00						
		88.04	1.165E+00	%(P	1.980E+00	6.03E-01	G
SN-113	-5.5776E-03						
		391.71	-5.578E-03	%(	6.758E-02	1.96E-02	G K
		255.04	7.255E-01	%	1.765E+00	5.32E-01	G
SB-125	2.7356E-02						
		427.95	2.736E-02	%(P	1.478E-01	4.32E-02	G K
		600.77	3.066E-05	& P	2.343E-01	6.55E-02	G
		636.15	-6.395E-02	& P	4.337E-01	1.25E-01	G
		463.51	2.293E-01	% P	4.847E-01	1.46E-01	G
		176.29	1.303E-01	% P	6.660E-01	1.98E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	1.8389E-03						
		364.48	1.839E-03	&(	4.700E-02	1.35E-02	G K
		636.97	-1.065E-01	&	6.875E-01	1.98E-01	G
		284.29	2.402E-03	%	6.983E-01	2.03E-01	G
CS-134	3.5216E-03						
		604.66	3.522E-03	&(	4.250E-02	1.20E-02	G K
		795.76	2.778E-02	%	5.397E-02	1.65E-02	G
		569.29	8.633E-02	%	2.366E-01	7.04E-02	G
		801.84	6.715E-02	& P	5.196E-01	1.47E-01	G
CS-137	1.5783E-02						
		661.62	1.578E-02	%(	4.058E-02	1.21E-02	G
CE-139	-7.8088E-03						
		165.85	-7.809E-03	%(P	5.567E-02	1.66E-02	G
EU-152	-1.8941E-03						
		121.78	-1.894E-03	%(P	1.466E-01	4.33E-02	G K
		344.30	-5.356E-02	&	1.614E-01	4.83E-02	G
		1408.08	1.399E-03	&	2.620E-01	6.94E-02	G
		964.00	1.123E-01	& P	3.760E-01	1.10E-01	G
		1112.07	1.254E-01	&	4.615E-01	1.35E-01	G
		778.90	-8.194E-02	% P	4.517E-01	1.31E-01	G
EU-154	-3.3629E-02						
		123.10	-3.363E-02	&(P	9.702E-02	2.92E-02	G K
		1274.80	-1.011E-04	&	1.857E-01	5.08E-02	G
		723.30	-8.848E-02	% P	3.233E-01	9.53E-02	G
		1004.80	4.914E-02	%	3.186E-01	9.06E-02	G
EU-155	1.1775E-01						
		86.45	1.178E-01	%(P	2.433E-01	7.37E-02	G K
		105.31	1.044E-01	%	2.299E-01	6.96E-02	G
HG-203	-6.8126E-05						
		279.17	-6.813E-05	&(P	5.428E-02	1.59E-02	G K
		72.87	4.384E-02	%	2.275E+00	6.80E-01	G
		70.83	1.158E-01	%	4.309E+00	1.29E+00	G
		82.50	1.494E-03	&	3.392E+00	1.01E+00	G
TL-208	3.1796E-01						
		583.14	3.180E-01	@(P	5.977E-02	3.09E-02	G
		510.72	5.297E-01	+	2.099E-01	8.89E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	6.4411E-01						
		238.63	6.085E-01	(	1.119E-01	4.26E-02	G K
							Energy duplication
		77.11	7.318E-01	*(	5.984E-01	1.87E-01	G
		74.81	8.010E-01	& P	1.235E+00	3.77E-01	G
PB-214	3.8170E-01						
		351.99	3.811E-01	(P	9.528E-02	3.87E-02	G K
		295.22	3.828E-01	*(	1.947E-01	6.65E-02	G
							Energy duplication
		77.11	1.197E+00	+	9.787E-01	3.05E-01	G
		241.92	3.878E-01	%	7.183E-01	2.19E-01	G
BI-212	4.6543E-01						
		727.17	4.654E-01	(	4.150E-01	1.39E-01	G K
		1620.56	-3.626E-02	% P	2.367E+00	6.23E-01	G
		785.42	2.330E-01	% P	2.279E+00	6.41E-01	G
BI-214	4.1367E-01						
		609.32	4.137E-01	(	9.463E-02	4.60E-02	G K
		1764.51	-1.743E-03	% P	1.482E-01	2.01E-02	G
		1120.28	5.987E-01	+	3.786E-01	1.52E-01	G
RA-224	9.3283E-01						
		241.00	9.328E-01	&(P	1.326E+00	4.07E-01	G
RA-226	1.2489E+00						
		185.99	1.249E+00	(P	1.033E+00	3.41E-01	G
AC-228	2.2104E-01						
		911.07	-2.191E-02	%(P	2.207E-01	6.27E-02	G K
		968.90	-2.122E-02	% P	4.042E-01	1.15E-01	G
		338.40	8.077E-01	(	3.398E-01	1.20E-01	G
TH-227	-2.5530E-01						
		236.00	-2.553E-01	%(P	4.962E-01	1.51E-01	G K
		256.25	-1.189E-01	%	6.040E-01	1.79E-01	G
PA-234	1.0111E-01						
		98.44	1.011E-01	&(	2.342E-01	7.09E-02	G K
		946.00	-5.205E-02	%	3.005E-01	8.63E-02	G
		131.28	-4.914E-03	&	2.454E-01	7.28E-02	G
		94.67	-6.424E-02	&	4.295E-01	1.28E-01	G
		883.24	-4.597E-02	&	4.761E-01	1.35E-01	G
		926.70	5.391E-02	&	5.283E-01	1.50E-01	G
		569.26	1.280E-01	%	3.507E-01	1.04E-01	G

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

TH-234       1.1701E+00
                           63.29 1.170E+00 %(P 4.662E+00 1.40E+00 G K
                           92.80 1.370E+00 %   2.394E+00 7.29E-01 G
                           92.38-5.541E-01 % P 2.877E+00 8.62E-01 G

AM-241      -7.0148E-02
                           59.54-7.015E-02 &(  6.946E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	1.2518E-01	1.2686E-01	3.0195E-01	3.0203E-01	3.327E-01
K-40		1.3641E+01	1.3641E+01	1.7802E+00	1.9378E+00	3.174E-01
MN-54	#A	-5.3413E-03	-5.3535E-03	5.7215E-02	5.7216E-02	5.865E-02
CO-57	#B	-4.6484E-03	-4.6607E-03	5.0670E-02	5.0671E-02	5.662E-02
CO-60	#B	1.8469E-02	1.8475E-02	4.6948E-02	4.6959E-02	5.327E-02
Sr-85	#A	-7.2575E-04	-7.3376E-04	4.3696E-02	4.3696E-02	5.030E-02

Kr-85	#A	-1.5276E+01	-1.5276E+01	9.9722E+02	9.9722E+02	1.161E+03
Y-88	#B	7.0394E-03	7.0866E-03	2.9292E-02	2.9294E-02	3.674E-02
NB-94	#B	-6.9725E-03	-6.9725E-03	4.8681E-02	4.8683E-02	5.695E-02
Ag-108M	#B	-1.7987E-03	-1.7987E-03	5.7480E-02	5.7480E-02	6.731E-02
CD-109	#A	1.1633E+00	1.1652E+00	1.8087E+00	1.8098E+00	1.977E+00
SN-113	#B	-5.5432E-03	-5.5776E-03	5.8907E-02	5.8908E-02	6.716E-02
SB-125	#B	2.7337E-02	2.7356E-02	1.2968E-01	1.2969E-01	1.477E-01
I-131	#B	1.6830E-03	1.8389E-03	4.0476E-02	4.0476E-02	4.302E-02
CS-134	#B	3.5183E-03	3.5216E-03	3.6098E-02	3.6098E-02	4.246E-02
CS-137	#A	1.5782E-02	1.5783E-02	3.6278E-02	3.6289E-02	4.058E-02
CE-139	#A	-7.7685E-03	-7.8088E-03	5.2741E-02	5.2743E-02	5.538E-02
EU-152	#B	-1.8939E-03	-1.8941E-03	6.5939E-01	6.5939E-01	1.465E-01
EU-154	#B	-3.3622E-02	-3.3629E-02	8.8670E-02	8.8690E-02	9.700E-02
EU-155	#B	1.1771E-01	1.1775E-01	2.2117E-01	2.2127E-01	2.432E-01
HG-203	#B	-6.7092E-05	-6.8126E-05	8.8195E-03	8.8195E-03	5.346E-02
TL-208		3.1796E-01	3.1796E-01	9.2458E-02	9.4164E-02	
PB-212	#	6.4411E-01	6.4411E-01	1.3529E-01	1.4004E-01	1.119E-01
PB-214	#	3.8170E-01	3.8170E-01	1.1523E-01	1.1720E-01	9.528E-02
BI-212		4.6543E-01	4.6543E-01	4.1594E-01	4.1676E-01	4.150E-01
BI-214		4.1367E-01	4.1367E-01	1.3789E-01	1.3983E-01	
RA-224	#A	9.3283E-01	9.3283E-01	1.2202E+00	1.2213E+00	1.326E+00
RA-226		1.2489E+00	1.2489E+00	1.0231E+00	1.0255E+00	
AC-228	F	2.2104E-01	2.2104E-01	9.8594E-02	9.9371E-02	2.207E-01
TH-227	#B	-2.5530E-01	-2.5530E-01	4.5667E-01	4.5689E-01	4.962E-01
PA-234	#B	1.0111E-01	1.0111E-01	2.1258E-01	2.1265E-01	2.342E-01
TH-234	#B	1.1701E+00	1.1701E+00	4.1988E+00	4.1993E+00	4.662E+00
AM-241	#A	-7.0148E-02	-7.0148E-02	6.2127E-01	6.2128E-01	6.946E-01

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

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

Total Activity (270.2 to 1999.0 keV) 1.6308075E+01 pCi/gm
Total Decayed Activity (270.2 to 1999.0 keV) 1.6308077E+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_18AUG2006_1247.An1

Sample description
FSS-OOL-02-04-008-F

Spectrum Filename: C:\GammaVision\Spectra\103F_18AUG2006_1247.An1

Acquisition information
Start time: 18-Aug-2006 12:47:56
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: 1.7270E+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	17-Aug-2006 14:20:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2075

***** S U M M A R Y O F P E A K 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	107.	25.07	0.99	9.052E-03	74.81	9.600	9.650E-01	PB212
77.22	159.	13.95	0.99	1.011E-02	77.11	10.700	1.189E+00	PB214
					77.11	17.500	7.268E-01	PB212
93.14	117.	30.47	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.14	112.	31.53	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.25	151.	21.11	1.08	2.566E-02	185.99	3.280	1.280E+00	RA226
209.66	115.	24.20	1.30	2.470E-02				
238.71	1090.	3.53	1.09	2.319E-02	238.63	43.100	8.435E-01	PB212
241.95	121.	21.62	1.10	2.302E-02	241.00	3.900	1.053E+00	RA224
					241.92	7.470	5.508E-01	PB214
269.90	145.	20.20	1.60	2.153E-02				
295.15	260.	11.24	1.09	2.025E-02	295.22	19.200	5.162E-01	PB214
300.64	100.	23.46	1.21	1.999E-02				
328.42	64.	38.00	1.25	1.872E-02				
338.28	274.	11.19	1.03	1.831E-02	338.40	12.010	9.719E-01	AC228
351.92	398.	9.24	1.01	1.776E-02	351.99	37.100	4.664E-01	PB214
463.00	70.	26.32	1.44	1.426E-02				
463.00	70.	26.32	1.44	1.426E-02	463.51	10.000	3.805E-01	SB125
510.60	140.	14.33	1.47	1.318E-02	510.72	22.500	2.992E-01	TL208
583.36	409.	7.35	1.25	1.184E-02	583.14	86.000	3.110E-01	TL208
609.51	246.	9.93	0.98	1.144E-02	609.32	46.090	3.561E-01	BI214
727.71	98.	18.93	1.96	9.959E-03	727.17	11.800	6.502E-01	BI212
794.97	32.	41.24	1.20	9.308E-03				
860.35	79.	26.21	1.35	8.769E-03				
911.26	277.	9.16	1.71	8.400E-03	911.07	29.000	8.775E-01	AC228

964.48	34.	27.84	1.54	8.054E-03	964.00	14.580	PBC<MDA	EU152
969.19	123.	11.06	1.54	8.025E-03	968.90	17.460	6.886E-01	AC228
1120.84	117.	18.90	1.65	7.209E-03	1120.28	15.040	8.304E-01	BI214
1461.14	1184.	3.00	1.88	5.931E-03	1460.75	10.700	1.436E+01	K40
1764.68	75.	12.22	1.02	5.142E-03	1764.51	15.920	7.134E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.48	209.66	316.	115.	0.058	72.59	1.303	NP-239	s
538.94	269.90	285.	145.	0.072	60.59	1.600	AC-228	s
600.42	300.64	198.	100.	0.050	70.39	1.208	PB-212	s
655.98	328.42	214.	64.	0.032	114.00	1.246	RH-106M	
1719.75	860.35	90.	79.	0.040	78.62	1.345	TL-208	
1928.35	964.39	26.	37.	0.019	76.16	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	330.	107.	0.054	75.21	0.993D
PB-212	153.39	77.11	331.	159.	0.079	41.85	0.995A
TH-234	185.46	93.14	796.	117.	0.059	91.40	1.500s
TH-234	185.46	93.14	792.	112.	0.056	94.58	1.500s
RA-226	370.82	185.83	518.	148.	0.074	69.23	1.097s
PB-212	476.63	238.73	608.	885.	0.442	16.14	1.079
RA-224	483.03	241.94	631.	116.	0.058	95.88	1.500
PB-214	483.05	241.95	316.	71.	0.036	106.88	1.381s
PB-214	589.44	295.15	243.	256.	0.128	33.71	1.092
AC-228	675.70	338.28	231.	273.	0.137	33.57	1.031
PB-214	702.99	351.92	286.	393.	0.196	27.71	1.009
SB-125	925.21	463.04	101.	69.	0.035	69.60	1.500
TL-208	1020.31	510.60	132.	113.	0.057	42.99	1.474s
TL-208	1165.81	583.36	142.	405.	0.202	22.06	1.247
BI-214	1218.12	609.51	128.	240.	0.120	29.80	0.983
BI-212	1454.49	727.71	80.	98.	0.049	56.79	1.963s
AC-228	1821.54	911.26	105.	273.	0.137	27.47	1.713
AC-228	1936.81	968.90	32.	123.	0.062	33.17	1.541D
BI-214	2240.66	1120.84	95.	115.	0.058	56.70	1.653s
K-40	2921.15	1461.14	36.	1165.	0.582	9.01	1.882
BI-214	3528.11	1764.68	6.	75.	0.037	36.66	1.018s

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

***** S U M M A R Y O 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		1.1401E-01					
			477.56	1.140E-01	%(	2.667E-01 8.04E-02	G
K-40		1.4359E+01					
			1460.75	1.436E+01	(P	3.791E-01 4.38E-01	G
MN-54		1.5486E-03					
			834.81	1.549E-03	%(P	4.161E-02 1.20E-02	G
CO-57		2.3254E-03					
			122.07	2.325E-03	%(P	5.365E-02 1.60E-02	G K
			136.43	-7.282E-02	%	4.000E-01 1.20E-01	G
CO-60		-1.1847E-02					
			1332.51	-1.185E-02	%(P	3.464E-02 9.63E-03	G K
			1173.23	4.302E-03	% P	4.741E-02 1.35E-02	G K
Sr-85		-2.2646E-02					
			514.00	-2.265E-02	%(	4.385E-02 1.33E-02	G
Kr-85		-5.1764E+02					
			513.99	-5.176E+02	%(	1.002E+03 3.05E+02	G
Y-88		-2.2452E-03					
			1836.01	-2.245E-03	%(P	2.186E-02 5.61E-03	G K
			898.02	-1.031E-03	% P	4.086E-02 1.16E-02	G
NB-94		1.3180E-03					
			871.10	1.318E-03	&(	3.475E-02 9.87E-03	G K
			702.50	-1.728E-03	%	3.543E-02 1.02E-02	G K
Ag-108M		-9.1951E-04					
			722.95	-9.195E-04	&(	6.707E-02 1.97E-02	G K
			614.37	-6.817E-03	& P	3.961E-02 1.16E-02	G
			433.93	-9.500E-03	%	3.926E-02 1.17E-02	G
CD-109		1.0002E+00					
			88.04	1.000E+00	%(	1.846E+00 5.61E-01	G
SN-113		4.0678E-05					
			391.71	4.068E-05	%(	4.963E-02 1.44E-02	G K
			255.04	1.529E-01	&	1.596E+00 4.73E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.3851E-02						
		427.95	-3.417E-03	%(P	1.137E-01	3.31E-02	G K
		600.77	2.582E-02	& P	1.605E-01	4.67E-02	G
		636.15	-5.404E-02	% P	3.348E-01	9.78E-02	G
		463.51	3.818E-01	(P	2.718E-01	9.02E-02	G
		176.29	2.600E-02	&	5.928E-01	1.76E-01	G
I-131	8.8275E-03						
		364.48	8.828E-03	%(P	3.964E-02	1.18E-02	G K
		636.97	7.231E-02	&	5.125E-01	1.49E-01	G
		284.29	-1.477E-01	& P	5.882E-01	1.76E-01	G
CS-134	-9.2104E-03						
		604.66	-9.210E-03	%(	4.008E-02	1.19E-02	G K
		795.76	-7.631E-04	% P	4.845E-02	1.39E-02	G
		569.29	-2.296E-02	% P	2.294E-01	6.62E-02	G
		801.84	-1.005E-02	% P	3.937E-01	1.10E-01	G
CS-137	1.2778E-02						
		661.62	1.278E-02	%(P	3.593E-02	1.07E-02	G
CE-139	-1.5811E-02						
		165.85	-1.581E-02	%(	4.970E-02	1.50E-02	G
EU-152	9.4447E-03						
		121.78	9.445E-03	&(P	1.311E-01	3.90E-02	G K
		344.30	1.368E-02	& P	9.110E-02	2.67E-02	G
		1408.08	2.684E-02	%	1.342E-01	3.79E-02	G
		964.00	1.480E-01	% P	2.862E-01	8.71E-02	G
		1112.07	1.847E-01	%	2.477E-01	7.86E-02	G
		778.90	3.582E-03	%	2.671E-01	7.60E-02	G
EU-154	2.0785E-02						
		123.10	2.078E-02	%(	1.056E-01	3.17E-02	G K
		1274.80	-2.005E-02	%	1.377E-01	3.99E-02	G
		723.30	-1.126E-01	&	2.359E-01	7.15E-02	G
		1004.80	4.476E-02	%	2.036E-01	5.93E-02	G
EU-155	1.0651E-01						
		86.45	1.065E-01	%(	2.373E-01	7.19E-02	G K
		105.31	1.123E-02	%	2.304E-01	6.86E-02	G
HG-203	9.6683E-04						
		279.17	9.668E-04	&(P	4.226E-02	1.25E-02	G K
		72.87	-1.866E-01	& P	2.289E+00	6.84E-01	G
		70.83	6.560E-02	%	4.407E+00	1.31E+00	G
		82.50	-1.104E+00	%	3.706E+00	1.12E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.0857E-01						
		583.14	3.110E-01	(P	4.475E-02	2.31E-02	G
		510.72	2.992E-01	*(P	1.483E-01	5.30E-02	G
PB-212	7.0225E-01						
		238.63	6.923E-01	(P	9.207E-02	3.78E-02	G K
							Energy duplication
		77.11	7.023E-01	} P	3.866E-01	9.80E-02	G
		74.81	9.650E-01	+ P	7.867E-01	2.49E-01	G
PB-214	4.8335E-01						
		351.99	4.664E-01	(P	9.692E-02	4.37E-02	G K
		295.22	5.162E-01	(P	1.515E-01	5.89E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.830E-01	0.00E+00	G
		241.92	3.231E-01	-	3.892E-01	1.15E-01	G
BI-212	6.5020E-01						
		727.17	6.502E-01	@(P	2.959E-01	1.24E-01	G K
		1620.56	5.130E-01	% P	9.652E-01	2.99E-01	G
		785.42	5.866E-01	%	1.646E+00	4.91E-01	G
BI-214	3.5608E-01						
		609.32	3.561E-01	(P	8.229E-02	3.63E-02	G K
		1764.51	7.134E-01	+ P	1.384E-01	9.10E-02	G
		1120.28	8.304E-01	+ P	3.470E-01	1.60E-01	G
RA-224	1.0098E+00						
		241.00	1.010E+00	(	1.041E+00	3.23E-01	G
RA-226	1.3723E+00						
		185.99	1.372E+00	(P	1.011E+00	3.44E-01	G
AC-228	9.0518E-01						
		911.07	8.775E-01	(P	1.619E-01	8.14E-02	G K
		968.90	6.888E-01	- P	1.615E-01	7.63E-02	G
		338.40	9.719E-01	(P	2.618E-01	1.09E-01	G
TH-227	-5.9474E-02						
		236.00	-5.947E-02	%(	3.150E-01	9.41E-02	G K
		256.25	-1.095E-02	& P	4.697E-01	1.38E-01	G
PA-234	-7.4582E-03						
		98.44	-7.458E-03	%(P	2.264E-01	6.73E-02	G K
		946.00	4.075E-03	% P	1.844E-01	5.22E-02	G
		131.28	1.424E-03	& P	1.842E-01	5.46E-02	G
		94.67	-1.118E-01	% P	4.148E-01	1.25E-01	G
		883.24	5.989E-02	&	2.377E-01	6.92E-02	G
		926.70	4.429E-02	&	2.683E-01	7.69E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-3.191E-02 % P 3.396E-01 9.80E-02 G

TH-234       1.1012E+00
                           63.29-1.398E-01 %(P 6.569E+00 1.94E+00 G K
                           92.80 1.780E+00 &(P 2.122E+00 6.49E-01 G
                           92.38 2.192E+00 &(P 2.506E+00 7.68E-01 G

AM-241       2.3801E-01
                           59.54 2.380E-01 &(P 9.915E-01 2.97E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.1264E-01	1.1401E-01	2.4125E-01	2.4134E-01	2.635E-01
K-40		1.4359E+01	1.4359E+01	1.3140E+00	1.5561E+00	
MN-54	#A	1.5454E-03	1.5486E-03	3.5859E-02	3.5859E-02	4.152E-02
CO-57	#B	2.3198E-03	2.3254E-03	4.7961E-02	4.7961E-02	5.352E-02
CO-60	#B	-1.1843E-02	-1.1847E-02	5.0868E-02	5.0873E-02	3.463E-02

Sr-85	#A	-2.2421E-02	-2.2646E-02	3.9998E-02	4.0020E-02	4.341E-02
Kr-85	#A	-5.1764E+02	-5.1764E+02	9.1422E+02	9.1471E+02	1.002E+03
Y-88	#B	-2.2316E-03	-2.2452E-03	1.8400E-02	1.8401E-02	2.173E-02
NB-94	#B	1.3179E-03	1.3180E-03	2.9599E-02	2.9600E-02	3.475E-02
Ag-108M	#B	-9.1950E-04	-9.1951E-04	5.8995E-02	5.8995E-02	6.707E-02
CD-109	#A	9.9879E-01	1.0002E+00	1.6843E+00	1.6852E+00	1.844E+00
SN-113	#B	4.0449E-05	4.0678E-05	4.3337E-02	4.3337E-02	4.935E-02
SB-125	#B	9.3791E-02	9.3851E-02	6.6523E-02	6.6746E-02	1.136E-01
I-131	#B	8.1431E-03	8.8275E-03	3.5256E-02	3.5260E-02	3.657E-02
CS-134	#B	-9.2025E-03	-9.2104E-03	3.5596E-02	3.5600E-02	4.005E-02
CS-137	#A	1.2778E-02	1.2778E-02	3.2019E-02	3.2028E-02	3.593E-02
CE-139	#A	-1.5737E-02	-1.5811E-02	4.4920E-02	4.4930E-02	4.947E-02
EU-152	#B	9.4434E-03	9.4447E-03	1.1691E-01	1.1691E-01	1.311E-01
EU-154	#B	2.0780E-02	2.0785E-02	9.4976E-02	9.4983E-02	1.056E-01
EU-155	#B	1.0647E-01	1.0651E-01	2.1565E-01	2.1573E-01	2.372E-01
HG-203	#B	9.5346E-04	9.6683E-04	3.7390E-02	3.7390E-02	4.168E-02
TL-208		3.0857E-01	3.0857E-01	6.8790E-02	7.1085E-02	
PB-212		7.0225E-01	7.0225E-01	1.1491E-01	1.2192E-01	
PB-214		4.8335E-01	4.8335E-01	1.0707E-01	1.1068E-01	
BI-212	#	6.5020E-01	6.5020E-01	3.7113E-01	3.7304E-01	
BI-214		3.5608E-01	3.5608E-01	1.0897E-01	1.1092E-01	
RA-224	A	1.0098E+00	1.0098E+00	9.6821E-01	9.6998E-01	1.041E+00
RA-226	#	1.3723E+00	1.3723E+00	1.0334E+00	1.0365E+00	
AC-228		9.0518E-01	9.0518E-01	1.9778E-01	2.0464E-01	
TH-227	#B	-5.9474E-02	-5.9474E-02	2.8228E-01	2.8230E-01	3.150E-01
PA-234	#B	-7.4582E-03	-7.4582E-03	3.2037E-01	3.2037E-01	2.264E-01
TH-234	#B	1.1012E+00	1.1012E+00	1.1578E+00	1.1594E+00	6.569E+00
AM-241	#A	2.3801E-01	2.3801E-01	8.9060E-01	8.9070E-01	9.915E-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 (1120.0 to 2000.7 keV) 2.0147108E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.0147108E+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_18AUG2006_1325.An1

Sample description
FSS-OOL-02-04-011-F

Spectrum Filename: C:\GammaVision\Spectra\103F_18AUG2006_1325.An1

Acquisition information
Start time: 18-Aug-2006 13:25:37
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: 1.8000E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8000E+03) =
5.5556E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 15:20:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1719

***** S U M M A R Y O F P E A K 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	122.	23.69	0.99	9.052E-03	74.81	9.600	1.054E+00	PB212
77.21	176.	13.85	0.99	1.011E-02	77.11	17.500	8.897E-01	PB212
					77.11	10.700	1.455E+00	PB214
93.27	105.	36.43	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.72	102.	40.11	1.33	2.433E-02				
185.85	210.	18.97	1.26	2.567E-02				
185.85	210.	18.97	1.26	2.567E-02	185.99	3.280	1.757E+00	RA226
209.27	124.	28.27	1.21	2.471E-02				
238.77	1097.	3.57	1.09	2.320E-02	238.63	43.100	8.149E-01	PB212
241.46	173.	18.09	1.09	2.305E-02	241.00	3.900	1.445E+00	RA224
					241.92	7.470	7.558E-01	PB214
295.30	278.	11.45	0.98	2.024E-02	295.22	19.200	5.290E-01	PB214
300.44	56.	35.53	1.00	2.000E-02				
327.64	68.	40.51	1.13	1.876E-02				
338.51	226.	14.39	1.09	1.830E-02	338.40	12.010	7.682E-01	AC228
352.07	485.	7.20	1.22	1.775E-02	351.99	37.100	5.466E-01	PB214
463.03	76.	25.20	0.85	1.426E-02				
463.03	76.	25.20	0.85	1.426E-02	463.51	10.000	3.935E-01	SB125
510.83	223.	11.74	1.32	1.317E-02	510.72	22.500	4.971E-01	TL208
583.21	364.	7.14	1.42	1.184E-02	583.14	86.000	2.654E-01	TL208
609.45	308.	9.05	1.13	1.144E-02	609.32	46.090	4.291E-01	BI214
726.73	120.	18.43	1.47	9.969E-03	727.17	11.800	7.605E-01	BI212
795.31	70.	32.68	1.52	9.305E-03				
795.31	70.	32.68	1.52	9.305E-03	795.76	85.400	6.566E-02	CS134
911.53	266.	8.38	1.41	8.398E-03	911.07	29.000	8.099E-01	AC228
965.19	44.	27.13	1.54	8.048E-03	964.00	14.580	PBC<MDA	EU152

969.25	126.	12.17	1.54	8.023E-03	968.90	17.460	6.729E-01	AC228
1120.67	126.	20.87	2.28	7.210E-03	1120.28	15.040	8.590E-01	BI214
1461.16	1776.	2.41	1.97	5.931E-03	1460.75	10.700	2.079E+01	K40
1765.05	66.	13.60	1.91	5.141E-03	1764.51	15.920	5.726E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
256.62	128.72	662.	128.	0.064	89.49	1.333	AC-228	s
417.70	209.27	484.	124.	0.062	84.81	1.207	AC-228	
600.02	300.44	176.	56.	0.028	106.60	0.997	PB-212	
654.42	327.64	262.	68.	0.034	121.52	1.130	AC-228	
1930.29	965.33	54.	40.	0.020	92.30	1.539	AC-228	D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	380.	122.	0.061	71.08	0.993D
PB-212	153.39	77.11	383.	176.	0.088	41.56	0.995A
RA-226	371.47	186.15	765.	191.	0.095	60.86	1.500s
PB-212	476.42	238.63	262.	1079.	0.540	10.97	1.093D
PB-214	483.00	241.92	342.	122.	0.061	53.69	1.095A
PB-214	589.74	295.30	298.	274.	0.137	34.35	0.985s
AC-228	676.17	338.51	298.	225.	0.112	43.17	1.093
PB-214	703.27	352.07	268.	480.	0.240	21.61	1.219
SB-125	925.64	463.26	165.	56.	0.028	103.42	1.500
TL-208	1020.78	510.83	176.	196.	0.098	35.23	1.318s
TL-208	1165.52	583.21	120.	360.	0.180	21.41	1.422
BI-214	1217.99	609.45	158.	301.	0.151	27.16	1.133
BI-212	1452.52	726.73	115.	119.	0.060	55.28	1.467s
CS-134	1589.50	795.22	77.	47.	0.024	89.89	1.500s
AC-228	1822.08	911.53	83.	263.	0.131	25.14	1.411
AC-228	1936.81	968.90	53.	125.	0.063	36.26	1.541D
BI-214	2240.31	1120.67	147.	124.	0.062	62.61	2.280s
K-40	2921.20	1461.16	33.	1757.	0.879	7.22	1.973
BI-214	3528.85	1765.05	7.	62.	0.031	40.81	1.907

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

***** S U M M A R Y O 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		0.0000E+00						
			477.56	0.000E+00	%(	3.496E-01	1.02E-01	G
K-40		2.0785E+01						
			1460.75	2.079E+01	(P	3.473E-01	5.06E-01	G
MN-54		-8.4234E-03						
			834.81	-8.423E-03	%(P	3.907E-02	1.14E-02	G
CO-57		1.5757E-02						
			122.07	1.576E-02	%(P	5.467E-02	1.65E-02	G K
			136.43	5.631E-02	&	4.124E-01	1.23E-01	G
CO-60		5.5776E-03						
			1332.51	5.578E-03	%(P	4.603E-02	1.31E-02	G K
			1173.23	1.101E-02	% P	5.302E-02	1.55E-02	G K
Sr-85		-1.1001E-02						
			514.00	-1.100E-02	%(	4.400E-02	1.31E-02	G
Kr-85		-2.5151E+02						
			513.99	-2.515E+02	%(	1.006E+03	3.00E+02	G
Y-88		8.3069E-03						
			1836.01	8.307E-03	%(P	2.035E-02	6.06E-03	G K
			898.02	-3.617E-03	% P	4.318E-02	1.24E-02	G
NB-94		-8.4806E-03						
			871.10	-8.481E-03	%(	3.691E-02	1.08E-02	G K
			702.50	8.855E-04	&	3.145E-02	8.98E-03	G K
Ag-108M		-9.2665E-03						
			722.95	-9.267E-03	%(	5.170E-02	1.53E-02	G K
			614.37	-1.131E-02	% P	4.866E-02	1.44E-02	G
			433.93	4.183E-03	&	3.519E-02	1.03E-02	G
CD-109		9.4940E-01						
			88.04	9.494E-01	%(	1.980E+00	6.01E-01	G
SN-113		-5.3431E-03						
			391.71	-5.343E-03	%(	5.275E-02	1.55E-02	G K
			255.04	-1.974E-01	%	1.731E+00	5.15E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.7486E-02						
		427.95	1.807E-02	%(P	9.148E-02	2.70E-02	G K
		600.77	-7.354E-04	% P	1.960E-01	5.66E-02	G
		636.15	-6.370E-02	& P	3.128E-01	9.17E-02	G
		463.51	2.930E-01	(P	3.297E-01	1.03E-01	G
		176.29	-1.543E-02	%	4.589E-01	1.36E-01	G
I-131	9.2056E-03						
		364.48	9.206E-03	&(P	3.924E-02	1.17E-02	G K
		636.97	1.045E-02	&	3.731E-01	1.05E-01	G
		284.29	4.066E-02	% P	5.472E-01	1.62E-01	G
CS-134	1.1497E-02						
		604.66	-1.759E-02	%(	4.578E-02	1.38E-02	G K
		795.76	4.473E-02	(P	4.129E-02	1.34E-02	G
		569.29	-3.643E-03	% P	2.237E-01	6.43E-02	G
		801.84	8.868E-03	% P	3.989E-01	1.13E-01	G
CS-137	4.7520E-03						
		661.62	4.752E-03	%(P	4.587E-02	1.34E-02	G
CE-139	1.1487E-04						
		165.85	1.149E-04	%(	5.007E-02	1.49E-02	G
EU-152	4.5535E-02						
		121.78	4.554E-02	%(P	1.600E-01	4.82E-02	G K
		344.30	-2.128E-03	% P	1.265E-01	3.72E-02	G
		1408.08	7.063E-02	&	1.543E-01	4.67E-02	G
		964.00	1.744E-02	& P	4.668E-01	1.37E-01	G
		1112.07	7.876E-02	%	3.417E-01	1.00E-01	G
		778.90	6.597E-02	%	2.599E-01	7.65E-02	G
EU-154	2.1667E-02						
		123.10	2.167E-02	%(	1.165E-01	3.49E-02	G K
		1274.80	3.125E-02	&	1.247E-01	3.66E-02	G
		723.30	-8.110E-03	%	3.459E-01	1.02E-01	G
		1004.80	-2.918E-02	&	2.508E-01	7.27E-02	G
EU-155	2.4949E-02						
		86.45	2.495E-02	%(	2.173E-01	6.49E-02	G K
		105.31	7.712E-02	&	2.400E-01	7.24E-02	G
HG-203	1.3923E-02						
		279.17	1.392E-02	%(P	3.875E-02	1.17E-02	G K
		72.87	-7.478E-01	% P	2.330E+00	7.02E-01	G
		70.83	-1.190E-01	%	4.186E+00	1.25E+00	G
		82.50	-1.137E+00	%	4.189E+00	1.26E+00	G

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

TL-208       2.6539E-01
                          583.14 2.654E-01  (P 3.961E-02 1.92E-02 G
                          510.72 4.971E-01 + P 1.634E-01 6.63E-02 G

PB-212       8.3334E-01
                          238.63 8.105E-01  (P 5.871E-02 3.00E-02 G K
                                                          Energy duplication
                           77.11 7.451E-01 } P 3.985E-01 1.03E-01 G
                           74.81 1.054E+00 + P 8.082E-01 2.56E-01 G

PB-214       5.3319E-01
                          351.99 5.466E-01  (P 9.012E-02 3.98E-02 G K
                          295.22 5.290E-01 *(P 1.606E-01 6.15E-02 G
                                                          Energy duplication
                           77.11 0.000E+00 } P 9.878E-01 0.00E+00 G
                          241.92 5.332E-01 }   3.879E-01 9.54E-02 G

BI-212       7.6047E-01
                          727.17 7.605E-01 *(P 3.362E-01 1.41E-01 G K
                         1620.56-2.221E-03 % P 1.049E+00 2.77E-01 G
                          785.42 0.000E+00 %   2.126E+00 6.12E-01 G

BI-214       4.2907E-01
                          609.32 4.291E-01  (P 8.718E-02 3.97E-02 G K
                         1764.51 5.726E-01 + P 1.344E-01 8.20E-02 G
                         1120.28 8.590E-01 + P 4.097E-01 1.82E-01 G

RA-224       7.8902E-01
                                                          Derived Ave Activity
                          241.00 7.890E-01 }(  1.211E+00 3.83E-01 G

RA-226       1.7008E+00
                          185.99 1.701E+00 *(P 1.173E+00 3.68E-01 G

AC-228       7.9769E-01
                          911.07 8.099E-01  (P 1.393E-01 6.88E-02 G K
                          968.90 6.720E-01 - P 1.955E-01 8.13E-02 G
                          338.40 7.682E-01  (P 2.841E-01 1.11E-01 G

TH-227      -3.8391E-02
                          236.00-3.839E-02 %(  3.607E-01 1.08E-01 G K
                          256.25-5.479E-04 & P 4.261E-01 1.25E-01 G

PA-234       5.4992E-02
                           98.44 5.499E-02 &(P 2.129E-01 6.40E-02 G K
                          946.00 2.514E-02 & P 2.080E-01 6.03E-02 G
                          131.28-4.572E-02 & P 2.334E-01 7.01E-02 G
                           94.67-1.179E-01 % P 4.220E-01 1.27E-01 G
                          883.24 4.226E-02 %   3.086E-01 8.94E-02 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          926.70 7.292E-02 %   3.343E-01 9.78E-02 G
                          569.26 4.406E-03 % P 3.217E-01 9.25E-02 G

TH-234       1.3737E+00
                           63.29 1.374E+00 %(P 6.960E+00 2.08E+00 G K
                           92.80 1.603E+00 & P 2.238E+00 6.82E-01 G
                           92.38-4.909E-02 & P 2.570E+00 7.61E-01 G

AM-241       1.9253E-02
                           59.54 1.925E-02 %(P 1.231E+00 3.66E-01 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	0.0000E+00	0.0000E+00	3.0517E-01	3.0517E-01	3.454E-01
K-40		2.0785E+01	2.0785E+01	1.5176E+00	1.9389E+00	
MN-54	#A	-8.4062E-03	-8.4234E-03	3.6876E-02	3.6880E-02	3.899E-02
CO-57	#B	1.5719E-02	1.5757E-02	4.9386E-02	4.9394E-02	5.454E-02

CO-60	#B	5.5758E-03	5.5776E-03	3.9317E-02	3.9319E-02	4.601E-02
Sr-85	#A	-1.0893E-02	-1.1001E-02	3.9365E-02	3.9370E-02	4.357E-02
Kr-85	#A	-2.5150E+02	-2.5151E+02	8.9977E+02	8.9988E+02	1.006E+03
Y-88	#B	8.2573E-03	8.3069E-03	1.8188E-02	1.8194E-02	2.023E-02
NB-94	#B	-8.4806E-03	-8.4806E-03	3.2500E-02	3.2504E-02	3.691E-02
Ag-108M	#B	-9.2664E-03	-9.2665E-03	4.5790E-02	4.5793E-02	5.170E-02
CD-109	#A	9.4806E-01	9.4940E-01	1.8019E+00	1.8026E+00	1.977E+00
SN-113	#B	-5.3135E-03	-5.3431E-03	4.6617E-02	4.6618E-02	5.246E-02
SB-125	#B	8.7431E-02	8.7486E-02	9.2556E-02	9.2696E-02	9.142E-02
I-131	#B	8.5032E-03	9.2056E-03	3.4964E-02	3.4968E-02	3.625E-02
CS-134	#B	1.1487E-02	1.1497E-02	1.0354E-02	1.0376E-02	4.574E-02
CS-137	#A	4.7517E-03	4.7520E-03	4.0053E-02	4.0054E-02	4.586E-02
CE-139	#A	1.1434E-04	1.1487E-04	4.4697E-02	4.4697E-02	4.984E-02
EU-152	#B	4.5529E-02	4.5535E-02	1.4452E-01	1.4454E-01	1.600E-01
EU-154	#B	2.1663E-02	2.1667E-02	1.0483E-01	1.0484E-01	1.164E-01
EU-155	#B	2.4940E-02	2.4949E-02	1.9476E-01	1.9476E-01	2.172E-01
HG-203	#B	1.3733E-02	1.3923E-02	3.4984E-02	3.4993E-02	3.822E-02
TL-208		2.6539E-01	2.6539E-01	5.7509E-02	5.9537E-02	
PB-212		8.3334E-01	8.3334E-01	9.2417E-02	1.0432E-01	
PB-214		5.3319E-01	5.3319E-01	1.1655E-01	1.2059E-01	
BI-212	#	7.6047E-01	7.6047E-01	4.2213E-01	4.2443E-01	
BI-214		4.2907E-01	4.2907E-01	1.1904E-01	1.2162E-01	
RA-224	A	7.8902E-01	7.8902E-01	1.1212E+00	1.1222E+00	
RA-226	#	1.7008E+00	1.7008E+00	1.1054E+00	1.1098E+00	1.173E+00
AC-228		7.9769E-01	7.9769E-01	2.0062E-01	2.0590E-01	
TH-227	#B	-3.8391E-02	-3.8391E-02	3.2281E-01	3.2282E-01	3.607E-01
PA-234	#B	5.4992E-02	5.4992E-02	1.9185E-01	1.9188E-01	2.129E-01
TH-234	#B	1.3737E+00	1.3737E+00	6.2502E+00	6.2506E+00	6.960E+00
AM-241	#A	1.9253E-02	1.9253E-02	1.0987E+00	1.0987E+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 (1120.0 to 2000.7 keV) 2.5193216E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.5193216E+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_18AUG2006_1404.An1

Sample description
FSS-OOL-02-04-002-F

Spectrum Filename: C:\GammaVision\Spectra\103F_18AUG2006_1404.An1

Acquisition information
Start time: 18-Aug-2006 14:04:24
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: 1.8540E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8540E+03) =
5.3937E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 13:50:00
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. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2343

***** S U M M A R Y O F P E A K 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	143.	19.21	0.99	9.052E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	1.199E+00	PB212
77.24	208.	11.28	0.99	1.011E-02	77.11	17.500	8.859E-01	PB212
93.59	96.	38.11	1.23	1.672E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.34	114.	24.79	1.14	2.566E-02	185.99	3.280	PBC<MDA	RA226
209.59	100.	26.07	1.00	2.470E-02				
238.82	1223.	3.35	1.09	2.319E-02	238.63	43.100	8.827E-01	PB212
242.41	118.	22.44	1.10	2.299E-02	241.00	3.900	9.563E-01	RA224
					241.92	7.470	5.003E-01	PB214
270.42	105.	26.18	1.46	2.150E-02				
295.38	202.	16.32	1.06	2.024E-02	295.22	19.200	3.704E-01	PB214
300.80	95.	27.08	1.50	1.998E-02				
328.13	66.	36.28	1.29	1.874E-02				
338.63	260.	10.72	0.95	1.829E-02	338.40	12.010	8.586E-01	AC228
352.04	398.	7.54	1.23	1.775E-02	351.99	37.100	4.342E-01	PB214
409.58	53.	33.34	1.28	1.574E-02				
463.28	62.	27.10	1.68	1.425E-02				
463.28	62.	27.10	1.68	1.425E-02	463.51	10.000	PBC<MDA	SB125
510.92	201.	14.34	1.58	1.317E-02	510.72	22.500	4.290E-01	TL208
583.37	423.	6.44	1.33	1.184E-02	583.14	86.000	2.993E-01	TL208
609.50	300.	9.04	1.62	1.144E-02	609.32	46.090	4.062E-01	BI214
727.61	99.	20.02	1.37	9.960E-03	727.17	11.800	6.106E-01	BI212
795.68	78.	25.98	1.33	9.302E-03				
795.68	78.	25.98	1.33	9.302E-03	795.76	85.400	7.156E-02	CS134
860.85	54.	23.85	1.28	8.765E-03				
911.47	262.	9.36	0.94	8.399E-03	911.07	29.000	7.752E-01	AC228

964.91	47.	25.14	1.54	8.051E-03	964.00	14.580	PBC<MDA	EU152
969.39	157.	9.61	1.54	8.023E-03	968.90	17.460	8.155E-01	AC228
1120.17	101.	25.67	1.51	7.212E-03	1120.28	15.040	6.646E-01	BI214
1461.29	1407.	2.78	1.97	5.930E-03	1460.75	10.700	1.594E+01	K40
1622.13	16.	35.20	0.70	5.488E-03	1620.56	2.750	7.803E-01	BI212
1765.08	61.	14.01	1.07	5.140E-03	1764.51	15.920	5.140E-01	BI214

********** U N I D E N T I F I E D P E A K S U 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	302.	100.	0.050	78.21	0.998	NP-239	
539.99	270.42	285.	105.	0.053	78.55	1.462	AC-228	s
600.75	300.80	235.	95.	0.047	81.25	1.503	PB-212	s
655.41	328.13	213.	66.	0.033	108.85	1.293	AC-228	
818.29	409.58	119.	53.	0.027	100.01	1.282	AC-228	s
1720.75	860.85	46.	54.	0.027	71.56	1.280	TL-208	s
1929.68	964.87	49.	45.	0.022	79.96	1.539	AC-228	D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	324.	143.	0.071	57.64	0.993D
PB-212	153.39	77.11	379.	208.	0.104	33.85	0.995A
TH-234	185.59	93.21	964.	129.	0.064	92.60	1.500s
TH-234	185.57	93.20	951.	127.	0.064	92.68	1.500s
RA-226	371.66	186.25	727.	122.	0.061	87.85	1.500s
PB-212	476.84	238.84	589.	1155.	0.578	12.98	0.985
RA-224	482.55	241.70	756.	107.	0.054	112.69	1.500
PB-214	589.90	295.38	330.	198.	0.099	48.97	1.058
AC-228	676.40	338.63	208.	259.	0.129	32.17	0.948
PB-214	703.22	352.04	207.	392.	0.196	22.62	1.231
SB-125	925.57	463.23	155.	66.	0.033	86.13	1.500s
TL-208	1020.95	510.92	218.	174.	0.087	43.01	1.584s
TL-208	1165.84	583.37	118.	418.	0.209	19.31	1.328
CS-134	1213.79	607.35	235.	-56.	-0.028	123.80	1.500s
BI-214	1218.10	609.50	147.	294.	0.147	27.11	1.622s
BI-212	1454.29	727.61	98.	99.	0.049	60.07	1.371s
CS-134	1589.28	795.11	63.	52.	0.026	76.88	1.500s
AC-228	1821.97	911.47	101.	259.	0.130	28.08	0.937s
AC-228	1936.81	968.90	36.	157.	0.078	28.89	1.541D
BI-214	2239.32	1120.17	131.	99.	0.049	77.00	1.513
K-40	2921.44	1461.29	49.	1388.	0.694	8.33	1.971
BI-212	3243.08	1622.13	5.	16.	0.008	105.60	0.700s
BI-214	3528.92	1765.08	6.	58.	0.029	42.02	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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		-3.9558E-03					
			477.56	-3.956E-03	&(	2.802E-01 8.09E-02	G
K-40		1.5942E+01					
			1460.75	1.594E+01	(P	4.046E-01 4.49E-01	G
MN-54		-5.7108E-03					
			834.81	-5.711E-03	%(P	3.668E-02 1.06E-02	G
CO-57		-9.4660E-03					
			122.07	-9.466E-03	&(P	5.084E-02 1.52E-02	G K
			136.43	-1.276E-01	%	4.064E-01 1.23E-01	G
CO-60		-6.2114E-03					
			1332.51	-6.211E-03	&(P	4.291E-02 1.19E-02	G K
			1173.23	1.176E-02	% P	5.174E-02 1.52E-02	G K
Sr-85		-1.4765E-02					
			514.00	-1.477E-02	&(	4.242E-02 1.27E-02	G
Kr-85		-3.3725E+02					
			513.99	-3.373E+02	&(	9.687E+02 2.91E+02	G
Y-88		-3.3193E-03					
			1836.01	-3.319E-03	%(P	3.201E-02 8.76E-03	G K
			898.02	-1.827E-04	& P	4.189E-02 1.19E-02	G
NB-94		9.5352E-04					
			871.10	9.535E-04	&(	3.592E-02 1.03E-02	G K
			702.50	-7.581E-04	%	3.737E-02 1.08E-02	G K
Ag-108M		-7.1154E-03					
			722.95	-7.115E-03	&(	4.045E-02 1.19E-02	G K
			614.37	-1.190E-02	% P	4.196E-02 1.25E-02	G
			433.93	-3.546E-03	&	3.748E-02 1.10E-02	G
CD-109		1.1276E+00					
			88.04	1.128E+00	%(	1.830E+00 5.58E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	0.0000E+00						
		391.71	0.000E+00	%(	5.160E-02	1.51E-02	G K
		255.04	-1.618E-02	%	1.456E+00	4.29E-01	G
SB-125	8.3660E-02						
		427.95	-2.487E-03	&(P	8.060E-02	2.32E-02	G K
		600.77	-3.005E-02	% P	1.806E-01	5.30E-02	G
		636.15	1.032E-01	& P	2.406E-01	7.23E-02	G
		463.51	3.387E-01	(P	3.108E-01	9.91E-02	G
		176.29	-6.455E-04	&	5.515E-01	1.64E-01	G
I-131	-4.7735E-03						
		364.48	-4.773E-03	&(P	3.627E-02	1.06E-02	G K
		636.97	5.944E-02	&	5.291E-01	1.54E-01	G
		284.29	9.783E-02	& P	5.099E-01	1.52E-01	G
CS-134	-3.6053E-02						
		604.66	-3.605E-02	&(	4.812E-02	1.49E-02	G K
		795.76	4.758E-02	+ P	3.634E-02	1.22E-02	G
		569.29	-3.107E-02	% P	2.288E-01	6.66E-02	G
		801.84	-6.499E-02	% P	4.162E-01	1.20E-01	G
CS-137	1.2538E-02						
		661.62	1.254E-02	%(P	4.493E-02	1.33E-02	G
CE-139	-3.8543E-03						
		165.85	-3.854E-03	&(	4.791E-02	1.43E-02	G
EU-152	-2.3924E-02						
		121.78	-2.392E-02	&(P	1.522E-01	4.56E-02	G K
		344.30	-1.979E-02	% P	1.177E-01	3.49E-02	G
		1408.08	3.621E-02	%	1.600E-01	4.62E-02	G
		964.00	1.831E-01	% P	2.969E-01	9.13E-02	G
		1112.07	-2.152E-03	%	3.360E-01	9.60E-02	G
		778.90	-6.520E-02	&	2.612E-01	7.70E-02	G
EU-154	-1.6022E-02						
		123.10	-1.602E-02	%(	1.093E-01	3.27E-02	G K
		1274.80	2.974E-02	%	9.110E-02	2.69E-02	G
		723.30	-3.937E-03	&	3.352E-01	9.88E-02	G
		1004.80	-6.242E-02	&	2.264E-01	6.69E-02	G
EU-155	8.4039E-03						
		86.45	8.404E-03	&(	2.482E-01	7.41E-02	G K
		105.31	5.396E-02	%	2.229E-01	6.70E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	2.3336E-02						
		279.17	2.334E-02	&(P	3.916E-02	1.20E-02	G K
		72.87	-8.849E-01	& P	2.229E+00	6.74E-01	G
		70.83	-4.676E-03	%	3.858E+00	1.15E+00	G
		82.50	-7.626E-01	%	3.414E+00	1.02E+00	G
TL-208	2.9931E-01						
		583.14	2.993E-01	(P	3.812E-02	1.95E-02	G
		510.72	4.290E-01	+ P	1.757E-01	7.09E-02	G
PB-212	8.5477E-01						
		238.63	8.421E-01	(P	8.440E-02	3.68E-02	G K
							Energy duplication
		77.11	8.548E-01	} P	3.847E-01	9.64E-02	G
		74.81	1.199E+00	+ P	7.263E-01	2.35E-01	G
PB-214	4.1244E-01						
		351.99	4.342E-01	(P	7.713E-02	3.32E-02	G K
		295.22	3.704E-01	(P	1.639E-01	6.17E-02	G
							Energy duplication
		77.11	9.337E-02	} P	5.911E-01	1.10E-01	G
		241.92	-4.977E-03	%	6.517E-01	1.94E-01	G
BI-212	6.4269E-01						
		727.17	6.106E-01	@(P	3.035E-01	1.23E-01	G K
		1620.56	7.803E-01	(P	6.263E-01	2.76E-01	G
		785.42	-4.130E-02	%	1.624E+00	4.63E-01	G
BI-214	4.3389E-01						
		609.32	4.062E-01	(P	8.190E-02	3.75E-02	G K
		1764.51	5.140E-01	(P	1.280E-01	7.61E-02	G
		1120.28	6.646E-01	+ P	3.768E-01	1.74E-01	G
RA-224	8.6792E-01						
		241.00	8.679E-01	(	1.060E+00	3.26E-01	G
RA-226	1.0571E+00						
		185.99	1.057E+00	*(P	1.112E+00	3.42E-01	G
AC-228	8.0429E-01						
		911.07	7.752E-01	@(P	1.481E-01	7.35E-02	G K
		968.90	8.152E-01	(P	1.591E-01	7.86E-02	G
		338.40	8.586E-01	(P	2.319E-01	9.25E-02	G
TH-227	-2.8562E-01						
		236.00	-2.856E-01	%(	4.156E-01	1.27E-01	G K
		256.25	-5.735E-03	& P	4.648E-01	1.37E-01	G

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

PA-234       1.8094E-03
                           98.44 1.809E-03 %(P 2.395E-01 7.14E-02 G K
                          946.00 3.618E-02 % P 1.522E-01 4.44E-02 G
                          131.28-1.115E-02 & P 2.166E-01 6.46E-02 G
                           94.67-1.896E-01 % P 4.264E-01 1.29E-01 G
                          883.24 3.971E-02 &   2.180E-01 6.26E-02 G
                          926.70-5.063E-02 &   2.888E-01 8.35E-02 G
                          569.26-4.945E-02 % P 3.397E-01 9.89E-02 G

TH-234       1.3122E+00
                           63.29 2.635E-01 %(P 6.165E+00 1.83E+00 G K
                           92.80 1.883E+00 *(P 2.162E+00 6.62E-01 G
                           92.38 2.237E+00 *(P 2.563E+00 7.85E-01 G

AM-241       3.7497E-02
                           59.54 3.750E-02 %(P 1.115E+00 3.31E-01 G
   ( - This peak used in the nuclide activity average.

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

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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	-3.9043E-03	-3.9558E-03	2.4274E-01	2.4274E-01	2.765E-01
K-40		1.5942E+01	1.5942E+01	1.3462E+00	1.6337E+00	
MN-54	#A	-5.6980E-03	-5.7108E-03	3.5383E-02	3.5385E-02	3.660E-02
CO-57	#B	-9.4414E-03	-9.4660E-03	4.7258E-02	4.7261E-02	5.071E-02
CO-60	#B	-6.2091E-03	-6.2114E-03	1.0449E-01	1.0449E-01	4.290E-02
Sr-85	#A	-1.4607E-02	-1.4765E-02	3.8219E-02	3.8229E-02	4.196E-02
Kr-85	#A	-3.3725E+02	-3.3725E+02	8.7286E+02	8.7308E+02	9.687E+02
Y-88	#B	-3.2975E-03	-3.3193E-03	2.7794E-02	2.7795E-02	3.180E-02
NB-94	#B	9.5352E-04	9.5352E-04	3.0753E-02	3.0753E-02	3.592E-02
Ag-108M	#B	-7.1153E-03	-7.1154E-03	3.5570E-02	3.5573E-02	4.045E-02
CD-109	#A	1.1259E+00	1.1276E+00	1.6735E+00	1.6747E+00	1.827E+00
SN-113	#B	0.0000E+00	0.0000E+00	4.5252E-02	4.5252E-02	5.129E-02
SB-125	#F	8.3602E-02	8.3660E-02	7.3442E-02	7.3602E-02	8.054E-02
I-131	#B	-4.3754E-03	-4.7735E-03	3.7554E-02	3.7556E-02	3.324E-02
CS-134	#A	-3.6019E-02	-3.6053E-02	4.4632E-02	4.4681E-02	4.807E-02
CS-137	#A	1.2537E-02	1.2538E-02	3.9969E-02	3.9976E-02	4.493E-02
CE-139	#A	-3.8347E-03	-3.8543E-03	4.2895E-02	4.2895E-02	4.767E-02
EU-152	#B	-2.3920E-02	-2.3924E-02	1.4886E-01	1.4886E-01	1.522E-01
EU-154	#B	-1.6018E-02	-1.6022E-02	9.8189E-02	9.8193E-02	1.093E-01
EU-155	#B	8.4006E-03	8.4039E-03	2.2232E-01	2.2232E-01	2.481E-01
HG-203	#B	2.2988E-02	2.3336E-02	3.5874E-02	3.5899E-02	3.858E-02
TL-208		2.9931E-01	2.9931E-01	5.8399E-02	6.0930E-02	
PB-212		8.5477E-01	8.5477E-01	1.1212E-01	1.2262E-01	
PB-214		4.1244E-01	4.1244E-01	9.4632E-02	9.7615E-02	
BI-212		6.4269E-01	6.4269E-01	3.8802E-01	3.8981E-01	
BI-214		4.3389E-01	4.3389E-01	1.1354E-01	1.1630E-01	
RA-224	#A	8.6792E-01	8.6792E-01	9.7803E-01	9.7933E-01	1.060E+00
RA-226	#A	1.0571E+00	1.0571E+00	1.0272E+00	1.0290E+00	1.112E+00
AC-228		8.0429E-01	8.0429E-01	1.3903E-01	1.4666E-01	
TH-227	#B	-2.8562E-01	-2.8562E-01	3.8099E-01	3.8135E-01	4.156E-01
PA-234	#B	1.8094E-03	1.8094E-03	2.1417E-01	2.1417E-01	2.395E-01
TH-234	#B	1.3122E+00	1.3122E+00	1.3817E+00	1.3836E+00	6.165E+00
AM-241	#A	3.7497E-02	3.7497E-02	9.9450E-01	9.9450E-01	1.115E+00

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

YAEC Chemistry Lab Spectrum name: 103F_18AUG2006_1404.An1

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

Total Activity (1120.0 to 2000.7 keV) 1.9389656E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.9389656E+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_18AUG2006_1443.An1

Sample description
FSS-OOL-02-04-001-F

Spectrum Filename: C:\GammaVision\Spectra\103F_18AUG2006_1443.An1

Acquisition information
Start time: 18-Aug-2006 14:43:06
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: 1.9000E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9000E+03) =
5.2632E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2583

***** S U M M A R Y O F P E A K 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	106.	27.88	0.99	8.988E-03	74.81	9.600	8.424E-01	PB212
77.30	236.	13.01	0.99	1.019E-02	77.11	17.500	9.376E-01	PB212
					77.11	10.700	1.533E+00	PB214
92.75	118.	38.42	1.73	1.644E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.44	188.	23.20	1.14	2.565E-02	185.99	3.280	1.478E+00	RA226
209.61	77.	37.08	1.09	2.470E-02				
238.78	1136.	3.43	1.09	2.319E-02	238.63	43.100	7.993E-01	PB212
241.89	152.	17.20	1.10	2.303E-02	241.00	3.900	1.202E+00	RA224
					241.92	7.470	6.288E-01	PB214
270.16	112.	24.18	1.29	2.152E-02				
277.69	66.	38.79	1.12	2.113E-02				
295.49	208.	12.14	0.98	2.024E-02	295.22	19.200	3.722E-01	PB214
300.54	94.	29.29	1.35	1.999E-02				
328.72	89.	34.88	1.24	1.871E-02				
338.43	261.	13.29	1.38	1.830E-02	338.40	12.010	8.410E-01	AC228
352.07	388.	7.26	1.10	1.775E-02	351.99	37.100	4.131E-01	PB214
409.30	50.	39.67	1.23	1.575E-02				
463.29	103.	21.14	1.12	1.425E-02				
463.29	103.	21.14	1.12	1.425E-02	463.51	10.000	5.062E-01	SB125
511.07	190.	13.75	1.54	1.317E-02	510.72	22.500	3.919E-01	TL208
583.41	401.	7.61	1.38	1.184E-02	583.14	86.000	2.770E-01	TL208
609.58	317.	6.73	1.29	1.144E-02	609.32	46.090	4.184E-01	BI214
661.78	55.	33.81	1.61	1.072E-02	661.62	84.620	4.281E-02	CS137
727.32	88.	21.08	1.07	9.963E-03	727.17	11.800	5.269E-01	BI212
768.84	71.	29.06	0.88	9.548E-03				
795.13	43.	32.41	1.36	9.307E-03				

795.13	43.	32.41	1.36	9.307E-03	795.76	85.400	3.846E-02	CS134
860.67	64.	23.74	1.24	8.767E-03				
911.52	262.	7.46	1.66	8.398E-03	911.07	29.000	7.550E-01	AC228
964.75	50.	24.19	1.54	8.051E-03				
969.32	161.	9.23	1.54	8.023E-03	968.90	17.460	8.168E-01	AC228
1120.79	92.	21.84	1.53	7.209E-03	1120.28	15.040	5.895E-01	BI214
1152.89	37.	36.58	1.48	7.062E-03				
1461.38	1299.	2.84	2.08	5.930E-03	1460.75	10.700	1.435E+01	K40
1620.84	17.	30.59	1.15	5.488E-03	1620.56	2.750	7.803E-01	BI212
1765.47	64.	12.91	1.36	5.140E-03	1764.51	15.920	5.233E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.38	209.61	369.	77.	0.038	111.23	1.094	NP-239	
539.47	270.16	272.	112.	0.056	72.53	1.294	AC-228	
554.53	277.69	259.	66.	0.033	109.32	1.118	NP-239	
600.23	300.54	262.	94.	0.047	87.86	1.349	PB-212	
656.58	328.72	300.	89.	0.044	104.64	1.240	LA-140	s
817.74	409.30	146.	50.	0.025	119.02	1.231	AC-228	
1536.75	768.84	106.	71.	0.036	70.63	0.883	BI-214	sM
1720.38	860.67	55.	64.	0.032	71.21	1.235	TL-208	
1929.25	964.74	45.	52.	0.026	69.42	1.538	AC-228	D
2304.75	1152.89	58.	37.	0.019	109.74	1.482	BI-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	148.79	74.81	382.	108.	0.054	79.30	0.993D
PB-212	153.39	77.11	357.	202.	0.101	4.11	0.995A
RA-226	371.48	186.16	710.	141.	0.070	76.87	1.500s
PB-212	476.79	238.82	675.	1114.	0.557	14.39	1.097
RA-224	482.73	241.79	729.	128.	0.064	93.13	1.500
PB-214	590.13	295.49	208.	203.	0.102	36.43	0.976
AC-228	675.99	338.43	315.	260.	0.130	39.87	1.378
PB-214	703.27	352.07	182.	383.	0.191	21.79	1.101
SB-125	925.61	463.25	151.	68.	0.034	83.01	1.500
TL-208	1021.25	511.07	181.	163.	0.082	41.26	1.543s
TL-208	1165.92	583.41	160.	397.	0.198	22.83	1.378
BI-214	1218.26	609.58	69.	310.	0.155	20.19	1.287
CS-137	1322.65	661.78	109.	55.	0.027	101.42	1.614s
BI-212	1453.70	727.32	88.	87.	0.044	63.25	1.068s
CS-134	1589.81	795.38	71.	38.	0.019	106.50	1.500
AC-228	1822.06	911.52	51.	259.	0.129	22.38	1.658s
AC-228	1936.81	968.90	32.	161.	0.080	27.92	1.541D
BI-214	2240.56	1120.79	93.	90.	0.045	65.51	1.527s
K-40	2921.62	1461.38	36.	1280.	0.640	8.53	2.078

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3240.48	1620.84	3.	17.	0.008	91.76	1.150s
BI-214	3529.69	1765.47	5.	60.	0.030	38.74	1.357s

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

***** S U M M A R Y O 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		9.8736E-02					
			477.56	9.874E-02	&(	3.231E-01 9.65E-02	G
K-40		1.4348E+01					
			1460.75	1.435E+01	(P	3.416E-01 4.14E-01	G
MN-54		1.4079E-03					
			834.81	1.408E-03	%(P	3.895E-02 1.12E-02	G
CO-57		9.8053E-04					
			122.07	9.805E-04	&(P	5.278E-02 1.57E-02	G K
			136.43	9.648E-02	%	3.687E-01 1.11E-01	G
CO-60		-1.5626E-03					
			1332.51	-1.563E-03	&(P	4.090E-02 1.13E-02	G K
			1173.23	1.924E-02	& P	3.386E-02 1.03E-02	G K
Sr-85		-1.2754E-02					
			514.00	-1.275E-02	%(	3.658E-02 1.10E-02	G
Kr-85		-2.9119E+02					
			513.99	-2.912E+02	%(	8.352E+02 2.51E+02	G
Y-88		-4.7466E-03					
			1836.01	-4.747E-03	&(P	2.909E-02 8.05E-03	G K
			898.02	-1.368E-03	& P	3.033E-02 8.45E-03	G
NB-94		0.0000E+00					
			871.10	0.000E+00	&(	3.275E-02 9.27E-03	G K
			702.50	1.899E-04	%	2.348E-02 6.56E-03	G K
Ag-108M		-6.7908E-03					
			722.95	-6.791E-03	%(	4.116E-02 1.21E-02	G K
			614.37	-2.640E-02	% P	4.240E-02 1.30E-02	G
			433.93	3.324E-03	%	3.054E-02 8.93E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	2.5418E-02						
		88.04	2.542E-02	%(	1.935E+00	5.77E-01	G
SN-113	6.7911E-03						
		391.71	6.791E-03	%(	4.264E-02	1.26E-02	G K
		255.04	1.878E-01	&	1.203E+00	3.56E-01	G
SB-125	1.0392E-01						
		427.95	2.403E-02	&(P	9.458E-02	2.81E-02	G K
		600.77	2.418E-02	& P	1.774E-01	5.19E-02	G
		636.15	5.247E-02	% P	2.120E-01	6.19E-02	G
		463.51	3.404E-01	(P	2.996E-01	9.59E-02	G
		176.29	0.000E+00	%	5.736E-01	1.71E-01	G
I-131	-3.8762E-03						
		364.48	-3.876E-03	%(P	4.060E-02	1.19E-02	G K
		636.97	7.048E-02	%	4.447E-01	1.30E-01	G
		284.29	-1.661E-02	& P	5.230E-01	1.54E-01	G
CS-134	-2.0180E-02						
		604.66	-2.018E-02	%(	3.388E-02	1.04E-02	G K
		795.76	3.375E-02	+ P	3.761E-02	1.20E-02	G
		569.29	-7.371E-03	% P	1.913E-01	5.45E-02	G
		801.84	8.499E-02	% P	3.675E-01	1.07E-01	G
CS-137	4.2813E-02						
		661.62	4.281E-02	(P	4.033E-02	1.48E-02	G
CE-139	-6.5059E-03						
		165.85	-6.506E-03	&(	4.583E-02	1.37E-02	G
EU-152	2.3240E-03						
		121.78	2.324E-03	&(P	1.496E-01	4.46E-02	G K
		344.30	3.946E-03	% P	1.149E-01	3.38E-02	G
		1408.08	4.670E-02	%	8.939E-02	2.77E-02	G
		964.00	-1.146E-01	% P	3.113E-01	9.30E-02	G
		1112.07	3.416E-02	%	3.102E-01	8.96E-02	G
		778.90	1.041E-02	%	2.275E-01	6.48E-02	G
EU-154	-3.0784E-02						
		123.10	-3.078E-02	%(	1.061E-01	3.19E-02	G K
		1274.80	0.000E+00	&	1.302E-01	3.70E-02	G
		723.30	-3.582E-02	%	1.991E-01	5.86E-02	G
		1004.80	7.055E-02	%	1.976E-01	5.89E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-1.6401E-02						
		86.45	-1.640E-02	%(	2.397E-01	7.17E-02	G K
		105.31	1.135E-02	%	2.303E-01	6.87E-02	G
HG-203	-1.6233E-05						
		279.17	-1.623E-05	&(P	3.995E-02	1.18E-02	G K
		72.87	-5.735E-03	% P	2.045E+00	6.09E-01	G
		70.83	4.947E-02	&	4.207E+00	1.25E+00	G
		82.50	3.268E-01	%	3.440E+00	1.03E+00	G
TL-208	2.7698E-01						
		583.14	2.770E-01	(P	4.309E-02	2.13E-02	G
		510.72	3.919E-01	+ P	1.568E-01	6.27E-02	G
PB-212	8.0970E-01						
		238.63	7.924E-01	(P	8.805E-02	3.85E-02	G K
							Energy duplication
		77.11	8.097E-01	} P	3.648E-01	1.11E-02	G
		74.81	8.871E-01	(P	7.673E-01	2.41E-01	G
PB-214	3.9916E-01						
		351.99	4.131E-01	(P	7.090E-02	3.04E-02	G K
		295.22	3.722E-01	(P	1.278E-01	4.61E-02	G
							Energy duplication
		77.11	1.505E-01	} P	9.089E-01	2.24E-01	G
		241.92	2.896E-01	%	5.589E-01	1.70E-01	G
BI-212	5.7477E-01						
		727.17	5.269E-01	@(P	2.807E-01	1.12E-01	G K
		1620.56	7.803E-01	(P	5.353E-01	2.39E-01	G
		785.42	-9.666E-02	%	1.554E+00	4.45E-01	G
BI-214	4.1836E-01						
		609.32	4.184E-01	(P	5.583E-02	2.87E-02	G K
		1764.51	5.233E-01	+ P	1.120E-01	7.13E-02	G
		1120.28	5.895E-01	+ P	3.126E-01	1.31E-01	G
RA-224	1.0139E+00						
		241.00	1.014E+00	(	1.016E+00	3.15E-01	G
RA-226	1.1879E+00						
		185.99	1.188E+00	*(P	1.072E+00	3.32E-01	G
AC-228	7.9122E-01						
		911.07	7.550E-01	@(P	1.054E-01	5.71E-02	G K
		968.90	8.171E-01	(P	1.476E-01	7.61E-02	G
		338.40	8.410E-01	(P	2.764E-01	1.12E-01	G

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

TH-227      -1.4605E-01
                          236.00-1.461E-01 %(  3.687E-01 1.11E-01 G K
                          256.25 8.548E-03 % P 3.874E-01 1.14E-01 G

PA-234      -3.6780E-02
                           98.44-3.678E-02 %(P 2.147E-01 6.43E-02 G K
                          946.00-5.549E-02 & P 1.906E-01 5.64E-02 G
                          131.28-2.811E-02 % P 2.126E-01 6.36E-02 G
                           94.67-1.507E-01 % P 4.082E-01 1.23E-01 G
                          883.24-1.181E-02 %   3.089E-01 8.85E-02 G
                          926.70 3.566E-04 &   2.481E-01 6.89E-02 G
                          569.26-1.212E-02 % P 2.837E-01 8.09E-02 G

TH-234       1.2587E+00
                           63.29 1.259E+00 %(P 6.235E+00 1.87E+00 G K
                           92.80 1.320E+00 % P 2.082E+00 6.32E-01 G
                           92.38 1.296E+00 % P 2.489E+00 7.53E-01 G

AM-241      -1.4689E-01
                           59.54-1.469E-01 %(P 1.112E+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		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	9.7419E-02	9.8736E-02	2.8959E-01	2.8965E-01	3.188E-01
K-40		1.4348E+01	1.4348E+01	1.2411E+00	1.4947E+00	
MN-54	#A	1.4047E-03	1.4079E-03	3.3618E-02	3.3618E-02	3.886E-02
CO-57	#B	9.7793E-04	9.8053E-04	4.7208E-02	4.7208E-02	5.264E-02
CO-60	#B	-1.5620E-03	-1.5626E-03	1.0905E-01	1.0905E-01	4.088E-02
Sr-85	#A	-1.2614E-02	-1.2754E-02	3.2920E-02	3.2928E-02	3.618E-02
Kr-85	#A	-2.9118E+02	-2.9119E+02	7.5162E+02	7.5181E+02	8.352E+02
Y-88	#B	-4.7148E-03	-4.7466E-03	2.5100E-02	2.5102E-02	2.890E-02
NB-94	#B	0.0000E+00	0.0000E+00	2.7797E-02	2.7797E-02	3.275E-02
Ag-108M	#B	-6.7906E-03	-6.7908E-03	3.6209E-02	3.6211E-02	4.116E-02
CD-109	#A	2.5378E-02	2.5418E-02	1.7313E+00	1.7313E+00	1.932E+00
SN-113	#B	6.7489E-03	6.7911E-03	3.7697E-02	3.7699E-02	4.238E-02
SB-125	#F	1.0384E-01	1.0392E-01	8.7873E-02	8.8080E-02	9.451E-02
I-131	#B	-3.5454E-03	-3.8762E-03	4.3545E-02	4.3545E-02	3.713E-02
CS-134	#B	-2.0161E-02	-2.0180E-02	3.1187E-02	3.1209E-02	3.385E-02
CS-137	#	4.2810E-02	4.2813E-02	4.4524E-02	4.4593E-02	
CE-139	#A	-6.4720E-03	-6.5059E-03	4.1121E-02	4.1123E-02	4.559E-02
EU-152	#B	2.3237E-03	2.3240E-03	1.3368E-01	1.3368E-01	1.496E-01
EU-154	#B	-3.0777E-02	-3.0784E-02	9.5799E-02	9.5814E-02	1.060E-01
EU-155	#B	-1.6394E-02	-1.6401E-02	2.1499E-01	2.1499E-01	2.396E-01
HG-203	#B	-1.5985E-05	-1.6233E-05	2.7245E-03	2.7245E-03	3.934E-02
TL-208		2.7698E-01	2.7698E-01	6.3926E-02	6.5918E-02	
PB-212		8.0970E-01	8.0970E-01	1.1775E-01	1.2678E-01	
PB-214		3.9916E-01	3.9916E-01	8.6288E-02	8.9346E-02	
BI-212	#	5.7477E-01	5.7477E-01	3.2145E-01	3.2318E-01	
BI-214		4.1836E-01	4.1836E-01	8.6219E-02	8.9575E-02	
RA-224	A	1.0139E+00	1.0139E+00	9.4431E-01	9.4615E-01	1.016E+00
RA-226	#	1.1879E+00	1.1879E+00	9.9727E-01	9.9966E-01	1.072E+00
AC-228		7.9122E-01	7.9122E-01	1.4197E-01	1.4922E-01	
TH-227	#B	-1.4605E-01	-1.4605E-01	3.3436E-01	3.3447E-01	3.687E-01
PA-234	#B	-3.6780E-02	-3.6780E-02	2.0960E-01	2.0961E-01	2.147E-01
TH-234	#B	1.2587E+00	1.2587E+00	5.5960E+00	5.5965E+00	6.235E+00
AM-241	#A	-1.4689E-01	-1.4689E-01	1.0200E+00	1.0200E+00	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

YAEC Chemistry Lab Spectrum name: 103F_18AUG2006_1443.An1

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

Total Activity (1120.0 to 2000.7 keV) 1.8675301E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.8675304E+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_18AUG2006_1524.An1

Sample description
FSS-OOL-02-04-016-F

Spectrum Filename: C:\GammaVision\Spectra\103F_18AUG2006_1524.An1

Acquisition information
Start time: 18-Aug-2006 15:24:56
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: 1.7980E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7980E+03) =
5.5617E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 15:55:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2658

***** S U M M A R Y O F P E A K 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	98.	27.27	0.99	9.002E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	8.206E-01	PB212
77.25	203.	14.04	0.99	1.015E-02	77.11	17.500	8.479E-01	PB212
					77.11	10.700	1.387E+00	PB214
87.25	73.	37.30	1.00	1.449E-02	86.45	32.740	1.186E-01	EU155
					88.04	3.790	9.823E-01	CD109
90.34	81.	32.67	1.00	1.565E-02				
93.38	118.	23.47	1.00	1.672E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.81	103.	40.30	1.22	2.434E-02				
186.32	152.	25.39	0.90	2.566E-02	185.99	3.280	1.246E+00	RA226
210.02	61.	36.87	1.12	2.468E-02				
238.78	976.	3.75	1.09	2.319E-02	238.63	43.100	7.246E-01	PB212
241.78	153.	16.06	1.09	2.303E-02	241.00	3.900	1.281E+00	RA224
					241.92	7.470	6.703E-01	PB214
270.59	131.	23.18	0.83	2.149E-02				
277.78	58.	38.36	1.29	2.112E-02				
277.78	58.	38.36	1.29	2.112E-02	279.17	81.500	PBC<MDA	HG203
295.20	228.	12.51	1.07	2.025E-02	295.22	19.200	4.339E-01	PB214
300.07	59.	27.72	0.99	2.001E-02				
327.95	55.	35.93	1.15	1.874E-02				
338.73	226.	10.93	1.19	1.829E-02	338.40	12.010	7.701E-01	AC228
351.98	357.	8.03	1.24	1.775E-02	351.99	37.100	4.009E-01	PB214
463.36	88.	25.20	1.08	1.425E-02				
463.36	88.	25.20	1.08	1.425E-02	463.51	10.000	4.599E-01	SB125
511.13	168.	14.46	1.53	1.316E-02	510.72	22.500	3.584E-01	TL208
583.45	333.	7.08	1.21	1.184E-02	583.14	86.000	2.422E-01	TL208

609.66	328.	7.56	1.41	1.143E-02	609.32	46.090	4.578E-01	BI214
661.98	37.	41.24	1.50	1.072E-02	661.62	84.620	PBC<MDA	CS137
727.13	87.	19.39	1.80	9.965E-03	727.17	11.800	5.517E-01	BI212
795.31	66.	27.82	1.98	9.305E-03				
795.31	66.	27.82	1.98	9.305E-03	795.76	85.400	6.223E-02	CS134
835.37	68.	26.95	1.19	8.966E-03	834.81	99.978	5.715E-02	MN54
860.54	62.	25.40	1.88	8.768E-03				
911.48	259.	10.88	1.51	8.398E-03	911.07	29.000	7.886E-01	AC228
961.15	30.	37.12	1.54	8.056E-03	964.00	14.580	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
969.02	168.	14.27	1.89	8.025E-03	968.90	17.460	8.981E-01	AC228
1120.87	91.	22.43	2.11	7.212E-03	1120.28	15.040	6.271E-01	BI214
1409.14	14.	40.26	1.81	6.096E-03	1408.08	21.210	PBC<MDA	EU152
1461.47	1206.	2.98	1.79	5.930E-03	1460.75	10.700	1.406E+01	K40
1621.58	20.	33.61	0.78	5.488E-03	1620.56	2.750	9.839E-01	BI212
1765.25	49.	13.87	2.50	5.142E-03	1764.51	15.920	4.474E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
173.67	87.45	332.	73.	0.036	111.89	1.001	PB-214	lD
179.86	90.55	311.	81.	0.041	98.02	1.003	PB-214	lD
256.80	128.81	630.	121.	0.060	92.37	1.218	AC-228	
419.21	210.02	249.	61.	0.031	110.60	1.116	NP-239	
540.34	270.59	302.	131.	0.065	69.55	0.825	AC-228	s
599.29	300.07	118.	59.	0.030	83.15	0.995	PB-212	
655.04	327.95	162.	55.	0.028	107.80	1.149	AC-228	
1720.11	860.54	62.	62.	0.031	76.20	1.877	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	307.	99.	0.050	78.13	0.993D
PB-212	153.39	77.11	306.	187.	0.094	4.14	0.995A
TH-234	186.02	93.42	803.	109.	0.055	97.35	1.500s
TH-234	186.04	93.44	839.	110.	0.055	98.51	1.500s
RA-226	371.82	186.33	679.	112.	0.056	91.51	1.500s
PB-212	476.84	238.84	554.	1009.	0.504	14.49	1.114
RA-224	482.41	241.63	649.	135.	0.067	84.12	1.500
PB-214	482.68	241.76	279.	56.	0.028	124.05	1.449s
HG-203	554.40	277.62	239.	76.	0.038	92.52	1.500s
PB-214	589.54	295.20	240.	224.	0.112	37.53	1.074
AC-228	676.61	338.73	169.	225.	0.113	32.80	1.187
PB-214	703.06	351.96	265.	372.	0.186	27.63	1.245s
SB-125	925.62	463.25	138.	53.	0.027	99.32	1.500s
TL-208	1021.38	511.13	159.	141.	0.071	43.39	1.530s
TL-208	1166.00	583.45	97.	328.	0.164	21.24	1.214

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	1218.42	609.66	99.	321.	0.161	22.69	1.415
BI-212	1453.34	727.13	71.	86.	0.043	58.18	1.802s
CS-134	1589.75	795.35	60.	45.	0.023	85.30	1.500s
MN-54	1669.80	835.37	70.	68.	0.034	80.85	1.192s
AC-228	1821.99	911.48	122.	256.	0.128	32.65	1.511
EU-152	1921.31	961.15	49.	30.	0.015	111.36	1.538s
AC-228	1937.06	969.02	107.	167.	0.084	42.81	1.886s
BI-214	2240.72	1120.87	95.	91.	0.045	67.28	2.107s
EU-152	2817.16	1409.14	9.	14.	0.007	120.79	1.812s
K-40	2921.81	1461.47	44.	1187.	0.593	8.93	1.793
BI-212	3241.98	1621.58	7.	20.	0.010	100.82	0.783s
BI-214	3529.25	1765.25	3.	49.	0.024	41.60	2.500s

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

***** S U M M A R Y O 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		8.1168E-02					
			477.56	8.117E-02	&(	2.896E-01 8.61E-02	G
K-40		1.4055E+01					
			1460.75	1.406E+01	(P	3.982E-01 4.25E-01	G
MN-54		5.7147E-02					
			834.81	5.715E-02	*(P	3.501E-02 1.55E-02	G
CO-57		-1.2684E-02					
			122.07	-1.268E-02	%(P	4.930E-02 1.48E-02	G K
			136.43	-3.249E-02	%	3.626E-01 1.08E-01	G
CO-60		-7.3038E-03					
			1332.51	-7.304E-03	%(P	3.755E-02 1.03E-02	G K
			1173.23	4.929E-03	& P	4.406E-02 1.26E-02	G K
Sr-85		-1.6334E-02					
			514.00	-1.633E-02	%(	4.135E-02 1.25E-02	G
Kr-85		-3.7326E+02					
			513.99	-3.733E+02	%(	9.448E+02 2.85E+02	G
Y-88		-3.3716E-03					
			1836.01	-3.372E-03	%(P	3.031E-02 8.23E-03	G K
			898.02	-7.787E-03	% P	3.444E-02 9.96E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	2.6885E-03						
		871.10	2.689E-03	&(	3.303E-02	9.44E-03	G K
		702.50	7.159E-03	%	3.088E-02	9.06E-03	G K
Ag-108M	-6.5168E-03						
		722.95	-6.517E-03	%(	3.649E-02	1.06E-02	G K
		614.37	2.665E-03	& P	2.823E-02	8.08E-03	G
		433.93	-5.329E-03	%	2.947E-02	8.66E-03	G
CD-109	6.7314E-01						
		88.04	6.731E-01	%(	1.887E+00	5.70E-01	G
SN-113	1.7979E-03						
		391.71	1.798E-03	%(	3.696E-02	1.07E-02	G K
		255.04	0.000E+00	&	1.632E+00	4.82E-01	G
SB-125	8.3424E-02						
		427.95	1.620E-02	&(P	1.024E-01	3.01E-02	G K
		600.77	4.482E-03	& P	1.738E-01	5.00E-02	G
		636.15	-3.511E-03	% P	3.165E-01	9.08E-02	G
		463.51	2.824E-01	*(P	3.036E-01	9.57E-02	G
		176.29	6.193E-02	%	5.482E-01	1.63E-01	G
I-131	-2.2505E-03						
		364.48	-2.251E-03	&(P	3.842E-02	1.12E-02	G K
		636.97	-5.527E-02	%	4.360E-01	1.26E-01	G
		284.29	6.275E-02	& P	5.413E-01	1.60E-01	G
CS-134	1.5677E-02						
		604.66	-7.982E-03	%(	3.231E-02	9.54E-03	G K
		795.76	4.271E-02	(P	3.676E-02	1.22E-02	G
		569.29	-6.821E-03	% P	2.429E-01	7.00E-02	G
		801.84	1.190E-01	% P	2.770E-01	8.25E-02	G
CS-137	3.0954E-02						
		661.62	3.095E-02	%(P	4.268E-02	1.32E-02	G
CE-139	0.0000E+00						
		165.85	0.000E+00	%(	4.519E-02	1.34E-02	G
EU-152	5.4255E-02						
		121.78	-3.465E-02	%(P	1.441E-01	4.32E-02	G K
		344.30	3.322E-02	% P	1.100E-01	3.29E-02	G
		1408.08	8.252E-02	(	9.808E-02	3.32E-02	G
		964.00	1.914E-01	&(P	2.266E-01	7.24E-02	G
		1112.07	-1.399E-03	%	2.840E-01	8.00E-02	G
		778.90	4.023E-02	%	2.401E-01	6.96E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	-2.5124E-03						
		123.10	-2.512E-03	%(	1.065E-01	3.17E-02	G K
		1274.80	-3.398E-02	%	1.262E-01	3.71E-02	G
		723.30	-3.256E-02	%	1.784E-01	5.22E-02	G
		1004.80	-8.814E-03	&	2.044E-01	5.80E-02	G
EU-155	6.9029E-02						
		86.45	6.903E-02	%(	2.344E-01	7.06E-02	G K
		105.31	1.457E-02	&	2.211E-01	6.59E-02	G
HG-203	3.3937E-02						
		279.17	3.394E-02	&(P	3.325E-02	1.05E-02	G K
		72.87	-6.327E-01	& P	2.070E+00	6.23E-01	G
		70.83	3.840E-01	%	4.062E+00	1.21E+00	G
		82.50	-8.214E-01	&	3.810E+00	1.14E+00	G
TL-208	2.4222E-01						
		583.14	2.422E-01	(P	3.581E-02	1.74E-02	G
		510.72	3.584E-01	+ P	1.557E-01	6.17E-02	G
PB-212	7.9468E-01						
		238.63	7.582E-01	(P	8.451E-02	3.71E-02	G K
							Energy duplication
		77.11	7.947E-01	} P	3.576E-01	1.10E-02	G
		74.81	8.579E-01	(P	7.294E-01	2.30E-01	G
PB-214	4.2753E-01						
		351.99	4.242E-01	@(P	8.970E-02	3.97E-02	G K
		295.22	4.339E-01	(P	1.447E-01	5.53E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.825E-01	0.00E+00	G
		241.92	2.434E-01	-	3.522E-01	1.01E-01	G
BI-212	5.5166E-01						
		727.17	5.517E-01	(P	2.678E-01	1.08E-01	G K
		1620.56	9.839E-01	+ P	7.597E-01	3.32E-01	G
		785.42	2.365E-01	&	1.521E+00	4.40E-01	G
BI-214	4.5511E-01						
		609.32	4.578E-01	(P	6.992E-02	3.53E-02	G K
		1764.51	4.474E-01	(P	1.023E-01	6.62E-02	G
		1120.28	6.271E-01	+ P	3.343E-01	1.44E-01	G
RA-224	1.1275E+00						
		241.00	1.127E+00	(	1.014E+00	3.16E-01	G
RA-226	1.0019E+00						
		185.99	1.002E+00	*(P	1.109E+00	3.41E-01	G

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

AC-228       8.1750E-01
                          911.07 7.886E-01  (P 1.674E-01 8.70E-02 G K
                          968.90 8.981E-01  (P 2.725E-01 1.28E-01 G
                          338.40 7.701E-01  (P 2.163E-01 8.47E-02 G

TH-227       1.9232E-02
                          236.00 1.923E-02 %(  2.630E-01 7.78E-02 G K
                          256.25-7.892E-02 % P 4.592E-01 1.37E-01 G

PA-234      -7.7635E-02
                           98.44-7.763E-02 %(P 1.857E-01 5.61E-02 G K
                          946.00-1.376E-02 % P 1.564E-01 4.44E-02 G
                          131.28-2.805E-02 % P 2.049E-01 6.13E-02 G
                           94.67-2.514E-02 % P 3.782E-01 1.13E-01 G
                          883.24 6.394E-02 %   2.053E-01 6.03E-02 G
                          926.70-6.502E-02 %   2.429E-01 7.08E-02 G
                          569.26-1.011E-02 % P 3.600E-01 1.04E-01 G

TH-234       5.9157E-01
                           63.29-1.150E+00 %(P 5.772E+00 1.71E+00 G K
                           92.80 1.683E+00 *(P 2.097E+00 6.41E-01 G
                           92.38 1.960E+00 &(P 2.416E+00 7.39E-01 G

AM-241       2.2613E-01
                           59.54 2.261E-01 &(P 1.092E+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
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	8.0143E-02	8.1168E-02	2.5818E-01	2.5823E-01	2.859E-01
K-40		1.4055E+01	1.4055E+01	1.2755E+00	1.5142E+00	
MN-54	#	5.7023E-02	5.7147E-02	4.6449E-02	4.6567E-02	
CO-57	#B	-1.2652E-02	-1.2684E-02	4.5575E-02	4.5580E-02	4.918E-02
CO-60	#B	-7.3013E-03	-7.3038E-03	7.7373E-02	7.7374E-02	3.754E-02
Sr-85	#A	-1.6164E-02	-1.6334E-02	3.7376E-02	3.7388E-02	4.092E-02
Kr-85	#A	-3.7325E+02	-3.7326E+02	8.5390E+02	8.5417E+02	9.448E+02
Y-88	#B	-3.3502E-03	-3.3716E-03	2.6153E-02	2.6154E-02	3.012E-02
NB-94	#B	2.6885E-03	2.6885E-03	2.8308E-02	2.8308E-02	3.303E-02
Ag-108M	#B	-6.5167E-03	-6.5168E-03	3.1945E-02	3.1948E-02	3.649E-02
CD-109	#A	6.7213E-01	6.7314E-01	1.7089E+00	1.7093E+00	1.884E+00
SN-113	#B	1.7873E-03	1.7979E-03	3.2054E-02	3.2054E-02	3.675E-02
SB-125	#B	8.3368E-02	8.3424E-02	8.4833E-02	8.4971E-02	1.023E-01
I-131	#B	-2.0684E-03	-2.2505E-03	4.8100E-02	4.8100E-02	3.531E-02
CS-134	#B	1.5662E-02	1.5677E-02	1.3398E-02	1.3429E-02	3.228E-02
CS-137	A	3.0952E-02	3.0954E-02	3.9720E-02	3.9761E-02	4.268E-02
CE-139	#A	0.0000E+00	0.0000E+00	4.0252E-02	4.0252E-02	4.497E-02
EU-152	#B	5.4247E-02	5.4255E-02	6.1518E-02	6.1591E-02	1.441E-01
EU-154	#B	-2.5119E-03	-2.5124E-03	9.5086E-02	9.5086E-02	1.064E-01
EU-155	#B	6.9003E-02	6.9029E-02	2.1181E-01	2.1184E-01	2.343E-01
HG-203	#	3.3446E-02	3.3937E-02	3.1415E-02	3.1477E-02	3.277E-02
TL-208		2.4222E-01	2.4222E-01	5.2116E-02	5.3980E-02	
PB-212		7.9468E-01	7.9468E-01	1.1653E-01	1.2534E-01	
PB-214		4.2753E-01	4.2753E-01	1.0133E-01	1.0432E-01	
BI-212		5.5166E-01	5.5166E-01	3.2279E-01	3.2438E-01	
BI-214		4.5511E-01	4.5511E-01	1.0536E-01	1.0862E-01	
RA-224		1.1275E+00	1.1275E+00	9.4848E-01	9.5074E-01	1.014E+00
RA-226	#A	1.0019E+00	1.0019E+00	1.0227E+00	1.0244E+00	1.109E+00
AC-228		8.1750E-01	8.1750E-01	1.7269E-01	1.7909E-01	
TH-227	#B	1.9232E-02	1.9232E-02	2.3342E-01	2.3342E-01	2.630E-01
PA-234	#B	-7.7635E-02	-7.7635E-02	1.7541E-01	1.7546E-01	1.857E-01
TH-234	#B	5.9157E-01	5.9157E-01	6.6887E-01	6.6967E-01	5.772E+00
AM-241	#A	2.2613E-01	2.2613E-01	9.8138E-01	9.8146E-01	1.092E+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) 1.8528387E+01 pCi/gm
Total Decayed Activity (87.4 to 2000.7 keV) 1.8528511E+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_18AUG2006_1609.An1

Sample description
FSS-OOL-02-04-020-F

Spectrum Filename: C:\GammaVision\Spectra\103F_18AUG2006_1609.An1

Acquisition information
Start time: 18-Aug-2006 16:10:00
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: 1.7970E+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	17-Aug-2006 16:08:00
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: 0.2382

***** S U M M A R Y O F P E A K 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	153.	18.50	0.99	9.052E-03	74.81	9.600	1.324E+00	PB212
77.22	160.	14.80	0.99	1.011E-02	77.11	17.500	8.501E-01	PB212
					77.11	10.700	1.390E+00	PB214
93.00	97.	38.20	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.04	108.	34.05	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.98	186.	22.75	1.22	2.567E-02				
185.98	186.	22.75	1.22	2.567E-02	185.99	3.280	1.542E+00	RA226
238.81	1144.	3.43	1.09	2.320E-02	238.63	43.100	8.512E-01	PB212
241.53	133.	24.16	1.09	2.305E-02	241.00	3.900	1.115E+00	RA224
270.07	112.	26.61	0.84	2.152E-02				
295.41	275.	12.00	0.98	2.024E-02	295.22	19.200	5.249E-01	PB214
300.90	110.	23.58	1.26	1.997E-02				
327.64	100.	26.51	1.20	1.876E-02				
338.62	243.	11.97	1.10	1.829E-02	338.40	12.010	8.276E-01	AC228
352.11	427.	7.63	1.22	1.775E-02	351.99	37.100	4.813E-01	PB214
462.87	100.	23.07	1.34	1.426E-02				
462.87	100.	23.07	1.34	1.426E-02	463.51	10.000	5.215E-01	SB125
510.94	179.	12.61	1.03	1.317E-02	510.72	22.500	3.855E-01	TL208
583.41	345.	7.82	1.39	1.184E-02	583.14	86.000	2.516E-01	TL208
600.33	30.	35.75	1.50	1.151E-02	600.77	18.400	PBC<MDA	SB125
					604.66	97.600	2.017E-02	CS134
609.56	349.	8.71	1.25	1.144E-02	609.32	46.090	4.883E-01	BI214
662.12	38.	29.65	0.84	1.072E-02	661.62	84.620	3.060E-02	CS137
727.27	84.	18.55	1.08	9.964E-03	727.17	11.800	5.373E-01	BI212
795.24	89.	18.83	1.30	9.306E-03				

795.24	89.	18.83	1.30	9.306E-03	795.76	85.400	8.425E-02	CS134
860.94	63.	31.56	0.94	8.765E-03				
911.54	252.	7.34	1.83	8.398E-03	911.07	29.000	7.674E-01	AC228
965.26	59.	20.17	1.54	8.048E-03	964.00	14.580	3.737E-01	EU152
969.52	163.	9.16	1.54	8.022E-03	968.90	17.460	8.741E-01	AC228
1120.36	105.	17.17	2.62	7.212E-03	1120.28	15.040	7.253E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.45	1367.	2.86	1.82	5.930E-03	1460.75	10.700	1.597E+01	K40
1621.68	19.	28.45	1.84	5.488E-03	1620.56	2.750	9.545E-01	BI212
1765.15	76.	12.29	1.69	5.140E-03	1764.51	15.920	6.691E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
539.30	270.07	308.	112.	0.056	79.83	0.840	AC-228	s
600.95	300.90	225.	110.	0.055	70.73	1.260	PB-212	s
654.41	327.64	238.	100.	0.050	79.53	1.199	AC-228	s
1720.91	860.94	94.	63.	0.032	74.91	0.941	TL-208	s
1930.63	965.25	56.	44.	0.022	84.80	1.539	AC-228	D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	342.	153.	0.076	55.51	0.993D
PB-212	153.39	77.11	374.	160.	0.080	44.41	0.995A
TH-234	185.24	93.04	867.	108.	0.054	102.14	1.500
RA-226	371.96	186.40	734.	121.	0.060	89.15	1.500s
PB-212	476.71	238.78	526.	973.	0.487	14.00	0.982
RA-224	482.94	241.89	752.	109.	0.054	110.82	1.500
PB-214	589.96	295.41	307.	271.	0.136	36.00	0.982
AC-228	676.38	338.62	233.	242.	0.121	35.91	1.105
PB-214	703.35	352.11	232.	422.	0.211	22.89	1.217
SB-125	925.72	463.30	140.	75.	0.037	74.05	1.500s
TL-208	1020.04	510.46	183.	185.	0.092	38.25	1.045s
TL-208	1165.92	583.41	128.	341.	0.170	23.47	1.395
CS-134	1199.76	600.33	43.	30.	0.015	107.26	1.500
BI-214	1218.22	609.56	158.	342.	0.171	26.14	1.247
CS-137	1323.33	662.12	49.	37.	0.018	88.94	0.843s
BI-212	1453.62	727.27	65.	84.	0.042	55.66	1.082
CS-134	1589.58	795.26	63.	56.	0.028	72.15	1.500s
AC-228	1822.10	911.54	42.	249.	0.124	22.01	1.828s
EU-152	1929.20	965.09	89.	41.	0.021	106.34	1.538
AC-228	1936.81	968.90	34.	162.	0.081	27.98	1.541D
BI-214	2239.70	1120.36	75.	105.	0.052	51.51	2.620s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2921.77	1461.45	52.	1348.	0.674	8.57	1.825
BI-212	3242.18	1621.68	3.	19.	0.010	85.35	1.843
BI-214	3529.06	1765.15	6.	73.	0.036	36.86	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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		2.0960E-02					
			477.56	2.096E-02	%(	2.865E-01	8.33E-02 G
K-40		1.5970E+01					
			1460.75	1.597E+01	(P	4.303E-01	4.63E-01 G
MN-54		1.9000E-02					
			834.81	1.900E-02	%(P	3.773E-02	1.15E-02 G
CO-57		4.9444E-03					
			122.07	4.944E-03	%(P	4.944E-02	1.48E-02 G K
			136.43	-7.354E-02	%	3.779E-01	1.13E-01 G
CO-60		1.6097E-03					
			1332.51	1.610E-03	%(P	3.901E-02	1.08E-02 G K
			1173.23	2.226E-02	% P	4.328E-02	1.31E-02 G K
Sr-85		-1.4474E-02					
			514.00	-1.447E-02	%(	4.360E-02	1.31E-02 G
Kr-85		-3.3105E+02					
			513.99	-3.310E+02	%(	9.959E+02	2.99E+02 G
Y-88		1.9948E-03					
			1836.01	1.995E-03	&(P	2.679E-02	7.08E-03 G K
			898.02	1.074E-03	& P	2.812E-02	7.78E-03 G
NB-94		1.7819E-03					
			871.10	1.782E-03	&(	3.136E-02	8.89E-03 G K
			702.50	1.991E-02	&	2.881E-02	8.99E-03 G K
Ag-108M		-9.0496E-03					
			722.95	-9.050E-03	&(	4.513E-02	1.33E-02 G K
			614.37	-9.044E-03	% P	4.173E-02	1.23E-02 G
			433.93	-1.385E-04	%	3.161E-02	9.14E-03 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.1557E+00						
		88.04	1.156E+00	&(	1.914E+00	5.83E-01	G
SN-113	-1.0420E-02						
		391.71	-1.042E-02	%(	4.723E-02	1.40E-02	G K
		255.04	6.457E-01	%	1.498E+00	4.53E-01	G
SB-125	1.1922E-01						
		427.95	2.572E-02	%(P	1.058E-01	3.14E-02	G K
		600.77	-5.018E-05	% P	2.110E-01	6.11E-02	G
		636.15	8.068E-02	% P	2.707E-01	8.01E-02	G
		463.51	3.960E-01	*(P	3.058E-01	9.94E-02	G
		176.29	4.905E-03	&	5.556E-01	1.65E-01	G
I-131	-6.9281E-03						
		364.48	-6.928E-03	%(P	4.409E-02	1.30E-02	G K
		636.97	-1.087E-02	&	5.420E-01	1.56E-01	G
		284.29	5.832E-03	% P	5.675E-01	1.67E-01	G
CS-134	3.5590E-02						
		604.66	2.017E-02	&(	2.226E-02	7.21E-03	G K
		795.76	5.321E-02	*(P	3.774E-02	1.28E-02	G
		569.29	1.798E-02	& P	2.021E-01	5.84E-02	G
		801.84	-1.130E-01	% P	4.023E-01	1.17E-01	G
CS-137	3.0596E-02						
		661.62	3.060E-02	(P	2.931E-02	9.42E-03	G
CE-139	-2.2196E-04						
		165.85	-2.220E-04	&(	4.720E-02	1.40E-02	G
EU-152	9.6630E-02						
		121.78	1.321E-02	%(P	1.448E-01	4.32E-02	G K
		344.30	-9.833E-03	% P	1.170E-01	3.45E-02	G
		1408.08	-8.532E-03	%	1.261E-01	3.42E-02	G
		964.00	2.639E-01	(P	2.992E-01	9.48E-02	G
		1112.07	1.149E-01	&	2.899E-01	8.69E-02	G
		778.90	-4.426E-02	%	2.805E-01	8.18E-02	G
EU-154	2.1185E-02						
		123.10	2.119E-02	%(	1.090E-01	3.27E-02	G K
		1274.80	8.405E-03	%	1.127E-01	3.20E-02	G
		723.30	-5.068E-02	&	2.115E-01	6.26E-02	G
		1004.80	1.877E-02	%	2.339E-01	6.72E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.6047E-01						
		86.45	1.605E-01	%(	2.325E-01	7.11E-02	G K
		105.31	6.344E-02	%	2.246E-01	6.75E-02	G
HG-203	2.5035E-02						
		279.17	2.503E-02	%(P	3.627E-02	1.12E-02	G K
		72.87	-5.770E-01	% P	2.149E+00	6.46E-01	G
		70.83	-4.438E-01	%	4.274E+00	1.28E+00	G
		82.50	-6.710E-01	&	3.595E+00	1.08E+00	G
TL-208	2.5159E-01						
		583.14	2.516E-01	(P	4.095E-02	1.99E-02	G
		510.72	4.692E-01	+ P	1.669E-01	6.85E-02	G
PB-212	7.6620E-01						
		238.63	7.321E-01	(P	8.239E-02	3.46E-02	G K
							Energy duplication
		77.11	6.782E-01	} P	3.943E-01	1.00E-01	G
		74.81	1.324E+00	+ P	7.693E-01	2.50E-01	G
PB-214	4.9617E-01						
		351.99	4.813E-01	(P	8.421E-02	3.72E-02	G K
		295.22	5.249E-01	(P	1.631E-01	6.40E-02	G
							Energy duplication
		77.11	0.000E+00	} P	9.146E-01	0.00E+00	G
		241.92	1.239E-01	%	4.919E-01	1.48E-01	G
BI-212	5.3725E-01						
		727.17	5.373E-01	(P	2.576E-01	1.00E-01	G K
		1620.56	9.545E-01	+ P	5.267E-01	2.72E-01	G
		785.42	5.466E-01	%	1.806E+00	5.36E-01	G
BI-214	4.8827E-01						
		609.32	4.883E-01	(P	8.733E-02	4.34E-02	G K
		1764.51	6.691E-01	+ P	1.313E-01	8.59E-02	G
		1120.28	7.253E-01	+ P	2.993E-01	1.27E-01	G
RA-224	9.0841E-01						
		241.00	9.084E-01	(	1.090E+00	3.36E-01	G
RA-226	1.0776E+00						
		185.99	1.078E+00	*(P	1.152E+00	3.55E-01	G
AC-228	8.1070E-01						
		911.07	7.674E-01	(P	1.020E-01	5.71E-02	G K
		968.90	8.709E-01	(P	1.597E-01	8.13E-02	G
		338.40	8.276E-01	(P	2.527E-01	9.96E-02	G

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

TH-227      -2.1274E-01
                          236.00-2.127E-01 &(  3.937E-01 1.20E-01 G K
                          256.25-6.565E-03 & P 4.468E-01 1.32E-01 G

PA-234       3.8401E-02
                           98.44 3.840E-02 &(P 2.247E-01 6.73E-02 G K
                          946.00-2.524E-02 & P 1.759E-01 5.07E-02 G
                          131.28 8.814E-03 & P 2.207E-01 6.58E-02 G
                           94.67-3.063E-02 % P 4.071E-01 1.22E-01 G
                          883.24 5.593E-02 %   2.785E-01 8.11E-02 G
                          926.70 4.130E-02 %   3.165E-01 9.12E-02 G
                          569.26 2.615E-02 & P 2.996E-01 8.65E-02 G

TH-234       1.6677E+00
                           63.29 1.687E+00 %(P 6.576E+00 1.97E+00 G K
                           92.80 1.642E+00  (P 2.132E+00 6.51E-01 G
                           92.38 1.736E+00 & P 2.578E+00 7.84E-01 G

AM-241      -1.9264E-01
                           59.54-1.926E-01 %(P 1.190E+00 3.56E-01 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     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	2.0689E-02	2.0960E-02	2.4976E-01	2.4977E-01	2.828E-01
K-40		1.5970E+01	1.5970E+01	1.3872E+00	1.6685E+00	
MN-54	#A	1.8958E-02	1.9000E-02	3.4399E-02	3.4416E-02	3.765E-02
CO-57	#B	4.9317E-03	4.9444E-03	4.4270E-02	4.4271E-02	4.931E-02
CO-60	#B	1.6091E-03	1.6097E-03	3.2346E-02	3.2346E-02	3.900E-02
Sr-85	#A	-1.4320E-02	-1.4474E-02	3.9238E-02	3.9247E-02	4.314E-02
Kr-85	#A	-3.3104E+02	-3.3105E+02	8.9626E+02	8.9647E+02	9.959E+02
Y-88	#B	1.9819E-03	1.9948E-03	2.1244E-02	2.1244E-02	2.662E-02
NB-94	#B	1.7819E-03	1.7819E-03	2.6677E-02	2.6678E-02	3.136E-02
Ag-108M	#B	-9.0495E-03	-9.0496E-03	3.9897E-02	3.9900E-02	4.513E-02
CD-109	#A	1.1539E+00	1.1557E+00	1.7495E+00	1.7506E+00	1.911E+00
SN-113	#B	-1.0357E-02	-1.0420E-02	4.2027E-02	4.2031E-02	4.694E-02
SB-125	#F	1.1914E-01	1.1922E-01	8.9786E-02	9.0053E-02	1.057E-01
I-131	#B	-6.3551E-03	-6.9281E-03	4.3875E-02	4.3876E-02	4.044E-02
CS-134	#	3.5557E-02	3.5590E-02	2.3014E-02	2.3107E-02	2.224E-02
CS-137		3.0594E-02	3.0596E-02	2.8235E-02	2.8291E-02	
CE-139	#A	-2.2084E-04	-2.2196E-04	4.2088E-02	4.2088E-02	4.696E-02
EU-152	#B	9.6616E-02	9.6630E-02	1.0412E-01	1.0425E-01	1.447E-01
EU-154	#B	2.1180E-02	2.1185E-02	9.8089E-02	9.8096E-02	1.090E-01
EU-155	#B	1.6041E-01	1.6047E-01	2.1329E-01	2.1347E-01	2.325E-01
HG-203	#B	2.4665E-02	2.5035E-02	3.3459E-02	3.3491E-02	3.574E-02
TL-208		2.5159E-01	2.5159E-01	5.9805E-02	6.1563E-02	
PB-212		7.6620E-01	7.6620E-01	1.0860E-01	1.1736E-01	
PB-214		4.9617E-01	4.9617E-01	1.0738E-01	1.1117E-01	
BI-212		5.3725E-01	5.3725E-01	3.0077E-01	3.0239E-01	
BI-214		4.8827E-01	4.8827E-01	1.3002E-01	1.3308E-01	
RA-224	A	9.0841E-01	9.0841E-01	1.0067E+00	1.0081E+00	1.090E+00
RA-226	#A	1.0776E+00	1.0776E+00	1.0639E+00	1.0657E+00	1.152E+00
AC-228		8.1070E-01	8.1070E-01	1.3735E-01	1.4519E-01	
TH-227	#B	-2.1274E-01	-2.1274E-01	3.5912E-01	3.5934E-01	3.937E-01
PA-234	#B	3.8401E-02	3.8401E-02	2.0189E-01	2.0190E-01	2.247E-01
TH-234	#B	1.6677E+00	1.6677E+00	1.9824E+00	1.9845E+00	6.576E+00
AM-241	#A	-1.9264E-01	-1.9264E-01	1.0889E+00	1.0889E+00	1.190E+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) 2.0259663E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.0259665E+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: 107F_18AUG2006_1250.An1

Sample description
FSS-OOL-02-04-007-F

Spectrum Filename: C:\GammaVision\Spectra\107F_18AUG2006_1250.An1

Acquisition information
Start time: 18-Aug-2006 12:51:02
Live time: 2000
Real time: 2004
Dead time: 0.19 %
Detector ID: 2

Detector system
Det 107- DSPE- 634

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

Energy Calibration
Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9400E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9400E+03) =
5.1546E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	17-Aug-2006 14:35:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1800

***** S U M M A R Y O F P E A K 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	408.	10.66	1.18	2.849E-02	74.81	9.600	1.038E+00	PB212
77.07	407.	9.24	1.18	2.957E-02	77.11	17.500	8.149E-01	PB212
					77.11	10.700	1.322E+00	PB214
77.10	185.	27.30	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
86.54	139.	28.20	1.19	3.291E-02	86.45	32.740	9.000E-02	EU155
					88.04	3.790	PBC<MDA	CD109
90.11	128.	28.60	1.19	3.382E-02				
93.05	237.	15.83	1.19	3.447E-02	92.38	2.570	1.811E+00	TH234
					92.80	3.000	1.468E+00	TH234
186.41	265.	17.85	1.80	3.607E-02	185.99	3.280	1.559E+00	RA226
209.22	99.	30.32	1.51	3.429E-02				
238.72	1459.	3.07	1.30	3.189E-02	238.63	43.100	7.314E-01	PB212
241.66	249.	13.42	1.30	3.165E-02	241.00	3.900	1.390E+00	RA224
					241.92	7.470	7.295E-01	PB214
270.09	121.	27.69	1.65	2.946E-02				
276.85	125.	27.52	1.59	2.896E-02				
295.41	326.	8.46	1.34	2.766E-02	295.22	19.200	4.209E-01	PB214
300.16	97.	21.96	1.34	2.735E-02				
327.25	61.	34.40	1.36	2.564E-02				
338.57	352.	7.43	1.37	2.499E-02	338.40	12.010	8.090E-01	AC228
352.22	616.	5.79	1.49	2.425E-02	351.99	37.100	4.728E-01	PB214
410.19	83.	28.57	1.84	2.152E-02				
463.31	105.	24.07	1.34	1.953E-02				
463.31	105.	24.07	1.34	1.953E-02	463.51	10.000	3.648E-01	SB125
510.94	260.	10.54	1.39	1.807E-02	510.72	22.500	3.867E-01	TL208
583.27	556.	6.02	1.53	1.629E-02	583.14	86.000	2.742E-01	TL208

609.62	424.	7.49	1.56	1.574E-02	609.32	46.090	4.034E-01	BI214
727.34	126.	19.42	1.28	1.374E-02	727.17	11.800	5.357E-01	BI212
795.06	46.	31.21	1.68	1.284E-02	795.76	85.400	2.925E-02	CS134
860.84	92.	26.78	1.27	1.211E-02				
911.47	340.	7.59	1.77	1.160E-02	911.07	29.000	6.950E-01	AC228
968.42	326.	7.51	1.63	1.110E-02	968.90	17.460	1.165E+00	AC228
1120.80	105.	16.34	2.51	9.966E-03	1120.28	15.040	4.855E-01	BI214
1408.00	25.	33.74	2.08	8.420E-03	1408.08	21.210	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.04	1780.	2.46	2.12	8.190E-03	1460.75	10.700	1.411E+01	K40
1621.11	33.	21.16	0.54	7.569E-03	1620.56	2.750	1.101E+00	BI212
1764.66	102.	11.79	2.25	7.084E-03	1764.51	15.920	6.282E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
172.75	86.71	697.	139.	0.069	84.59	1.186	BI-207	lD
179.88	90.28	609.	128.	0.064	85.79	1.189	PB-214	lD
185.41	93.22	620.	214.	0.107	53.44	1.191	U-235	D
418.08	209.22	401.	99.	0.049	90.96	1.512	AC-228	
539.81	270.09	382.	121.	0.060	83.06	1.651	AC-228	s
553.32	276.85	378.	125.	0.062	71.24	1.592	TL-208	s
599.91	300.14	217.	72.	0.036	93.73	1.335	PB-212	M
654.37	327.38	275.	152.	0.076	60.11	1.417	AC-228	s
819.98	410.19	182.	83.	0.041	85.71	1.837	AC-228	s
1721.25	860.84	130.	92.	0.046	80.34	1.267	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	760.	408.	0.204	31.97	1.178D
PB-212	153.89	77.11	763.	407.	0.204	27.73	1.179A
PB-214	153.89	77.11	1308.	185.	0.093	81.89	1.500A
TH-234	185.48	92.91	1435.	221.	0.110	72.83	1.500s
TH-234	185.44	92.89	1399.	210.	0.105	71.37	1.500s
RA-226	372.47	186.41	731.	265.	0.132	53.56	1.797s
TH-227	471.88	236.12	1122.	-118.	-0.059	124.25	1.500s
PB-212	476.89	238.63	287.	1444.	0.722	9.20	1.297D
RA-224	482.77	241.57	1003.	140.	0.070	97.37	1.500s
PB-214	483.47	241.92	494.	224.	0.112	46.40	1.299D
PB-214	590.59	295.48	415.	443.	0.222	27.43	1.648s
AC-228	677.01	338.70	307.	381.	0.190	28.12	1.337s
PB-214	704.06	352.22	239.	611.	0.305	17.36	1.489s
SB-125	926.06	463.23	158.	79.	0.039	72.61	1.500s
TL-208	1021.48	510.94	191.	226.	0.113	31.61	1.395s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1166.13	583.27	181.	551.	0.276	18.05	1.529
BI-214	1218.81	609.62	172.	420.	0.210	22.47	1.564
BI-212	1454.24	727.34	136.	125.	0.062	58.25	1.284s
CS-134	1589.69	795.06	83.	46.	0.023	93.62	1.684s
AC-228	1822.51	911.47	103.	336.	0.168	22.77	1.772
AC-228	1936.41	968.42	88.	324.	0.162	22.54	1.626
BI-214	2241.16	1120.80	74.	105.	0.052	49.03	2.511s
EU-152	2815.60	1408.00	26.	25.	0.013	101.23	2.078
K-40	2921.68	1461.04	35.	1776.	0.888	7.37	2.125
BI-212	3241.84	1621.11	4.	33.	0.016	63.49	0.539s
BI-214	3528.97	1764.66	9.	102.	0.051	35.36	2.249

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm		COMMENTS
BE-7		0.0000E+00						
			477.56	0.000E+00	%(	2.438E-01	7.10E-02	G
K-40		1.4113E+01						
			1460.75	1.411E+01	(P	2.417E-01	3.48E-01	G
MN-54		-2.4173E-04						
			834.81	-2.417E-04	&(P	3.194E-02	9.22E-03	G
CO-57		4.1761E-03						
			122.07	4.176E-03	%(P	3.334E-02	9.99E-03	G K
			136.43	3.440E-02	& P	2.739E-01	8.21E-02	G
CO-60		5.9796E-03						
			1332.51	5.980E-03	%(P	2.596E-02	7.39E-03	G K
			1173.23	-7.699E-03	% P	3.971E-02	1.14E-02	G K
Sr-85		-1.3857E-02						
			514.00	-1.386E-02	%(	3.305E-02	9.98E-03	G
Kr-85		-3.4151E+02						
			513.99	-3.415E+02	%(P	7.590E+02	2.28E+02	G
Y-88		8.1482E-05						
			1836.01	8.148E-05	%(P	2.026E-02	5.23E-03	G K
			898.02	-7.783E-04	% P	3.072E-02	8.74E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-7.8947E-05						
		871.10	-7.895E-05	%(P	2.738E-02	7.83E-03	G K
		702.50	9.741E-05	% P	2.276E-02	6.49E-03	G K
Ag-108M	-1.5813E-02						
		722.95	-1.581E-02	%(	3.698E-02	1.12E-02	G K
		614.37	-1.982E-02	%	3.508E-02	1.07E-02	G
		433.93	3.022E-03	& P	2.476E-02	7.27E-03	G
CD-109	7.2720E-01						
		88.04	7.272E-01	%(P	9.986E-01	3.05E-01	G
SN-113	-2.0031E-03						
		391.71	-2.003E-03	%(P	2.767E-02	7.97E-03	G K
		255.04	-3.312E-02	&	1.061E+00	3.14E-01	G
SB-125	8.5038E-02						
		427.95	1.852E-02	&(P	7.540E-02	2.24E-02	G K
		600.77	-6.361E-04	& P	1.539E-01	4.46E-02	G
		636.15	-1.616E-02	& P	2.133E-01	6.17E-02	G
		463.51	2.819E-01	*(P	2.187E-01	7.07E-02	G
		176.29	-2.046E-02	& P	3.986E-01	1.19E-01	G
I-131	3.1788E-04						
		364.48	3.179E-04	%(	2.674E-02	7.80E-03	G K
		636.97	9.886E-02	&	3.076E-01	9.15E-02	G
		284.29	-1.940E-02	&	3.940E-01	1.16E-01	G
CS-134	1.2728E-02						
		604.66	-1.729E-03	%(P	5.930E-02	1.76E-02	G K
		795.76	2.925E-02	(P	2.867E-02	9.23E-03	G
		569.29	-2.116E-02	&	1.635E-01	4.80E-02	G
		801.84	1.006E-01	% P	2.600E-01	7.78E-02	G
CS-137	5.9897E-03						
		661.62	5.990E-03	%(P	3.078E-02	9.01E-03	G
CE-139	3.4882E-04						
		165.85	3.488E-04	%(P	3.262E-02	9.71E-03	G
EU-152	4.6052E-02						
		121.78	7.835E-03	%(P	1.004E-01	3.00E-02	G K
		344.30	-2.262E-02	& P	9.158E-02	2.73E-02	G
		1408.08	9.874E-02	(P	1.037E-01	3.42E-02	G
		964.00	4.437E-02	% P	1.860E-01	5.47E-02	G
		1112.07	7.336E-02	& P	2.093E-01	6.23E-02	G
		778.90	6.378E-02	% P	1.669E-01	4.99E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	1.6860E-03						
		123.10	1.686E-03	&(P	7.025E-02	2.10E-02	G K
		1274.80	-2.815E-02	% P	9.752E-02	2.88E-02	G
		723.30	-7.461E-02	% P	1.673E-01	5.05E-02	G
		1004.80	6.339E-03	& P	1.767E-01	5.08E-02	G
EU-155	7.9228E-02						
		86.45	7.923E-02	%(	1.213E-01	3.70E-02	G K
		105.31	1.639E-02	% P	1.418E-01	4.25E-02	G
HG-203	1.4620E-03						
		279.17	1.462E-03	&(P	2.298E-02	6.75E-03	G K
		72.87	-2.601E-03	% P	1.029E+00	3.09E-01	G
		70.83	-1.100E+00	&	1.544E+00	4.71E-01	G
		82.50	-4.270E-01	%	1.602E+00	4.82E-01	G
TL-208	2.7420E-01						
		583.14	2.742E-01	(P	3.248E-02	1.66E-02	G
		510.72	3.867E-01	+ P	1.150E-01	4.68E-02	G
PB-212	7.5555E-01						
		238.63	7.315E-01	(P	4.141E-02	2.27E-02	G K
							Energy duplication
		77.11	5.481E-01	}	1.768E-01	5.07E-02	G
		74.81	1.038E+00	+ P	3.341E-01	1.12E-01	G
PB-214	4.7282E-01						
		351.99	4.728E-01	*(P	5.787E-02	2.76E-02	G K
		295.22	5.813E-01	+ P	1.279E-01	5.37E-02	G
							Energy duplication
		77.11	4.073E-01	} P	3.769E-01	1.11E-01	G
		241.92	6.591E-01	+ P	3.135E-01	1.03E-01	G
BI-212	5.3570E-01						
		727.17	5.357E-01	(P	2.453E-01	1.05E-01	G K
		1620.56	1.101E+00	+ P	4.065E-01	2.37E-01	G
		785.42	4.513E-01	% P	1.387E+00	4.13E-01	G
BI-214	4.2360E-01						
		609.32	4.034E-01	(P	6.125E-02	3.05E-02	G K
		1764.51	6.282E-01	+ P	1.045E-01	7.47E-02	G
		1120.28	4.855E-01	(P	1.994E-01	8.01E-02	G
RA-224	7.9105E-01						
		241.00	7.910E-01	?(P	8.466E-01	2.61E-01	G
RA-226	1.5589E+00						
		185.99	1.559E+00	*(	7.571E-01	2.79E-01	G

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

AC-228       6.9499E-01
                          911.07 6.950E-01  (P 1.035E-01 5.34E-02 G K
                          968.90 1.165E+00 + P 1.670E-01 8.81E-02 G
                          338.40 8.833E-01 + P 1.958E-01 8.36E-02 G

TH-227      -2.2779E-01
                          236.00-2.278E-01 ?(P 3.076E-01 9.41E-02 G K
                          256.25-5.763E-03 & P 2.903E-01 8.51E-02 G

PA-234      -5.8790E-04
                           98.44-5.879E-04 &(  9.671E-02 2.87E-02 G K
                          946.00 0.000E+00 &   1.609E-01 4.63E-02 G
                          131.28-8.582E-03 %   1.432E-01 4.28E-02 G
                           94.67-8.723E-02 %   2.355E-01 7.12E-02 G
                          883.24 3.497E-02 %   2.386E-01 6.96E-02 G
                          926.70-6.944E-03 %   3.272E-01 9.50E-02 G
                          569.26-3.144E-02 &   2.424E-01 7.11E-02 G

TH-234       1.0584E+00
                           63.29 3.292E-01 %(P 1.576E+00 4.73E-01 G K
                           92.80 1.419E+00  (P 1.195E+00 3.69E-01 G
                           92.38 1.744E+00  (P 1.417E+00 4.39E-01 G

AM-241      -4.7824E-02
                           59.54-4.782E-02 &(P 1.958E-01 5.89E-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
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	0.0000E+00	0.0000E+00	2.1306E-01	2.1306E-01	2.408E-01
K-40		1.4113E+01	1.4113E+01	1.0434E+00	1.3355E+00	
MN-54	#A	-2.4124E-04	-2.4173E-04	2.3713E-02	2.3713E-02	3.188E-02
CO-57	#B	4.1662E-03	4.1761E-03	2.9958E-02	2.9959E-02	3.326E-02
CO-60	#B	5.9776E-03	5.9796E-03	2.2166E-02	2.2169E-02	2.595E-02
Sr-85	#A	-1.3721E-02	-1.3857E-02	2.9948E-02	2.9959E-02	3.272E-02
Kr-85	#A	-3.4150E+02	-3.4151E+02	8.0162E+02	8.0187E+02	7.590E+02
Y-88	#B	8.0992E-05	8.1482E-05	1.5692E-02	1.5692E-02	2.014E-02
NB-94	#B	-7.8947E-05	-7.8947E-05	6.3860E-03	6.3860E-03	2.738E-02
Ag-108M	#B	-1.5813E-02	-1.5813E-02	3.3500E-02	3.3513E-02	3.698E-02
CD-109	#A	7.2617E-01	7.2720E-01	9.1548E-01	9.1636E-01	9.972E-01
SN-113	#B	-1.9919E-03	-2.0031E-03	6.1948E-02	6.1948E-02	2.751E-02
SB-125	#F	8.4984E-02	8.5038E-02	6.3948E-02	6.4145E-02	7.536E-02
I-131	#B	2.9344E-04	3.1788E-04	2.3395E-02	2.3395E-02	2.468E-02
CS-134	#B	1.2717E-02	1.2728E-02	1.2052E-02	1.2076E-02	5.925E-02
CS-137	#A	5.9893E-03	5.9897E-03	2.7022E-02	2.7024E-02	3.078E-02
CE-139	#A	3.4720E-04	3.4882E-04	2.9129E-02	2.9129E-02	3.247E-02
EU-152	#B	4.6046E-02	4.6052E-02	4.7923E-02	4.7991E-02	1.004E-01
EU-154	#B	1.6856E-03	1.6860E-03	6.2886E-02	6.2886E-02	7.024E-02
EU-155	#B	7.9200E-02	7.9228E-02	1.1095E-01	1.1104E-01	1.213E-01
HG-203	#B	1.4419E-03	1.4620E-03	2.0249E-02	2.0249E-02	2.266E-02
TL-208		2.7420E-01	2.7420E-01	4.9903E-02	5.2465E-02	
PB-212		7.5555E-01	7.5555E-01	7.0272E-02	8.3242E-02	
PB-214		4.7282E-01	4.7282E-01	8.2787E-02	8.7369E-02	
BI-212	#	5.3570E-01	5.3570E-01	3.1526E-01	3.1684E-01	
BI-214		4.2360E-01	4.2360E-01	9.6155E-02	9.9356E-02	
RA-224	#A	7.9105E-01	7.9105E-01	7.8250E-01	7.8389E-01	8.466E-01
RA-226	#	1.5589E+00	1.5589E+00	8.3500E-01	8.4006E-01	
AC-228		6.9499E-01	6.9499E-01	1.6026E-01	1.6543E-01	
TH-227	#A	-2.2779E-01	-2.2779E-01	2.8369E-01	2.8401E-01	3.076E-01
PA-234	#B	-5.8790E-04	-5.8790E-04	8.6142E-02	8.6142E-02	9.671E-02
TH-234	#B	1.0584E+00	1.0584E+00	7.9867E-01	8.0082E-01	1.576E+00
AM-241	#A	-4.7823E-02	-4.7824E-02	1.8243E-01	1.8245E-01	1.958E-01

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

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

Total Activity (269.7 to 2000.1 keV) 1.8828442E+01 pCi/gm
Total Decayed Activity (269.7 to 2000.1 keV) 1.8828442E+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: 107F_18AUG2006_1328.An1

Sample description
FSS-OOL-02-04-007-F-RC

Spectrum Filename: C:\GammaVision\Spectra\107F_18AUG2006_1328.An1

Acquisition information
Start time: 18-Aug-2006 13:28:20
Live time: 2000
Real time: 2004
Dead time: 0.19 %
Detector ID: 2

Detector system
Det 107- DSPE- 634

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

Energy Calibration
Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9400E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9400E+03) =
5.1546E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	17-Aug-2006 14:35:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1581

***** S U M M A R Y O F P E A K 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	385.	11.59	1.18	2.842E-02	74.81	9.600	9.708E-01	PB212
77.19	680.	7.10	1.18	2.968E-02	77.11	10.700	1.487E+00	PB214
					77.11	17.500	9.153E-01	PB212
84.33	95.	38.32	1.18	3.232E-02				
87.31	246.	15.57	1.19	3.316E-02	86.45	32.740	1.596E-01	EU155
89.82	170.	21.76	1.19	3.379E-02	88.04	3.790	PBC<MDA	CD109
93.22	226.	16.59	1.19	3.454E-02	92.38	2.570	1.726E+00	TH234
					92.80	3.000	1.395E+00	TH234
185.82	279.	16.50	1.22	3.611E-02	185.99	3.280	1.642E+00	RA226
209.37	135.	22.75	1.58	3.428E-02				
239.13	1826.	3.57	1.45	3.185E-02	238.63	43.100	9.171E-01	PB212
241.32	116.	39.07	1.50	3.170E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
242.04	182.	19.23	1.30	3.163E-02	241.00	3.900	1.028E+00	RA224
					241.92	7.470	5.379E-01	PB214
270.16	141.	19.91	1.29	2.945E-02				
277.61	102.	31.77	1.78	2.891E-02				
277.61	102.	31.77	1.78	2.891E-02	279.17	81.500	PBC<MDA	HG203
295.34	297.	8.81	1.34	2.766E-02	295.22	19.200	3.838E-01	PB214
300.73	76.	27.82	1.34	2.730E-02				
338.52	290.	12.03	1.50	2.500E-02	338.40	12.010	6.648E-01	AC228
352.14	598.	6.42	1.27	2.425E-02	351.99	37.100	4.593E-01	PB214
463.04	90.	28.70	1.57	1.954E-02				
463.04	90.	28.70	1.57	1.954E-02	463.51	10.000	3.105E-01	SB125
511.11	257.	12.85	2.29	1.807E-02	510.72	22.500	3.817E-01	TL208
583.27	504.	7.42	1.19	1.629E-02	583.14	86.000	2.482E-01	TL208
609.51	398.	6.79	1.43	1.574E-02	609.32	46.090	3.776E-01	BI214

727.42	116.	16.42	1.39	1.374E-02	727.17	11.800	4.936E-01	BI212
795.40	92.	22.40	1.70	1.284E-02				
795.40	92.	22.40	1.70	1.284E-02	795.76	85.400	5.810E-02	CS134
860.68	89.	21.88	0.94	1.211E-02				
911.50	456.	7.52	1.74	1.160E-02	911.07	29.000	9.348E-01	AC228
964.70	57.	24.17	1.80	1.113E-02				
969.30	229.	7.91	1.80	1.109E-02	968.90	17.460	8.143E-01	AC228
1121.40	117.	16.15	1.96	9.963E-03	1120.28	15.040	5.394E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.12	1836.	2.39	2.08	8.189E-03	1460.75	10.700	1.455E+01	K40
1764.82	108.	9.58	2.31	7.084E-03	1764.51	15.920	6.677E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
168.32	84.67	620.	95.	0.048	114.96	1.185	TA-182	D
174.28	87.65	612.	246.	0.123	46.70	1.187	PB-214	D
179.31	90.16	599.	170.	0.085	65.27	1.189	PB-214	D
186.10	93.56	592.	226.	0.113	49.76	1.191	U-235	D
418.38	209.37	404.	135.	0.068	68.24	1.583	AC-228	s
539.94	270.16	294.	141.	0.071	59.72	1.286	AC-228	s
554.84	277.61	361.	104.	0.052	82.83	1.776	NP-239	s
601.24	300.81	266.	67.	0.033	115.08	1.379	PB-212	s
1720.92	860.68	90.	89.	0.044	65.63	0.944	TL-208	s
1929.74	964.71	63.	60.	0.030	68.03	1.797	AC-228	D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
HG-203	145.22	72.78	1801.	-167.	-0.083	110.45	1.500s
PB-212	149.29	74.81	777.	411.	0.206	31.99	1.178D
PB-212	153.89	77.11	822.	549.	0.275	20.84	1.179A
EU-155	174.61	87.47	1620.	157.	0.078	111.68	1.500
TH-234	185.80	93.07	1475.	194.	0.097	83.29	1.500s
TH-234	185.76	93.05	1424.	183.	0.092	81.16	1.500s
RA-226	371.29	185.82	709.	279.	0.140	49.50	1.217s
TH-227	471.89	236.13	1296.	-162.	-0.081	97.19	1.500s
PB-212	476.89	238.63	330.	1459.	0.730	9.33	1.297D
RA-224	482.27	241.32	1014.	116.	0.058	117.21	1.500s
PB-214	483.47	241.92	535.	182.	0.091	57.68	1.299D
PB-214	590.46	295.42	442.	288.	0.144	40.44	1.052
AC-228	676.65	338.52	322.	287.	0.143	36.09	1.499
PB-214	703.90	352.14	289.	593.	0.297	19.27	1.266
SB-125	925.69	463.05	183.	75.	0.037	80.74	1.500
TL-208	1021.81	511.11	252.	223.	0.111	38.54	2.295s
TL-208	1166.12	583.27	240.	499.	0.250	22.26	1.188

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	1218.60	609.51	127.	393.	0.197	20.36	1.429
BI-212	1454.41	727.42	93.	115.	0.057	49.26	1.386s
CS-134	1590.14	795.29	95.	69.	0.035	69.30	1.684
AC-228	1822.57	911.50	148.	452.	0.226	22.56	1.735s
AC-228	1937.36	968.90	71.	226.	0.113	25.08	1.799D
BI-214	2242.38	1121.40	81.	116.	0.058	48.45	1.961s
K-40	2921.84	1461.12	24.	1831.	0.915	7.18	2.083
BI-214	3529.28	1764.82	1.	108.	0.054	28.73	2.312

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		2.3695E-02					
			477.56	2.370E-02	&(	2.187E-01 6.41E-02 G	
K-40		1.4551E+01					
			1460.75	1.455E+01	(P	2.038E-01 3.49E-01 G	
MN-54		1.1266E-03					
			834.81	1.127E-03	&(P	3.398E-02 9.87E-03 G	
CO-57		2.3595E-03					
			122.07	2.360E-03	&(P	2.974E-02 8.88E-03 G K	
			136.43	-8.757E-03	% P	2.721E-01 8.12E-02 G	
CO-60		6.0743E-03					
			1332.51	6.074E-03	%(P	2.575E-02 7.33E-03 G K	
			1173.23	4.753E-03	% P	3.708E-02 1.07E-02 G K	
Sr-85		-1.5368E-02					
			514.00	-1.537E-02	%(	3.443E-02 1.04E-02 G	
Kr-85		-3.7824E+02					
			513.99	-3.782E+02	%(P	7.901E+02 2.38E+02 G	
Y-88		-1.3204E-03					
			1836.01	-1.320E-03	%(P	1.814E-02 4.53E-03 G K	
			898.02	7.718E-04	& P	2.976E-02 8.50E-03 G	
NB-94		-4.5420E-03					
			871.10	-4.542E-03	%(P	2.670E-02 7.79E-03 G K	
			702.50	6.641E-03	% P	2.621E-02 7.75E-03 G K	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.5679E-02						
		722.95	-1.568E-02	%(	3.595E-02	1.09E-02	G K
		614.37	-2.438E-02	%	3.541E-02	1.09E-02	G
		433.93	9.362E-03	% P	2.026E-02	6.11E-03	G
CD-109	-2.9146E-02						
		88.04	-2.915E-02	%(P	1.079E+00	3.23E-01	G
SN-113	-9.8389E-03						
		391.71	-9.839E-03	%(P	3.708E-02	1.10E-02	G K
		255.04	-2.640E-01	&	1.252E+00	3.75E-01	G
SB-125	7.0237E-02						
		427.95	3.553E-03	%(P	6.075E-02	1.76E-02	G K
		600.77	1.353E-03	% P	1.058E-01	3.01E-02	G
		636.15	-3.378E-02	& P	2.285E-01	6.68E-02	G
		463.51	2.676E-01	(P	2.347E-01	7.47E-02	G
		176.29	-1.310E-02	& P	4.167E-01	1.24E-01	G
I-131	6.3465E-04						
		364.48	6.346E-04	&(	3.063E-02	8.99E-03	G K
		636.97	3.351E-02	&	3.498E-01	1.02E-01	G
		284.29	-1.229E-01	&	4.334E-01	1.30E-01	G
CS-134	1.6219E-02						
		604.66	-7.984E-03	%(P	2.802E-02	8.33E-03	G K
		795.76	4.388E-02	(P	3.057E-02	1.02E-02	G
		569.29	2.729E-03	%	1.474E-01	4.26E-02	G
		801.84	-4.505E-02	& P	3.288E-01	9.60E-02	G
CS-137	-1.9693E-03						
		661.62	-1.969E-03	%(P	2.859E-02	8.08E-03	G
CE-139	1.1562E-02						
		165.85	1.156E-02	&(P	2.975E-02	8.99E-03	G
EU-152	-3.5506E-02						
		121.78	-3.551E-02	%(P	9.833E-02	2.97E-02	G K
		344.30	3.035E-03	& P	8.670E-02	2.55E-02	G
		1408.08	4.422E-02	% P	1.084E-01	3.23E-02	G
		964.00	-5.383E-02	% P	2.816E-01	8.33E-02	G
		1112.07	3.075E-03	& P	2.213E-01	6.30E-02	G
		778.90	-3.617E-02	% P	2.250E-01	6.58E-02	G
EU-154	4.7009E-03						
		123.10	4.701E-03	&(P	6.636E-02	1.98E-02	G K
		1274.80	3.121E-02	% P	9.900E-02	2.94E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-7.694E-02 % P 1.738E-01 5.25E-02 G
                         1004.80-3.947E-02 % P 1.960E-01 5.77E-02 G

EU-155       1.0147E-01
                           86.45 1.015E-01  (  1.233E-01 3.78E-02 G K
                          105.31 2.608E-02 & P 1.352E-01 4.06E-02 G

HG-203      -1.0799E-03
                          279.17-1.080E-03 &(P 3.092E-02 9.13E-03 G K
                           72.87 1.075E-01 % P 8.112E-01 2.44E-01 G
                           70.83-1.275E+00 +   1.533E+00 4.69E-01 G
                           82.50-3.249E-01 %   1.879E+00 5.65E-01 G

TL-208       2.4824E-01
                          583.14 2.482E-01  (P 3.722E-02 1.86E-02 G
                          510.72 3.817E-01 + P 1.313E-01 5.64E-02 G

PB-212       7.3948E-01
                          238.63 7.395E-01  (P 4.425E-02 2.32E-02 G K
                                                          Energy duplication
                           77.11 7.395E-01 }   1.834E-01 5.14E-02 G
                           74.81 1.048E+00 + P 3.376E-01 1.13E-01 G

PB-214       4.7245E-01
                          351.99 4.593E-01  (P 6.337E-02 2.98E-02 G K
                          295.22 3.781E-01 - P 1.319E-01 5.18E-02 G
                                                          Energy duplication
                           77.11 2.107E-01 } P 3.892E-01 1.19E-01 G
                          241.92 5.379E-01  (P 3.256E-01 1.04E-01 G

BI-212       4.9360E-01
                          727.17 4.936E-01 @(P 2.048E-01 8.20E-02 G K
                         1620.56-1.825E-01 & P 9.253E-01 2.62E-01 G
                          785.42 4.411E-01 % P 1.496E+00 4.44E-01 G

BI-214       3.7757E-01
                          609.32 3.776E-01  (P 5.297E-02 2.59E-02 G K
                         1764.51 6.677E-01 + P 4.552E-02 6.45E-02 G
                         1120.28 5.394E-01 + P 2.073E-01 8.78E-02 G

RA-224       6.5466E-01
                          241.00 6.547E-01 ?(P 8.511E-01 2.61E-01 G

RA-226       1.6424E+00
                          185.99 1.642E+00 *(  7.458E-01 2.71E-01 G

AC-228       8.8953E-01
                          911.07 9.348E-01 @(P 1.230E-01 7.10E-02 G K
                          968.90 8.143E-01  (P 1.506E-01 6.87E-02 G
                          338.40 6.648E-01 - P 2.004E-01 8.09E-02 G
```

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

TH-227      -3.1430E-01
                          236.00-3.143E-01 ?(P 3.302E-01 1.02E-01 G K
                          256.25 5.387E-02 & P 3.342E-01 9.94E-02 G

PA-234       1.1338E-04
                           98.44 1.134E-04 %(  1.149E-01 3.42E-02 G K
                          946.00-3.395E-02 &   1.660E-01 4.89E-02 G
                          131.28 4.860E-02 &   1.483E-01 4.47E-02 G
                           94.67-1.285E-01 %   2.338E-01 7.11E-02 G
                          883.24 1.066E-02 &   2.279E-01 6.55E-02 G
                          926.70-6.944E-03 &   2.546E-01 7.30E-02 G
                          569.26 3.715E-03 %   2.313E-01 6.70E-02 G

TH-234       1.0551E+00
                           63.29 6.018E-01 %(P 1.587E+00 4.79E-01 G K
                           92.80 1.237E+00  (P 1.206E+00 3.71E-01 G
                           92.38 1.531E+00  (P 1.436E+00 4.43E-01 G

AM-241       3.9640E-03
                           59.54 3.964E-03 %(P 2.031E-01 6.07E-02 G
   ( - This peak used in the nuclide activity average.

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

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

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	2.3404E-02	2.3695E-02	1.9227E-01	1.9228E-01	2.160E-01
K-40		1.4551E+01	1.4551E+01	1.0478E+00	1.3551E+00	
MN-54	#A	1.1242E-03	1.1266E-03	2.9618E-02	2.9618E-02	3.390E-02
CO-57	#B	2.3538E-03	2.3595E-03	2.6630E-02	2.6630E-02	2.967E-02
CO-60	#B	6.0722E-03	6.0743E-03	2.1990E-02	2.1993E-02	2.574E-02
Sr-85	#A	-1.5212E-02	-1.5368E-02	3.1256E-02	3.1269E-02	3.408E-02
Kr-85	#A	-3.7824E+02	-3.7824E+02	8.2377E+02	8.2407E+02	7.901E+02
Y-88	#B	-1.3123E-03	-1.3204E-03	6.0436E-02	6.0436E-02	1.803E-02
NB-94	#B	-4.5420E-03	-4.5420E-03	2.4186E-02	2.4188E-02	2.670E-02
Ag-108M	#B	-1.5679E-02	-1.5679E-02	3.2584E-02	3.2597E-02	3.595E-02
CD-109	#A	-2.9104E-02	-2.9146E-02	1.0950E+00	1.0950E+00	1.078E+00
SN-113	#B	-9.7825E-03	-9.8389E-03	3.9585E-02	3.9589E-02	3.687E-02
SB-125	#F	7.0192E-02	7.0237E-02	5.8840E-02	5.8986E-02	6.071E-02
I-131	#B	5.8455E-04	6.3465E-04	2.6960E-02	2.6960E-02	2.822E-02
CS-134	#B	1.6205E-02	1.6219E-02	1.1326E-02	1.1366E-02	2.799E-02
CS-137	#A	-1.9692E-03	-1.9693E-03	1.9005E+02	1.9005E+02	2.858E-02
CE-139	#A	1.1507E-02	1.1562E-02	2.6964E-02	2.6973E-02	2.961E-02
EU-152	#B	-3.5501E-02	-3.5506E-02	8.9531E-02	8.9553E-02	9.831E-02
EU-154	#B	4.6999E-03	4.7009E-03	5.9451E-02	5.9452E-02	6.635E-02
EU-155	#A	1.0143E-01	1.0147E-01	1.1332E-01	1.1346E-01	1.233E-01
HG-203	#B	-1.0647E-03	-1.0799E-03	5.8370E-02	5.8370E-02	3.048E-02
TL-208		2.4824E-01	2.4824E-01	5.5764E-02	5.7659E-02	
PB-212		7.3948E-01	7.3948E-01	6.9711E-02	8.2262E-02	
PB-214		4.7245E-01	4.7245E-01	9.1807E-02	9.5954E-02	
BI-212	#	4.9360E-01	4.9360E-01	2.4588E-01	2.4760E-01	
BI-214		3.7757E-01	3.7757E-01	7.7716E-02	8.0852E-02	
RA-224	#A	6.5466E-01	6.5466E-01	7.8209E-01	7.8305E-01	8.511E-01
RA-226	#	1.6424E+00	1.6424E+00	8.1296E-01	8.1872E-01	
AC-228		8.8953E-01	8.8953E-01	1.5148E-01	1.6034E-01	
TH-227	#A	-3.1430E-01	-3.1430E-01	3.0598E-01	3.0654E-01	3.302E-01
PA-234	#B	1.1338E-04	1.1338E-04	1.0266E-01	1.0266E-01	1.149E-01
TH-234	#B	1.0551E+00	1.0551E+00	9.1501E-01	9.1688E-01	1.587E+00
AM-241	#A	3.9639E-03	3.9640E-03	1.8201E-01	1.8201E-01	2.031E-01

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

H - Halflife limit exceeded

YAEC Chemistry Lab Spectrum name: 107F_18AUG2006_1328.An1

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

Total Activity (1120.2 to 2000.1 keV) 1.9413918E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.9413919E+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: 107F_18AUG2006_1408.An1

Sample description
FSS-OOL-02-04-005-F

Spectrum Filename: C:\GammaVision\Spectra\107F_18AUG2006_1408.An1

Acquisition information
Start time: 18-Aug-2006 14:08:08
Live time: 2000
Real time: 2003
Dead time: 0.13 %
Detector ID: 2

Detector system
Det 107- DSPE- 634

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

Energy Calibration
Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8040E+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	17-Aug-2006 14:04:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1794

***** S U M M A R Y O F P E A K 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	373.	11.85	1.18	2.842E-02	74.81	9.600	1.010E+00	PB212
77.12	616.	7.75	1.18	2.958E-02	77.11	10.700	1.447E+00	PB214
					77.11	17.500	8.918E-01	PB212
93.01	180.	28.90	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.17	214.	18.63	1.14	3.609E-02	185.99	3.280	1.351E+00	RA226
209.33	149.	30.02	1.36	3.428E-02				
238.78	1468.	3.31	1.30	3.188E-02	238.63	43.100	7.916E-01	PB212
241.96	248.	14.52	1.30	3.163E-02	241.92	7.470	7.832E-01	PB214
270.34	127.	23.58	1.81	2.944E-02				
295.40	301.	9.11	1.34	2.767E-02	295.22	19.200	4.181E-01	PB214
300.68	61.	36.45	1.34	2.732E-02				
328.18	100.	26.31	1.71	2.559E-02				
338.62	406.	10.02	1.51	2.499E-02	338.40	12.010	1.004E+00	AC228
352.05	598.	7.92	1.56	2.425E-02	351.99	37.100	4.935E-01	PB214
463.28	86.	28.27	1.36	1.953E-02				
463.28	86.	28.27	1.36	1.953E-02	463.51	10.000	3.193E-01	SB125
510.53	256.	12.31	1.99	1.809E-02	510.72	22.500	4.098E-01	TL208
583.34	505.	6.43	1.49	1.629E-02	583.14	86.000	2.678E-01	TL208
609.51	405.	7.50	1.77	1.574E-02	609.32	46.090	4.133E-01	BI214
661.94	80.	35.69	1.37	1.477E-02	661.62	84.620	4.595E-02	CS137
727.54	138.	20.31	2.20	1.374E-02	722.95	90.499	8.257E-02	Ag108M
					723.30	19.700	3.783E-01	EU154
					727.17	11.800	6.301E-01	BI212
795.62	63.	25.18	1.37	1.284E-02				
795.62	63.	25.18	1.37	1.284E-02	795.76	85.400	4.299E-02	CS134
911.66	388.	6.59	1.87	1.160E-02	911.07	29.000	8.535E-01	AC228

964.88	61.	22.33	1.80	1.113E-02				
969.36	239.	8.11	1.80	1.109E-02	968.90	17.460	9.149E-01	AC228
1120.56	98.	22.62	2.24	9.970E-03	1120.28	15.040	4.902E-01	BI214
1171.42	65.	31.18	0.80	9.648E-03				
1461.15	1961.	2.29	2.12	8.189E-03	1460.75	10.700	1.672E+01	K40
1621.01	26.	25.66	1.25	7.569E-03	1620.56	2.750	9.392E-01	BI212
1765.19	101.	12.70	0.87	7.081E-03	1764.51	15.920	6.630E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
418.29	209.33	685.	149.	0.074	90.07	1.360	AC-228	
540.31	270.34	334.	127.	0.063	70.74	1.808	AC-228	s
600.69	300.53	345.	86.	0.043	107.43	0.882	PB-212	M
655.99	328.18	248.	100.	0.050	78.93	1.715	AC-228	s
1930.22	964.89	60.	62.	0.031	64.78	1.797	AC-228	D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.29	74.81	791.	371.	0.185	35.36	1.178D
PB-214	153.89	77.11	1427.	202.	0.101	3.25	1.500A
PB-212	153.89	77.11	831.	430.	0.215	27.53	1.179A
TH-234	185.68	93.01	1588.	180.	0.090	86.69	1.500
RA-226	371.99	186.17	595.	214.	0.107	55.88	1.135
PB-212	476.89	238.63	390.	1448.	0.724	9.64	1.297D
PB-214	483.47	241.92	538.	237.	0.118	45.63	1.299D
PB-214	590.14	295.26	369.	320.	0.160	33.01	1.374s
AC-228	676.86	338.62	370.	403.	0.201	30.07	1.505s
PB-214	703.72	352.05	416.	593.	0.296	23.75	1.556
SB-125	926.04	463.22	193.	78.	0.039	79.60	1.500
TL-208	1020.65	510.53	233.	223.	0.111	36.94	1.995s
TL-208	1166.25	583.34	176.	501.	0.250	19.28	1.488
CS-134	1213.67	607.05	241.	-57.	-0.028	123.43	1.555s
BI-214	1218.60	609.51	161.	400.	0.200	22.50	1.766
CS-137	1323.46	661.94	203.	77.	0.038	107.08	1.368
BI-212	1454.65	727.54	167.	136.	0.068	60.94	2.202s
CS-134	1590.29	795.36	84.	57.	0.028	78.33	1.684
AC-228	1822.89	911.66	95.	384.	0.192	19.76	1.873
AC-228	1937.36	968.90	79.	237.	0.118	24.91	1.799D
BI-214	2240.69	1120.56	116.	98.	0.049	67.86	2.241s
K-40	2921.90	1461.15	20.	1957.	0.978	6.87	2.115
BI-212	3241.63	1621.01	6.	26.	0.013	76.97	1.250s
BI-214	3530.04	1765.19	13.	100.	0.050	38.09	0.874s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		3.5271E-03					
			477.56	3.527E-03	%(	2.600E-01 7.58E-02	G
K-40		1.6724E+01					
			1460.75	1.672E+01	(P	2.027E-01 3.84E-01	G
MN-54		-7.8233E-03					
			834.81	-7.823E-03	&(P	3.198E-02 9.44E-03	G
CO-57		-5.5202E-03					
			122.07	-5.520E-03	&(P	3.796E-02 1.14E-02	G K
			136.43	-2.767E-04	& P	2.789E-01 8.31E-02	G
CO-60		7.4065E-03					
			1332.51	7.406E-03	%(P	2.674E-02 7.65E-03	G K
			1173.23	-8.075E-03	% P	4.852E-02 1.40E-02	G K
Sr-85		-1.3429E-02					
			514.00	-1.343E-02	%(	3.506E-02 1.06E-02	G
Kr-85		-3.3576E+02					
			513.99	-3.358E+02	%(P	8.047E+02 2.41E+02	G
Y-88		-7.4612E-04					
			1836.01	-7.461E-04	&(P	2.146E-02 5.44E-03	G K
			898.02	-7.221E-03	% P	3.337E-02 9.71E-03	G
NB-94		-4.1136E-03					
			871.10	-4.114E-03	&(P	3.059E-02 8.91E-03	G K
			702.50	1.371E-02	% P	2.339E-02 7.18E-03	G K
Ag-108M		-2.5989E-02					
			722.95	-2.599E-02	&(	4.225E-02 1.29E-02	G K
			614.37	-2.712E-02	%	3.887E-02 1.20E-02	G
			433.93	-5.757E-03	% P	2.867E-02 8.46E-03	G
CD-109		7.4108E-02					
			88.04	7.411E-02	&(P	1.201E+00 3.60E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-5.1615E-03						
		391.71	-5.161E-03	&(P	4.010E-02	1.18E-02	G K
		255.04	-2.389E-01	&	1.301E+00	3.89E-01	G
SB-125	9.1148E-02						
		427.95	2.070E-02	&(P	7.794E-02	2.32E-02	G K
		600.77	-2.595E-02	% P	1.482E-01	4.33E-02	G
		636.15	-1.204E-03	% P	2.554E-01	7.38E-02	G
		463.51	2.997E-01	(P	2.587E-01	8.24E-02	G
		176.29	1.232E-01	& P	4.183E-01	1.26E-01	G
I-131	-2.3470E-03						
		364.48	-2.347E-03	&(	3.468E-02	1.02E-02	G K
		636.97	2.392E-02	%	4.274E-01	1.24E-01	G
		284.29	-7.877E-02	%	4.073E-01	1.21E-01	G
CS-134	-2.7559E-02						
		604.66	-2.756E-02	?(P	3.637E-02	1.12E-02	G K
		795.76	3.888E-02	+ P	3.107E-02	1.02E-02	G
		569.29	5.822E-02	&	1.629E-01	4.88E-02	G
		801.84	-7.393E-04	% P	3.136E-01	8.95E-02	G
CS-137	4.5950E-02						
		661.62	4.595E-02	(P	4.145E-02	1.72E-02	G
CE-139	-2.2413E-03						
		165.85	-2.241E-03	&(P	3.642E-02	1.09E-02	G
EU-152	-9.3358E-05						
		121.78	-9.336E-05	&(P	1.104E-01	3.29E-02	G K
		344.30	-1.375E-02	% P	8.554E-02	2.53E-02	G
		1408.08	5.752E-02	% P	1.356E-01	4.06E-02	G
		964.00	-7.711E-02	% P	2.770E-01	8.24E-02	G
		1112.07	7.773E-03	& P	2.541E-01	7.28E-02	G
		778.90	-6.489E-02	% P	2.235E-01	6.62E-02	G
EU-154	-9.7609E-03						
		123.10	-9.761E-03	%(P	7.744E-02	2.32E-02	G K
		1274.80	4.100E-02	% P	9.061E-02	2.74E-02	G
		723.30	-1.017E-01	& P	1.984E-01	6.02E-02	G
		1004.80	-4.440E-02	& P	1.775E-01	5.22E-02	G
EU-155	7.4191E-02						
		86.45	7.419E-02	&(	1.393E-01	4.23E-02	G K
		105.31	6.122E-02	% P	1.564E-01	4.73E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	2.7020E-04						
		279.17	2.702E-04	%(P	3.202E-02	9.45E-03	G K
		72.87	-3.110E-01	% P	1.007E+00	3.04E-01	G
		70.83	-5.256E-02	%	1.976E+00	5.93E-01	G
		82.50	7.158E-01	%	2.025E+00	6.12E-01	G
TL-208	2.6781E-01						
		583.14	2.678E-01	(P	3.452E-02	1.74E-02	G
		510.72	4.098E-01	+ P	1.361E-01	5.81E-02	G
PB-212	8.1863E-01						
		238.63	7.890E-01	(P	5.162E-02	2.56E-02	G K
							Energy duplication
		77.11	6.229E-01	}	1.984E-01	5.72E-02	G
		74.81	1.015E+00	+ P	3.664E-01	1.21E-01	G
PB-214	4.7887E-01						
		351.99	4.935E-01	(P	8.138E-02	3.94E-02	G K
		295.22	4.506E-01	@(P	1.301E-01	5.03E-02	G
							Energy duplication
		77.11	4.789E-01	} P	4.231E-01	5.19E-03	G
		241.92	7.504E-01	+ P	3.514E-01	1.15E-01	G
BI-212	6.8855E-01						
		727.17	6.301E-01	(P	2.904E-01	1.29E-01	G K
		1620.56	9.392E-01	(P	5.050E-01	2.46E-01	G
		785.42	4.437E-01	% P	1.607E+00	4.76E-01	G
BI-214	4.3218E-01						
		609.32	4.133E-01	(P	6.379E-02	3.13E-02	G K
		1764.51	6.630E-01	+ P	1.304E-01	8.49E-02	G
		1120.28	4.902E-01	@(P	2.641E-01	1.12E-01	G
RA-224	3.1515E-01						
		241.00	3.152E-01	%(P	9.734E-01	2.94E-01	G
RA-226	1.3512E+00						
		185.99	1.351E+00	(	7.365E-01	2.52E-01	G
AC-228	9.0280E-01						
		911.07	8.535E-01	(P	1.073E-01	5.69E-02	G K
		968.90	9.148E-01	(P	1.712E-01	7.67E-02	G
		338.40	1.004E+00	*(P	2.305E-01	1.02E-01	G
TH-227	-2.4060E-01						
		236.00	-2.406E-01	%(P	3.604E-01	1.10E-01	G K
		256.25	-4.345E-02	% P	3.567E-01	1.06E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	2.7175E-03						
		98.44	2.718E-03	&(	1.359E-01	4.06E-02	G K
		946.00	-4.157E-02	%	1.720E-01	5.08E-02	G
		131.28	-1.338E-02	&	1.558E-01	4.66E-02	G
		94.67	-1.031E-01	%	2.595E-01	7.85E-02	G
		883.24	-5.638E-02	%	2.462E-01	7.25E-02	G
		926.70	-5.902E-02	%	2.889E-01	8.49E-02	G
		569.26	8.686E-02	&	2.413E-01	7.23E-02	G
TH-234	9.0516E-01						
		63.29	5.950E-01	%(P	1.675E+00	5.05E-01	G K
		92.80	1.308E+00	(P	1.368E+00	4.19E-01	G
		92.38	-2.253E-02	& P	1.577E+00	4.71E-01	G
AM-241	2.2696E-02						
		59.54	2.270E-02	%(P	2.216E-01	6.64E-02	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - 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	3.4814E-03	3.5271E-03	2.2743E-01	2.2743E-01	2.566E-01
K-40		1.6724E+01	1.6724E+01	1.1517E+00	1.5172E+00	
MN-54	#A	-7.8059E-03	-7.8233E-03	3.0251E-02	3.0255E-02	3.191E-02
CO-57	#B	-5.5060E-03	-5.5202E-03	3.4952E-02	3.4954E-02	3.786E-02
CO-60	#B	7.4038E-03	7.4065E-03	2.2951E-02	2.2955E-02	2.673E-02
Sr-85	#A	-1.3286E-02	-1.3429E-02	3.1694E-02	3.1704E-02	3.469E-02
Kr-85	#A	-3.3576E+02	-3.3576E+02	8.6057E+02	8.6080E+02	8.047E+02
Y-88	#B	-7.4127E-04	-7.4612E-04	1.7539E-01	1.7539E-01	2.132E-02
NB-94	#B	-4.1136E-03	-4.1136E-03	2.7843E-02	2.7844E-02	3.059E-02
Ag-108M	#B	-2.5989E-02	-2.5989E-02	3.8839E-02	3.8870E-02	4.225E-02
CD-109	#A	7.3994E-02	7.4108E-02	1.0805E+00	1.0805E+00	1.199E+00
SN-113	#B	-5.1304E-03	-5.1615E-03	5.1411E-02	5.1412E-02	3.986E-02
SB-125	#F	9.1085E-02	9.1148E-02	7.5172E-02	7.5365E-02	7.788E-02
I-131	#B	-2.1526E-03	-2.3470E-03	3.0675E-02	3.0675E-02	3.181E-02
CS-134	#A	-2.7533E-02	-2.7559E-02	3.4329E-02	3.4367E-02	3.634E-02
CS-137		4.5947E-02	4.5950E-02	5.1470E-02	5.1542E-02	
CE-139	#A	-2.2300E-03	-2.2413E-03	3.5207E-02	3.5207E-02	3.624E-02
EU-152	#B	-9.3344E-05	-9.3358E-05	2.7289E-02	2.7289E-02	1.103E-01
EU-154	#B	-9.7588E-03	-9.7609E-03	7.3447E-02	7.3449E-02	7.742E-02
EU-155	#B	7.4162E-02	7.4191E-02	1.2697E-01	1.2704E-01	1.393E-01
HG-203	#B	2.6620E-04	2.7020E-04	2.8346E-02	2.8346E-02	3.155E-02
TL-208		2.6781E-01	2.6781E-01	5.2091E-02	5.4439E-02	
PB-212		8.1863E-01	8.1863E-01	7.9773E-02	9.3281E-02	
PB-214		4.7887E-01	4.7887E-01	9.8574E-02	1.0255E-01	
BI-212		6.8855E-01	6.8855E-01	3.4322E-01	3.4562E-01	
BI-214		4.3218E-01	4.3218E-01	9.8286E-02	1.0155E-01	
RA-224	#A	3.1515E-01	3.1515E-01	8.8064E-01	8.8083E-01	9.734E-01
RA-226		1.3512E+00	1.3512E+00	7.5508E-01	7.5929E-01	
AC-228		9.0280E-01	9.0280E-01	1.3290E-01	1.4319E-01	
TH-227	#B	-2.4060E-01	-2.4060E-01	3.3137E-01	3.3168E-01	3.604E-01
PA-234	#B	2.7175E-03	2.7175E-03	1.2176E-01	1.2176E-01	1.359E-01
TH-234	#B	9.0516E-01	9.0516E-01	8.7055E-01	8.7200E-01	1.675E+00
AM-241	#A	2.2696E-02	2.2696E-02	1.9917E-01	1.9917E-01	2.216E-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) 2.1709665E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 2.1709671E+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: 107F_18AUG2006_1512.An1

Sample description
FSS-OOL-02-04-003-F

Spectrum Filename: C:\GammaVision\Spectra\107F_18AUG2006_1512.An1

Acquisition information
Start time: 18-Aug-2006 15:12:20
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: 1.8180E+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	17-Aug-2006 14:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1686

***** S U M M A R Y O F P E A K 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	414.	10.78	1.18	2.849E-02	74.81	9.600	1.115E+00	PB212
77.11	609.	8.01	1.18	2.958E-02	77.11	17.500	8.754E-01	PB212
					77.11	10.700	1.420E+00	PB214
84.13	119.	31.40	1.18	3.217E-02				
87.14	212.	18.21	1.19	3.304E-02	86.45	32.740	1.466E-01	EU155
89.89	163.	24.91	1.19	3.373E-02	88.04	3.790	PBC<MDA	CD109
93.19	246.	15.38	1.19	3.447E-02	92.38	2.570	2.008E+00	TH234
					92.80	3.000	1.631E+00	TH234
129.35	161.	37.42	1.91	3.819E-02				
186.02	207.	18.25	1.89	3.610E-02	185.99	3.280	1.298E+00	RA226
209.24	160.	24.69	1.37	3.429E-02				
238.76	1508.	3.04	1.30	3.189E-02	238.63	43.100	8.070E-01	PB212
241.54	236.	19.17	1.30	3.167E-02	241.00	3.900	1.406E+00	RA224
					241.92	7.470	7.383E-01	PB214
270.36	148.	24.32	1.54	2.944E-02				
277.41	79.	30.62	1.32	2.892E-02				
295.35	280.	9.60	1.34	2.766E-02	295.22	19.200	3.852E-01	PB214
301.00	90.	25.86	1.34	2.729E-02				
338.48	388.	9.50	1.60	2.500E-02	338.40	12.010	9.525E-01	AC228
352.12	518.	6.06	1.33	2.425E-02	351.99	37.100	4.239E-01	PB214
409.55	81.	32.63	1.00	2.154E-02				
463.12	175.	16.10	1.82	1.954E-02				
463.12	175.	16.10	1.82	1.954E-02	463.51	10.000	6.574E-01	SB125
510.76	228.	12.11	1.89	1.808E-02	510.72	22.500	3.551E-01	TL208
583.29	529.	6.34	1.64	1.629E-02	583.14	86.000	2.782E-01	TL208
609.57	406.	6.76	1.44	1.574E-02	609.32	46.090	4.115E-01	BI214
619.34	41.	40.70	1.00	1.554E-02				

727.36	174.	16.20	1.93	1.374E-02	727.17	11.800	7.898E-01	BI212
795.15	50.	29.54	1.68	1.284E-02	795.76	85.400	3.417E-02	CS134
872.91	31.	41.21	0.67	1.198E-02				
911.41	379.	7.13	1.81	1.160E-02	911.07	29.000	8.275E-01	AC228
964.77	61.	22.58	1.80	1.113E-02	964.00	14.580	PBC<MDA	EU152
969.12	207.	8.66	1.80	1.109E-02	968.90	17.460	7.853E-01	AC228
1120.50	140.	17.39	2.40	9.968E-03	1120.28	15.040	6.896E-01	BI214
1238.26	67.	34.76	0.67	9.262E-03				
1461.14	1920.	2.34	2.11	8.189E-03	1460.75	10.700	1.625E+01	K40
1620.63	24.	30.98	0.97	7.569E-03	1620.56	2.750	8.748E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1765.51	77.	12.20	1.59	7.080E-03	1764.51	15.920	5.023E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
167.93	84.17	637.	119.	0.059	94.20	1.185	TA-182	D
173.94	87.17	639.	212.	0.106	54.63	1.187	BI-207	D
179.44	89.92	738.	163.	0.081	74.72	1.189	PB-214	D
186.04	93.22	593.	246.	0.123	46.13	1.191	U-235	D
258.35	129.35	1215.	139.	0.070	109.13	1.909	AC-228	s
418.12	209.24	587.	160.	0.080	74.07	1.365	AC-228	s
540.34	270.36	427.	148.	0.074	72.95	1.543	AC-228	s
554.44	277.41	252.	80.	0.040	90.68	1.315	TL-208	
601.75	301.07	346.	115.	0.058	82.78	1.247	PB-212	
818.71	409.55	215.	81.	0.041	97.90	0.996	AC-228	
925.84	463.12	267.	97.	0.049	77.61	1.820	AC-228	s
1929.31	964.67	65.	62.	0.031	67.51	1.796	AC-228	D
2476.09	1238.26	142.	67.	0.034	104.28	0.670	CO-56	s

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.29	74.81	793.	411.	0.206	32.25	1.178D
PB-212	153.89	77.11	887.	449.	0.224	26.20	1.179A
PB-214	153.89	77.11	1540.	151.	0.076	105.87	1.500A
TH-234	185.83	93.08	1427.	212.	0.106	71.52	1.500
RA-226	371.68	186.02	553.	207.	0.103	54.74	1.895s
TH-227	471.54	235.95	1298.	-173.	-0.086	91.42	1.500s
PB-212	476.89	238.63	314.	1493.	0.746	9.12	1.297D
RA-224	482.61	241.49	1052.	131.	0.066	106.10	1.500
PB-214	483.47	241.92	551.	197.	0.099	54.42	1.299D
PB-214	590.45	295.42	295.	281.	0.141	31.94	1.472
AC-228	676.57	338.48	327.	385.	0.192	28.51	1.596s
PB-214	703.85	352.12	200.	513.	0.257	18.17	1.329
SB-125	926.38	463.39	213.	75.	0.038	85.50	1.500s
TL-208	1021.11	510.76	212.	194.	0.097	36.32	1.887s
TL-208	1166.16	583.29	180.	524.	0.262	19.02	1.644

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	1218.72	609.57	120.	402.	0.201	20.29	1.441s
BI-212	1454.29	727.36	164.	172.	0.086	48.59	1.934s
CS-134	1589.87	795.15	88.	50.	0.025	88.63	1.684
AC-228	1822.38	911.41	114.	375.	0.187	21.40	1.814
AC-228	1937.36	968.90	67.	205.	0.102	26.63	1.799D
BI-214	2240.57	1120.50	117.	139.	0.070	52.16	2.402s
K-40	2921.88	1461.14	32.	1916.	0.958	7.02	2.114
BI-212	3240.88	1620.63	11.	24.	0.012	92.95	0.966s
BI-214	3530.66	1765.51	4.	76.	0.038	36.59	1.588s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		8.0613E-02					
			477.56	8.061E-02	%(	2.469E-01 7.39E-02	G
K-40		1.6248E+01					
			1460.75	1.625E+01	(P	2.474E-01 3.81E-01	G
MN-54		1.1817E-02					
			834.81	1.182E-02	%(P	3.145E-02 9.43E-03	G
CO-57		-3.9099E-04					
			122.07	-3.910E-04	%(P	3.130E-02 9.31E-03	G K
			136.43	-8.999E-02	& P	2.707E-01 8.16E-02	G
CO-60		-1.0712E-02					
			1332.51	-1.071E-02	&(P	3.801E-02 1.09E-02	G K
			1173.23	1.874E-02	% P	4.415E-02 1.32E-02	G K
Sr-85		-1.8045E-02					
			514.00	-1.805E-02	%(	3.597E-02 1.09E-02	G
Kr-85		-4.4040E+02					
			513.99	-4.404E+02	%(P	8.247E+02 2.49E+02	G
Y-88		-1.1711E-03					
			1836.01	-1.171E-03	&(P	2.055E-02 5.18E-03	G K
			898.02	-2.915E-03	% P	2.904E-02 8.24E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-8.4667E-04						
		871.10	-8.467E-04	&(P	2.887E-02	8.28E-03	G K
		702.50	-2.810E-04	% P	2.977E-02	8.58E-03	G K
Ag-108M	-2.0452E-02						
		722.95	-2.045E-02	&(	4.150E-02	1.26E-02	G K
		614.37	-1.074E-02	%	3.299E-02	9.87E-03	G
		433.93	-3.121E-03	% P	2.830E-02	8.28E-03	G
CD-109	1.3818E-01						
		88.04	1.382E-01	%(P	1.128E+00	3.39E-01	G
SN-113	-6.1220E-03						
		391.71	-6.122E-03	&(P	3.481E-02	1.02E-02	G K
		255.04	-2.633E-01	%	1.259E+00	3.76E-01	G
SB-125	8.1254E-02						
		427.95	1.155E-02	&(P	7.967E-02	2.34E-02	G K
		600.77	-6.789E-04	& P	1.406E-01	4.04E-02	G
		636.15	5.834E-02	& P	2.134E-01	6.31E-02	G
		463.51	2.876E-01	*(P	2.692E-01	8.50E-02	G
		176.29	9.422E-03	% P	3.694E-01	1.10E-01	G
I-131	9.1251E-04						
		364.48	9.125E-04	%(	3.191E-02	9.36E-03	G K
		636.97	-1.504E-02	%	4.014E-01	1.16E-01	G
		284.29	-8.859E-02	%	4.775E-01	1.42E-01	G
CS-134	1.4113E-02						
		604.66	-3.438E-03	%(P	5.934E-02	1.76E-02	G K
		795.76	3.417E-02	(P	3.152E-02	1.02E-02	G
		569.29	3.650E-02	%	1.514E-01	4.48E-02	G
		801.84	7.111E-02	% P	3.028E-01	8.90E-02	G
CS-137	1.2807E-02						
		661.62	1.281E-02	%(P	3.412E-02	1.02E-02	G
CE-139	8.1513E-03						
		165.85	8.151E-03	%(P	3.587E-02	1.08E-02	G
EU-152	-7.6003E-03						
		121.78	-7.600E-03	%(P	1.064E-01	3.18E-02	G K
		344.30	-2.180E-02	% P	9.096E-02	2.71E-02	G
		1408.08	3.961E-02	% P	1.227E-01	3.60E-02	G
		964.00	-5.656E-02	% P	3.321E-01	9.83E-02	G
		1112.07	-4.577E-02	% P	2.531E-01	7.37E-02	G
		778.90	-2.099E-03	% P	2.119E-01	6.05E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	-5.4204E-03						
		123.10	-5.420E-03	&(P	7.848E-02	2.35E-02	G K
		1274.80	2.002E-02	% P	8.583E-02	2.51E-02	G
		723.30	-1.082E-01	& P	2.050E-01	6.23E-02	G
		1004.80	-3.566E-02	& P	2.230E-01	6.55E-02	G
EU-155	9.1747E-02						
		86.45	9.175E-02	%(	1.337E-01	4.08E-02	G K
		105.31	5.730E-02	% P	1.553E-01	4.69E-02	G
HG-203	-7.5915E-04						
		279.17	-7.592E-04	&(P	3.270E-02	9.65E-03	G K
		72.87	-2.899E-01	% P	1.004E+00	3.03E-01	G
		70.83	-1.546E-01	%	1.707E+00	5.12E-01	G
		82.50	-5.136E-01	%	2.033E+00	6.13E-01	G
TL-208	2.7817E-01						
		583.14	2.782E-01	(P	3.459E-02	1.78E-02	G
		510.72	3.551E-01	+ P	1.288E-01	5.04E-02	G
PB-212	8.2694E-01						
		238.63	8.072E-01	(P	4.613E-02	2.48E-02	G K
							Energy duplication
		77.11	6.447E-01	}	2.033E-01	5.63E-02	G
		74.81	1.118E+00	+ P	3.639E-01	1.21E-01	G
PB-214	4.1345E-01						
		351.99	4.239E-01	(P	5.663E-02	2.59E-02	G K
		295.22	3.932E-01	(P	1.157E-01	4.26E-02	G
							Energy duplication
		77.11	3.549E-01	} P	4.360E-01	1.25E-01	G
		241.92	6.201E-01	+ P	3.526E-01	1.13E-01	G
BI-212	8.0590E-01						
		727.17	7.898E-01	(P	2.857E-01	1.29E-01	G K
		1620.56	8.748E-01	(P	6.361E-01	2.77E-01	G
		785.42	7.293E-01	% P	1.544E+00	4.67E-01	G
BI-214	4.1151E-01						
		609.32	4.115E-01	@(P	5.515E-02	2.81E-02	G K
		1764.51	5.023E-01	+ P	7.771E-02	6.20E-02	G
		1120.28	6.896E-01	+ P	2.632E-01	1.21E-01	G
RA-224	7.8976E-01						
		241.00	7.898E-01	?(P	9.248E-01	2.84E-01	G
RA-226	1.2981E+00						
		185.99	1.298E+00	*(	7.050E-01	2.37E-01	G

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

AC-228       8.4058E-01
                          911.07 8.275E-01  (P 1.160E-01 5.97E-02 G K
                          968.90 7.853E-01  (P 1.572E-01 7.05E-02 G
                          338.40 9.525E-01 @(P 2.154E-01 9.13E-02 G

TH-227      -3.5742E-01
                          236.00-3.574E-01 ?(P 3.526E-01 1.09E-01 G K
                          256.25 8.030E-03 % P 3.718E-01 1.10E-01 G

PA-234       1.7782E-03
                           98.44 1.778E-03 %(  1.411E-01 4.21E-02 G K
                          946.00 1.441E-02 %   1.411E-01 4.07E-02 G
                          131.28 2.173E-02 &   1.509E-01 4.52E-02 G
                           94.67-1.376E-01 %   2.508E-01 7.62E-02 G
                          883.24-4.230E-03 %   2.219E-01 6.32E-02 G
                          926.70 1.342E-02 %   2.644E-01 7.59E-02 G
                          569.26 5.409E-02 %   2.244E-01 6.64E-02 G

TH-234       1.0314E+00
                           63.29 6.510E-01 %(P 1.641E+00 4.95E-01 G K
                           92.80 1.526E+00  (P 1.288E+00 3.98E-01 G
                           92.38-3.134E-02 % P 1.537E+00 4.58E-01 G

AM-241      -1.8329E-02
                           59.54-1.833E-02 %(P 2.143E-01 6.41E-02 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
```

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	7.9521E-02	8.0613E-02	2.2171E-01	2.2176E-01	2.436E-01
K-40		1.6248E+01	1.6248E+01	1.1426E+00	1.4921E+00	
MN-54	#A	1.1790E-02	1.1817E-02	2.8278E-02	2.8287E-02	3.138E-02
CO-57	#B	-3.8994E-04	-3.9099E-04	3.8736E-02	3.8736E-02	3.122E-02
CO-60	#B	-1.0708E-02	-1.0712E-02	6.0334E-02	6.0337E-02	3.800E-02
Sr-85	#A	-1.7844E-02	-1.8045E-02	3.2768E-02	3.2785E-02	3.557E-02
Kr-85	#A	-4.4040E+02	-4.4040E+02	8.5240E+02	8.5280E+02	8.247E+02
Y-88	#B	-1.1631E-03	-1.1711E-03	1.1505E-01	1.1505E-01	2.041E-02
NB-94	#B	-8.4667E-04	-8.4667E-04	3.0312E-02	3.0312E-02	2.887E-02
Ag-108M	#B	-2.0451E-02	-2.0452E-02	3.7796E-02	3.7815E-02	4.150E-02
CD-109	#A	1.3796E-01	1.3818E-01	1.0160E+00	1.0160E+00	1.126E+00
SN-113	#B	-6.0834E-03	-6.1220E-03	4.1878E-02	4.1880E-02	3.459E-02
SB-125	#F	8.1195E-02	8.1254E-02	7.2060E-02	7.2220E-02	7.961E-02
I-131	#B	8.3352E-04	9.1251E-04	2.8065E-02	2.8065E-02	2.915E-02
CS-134	#B	1.4099E-02	1.4113E-02	1.2639E-02	1.2667E-02	5.928E-02
CS-137	#A	1.2807E-02	1.2807E-02	3.0550E-02	3.0560E-02	3.412E-02
CE-139	#A	8.1082E-03	8.1513E-03	3.2322E-02	3.2326E-02	3.568E-02
EU-152	#B	-7.5991E-03	-7.6003E-03	9.7824E-02	9.7825E-02	1.064E-01
EU-154	#B	-5.4191E-03	-5.4204E-03	7.7537E-02	7.7538E-02	7.846E-02
EU-155	#B	9.1711E-02	9.1747E-02	1.2239E-01	1.2250E-01	1.337E-01
HG-203	#B	-7.4738E-04	-7.5915E-04	9.9395E-02	9.9395E-02	3.219E-02
TL-208		2.7817E-01	2.7817E-01	5.3377E-02	5.5848E-02	
PB-212		8.2694E-01	8.2694E-01	7.6252E-02	9.0552E-02	
PB-214		4.1345E-01	4.1345E-01	7.5856E-02	7.9690E-02	
BI-212		8.0590E-01	8.0590E-01	3.9455E-01	3.9741E-01	
BI-214		4.1151E-01	4.1151E-01	8.4395E-02	8.7825E-02	
RA-224	#A	7.8976E-01	7.8976E-01	8.5214E-01	8.5341E-01	9.248E-01
RA-226	#	1.2981E+00	1.2981E+00	7.1060E-01	7.1472E-01	
AC-228		8.4058E-01	8.4058E-01	1.2593E-01	1.3536E-01	
TH-227	#A	-3.5742E-01	-3.5742E-01	3.2727E-01	3.2795E-01	3.526E-01
PA-234	#B	1.7782E-03	1.7782E-03	1.2644E-01	1.2644E-01	1.411E-01
TH-234	#B	1.0314E+00	1.0314E+00	8.0637E-01	8.0839E-01	1.641E+00
AM-241	#A	-1.8329E-02	-1.8329E-02	2.1031E-01	2.1032E-01	2.143E-01

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

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

Total Activity (1120.2 to 2000.1 keV) 2.1122673E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 2.1122675E+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: 107F_18AUG2006_1558.An1

Sample description
FSS-OOL-02-04-018-F

Spectrum Filename: C:\GammaVision\Spectra\107F_18AUG2006_1558.An1

Acquisition information
Start time: 18-Aug-2006 15:58:30
Live time: 2000
Real time: 2004
Dead time: 0.18 %
Detector ID: 2

Detector system
Det 107- DSPE- 634

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

Energy Calibration
Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8080E+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	18-Aug-2006 15:55:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1599

***** S U M M A R Y O F P E A K 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	372.	11.72	1.18	2.849E-02	74.81	9.600	1.018E+00	PB212
77.08	552.	6.76	1.18	2.957E-02	77.11	10.700	1.479E+00	PB214
					77.11	17.500	9.115E-01	PB212
84.08	110.	33.18	1.18	3.217E-02				
87.26	257.	15.19	1.19	3.308E-02	86.45	32.740	1.788E-01	EU155
					88.04	3.790	1.523E+00	CD109
90.29	184.	20.67	1.19	3.384E-02				
93.06	249.	15.36	1.19	3.446E-02	92.80	3.000	1.661E+00	TH234
185.54	300.	16.26	1.50	3.613E-02	185.99	3.280	1.891E+00	RA226
209.49	129.	31.36	0.99	3.427E-02				
238.78	1482.	3.18	1.30	3.188E-02	238.63	43.100	7.974E-01	PB212
241.98	225.	15.18	1.30	3.163E-02	241.00	3.900	1.346E+00	RA224
					241.92	7.470	7.071E-01	PB214
270.67	136.	25.39	1.59	2.941E-02				
277.32	65.	38.62	1.50	2.879E-02				
277.32	65.	38.62	1.50	2.879E-02	279.17	81.500	PBC<MDA	HG203
295.37	353.	7.78	1.34	2.767E-02	295.22	19.200	4.900E-01	PB214
300.48	106.	19.56	1.34	2.733E-02				
328.57	136.	24.52	0.86	2.557E-02				
338.65	376.	11.16	1.30	2.499E-02	338.40	12.010	9.284E-01	AC228
352.03	619.	7.38	1.38	2.426E-02	351.99	37.100	5.095E-01	PB214
409.87	70.	29.53	1.09	2.153E-02				
463.23	141.	20.78	1.72	1.954E-02				
463.23	141.	20.78	1.72	1.954E-02	463.51	10.000	5.289E-01	SB125
511.17	254.	12.92	1.83	1.807E-02	510.72	22.500	4.041E-01	TL208
583.21	534.	5.85	1.27	1.629E-02	583.14	86.000	2.827E-01	TL208
609.55	452.	6.94	1.66	1.574E-02	609.32	46.090	4.612E-01	BI214

727.66	140.	15.08	1.71	1.374E-02	727.17	11.800	6.370E-01	BI212
768.80	76.	28.22	0.91	1.318E-02				
795.60	80.	24.04	1.01	1.284E-02				
795.60	80.	24.04	1.01	1.284E-02	795.76	85.400	5.390E-02	CS134
860.60	100.	18.10	1.86	1.211E-02				
911.46	387.	5.86	1.95	1.160E-02	911.07	29.000	8.499E-01	AC228
964.83	79.	17.13	1.80	1.113E-02				
969.21	180.	9.38	1.80	1.109E-02	968.90	17.460	6.869E-01	AC228
1120.66	103.	17.32	1.25	9.967E-03	1120.28	15.040	5.085E-01	BI214
1461.12	1699.	2.45	2.03	8.189E-03	1460.75	10.700	1.445E+01	K40
1764.62	76.	12.94	2.55	7.084E-03	1764.51	15.920	5.004E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
167.83	84.17	605.	110.	0.055	99.54	1.185	TA-182	D
174.18	87.34	635.	257.	0.129	45.57	1.187	PB-214	D
180.24	90.37	628.	184.	0.092	62.00	1.189	PB-214	D
185.79	93.15	607.	249.	0.124	46.09	1.191	U-235	D
418.61	209.49	603.	129.	0.064	94.08	0.986	AC-228	
540.96	270.67	389.	136.	0.068	76.16	1.585	AC-228	s
556.27	278.32	310.	102.	0.051	86.76	0.826	SB-126	l
600.37	300.37	286.	79.	0.040	104.49	1.017	PB-212	M
656.75	328.57	334.	136.	0.068	73.56	0.859	RH-106M	s
819.35	409.87	153.	70.	0.035	88.59	1.092	AC-228	s
926.06	463.23	266.	80.	0.040	93.00	1.719	AC-228	s
1537.17	768.80	126.	78.	0.039	69.78	0.912	BI-214	sM
1720.76	860.60	69.	100.	0.050	54.31	1.864	TL-208	s
1930.09	965.01	52.	78.	0.039	51.70	1.797	AC-228	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
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	788.	372.	0.186	35.15	1.178D
PB-212	153.89	77.11	827.	552.	0.276	20.28	1.179A
EU-155	174.24	87.29	1673.	163.	0.081	109.27	1.500
TH-234	177.15	88.74	1303.	-162.	-0.081	101.78	1.500
TH-234	185.93	93.13	1482.	197.	0.098	77.68	1.500
RA-226	370.72	185.54	768.	300.	0.150	48.79	1.498s
TH-227	471.72	236.04	1354.	-156.	-0.078	103.30	1.500s
PB-212	476.89	238.63	306.	1467.	0.733	9.19	1.297D
PB-214	483.47	241.92	479.	217.	0.109	46.96	1.299D
HG-203	554.27	277.32	299.	65.	0.033	115.86	1.500s
PB-214	590.43	295.40	483.	451.	0.226	29.70	1.496s
AC-228	676.92	338.65	388.	373.	0.186	33.47	1.300
PB-214	703.67	352.03	392.	613.	0.307	22.15	1.381
SB-125	925.94	463.17	193.	58.	0.029	103.06	1.500s
TL-208	1021.92	511.17	255.	220.	0.110	38.75	1.828s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1166.00	583.21	143.	530.	0.265	17.56	1.274s
BI-214	1218.69	609.55	165.	448.	0.224	20.81	1.663
Ag-108M	1223.19	611.81	299.	-93.	-0.046	84.78	1.561s
BI-212	1454.89	727.66	106.	138.	0.069	45.24	1.708s
CS-134	1589.92	795.17	87.	57.	0.028	79.78	1.684s
AC-228	1822.48	911.46	55.	383.	0.191	17.58	1.949
AC-228	1937.36	968.90	67.	178.	0.089	29.32	1.799D
BI-214	2240.90	1120.66	75.	102.	0.051	51.97	1.246s
K-40	2921.84	1461.12	16.	1694.	0.847	7.35	2.033
BI-214	3528.89	1764.62	6.	76.	0.038	38.81	2.548s

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

***** S U M M A R Y O 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		8.8368E-02					
			477.56	8.837E-02	&(	1.887E-01 5.72E-02 G	
K-40		1.4449E+01					
			1460.75	1.445E+01	(P	1.807E-01 3.55E-01 G	
MN-54		7.9182E-03					
			834.81	7.918E-03	%(P	3.011E-02 8.90E-03 G	
CO-57		1.7353E-04					
			122.07	1.735E-04	&(P	3.617E-02 1.08E-02 G K	
			136.43	2.746E-04	& P	2.851E-01 8.50E-02 G	
CO-60		-3.1062E-03					
			1332.51	-3.106E-03	%(P	2.810E-02 7.48E-03 G K	
			1173.23	-7.915E-03	% P	4.496E-02 1.30E-02 G K	
Sr-85		-1.5148E-02					
			514.00	-1.515E-02	&(	3.495E-02 1.06E-02 G	
Kr-85		-3.7879E+02					
			513.99	-3.788E+02	&(P	8.107E+02 2.44E+02 G	
Y-88		-7.0840E-04					
			1836.01	-7.084E-04	%(P	2.262E-02 5.81E-03 G K	
			898.02	-4.948E-03	% P	3.606E-02 1.04E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-4.7526E-03						
		871.10	-4.753E-03	&(P	2.877E-02	8.39E-03	G K
		702.50	7.441E-03	% P	2.612E-02	7.74E-03	G K
Ag-108M	8.0808E-03						
		722.95	8.081E-03	%(	2.383E-02	7.09E-03	G K
		614.37	-4.914E-02	+	4.400E-02	1.39E-02	G
		433.93	-5.397E-03	% P	3.016E-02	8.90E-03	G
CD-109	-1.4518E-02						
		88.04	-1.452E-02	%(P	1.199E+00	3.59E-01	G
SN-113	-5.8992E-04						
		391.71	-5.899E-04	%(P	3.562E-02	1.03E-02	G K
		255.04	3.769E-02	%	1.287E+00	3.82E-01	G
SB-125	6.0826E-02						
		427.95	5.893E-03	&(P	8.134E-02	2.38E-02	G K
		600.77	-4.930E-03	& P	1.307E-01	3.74E-02	G
		636.15	-2.248E-02	% P	1.997E-01	5.76E-02	G
		463.51	2.234E-01	*(P	2.583E-01	8.05E-02	G
		176.29	-5.586E-02	% P	4.544E-01	1.36E-01	G
I-131	-2.0554E-03						
		364.48	-2.055E-03	%(	2.931E-02	8.62E-03	G K
		636.97	-4.252E-02	%	3.533E-01	1.03E-01	G
		284.29	0.000E+00	&	4.546E-01	1.34E-01	G
CS-134	1.5869E-02						
		604.66	-3.988E-03	%(P	6.461E-02	1.92E-02	G K
		795.76	3.856E-02	*(P	3.152E-02	1.04E-02	G
		569.29	7.178E-03	&	1.541E-01	4.46E-02	G
		801.84	-2.514E-02	% P	3.425E-01	9.91E-02	G
CS-137	-7.5992E-04						
		661.62	-7.599E-04	%(P	3.870E-02	1.12E-02	G
CE-139	6.8922E-03						
		165.85	6.892E-03	%(P	3.526E-02	1.06E-02	G
EU-152	1.6534E-02						
		121.78	1.653E-02	%(P	8.642E-02	2.59E-02	G K
		344.30	-1.988E-02	% P	8.329E-02	2.47E-02	G
		1408.08	5.266E-02	% P	1.226E-01	3.67E-02	G
		964.00	1.065E-01	& P	3.367E-01	1.01E-01	G
		1112.07	-7.698E-03	% P	2.290E-01	6.49E-02	G
		778.90	-2.404E-02	% P	1.646E-01	4.71E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	-2.5881E-03						
		123.10	-2.588E-03	%(P	7.281E-02	2.17E-02	G K
		1274.80	-1.683E-02	% P	9.937E-02	2.88E-02	G
		723.30	5.166E-03	% P	2.875E-01	8.51E-02	G
		1004.80	-1.861E-02	% P	1.844E-01	5.33E-02	G
EU-155	1.1305E-01						
		86.45	1.130E-01	(	1.344E-01	4.12E-02	G K
		105.31	7.249E-02	% P	1.515E-01	4.60E-02	G
HG-203	2.0820E-02						
		279.17	2.082E-02	*(P	2.654E-02	8.20E-03	G K
		72.87	-1.997E-01	% P	9.761E-01	2.94E-01	G
		70.83	0.000E+00	%	1.909E+00	5.73E-01	G
		82.50	-4.156E-01	%	1.892E+00	5.69E-01	G
TL-208	2.8269E-01						
		583.14	2.827E-01	@(P	3.119E-02	1.67E-02	G
		510.72	4.041E-01	+ P	1.417E-01	6.02E-02	G
PB-212	7.9742E-01						
		238.63	7.974E-01	(P	4.582E-02	2.47E-02	G K
							Energy duplication
		77.11	7.974E-01	}	1.974E-01	5.39E-02	G
		74.81	1.018E+00	+ P	3.647E-01	1.20E-01	G
PB-214	5.0950E-01						
		351.99	5.095E-01	(P	7.883E-02	3.79E-02	G K
		295.22	6.345E-01	+ P	1.479E-01	6.34E-02	G
							Energy duplication
		77.11	1.309E-01	} P	4.293E-01	1.26E-01	G
		241.92	6.876E-01	+ P	3.311E-01	1.08E-01	G
BI-212	6.3703E-01						
		727.17	6.370E-01	*(P	2.334E-01	9.70E-02	G K
		1620.56	3.980E-01	% P	8.731E-01	2.63E-01	G
		785.42	5.914E-01	% P	1.317E+00	3.97E-01	G
BI-214	4.7852E-01						
		609.32	4.612E-01	(P	6.452E-02	3.23E-02	G K
		1764.51	5.004E-01	@(P	9.668E-02	6.55E-02	G
		1120.28	5.085E-01	(P	2.147E-01	8.89E-02	G
RA-224	6.3644E-01						
		241.00	6.364E-01	%(P	9.697E-01	2.96E-01	G
RA-226	1.8911E+00						
		185.99	1.891E+00	*(	8.325E-01	3.07E-01	G

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

AC-228       8.7285E-01
                          911.07 8.499E-01  (P 8.291E-02 5.04E-02 G K
                          968.90 6.864E-01 - P 1.578E-01 6.79E-02 G
                          338.40 9.284E-01  (P 2.352E-01 1.05E-01 G

TH-227      -3.2355E-01
                          236.00-3.235E-01 &(P 3.620E-01 1.11E-01 G K
                          256.25-6.779E-02 & P 4.053E-01 1.21E-01 G

PA-234      -6.1465E-02
                           98.44-6.147E-02 &(  1.183E-01 3.59E-02 G K
                          946.00-3.745E-02 %   1.749E-01 5.16E-02 G
                          131.28 4.601E-02 &   1.484E-01 4.47E-02 G
                           94.67-2.376E-04 %   2.547E-01 7.62E-02 G
                          883.24-6.485E-03 %   2.864E-01 8.28E-02 G
                          926.70 4.706E-03 %   2.970E-01 8.54E-02 G
                          569.26 9.422E-02 &   2.001E-01 6.06E-02 G

TH-234       1.1477E+00
                           63.29 9.339E-01 %(P 1.609E+00 4.88E-01 G K
                           92.80 1.426E+00  (P 1.320E+00 4.06E-01 G
                           92.38-1.377E+00 - P 1.449E+00 4.44E-01 G

AM-241      -3.4124E-02
                           59.54-3.412E-02 %(P 2.095E-01 6.28E-02 G
   ( - This peak used in the nuclide activity average.

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

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
```

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

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

- -

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	8.8365E-02	8.8368E-02	1.7151E-01	1.7159E-01	1.887E-01
K-40		1.4449E+01	1.4449E+01	1.0654E+00	1.3650E+00	
MN-54	#A	7.9182E-03	7.9182E-03	2.6714E-02	2.6718E-02	3.011E-02
CO-57	#B	1.7353E-04	1.7353E-04	3.2362E-02	3.2362E-02	3.617E-02
CO-60	#B	-3.1062E-03	-3.1062E-03	1.4191E+00	1.4191E+00	2.810E-02
Sr-85	#A	-1.5148E-02	-1.5148E-02	3.1698E-02	3.1711E-02	3.495E-02
Kr-85	#A	-3.7879E+02	-3.7879E+02	8.5271E+02	8.5300E+02	8.107E+02
Y-88	#B	-7.0839E-04	-7.0840E-04	1.5248E-01	1.5248E-01	2.262E-02
NB-94	#B	-4.7526E-03	-4.7526E-03	2.6078E-02	2.6080E-02	2.877E-02
Ag-108M	#B	8.0808E-03	8.0808E-03	2.1271E-02	2.1276E-02	2.383E-02
CD-109	#A	-1.4518E-02	-1.4518E-02	1.4011E+00	1.4011E+00	1.199E+00
SN-113	#B	-5.8991E-04	-5.8992E-04	1.3368E-01	1.3368E-01	3.562E-02
SB-125	#B	6.0826E-02	6.0826E-02	6.5712E-02	6.5810E-02	8.134E-02
I-131	#B	-2.0550E-03	-2.0554E-03	2.5867E-02	2.5867E-02	2.931E-02
CS-134	#B	1.5869E-02	1.5869E-02	1.2778E-02	1.2813E-02	6.461E-02
CS-137	#A	-7.5992E-04	-7.5992E-04	7.1211E-02	7.1211E-02	3.870E-02
CE-139	#A	6.8922E-03	6.8922E-03	3.1727E-02	3.1730E-02	3.526E-02
EU-152	#B	1.6534E-02	1.6534E-02	7.7658E-02	7.7664E-02	8.642E-02
EU-154	#B	-2.5881E-03	-2.5881E-03	7.9888E-02	7.9888E-02	7.281E-02
EU-155	#A	1.1305E-01	1.1305E-01	1.2353E-01	1.2369E-01	1.344E-01
HG-203	#A	2.0819E-02	2.0820E-02	2.4599E-02	2.4629E-02	2.654E-02
TL-208	#	2.8269E-01	2.8269E-01	5.0052E-02	5.2764E-02	
PB-212		7.9742E-01	7.9742E-01	7.4099E-02	8.7799E-02	
PB-214		5.0950E-01	5.0950E-01	1.1382E-01	1.1773E-01	
BI-212	#	6.3703E-01	6.3703E-01	2.9088E-01	2.9330E-01	
BI-214		4.7852E-01	4.7852E-01	1.0056E-01	1.0445E-01	
RA-224	#A	6.3644E-01	6.3644E-01	8.8721E-01	8.8801E-01	9.697E-01
RA-226	#	1.8911E+00	1.8911E+00	9.2269E-01	9.2943E-01	
AC-228		8.7285E-01	8.7285E-01	1.5517E-01	1.6351E-01	
TH-227	#A	-3.2355E-01	-3.2355E-01	3.3481E-01	3.3535E-01	3.620E-01
PA-234	#B	-6.1465E-02	-6.1465E-02	1.0780E-01	1.0786E-01	1.183E-01
TH-234	#B	1.1477E+00	1.1477E+00	9.8094E-01	9.8300E-01	1.609E+00
AM-241	#A	-3.4124E-02	-3.4124E-02	1.9781E-01	1.9782E-01	2.095E-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) 1.9917978E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 1.9917978E+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: 107F_20SEPT2006_1429.An1

Sample description
FSS-OOL-02-04-020-F-RC

Spectrum Filename: C:\GammaVision\Spectra\107F_20SEPT2006_1429.An1

Acquisition information
Start time: 20-Sep-2006 14:30:23
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: 1.7970E+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	17-Aug-2006 16:08:00
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. 14 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
75.08	427.	11.39	1.18	2.849E-02	74.81	9.600	1.173E+00	PB212
77.38	215.	19.09	1.18	2.957E-02	77.11	17.500	6.224E-01	PB212
					77.11	10.700	1.007E+00	PB214
77.87	163.	31.98	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
87.29	218.	28.34	1.52	3.307E-02	86.45	32.740	1.541E-01	EU155
					88.04	3.790	1.364E+00	CD109
185.71	221.	23.12	1.51	3.612E-02				
185.71	221.	23.12	1.51	3.612E-02	185.99	3.280	1.402E+00	RA226
239.17	1887.	4.09	2.41	3.185E-02	238.63	43.100	1.024E+00	PB212
					241.00	3.900	1.146E+01	RA224
242.09	215.	19.67	1.30	3.163E-02	241.92	7.470	6.832E-01	PB214
270.10	197.	20.65	2.01	2.945E-02				
295.80	500.	9.54	2.35	2.764E-02	295.22	19.200	7.006E-01	PB214
338.67	309.	12.27	2.50	2.499E-02	338.40	12.010	7.658E-01	AC228
352.08	801.	4.77	2.53	2.425E-02	351.99	37.100	6.649E-01	PB214
463.10	62.	31.81	1.50	1.953E-02	463.51	10.000	PBC<MDA	SB125
510.39	288.	10.43	2.23	1.809E-02	510.72	22.500	4.694E-01	TL208
583.44	534.	6.40	2.78	1.628E-02	583.14	86.000	2.843E-01	TL208
609.19	587.	5.91	2.45	1.574E-02				
609.19	587.	5.91	2.45	1.574E-02	609.32	46.090	6.043E-01	BI214
727.54	145.	20.03	1.29	1.374E-02	727.17	11.800	6.725E-01	BI212
785.86	46.	38.45	1.55	1.297E-02	785.42	2.000	PBC<MDA	BI212
795.23	43.	36.67	1.68	1.284E-02	795.76	85.400	PBC<MDA	CS134
911.25	404.	8.33	2.64	1.161E-02	911.07	29.000	8.930E-01	AC228
968.33	267.	9.30	3.27	1.110E-02	968.90	17.460	1.028E+00	AC228
1120.79	102.	18.24	1.90	9.970E-03	1120.28	15.040	5.093E-01	BI214

1461.06	1881.	2.39	2.78	8.190E-03	1460.75	10.700	1.610E+01	K40
1765.17	62.	17.10	2.29	7.084E-03	1764.51	15.920	4.125E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
174.24	87.29	1432.	218.	0.109	85.01	1.518	BI-207	l
539.83	270.10	486.	197.	0.098	61.95	2.014	AC-228	s
1217.95	609.19	570.	189.	0.094	57.88	2.453	BI-214	s

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.29	74.81	991.	427.	0.213	34.16	1.178D
PB-212	153.89	77.11	1187.	215.	0.107	57.27	1.180A
PB-214	153.89	77.11	1728.	163.	0.082	95.93	1.500A
RA-226	371.34	185.85	933.	142.	0.071	94.89	1.500s
TH-227	471.38	235.87	1878.	-213.	-0.107	88.71	1.500s
PB-212	476.89	238.63	733.	1017.	0.508	14.43	1.297D
RA-224	477.43	238.90	1122.	908.	0.454	18.49	1.500s
PB-214	483.47	241.92	797.	215.	0.107	59.02	1.299D
PB-214	591.21	295.80	559.	495.	0.248	28.63	2.353s
AC-228	676.95	338.67	379.	306.	0.153	36.80	2.502s
PB-214	703.78	352.08	248.	796.	0.398	14.30	2.529s
SB-125	925.79	463.10	181.	62.	0.031	95.43	1.500s
TL-208	1020.38	510.39	225.	254.	0.127	31.29	2.228s
TL-208	1166.47	583.44	181.	530.	0.265	19.21	2.780s
BI-214	1218.35	609.38	224.	394.	0.197	21.79	1.558s
BI-212	1454.65	727.54	184.	145.	0.073	60.09	1.291s
BI-212	1571.30	785.86	102.	46.	0.023	115.36	1.546s
CS-134	1590.02	795.23	105.	43.	0.021	110.01	1.684s
AC-228	1822.06	911.25	156.	400.	0.200	25.00	2.642s
AC-228	1936.22	968.33	102.	265.	0.132	27.91	3.273s
BI-214	2241.15	1120.79	124.	102.	0.051	54.73	1.897s
K-40	2921.71	1461.06	37.	1876.	0.938	7.16	2.782s
BI-214	3529.99	1765.17	27.	62.	0.031	51.30	2.291s

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

***** S U M M A R Y O 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		-3.0957E-02					
			477.56	-3.096E-02	%(	3.431E-01 1.00E-01	G
K-40		1.6099E+01					
			1460.75	1.610E+01	*(P	2.656E-01 3.85E-01	G
MN-54		1.2295E-02					
			834.81	1.230E-02	%(P	3.083E-02 9.25E-03	G
CO-57		-1.1393E-02					
			122.07	-1.139E-02	%(P	3.549E-02 1.07E-02	G K
			136.43	-7.869E-02	% P	3.133E-01 9.43E-02	G
CO-60		-3.7858E-03					
			1332.51	-3.786E-03	%(P	3.219E-02 8.76E-03	G K
			1173.23	-1.551E-02	& P	4.851E-02 1.42E-02	G K
Sr-85		-3.2629E-02					
			514.00	-3.263E-02	%(	5.601E-02 1.71E-02	G
Kr-85		-5.5330E+02					
			513.99	-5.533E+02	%(P	9.034E+02 2.75E+02	G
Y-88		-2.9203E-03					
			1836.01	-2.920E-03	%(P	2.467E-02 6.31E-03	G K
			898.02	6.020E-03	% P	3.685E-02 1.07E-02	G
NB-94		4.3270E-03					
			871.10	4.327E-03	%(P	3.052E-02 8.90E-03	G K
			702.50	5.156E-04	% P	2.583E-02 7.41E-03	G K
Ag-108M		-1.1736E-02					
			722.95	-1.174E-02	%(	4.097E-02 1.22E-02	G K
			614.37	-2.551E-02	%	4.304E-02 1.31E-02	G
			433.93	2.725E-03	% P	2.773E-02 8.13E-03	G
CD-109		8.6815E-01					
			88.04	8.682E-01	%(P	1.198E+00 3.66E-01	G
SN-113		8.8978E-03					
			391.71	8.898E-03	%(P	4.747E-02 1.41E-02	G K
			255.04	5.275E-02	&	1.693E+00 5.02E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.2121E-02						
		427.95	1.427E-02	%(P	8.884E-02	2.62E-02	G K
		600.77	-4.703E-02	% P	1.673E-01	4.96E-02	G
		636.15	-4.422E-02	% P	2.088E-01	6.10E-02	G
		463.51	2.433E-01	(P	2.580E-01	8.09E-02	G
		176.29	-6.000E-02	% P	4.777E-01	1.43E-01	G
I-131	8.6032E-02						
		364.48	8.603E-02	%(	5.949E-01	1.76E-01	G K
		636.97	-4.502E-02	%	5.833E+00	1.67E+00	G
		284.29	7.474E-02	%	8.066E+00	2.38E+00	G
CS-134	1.4001E-02						
		604.66	-2.070E-04	%(P	3.285E-02	9.55E-03	G K
		795.76	3.024E-02	*(P	3.566E-02	1.12E-02	G
		569.29	5.989E-02	%	1.478E-01	4.44E-02	G
		801.84	-9.675E-03	% P	3.001E-01	8.55E-02	G
CS-137	1.1162E-02						
		661.62	1.116E-02	%(P	3.776E-02	1.12E-02	G
CE-139	1.4290E-04						
		165.85	1.429E-04	%(P	3.687E-02	1.09E-02	G
EU-152	-2.2354E-02						
		121.78	-2.235E-02	%(P	9.916E-02	2.98E-02	G K
		344.30	-2.703E-02	& P	1.003E-01	3.00E-02	G
		1408.08	7.208E-02	% P	1.466E-01	4.44E-02	G
		964.00	-6.012E-02	% P	3.127E-01	9.25E-02	G
		1112.07	2.420E-03	& P	3.197E-01	9.25E-02	G
		778.90	-5.863E-02	% P	2.409E-01	7.11E-02	G
EU-154	-1.0174E-03						
		123.10	-1.017E-03	&(P	7.223E-02	2.15E-02	G K
		1274.80	2.747E-02	% P	9.804E-02	2.89E-02	G
		723.30	-4.469E-03	% P	2.561E-01	7.54E-02	G
		1004.80	-1.931E-02	% P	1.973E-01	5.72E-02	G
EU-155	9.7853E-02						
		86.45	9.785E-02	%(	1.414E-01	4.32E-02	G K
		105.31	1.514E-02	% P	1.336E-01	3.99E-02	G
HG-203	2.1063E-02						
		279.17	2.106E-02	&(P	5.182E-02	1.56E-02	G K
		72.87	-7.944E-01	% P	1.662E+00	5.04E-01	G
		70.83	-1.289E+00	%	2.853E+00	8.65E-01	G
		82.50	-7.175E-01	%	3.160E+00	9.51E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8431E-01						
		583.14	2.843E-01	*(P	3.514E-02	1.84E-02	G
		510.72	4.694E-01	+ P	1.342E-01	5.54E-02	G
PB-212	5.7537E-01						
		238.63	5.563E-01	(P	7.051E-02	2.72E-02	G K
							Energy duplication
		77.11	3.117E-01	}	2.372E-01	5.95E-02	G
		74.81	1.173E+00	+ P	4.108E-01	1.35E-01	G
PB-214	6.7783E-01						
		351.99	6.649E-01	*(P	6.361E-02	3.19E-02	G K
		295.22	7.006E-01	*(P	1.597E-01	6.75E-02	G
							Energy duplication
		77.11	3.884E-01	} P	4.668E-01	1.24E-01	G
		241.92	6.832E-01	(P	4.274E-01	1.35E-01	G
BI-212	6.7247E-01						
		727.17	6.725E-01	*(P	3.057E-01	1.36E-01	G K
		1620.56	4.308E-01	% P	6.772E-01	2.14E-01	G
		785.42	1.332E+00	+ P	1.444E+00	5.27E-01	G
BI-214	4.0942E-01						
		609.32	4.084E-01	*(P	7.503E-02	3.00E-02	G K
		1764.51	4.125E-01	*(P	1.798E-01	7.15E-02	G
		1120.28	5.093E-01	+ P	2.741E-01	9.37E-02	G
RA-224	5.5252E+00						
		241.00	5.525E+00	&(P	9.656E-01	3.41E-01	G
RA-226	8.9959E-01						
		185.99	8.996E-01	*(	9.212E-01	2.85E-01	G
AC-228	9.4377E-01						
		911.07	8.930E-01	*(P	1.362E-01	7.52E-02	G K
		968.90	1.028E+00	*(P	1.935E-01	9.64E-02	G
		338.40	7.658E-01	- P	2.340E-01	9.50E-02	G
TH-227	-4.4607E-01						
		236.00	-4.461E-01	?(P	4.280E-01	1.32E-01	G K
		256.25	1.079E-02	& P	3.954E-01	1.17E-01	G
PA-234	-6.6319E-02						
		98.44	-6.632E-02	&(	1.365E-01	4.14E-02	G K
		946.00	-1.026E-02	&	1.748E-01	5.07E-02	G
		131.28	3.138E-03	&	1.657E-01	4.95E-02	G
		94.67	2.624E-03	%	2.637E-01	7.89E-02	G
		883.24	-2.223E-02	%	2.710E-01	7.87E-02	G
		926.70	-7.687E-02	&	3.176E-01	9.40E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 5.966E-03 %   2.476E-01 7.17E-02 G

TH-234       5.2088E-01
                           63.29 5.209E-01 %(P 1.698E+00 5.11E-01 G K
                           92.80 3.212E-01 % P 1.422E+00 4.27E-01 G
                           92.38 5.549E-01 % P 1.565E+00 4.72E-01 G

AM-241       7.5103E-02
                           59.54 7.510E-02 &(P 2.026E-01 6.12E-02 G
   ( - This peak used in the nuclide activity average.

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-1.9928E-02	-3.0957E-02	3.0046E-01	3.0046E-01	2.209E-01
K-40	#	1.6099E+01	1.6099E+01	1.1556E+00	1.4965E+00	
MN-54	#A	1.1403E-02	1.2295E-02	2.7758E-02	2.7768E-02	2.859E-02
CO-57	#B	-1.0442E-02	-1.1393E-02	3.2479E-02	3.2485E-02	3.253E-02
CO-60	#B	-3.7398E-03	-3.7858E-03	3.5601E-01	3.5601E-01	3.180E-02

Sr-85	#A	-2.2702E-02	-3.2629E-02	5.1267E-02	5.1304E-02	3.897E-02
Kr-85	#A	-5.5316E+02	-5.5330E+02	9.1508E+02	9.1566E+02	9.032E+02
Y-88	#B	-2.3421E-03	-2.9203E-03	4.2426E-02	4.2426E-02	1.979E-02
NB-94	#B	4.3270E-03	4.3270E-03	2.6688E-02	2.6690E-02	3.052E-02
Ag-108M	#B	-1.1730E-02	-1.1736E-02	3.6696E-02	3.6702E-02	4.095E-02
CD-109	#A	8.2425E-01	8.6815E-01	1.0981E+00	1.0992E+00	1.138E+00
SN-113	#B	7.2533E-03	8.8978E-03	4.2162E-02	4.2166E-02	3.870E-02
SB-125	#B	7.0464E-02	7.2121E-02	7.1962E-02	7.2088E-02	8.679E-02
I-131	#B	4.6152E-03	8.6032E-02	5.2900E-01	5.2902E-01	3.192E-02
CS-134	#B	1.3570E-02	1.4001E-02	1.5593E-02	1.5615E-02	3.184E-02
CS-137	#A	1.1138E-02	1.1162E-02	3.3630E-02	3.3636E-02	3.768E-02
CE-139	#A	1.2044E-04	1.4290E-04	3.2830E-02	3.2830E-02	3.107E-02
EU-152	#B	-2.2241E-02	-2.2354E-02	9.0116E-02	9.0125E-02	9.866E-02
EU-154	#B	-1.0097E-03	-1.0174E-03	1.1039E-01	1.1039E-01	7.169E-02
EU-155	#B	9.6591E-02	9.7853E-02	1.2946E-01	1.2957E-01	1.396E-01
HG-203	#B	1.2714E-02	2.1063E-02	4.6921E-02	4.6938E-02	3.128E-02
TL-208	#	2.8431E-01	2.8431E-01	5.5099E-02	5.7601E-02	
PB-212		5.7537E-01	5.7537E-01	8.4322E-02	9.0912E-02	
PB-214		6.7783E-01	6.7783E-01	9.7547E-02	1.0544E-01	
BI-212	#	6.7247E-01	6.7247E-01	4.0770E-01	4.0963E-01	
BI-214	#	4.0942E-01	4.0942E-01	9.0182E-02	9.3368E-02	7.503E-02
RA-224	#	5.5252E+00	5.5252E+00	1.0239E+00	1.0747E+00	9.656E-01
RA-226	#A	8.9955E-01	8.9959E-01	8.5366E-01	8.5531E-01	9.211E-01
AC-228	#	9.4377E-01	9.4377E-01	1.7848E-01	1.8698E-01	
TH-227	#A	-4.4607E-01	-4.4607E-01	3.9622E-01	3.9710E-01	4.280E-01
PA-234	#B	-6.6319E-02	-6.6319E-02	1.2420E-01	1.2426E-01	1.365E-01
TH-234	#B	5.2088E-01	5.2088E-01	1.5332E+00	1.5335E+00	1.698E+00
AM-241	#A	7.5092E-02	7.5103E-02	1.8363E-01	1.8368E-01	2.026E-01

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

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

Total Activity (269.7 to 2000.1 keV) 1.9252678E+01 pCi/gm
Total Decayed Activity (269.7 to 2000.1 keV) 1.9252678E+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_1SEP2006_0613.An1

Sample description
FSS-OOL-02-05-002-F

Spectrum Filename: C:\GammaVision\Spectra\101F_1SEP2006_0613.An1

Acquisition information
Start time: 01-Sep-2006 06:14:03
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: 1.6660E+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-2006 13:25:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1395

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.74	234.	12.79	1.00	1.654E-02	74.81	9.600	1.194E+00	PB212
87.69	101.	27.11	1.01	1.934E-02				
89.76	67.	41.52	1.02	1.960E-02				
92.98	147.	18.89	1.02	1.996E-02	92.38	2.570	2.170E+00	TH234
					92.80	3.000	1.919E+00	TH234
129.01	86.	31.80	1.72	2.110E-02				
129.01	86.	31.80	1.72	2.110E-02	131.28	20.000	1.656E-01	PA234
185.86	101.	24.47	1.43	1.859E-02				
185.86	101.	24.47	1.43	1.859E-02	185.99	3.280	1.344E+00	RA226
209.45	80.	31.43	0.81	1.721E-02				
238.68	694.	4.52	1.12	1.558E-02	238.63	43.100	8.312E-01	PB212
241.66	84.	24.98	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.908E-01	PB214
270.21	48.	39.67	1.12	1.400E-02				
295.15	165.	10.69	1.16	1.292E-02	295.22	19.200	5.346E-01	PB214
300.04	62.	24.39	1.16	1.273E-02				
338.87	159.	14.52	1.10	1.133E-02	338.40	12.010	9.320E-01	AC228
351.79	235.	9.95	1.21	1.093E-02	351.99	37.100	4.663E-01	PB214
510.52	86.	19.79	1.75	7.593E-03	510.72	22.500	3.347E-01	TL208
582.87	241.	8.76	1.68	6.687E-03	583.14	86.000	3.366E-01	TL208
609.02	181.	10.83	1.34	6.416E-03	609.32	46.090	4.942E-01	BI214
727.23	56.	23.83	1.04	5.443E-03	727.17	11.800	6.962E-01	BI212
794.78	29.	31.39	1.50	5.016E-03	795.76	85.400	5.512E-02	CS134
910.26	154.	10.48	2.19	4.450E-03				
910.26	154.	10.48	2.19	4.450E-03	911.07	29.000	9.557E-01	AC228
968.59	97.	16.63	1.64	4.213E-03				
968.59	97.	16.63	1.64	4.213E-03	968.90	17.460	1.062E+00	AC228

1120.02	38.	33.54	2.15	3.711E-03	1120.28	15.040	5.511E-01	BI214
1460.25	677.	3.91	1.93	2.943E-03	1460.75	10.700	1.738E+01	K40
1763.82	30.	19.83	2.41	2.481E-03	1764.51	15.920	6.091E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
174.96	88.14	324.	101.	0.050	81.33	1.014	PB-214	lD
179.10	90.21	353.	67.	0.033	124.55	1.016	PB-214	lD
418.57	209.45	248.	80.	0.040	94.30	0.810	AC-228	s
540.15	270.21	140.	48.	0.024	119.00	1.120	AC-228	
599.81	300.03	139.	64.	0.032	90.45	0.845	PB-212	s
1937.60	968.59	87.	58.	0.029	78.17	1.637	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	149.19	74.81	352.	234.	0.117	38.36	1.005D
PB-212	153.79	77.11	370.	309.	0.154	26.58	1.006A
TH-234	185.30	92.86	788.	152.	0.076	76.26	1.499s
TH-234	185.25	92.84	761.	156.	0.078	75.59	1.499s
PA-234	257.55	128.97	434.	86.	0.043	107.38	1.499s
RA-226	371.58	185.96	433.	105.	0.053	88.93	1.499s
PB-212	476.96	238.63	151.	688.	0.344	13.56	1.122D
PB-214	483.54	241.92	153.	73.	0.036	79.35	1.124D
PB-214	590.02	295.13	146.	129.	0.065	48.46	0.870
AC-228	676.39	338.30	149.	111.	0.055	53.46	1.499s
PB-214	703.38	351.79	122.	233.	0.117	29.86	1.213
TL-208	1020.99	510.52	93.	70.	0.035	59.37	1.748s
TL-208	1165.76	582.87	64.	239.	0.119	26.29	1.682s
BI-214	1218.07	609.02	65.	180.	0.090	32.50	1.342
BI-212	1454.60	727.23	44.	55.	0.028	71.48	1.041
CS-134	1589.78	794.78	28.	29.	0.015	94.16	1.502s
AC-228	1822.16	910.90	32.	114.	0.057	34.32	1.578s
AC-228	1937.51	968.55	41.	60.	0.030	58.64	1.616
BI-214	2240.63	1120.02	44.	38.	0.019	100.62	2.147s
K-40	2921.51	1460.25	8.	675.	0.337	11.73	1.933
BI-214	3529.08	1763.82	2.	30.	0.015	59.48	2.407

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

***** S U M M A R Y O 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		2.0906E-03					
			477.56	2.091E-03	&(	4.630E-01 1.32E-01	G
K-40		1.7383E+01					
			1460.75	1.738E+01	(P	4.153E-01 6.82E-01	G
MN-54		-2.8240E-03					
			834.81	-2.824E-03	%(P	4.709E-02 1.29E-02	G
CO-57		-8.9850E-03					
			122.07	-8.985E-03	%(	5.124E-02 1.53E-02	G K
			136.43	-1.840E-02	&	4.389E-01 1.30E-01	G
CO-60		-8.3960E-04					
			1332.51	-8.396E-04	&(P	6.137E-02 1.65E-02	G K
			1173.23	-3.421E-04	& P	7.626E-02 2.12E-02	G K
Sr-85		-3.1296E-02					
			514.00	-3.130E-02	%(	6.812E-02 2.06E-02	G
Kr-85		-7.3137E+02					
			513.99	-7.314E+02	%(P	1.533E+03 4.62E+02	G
Y-88		-7.2885E-03					
			1836.01	-7.288E-03	%(	5.031E-02 1.34E-02	G K
			898.02	-3.932E-05	% P	5.372E-02 1.47E-02	G
NB-94		1.2837E-02					
			871.10	1.284E-02	%(P	4.815E-02 1.40E-02	G K
			702.50	6.698E-03	% P	4.970E-02 1.42E-02	G K
Ag-108M		0.0000E+00					
			722.95	0.000E+00	&(	1.083E-01 3.15E-02	G K
			614.37	5.158E-03	% P	5.398E-02 1.55E-02	G
			433.93	-7.473E-03	&	5.433E-02 1.59E-02	G
CD-109		-4.1271E-01					
			88.04	-4.127E-01	%(P	1.713E+00 5.15E-01	G
SN-113		-2.1661E-02					
			391.71	-2.166E-02	%(	6.806E-02 2.03E-02	G K
			255.04	1.327E-02	& P	2.104E+00 6.16E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-1.0238E-02						
		427.95	-1.024E-02	&(P	1.293E-01	3.70E-02	G K
		600.77	-8.026E-02	% P	2.899E-01	8.55E-02	G
		636.15	2.715E-02	& P	3.986E-01	1.13E-01	G
		463.51	2.760E-01	% P	4.476E-01	1.37E-01	G
		176.29	8.763E-02	% P	6.764E-01	2.01E-01	G
I-131	1.8981E-02						
		364.48	1.898E-02	&(	6.023E-02	1.79E-02	G K
		636.97	7.645E-03	%	7.422E-01	2.07E-01	G
		284.29	9.810E-02	%	8.818E-01	2.60E-01	G
CS-134	-2.8894E-02						
		604.66	-2.889E-02	%(P	6.455E-02	1.94E-02	G K
		795.76	5.512E-02	+ P	5.231E-02	1.76E-02	G
		569.29	8.247E-02	& P	2.829E-01	8.33E-02	G
		801.84	-1.966E-01	%	7.003E-01	2.06E-01	G
CS-137	1.6302E-02						
		661.62	1.630E-02	&(P	6.472E-02	1.90E-02	G
CE-139	-1.4784E-02						
		165.85	-1.478E-02	%(P	5.543E-02	1.66E-02	G
EU-152	-2.4257E-03						
		121.78	-2.426E-03	%(P	1.601E-01	4.75E-02	G K
		344.30	-3.777E-02	% P	1.776E-01	5.25E-02	G
		1408.08	1.619E-02	% P	2.797E-01	7.57E-02	G
		964.00	-2.995E-01	& P	6.669E-01	2.01E-01	G
		1112.07	2.022E-01	% P	4.541E-01	1.37E-01	G
		778.90	7.164E-02	% P	3.222E-01	9.25E-02	G
EU-154	2.8589E-02						
		123.10	2.859E-02	%(P	1.104E-01	3.31E-02	G K
		1274.80	1.704E-02	& P	1.961E-01	5.49E-02	G
		723.30	-8.757E-02	& P	3.284E-01	9.66E-02	G
		1004.80	3.404E-03	& P	3.698E-01	1.03E-01	G
EU-155	-5.5300E-03						
		86.45	-5.530E-03	&(	1.964E-01	5.86E-02	G K
		105.31	5.585E-02	%	2.153E-01	6.47E-02	G
HG-203	-6.7976E-03						
		279.17	-6.798E-03	%(	5.775E-02	1.71E-02	G K
		72.87	-3.314E-01	& P	1.408E+00	4.23E-01	G
		70.83	-1.755E+00	%	2.397E+00	7.34E-01	G
		82.50	5.861E-02	&	2.925E+00	8.72E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.3618E-01						
		583.14	3.366E-01	@(P	5.662E-02	2.98E-02	G
		510.72	3.347E-01	*(P	2.258E-01	8.13E-02	G
PB-212	8.3726E-01						
		238.63	8.312E-01	(P	7.252E-02	3.79E-02	G K
							Energy duplication
		77.11	8.314E-01	}	2.487E-01	7.37E-02	G
		74.81	1.194E+00	+ P	4.607E-01	1.56E-01	G
PB-214	4.5870E-01						
		351.99	4.663E-01	(P	1.084E-01	4.68E-02	G K
		295.22	4.225E-01	(P	1.928E-01	6.92E-02	G
							Energy duplication
		77.11	0.000E+00	} P	5.724E-01	0.00E+00	G
		241.92	5.137E-01	(P	4.257E-01	1.37E-01	G
BI-212	6.9615E-01						
		727.17	6.962E-01	(P	4.241E-01	1.68E-01	G K
		1620.56	3.938E-01	&	1.227E+00	3.50E-01	G
		785.42	-8.265E-03	% P	2.322E+00	6.37E-01	G
BI-214	5.2906E-01						
		609.32	4.942E-01	(P	1.105E-01	5.39E-02	G K
		1764.51	6.091E-01	(P	2.019E-01	1.22E-01	G
		1120.28	5.511E-01	(P	4.891E-01	1.87E-01	G
RA-224	5.8827E-01						
		241.00	5.883E-01	%(P	1.478E+00	4.46E-01	G
RA-226	1.3987E+00						
		185.99	1.399E+00	(	1.326E+00	4.15E-01	G
AC-228	6.8980E-01						
		911.07	7.177E-01	@(P	1.826E-01	8.35E-02	G K
		968.90	6.637E-01	(P	3.595E-01	1.31E-01	G
		338.40	6.604E-01	(P	3.545E-01	1.20E-01	G
TH-227	-1.9914E-01						
		236.00	-1.991E-01	%(P	5.120E-01	1.54E-01	G K
		256.25	5.747E-02	& P	5.992E-01	1.76E-01	G
PA-234	1.0733E-01						
		98.44	6.044E-02	&(	1.962E-01	5.91E-02	G K
		946.00	4.046E-02	&	2.194E-01	6.20E-02	G
		131.28	1.662E-01	?(	1.921E-01	5.95E-02	G
		94.67	-8.323E-03	%	3.606E-01	1.07E-01	G
		883.24	1.123E-04	&	4.136E-01	1.13E-01	G
		926.70	2.844E-02	%	4.984E-01	1.39E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.271E-01 &   4.171E-01 1.23E-01 G

TH-234       1.6755E+00
                           63.29 8.418E-01 &(P 2.377E+00 7.15E-01 G K
                           92.80 2.122E+00  (P 1.784E+00 5.56E-01 G
                           92.38 2.420E+00  (P 2.123E+00 6.59E-01 G

AM-241       2.8384E-02
                           59.54 2.838E-02 &(P 3.359E-01 1.00E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	2.0186E-03	2.0906E-03	3.9691E-01	3.9691E-01	4.470E-01
K-40		1.7383E+01	1.7383E+01	2.0463E+00	2.2699E+00	
MN-54	#A	-2.8071E-03	-2.8240E-03	6.4869E-02	6.4869E-02	4.680E-02
CO-57	#B	-8.9229E-03	-8.9850E-03	4.5938E-02	4.5940E-02	5.089E-02
CO-60	#B	-8.3878E-04	-8.3960E-04	8.5018E-02	8.5019E-02	6.131E-02

Sr-85	#A	-3.0406E-02	-3.1296E-02	6.1857E-02	6.1882E-02	6.618E-02
Kr-85	#A	-7.3136E+02	-7.3137E+02	1.5037E+03	1.5043E+03	1.533E+03
Y-88	#B	-7.1616E-03	-7.2885E-03	4.0180E-02	4.0182E-02	4.944E-02
NB-94	#B	1.2837E-02	1.2837E-02	4.1956E-02	4.1962E-02	4.815E-02
Ag-108M	#B	0.0000E+00	0.0000E+00	9.4546E-02	9.4546E-02	1.083E-01
CD-109	#A	-4.1100E-01	-4.1271E-01	1.5843E+00	1.5845E+00	1.706E+00
SN-113	#B	-2.1311E-02	-2.1661E-02	6.0870E-02	6.0883E-02	6.696E-02
SB-125	#B	-1.0219E-02	-1.0238E-02	1.3494E-01	1.3494E-01	1.291E-01
I-131	#B	1.5038E-02	1.8981E-02	5.3824E-02	5.3834E-02	4.772E-02
CS-134	#B	-2.8822E-02	-2.8894E-02	6.1597E-02	6.1619E-02	6.439E-02
CS-137	#A	1.6299E-02	1.6302E-02	5.6875E-02	5.6882E-02	6.471E-02
CE-139	#A	-1.4584E-02	-1.4784E-02	5.1020E-02	5.1027E-02	5.468E-02
EU-152	#B	-2.4248E-03	-2.4257E-03	3.5246E-01	3.5246E-01	1.600E-01
EU-154	#B	2.8572E-02	2.8589E-02	9.9375E-02	9.9387E-02	1.103E-01
EU-155	#B	-5.5243E-03	-5.5300E-03	1.7582E-01	1.7582E-01	1.962E-01
HG-203	#B	-6.5299E-03	-6.7976E-03	5.1157E-02	5.1158E-02	5.548E-02
TL-208	#	3.3618E-01	3.3618E-01	8.9277E-02	9.1275E-02	
PB-212		8.3726E-01	8.3726E-01	1.1455E-01	1.2394E-01	
PB-214		4.5870E-01	4.5870E-01	1.3812E-01	1.4053E-01	
BI-212		6.9615E-01	6.9615E-01	5.0372E-01	5.0526E-01	
BI-214		5.2906E-01	5.2906E-01	1.7301E-01	1.7557E-01	
RA-224	#A	5.8827E-01	5.8827E-01	1.3392E+00	1.3397E+00	1.478E+00
RA-226	#	1.3987E+00	1.3987E+00	1.2439E+00	1.2464E+00	1.326E+00
AC-228	#	6.8980E-01	6.8980E-01	2.0189E-01	2.0562E-01	1.826E-01
TH-227	#B	-1.9914E-01	-1.9914E-01	4.7291E-01	4.7305E-01	5.120E-01
PA-234	#B	1.0733E-01	1.0733E-01	1.1525E-01	1.1540E-01	1.962E-01
TH-234	#B	1.6755E+00	1.6755E+00	1.3167E+00	1.3199E+00	2.377E+00
AM-241	#A	2.8384E-02	2.8384E-02	3.0037E-01	3.0038E-01	3.359E-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) 2.0240263E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 2.0240263E+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_1SEP2006_0711.An1

Sample description
FSS-OOL-02-05-005-F

Spectrum Filename: C:\GammaVision\Spectra\101F_1SEP2006_0711.An1

Acquisition information
Start time: 01-Sep-2006 07:11:58
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: 1.7540E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7540E+03) =
5.7013E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-2006 13:40:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2890

***** S U M M A R Y O F P E A K 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	221.	15.19	1.00	1.651E-02	74.81	9.600	1.047E+00	PB212
76.99	339.	9.91	1.01	1.714E-02	77.11	17.500	8.685E-01	PB212
					77.11	10.700	1.405E+00	PB214
82.71	135.	14.59	0.00	1.847E-02				
86.90	165.	17.47	1.01	1.917E-02	86.45	32.740	2.031E-01	EU155
89.53	86.	32.15	1.02	1.953E-02	88.04	3.790	PBC<MDA	CD109
93.33	170.	17.61	1.02	1.996E-02	92.38	2.570	2.398E+00	TH234
					92.80	3.000	2.110E+00	TH234
129.11	81.	38.59	1.68	2.110E-02				
185.76	138.	22.90	1.25	1.860E-02	185.99	3.280	1.747E+00	RA226
208.93	100.	31.11	0.71	1.724E-02				
238.68	709.	4.44	1.12	1.557E-02	238.63	43.100	8.063E-01	PB212
241.70	133.	17.33	1.12	1.541E-02	241.00	3.900	1.694E+00	RA224
					241.92	7.470	8.876E-01	PB214
295.24	194.	9.84	1.16	1.292E-02	295.22	19.200	5.966E-01	PB214
300.14	41.	35.76	1.16	1.273E-02				
327.70	51.	36.28	0.86	1.171E-02				
338.10	138.	15.68	1.28	1.136E-02	338.40	12.010	7.699E-01	AC228
351.85	273.	9.97	0.97	1.093E-02	351.99	37.100	5.152E-01	PB214
462.49	64.	29.93	1.53	8.360E-03				
462.49	64.	29.93	1.53	8.360E-03	463.51	10.000	5.816E-01	SB125
509.98	97.	20.75	0.98	7.601E-03	510.72	22.500	3.662E-01	TL208
583.05	254.	9.81	1.22	6.685E-03	583.14	86.000	3.367E-01	TL208
609.06	202.	9.07	1.39	6.415E-03	609.32	46.090	5.231E-01	BI214
726.71	53.	31.69	1.53	5.446E-03				
726.71	53.	31.69	1.53	5.446E-03	727.17	11.800	6.228E-01	BI212
910.99	151.	11.56	1.94	4.447E-03	911.07	29.000	8.934E-01	AC228

968.49	53.	24.90	1.62	4.212E-03	968.90	17.460	5.526E-01	AC228
1119.94	53.	30.60	1.67	3.711E-03	1120.28	15.040	7.264E-01	BI214
1460.28	674.	4.10	1.68	2.943E-03	1460.75	10.700	1.643E+01	K40
1763.62	39.	18.82	0.68	2.481E-03	1764.51	15.920	7.618E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
178.64	89.61	340.	86.	0.043	96.46	1.015	PB-214	lD
257.83	129.11	420.	83.	0.041	109.82	1.679	AC-228	s
417.53	208.93	344.	100.	0.050	93.33	0.712	AC-228	s
600.03	300.05	87.	41.	0.021	107.27	1.165	PB-212	lD
655.18	327.70	126.	51.	0.025	108.83	0.861	AC-228	s
1933.45	966.52	34.	131.	0.066	36.36	1.268	TB-160	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	405.	210.	0.105	44.45	1.005D
PB-212	153.79	77.11	397.	284.	0.142	27.59	1.006A
HG-203	170.43	85.43	996.	-135.	-0.068	102.37	1.499s
EU-155	173.48	86.95	952.	144.	0.072	94.18	1.499
TH-234	185.59	93.00	843.	204.	0.102	60.41	1.499s
TH-234	185.56	92.99	831.	204.	0.102	61.57	1.499s
RA-226	371.18	185.76	360.	138.	0.069	68.70	1.251s
PB-212	476.96	238.63	149.	701.	0.351	13.36	1.122D
RA-224	483.04	241.67	507.	103.	0.051	96.68	1.499
PB-214	483.54	241.92	155.	127.	0.064	49.02	1.124D
PB-214	590.05	295.15	166.	176.	0.088	40.24	1.064
AC-228	675.98	338.10	141.	136.	0.068	47.05	1.277s
PB-214	703.50	351.85	158.	271.	0.136	29.91	0.973s
SB-125	925.43	462.77	87.	38.	0.019	110.42	1.499
TL-208	1019.89	509.98	113.	81.	0.041	62.26	0.985s
TL-208	1166.11	583.05	104.	251.	0.126	29.42	1.221
BI-214	1218.16	609.06	52.	201.	0.100	27.21	1.386
BI-212	1453.99	726.92	53.	37.	0.019	94.27	1.499s
AC-228	1822.34	910.99	47.	150.	0.075	34.69	1.939s
AC-228	1937.40	968.49	63.	53.	0.026	74.70	1.616s
BI-214	2240.46	1119.94	60.	53.	0.026	91.80	1.674s
K-40	2921.58	1460.28	19.	672.	0.336	12.31	1.678
BI-214	3528.67	1763.62	4.	39.	0.020	56.45	0.684s

s - Peak fails shape tests.
D - Peak area deconvoluted.

A Derived peak area.

***** S U M M A R Y O 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	&(	5.185E-01 1.49E-01	G
K-40		1.6432E+01					
			1460.75	1.643E+01	(P	5.696E-01 6.77E-01	G
MN-54		-1.2162E-02					
			834.81	-1.216E-02	&(P	5.153E-02 1.49E-02	G
CO-57		-2.5747E-03					
			122.07	-2.575E-03	&(	5.361E-02 1.60E-02	G K
			136.43	3.720E-03	&	4.436E-01 1.32E-01	G
CO-60		1.1866E-03					
			1332.51	1.187E-03	&(P	5.487E-02 1.47E-02	G K
			1173.23	-7.021E-03	& P	7.273E-02 2.06E-02	G K
Sr-85		-1.7146E-02					
			514.00	-1.715E-02	%(	6.223E-02 1.85E-02	G
Kr-85		-4.1257E+02					
			513.99	-4.126E+02	%(P	1.401E+03 4.15E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	5.471E-02 1.39E-02	G K
			898.02	-5.263E-03	% P	5.179E-02 1.45E-02	G
NB-94		1.8745E-02					
			871.10	1.874E-02	&(P	3.517E-02 1.08E-02	G K
			702.50	1.977E-02	% P	4.758E-02 1.43E-02	G K
Ag-108M		-1.3074E-02					
			722.95	-1.307E-02	&(	6.564E-02 1.92E-02	G K
			614.37	-1.047E-02	% P	5.601E-02 1.63E-02	G
			433.93	-4.990E-03	%	3.639E-02 1.05E-02	G
CD-109		1.5883E-01					
			88.04	1.588E-01	%(P	1.607E+00 4.81E-01	G
SN-113		-1.7337E-02					
			391.71	-1.734E-02	%(	7.023E-02 2.08E-02	G K
			255.04	-7.189E-03	& P	2.175E+00 6.39E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	6.1858E-02						
		427.95	-3.604E-02	%(P	1.588E-01	4.68E-02	G K
		600.77	4.307E-02	& P	2.488E-01	7.21E-02	G
		636.15	-1.014E-01	% P	4.278E-01	1.25E-01	G
		463.51	3.516E-01	(P	4.276E-01	1.34E-01	G
		176.29	-1.853E-01	% P	6.968E-01	2.08E-01	G
I-131	-3.6789E-03						
		364.48	-3.679E-03	&(	7.011E-02	2.04E-02	G K
		636.97	2.834E-01	%	6.082E-01	1.84E-01	G
		284.29	-1.728E-01	%	8.322E-01	2.47E-01	G
CS-134	-2.5647E-02						
		604.66	-2.565E-02	%(P	6.236E-02	1.87E-02	G K
		795.76	3.611E-02	% P	5.512E-02	1.72E-02	G
		569.29	1.667E-02	% P	2.836E-01	8.07E-02	G
		801.84	8.170E-02	%	5.745E-01	1.64E-01	G
CS-137	1.9502E-02						
		661.62	1.950E-02	&(P	5.259E-02	1.56E-02	G
CE-139	-1.3334E-02						
		165.85	-1.333E-02	%(P	5.718E-02	1.71E-02	G
EU-152	-1.1637E-02						
		121.78	-1.164E-02	&(P	1.203E-01	3.56E-02	G K
		344.30	4.209E-02	% P	1.586E-01	4.71E-02	G
		1408.08	6.284E-02	% P	2.223E-01	6.36E-02	G
		964.00	-1.901E-02	& P	7.030E-01	2.03E-01	G
		1112.07	5.784E-02	& P	4.097E-01	1.16E-01	G
		778.90	-4.339E-02	& P	3.846E-01	1.09E-01	G
EU-154	-1.3738E-02						
		123.10	-1.374E-02	&(P	1.167E-01	3.48E-02	G K
		1274.80	6.084E-02	% P	1.454E-01	4.36E-02	G
		723.30	-6.718E-02	& P	2.834E-01	8.27E-02	G
		1004.80	-6.841E-02	% P	3.429E-01	9.89E-02	G
EU-155	1.7783E-01						
		86.45	1.778E-01	(	1.807E-01	5.58E-02	G K
		105.31	4.813E-02	%	2.210E-01	6.63E-02	G
HG-203	3.0712E-03						
		279.17	3.071E-03	&(	5.317E-02	1.56E-02	G K
		72.87	-5.695E-01	& P	1.407E+00	4.25E-01	G
		70.83	-9.777E-02	%	2.071E+00	6.17E-01	G
		82.50	-2.627E+00	+	2.911E+00	8.97E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.4281E-01						
		583.14	3.367E-01	(P	6.725E-02	3.33E-02	G
		510.72	3.662E-01	*(P	2.355E-01	9.09E-02	G
PB-212	8.2233E-01						
		238.63	8.051E-01	(P	6.842E-02	3.62E-02	G K
							Energy duplication
		77.11	7.257E-01	}	2.446E-01	6.68E-02	G
		74.81	1.018E+00	+ P	4.683E-01	1.55E-01	G
PB-214	5.2635E-01						
		351.99	5.152E-01	@(P	1.165E-01	5.17E-02	G K
		295.22	5.479E-01	(P	1.947E-01	7.42E-02	G
							Energy duplication
		77.11	0.000E+00	} P	5.887E-01	0.00E+00	G
		241.92	8.513E-01	+ P	4.065E-01	1.40E-01	G
BI-212	4.4904E-01						
		727.17	4.490E-01	(P	4.408E-01	1.44E-01	G K
		1620.56	4.048E-01	%	1.655E+00	4.64E-01	G
		785.42	-1.822E-02	% P	2.748E+00	7.70E-01	G
BI-214	5.2315E-01						
		609.32	5.231E-01	(P	9.492E-02	4.77E-02	G K
		1764.51	7.618E-01	+ P	2.332E-01	1.45E-01	G
		1120.28	7.264E-01	+ P	5.373E-01	2.24E-01	G
RA-224	1.3165E+00						
		241.00	1.317E+00	(P	1.376E+00	4.27E-01	G
RA-226	1.7469E+00						
		185.99	1.747E+00	*(	1.152E+00	4.00E-01	G
AC-228	8.5725E-01						
		911.07	8.934E-01	@(P	2.080E-01	1.05E-01	G K
		968.90	5.526E-01	& P	4.147E-01	1.39E-01	G
		338.40	7.699E-01	*(P	3.278E-01	1.23E-01	G
TH-227	-2.7260E-01						
		236.00	-2.726E-01	&(P	5.250E-01	1.59E-01	G K
		256.25	1.565E-01	% P	6.432E-01	1.92E-01	G
PA-234	-1.0743E-01						
		98.44	-1.074E-01	%(	1.840E-01	5.61E-02	G K
		946.00	4.759E-02	&	2.618E-01	7.50E-02	G
		131.28	-3.413E-02	%	2.432E-01	7.27E-02	G
		94.67	-1.318E-02	%	3.470E-01	1.03E-01	G
		883.24	-2.664E-02	%	4.393E-01	1.23E-01	G
		926.70	1.717E-01	%	4.401E-01	1.31E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 1.842E-02 %   4.215E-01 1.20E-01 G

TH-234       2.0169E+00
                           63.29 8.374E-01 %(P 2.312E+00 6.96E-01 G K
                           92.80 2.632E+00 *(P 1.769E+00 5.57E-01 G
                           92.38 3.088E+00 &(P 2.085E+00 6.55E-01 G

AM-241       1.9301E-02
                           59.54 1.930E-02 %(P 3.174E-01 9.45E-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	0.0000E+00	0.0000E+00	4.4847E-01	4.4847E-01	5.005E-01
K-40		1.6432E+01	1.6432E+01	2.0304E+00	2.2326E+00	
MN-54	#A	-1.2088E-02	-1.2162E-02	4.9852E-02	4.9857E-02	5.122E-02
CO-57	#B	-2.5567E-03	-2.5747E-03	4.7851E-02	4.7851E-02	5.323E-02
CO-60	#B	1.1854E-03	1.1866E-03	4.4233E-02	4.4233E-02	5.482E-02

Sr-85	#A	-1.6653E-02	-1.7146E-02	5.5532E-02	5.5540E-02	6.044E-02
Kr-85	#A	-4.1256E+02	-4.1257E+02	1.4261E+03	1.4263E+03	1.401E+03
Y-88	#B	0.0000E+00	0.0000E+00	4.1665E-02	4.1665E-02	5.374E-02
NB-94	#B	1.8745E-02	1.8745E-02	3.2502E-02	3.2520E-02	3.517E-02
Ag-108M	#B	-1.3074E-02	-1.3074E-02	5.7537E-02	5.7542E-02	6.564E-02
CD-109	A	1.5817E-01	1.5883E-01	1.4421E+00	1.4421E+00	1.600E+00
SN-113	#B	-1.7055E-02	-1.7337E-02	6.2451E-02	6.2459E-02	6.909E-02
SB-125	#B	6.1742E-02	6.1858E-02	7.0905E-02	7.0991E-02	1.585E-01
I-131	#B	-2.9072E-03	-3.6789E-03	6.1336E-02	6.1336E-02	5.541E-02
CS-134	#B	-2.5583E-02	-2.5647E-02	5.9514E-02	5.9531E-02	6.220E-02
CS-137	#A	1.9498E-02	1.9502E-02	4.6852E-02	4.6865E-02	5.258E-02
CE-139	#A	-1.3151E-02	-1.3334E-02	5.2662E-02	5.2667E-02	5.640E-02
EU-152	#B	-1.1632E-02	-1.1637E-02	1.2652E-01	1.2652E-01	1.203E-01
EU-154	#B	-1.3730E-02	-1.3738E-02	1.1772E-01	1.1772E-01	1.166E-01
EU-155	#A	1.7764E-01	1.7783E-01	1.6748E-01	1.6777E-01	1.805E-01
HG-203	#B	2.9489E-03	3.0712E-03	4.6838E-02	4.6838E-02	5.106E-02
TL-208		3.4281E-01	3.4281E-01	1.0182E-01	1.0365E-01	
PB-212		8.2233E-01	8.2233E-01	1.1086E-01	1.2020E-01	
PB-214		5.2635E-01	5.2635E-01	1.3316E-01	1.3644E-01	
BI-212	#	4.4904E-01	4.4904E-01	4.3099E-01	4.3174E-01	4.408E-01
BI-214		5.2315E-01	5.2315E-01	1.4311E-01	1.4614E-01	
RA-224	#A	1.3165E+00	1.3165E+00	1.2817E+00	1.2838E+00	1.376E+00
RA-226	#	1.7469E+00	1.7469E+00	1.2002E+00	1.2042E+00	
AC-228	#	8.5725E-01	8.5725E-01	2.5424E-01	2.5881E-01	
TH-227	#B	-2.7260E-01	-2.7260E-01	4.8501E-01	4.8526E-01	5.250E-01
PA-234	#B	-1.0743E-01	-1.0743E-01	1.6821E-01	1.6832E-01	1.840E-01
TH-234	#B	2.0169E+00	2.0169E+00	1.2794E+00	1.2843E+00	2.312E+00
AM-241	#A	1.9301E-02	1.9301E-02	2.8348E-01	2.8348E-01	3.174E-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) 2.1251251E+01 pCi/gm
Total Decayed Activity (277.1 to 1999.1 keV) 2.1251257E+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_1SEP2006_0804.An1

Sample description
FSS-OOL-02-05-006-F

Spectrum Filename: C:\GammaVision\Spectra\101F_1SEP2006_0804.An1

Acquisition information
Start time: 01-Sep-2006 08:04:50
Live time: 2000
Real time: 2003
Dead time: 0.13 %
Detector ID: 1

Detector system
Det 101- DSPE-633

Calibration
Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration
Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.6460E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6460E+03) =
6.0753E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-2006 13:45:00
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. 21 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1670

***** S U M M A R Y O F P E A K 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	208.	14.11	1.00	1.654E-02	74.81	9.600	1.077E+00	PB212
77.07	311.	8.61	1.01	1.720E-02	77.11	10.700	1.414E+00	PB214
					77.11	17.500	8.747E-01	PB212
84.21	61.	37.76	0.00	1.874E-02				
87.39	102.	40.41	1.50	1.910E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
92.51	108.	35.77	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.90	134.	29.71	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.29	128.	26.33	1.02	1.857E-02	185.99	3.280	1.731E+00	RA226
238.67	690.	4.42	1.12	1.558E-02	238.63	43.100	8.370E-01	PB212
241.33	113.	23.78	1.12	1.543E-02	241.00	3.900	1.531E+00	RA224
					241.92	7.470	8.021E-01	PB214
270.03	65.	29.38	1.41	1.401E-02				
295.25	160.	12.76	0.93	1.292E-02	295.22	19.200	5.250E-01	PB214
300.45	62.	32.05	0.86	1.271E-02				
338.35	138.	15.05	1.24	1.135E-02	338.40	12.010	8.210E-01	AC228
351.90	279.	9.72	1.18	1.093E-02	351.99	37.100	5.611E-01	PB214
462.55	54.	30.36	0.98	8.359E-03				
462.55	54.	30.36	0.98	8.359E-03	463.51	10.000	5.192E-01	SB125
510.45	105.	21.85	0.86	7.594E-03	510.72	22.500	4.277E-01	TL208
582.80	216.	10.61	1.11	6.688E-03	583.14	86.000	3.048E-01	TL208
609.42	195.	10.24	1.43	6.412E-03	609.32	46.090	5.386E-01	BI214
661.48	31.	37.09	1.50	5.937E-03	661.62	84.620	PBC<MDA	CS137
726.82	52.	21.42	1.70	5.445E-03	727.17	11.800	6.509E-01	BI212
768.35	41.	33.91	1.01	5.177E-03				

911.06	136.	10.04	1.70	4.447E-03	911.07	29.000	8.540E-01	AC228
964.14	27.	28.94	1.61	4.230E-03				
968.71	56.	18.57	1.62	4.213E-03	968.90	17.460	6.214E-01	AC228
1119.58	46.	29.04	1.41	3.711E-03	1120.28	15.040	6.740E-01	BI214
1460.28	638.	4.20	1.90	2.943E-03	1460.75	10.700	1.656E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1763.72	33.	17.41	1.03	2.481E-03	1764.51	15.920	6.767E-01	BI214

********** U N I D E N T I F I E D P E A K S U 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	270.03	134.	65.	0.032	88.15	1.412	AC-228	s
600.64	300.45	128.	62.	0.031	96.14	0.861	PB-212	
1536.89	768.35	49.	40.	0.020	87.48	1.012	BI-214	sM
1928.47	964.17	18.	26.	0.013	89.52	1.612	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	149.19	74.81	353.	208.	0.104	42.34	1.005D
PB-212	153.79	77.11	371.	311.	0.155	25.84	1.006A
EU-155	174.35	87.39	804.	102.	0.051	121.22	1.499s
TH-234	184.59	92.51	860.	108.	0.054	107.32	1.499s
TH-234	185.38	92.90	807.	134.	0.067	89.12	1.499s
RA-226	371.89	186.12	467.	111.	0.056	87.25	1.499s
PB-212	476.96	238.63	126.	684.	0.342	13.25	1.122D
RA-224	481.77	241.03	-24.	93.	0.047	21.12	1.499
PB-214	483.54	241.92	125.	110.	0.055	51.25	1.124D
PB-214	590.25	295.25	119.	159.	0.079	38.29	0.931
AC-228	676.49	338.35	121.	136.	0.068	45.16	1.242
PB-214	703.59	351.90	149.	277.	0.139	29.15	1.179
SB-125	925.70	462.90	83.	37.	0.018	112.02	1.499s
TL-208	1020.83	510.45	133.	89.	0.044	65.54	0.857s
TL-208	1165.61	582.80	84.	213.	0.107	31.83	1.114s
BI-214	1218.88	609.42	61.	194.	0.097	30.73	1.430s
CS-137	1323.05	661.48	56.	31.	0.016	111.27	1.499
BI-212	1453.80	726.82	30.	51.	0.025	64.26	1.703
AC-228	1822.47	911.06	23.	134.	0.067	30.12	1.704
AC-228	1938.21	968.90	30.	55.	0.028	56.95	1.616D
BI-214	2239.75	1119.58	42.	46.	0.023	87.11	1.405
K-40	2921.58	1460.28	20.	635.	0.318	12.59	1.895
BI-214	3528.88	1763.72	0.	33.	0.016	52.22	1.031s

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

***** S U M M A R Y O 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		2.5245E-01					
			477.56	2.525E-01	%(	4.502E-01 1.38E-01	G
K-40		1.6564E+01					
			1460.75	1.656E+01	(P	6.111E-01 6.98E-01	G
MN-54		1.1702E-02					
			834.81	1.170E-02	&(P	5.068E-02 1.46E-02	G
CO-57		-7.4878E-03					
			122.07	-7.488E-03	%(	5.642E-02 1.68E-02	G K
			136.43	-9.061E-02	%	4.309E-01 1.29E-01	G
CO-60		9.1368E-03					
			1332.51	9.137E-03	%(P	6.173E-02 1.73E-02	G K
			1173.23	1.605E-02	% P	8.730E-02 2.53E-02	G K
Sr-85		-2.8280E-02					
			514.00	-2.828E-02	%(	6.613E-02 2.00E-02	G
Kr-85		-6.6364E+02					
			513.99	-6.636E+02	%(P	1.488E+03 4.47E+02	G
Y-88		3.7672E-03					
			1836.01	3.767E-03	%(	3.730E-02 9.18E-03	G K
			898.02	2.352E-02	% P	4.706E-02 1.44E-02	G
NB-94		-2.5655E-03					
			871.10	-2.566E-03	%(P	5.025E-02 1.39E-02	G K
			702.50	-6.495E-05	% P	6.396E-02 1.82E-02	G K
Ag-108M		-2.9556E-02					
			722.95	-2.956E-02	&(	7.710E-02 2.31E-02	G K
			614.37	-8.193E-03	% P	5.804E-02 1.68E-02	G
			433.93	-8.703E-03	%	5.491E-02 1.61E-02	G
CD-109		-1.7304E-01					
			88.04	-1.730E-01	%(P	1.752E+00 5.24E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-8.4907E-03						
		391.71	-8.491E-03	%(	6.748E-02	1.97E-02	G K
		255.04	-2.804E-01	% P	2.196E+00	6.50E-01	G
SB-125	9.0899E-02						
		427.95	-4.196E-05	%(P	1.201E-01	3.39E-02	G K
		600.77	-5.146E-02	% P	2.384E-01	6.91E-02	G
		636.15	-8.855E-03	& P	3.967E-01	1.10E-01	G
		463.51	3.601E-01	@(P	4.452E-01	1.40E-01	G
		176.29	-2.236E-02	& P	7.218E-01	2.13E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	%(	7.002E-02	2.03E-02	G K
		636.97	1.596E-01	&	7.336E-01	2.12E-01	G
		284.29	5.627E-02	&	7.597E-01	2.22E-01	G
CS-134	-2.1971E-03						
		604.66	-2.197E-03	&(P	1.178E-01	3.47E-02	G K
		795.76	-8.024E-04	& P	6.485E-02	1.80E-02	G
		569.29	3.466E-03	& P	3.016E-01	8.51E-02	G
		801.84	-8.449E-02	&	6.107E-01	1.74E-01	G
CS-137	5.1016E-02						
		661.62	5.102E-02	(P	6.127E-02	1.95E-02	G
CE-139	1.0094E-02						
		165.85	1.009E-02	%(P	5.357E-02	1.60E-02	G
EU-152	-6.9428E-03						
		121.78	-6.943E-03	%(P	1.541E-01	4.57E-02	G K
		344.30	-6.644E-04	% P	1.587E-01	4.58E-02	G
		1408.08	8.496E-02	% P	2.054E-01	6.12E-02	G
		964.00	-1.511E-01	& P	5.939E-01	1.74E-01	G
		1112.07	-2.296E-03	& P	5.140E-01	1.43E-01	G
		778.90	1.226E-02	% P	3.154E-01	8.64E-02	G
EU-154	-1.9471E-02						
		123.10	-1.947E-02	%(P	1.222E-01	3.65E-02	G K
		1274.80	5.636E-02	% P	2.098E-01	6.12E-02	G
		723.30	2.867E-03	% P	2.885E-01	8.13E-02	G
		1004.80	7.863E-03	& P	3.762E-01	1.05E-01	G
EU-155	1.3456E-01						
		86.45	1.346E-01	@(	1.773E-01	5.44E-02	G K
		105.31	1.404E-02	&	2.177E-01	6.48E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	-1.9074E-02						
		279.17	-1.907E-02	%(	6.332E-02	1.90E-02	G K
		72.87	-2.310E-02	% P	1.649E+00	4.93E-01	G
		70.83	-6.899E-02	%	2.441E+00	7.28E-01	G
		82.50	-8.456E-01	%	2.844E+00	8.56E-01	G
TL-208	3.0480E-01						
		583.14	3.048E-01	@(P	6.471E-02	3.27E-02	G
		510.72	4.277E-01	+ P	2.714E-01	1.10E-01	G
PB-212	8.4790E-01						
		238.63	8.370E-01	(P	6.726E-02	3.73E-02	G K
							Energy duplication
		77.11	8.479E-01	}	2.522E-01	7.30E-02	G
		74.81	1.077E+00	+ P	4.665E-01	1.56E-01	G
PB-214	5.4880E-01						
		351.99	5.611E-01	(P	1.207E-01	5.49E-02	G K
		295.22	5.250E-01	(P	1.775E-01	6.78E-02	G
							Energy duplication
		77.11	1.364E-02	} P	5.742E-01	1.66E-01	G
		241.92	7.867E-01	+ P	3.908E-01	1.35E-01	G
BI-212	6.5092E-01						
		727.17	6.509E-01	(P	3.613E-01	1.41E-01	G K
		1620.56	5.618E-01	%	1.705E+00	4.94E-01	G
		785.42	1.268E+00	% P	2.402E+00	7.35E-01	G
BI-214	5.9356E-01						
		609.32	5.386E-01	*(P	1.087E-01	5.55E-02	G K
		1764.51	6.767E-01	(P	1.532E-01	1.19E-01	G
		1120.28	6.740E-01	(P	4.851E-01	1.97E-01	G
RA-224	1.2719E+00						
		241.00	1.272E+00	(P	1.004E-01	9.02E-02	G
RA-226	1.4978E+00						
		185.99	1.498E+00	*(	1.393E+00	4.36E-01	G
AC-228	8.4434E-01						
		911.07	8.540E-01	(P	1.591E-01	8.69E-02	G K
		968.90	6.193E-01	- P	3.129E-01	1.19E-01	G
		338.40	8.210E-01	(P	3.247E-01	1.26E-01	G
TH-227	-1.1409E-01						
		236.00	-1.141E-01	%(P	4.726E-01	1.41E-01	G K
		256.25	-8.654E-02	% P	6.231E-01	1.84E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	-4.5248E-03						
		98.44	-4.525E-03	&(	2.023E-01	6.01E-02	G K
		946.00	-1.165E-02	%	2.663E-01	7.37E-02	G
		131.28	3.560E-02	&	2.229E-01	6.66E-02	G
		94.67	-1.822E-02	%	3.339E-01	9.94E-02	G
		883.24	-1.192E-01	%	4.871E-01	1.42E-01	G
		926.70	-7.959E-02	%	4.896E-01	1.40E-01	G
		569.26	4.056E-03	&	4.119E-01	1.16E-01	G
TH-234	1.3163E+00						
		63.29	6.266E-01	%(P	2.426E+00	7.27E-01	G K
		92.80	1.847E+00	(P	1.858E+00	5.74E-01	G
		92.38	1.743E+00	&(P	2.243E+00	6.86E-01	G
AM-241	8.5240E-02						
		59.54	8.524E-02	%(P	3.114E-01	9.35E-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	2.4356E-01	2.5245E-01	4.1375E-01	4.1399E-01	4.343E-01
K-40		1.6564E+01	1.6564E+01	2.0936E+00	2.2933E+00	
MN-54	#A	1.1631E-02	1.1702E-02	4.3884E-02	4.3889E-02	5.037E-02
CO-57	#B	-7.4349E-03	-7.4878E-03	5.0549E-02	5.0550E-02	5.602E-02
CO-60	#B	9.1278E-03	9.1368E-03	5.1879E-02	5.1881E-02	6.167E-02
Sr-85	#A	-2.7457E-02	-2.8280E-02	5.9870E-02	5.9891E-02	6.420E-02
Kr-85	#A	-6.6363E+02	-6.6364E+02	1.4680E+03	1.4685E+03	1.488E+03
Y-88	#B	3.7001E-03	3.7672E-03	2.7536E-02	2.7537E-02	3.663E-02
NB-94	#B	-2.5655E-03	-2.5655E-03	5.0203E-02	5.0203E-02	5.025E-02
Ag-108M	#B	-2.9555E-02	-2.9556E-02	6.9359E-02	6.9379E-02	7.710E-02
CD-109	#A	-1.7231E-01	-1.7304E-01	1.6718E+00	1.6718E+00	1.745E+00
SN-113	#B	-8.3505E-03	-8.4907E-03	5.9037E-02	5.9039E-02	6.637E-02
SB-125	#B	9.0727E-02	9.0899E-02	1.0585E-01	1.0598E-01	1.199E-01
I-131	#B	0.0000E+00	0.0000E+00	6.0755E-02	6.0755E-02	5.518E-02
CS-134	#B	-2.1915E-03	-2.1971E-03	2.2486E-01	2.2486E-01	1.175E-01
CS-137	#A	5.1008E-02	5.1016E-02	5.8374E-02	5.8445E-02	6.126E-02
CE-139	#A	9.9541E-03	1.0094E-02	4.7962E-02	4.7965E-02	5.283E-02
EU-152	#B	-6.9399E-03	-6.9428E-03	1.8561E-01	1.8561E-01	1.540E-01
EU-154	#B	-1.9459E-02	-1.9471E-02	1.1984E-01	1.1985E-01	1.221E-01
EU-155	#A	1.3442E-01	1.3456E-01	1.6312E-01	1.6329E-01	1.771E-01
HG-203	#B	-1.8305E-02	-1.9074E-02	5.6922E-02	5.6932E-02	6.077E-02
TL-208	#	3.0480E-01	3.0480E-01	9.8109E-02	9.9609E-02	
PB-212		8.4790E-01	8.4790E-01	1.1335E-01	1.2306E-01	
PB-214		5.4880E-01	5.4880E-01	1.3333E-01	1.3689E-01	
BI-212		6.5092E-01	6.5092E-01	4.2385E-01	4.2544E-01	
BI-214		5.9356E-01	5.9356E-01	1.8345E-01	1.8649E-01	
RA-224		1.2719E+00	1.2719E+00	2.7073E-01	2.8010E-01	1.004E-01
RA-226	#	1.4978E+00	1.4978E+00	1.3068E+00	1.3095E+00	1.393E+00
AC-228		8.4434E-01	8.4434E-01	2.3270E-01	2.3754E-01	
TH-227	#B	-1.1409E-01	-1.1409E-01	4.3954E-01	4.3958E-01	4.726E-01
PA-234	#B	-4.5248E-03	-4.5248E-03	1.8042E-01	1.8042E-01	2.023E-01
TH-234	#B	1.3163E+00	1.3163E+00	1.2271E+00	1.2293E+00	2.426E+00
AM-241	#A	8.5239E-02	8.5240E-02	2.8056E-01	2.8060E-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 (1120.2 to 1999.1 keV) 2.1626308E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 2.1626308E+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_1SEP2006_0840.An1

Sample description
FSS-OOL-02-05-002-F-RC

Spectrum Filename: C:\GammaVision\Spectra\101F_1SEP2006_0840.An1

Acquisition information
Start time: 01-Sep-2006 08:40:46
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: 1.6660E+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-2006 13:25:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2350

***** S U M M A R Y O F P E A K 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	213.	15.40	1.00	1.651E-02				
74.64	213.	15.40	1.00	1.651E-02	74.81	9.600	1.064E+00	PB212
77.11	350.	9.27	1.01	1.723E-02	77.11	10.700	1.525E+00	PB214
					77.11	17.500	9.425E-01	PB212
86.76	76.	36.54	1.01	1.917E-02				
90.02	91.	31.18	1.02	1.960E-02	88.04	3.790	PBC<MDA	CD109
93.63	101.	28.64	1.02	2.000E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.10	87.	29.80	0.90	1.858E-02	185.99	3.280	1.155E+00	RA226
209.55	105.	29.29	1.07	1.720E-02				
238.62	681.	4.52	1.12	1.557E-02	238.63	43.100	8.159E-01	PB212
240.98	93.	29.14	1.12	1.545E-02	241.00	3.900	1.254E+00	RA224
269.62	68.	34.43	0.89	1.403E-02				
295.32	142.	18.11	1.06	1.292E-02	295.22	19.200	4.572E-01	PB214
300.30	49.	36.26	0.95	1.272E-02				
338.23	134.	15.81	0.94	1.136E-02	338.40	12.010	7.844E-01	AC228
351.78	266.	10.88	1.25	1.093E-02				
351.78	266.	10.88	1.25	1.093E-02	351.99	37.100	5.274E-01	PB214
462.61	36.	35.01	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125
510.66	120.	16.26	1.00	7.591E-03	510.72	22.500	4.924E-01	TL208
582.94	201.	8.79	1.42	6.687E-03	583.14	86.000	2.800E-01	TL208
609.12	165.	10.38	1.41	6.415E-03	609.32	46.090	4.492E-01	BI214
727.20	50.	28.93	1.39	5.443E-03	727.17	11.800	6.179E-01	BI212
860.24	33.	39.58	1.05	4.678E-03				
910.80	154.	13.77	1.66	4.448E-03	911.07	29.000	9.545E-01	AC228
964.20	42.	22.37	1.61	4.230E-03				
968.70	84.	14.19	1.62	4.213E-03	968.90	17.460	9.132E-01	AC228

1119.72	54.	30.29	1.94	3.711E-03	1120.28	15.040	7.822E-01	BI214
1460.09	657.	3.98	2.02	2.944E-03	1460.75	10.700	1.686E+01	K40
1763.85	25.	21.02	2.28	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	
148.84	74.72	434.	213.	0.107	46.20	1.005	BI-207	D
153.79	77.19	351.	350.	0.175	27.82	1.006	PB-214	D
173.09	86.95	352.	76.	0.038	109.63	1.013	TB-160	lD
179.62	90.21	355.	91.	0.045	93.53	1.016	PB-214	lD
418.78	209.55	313.	105.	0.053	87.88	1.066	AC-228	s
476.95	238.64	134.	682.	0.341	13.57	1.121	PB-212	D
538.97	269.62	192.	68.	0.034	103.28	0.889	AC-228	s
600.36	300.30	129.	49.	0.025	108.78	0.955	PB-212	
1720.78	860.24	44.	33.	0.016	100.35	1.046	TL-208	s
1928.55	964.23	26.	39.	0.020	72.52	1.612	EU-152	D

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

This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.89	74.66	931.	192.	0.096	68.95	1.499
PB-214	153.79	77.11	888.	285.	0.143	47.07	1.499D
PB-212	153.79	77.11	884.	289.	0.145	47.07	1.499D
TH-234	185.87	93.14	803.	144.	0.072	81.02	1.499s
TH-234	185.85	93.13	768.	150.	0.075	78.71	1.499s
RA-226	371.95	186.15	420.	80.	0.040	113.64	1.499
PB-212	476.94	238.62	329.	552.	0.276	18.64	1.499
RA-224	481.70	241.00	328.	93.	0.047	87.42	1.123D
PB-214	590.30	295.28	226.	140.	0.070	51.25	1.499
AC-228	676.25	338.23	128.	132.	0.066	47.44	0.942
PB-214	703.61	351.91	120.	216.	0.108	29.30	1.499
SB-125	925.12	462.61	67.	36.	0.018	105.03	1.499s
TL-208	1021.26	510.66	105.	104.	0.052	48.77	1.004s
TL-208	1165.90	582.94	49.	198.	0.099	26.38	1.424s
BI-214	1218.27	609.12	54.	164.	0.082	31.13	1.413
BI-212	1454.39	727.12	45.	34.	0.017	96.94	1.499
AC-228	1821.94	910.80	77.	152.	0.076	41.32	1.664s
AC-228	1938.21	968.90	33.	82.	0.041	43.72	1.616D
BI-214	2240.02	1119.72	60.	54.	0.027	90.86	1.939s
K-40	2921.20	1460.09	9.	654.	0.327	11.94	2.022

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3529.14	1763.85	2.	25.	0.013	63.06	2.276

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

***** S U M M A R Y O 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		5.4848E-02					
			477.56	5.485E-02	&(	4.276E-01 1.24E-01	G
K-40		1.6857E+01					
			1460.75	1.686E+01	(P	4.235E-01 6.73E-01	G
MN-54		9.1183E-03					
			834.81	9.118E-03	%(P	6.342E-02 1.82E-02	G
CO-57		3.4682E-04					
			122.07	3.468E-04	&(	5.414E-02 1.61E-02	G K
			136.43	1.024E-01	&	4.272E-01 1.28E-01	G
CO-60		1.1216E-03					
			1332.51	1.122E-03	%(P	4.721E-02 1.23E-02	G K
			1173.23	6.512E-03	& P	8.374E-02 2.38E-02	G K
Sr-85		-8.2998E-03					
			514.00	-8.300E-03	&(	7.068E-02 2.08E-02	G
Kr-85		-2.1424E+02					
			513.99	-2.142E+02	&(P	1.589E+03 4.65E+02	G
Y-88		-7.0636E-03					
			1836.01	-7.064E-03	%(	5.047E-02 1.34E-02	G K
			898.02	2.896E-03	& P	4.559E-02 1.24E-02	G
NB-94		-4.9521E-03					
			871.10	-4.952E-03	%(P	5.102E-02 1.43E-02	G K
			702.50	1.327E-02	% P	3.884E-02 1.15E-02	G K
Ag-108M		-1.9814E-02					
			722.95	-1.981E-02	&(	7.226E-02 2.14E-02	G K
			614.37	-2.539E-02	& P	6.181E-02 1.86E-02	G
			433.93	1.104E-03	%	4.272E-02 1.22E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	5.5045E-02						
		88.04	5.504E-02	%(P	1.627E+00	4.85E-01	G
SN-113	0.0000E+00						
		391.71	0.000E+00	%(	6.904E-02	1.99E-02	G K
		255.04	7.761E-02	% P	2.031E+00	5.96E-01	G
SB-125	8.7978E-02						
		427.95	6.907E-04	%(P	1.503E-01	4.31E-02	G K
		600.77	-2.784E-02	% P	2.920E-01	8.40E-02	G
		636.15	-7.394E-02	& P	4.448E-01	1.28E-01	G
		463.51	3.463E-01	(P	3.976E-01	1.26E-01	G
		176.29	-2.026E-01	% P	7.133E-01	2.13E-01	G
I-131	1.3753E-02						
		364.48	1.375E-02	%(	6.538E-02	1.93E-02	G K
		636.97	-2.853E-02	%	7.150E-01	2.00E-01	G
		284.29	-3.622E-01	%	8.702E-01	2.63E-01	G
CS-134	-3.5439E-03						
		604.66	-3.544E-03	%(P	1.291E-01	3.81E-02	G K
		795.76	3.094E-02	% P	5.803E-02	1.77E-02	G
		569.29	1.013E-01	% P	2.719E-01	8.10E-02	G
		801.84	-9.934E-02	%	5.813E-01	1.67E-01	G
CS-137	2.0636E-02						
		661.62	2.064E-02	%(P	6.425E-02	1.90E-02	G
CE-139	1.0417E-02						
		165.85	1.042E-02	&(P	4.936E-02	1.47E-02	G
EU-152	-1.5587E-03						
		121.78	-1.559E-03	%(P	1.297E-01	3.83E-02	G K
		344.30	-2.064E-03	% P	1.801E-01	5.23E-02	G
		1408.08	5.468E-02	& P	1.962E-01	5.55E-02	G
		964.00	-9.054E-02	& P	5.785E-01	1.68E-01	G
		1112.07	1.898E-01	% P	5.007E-01	1.49E-01	G
		778.90	2.092E-02	% P	3.766E-01	1.05E-01	G
EU-154	-4.1677E-02						
		123.10	-4.168E-02	%(P	1.199E-01	3.61E-02	G K
		1274.80	5.065E-02	% P	1.787E-01	5.20E-02	G
		723.30	-8.250E-02	& P	3.478E-01	1.02E-01	G
		1004.80	-5.625E-02	% P	3.702E-01	1.06E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	4.6445E-02						
		86.45	4.644E-02	%(	1.558E-01	4.69E-02	G K
		105.31	6.047E-02	%	2.185E-01	6.57E-02	G
HG-203	-1.4136E-02						
		279.17	-1.414E-02	&(	6.003E-02	1.79E-02	G K
		72.87	-8.090E-02	% P	1.208E+00	3.60E-01	G
		70.83	7.698E-01	&	1.953E+00	5.90E-01	G
		82.50	-3.051E-01	%	2.656E+00	7.93E-01	G
TL-208	2.7998E-01						
		583.14	2.800E-01	@(P	4.965E-02	2.49E-02	G
		510.72	4.924E-01	+ P	2.400E-01	9.24E-02	G
PB-212	6.9947E-01						
		238.63	6.672E-01	(P	1.054E-01	4.19E-02	G K
							Energy duplication
		77.11	7.790E-01	(	3.807E-01	1.22E-01	G
		74.81	9.790E-01	& P	7.401E-01	2.31E-01	G
PB-214	4.4183E-01						
		351.99	4.328E-01	(P	1.076E-01	4.27E-02	G K
		295.22	4.593E-01	(P	2.379E-01	7.95E-02	G
							Energy duplication
		77.11	1.258E+00	+ P	6.239E-01	2.00E-01	G
		241.92	5.767E-02	% P	6.486E-01	1.92E-01	G
BI-212	4.2548E-01						
		727.17	4.255E-01	(P	4.297E-01	1.40E-01	G K
		1620.56	1.676E-01	%	1.350E+00	3.47E-01	G
		785.42	6.588E-02	% P	3.090E+00	8.74E-01	G
BI-214	4.6655E-01						
		609.32	4.492E-01	(P	1.017E-01	4.69E-02	G K
		1764.51	5.167E-01	(P	1.854E-01	1.10E-01	G
		1120.28	7.822E-01	+ P	5.648E-01	2.38E-01	G
RA-224	1.2540E+00						
		241.00	1.254E+00	(P	1.172E+00	3.68E-01	G
RA-226	1.0659E+00						
		185.99	1.066E+00	(	1.307E+00	4.04E-01	G
AC-228	9.0600E-01						
		911.07	9.545E-01	*(P	2.747E-01	1.33E-01	G K
		968.90	9.092E-01	(P	3.232E-01	1.34E-01	G
		338.40	7.844E-01	(P	3.301E-01	1.26E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-2.6062E-02						
		236.00	-2.606E-02	&(P	4.570E-01	1.35E-01	G K
		256.25	4.871E-03	% P	5.385E-01	1.57E-01	G
PA-234	-8.9487E-02						
		98.44	-8.949E-02	%(	1.873E-01	5.68E-02	G K
		946.00	8.656E-02	&	3.055E-01	8.96E-02	G
		131.28	7.257E-03	%	2.316E-01	6.88E-02	G
		94.67	1.649E-02	%	3.272E-01	9.74E-02	G
		883.24	9.999E-02	%	4.526E-01	1.31E-01	G
		926.70	1.281E-01	%	4.473E-01	1.30E-01	G
		569.26	1.549E-01	%	4.007E-01	1.20E-01	G
TH-234	1.4489E+00						
		63.29	4.448E-01	%(P	2.320E+00	6.93E-01	G K
		92.80	2.040E+00	*(P	1.793E+00	5.57E-01	G
		92.38	2.283E+00	*(P	2.143E+00	6.63E-01	G
AM-241	3.4652E-02						
		59.54	3.465E-02	%(P	2.830E-01	8.42E-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	5.2888E-02	5.4848E-02	3.7121E-01	3.7123E-01	4.123E-01
K-40		1.6857E+01	1.6857E+01	2.0206E+00	2.2339E+00	
MN-54	#A	9.0618E-03	9.1183E-03	5.4732E-02	5.4735E-02	6.302E-02
CO-57	#B	3.4434E-04	3.4682E-04	4.8191E-02	4.8191E-02	5.375E-02
CO-60	#B	1.1204E-03	1.1216E-03	3.6981E-02	3.6981E-02	4.716E-02
Sr-85	#A	-8.0548E-03	-8.2998E-03	6.2267E-02	6.2269E-02	6.859E-02
Kr-85	#A	-2.1423E+02	-2.1424E+02	1.8388E+03	1.8389E+03	1.589E+03
Y-88	#B	-6.9360E-03	-7.0636E-03	4.0218E-02	4.0220E-02	4.955E-02
NB-94	#B	-4.9521E-03	-4.9521E-03	4.7167E-02	4.7168E-02	5.102E-02
Ag-108M	#B	-1.9813E-02	-1.9814E-02	6.4069E-02	6.4078E-02	7.226E-02
CD-109	#A	5.4809E-02	5.5045E-02	1.4556E+00	1.4556E+00	1.620E+00
SN-113	#B	0.0000E+00	0.0000E+00	5.9634E-02	5.9634E-02	6.789E-02
SB-125	#B	8.7809E-02	8.7978E-02	9.6163E-02	9.6291E-02	1.500E-01
I-131	#B	1.0801E-02	1.3753E-02	5.7855E-02	5.7860E-02	5.134E-02
CS-134	#B	-3.5348E-03	-3.5439E-03	1.8085E-01	1.8085E-01	1.288E-01
CS-137	#A	2.0633E-02	2.0636E-02	5.7012E-02	5.7024E-02	6.424E-02
CE-139	#A	1.0271E-02	1.0417E-02	4.4200E-02	4.4204E-02	4.867E-02
EU-152	#B	-1.5581E-03	-1.5587E-03	5.6070E-01	5.6070E-01	1.297E-01
EU-154	#B	-4.1651E-02	-4.1677E-02	1.1299E-01	1.1301E-01	1.198E-01
EU-155	#B	4.6395E-02	4.6445E-02	1.4061E-01	1.4064E-01	1.557E-01
HG-203	#B	-1.3558E-02	-1.4136E-02	5.3685E-02	5.3691E-02	5.758E-02
TL-208	#	2.7998E-01	2.7998E-01	7.4731E-02	7.6387E-02	
PB-212	#	6.9947E-01	6.9947E-01	1.3187E-01	1.3766E-01	1.054E-01
PB-214	#	4.4183E-01	4.4183E-01	1.3066E-01	1.3302E-01	1.076E-01
BI-212	#A	4.2548E-01	4.2548E-01	4.2077E-01	4.2146E-01	4.297E-01
BI-214		4.6655E-01	4.6655E-01	1.4623E-01	1.4859E-01	
RA-224		1.2540E+00	1.2540E+00	1.1047E+00	1.1070E+00	
RA-226	#A	1.0659E+00	1.0659E+00	1.2112E+00	1.2127E+00	1.307E+00
AC-228		9.0600E-01	9.0600E-01	2.3433E-01	2.3986E-01	
TH-227	#B	-2.6062E-02	-2.6062E-02	4.7356E-01	4.7356E-01	4.570E-01
PA-234	#B	-8.9487E-02	-8.9487E-02	1.7044E-01	1.7051E-01	1.873E-01
TH-234	#B	1.4489E+00	1.4489E+00	1.1874E+00	1.1901E+00	2.320E+00
AM-241	#A	3.4651E-02	3.4652E-02	2.5270E-01	2.5271E-01	2.830E-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 1999.1 keV) 1.9763849E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 1.9763849E+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_1SEP2006_1046.An1

Sample description
FSS-OOL-02-05-014-F

Spectrum Filename: C:\GammaVision\Spectra\101F_1SEP2006_1046.An1

Acquisition information
Start time: 01-Sep-2006 10:46:35
Live time: 2000
Real time: 2003
Dead time: 0.13 %
Detector ID: 1

Detector system
Det 101- DSPE-633

Calibration
Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration
Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel^2

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

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

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8370E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8370E+03) =
5.4437E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-2006 13:55:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1869

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.30	149.	23.28	1.00	1.651E-02				
74.30	149.	23.28	1.00	1.651E-02	74.81	9.600	PBC<MDA	PB212
77.33	364.	8.89	1.01	1.737E-02	77.11	10.700	1.438E+00	PB214
					77.11	17.500	8.882E-01	PB212
86.77	109.	27.33	1.01	1.915E-02	86.45	32.740	1.289E-01	EU155
90.16	84.	35.49	1.02	1.960E-02	88.04	3.790	PBC<MDA	CD109
93.41	122.	24.00	1.02	1.996E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.92	167.	19.09	1.53	1.859E-02	185.99	3.280	2.020E+00	RA226
209.59	113.	28.17	0.96	1.720E-02				
238.72	946.	4.90	1.20	1.557E-02	238.63	43.100	1.031E+00	PB212
271.13	65.	33.58	1.27	1.396E-02				
295.31	148.	12.84	1.16	1.292E-02	295.22	19.200	4.349E-01	PB214
328.82	54.	36.98	1.01	1.167E-02				
338.29	205.	12.13	1.21	1.135E-02	338.40	12.010	1.092E+00	AC228
351.97	263.	9.46	1.18	1.093E-02				
351.97	263.	9.46	1.18	1.093E-02	351.99	37.100	4.745E-01	PB214
408.45	47.	36.04	1.07	9.443E-03				
462.95	47.	27.40	1.43	8.352E-03				
462.95	47.	27.40	1.43	8.352E-03	463.51	10.000	4.025E-01	SB125
510.49	109.	15.27	1.32	7.594E-03	510.72	22.500	4.005E-01	TL208
583.12	238.	10.19	1.40	6.685E-03	583.14	86.000	3.016E-01	TL208
609.13	201.	12.01	1.39	6.415E-03	609.32	46.090	4.980E-01	BI214
661.38	31.	36.18	1.50	5.937E-03	661.62	84.620	PBC<MDA	CS137
727.22	77.	27.48	1.90	5.443E-03	727.17	11.800	8.856E-01	BI212
794.25	54.	25.32	1.27	5.025E-03				
910.88	185.	11.50	1.78	4.447E-03	911.07	29.000	1.044E+00	AC228

968.03	135.	12.89	1.76	4.215E-03	968.90	17.460	1.345E+00	AC228
1119.81	61.	26.12	1.40	3.712E-03	1120.28	15.040	8.043E-01	BI214
1460.26	677.	3.95	1.84	2.943E-03	1460.75	10.700	1.576E+01	K40
1763.81	24.	21.49	2.14	2.481E-03	1764.51	15.920	4.499E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
179.91	90.21	398.	84.	0.042	106.48	1.016	PB-214	lD
418.86	209.59	360.	113.	0.056	84.50	0.958	NP-239	
477.14	238.72	1151.	184.	0.092	81.49	1.202	PB-212	
541.99	271.13	181.	65.	0.033	100.75	1.271	AC-228	s
657.42	328.82	141.	54.	0.027	110.95	1.010	LA-140	s
816.74	408.45	96.	47.	0.023	108.13	1.068	CS-138	s
1588.73	794.25	35.	57.	0.028	59.85	1.275	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	149.29	74.86	1103.	181.	0.090	78.66	1.499
PB-214	153.79	77.11	935.	329.	0.165	42.22	1.499D
PB-212	153.79	77.11	932.	333.	0.167	42.22	1.499D
EU-155	173.71	87.07	995.	126.	0.063	109.62	1.499
TH-234	185.60	93.01	898.	144.	0.072	85.13	1.499s
TH-234	185.56	92.99	859.	154.	0.077	80.94	1.499s
RA-226	371.50	185.92	356.	167.	0.084	57.26	1.530s
PB-212	476.97	238.64	392.	702.	0.351	16.30	1.499
PB-214	590.21	295.23	241.	131.	0.066	55.87	1.499
AC-228	676.37	338.29	161.	202.	0.101	36.40	1.215
PB-214	703.56	351.88	149.	230.	0.115	29.64	1.499s
SB-125	925.65	462.88	68.	44.	0.022	88.28	1.499
TL-208	1020.92	510.49	86.	93.	0.046	45.81	1.319s
TL-208	1166.25	583.12	92.	236.	0.118	30.57	1.399s
BI-214	1218.29	609.13	102.	200.	0.100	36.04	1.390
CS-137	1322.86	661.38	52.	31.	0.016	108.55	1.499s
BI-212	1454.59	727.22	94.	77.	0.039	82.43	1.898s
AC-228	1822.11	910.88	67.	183.	0.092	34.49	1.780s
AC-228	1936.46	968.03	48.	134.	0.067	38.67	1.756s
BI-214	2240.21	1119.81	58.	61.	0.031	78.36	1.400
K-40	2921.54	1460.26	12.	674.	0.337	11.85	1.844
BI-214	3529.05	1763.81	2.	24.	0.012	64.48	2.144

s - Peak fails shape tests.
D - Peak area deconvoluted.

A Derived peak area.

***** S U M M A R Y O 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		2.4701E-01					
			477.56	2.470E-01	%(	3.756E-01 1.17E-01	G
K-40		1.5758E+01					
			1460.75	1.576E+01	(P	4.338E-01 6.25E-01	G
MN-54		2.3919E-02					
			834.81	2.392E-02	%(P	4.932E-02 1.50E-02	G
CO-57		7.9411E-04					
			122.07	7.941E-04	&(	5.031E-02 1.49E-02	G K
			136.43	1.066E-02	&	4.509E-01 1.34E-01	G
CO-60		2.6724E-04					
			1332.51	2.672E-04	%(P	4.916E-02 1.30E-02	G K
			1173.23	3.392E-02	% P	6.319E-02 1.94E-02	G K
Sr-85		-2.5048E-02					
			514.00	-2.505E-02	%(	6.029E-02 1.82E-02	G
Kr-85		-5.8752E+02					
			513.99	-5.875E+02	%(P	1.355E+03 4.07E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	%(	5.228E-02 1.33E-02	G K
			898.02	-5.211E-03	& P	5.402E-02 1.52E-02	G
NB-94		-4.5674E-03					
			871.10	-4.567E-03	&(P	5.402E-02 1.53E-02	G K
			702.50	-3.225E-03	% P	5.033E-02 1.43E-02	G K
Ag-108M		6.3209E-04					
			722.95	6.321E-04	%(	6.273E-02 1.78E-02	G K
			614.37	-1.770E-02	& P	5.663E-02 1.68E-02	G
			433.93	-3.794E-03	%	4.608E-02 1.34E-02	G
CD-109		7.7499E-02					
			88.04	7.750E-02	&(P	1.533E+00 4.58E-01	G
SN-113		-1.2390E-02					
			391.71	-1.239E-02	%(	6.656E-02 1.96E-02	G K
			255.04	-4.563E-03	% P	2.027E+00 5.95E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.4903E-02						
		427.95	-3.838E-03	&(P	1.402E-01	4.03E-02	G K
		600.77	-2.274E-03	% P	2.249E-01	6.31E-02	G
		636.15	-5.918E-02	% P	4.381E-01	1.26E-01	G
		463.51	3.872E-01	(P	3.623E-01	1.18E-01	G
		176.29	1.284E-01	& P	6.587E-01	1.97E-01	G
I-131	-1.2697E-02						
		364.48	-1.270E-02	&(	6.444E-02	1.90E-02	G K
		636.97	-1.311E-01	%	8.323E-01	2.41E-01	G
		284.29	-3.199E-01	%	9.160E-01	2.75E-01	G
CS-134	-8.6254E-03						
		604.66	-8.625E-03	%(P	4.343E-02	1.25E-02	G K
		795.76	-5.847E-03	& P	6.381E-02	1.81E-02	G
		569.29	1.354E-02	% P	2.629E-01	7.45E-02	G
		801.84	-1.633E-01	%	6.160E-01	1.81E-01	G
CS-137	4.5581E-02						
		661.62	4.558E-02	*(P	5.316E-02	1.70E-02	G
CE-139	-1.4901E-03						
		165.85	-1.490E-03	%(P	5.271E-02	1.56E-02	G
EU-152	3.2892E-02						
		121.78	3.289E-02	&(P	1.476E-01	4.42E-02	G K
		344.30	-8.754E-03	% P	1.503E-01	4.37E-02	G
		1408.08	1.894E-02	% P	2.479E-01	6.73E-02	G
		964.00	2.587E-02	% P	2.979E-01	8.21E-02	G
		1112.07	-3.271E-02	% P	3.526E-01	9.72E-02	G
		778.90	3.000E-02	% P	3.685E-01	1.04E-01	G
EU-154	1.9564E-02						
		123.10	1.956E-02	%(P	1.072E-01	3.21E-02	G K
		1274.80	-2.334E-02	% P	1.901E-01	5.39E-02	G
		723.30	-1.008E-02	% P	3.199E-01	9.16E-02	G
		1004.80	9.421E-04	& P	2.966E-01	8.16E-02	G
EU-155	1.4831E-01						
		86.45	1.483E-01	(	1.764E-01	5.42E-02	G K
		105.31	6.124E-02	%	2.038E-01	6.13E-02	G
HG-203	7.9327E-03						
		279.17	7.933E-03	&(	5.075E-02	1.50E-02	G K
		72.87	-2.425E-01	% P	1.123E+00	3.37E-01	G
		70.83	1.004E-02	&	2.327E+00	6.94E-01	G
		82.50	-1.980E-02	%	2.981E+00	8.90E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.0165E-01						
		583.14	3.016E-01	@(P	6.075E-02	3.11E-02	G
		510.72	4.005E-01	+ P	1.978E-01	7.17E-02	G
PB-212	7.8962E-01						
		238.63	7.690E-01	(P	1.041E-01	4.22E-02	G K
							Energy duplication
		77.11	8.138E-01	(	3.542E-01	1.15E-01	G
		74.81	8.381E-01	&(P	7.297E-01	2.26E-01	G
PB-214	4.0784E-01						
		351.99	4.177E-01	@(P	1.081E-01	4.16E-02	G K
		295.22	3.887E-01	(P	2.228E-01	7.34E-02	G
							Energy duplication
		77.11	1.316E+00	+ P	5.804E-01	1.87E-01	G
		241.92	-5.116E-02	% P	7.652E-01	2.27E-01	G
BI-212	8.8562E-01						
		727.17	8.856E-01	(P	5.476E-01	2.45E-01	G K
		1620.56	5.810E-01	%	9.912E-01	3.25E-01	G
		785.42	1.793E-02	% P	2.508E+00	7.01E-01	G
BI-214	4.8568E-01						
		609.32	4.980E-01	(P	1.238E-01	6.01E-02	G K
		1764.51	4.499E-01	(P	1.681E-01	9.84E-02	G
		1120.28	8.043E-01	+ P	5.034E-01	2.11E-01	G
RA-224	6.6341E-01						
		241.00	6.634E-01	%(P	1.322E+00	4.01E-01	G
RA-226	2.0204E+00						
		185.99	2.020E+00	*(	1.093E+00	3.86E-01	G
AC-228	1.1440E+00						
		911.07	1.044E+00	*(P	2.330E-01	1.21E-01	G K
		968.90	1.345E+00	(P	3.484E-01	1.74E-01	G
		338.40	1.092E+00	(P	3.333E-01	1.34E-01	G
TH-227	-2.4787E-01						
		236.00	-2.479E-01	%(P	5.228E-01	1.58E-01	G K
		256.25	-1.427E-01	% P	5.854E-01	1.74E-01	G
PA-234	-1.8127E-03						
		98.44	-1.813E-03	%(	1.705E-01	5.06E-02	G K
		946.00	-6.190E-02	&	2.968E-01	8.62E-02	G
		131.28	9.609E-02	&	1.980E-01	6.01E-02	G
		94.67	-1.103E-01	%	3.196E-01	9.64E-02	G
		883.24	-3.940E-03	%	3.495E-01	9.53E-02	G
		926.70	1.487E-01	%	4.121E-01	1.22E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 2.313E-02 %   3.953E-01 1.13E-01 G

TH-234       1.1638E+00
                           63.29-6.930E-04 %(P 2.394E+00 7.11E-01 G K
                           92.80 1.897E+00  (P 1.717E+00 5.32E-01 G
                           92.38 2.075E+00  (P 2.052E+00 6.33E-01 G

AM-241       8.7650E-02
                           59.54 8.765E-02 %(P 2.578E-01 7.76E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	2.3798E-01	2.4701E-01	3.4976E-01	3.5004E-01	3.618E-01
K-40		1.5758E+01	1.5758E+01	1.8741E+00	2.0748E+00	
MN-54	#A	2.3767E-02	2.3919E-02	4.4855E-02	4.4876E-02	4.901E-02
CO-57	#B	7.8828E-04	7.9411E-04	4.4828E-02	4.4828E-02	4.994E-02
CO-60	#B	2.6696E-04	2.6724E-04	3.9082E-02	3.9082E-02	4.911E-02

Sr-85	#A	-2.4292E-02	-2.5048E-02	5.4530E-02	5.4549E-02	5.847E-02
Kr-85	#A	-5.8751E+02	-5.8752E+02	1.3370E+03	1.3374E+03	1.355E+03
Y-88	#B	0.0000E+00	0.0000E+00	3.9818E-02	3.9819E-02	5.132E-02
NB-94	#B	-4.5674E-03	-4.5674E-03	5.0346E-02	5.0346E-02	5.402E-02
Ag-108M	#B	6.3206E-04	6.3209E-04	5.3530E-02	5.3530E-02	6.273E-02
CD-109	#A	7.7159E-02	7.7499E-02	1.3732E+00	1.3732E+00	1.526E+00
SN-113	#B	-1.2178E-02	-1.2390E-02	5.8809E-02	5.8814E-02	6.542E-02
SB-125	#B	9.4716E-02	9.4903E-02	8.6544E-02	8.6710E-02	1.399E-01
I-131	#B	-9.9148E-03	-1.2697E-02	5.7069E-02	5.7074E-02	5.032E-02
CS-134	#B	-8.6026E-03	-8.6254E-03	4.4450E-02	4.4452E-02	4.332E-02
CS-137	#A	4.5572E-02	4.5581E-02	5.0883E-02	5.0949E-02	5.315E-02
CE-139	#A	-1.4687E-03	-1.4901E-03	5.7742E-02	5.7742E-02	5.195E-02
EU-152	#B	3.2878E-02	3.2892E-02	1.3273E-01	1.3275E-01	1.475E-01
EU-154	#B	1.9552E-02	1.9564E-02	9.6270E-02	9.6276E-02	1.072E-01
EU-155	#A	1.4815E-01	1.4831E-01	1.6258E-01	1.6278E-01	1.762E-01
HG-203	#B	7.6012E-03	7.9327E-03	4.5049E-02	4.5051E-02	4.863E-02
TL-208	#	3.0165E-01	3.0165E-01	9.3146E-02	9.4693E-02	
PB-212	#	7.8962E-01	7.8962E-01	1.2987E-01	1.3732E-01	1.041E-01
PB-214	#	4.0784E-01	4.0784E-01	1.2192E-01	1.2408E-01	1.081E-01
BI-212		8.8562E-01	8.8562E-01	7.3640E-01	7.3810E-01	
BI-214		4.8568E-01	4.8568E-01	1.7601E-01	1.7814E-01	
RA-224	#A	6.6341E-01	6.6341E-01	1.2035E+00	1.2041E+00	1.322E+00
RA-226	#	2.0204E+00	2.0204E+00	1.1569E+00	1.1625E+00	
AC-228		1.1440E+00	1.1440E+00	2.4354E-01	2.5197E-01	
TH-227	#B	-2.4787E-01	-2.4787E-01	4.8236E-01	4.8257E-01	5.228E-01
PA-234	#B	-1.8127E-03	-1.8127E-03	1.5177E-01	1.5177E-01	1.705E-01
TH-234	#B	1.1638E+00	1.1638E+00	9.7982E-01	9.8194E-01	2.394E+00
AM-241	#A	8.7649E-02	8.7650E-02	2.3280E-01	2.3285E-01	2.578E-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) 2.0595055E+01 pCi/gm
Total Decayed Activity (50.2 to 1999.1 keV) 2.0595060E+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_29AUG2006_1259.An1

Sample description
FSS-OOL-02-05-004-F

Spectrum Filename: C:\GammaVision\Spectra\101F_29AUG2006_1259.An1

Acquisition information

Start time:	29-Aug-2006 12:59:38
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:	1.9600E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.9600E+03) = 5.1020E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

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

Half lives decay limit: 12.000
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-2006 13:25:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0786

***** S U M M A R Y O F P E A K 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	155.	22.33	1.00	1.651E-02	70.83	3.520	2.136E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.21	371.	9.03	1.01	1.732E-02	77.11	17.500	8.507E-01	PB212
					77.11	10.700	1.377E+00	PB214
93.00	115.	37.40	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.00	110.	37.94	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.81	123.	27.49	1.46	1.853E-02	185.99	3.280	1.391E+00	RA226
238.83	739.	4.34	1.12	1.556E-02	238.63	43.100	7.531E-01	PB212
241.76	118.	20.20	1.12	1.541E-02	241.00	3.900	1.340E+00	RA224
270.35	56.	35.54	1.00	1.400E-02				
295.42	151.	12.76	1.16	1.291E-02	295.22	19.200	4.137E-01	PB214
300.17	52.	31.91	1.16	1.272E-02				
338.71	186.	14.80	1.31	1.134E-02	338.40	12.010	9.308E-01	AC228
352.08	300.	9.37	1.34	1.092E-02	351.99	37.100	5.068E-01	PB214
439.83	32.	40.03	1.68	8.781E-03				
463.10	43.	34.55	1.21	8.349E-03				
463.10	43.	34.55	1.21	8.349E-03	463.51	10.000	PBC<MDA	SB125
510.96	121.	17.32	1.54	7.587E-03	510.72	22.500	4.242E-01	TL208
583.27	237.	12.03	1.17	6.683E-03	583.14	86.000	2.815E-01	TL208
609.18	221.	11.12	1.22	6.414E-03	604.66	97.600	2.421E-01	CS134
					609.32	46.090	5.134E-01	BI214
795.02	31.	34.17	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134
911.22	136.	11.01	1.62	4.446E-03	911.07	29.000	7.150E-01	AC228
969.11	82.	14.71	1.62	4.211E-03	968.90	17.460	7.615E-01	AC228
1120.59	75.	23.07	1.44	3.711E-03	1120.28	15.040	9.292E-01	BI214

1172.89	33.	33.67	1.75	3.565E-03	1173.23	99.860	PBC<MDA	CO60
1460.99	806.	3.68	2.05	2.942E-03	1460.75	10.700	1.761E+01	K40
1764.50	27.	21.67	2.18	2.481E-03	1764.51	15.920	4.741E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
148.33	74.72	525.	155.	0.078	66.99	1.005	BI-207	D
153.99	77.55	377.	371.	0.186	27.08	1.007	PB-214	D
477.36	238.87	145.	739.	0.370	13.02	1.122	PB-212	D
483.22	241.79	224.	118.	0.059	60.61	1.124	PB-214	D
540.43	270.35	170.	56.	0.028	106.61	1.004	AC-228	
600.09	300.18	110.	52.	0.026	95.72	1.165	PB-212	lD
879.53	439.83	64.	32.	0.016	117.78	1.681	ND-147	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	1153.	188.	0.094	77.45	1.499s
PB-212	153.79	77.11	992.	348.	0.174	41.63	1.499D
PB-214	153.79	77.11	996.	344.	0.172	41.63	1.499D
TH-234	185.59	93.00	966.	115.	0.057	112.19	1.499
RA-226	372.09	186.22	520.	95.	0.048	106.04	1.499s
PB-212	477.18	238.74	426.	594.	0.297	18.96	1.499
RA-224	483.20	241.75	517.	89.	0.044	112.24	1.499s
PB-214	590.72	295.49	213.	158.	0.079	45.25	1.499
AC-228	677.20	338.71	187.	184.	0.092	44.39	1.314s
PB-214	703.89	352.05	136.	266.	0.133	25.91	1.499
SB-125	926.00	463.05	71.	41.	0.021	94.88	1.499
TL-208	1021.85	510.96	119.	105.	0.053	51.97	1.537s
TL-208	1166.54	583.27	150.	235.	0.117	36.10	1.170
BI-214	1218.39	609.18	114.	220.	0.110	33.35	1.221
CS-134	1590.26	795.02	42.	31.	0.016	102.50	1.502s
AC-228	1822.79	911.22	38.	134.	0.067	33.04	1.616
AC-228	1938.21	968.90	32.	81.	0.041	44.11	1.616D
BI-214	2241.77	1120.59	55.	75.	0.038	69.20	1.440s
CO-60	2346.43	1172.89	45.	33.	0.016	101.02	1.746s
K-40	2923.00	1460.99	18.	804.	0.402	11.05	2.048
BI-214	3530.43	1764.50	3.	27.	0.014	65.00	2.179

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

***** S U M M A R Y O 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		1.5977E-01					
			477.56	1.598E-01	%(	3.750E-01 1.13E-01	G
K-40		1.7609E+01					
			1460.75	1.761E+01	(P	4.909E-01 6.51E-01	G
MN-54		2.5496E-02					
			834.81	2.550E-02	%(P	4.616E-02 1.42E-02	G
CO-57		2.4517E-03					
			122.07	2.452E-03	%(	5.155E-02 1.54E-02	G K
			136.43	7.399E-02	%	4.063E-01 1.22E-01	G
CO-60		4.3679E-02					
			1332.51	2.374E-02	&(P	5.680E-02 1.70E-02	G K
			1173.23	6.364E-02	*(P	6.606E-02 2.15E-02	G K
Sr-85		-1.0359E-02					
			514.00	-1.036E-02	%(	5.342E-02 1.57E-02	G
Kr-85		-2.5475E+02					
			513.99	-2.547E+02	%(P	1.187E+03 3.48E+02	G
Y-88		0.0000E+00					
			1836.01	0.000E+00	&(	6.646E-02 1.77E-02	G K
			898.02	1.289E-02	% P	6.025E-02 1.75E-02	G
NB-94		5.9455E-03					
			871.10	5.946E-03	%(P	4.473E-02 1.27E-02	G K
			702.50	-5.455E-05	& P	5.925E-02 1.70E-02	G K
Ag-108M		1.5001E-02					
			722.95	1.500E-02	&(	5.338E-02 1.57E-02	G K
			614.37	1.819E-03	% P	5.026E-02 1.43E-02	G
			433.93	6.956E-03	%	4.572E-02 1.34E-02	G
CD-109		3.2792E-01					
			88.04	3.279E-01	%(P	1.396E+00 4.20E-01	G
SN-113		8.1942E-04					
			391.71	8.194E-04	&(	7.116E-02 2.07E-02	G K
			255.04	-2.123E-01	% P	1.938E+00 5.73E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	9.7374E-02						
		427.95	1.463E-02	%(P	1.418E-01	4.13E-02	G K
		600.77	-6.332E-02	% P	2.634E-01	7.74E-02	G
		636.15	1.378E-01	% P	3.798E-01	1.13E-01	G
		463.51	3.423E-01	(P	3.490E-01	1.12E-01	G
		176.29	-1.339E-01	& P	6.443E-01	1.92E-01	G
I-131	8.6903E-03						
		364.48	8.690E-03	&(	6.704E-02	1.97E-02	G K
		636.97	3.086E-01	%	7.980E-01	2.39E-01	G
		284.29	-1.740E-01	%	9.464E-01	2.81E-01	G
CS-134	2.4201E-02						
		604.66	1.548E-03	&(P	5.671E-02	1.63E-02	G K
		795.76	5.009E-02	*(P	5.336E-02	1.73E-02	G
		569.29	-7.380E-02	% P	3.091E-01	9.08E-02	G
		801.84	-6.352E-02	%	5.609E-01	1.60E-01	G
CS-137	2.6226E-02						
		661.62	2.623E-02	%(P	5.369E-02	1.63E-02	G
CE-139	-1.8747E-02						
		165.85	-1.875E-02	%(P	5.374E-02	1.62E-02	G
EU-152	5.0288E-03						
		121.78	5.029E-03	%(P	1.542E-01	4.59E-02	G K
		344.30	-2.902E-02	& P	1.549E-01	4.57E-02	G
		1408.08	4.541E-02	% P	1.403E-01	4.01E-02	G
		964.00	2.367E-01	% P	4.173E-01	1.28E-01	G
		1112.07	1.806E-01	% P	3.570E-01	1.09E-01	G
		778.90	5.995E-02	& P	3.246E-01	9.33E-02	G
EU-154	3.6784E-03						
		123.10	3.678E-03	%(P	9.822E-02	2.92E-02	G K
		1274.80	-4.525E-02	& P	2.207E-01	6.42E-02	G
		723.30	-1.018E-01	& P	3.220E-01	9.57E-02	G
		1004.80	7.854E-02	% P	3.414E-01	9.95E-02	G
EU-155	1.5284E-02						
		86.45	1.528E-02	&(	1.855E-01	5.56E-02	G K
		105.31	5.141E-02	%	2.088E-01	6.28E-02	G
HG-203	1.3356E-02						
		279.17	1.336E-02	%(	4.860E-02	1.45E-02	G K
		72.87	-3.506E-02	% P	1.509E+00	4.52E-01	G
		70.83	-9.560E-01	%	2.105E+00	6.38E-01	G
		82.50	-6.778E-02	%	2.351E+00	7.00E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8152E-01						
		583.14	2.815E-01	(P	7.176E-02	3.42E-02	G
		510.72	4.242E-01	+ P	2.161E-01	8.47E-02	G
PB-212	6.1043E-01						
		238.63	6.104E-01	(P	1.015E-01	3.90E-02	G K
							Energy duplication
		77.11	7.970E-01	+	3.423E-01	1.11E-01	G
		74.81	8.164E-01	& P	6.989E-01	2.17E-01	G
PB-214	4.4795E-01						
		351.99	4.523E-01	(P	9.695E-02	3.94E-02	G K
		295.22	4.396E-01	(P	1.965E-01	6.70E-02	G
							Energy duplication
		77.11	1.290E+00	+ P	5.609E-01	1.81E-01	G
		241.92	1.054E-01	% P	7.143E-01	2.13E-01	G
BI-212	3.0588E-01						
		727.17	3.059E-01	%(P	4.450E-01	1.38E-01	G K
		1620.56	8.470E-01	%	1.284E+00	4.21E-01	G
		785.42	1.025E+00	% P	2.496E+00	7.49E-01	G
BI-214	5.0332E-01						
		609.32	5.134E-01	(P	1.223E-01	5.74E-02	G K
		1764.51	4.741E-01	(P	1.843E-01	1.04E-01	G
		1120.28	9.292E-01	+ P	4.596E-01	2.15E-01	G
RA-224	1.0160E+00						
		241.00	1.016E+00	(P	1.243E+00	3.83E-01	G
RA-226	1.0788E+00						
		185.99	1.079E+00	*(	1.233E+00	3.81E-01	G
AC-228	7.7327E-01						
		911.07	7.150E-01	(P	1.686E-01	7.98E-02	G K
		968.90	7.617E-01	(P	2.739E-01	1.13E-01	G
		338.40	9.308E-01	@(P	3.360E-01	1.39E-01	G
TH-227	-1.3269E-01						
		236.00	-1.327E-01	&(P	4.446E-01	1.34E-01	G K
		256.25	-7.026E-02	% P	5.886E-01	1.74E-01	G
PA-234	-4.4288E-02						
		98.44	-4.429E-02	%(	1.907E-01	5.73E-02	G K
		946.00	8.878E-02	&	2.836E-01	8.38E-02	G
		131.28	3.485E-03	%	2.173E-01	6.46E-02	G
		94.67	-6.839E-02	&	3.342E-01	1.00E-01	G
		883.24	-8.672E-02	%	4.554E-01	1.32E-01	G
		926.70	7.837E-04	%	3.958E-01	1.08E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.008E-01 %   4.544E-01 1.34E-01 G

TH-234       1.1329E+00
                           63.29 9.862E-01 %(P 2.147E+00 6.49E-01 G K
                           92.80 1.324E+00  (P 1.704E+00 5.22E-01 G
                           92.38 1.483E+00 & P 2.025E+00 6.18E-01 G

AM-241      -3.3184E-02
                           59.54-3.318E-02 &(P 3.036E-01 9.06E-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	1.5172E-01	1.5977E-01	3.3892E-01	3.3904E-01	3.561E-01
K-40		1.7609E+01	1.7609E+01	1.9520E+00	2.1910E+00	
MN-54	#A	2.5272E-02	2.5496E-02	4.2465E-02	4.2490E-02	4.576E-02
CO-57	#B	2.4267E-03	2.4517E-03	4.6075E-02	4.6075E-02	5.102E-02
CO-60	#B	4.3616E-02	4.3679E-02	4.4324E-02	4.4392E-02	5.672E-02

Sr-85	#A	-9.9277E-03	-1.0359E-02	4.7225E-02	4.7229E-02	5.120E-02
Kr-85	#A	-2.5474E+02	-2.5475E+02	1.2724E+03	1.2725E+03	1.187E+03
Y-88	#B	0.0000E+00	0.0000E+00	5.3161E-02	5.3161E-02	6.476E-02
NB-94	#B	5.9455E-03	5.9455E-03	3.8077E-02	3.8078E-02	4.473E-02
Ag-108M	#B	1.5000E-02	1.5001E-02	4.7201E-02	4.7209E-02	5.338E-02
CD-109	#A	3.2593E-01	3.2792E-01	1.2585E+00	1.2586E+00	1.387E+00
SN-113	#B	8.0000E-04	8.1942E-04	6.2098E-02	6.2098E-02	6.948E-02
SB-125	#B	9.7109E-02	9.7374E-02	9.5625E-02	9.5783E-02	1.414E-01
I-131	#B	6.1650E-03	8.6903E-03	5.8993E-02	5.8995E-02	4.756E-02
CS-134	#B	2.4113E-02	2.4201E-02	2.5140E-02	2.5177E-02	5.650E-02
CS-137	#A	2.6220E-02	2.6226E-02	4.8770E-02	4.8792E-02	5.367E-02
CE-139	#A	-1.8375E-02	-1.8747E-02	4.9351E-02	4.9362E-02	5.267E-02
EU-152	#B	5.0258E-03	5.0288E-03	1.3776E-01	1.3777E-01	1.541E-01
EU-154	#B	3.6752E-03	3.6784E-03	8.7556E-02	8.7556E-02	9.813E-02
EU-155	#B	1.5261E-02	1.5284E-02	1.6665E-01	1.6666E-01	1.853E-01
HG-203	#B	1.2587E-02	1.3356E-02	4.3536E-02	4.3543E-02	4.580E-02
TL-208		2.8152E-01	2.8152E-01	1.0265E-01	1.0387E-01	
PB-212	#	6.1043E-01	6.1043E-01	1.1691E-01	1.2189E-01	1.015E-01
PB-214	#	4.4795E-01	4.4795E-01	1.1694E-01	1.1965E-01	9.695E-02
BI-212	#B	3.0588E-01	3.0588E-01	4.1501E-01	4.1537E-01	4.450E-01
BI-214		5.0332E-01	5.0332E-01	1.6871E-01	1.7109E-01	
RA-224	#A	1.0160E+00	1.0160E+00	1.1495E+00	1.1509E+00	1.243E+00
RA-226	#A	1.0788E+00	1.0788E+00	1.1439E+00	1.1455E+00	1.233E+00
AC-228		7.7327E-01	7.7327E-01	1.8444E-01	1.8954E-01	
TH-227	#B	-1.3269E-01	-1.3269E-01	4.1122E-01	4.1129E-01	4.446E-01
PA-234	#B	-4.4288E-02	-4.4288E-02	1.7182E-01	1.7184E-01	1.907E-01
TH-234	#B	1.1329E+00	1.1329E+00	1.3037E+00	1.3052E+00	2.147E+00
AM-241	#A	-3.3183E-02	-3.3184E-02	3.0628E-01	3.0628E-01	3.035E-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) 1.9167263E+01 pCi/gm
Total Decayed Activity (1120.2 to 1999.1 keV) 1.9167263E+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_29AUG2006_1431.An1

Sample description
FSS-OOL-02-05-017-F

Spectrum Filename: C:\GammaVision\Spectra\101F_29AUG2006_1431.An1

Acquisition information
Start time: 29-Aug-2006 14:31:10
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: 1.5870E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5870E+03) =
6.3012E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
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-Aug-2006 10:30:00
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. 17 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1018

***** S U M M A R Y O F P E A K 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	209.	14.26	1.00	1.651E-02	74.81	9.600	1.093E+00	PB212
77.15	302.	10.10	1.01	1.720E-02	77.11	17.500	8.538E-01	PB212
87.22	127.	20.16	1.01	1.923E-02	86.45	32.740	1.732E-01	EU155
					88.04	3.790	PBC<MDA	CD109
89.54	80.	33.32	1.02	1.954E-02				
93.20	131.	19.27	1.02	1.995E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.781E+00	TH234
186.26	72.	32.65	0.83	1.857E-02	185.99	3.280	9.989E-01	RA226
209.63	89.	27.13	1.07	1.720E-02				
238.80	646.	4.62	1.12	1.557E-02	238.63	43.100	8.122E-01	PB212
242.02	101.	17.70	1.12	1.540E-02	241.00	3.900	1.420E+00	RA224
					241.92	7.470	7.439E-01	PB214
270.57	65.	36.62	1.49	1.399E-02				
295.04	135.	16.88	1.20	1.293E-02	295.22	19.200	4.566E-01	PB214
300.27	48.	30.90	0.72	1.272E-02				
338.37	143.	16.29	1.13	1.135E-02	338.40	12.010	8.784E-01	AC228
352.08	263.	10.13	0.89	1.092E-02	351.99	37.100	5.490E-01	PB214
463.46	49.	33.71	1.09	8.342E-03				
463.46	49.	33.71	1.09	8.342E-03	463.51	10.000	4.844E-01	SB125
511.05	104.	15.70	1.38	7.586E-03	510.72	22.500	4.361E-01	TL208
583.32	222.	9.04	1.26	6.682E-03	583.14	86.000	3.258E-01	TL208
609.56	160.	12.02	1.41	6.410E-03	609.32	46.090	4.578E-01	BI214
727.76	55.	22.25	1.82	5.443E-03	727.17	11.800	7.229E-01	BI212
795.29	36.	25.25	1.50	5.016E-03	795.76	85.400	7.182E-02	CS134
861.19	29.	35.57	1.02	4.674E-03				
911.40	139.	13.78	1.73	4.445E-03	911.07	29.000	9.056E-01	AC228
968.99	74.	21.72	1.20	4.212E-03	968.90	17.460	8.462E-01	AC228

1119.77	60.	29.86	2.05	3.711E-03	1120.28	15.040	9.157E-01	BI214
1460.97	585.	4.20	2.02	2.942E-03	1460.75	10.700	1.575E+01	K40
1764.93	16.	27.14	2.11	2.481E-03	1764.51	15.920	3.528E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
178.66	89.71	318.	80.	0.040	99.95	1.015	PB-214	lD
418.93	209.63	216.	89.	0.045	81.38	1.072	NP-239	
540.86	270.57	190.	65.	0.032	109.86	1.488	AC-228	s
600.28	300.27	86.	48.	0.024	92.70	0.725	PB-212	s
1722.68	861.19	29.	29.	0.015	106.70	1.024	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	149.19	74.81	299.	207.	0.104	39.97	1.005D
PB-212	153.79	77.11	313.	292.	0.146	25.53	1.006A
EU-155	174.01	87.22	713.	111.	0.055	106.12	1.499
TH-234	185.69	93.05	682.	132.	0.066	80.72	1.499s
TH-234	185.66	93.04	647.	139.	0.069	78.20	1.499s
RA-226	372.03	186.19	344.	83.	0.041	100.92	1.499
PB-212	476.96	238.63	128.	640.	0.320	13.85	1.122D
RA-224	484.11	242.20	354.	75.	0.037	110.91	1.499
PB-214	483.54	241.92	113.	98.	0.049	54.54	1.124D
PB-214	589.83	295.04	149.	133.	0.067	50.63	1.202s
AC-228	676.52	338.37	144.	141.	0.070	48.86	1.131
PB-214	703.96	352.08	138.	261.	0.131	30.38	0.885
TL-208	1022.03	511.05	76.	87.	0.044	47.11	1.379s
TL-208	1166.66	583.32	65.	220.	0.110	27.13	1.255
BI-214	1219.16	609.56	71.	159.	0.079	36.07	1.409
BI-212	1455.67	727.76	37.	55.	0.027	66.76	1.819s
CS-134	1590.80	795.29	25.	36.	0.018	75.76	1.502s
AC-228	1823.14	911.40	59.	137.	0.069	41.35	1.727s
AC-228	1938.39	968.99	58.	73.	0.037	65.15	1.196
BI-214	2240.13	1119.77	58.	60.	0.030	89.59	2.049s
K-40	2922.95	1460.97	7.	583.	0.291	12.60	2.020
BI-214	3531.29	1764.93	2.	16.	0.008	81.41	2.106s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		-9.9131E-02					
			477.56	-9.913E-02	%(	4.637E-01 1.36E-01	G
K-40		1.5755E+01					
			1460.75	1.575E+01	(P	4.180E-01 6.65E-01	G
MN-54		-5.5786E-03					
			834.81	-5.579E-03	&(P	5.856E-02 1.65E-02	G
CO-57		3.3515E-03					
			122.07	3.351E-03	&(	5.118E-02 1.52E-02	G K
			136.43	2.759E-02	&	4.382E-01 1.30E-01	G
CO-60		2.2630E-02					
			1332.51	2.263E-02	%(P	5.546E-02 1.66E-02	G K
			1173.23	-3.329E-03	% P	8.978E-02 2.54E-02	G K
Sr-85		-1.8835E-02					
			514.00	-1.884E-02	%(	6.714E-02 2.00E-02	G
Kr-85		-4.5123E+02					
			513.99	-4.512E+02	%(P	1.505E+03 4.46E+02	G
Y-88		2.4602E-03					
			1836.01	2.460E-03	%(	3.674E-02 8.68E-03	G K
			898.02	-1.021E-03	& P	4.891E-02 1.31E-02	G
NB-94		1.8776E-02					
			871.10	1.878E-02	%(P	4.928E-02 1.47E-02	G K
			702.50	1.227E-02	% P	4.807E-02 1.40E-02	G K
Ag-108M		-1.8305E-03					
			722.95	-1.830E-03	%(	9.655E-02 2.79E-02	G K
			614.37	-1.140E-02	% P	6.538E-02 1.91E-02	G
			433.93	3.069E-03	%	4.689E-02 1.35E-02	G
CD-109		1.9396E-02					
			88.04	1.940E-02	%(P	1.636E+00 4.87E-01	G
SN-113		-9.8182E-04					
			391.71	-9.818E-04	%(	5.994E-02 1.71E-02	G K
			255.04	-3.559E-02	% P	2.341E+00 6.87E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.8890E-02						
		427.95	1.889E-02	&(P	1.427E-01	4.14E-02	G K
		600.77	-1.440E-03	& P	2.706E-01	7.61E-02	G
		636.15	1.507E-01	& P	3.698E-01	1.11E-01	G
		463.51	3.401E-01	% P	4.551E-01	1.42E-01	G
		176.29	-1.534E-02	& P	6.307E-01	1.85E-01	G
I-131	-1.1666E-02						
		364.48	-1.167E-02	%(	5.941E-02	1.74E-02	G K
		636.97	-3.353E-02	&	8.438E-01	2.37E-01	G
		284.29	2.331E-01	%	8.124E-01	2.42E-01	G
CS-134	3.9361E-02						
		604.66	1.096E-02	&(P	5.805E-02	1.69E-02	G K
		795.76	7.182E-02	@(P	5.143E-02	1.83E-02	G
		569.29	-3.597E-03	& P	3.263E-01	9.21E-02	G
		801.84	-1.177E-01	%	6.346E-01	1.83E-01	G
CS-137	3.7101E-02						
		661.62	3.710E-02	%(P	6.145E-02	1.89E-02	G
CE-139	-9.7513E-04						
		165.85	-9.751E-04	&(P	5.226E-02	1.54E-02	G
EU-152	-5.4250E-03						
		121.78	-5.425E-03	&(P	1.536E-01	4.55E-02	G K
		344.30	7.002E-03	% P	1.507E-01	4.36E-02	G
		1408.08	-2.349E-03	% P	2.170E-01	5.44E-02	G
		964.00	-1.013E-02	% P	6.465E-01	1.85E-01	G
		1112.07	3.071E-02	% P	4.844E-01	1.35E-01	G
		778.90	5.655E-02	& P	3.873E-01	1.10E-01	G
EU-154	6.5718E-03						
		123.10	6.572E-03	%(P	1.106E-01	3.28E-02	G K
		1274.80	6.169E-04	% P	1.800E-01	4.87E-02	G
		723.30	-1.093E-01	% P	3.496E-01	1.04E-01	G
		1004.80	-3.032E-03	& P	3.307E-01	9.07E-02	G
EU-155	1.5115E-01						
		86.45	1.511E-01	(	1.734E-01	5.35E-02	G K
		105.31	8.907E-02	%	2.081E-01	6.30E-02	G
HG-203	1.0993E-02						
		279.17	1.099E-02	%(	4.992E-02	1.48E-02	G K
		72.87	-6.700E-01	& P	9.148E-01	2.80E-01	G
		70.83	2.790E-01	%	2.333E+00	6.97E-01	G
		82.50	-1.111E+00	&	2.918E+00	8.82E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.2576E-01						
		583.14	3.258E-01	(P	5.970E-02	2.98E-02	G
		510.72	4.361E-01	+ P	2.154E-01	8.11E-02	G
PB-212	8.2494E-01						
		238.63	8.122E-01	(P	7.039E-02	3.79E-02	G K
							Energy duplication
		77.11	8.249E-01	}	2.409E-01	7.02E-02	G
		74.81	1.110E+00	+ P	4.468E-01	1.52E-01	G
PB-214	5.1750E-01						
		351.99	5.490E-01	(P	1.206E-01	5.60E-02	G K
		295.22	4.566E-01	@(P	2.045E-01	7.80E-02	G
							Energy duplication
		77.11	0.000E+00	} P	4.308E-01	0.00E+00	G
		241.92	7.267E-01	+ P	3.864E-01	1.33E-01	G
BI-212	7.2285E-01						
		727.17	7.229E-01	*(P	4.142E-01	1.63E-01	G K
		1620.56	2.627E-01	%	1.856E+00	5.00E-01	G
		785.42	1.090E+00	% P	2.504E+00	7.53E-01	G
BI-214	4.5777E-01						
		609.32	4.578E-01	(P	1.210E-01	5.54E-02	G K
		1764.51	3.528E-01	- P	2.151E-01	9.83E-02	G
		1120.28	9.157E-01	+ P	5.827E-01	2.75E-01	G
RA-224	1.0585E+00						
		241.00	1.058E+00	(P	1.277E+00	3.95E-01	G
RA-226	1.1527E+00						
		185.99	1.153E+00	(	1.245E+00	3.88E-01	G
AC-228	8.8225E-01						
		911.07	9.056E-01	@(P	2.540E-01	1.27E-01	G K
		968.90	8.462E-01	(P	4.420E-01	1.86E-01	G
		338.40	8.784E-01	(P	3.667E-01	1.45E-01	G
TH-227	-6.7849E-02						
		236.00	-6.785E-02	%(P	4.172E-01	1.24E-01	G K
		256.25	-1.459E-01	& P	6.505E-01	1.93E-01	G
PA-234	-2.2594E-02						
		98.44	-2.259E-02	&(	1.923E-01	5.73E-02	G K
		946.00	-1.730E-02	&	3.241E-01	9.12E-02	G
		131.28	7.887E-03	&	2.335E-01	6.93E-02	G
		94.67	-1.114E-01	%	3.346E-01	1.01E-01	G
		883.24	-1.046E-02	%	4.499E-01	1.24E-01	G
		926.70	1.029E-01	&	5.365E-01	1.54E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 0.000E+00 &   4.812E-01 1.36E-01 G

TH-234       1.4650E+00
                           63.29 5.779E-01 %(P 2.364E+00 7.07E-01 G K
                           92.80 1.979E+00  (P 1.730E+00 5.39E-01 G
                           92.38 2.211E+00 &(P 2.077E+00 6.44E-01 G

AM-241       5.8499E-02
                           59.54 5.850E-02 &(P 2.874E-01 8.59E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	-9.5138E-02	-9.9131E-02	4.0772E-01	4.0776E-01	4.450E-01
K-40		1.5755E+01	1.5755E+01	1.9933E+00	2.1830E+00	
MN-54	#A	-5.5395E-03	-5.5786E-03	6.4722E-02	6.4723E-02	5.815E-02
CO-57	#B	3.3243E-03	3.3515E-03	4.5582E-02	4.5582E-02	5.076E-02
CO-60	#B	2.2604E-02	2.2630E-02	4.9658E-02	4.9674E-02	5.540E-02

Sr-85	#A	-1.8208E-02	-1.8835E-02	5.9913E-02	5.9922E-02	6.491E-02
Kr-85	#A	-4.5122E+02	-4.5123E+02	1.5336E+03	1.5338E+03	1.505E+03
Y-88	#B	2.4100E-03	2.4602E-03	2.6032E-02	2.6033E-02	3.599E-02
NB-94	#B	1.8776E-02	1.8776E-02	4.3968E-02	4.3981E-02	4.928E-02
Ag-108M	#B	-1.8304E-03	-1.8305E-03	8.3830E-02	8.3830E-02	9.655E-02
CD-109	#A	1.9302E-02	1.9396E-02	1.4607E+00	1.4607E+00	1.628E+00
SN-113	#B	-9.6327E-04	-9.8182E-04	5.1302E-02	5.1302E-02	5.881E-02
SB-125	#B	1.8849E-02	1.8890E-02	1.2409E-01	1.2409E-01	1.424E-01
I-131	#B	-8.8784E-03	-1.1666E-02	5.2200E-02	5.2204E-02	4.521E-02
CS-134	#B	3.9246E-02	3.9361E-02	3.0167E-02	3.0249E-02	5.788E-02
CS-137	#A	3.7094E-02	3.7101E-02	5.6770E-02	5.6809E-02	6.144E-02
CE-139	#A	-9.5969E-04	-9.7513E-04	6.7134E-02	6.7134E-02	5.144E-02
EU-152	#B	-5.4225E-03	-5.4250E-03	2.0450E-01	2.0450E-01	1.536E-01
EU-154	#B	6.5672E-03	6.5718E-03	9.8502E-02	9.8503E-02	1.105E-01
EU-155	#A	1.5096E-01	1.5115E-01	1.6039E-01	1.6061E-01	1.732E-01
HG-203	#B	1.0487E-02	1.0993E-02	4.4372E-02	4.4376E-02	4.762E-02
TL-208		3.2576E-01	3.2576E-01	8.9332E-02	9.1209E-02	
PB-212		8.2494E-01	8.2494E-01	1.1535E-01	1.2441E-01	
PB-214		5.1750E-01	5.1750E-01	1.5459E-01	1.5733E-01	
BI-212	#	7.2285E-01	7.2285E-01	4.8855E-01	4.9026E-01	
BI-214		4.5777E-01	4.5777E-01	1.6625E-01	1.6825E-01	
RA-224	#A	1.0585E+00	1.0585E+00	1.1852E+00	1.1867E+00	1.277E+00
RA-226	#A	1.1527E+00	1.1527E+00	1.1634E+00	1.1652E+00	1.245E+00
AC-228		8.8225E-01	8.8225E-01	2.7187E-01	2.7641E-01	
TH-227	#B	-6.7849E-02	-6.7849E-02	3.9539E-01	3.9540E-01	4.172E-01
PA-234	#B	-2.2594E-02	-2.2594E-02	1.7192E-01	1.7193E-01	1.923E-01
TH-234	#B	1.4650E+00	1.4650E+00	1.1966E+00	1.1994E+00	2.364E+00
AM-241	#A	5.8498E-02	5.8499E-02	2.5763E-01	2.5765E-01	2.874E-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) 1.9485678E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.9485678E+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_30AUG2006_1602.An1

Sample description
FSS-OOL-02-05-021-F-I

Spectrum Filename: C:\GammaVision\Spectra\101F_30AUG2006_1602.An1

Acquisition information
Start time: 30-Aug-2006 16:02:59
Live time: 2000
Real time: 2002
Dead time: 0.10 %
Detector ID: 1

Detector system
Det 101- DSPE-633

Calibration
Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration
Created: 03-Sep-2004 08:50:48
Zero offset: 0.244 keV
Gain: 0.500 keV/channel
Quadratic: -2.493E-08 keV/channel^2

Efficiency Calibration
Created: 03-Sep-2004 08:52:26
Type: Polynomial
Uncertainty: 0.626 %
Coefficients: -0.321775 -5.816463 0.734234
-0.099357 0.006049 -0.000149

Library Files
Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9790E+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	28-Aug-2006 15:30:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1693

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.55	225.	15.45	1.00	1.655E-02	74.81	9.600	9.444E-01	PB212
77.41	368.	10.14	1.01	1.736E-02	77.11	10.700	1.353E+00	PB214
					77.11	17.500	8.356E-01	PB212
86.75	133.	34.01	1.50	1.932E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
87.20	179.	27.01	1.50	1.910E-02	86.45	32.740	1.952E-01	EU155
					88.04	3.790	1.666E+00	CD109
92.91	147.	30.77	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.96	160.	28.46	1.50	1.989E-02	92.38	2.570	2.144E+00	TH234
					92.80	3.000	1.833E+00	TH234
129.58	117.	29.47	1.20	2.109E-02				
186.14	107.	28.05	1.16	1.857E-02	185.99	3.280	1.203E+00	RA226
209.25	57.	41.26	0.99	1.722E-02				
238.81	953.	3.73	1.12	1.557E-02	238.63	43.100	9.630E-01	PB212
242.01	147.	16.88	1.12	1.540E-02	241.00	3.900	1.655E+00	RA224
270.06	67.	38.20	1.21	1.401E-02				
295.18	175.	15.41	1.24	1.292E-02				
295.18	175.	15.41	1.24	1.292E-02	295.22	19.200	4.774E-01	PB214
300.52	86.	26.81	0.87	1.271E-02				
321.02	41.	40.83	0.65	1.194E-02				
338.55	192.	14.10	1.14	1.134E-02	338.40	12.010	9.499E-01	AC228
352.00	303.	11.59	1.03	1.092E-02	351.99	37.100	5.065E-01	PB214
462.51	40.	33.41	1.59	8.359E-03				
462.51	40.	33.41	1.59	8.359E-03	463.51	10.000	PBC<MDA	SB125
511.47	155.	13.60	1.34	7.580E-03	510.72	22.500	5.549E-01	TL208
					513.99	0.004	3.234E+03	Kr85

					514.00	99.270	1.442E-01	Sr85
583.22	261.	9.87	1.12	6.684E-03	583.14	86.000	3.072E-01	TL208
609.52	211.	9.31	1.71	6.411E-03	609.32	46.090	4.845E-01	BI214
727.58	86.	17.59	1.93	5.440E-03	727.17	11.800	9.029E-01	BI212
794.91	33.	29.81	1.50	5.016E-03	795.76	85.400	5.250E-02	CS134
860.62	64.	24.27	0.95	4.677E-03				
910.95	211.	9.37	1.60	4.447E-03	911.07	29.000	1.110E+00	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
968.35	108.	19.14	1.42	4.214E-03	968.90	17.460	9.961E-01	AC228
1120.29	64.	25.58	1.11	3.711E-03	1120.28	15.040	7.784E-01	BI214
1460.98	799.	3.65	1.97	2.942E-03	1460.75	10.700	1.728E+01	K40
1621.05	15.	30.07	0.61	2.682E-03	1620.56	2.750	1.398E+00	BI212
1764.84	47.	18.85	2.05	2.481E-03	1764.51	15.920	8.049E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
148.67	74.86	491.	225.	0.112	46.35	1.005	PB-214	D
154.38	77.72	514.	368.	0.184	30.42	1.007	PB-214	D
418.18	209.25	259.	57.	0.028	123.79	0.988	AC-228	
477.35	238.77	155.	952.	0.476	11.19	1.122	PB-212	D
539.84	270.06	245.	67.	0.034	114.60	1.213	AC-228	
600.79	300.52	188.	86.	0.043	74.61	0.868	PB-212	
641.80	321.02	104.	41.	0.021	122.48	0.650	CR-51	s
1721.53	860.62	49.	64.	0.032	72.80	0.951	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	149.35	74.89	1322.	223.	0.111	70.39	1.499
PB-214	153.79	77.11	1165.	353.	0.177	43.53	1.499D
PB-212	153.79	77.11	1161.	357.	0.178	43.53	1.499D
EU-155	173.97	87.20	1074.	179.	0.089	81.02	1.499s
CD-109	173.07	86.75	965.	133.	0.067	102.04	1.499s
TH-234	185.41	92.91	1109.	147.	0.073	92.30	1.499s
TH-234	185.51	92.96	1044.	160.	0.080	85.39	1.499s
RA-226	371.85	186.10	501.	119.	0.060	84.08	1.499s
PB-212	477.29	238.80	485.	801.	0.401	15.61	1.499
RA-224	481.70	241.00	601.	146.	0.073	75.23	1.123D
PB-214	590.64	295.44	246.	152.	0.076	49.53	1.499
AC-228	676.88	338.55	188.	190.	0.095	42.31	1.144
PB-214	703.88	352.04	167.	277.	0.138	26.54	1.499
SB-125	925.66	462.88	85.	44.	0.022	96.61	1.499s
TL-208	1022.89	511.47	106.	139.	0.069	40.81	1.339s
TL-208	1166.46	583.22	117.	259.	0.129	29.61	1.119

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	1219.07	609.52	68.	210.	0.105	27.94	1.706s
BI-212	1455.32	727.58	51.	85.	0.042	52.77	1.934s
CS-134	1590.04	794.91	33.	33.	0.016	89.44	1.502s
AC-228	1822.26	910.95	49.	210.	0.105	28.11	1.603s
AC-228	1937.12	968.35	85.	107.	0.054	57.41	1.416
BI-214	2241.17	1120.29	60.	64.	0.032	76.74	1.107s
K-40	2922.98	1460.98	13.	797.	0.398	10.95	1.965
BI-212	3243.34	1621.05	2.	15.	0.008	90.20	0.612s
BI-214	3531.11	1764.84	7.	47.	0.023	56.55	2.053

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O 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		-2.2448E-02					
			477.56	-2.245E-02	%(	4.101E-01 1.18E-01 G	
K-40		1.7277E+01					
			1460.75	1.728E+01	(P	4.285E-01 6.33E-01 G	
MN-54		-1.8981E-02					
			834.81	-1.898E-02	%(P	5.684E-02 1.68E-02 G	
CO-57		-7.7737E-03					
			122.07	-7.774E-03	%(	5.380E-02 1.61E-02 G K	
			136.43	4.900E-02	%	4.073E-01 1.22E-01 G	
CO-60		-8.7576E-03					
			1332.51	-8.758E-03	%(P	6.471E-02 1.84E-02 G K	
			1173.23	1.687E-02	% P	8.433E-02 2.47E-02 G K	
Sr-85		-2.0526E-03					
			514.00	-2.053E-03	&(	5.517E-02 1.60E-02 G	
Kr-85		-7.1677E+01					
			513.99	-7.168E+01	&(P	1.251E+03 3.62E+02 G	
Y-88		0.0000E+00					
			1836.01	0.000E+00	&(	8.864E-02 2.45E-02 G K	
			898.02	4.573E-03	& P	5.460E-02 1.55E-02 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-1.0536E-02						
		871.10	-1.054E-02	&(P	5.802E-02	1.68E-02	G K
		702.50	7.332E-03	% P	5.032E-02	1.46E-02	G K
Ag-108M	-1.5243E-02						
		722.95	-1.524E-02	%(	6.645E-02	1.96E-02	G K
		614.37	-1.328E-02	% P	5.365E-02	1.58E-02	G
		433.93	3.664E-03	&	4.312E-02	1.25E-02	G
CD-109	1.2443E+00						
		88.04	1.244E+00	(P	1.379E+00	4.25E-01	G
SN-113	1.7159E-02						
		391.71	1.716E-02	%(	5.976E-02	1.78E-02	G K
		255.04	4.356E-02	& P	1.382E+00	4.02E-01	G
SB-125	9.7948E-02						
		427.95	9.587E-03	&(P	1.388E-01	4.03E-02	G K
		600.77	1.313E-01	& P	2.301E-01	7.06E-02	G
		636.15	-8.633E-03	& P	3.985E-01	1.13E-01	G
		463.51	3.595E-01	(P	3.748E-01	1.20E-01	G
		176.29	9.085E-02	& P	6.537E-01	1.95E-01	G
I-131	-1.3860E-03						
		364.48	-1.386E-03	&(	5.554E-02	1.61E-02	G K
		636.97	2.876E-04	&	7.315E-01	2.07E-01	G
		284.29	2.804E-03	&	7.341E-01	2.15E-01	G
CS-134	2.6606E-02						
		604.66	3.950E-03	&(P	9.953E-02	2.94E-02	G K
		795.76	5.250E-02	*(P	4.710E-02	1.59E-02	G
		569.29	7.795E-02	& P	3.041E-01	8.97E-02	G
		801.84	1.100E-01	%	4.651E-01	1.35E-01	G
CS-137	2.7331E-02						
		661.62	2.733E-02	%(P	6.530E-02	1.96E-02	G
CE-139	-1.4318E-04						
		165.85	-1.432E-04	%(P	5.568E-02	1.65E-02	G
EU-152	9.8251E-03						
		121.78	9.825E-03	%(P	1.109E-01	3.29E-02	G K
		344.30	1.877E-03	% P	1.187E-01	3.42E-02	G
		1408.08	-1.884E-03	& P	1.740E-01	4.36E-02	G
		964.00	-5.109E-03	% P	8.073E-01	2.36E-01	G
		1112.07	4.417E-03	% P	4.642E-01	1.30E-01	G
		778.90	-7.401E-02	% P	4.125E-01	1.20E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	-1.5931E-02						
		123.10	-1.593E-02	%(P	1.097E-01	3.28E-02	G K
		1274.80	-2.327E-03	% P	1.684E-01	4.64E-02	G
		723.30	-8.297E-02	% P	3.223E-01	9.52E-02	G
		1004.80	1.296E-01	% P	2.990E-01	9.00E-02	G
EU-155	1.9525E-01						
		86.45	1.952E-01	?(	1.699E-01	5.27E-02	G K
		105.31	1.009E-01	%	2.099E-01	6.37E-02	G
HG-203	-1.1960E-02						
		279.17	-1.196E-02	%(	5.309E-02	1.58E-02	G K
		72.87	-6.306E-01	& P	1.277E+00	3.87E-01	G
		70.83	2.482E-02	%	1.681E+00	5.00E-01	G
		82.50	-5.519E-01	&	2.657E+00	7.98E-01	G
TL-208	3.0720E-01						
		583.14	3.072E-01	(P	6.319E-02	3.06E-02	G
		510.72	5.549E-01	+ P	2.029E-01	8.43E-02	G
PB-212	8.1335E-01						
		238.63	8.150E-01	(P	1.072E-01	4.27E-02	G K
							Energy duplication
		77.11	8.093E-01	(	3.664E-01	1.17E-01	G
		74.81	9.578E-01	& P	7.403E-01	2.30E-01	G
PB-214	4.4967E-01						
		351.99	4.662E-01	(P	1.059E-01	4.15E-02	G K
		295.22	4.177E-01	(P	2.087E-01	6.98E-02	G
							Energy duplication
		77.11	1.310E+00	+ P	6.001E-01	1.92E-01	G
		241.92	-2.464E-01	% P	6.969E-01	2.10E-01	G
BI-212	9.9648E-01						
		727.17	9.029E-01	*(P	3.829E-01	1.60E-01	G K
		1620.56	1.398E+00	(	8.457E-01	4.20E-01	G
		785.42	6.547E-02	% P	2.275E+00	6.38E-01	G
BI-214	4.8446E-01						
		609.32	4.845E-01	(P	9.524E-02	4.54E-02	G K
		1764.51	8.049E-01	+ P	2.665E-01	1.53E-01	G
		1120.28	7.784E-01	+ P	4.762E-01	2.00E-01	G
RA-224	1.6510E+00						
		241.00	1.651E+00	(P	1.326E+00	4.16E-01	G
RA-226	1.3380E+00						
		185.99	1.338E+00	(	1.198E+00	3.75E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	1.0429E+00						
		911.07	1.110E+00	*(P	1.879E-01	1.05E-01	G K
		968.90	9.961E-01	(P	4.234E-01	1.92E-01	G
		338.40	9.499E-01	(P	3.340E-01	1.36E-01	G
TH-227	-2.1889E-01						
		236.00	-2.189E-01	%(P	4.627E-01	1.40E-01	G K
		256.25	-2.427E-02	& P	5.669E-01	1.67E-01	G
PA-234	1.4201E-03						
		98.44	1.420E-03	&(	1.920E-01	5.72E-02	G K
		946.00	1.491E-03	%	2.682E-01	7.50E-02	G
		131.28	-5.069E-02	%	1.905E-01	5.72E-02	G
		94.67	-5.922E-02	&	3.452E-01	1.04E-01	G
		883.24	1.658E-01	%	3.390E-01	1.03E-01	G
		926.70	7.553E-02	%	4.432E-01	1.27E-01	G
		569.26	1.219E-01	&	4.484E-01	1.33E-01	G
TH-234	1.5121E+00						
		63.29	9.666E-01	%(P	2.373E+00	7.17E-01	G K
		92.80	1.833E+00	(P	1.754E+00	5.42E-01	G
		92.38	1.966E+00	(P	2.114E+00	6.49E-01	G
AM-241	-4.2104E-02						
		59.54	-4.210E-02	%(P	3.159E-01	9.45E-02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-2.1866E-02	-2.2448E-02	3.5502E-01	3.5502E-01	3.994E-01
K-40		1.7277E+01	1.7277E+01	1.8982E+00	2.1345E+00	
MN-54	#A	-1.8896E-02	-1.8981E-02	5.3744E-02	5.3755E-02	5.659E-02
CO-57	#B	-7.7335E-03	-7.7737E-03	4.8321E-02	4.8323E-02	5.352E-02
CO-60	#B	-8.7512E-03	-8.7576E-03	5.7473E-02	5.7476E-02	6.467E-02
Sr-85	#A	-2.0087E-03	-2.0526E-03	4.8105E-02	4.8105E-02	5.399E-02
Kr-85	#A	-7.1676E+01	-7.1677E+01	2.2345E+03	2.2345E+03	1.251E+03
Y-88	#B	0.0000E+00	0.0000E+00	7.3516E-02	7.3517E-02	8.748E-02
NB-94	#B	-1.0536E-02	-1.0536E-02	5.2428E-02	5.2432E-02	5.802E-02
Ag-108M	#B	-1.5243E-02	-1.5243E-02	5.8733E-02	5.8739E-02	6.645E-02
CD-109	#A	1.2405E+00	1.2443E+00	1.2742E+00	1.2761E+00	1.375E+00
SN-113	#B	1.6952E-02	1.7159E-02	5.3315E-02	5.3324E-02	5.903E-02
SB-125	#B	9.7812E-02	9.7948E-02	9.7749E-02	9.7905E-02	1.386E-01
I-131	#B	-1.1641E-03	-1.3860E-03	4.8351E-02	4.8351E-02	4.665E-02
CS-134	#B	2.6557E-02	2.6606E-02	2.4100E-02	2.4147E-02	9.934E-02
CS-137	#A	2.7327E-02	2.7331E-02	5.8882E-02	5.8902E-02	6.530E-02
CE-139	#A	-1.4173E-04	-1.4318E-04	3.2474E-02	3.2474E-02	5.511E-02
EU-152	#B	9.8221E-03	9.8251E-03	9.8721E-02	9.8722E-02	1.109E-01
EU-154	#B	-1.5924E-02	-1.5931E-02	1.0782E-01	1.0782E-01	1.096E-01
EU-155	#	1.9510E-01	1.9525E-01	1.5819E-01	1.5856E-01	1.698E-01
HG-203	#B	-1.1605E-02	-1.1960E-02	4.7493E-02	4.7498E-02	5.152E-02
TL-208		3.0720E-01	3.0720E-01	9.1791E-02	9.3417E-02	
PB-212	#	8.1335E-01	8.1335E-01	1.2796E-01	1.3596E-01	1.072E-01
PB-214	#	4.4967E-01	4.4967E-01	1.2019E-01	1.2285E-01	1.059E-01
BI-212		9.9648E-01	9.9648E-01	5.2172E-01	5.2474E-01	
BI-214		4.8446E-01	4.8446E-01	1.3609E-01	1.3881E-01	
RA-224		1.6510E+00	1.6510E+00	1.2481E+00	1.2516E+00	
RA-226	#	1.3380E+00	1.3380E+00	1.1250E+00	1.1276E+00	1.198E+00
AC-228		1.0429E+00	1.0429E+00	2.6875E-01	2.7513E-01	
TH-227	#B	-2.1889E-01	-2.1889E-01	4.2720E-01	4.2738E-01	4.627E-01
PA-234	#B	1.4201E-03	1.4201E-03	1.7158E-01	1.7158E-01	1.920E-01
TH-234	#B	1.5121E+00	1.5121E+00	1.3061E+00	1.3088E+00	2.373E+00
AM-241	#A	-4.2103E-02	-4.2104E-02	3.1100E-01	3.1101E-01	3.158E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (269.6 to 1999.1 keV) 2.1759464E+01 pCi/gm
Total Decayed Activity (269.6 to 1999.1 keV) 2.1759464E+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_31AUG2006_1716.An1

Sample description
FSS-OOL-02-05-006-F-S

Spectrum Filename: C:\GammaVision\Spectra\101F_31AUG2006_1716.An1

Acquisition information

Start time:	31-Aug-2006 17:16:43
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:	2.4540E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 2.4540E+03) = 4.0750E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 13:45:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1687

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.55	212.	16.23	1.00	1.663E-02	72.87	6.400	1.172E+00	HG203
					74.81	9.600	7.184E-01	PB212
77.17	362.	10.03	1.01	1.736E-02	77.11	10.700	1.072E+00	PB214
					77.11	17.500	6.624E-01	PB212
92.95	127.	35.59	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.97	135.	34.39	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.91	103.	33.86	1.38	1.859E-02				
185.91	103.	33.86	1.38	1.859E-02	185.99	3.280	9.342E-01	RA226
238.75	743.	4.59	1.12	1.558E-02				
238.75	743.	4.59	1.12	1.558E-02	238.63	43.100	6.048E-01	PB212
242.02	90.	24.10	1.12	1.540E-02	241.00	3.900	PBC<MDA	RA224
270.49	60.	36.89	1.05	1.399E-02				
295.30	172.	11.13	1.16	1.291E-02	295.22	19.200	3.779E-01	PB214
299.98	56.	28.70	1.16	1.273E-02				
338.33	148.	18.33	1.18	1.135E-02	338.40	12.010	5.875E-01	AC228
351.99	311.	10.83	1.19	1.092E-02	351.99	37.100	4.199E-01	PB214
463.24	70.	28.43	0.74	8.346E-03				
463.24	70.	28.43	0.74	8.346E-03	463.51	10.000	4.526E-01	SB125
510.79	116.	19.80	1.17	7.589E-03	510.72	22.500	3.217E-01	TL208
583.12	231.	9.02	1.25	6.685E-03	583.14	86.000	2.192E-01	TL208
609.34	190.	10.53	1.20	6.412E-03	609.32	46.090	3.519E-01	BI214
661.73	92.	22.34	1.36	5.937E-03	661.62	84.620	9.977E-02	CS137
727.29	61.	21.62	1.98	5.443E-03	723.30	19.700	3.135E-01	EU154
					727.17	11.800	5.258E-01	BI212
794.97	30.	35.04	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134

910.97	173.	11.50	1.43	4.447E-03	911.07	29.000	7.317E-01	AC228
967.93	125.	17.03	1.75	4.216E-03	968.90	17.460	9.336E-01	AC228
1120.01	62.	26.83	1.47	3.712E-03	1120.28	15.040	6.129E-01	BI214
1460.56	702.	3.85	1.97	2.943E-03	1460.75	10.700	1.224E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.16	45.	14.91	2.87	2.481E-03	1764.51	15.920	6.212E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
148.67	75.09	488.	212.	0.106	48.68	1.005	PB-214	D
153.91	77.72	479.	362.	0.181	30.09	1.007	PB-214	D
477.20	238.61	211.	743.	0.372	13.77	1.122	PB-212	D
483.74	241.88	190.	90.	0.045	72.29	1.124	PB-214	D
540.70	270.49	197.	60.	0.030	110.67	1.055	AC-228	
599.85	300.05	135.	53.	0.026	101.73	0.870	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	148.93	74.68	1251.	188.	0.094	80.41	1.499
PB-214	153.79	77.11	1195.	296.	0.148	51.80	1.499D
PB-212	153.79	77.11	1192.	300.	0.150	51.80	1.499D
TH-234	185.49	92.95	1144.	127.	0.063	106.77	1.499s
TH-234	185.52	92.97	1110.	135.	0.067	103.18	1.499s
RA-226	371.88	186.11	557.	112.	0.056	93.86	1.499s
PB-212	477.19	238.75	512.	616.	0.308	19.48	1.499
PB-214	590.29	295.27	225.	162.	0.081	45.21	1.499
AC-228	676.45	338.33	204.	145.	0.073	54.98	1.176
PB-214	703.78	351.99	150.	296.	0.148	24.57	1.499D
SB-125	926.30	463.20	103.	44.	0.022	104.13	1.499s
TL-208	1021.52	510.79	140.	100.	0.050	59.40	1.172s
TL-208	1166.24	583.12	66.	229.	0.114	27.07	1.245
BI-214	1218.72	609.34	71.	189.	0.094	31.58	1.201s
CS-137	1323.56	661.73	90.	91.	0.046	67.03	1.363
BI-212	1454.73	727.29	50.	61.	0.031	64.85	1.982s
CS-134	1590.16	794.97	42.	30.	0.015	105.12	1.502s
AC-228	1822.23	910.94	57.	177.	0.089	33.28	1.434s
AC-228	1936.26	967.93	81.	125.	0.062	51.08	1.747
BI-214	2240.62	1120.01	63.	62.	0.031	80.50	1.474
K-40	2922.14	1460.56	10.	700.	0.350	11.56	1.971
BI-214	3529.75	1764.16	0.	45.	0.022	44.72	2.873s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O 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		1.5436E-01					
			477.56	1.544E-01	%(	3.078E-01 9.36E-02	G
K-40		1.2237E+01					
			1460.75	1.224E+01	(P	3.100E-01 4.73E-01	G
MN-54		4.8920E-04					
			834.81	4.892E-04	%(P	4.414E-02 1.24E-02	G
CO-57		3.2556E-04					
			122.07	3.256E-04	%(	4.189E-02 1.25E-02	G K
			136.43	-9.079E-03	&	3.359E-01 1.00E-01	G
CO-60		8.3482E-03					
			1332.51	8.348E-03	%(P	3.499E-02 9.94E-03	G K
			1173.23	2.166E-02	% P	5.594E-02 1.67E-02	G K
Sr-85		-1.4695E-02					
			514.00	-1.470E-02	&(	4.679E-02 1.40E-02	G
Kr-85		-3.5217E+02					
			513.99	-3.522E+02	&(P	1.060E+03 3.16E+02	G
Y-88		7.6728E-03					
			1836.01	7.673E-03	&(	3.042E-02 8.44E-03	G K
			898.02	-1.416E-03	% P	3.561E-02 9.77E-03	G
NB-94		2.4599E-03					
			871.10	2.460E-03	%(P	2.965E-02 8.19E-03	G K
			702.50	7.407E-03	& P	3.701E-02 1.08E-02	G K
Ag-108M		-1.8790E-03					
			722.95	-1.879E-03	%(	4.905E-02 1.40E-02	G K
			614.37	-9.979E-03	% P	4.297E-02 1.26E-02	G
			433.93	1.467E-02	&	3.199E-02 9.68E-03	G
CD-109		9.1388E-02					
			88.04	9.139E-02	&(P	8.972E-01 2.67E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-1.2259E-02						
		391.71	-1.226E-02	%(	5.218E-02	1.55E-02	G K
		255.04	5.833E-03	& P	1.576E+00	4.63E-01	G
SB-125	7.8181E-02						
		427.95	6.213E-03	%(P	8.191E-02	2.34E-02	G K
		600.77	-3.526E-02	% P	2.050E-01	5.97E-02	G
		636.15	-2.272E-03	& P	4.261E-01	1.23E-01	G
		463.51	2.912E-01	*(P	3.312E-01	1.04E-01	G
		176.29	-6.662E-04	& P	5.580E-01	1.65E-01	G
I-131	-5.3598E-03						
		364.48	-5.360E-03	&(	5.321E-02	1.56E-02	G K
		636.97	-1.578E-02	&	6.649E-01	1.90E-01	G
		284.29	7.836E-03	%	6.441E-01	1.89E-01	G
CS-134	1.8710E-02						
		604.66	1.322E-03	&(P	7.472E-02	2.20E-02	G K
		795.76	3.858E-02	*(P	4.232E-02	1.37E-02	G
		569.29	7.285E-02	% P	1.867E-01	5.58E-02	G
		801.84	0.000E+00	&	5.280E-01	1.50E-01	G
CS-137	9.9769E-02						
		661.62	9.977E-02	(P	5.143E-02	2.25E-02	G
CE-139	6.2884E-03						
		165.85	6.288E-03	%(P	4.386E-02	1.31E-02	G
EU-152	2.9677E-02						
		121.78	2.968E-02	%(P	1.242E-01	3.73E-02	G K
		344.30	1.449E-02	% P	1.098E-01	3.22E-02	G
		1408.08	-1.610E-02	% P	1.791E-01	4.84E-02	G
		964.00	-4.261E-03	& P	4.479E-01	1.28E-01	G
		1112.07	-1.178E-03	% P	4.301E-01	1.21E-01	G
		778.90	3.048E-02	% P	2.797E-01	7.96E-02	G
EU-154	1.7013E-02						
		123.10	1.701E-02	%(P	9.111E-02	2.73E-02	G K
		1274.80	-2.251E-03	% P	1.509E-01	4.20E-02	G
		723.30	2.935E-03	% P	2.622E-01	7.54E-02	G
		1004.80	-1.524E-02	& P	1.832E-01	5.03E-02	G
EU-155	0.0000E+00						
		86.45	0.000E+00	&(	1.577E-01	4.71E-02	G K
		105.31	4.615E-02	%	1.787E-01	5.38E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
HG-203	9.4826E-03						
		279.17	9.483E-03	&(	3.876E-02	1.16E-02	G K
		72.87	-3.764E-02	& P	1.045E+00	3.12E-01	G
		70.83	3.411E-02	&	2.126E+00	6.37E-01	G
		82.50	-6.021E-01	&	2.094E+00	6.31E-01	G
TL-208	2.1919E-01						
		583.14	2.192E-01	(P	3.891E-02	2.00E-02	G
		510.72	3.217E-01	+ P	1.867E-01	7.39E-02	G
PB-212	5.1808E-01						
		238.63	5.056E-01	(P	8.873E-02	3.32E-02	G K
							Energy duplication
		77.11	5.488E-01	(	2.992E-01	9.47E-02	G
		74.81	6.523E-01	& P	5.811E-01	1.80E-01	G
PB-214	3.8749E-01						
							Energy duplication
		351.99	4.016E-01	(P	8.128E-02	3.31E-02	G K
		295.22	3.603E-01	(P	1.613E-01	5.49E-02	G
							Energy duplication
		77.11	8.864E-01	+ P	4.901E-01	1.55E-01	G
		241.92	4.877E-02	% P	5.546E-01	1.65E-01	G
BI-212	5.2577E-01						
		727.17	5.258E-01	*(P	3.048E-01	1.15E-01	G K
		1620.56	2.040E-01	%	8.585E-01	2.34E-01	G
		785.42	5.573E-01	% P	1.762E+00	5.19E-01	G
BI-214	3.5193E-01						
		609.32	3.519E-01	@(P	7.826E-02	3.73E-02	G K
		1764.51	6.212E-01	+ P	1.027E-01	9.35E-02	G
		1120.28	6.129E-01	+ P	3.913E-01	1.65E-01	G
RA-224	5.8677E-01						
		241.00	5.868E-01	%(P	1.076E+00	3.27E-01	G
RA-226	1.0115E+00						
		185.99	1.012E+00	(	1.019E+00	3.16E-01	G
AC-228	8.2275E-01						
		911.07	7.560E-01	@(P	1.618E-01	8.47E-02	G K
		968.90	9.336E-01	(P	3.349E-01	1.60E-01	G
		338.40	5.875E-01	- P	2.796E-01	1.09E-01	G
TH-227	-1.7167E-01						
		236.00	-1.717E-01	&(P	4.127E-01	1.25E-01	G K
		256.25	-9.649E-03	& P	3.755E-01	1.09E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	-3.4993E-02						
		98.44	-3.499E-02	&(	1.431E-01	4.30E-02	G K
		946.00	-3.121E-02	%	2.190E-01	6.28E-02	G
		131.28	-2.310E-03	%	1.901E-01	5.67E-02	G
		94.67	-9.723E-02	&	2.923E-01	8.82E-02	G
		883.24	-5.716E-02	%	3.531E-01	1.02E-01	G
		926.70	-3.501E-02	&	3.488E-01	9.85E-02	G
		569.26	1.113E-01	%	2.677E-01	8.04E-02	G
TH-234	8.1924E-01						
		63.29	1.301E-01	%(P	1.933E+00	5.77E-01	G K
		92.80	1.243E+00	(P	1.458E+00	4.47E-01	G
		92.38	1.370E+00	(P	1.731E+00	5.29E-01	G
AM-241	4.0210E-02						
		59.54	4.021E-02	%(P	2.523E-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		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	1.5012E-01	1.5436E-01	2.8078E-01	2.8092E-01	2.993E-01
K-40		1.2237E+01	1.2237E+01	1.4195E+00	1.5789E+00	
MN-54	#A	4.8687E-04	4.8920E-04	3.7349E-02	3.7349E-02	4.393E-02
CO-57	#B	3.2378E-04	3.2556E-04	3.7400E-02	3.7400E-02	4.166E-02
CO-60	#B	8.3418E-03	8.3482E-03	2.9811E-02	2.9815E-02	3.496E-02
Sr-85	#A	-1.4362E-02	-1.4695E-02	4.1948E-02	4.1956E-02	4.573E-02
Kr-85	#A	-3.5217E+02	-3.5217E+02	1.0604E+03	1.0606E+03	1.059E+03
Y-88	#B	7.5664E-03	7.6728E-03	2.5333E-02	2.5337E-02	3.000E-02
NB-94	#B	2.4599E-03	2.4599E-03	2.4567E-02	2.4567E-02	2.965E-02
Ag-108M	#B	-1.8789E-03	-1.8790E-03	4.2136E-02	4.2136E-02	4.905E-02
CD-109	#A	9.1089E-02	9.1388E-02	8.0193E-01	8.0195E-01	8.942E-01
SN-113	#B	-1.2101E-02	-1.2259E-02	4.6391E-02	4.6396E-02	5.151E-02
SB-125	#B	7.8066E-02	7.8181E-02	8.4087E-02	8.4203E-02	8.179E-02
I-131	#B	-4.4541E-03	-5.3598E-03	4.6940E-02	4.6941E-02	4.422E-02
CS-134	#B	1.8673E-02	1.8710E-02	1.9941E-02	1.9969E-02	7.457E-02
CS-137		9.9756E-02	9.9769E-02	6.7520E-02	6.7755E-02	
CE-139	#A	6.2207E-03	6.2884E-03	3.9315E-02	3.9317E-02	4.339E-02
EU-152	#B	2.9667E-02	2.9677E-02	1.1195E-01	1.1196E-01	1.242E-01
EU-154	#B	1.7005E-02	1.7013E-02	8.1941E-02	8.1947E-02	9.106E-02
EU-155	#B	0.0000E+00	0.0000E+00	1.4138E-01	1.4138E-01	1.576E-01
HG-203	#B	9.1844E-03	9.4826E-03	3.4661E-02	3.4665E-02	3.754E-02
TL-208		2.1919E-01	2.1919E-01	5.9962E-02	6.1227E-02	
PB-212	#	5.1808E-01	5.1808E-01	1.0194E-01	1.0606E-01	8.873E-02
PB-214	#	3.8749E-01	3.8749E-01	9.5857E-02	9.8325E-02	8.128E-02
BI-212	#	5.2577E-01	5.2577E-01	3.4471E-01	3.4599E-01	
BI-214		3.5193E-01	3.5193E-01	1.1179E-01	1.1354E-01	
RA-224	#A	5.8677E-01	5.8677E-01	9.8181E-01	9.8237E-01	1.076E+00
RA-226	#A	1.0115E+00	1.0115E+00	9.4938E-01	9.5110E-01	1.019E+00
AC-228		8.2275E-01	8.2275E-01	2.5258E-01	2.5683E-01	
TH-227	#B	-1.7167E-01	-1.7167E-01	3.8038E-01	3.8050E-01	4.127E-01
PA-234	#B	-3.4993E-02	-3.4993E-02	1.2899E-01	1.2900E-01	1.431E-01
TH-234	#B	8.1924E-01	8.1924E-01	8.8408E-01	8.8525E-01	1.933E+00
AM-241	#A	4.0210E-02	4.0210E-02	2.2671E-01	2.2672E-01	2.523E-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_31AUG2006_1716.An1

---------- S U M M A R Y ----------

Total Activity (270.1 to 1999.1 keV) 1.4256021E+01 pCi/gm
Total Decayed Activity (270.1 to 1999.1 keV) 1.4256037E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-02-05-011-F

Spectrum Filename: C:\GammaVision\Spectra\102F_1SEP2006_0809.An1

Acquisition information

Start time:	01-Sep-2006 08:09:23
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:	1.7980E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.7980E+03) = 5.5617E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 14:00:00
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: 0.5095

***** S U M M A R Y O F P E A K 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	109.	39.22	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.13	176.	23.93	1.50	9.541E-03	77.11	10.700	1.299E+00	PB214
					77.11	17.500	7.944E-01	PB212
77.13	176.	23.93	1.50	9.541E-03	77.11	10.700	1.299E+00	PB214
					77.11	17.500	7.944E-01	PB212
185.87	85.	29.12	0.82	1.627E-02				
185.87	85.	29.12	0.82	1.627E-02	185.99	3.280	PBC<MDA	RA226
239.01	711.	4.38	1.22	1.379E-02	238.63	43.100	8.979E-01	PB212
241.74	98.	25.43	1.22	1.366E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.217E-01	PB214
295.69	131.	13.02	1.25	1.145E-02	295.22	19.200	4.485E-01	PB214
300.31	41.	34.51	1.26	1.129E-02				
338.65	164.	15.43	1.45	1.005E-02	338.40	12.010	1.023E+00	AC228
348.00	29.	36.89	1.50	9.891E-03	344.30	27.000	PBC<MDA	EU152
352.38	226.	12.22	1.20	9.668E-03	351.99	37.100	4.712E-01	PB214
463.60	50.	22.93	1.27	7.363E-03	463.51	10.000	4.995E-01	SB125
511.38	116.	14.39	1.21	6.686E-03	510.72	22.500	5.763E-01	TL208
584.00	187.	8.49	1.43	5.882E-03	583.14	86.000	2.775E-01	TL208
610.08	177.	11.89	1.41	5.643E-03	609.32	46.090	5.109E-01	BI214
728.29	50.	24.99	1.58	4.787E-03	727.17	11.800	6.630E-01	BI212
795.71	27.	34.69	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
912.43	197.	9.31	1.76	3.917E-03	911.07	29.000	1.298E+00	AC228
969.49	118.	13.42	1.50	3.716E-03	968.90	17.460	1.360E+00	AC228
1121.00	32.	30.21	1.03	3.283E-03	1120.28	15.040	4.840E-01	BI214
1462.65	551.	4.32	2.07	2.618E-03	1460.75	10.700	1.476E+01	K40
1767.13	38.	16.22	1.07	2.222E-03	1764.51	15.920	8.043E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
477.66	239.01	129.	711.	0.355	13.14	1.215	PB-212	D
483.11	241.73	261.	98.	0.049	76.28	1.217	PB-214	D
600.27	300.19	81.	41.	0.021	103.54	1.258	PB-212	lD
3536.15	1767.13	1.	32.	0.016	55.79	2.238	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	149.36	74.89	919.	109.	0.055	117.66	1.500s
PB-214	153.80	77.11	803.	176.	0.088	71.79	1.500D
PB-212	153.80	77.11	803.	176.	0.088	71.79	1.500D
RA-226	371.98	186.18	387.	81.	0.041	102.06	1.500
PB-212	477.64	239.00	397.	607.	0.304	18.50	1.500
PB-214	590.95	295.65	189.	121.	0.061	55.20	1.500
AC-228	676.97	338.65	150.	164.	0.082	46.28	1.452
EU-152	695.69	348.00	43.	29.	0.014	110.68	1.500s
PB-214	704.43	352.37	110.	193.	0.097	31.47	1.500
SB-125	926.81	463.53	56.	44.	0.022	80.97	1.500s
TL-208	1022.54	511.38	60.	116.	0.058	43.16	1.206s
TL-208	1167.84	584.00	29.	187.	0.093	25.47	1.435
BI-214	1220.02	610.08	70.	177.	0.089	35.67	1.412
BI-212	1456.54	728.29	39.	50.	0.025	74.96	1.581
CS-134	1591.44	795.71	30.	27.	0.013	104.08	1.601
AC-228	1825.00	912.43	37.	196.	0.098	27.93	1.755
AC-228	1939.18	969.49	38.	117.	0.059	40.27	1.495
BI-214	2242.39	1121.00	25.	32.	0.016	90.62	1.034s
K-40	2926.31	1462.70	13.	519.	0.259	13.49	2.042
BI-214	3530.48	1764.51	7.	18.	0.009	91.52	2.237D

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O 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		1.4812E-01					
			477.56	1.481E-01	&(	3.676E-01 1.10E-01	G
K-40		1.3903E+01					
			1460.75	1.390E+01	(P	5.222E-01 6.25E-01	G
MN-54		-1.1316E-02					
			834.81	-1.132E-02	%(P	6.427E-02 1.85E-02	G
CO-57		2.2767E-02					
			122.07	2.277E-02	%(	5.969E-02 1.80E-02	G K
			136.43	7.927E-02	&	4.614E-01 1.38E-01	G
CO-60		-9.7241E-03					
			1332.51	-9.724E-03	&(P	7.450E-02 2.10E-02	G K
			1173.23	-1.764E-02	&	8.683E-02 2.52E-02	G K
Sr-85		-1.5290E-02					
			514.00	-1.529E-02	%(	6.082E-02 1.80E-02	G
Kr-85		-3.4319E+02					
			513.99	-3.432E+02	%(	1.364E+03 4.04E+02	G
Y-88		-2.3526E-05					
			1836.01	-2.353E-05	&(P	6.032E-02 1.54E-02	G K
			898.02	1.559E-03	& P	5.681E-02 1.56E-02	G
NB-94		1.2310E-02					
			871.10	1.231E-02	&(	4.567E-02 1.32E-02	G K
			702.50	-3.541E-05	%	4.746E-02 1.32E-02	G K
Ag-108M		6.9248E-04					
			722.95	6.925E-04	%(	5.739E-02 1.60E-02	G K
			614.37	-1.909E-02	% P	6.925E-02 2.05E-02	G
			433.93	9.129E-03	%	4.163E-02 1.22E-02	G
CD-109		-5.7996E-02					
			88.04	-5.800E-02	&(P	2.241E+00 6.67E-01	G
SN-113		6.5945E-03					
			391.71	6.594E-03	&(	6.891E-02 2.00E-02	G K
			255.04	6.395E-01	&	1.563E+00 4.71E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.4923E-01						
		427.95	4.615E-02	%(P	1.272E-01	3.78E-02	G K
		600.77	7.741E-02	% P	2.274E-01	6.73E-02	G
		636.15	-3.985E-03	% P	4.238E-01	1.19E-01	G
		463.51	4.544E-01	@(P	3.829E-01	1.27E-01	G
		176.29	-1.588E-02	& P	6.908E-01	2.03E-01	G
I-131	-1.0522E-02						
		364.48	-1.052E-02	%(	7.041E-02	2.07E-02	G K
		636.97	-5.077E-03	&	9.063E-01	2.55E-01	G
		284.29	2.774E-01	%	7.793E-01	2.34E-01	G
CS-134	2.0081E-02						
		604.66	-9.436E-03	%(	5.227E-02	1.52E-02	G K
		795.76	5.381E-02	(	5.658E-02	1.87E-02	G
		569.29	6.434E-02	%	2.781E-01	8.10E-02	G
		801.84	1.680E-02	& P	6.618E-01	1.86E-01	G
CS-137	1.6689E-02						
		661.62	1.669E-02	&(	5.291E-02	1.56E-02	G
CE-139	3.6531E-03						
		165.85	3.653E-03	%(P	5.779E-02	1.71E-02	G
EU-152	7.0841E-02						
		121.78	6.102E-02	%(P	1.738E-01	5.24E-02	G K
		344.30	8.148E-02	?(	9.319E-02	3.01E-02	G
		1408.08	1.967E-02	%	2.581E-01	6.94E-02	G
		964.00	1.677E-01	% P	4.641E-01	1.38E-01	G
		1112.07	3.608E-03	&	4.970E-01	1.37E-01	G
		778.90	8.678E-02	& P	3.226E-01	9.34E-02	G
EU-154	4.2153E-02						
		123.10	4.215E-02	&(P	1.208E-01	3.64E-02	G K
		1274.80	-4.496E-02	%	2.277E-01	6.57E-02	G
		723.30	-1.051E-02	% P	4.340E-01	1.25E-01	G
		1004.80	5.669E-04	&	3.780E-01	1.05E-01	G
EU-155	7.8607E-02						
		86.45	7.861E-02	%(P	2.764E-01	8.31E-02	G K
		105.31	3.166E-02	%	2.462E-01	7.33E-02	G
HG-203	3.7483E-02						
		279.17	3.748E-02	&(P	5.139E-02	1.59E-02	G K
		72.87	-9.289E-01	&	2.352E+00	7.11E-01	G
		70.83	-1.713E+00	&	4.051E+00	1.23E+00	G
		82.50	-1.698E+00	%	4.245E+00	1.28E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7746E-01						
		583.14	2.775E-01	(P	4.126E-02	2.36E-02	G
		510.72	5.763E-01	+	1.929E-01	8.30E-02	G
PB-212	7.7490E-01						
		238.63	7.670E-01	(	1.207E-01	4.73E-02	G K
							Energy duplication
		77.11	7.944E-01	*(	6.067E-01	1.90E-01	G
		74.81	9.681E-01	& P	1.274E+00	3.90E-01	G
PB-214	4.0816E-01						
		351.99	4.050E-01	(P	1.081E-01	4.26E-02	G K
		295.22	4.143E-01	(	2.277E-01	7.62E-02	G
							Energy duplication
		77.11	1.299E+00	+	9.923E-01	3.11E-01	G
		241.92	4.385E-01	%	7.445E-01	2.27E-01	G
BI-212	6.6297E-01						
		727.17	6.630E-01	(	4.231E-01	1.66E-01	G K
		1620.56	5.309E-01	% P	1.537E+00	4.42E-01	G
		785.42	9.936E-01	% P	2.242E+00	6.76E-01	G
BI-214	5.0430E-01						
		609.32	5.109E-01	(	1.204E-01	6.08E-02	G K
		1764.51	3.863E-01	- P	3.098E-01	1.18E-01	G
		1120.28	4.840E-01	(	3.973E-01	1.46E-01	G
RA-224	9.9435E-01						
		241.00	9.944E-01	%(P	1.402E+00	4.30E-01	G
RA-226	1.1450E+00						
		185.99	1.145E+00	(P	1.330E+00	4.11E-01	G
AC-228	1.3211E+00						
		911.07	1.298E+00	(P	2.043E-01	1.21E-01	G K
		968.90	1.360E+00	(P	3.619E-01	1.83E-01	G
		338.40	1.023E+00	-	3.714E-01	1.58E-01	G
TH-227	8.8839E-03						
		236.00	8.884E-03	%(P	6.077E-01	1.81E-01	G K
		256.25	-1.431E-02	%	6.000E-01	1.75E-01	G
PA-234	-1.5969E-02						
		98.44	-1.597E-02	&(	2.691E-01	8.02E-02	G K
		946.00	-2.464E-02	%	2.914E-01	8.18E-02	G
		131.28	-2.396E-02	%	2.512E-01	7.48E-02	G
		94.67	-2.198E-01	%	4.296E-01	1.30E-01	G
		883.24	-5.288E-04	&	4.446E-01	1.22E-01	G
		926.70	-5.004E-02	%	4.438E-01	1.24E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 9.523E-02 %   4.115E-01 1.20E-01 G

TH-234       1.3016E+00
                           63.29 1.302E+00 %(P 4.903E+00 1.47E+00 G K
                           92.80 1.752E+00 %   2.593E+00 7.93E-01 G
                           92.38 8.008E-01 & P 2.745E+00 8.25E-01 G

AM-241       6.9384E-03
                           59.54 6.938E-03 %(  6.156E-01 1.82E-01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.4291E-01	1.4812E-01	3.3067E-01	3.3077E-01	3.547E-01
K-40		1.3903E+01	1.3903E+01	1.8762E+00	2.0320E+00	5.222E-01
MN-54	#A	-1.1247E-02	-1.1316E-02	5.9475E-02	5.9479E-02	6.388E-02
CO-57	#B	2.2606E-02	2.2767E-02	5.4055E-02	5.4070E-02	5.927E-02
CO-60	#B	-9.7145E-03	-9.7241E-03	6.5760E-02	6.5762E-02	7.442E-02

Sr-85	#A	-1.4846E-02	-1.5290E-02	5.3995E-02	5.4001E-02	5.905E-02
Kr-85	#A	-3.4318E+02	-3.4319E+02	1.2106E+03	1.2108E+03	1.364E+03
Y-88	#B	-2.3108E-05	-2.3526E-05	6.0459E-04	6.0459E-04	5.925E-02
NB-94	#B	1.2310E-02	1.2310E-02	3.9695E-02	3.9701E-02	4.567E-02
Ag-108M	#B	6.9245E-04	6.9248E-04	4.8112E-02	4.8112E-02	5.739E-02
CD-109	#A	-5.7752E-02	-5.7996E-02	4.8137E+00	4.8137E+00	2.231E+00
SN-113	#B	6.4859E-03	6.5945E-03	6.0041E-02	6.0042E-02	6.777E-02
SB-125	#F	1.4895E-01	1.4923E-01	1.2505E-01	1.2533E-01	1.270E-01
I-131	#B	-8.2962E-03	-1.0522E-02	6.1974E-02	6.1977E-02	5.552E-02
CS-134	#B	2.0030E-02	2.0081E-02	2.0899E-02	2.0930E-02	5.213E-02
CS-137	#A	1.6686E-02	1.6689E-02	4.6787E-02	4.6797E-02	5.290E-02
CE-139	#A	3.6027E-03	3.6531E-03	5.1398E-02	5.1398E-02	5.699E-02
EU-152	#B	7.0812E-02	7.0841E-02	7.8405E-02	7.8504E-02	1.737E-01
EU-154	#B	4.2127E-02	4.2153E-02	1.0922E-01	1.0924E-01	1.208E-01
EU-155	#B	7.8524E-02	7.8607E-02	2.4939E-01	2.4943E-01	2.761E-01
HG-203	#B	3.5977E-02	3.7483E-02	4.7723E-02	4.7769E-02	4.933E-02
TL-208		2.7746E-01	2.7746E-01	7.0828E-02	7.2519E-02	
PB-212	#	7.7490E-01	7.7490E-01	1.4332E-01	1.4977E-01	1.207E-01
PB-214	#	4.0816E-01	4.0816E-01	1.2869E-01	1.3071E-01	1.081E-01
BI-212		6.6297E-01	6.6297E-01	4.9698E-01	4.9837E-01	
BI-214		5.0430E-01	5.0430E-01	1.7990E-01	1.8212E-01	
RA-224	#A	9.9435E-01	9.9435E-01	1.2904E+00	1.2916E+00	1.402E+00
RA-226	#A	1.1450E+00	1.1450E+00	1.2327E+00	1.2344E+00	1.330E+00
AC-228		1.3211E+00	1.3211E+00	3.2388E-01	3.3226E-01	
TH-227	#B	8.8839E-03	8.8839E-03	5.4168E-01	5.4168E-01	6.077E-01
PA-234	#B	-1.5969E-02	-1.5969E-02	2.4049E-01	2.4049E-01	2.691E-01
TH-234	#B	1.3016E+00	1.3016E+00	4.4181E+00	4.4187E+00	4.903E+00
AM-241	#A	6.9383E-03	6.9384E-03	5.4607E-01	5.4607E-01	6.156E-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) 1.6669271E+01 pCi/gm
Total Decayed Activity (1766.8 to 1999.0 keV) 1.6669271E+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_28AUG2006_1028.An1

Sample description
FSS-OOL-02-05-015-F

Spectrum Filename: C:\GammaVision\Spectra\102F_28AUG2006_1028.An1

Acquisition information
Start time: 28-Aug-2006 10:29:15
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: 1.8810E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8810E+03) =
5.3163E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	25-Aug-2006 13:15:00
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. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.7470

***** S U M M A R Y O F P E A K 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	125.	34.58	1.50	8.847E-03	72.87	6.400	1.777E+00	HG203
					74.81	9.600	PBC<MDA	PB212
77.26	207.	21.60	1.50	9.541E-03	77.11	10.700	1.455E+00	PB214
					77.11	17.500	8.896E-01	PB212
77.26	207.	21.60	1.50	9.541E-03	77.11	10.700	1.455E+00	PB214
					77.11	17.500	8.896E-01	PB212
185.99	122.	23.07	2.02	1.627E-02	185.99	3.280	1.577E+00	RA226
210.03	62.	38.41	1.98	1.516E-02				
239.00	697.	4.60	1.22	1.379E-02	238.63	43.100	8.419E-01	PB212
242.05	111.	20.08	1.22	1.365E-02	241.00	3.900	1.475E+00	RA224
					241.92	7.470	7.805E-01	PB214
270.90	62.	38.21	0.81	1.240E-02				
295.75	127.	13.86	1.26	1.145E-02	295.22	19.200	4.151E-01	PB214
300.44	44.	34.93	1.26	1.128E-02				
328.40	61.	31.65	1.07	1.036E-02				
338.68	121.	17.98	1.22	1.005E-02	338.40	12.010	7.171E-01	AC228
352.42	255.	10.85	1.36	9.667E-03	351.99	37.100	5.094E-01	PB214
463.25	53.	34.42	0.80	7.369E-03				
463.25	53.	34.42	0.80	7.369E-03	463.51	10.000	5.039E-01	SB125
511.87	107.	18.09	1.42	6.680E-03	510.72	22.500	5.098E-01	TL208
583.93	227.	9.20	1.54	5.882E-03	583.14	86.000	3.211E-01	TL208
610.04	158.	11.27	1.72	5.643E-03	609.32	46.090	4.373E-01	BI214
727.81	71.	24.77	0.69	4.790E-03	727.17	11.800	9.042E-01	BI212
795.92	26.	40.19	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
912.47	165.	12.64	1.59	3.917E-03	911.07	29.000	1.040E+00	AC228
970.10	132.	14.89	1.30	3.714E-03	968.90	17.460	1.463E+00	AC228
1122.00	52.	36.04	1.12	3.279E-03	1120.28	15.040	7.566E-01	BI214

1462.62	636.	4.00	1.98	2.618E-03	1460.75	10.700	1.630E+01	K40
1766.68	31.	20.44	2.24	2.225E-03	1764.51	15.920	6.187E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
419.67	210.03	236.	62.	0.031	115.24	1.979	NP-239 s
477.62	239.03	166.	697.	0.349	13.80	1.215	PB-212 D
483.72	242.08	192.	111.	0.055	60.25	1.217	PB-214 D
541.44	270.90	192.	62.	0.031	102.23	0.806	AC-228 s
600.54	300.38	94.	44.	0.022	104.78	1.258	PB-212 lD
656.47	328.40	122.	61.	0.031	94.94	1.068	RH-106M s
1455.58	727.81	88.	48.	0.024	93.62	0.693	J-132 s
2244.40	1122.00	68.	52.	0.026	108.12	1.122	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	148.92	74.67	917.	125.	0.062	103.75	1.500s
PB-214	153.80	77.11	894.	207.	0.103	64.79	1.500D
PB-212	153.80	77.11	894.	207.	0.103	64.79	1.500D
RA-226	371.60	185.99	307.	117.	0.059	69.21	2.018s
PB-212	477.55	238.96	475.	627.	0.314	19.00	1.500s
RA-224	483.43	241.90	491.	90.	0.045	107.32	1.500s
PB-214	591.04	295.69	183.	127.	0.064	52.35	1.500s
AC-228	677.04	338.68	134.	121.	0.060	53.93	1.220s
PB-214	704.58	352.45	148.	238.	0.119	29.09	1.500s
SB-125	927.31	463.78	91.	38.	0.019	111.46	1.500s
TL-208	1023.51	511.87	86.	107.	0.053	54.26	1.416s
TL-208	1167.70	583.93	68.	226.	0.113	27.59	1.544
BI-214	1219.93	610.04	60.	158.	0.079	33.81	1.722s
CS-134	1591.86	795.92	42.	26.	0.013	120.57	1.601s
AC-228	1825.08	912.47	61.	165.	0.082	37.93	1.587
AC-228	1940.40	970.10	61.	132.	0.066	44.67	1.295
K-40	2926.14	1462.62	3.	636.	0.318	11.99	1.984
BI-214	3534.82	1766.68	4.	31.	0.015	61.31	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		0.0000E+00					
			477.56	0.000E+00	&(	4.575E-01 1.31E-01	G
K-40		1.6295E+01					
			1460.75	1.630E+01	(P	2.745E-01 6.52E-01	G
MN-54		-9.8067E-03					
			834.81	-9.807E-03	%(P	5.785E-02 1.66E-02	G
CO-57		1.0160E-02					
			122.07	1.016E-02	&(	4.872E-02 1.45E-02	G K
			136.43	-6.944E-02	%	4.866E-01 1.45E-01	G
CO-60		-4.4670E-03					
			1332.51	-4.467E-03	%(P	6.259E-02 1.72E-02	G K
			1173.23	-9.080E-03	%	7.530E-02 2.15E-02	G K
Sr-85		-2.3883E-03					
			514.00	-2.388E-03	&(	5.595E-02 1.61E-02	G
Kr-85		-5.3462E+01					
			513.99	-5.346E+01	&(	1.252E+03 3.61E+02	G
Y-88		1.9055E-03					
			1836.01	1.906E-03	%(P	3.862E-02 9.26E-03	G K
			898.02	-4.883E-03	% P	6.266E-02 1.75E-02	G
NB-94		6.2158E-03					
			871.10	6.216E-03	%(	5.275E-02 1.49E-02	G K
			702.50	-4.965E-03	&	4.839E-02 1.38E-02	G K
Ag-108M		-2.2318E-03					
			722.95	-2.232E-03	%(	6.385E-02 1.81E-02	G K
			614.37	-4.197E-02	& P	7.532E-02 2.30E-02	G
			433.93	-1.686E-04	&	4.621E-02 1.32E-02	G
CD-109		7.2349E-01					
			88.04	7.235E-01	%(P	2.078E+00 6.27E-01	G
SN-113		9.1838E-03					
			391.71	9.184E-03	%(	6.097E-02 1.78E-02	G K
			255.04	5.484E-02	%	2.096E+00 6.15E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.3366E-02						
		427.95	-1.462E-02	%(P	1.303E-01	3.73E-02	G K
		600.77	6.424E-02	& P	2.439E-01	7.15E-02	G
		636.15	-9.189E-02	% P	4.589E-01	1.34E-01	G
		463.51	3.734E-01	(P	4.603E-01	1.44E-01	G
		176.29	3.720E-02	% P	7.164E-01	2.12E-01	G
I-131	-1.0962E-02						
		364.48	-1.096E-02	%(	6.089E-02	1.79E-02	G K
		636.97	9.398E-04	%	9.071E-01	2.56E-01	G
		284.29	2.521E-03	%	8.350E-01	2.43E-01	G
CS-134	1.3034E-02						
		604.66	-1.922E-02	&(	6.162E-02	1.83E-02	G K
		795.76	4.990E-02	*(	6.291E-02	2.01E-02	G
		569.29	4.081E-03	&	2.697E-01	7.57E-02	G
		801.84	-5.545E-02	% P	6.608E-01	1.88E-01	G
CS-137	1.4481E-02						
		661.62	1.448E-02	%(	6.044E-02	1.77E-02	G
CE-139	5.6874E-03						
		165.85	5.687E-03	&(P	5.727E-02	1.70E-02	G
EU-152	-5.9811E-03						
		121.78	-5.981E-03	%(P	1.485E-01	4.39E-02	G K
		344.30	8.590E-05	%	1.727E-01	5.02E-02	G
		1408.08	9.196E-02	%	2.271E-01	6.77E-02	G
		964.00	-3.652E-02	% P	4.782E-01	1.36E-01	G
		1112.07	0.000E+00	%	6.604E-01	1.87E-01	G
		778.90	-5.575E-02	% P	3.359E-01	9.53E-02	G
EU-154	-2.5437E-03						
		123.10	-2.544E-03	%(P	1.237E-01	3.67E-02	G K
		1274.80	9.754E-03	&	1.954E-01	5.42E-02	G
		723.30	-2.642E-02	& P	2.881E-01	8.22E-02	G
		1004.80	8.216E-02	&	3.308E-01	9.60E-02	G
EU-155	1.1878E-01						
		86.45	1.188E-01	%(P	2.759E-01	8.35E-02	G K
		105.31	7.218E-02	%	2.618E-01	7.87E-02	G
HG-203	1.7850E-02						
		279.17	1.785E-02	%(P	4.733E-02	1.42E-02	G K
		72.87	-1.142E-01	&	2.197E+00	6.56E-01	G
		70.83	-1.818E+00	%	4.101E+00	1.24E+00	G
		82.50	0.000E+00	%	4.746E+00	1.42E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.2109E-01						
		583.14	3.211E-01	(P	5.819E-02	2.96E-02	G
		510.72	5.098E-01	+	2.192E-01	9.23E-02	G
PB-212	7.9546E-01						
		238.63	7.572E-01	@(	1.259E-01	4.80E-02	G K
							Energy duplication
		77.11	8.896E-01	@(	6.110E-01	1.92E-01	G
		74.81	1.056E+00	& P	1.217E+00	3.74E-01	G
PB-214	4.5512E-01						
		351.99	4.757E-01	@(P	1.188E-01	4.62E-02	G K
		295.22	4.153E-01	@(	2.145E-01	7.25E-02	G
							Energy duplication
		77.11	1.455E+00	+	9.993E-01	3.14E-01	G
		241.92	5.034E-01	%	7.836E-01	2.40E-01	G
BI-212	2.9509E-01						
		727.17	2.951E-01	%(	5.105E-01	1.57E-01	G K
		1620.56	2.525E-01	& P	1.408E+00	3.71E-01	G
		785.42	8.998E-01	% P	2.536E+00	7.53E-01	G
BI-214	4.3733E-01						
		609.32	4.373E-01	*(	1.067E-01	4.93E-02	G K
		1764.51	6.187E-01	+ P	2.518E-01	1.27E-01	G
		1120.28	3.439E-01	%	4.766E-01	1.50E-01	G
RA-224	1.2152E+00						
		241.00	1.215E+00	(P	1.426E+00	4.40E-01	G
RA-226	1.5773E+00						
		185.99	1.577E+00	(P	1.136E+00	3.78E-01	G
AC-228	1.0395E+00						
		911.07	1.040E+00	(P	2.478E-01	1.32E-01	G K
		968.90	1.463E+00	+ P	4.322E-01	2.18E-01	G
		338.40	7.171E-01	-	3.374E-01	1.29E-01	G
TH-227	-2.6673E-01						
		236.00	-2.667E-01	%(P	5.065E-01	1.54E-01	G K
		256.25	4.719E-03	&	6.357E-01	1.86E-01	G
PA-234	-4.3044E-02						
		98.44	-4.304E-02	%(	2.528E-01	7.57E-02	G K
		946.00	-7.937E-02	%	3.377E-01	9.86E-02	G
		131.28	-7.284E-02	%	2.575E-01	7.74E-02	G
		94.67	4.564E-04	%	4.868E-01	1.45E-01	G
		883.24	-1.192E-01	%	5.115E-01	1.49E-01	G
		926.70	2.440E-02	%	3.801E-01	1.03E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 5.271E-03 &   3.861E-01 1.08E-01 G

TH-234       1.7301E+00
                           63.29 1.730E+00 %(P 4.880E+00 1.47E+00 G K
                           92.80 1.384E+00 %   2.580E+00 7.84E-01 G
                           92.38-1.146E-01 % P 3.093E+00 9.22E-01 G

AM-241      -6.5309E-04
                           59.54-6.531E-04 %(  5.523E-01 1.63E-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	3.9155E-01	3.9155E-01	4.407E-01
K-40		1.6295E+01	1.6295E+01	1.9547E+00	2.1581E+00	
MN-54	#A	-9.7441E-03	-9.8067E-03	5.3658E-02	5.3660E-02	5.748E-02
CO-57	#B	1.0085E-02	1.0160E-02	4.3650E-02	4.3653E-02	4.836E-02
CO-60	#B	-4.4623E-03	-4.4670E-03	5.6353E-02	5.6354E-02	6.252E-02

Sr-85	#A	-2.3158E-03	-2.3883E-03	4.8419E-02	4.8419E-02	5.425E-02
Kr-85	#A	-5.3461E+01	-5.3462E+01	1.0839E+03	1.0839E+03	1.252E+03
Y-88	#B	1.8701E-03	1.9055E-03	2.7771E-02	2.7771E-02	3.791E-02
NB-94	#B	6.2158E-03	6.2158E-03	4.4796E-02	4.4798E-02	5.275E-02
Ag-108M	#B	-2.2317E-03	-2.2318E-03	5.4372E-02	5.4373E-02	6.385E-02
CD-109	#A	7.2031E-01	7.2349E-01	1.8803E+00	1.8807E+00	2.069E+00
SN-113	#B	9.0256E-03	9.1838E-03	5.3309E-02	5.3311E-02	5.992E-02
SB-125	#B	8.3202E-02	8.3366E-02	9.6685E-02	9.6798E-02	1.300E-01
I-131	#B	-8.5480E-03	-1.0962E-02	5.3575E-02	5.3579E-02	4.748E-02
CS-134	#B	1.3000E-02	1.3034E-02	1.5716E-02	1.5733E-02	6.146E-02
CS-137	#A	1.4478E-02	1.4481E-02	5.3052E-02	5.3058E-02	6.043E-02
CE-139	#A	5.6053E-03	5.6874E-03	5.1082E-02	5.1083E-02	5.645E-02
EU-152	#B	-5.9785E-03	-5.9811E-03	2.0353E-01	2.0353E-01	1.484E-01
EU-154	#B	-2.5421E-03	-2.5437E-03	1.3053E-01	1.3053E-01	1.236E-01
EU-155	#B	1.1865E-01	1.1878E-01	2.5039E-01	2.5048E-01	2.756E-01
HG-203	#B	1.7101E-02	1.7850E-02	4.2664E-02	4.2676E-02	4.534E-02
TL-208		3.2109E-01	3.2109E-01	8.8755E-02	9.0566E-02	
PB-212	#	7.9546E-01	7.9546E-01	1.5113E-01	1.5759E-01	1.259E-01
PB-214	#	4.5512E-01	4.5512E-01	1.3260E-01	1.3504E-01	1.188E-01
BI-212	#B	2.9509E-01	2.9509E-01	4.7074E-01	4.7103E-01	5.105E-01
BI-214	#	4.3733E-01	4.3733E-01	1.4788E-01	1.4990E-01	
RA-224	#A	1.2152E+00	1.2152E+00	1.3210E+00	1.3228E+00	1.426E+00
RA-226	#	1.5773E+00	1.5773E+00	1.1332E+00	1.1366E+00	
AC-228		1.0395E+00	1.0395E+00	3.9481E-01	3.9910E-01	
TH-227	#B	-2.6673E-01	-2.6673E-01	4.6632E-01	4.6656E-01	5.065E-01
PA-234	#B	-4.3044E-02	-4.3044E-02	2.2696E-01	2.2698E-01	2.528E-01
TH-234	#B	1.7301E+00	1.7301E+00	4.4163E+00	4.4173E+00	4.880E+00
AM-241	#A	-6.5308E-04	-6.5309E-04	4.8881E-01	4.8881E-01	5.523E-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) 1.9670467E+01 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.9670473E+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_29AUG2006_1105.An1

Sample description
FSS-OOL-02-05-020-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29AUG2006_1105.An1

Acquisition information
Start time: 29-Aug-2006 11:05:06
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: 1.5610E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5610E+03) =
6.4061E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-Aug-2006 10:25:00
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: 0.5941

***** S U M M A R Y O F P E A 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	194.	21.17	1.50	9.541E-03	72.87	6.400	3.328E+00	HG203
					77.11	10.700	1.642E+00	PB214
					77.11	17.500	1.004E+00	PB212
77.18	194.	21.17	1.50	9.541E-03	77.11	10.700	1.642E+00	PB214
					77.11	17.500	1.004E+00	PB212
93.22	93.	41.63	1.50	1.333E-02	92.80	3.000	PBC<MDA	TH234
186.18	119.	28.60	1.41	1.626E-02	185.99	3.280	1.855E+00	RA226
239.60	694.	5.52	1.26	1.376E-02	238.63	43.100	1.010E+00	PB212
241.78	70.	41.54	1.50	1.370E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.59	99.	20.96	1.73	1.241E-02				
295.55	127.	15.33	1.46	1.145E-02	295.22	19.200	4.994E-01	PB214
329.10	45.	35.56	1.65	1.034E-02				
338.78	144.	14.89	1.13	1.005E-02	338.40	12.010	1.030E+00	AC228
352.36	179.	12.68	1.36	9.669E-03	351.99	37.100	4.306E-01	PB214
463.76	68.	26.05	1.31	7.361E-03	463.51	10.000	7.851E-01	SB125
511.80	70.	27.53	1.20	6.681E-03	510.72	22.500	4.011E-01	TL208
					513.99	0.004	2.112E+03	Kr85
					514.00	99.270	9.450E-02	Sr85
584.25	212.	10.10	1.24	5.879E-03	583.14	86.000	3.609E-01	TL208
610.38	145.	12.75	0.83	5.640E-03	609.32	46.090	4.828E-01	BI214
728.95	50.	18.82	1.35	4.783E-03	727.17	11.800	7.697E-01	BI212
912.78	119.	15.35	1.06	3.916E-03	911.07	29.000	9.063E-01	AC228
966.15	35.	23.98	1.72	3.726E-03				
970.97	59.	17.56	1.72	3.710E-03	968.90	17.460	7.797E-01	AC228
1463.43	479.	4.57	1.80	2.617E-03	1460.75	10.700	1.478E+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	
540.83	270.59	126.	99.	0.049	62.89	1.729	AC-228	sM
657.88	329.10	94.	45.	0.023	106.69	1.652	LA-140	sM
1457.85	728.95	18.	51.	0.025	55.42	1.350	J-132	M
1932.51	966.53	17.	35.	0.017	71.95	1.716	TB-160	D
1942.15	971.34	23.	59.	0.029	52.67	1.719	J-135	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: FSS_Rev_1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.80	77.11	743.	194.	0.097	63.50	1.500D
PB-212	153.80	77.11	743.	194.	0.097	63.50	1.500D
TH-234	186.02	93.22	701.	93.	0.046	124.88	1.500s
RA-226	372.32	186.36	364.	78.	0.039	102.53	1.500s
PB-212	477.96	239.17	354.	528.	0.264	19.97	1.500
PB-214	591.38	295.86	135.	115.	0.058	51.18	1.500s
AC-228	677.52	338.92	99.	119.	0.060	44.87	1.500
PB-214	704.94	352.63	109.	163.	0.081	35.88	1.500s
SB-125	927.78	464.02	74.	47.	0.023	86.62	1.500s
TL-208	1023.38	511.80	83.	70.	0.035	82.60	1.201s
TL-208	1168.33	584.25	65.	211.	0.106	30.29	1.238
BI-214	1220.62	610.38	60.	145.	0.073	38.24	0.831s
AC-228	1825.71	912.79	33.	93.	0.046	40.58	1.679
K-40	2927.85	1463.47	6.	441.	0.220	14.46	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		7.1690E-03					
			477.56	7.169E-03	&(	4.528E-01 1.28E-01	G
K-40		1.3603E+01					
			1460.75	1.360E+01	(P	4.227E-01 6.56E-01	G
MN-54		2.1247E-02					
			834.81	2.125E-02	%(P	6.745E-02 1.99E-02	G
CO-57		1.9345E-03					
			122.07	1.934E-03	%(	6.288E-02 1.86E-02	G K
			136.43	7.712E-02	&	5.021E-01 1.50E-01	G
CO-60		-1.4001E-02					
			1332.51	-1.400E-02	%(P	8.063E-02 2.29E-02	G K
			1173.23	5.850E-03	&	7.545E-02 2.10E-02	G K
Sr-85		-1.3182E-03					
			514.00	-1.318E-03	&(	5.413E-02 1.54E-02	G
Kr-85		-2.8657E+01					
			513.99	-2.866E+01	&(	1.210E+03 3.43E+02	G
Y-88		9.6888E-03					
			1836.01	9.689E-03	%(P	3.446E-02 9.47E-03	G K
			898.02	-1.234E-02	& P	8.206E-02 2.34E-02	G
NB-94		1.8229E-03					
			871.10	1.823E-03	&(	6.173E-02 1.71E-02	G K
			702.50	-4.620E-03	%	5.751E-02 1.63E-02	G K
Ag-108M		1.1276E-02					
			722.95	1.128E-02	%(	5.264E-02 1.51E-02	G K
			614.37	-4.138E-02	% P	9.316E-02 2.81E-02	G
			433.93	8.366E-05	&	4.974E-02 1.41E-02	G
CD-109		9.7081E-01					
			88.04	9.708E-01	%(P	2.317E+00 7.00E-01	G
SN-113		-1.0215E-02					
			391.71	-1.021E-02	%(	6.777E-02 1.97E-02	G K
			255.04	2.825E-02	%	1.613E+00 4.64E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.5142E-01						
		427.95	1.738E-02	&(P	1.603E-01	4.62E-02	G K
		600.77	1.173E-02	& P	2.753E-01	7.73E-02	G
		636.15	2.769E-02	% P	4.194E-01	1.17E-01	G
		463.51	5.482E-01	*(P	5.037E-01	1.64E-01	G
		176.29	-1.532E-01	% P	7.788E-01	2.31E-01	G
I-131	-1.2378E-02						
		364.48	-1.238E-02	%(	6.856E-02	2.01E-02	G K
		636.97	2.187E-01	&	7.944E-01	2.32E-01	G
		284.29	-3.901E-02	%	9.240E-01	2.69E-01	G
CS-134	1.2353E-02						
		604.66	1.235E-02	%(	4.801E-02	1.40E-02	G K
		795.76	4.421E-02	%	7.414E-02	2.29E-02	G
		569.29	-3.447E-02	%	3.411E-01	9.75E-02	G
		801.84	1.104E-02	% P	6.083E-01	1.67E-01	G
CS-137	1.7271E-02						
		661.62	1.727E-02	%(	6.477E-02	1.90E-02	G
CE-139	1.0917E-03						
		165.85	1.092E-03	&(P	6.194E-02	1.83E-02	G
EU-152	4.9336E-02						
		121.78	4.934E-02	%(P	1.754E-01	5.26E-02	G K
		344.30	-4.097E-02	&	1.669E-01	4.94E-02	G
		1408.08	-3.446E-03	&	2.879E-01	7.53E-02	G
		964.00	-3.659E-03	% P	6.164E-01	1.74E-01	G
		1112.07	2.028E-01	%	4.534E-01	1.37E-01	G
		778.90	-1.336E-02	% P	5.270E-01	1.48E-01	G
EU-154	-2.2409E-02						
		123.10	-2.241E-02	%(P	1.365E-01	4.07E-02	G K
		1274.80	5.804E-02	%	1.700E-01	4.99E-02	G
		723.30	-2.138E-02	% P	2.847E-01	7.98E-02	G
		1004.80	-5.589E-02	&	4.523E-01	1.29E-01	G
EU-155	-2.2531E-02						
		86.45	-2.253E-02	%(P	3.234E-01	9.63E-02	G K
		105.31	-3.014E-02	&	2.565E-01	7.62E-02	G
HG-203	2.8543E-03						
		279.17	2.854E-03	%(P	5.795E-02	1.69E-02	G K
		72.87	-1.523E-02	%	2.117E+00	6.28E-01	G
		70.83	-8.888E-01	&	4.626E+00	1.39E+00	G
		82.50	-9.683E-01	&	4.786E+00	1.43E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.6928E-01						
		583.14	3.609E-01	(P	6.875E-02	3.66E-02	G
		510.72	4.011E-01	@(	2.599E-01	1.11E-01	G
PB-212	7.6891E-01						
		238.63	7.689E-01	(	1.316E-01	5.12E-02	G K
							Energy duplication
		77.11	1.004E+00	+	6.727E-01	2.13E-01	G
		74.81	9.792E-01	& P	1.416E+00	4.33E-01	G
PB-214	4.1301E-01						
		351.99	3.927E-01	@(P	1.241E-01	4.71E-02	G K
		295.22	4.523E-01	*(	2.236E-01	7.72E-02	G
							Energy duplication
		77.11	1.642E+00	+	1.100E+00	3.48E-01	G
		241.92	5.203E-01	%	8.393E-01	2.56E-01	G
BI-212	-4.6630E-03						
		727.17	-4.663E-03	%(	4.943E-01	1.38E-01	G K
		1620.56	-4.407E-02	% P	2.155E+00	5.35E-01	G
		785.42	1.518E+00	% P	2.684E+00	8.29E-01	G
BI-214	4.8276E-01						
		609.32	4.828E-01	(	1.288E-01	6.16E-02	G K
		1764.51	-2.118E-03	% P	4.098E-01	1.04E-01	G
		1120.28	-1.511E-02	&	4.818E-01	1.33E-01	G
RA-224	1.1404E+00						
		241.00	1.140E+00	&(P	1.567E+00	4.81E-01	G
RA-226	1.2720E+00						
		185.99	1.272E+00	*(P	1.487E+00	4.59E-01	G
AC-228	7.4839E-01						
		911.07	7.051E-01	(P	2.234E-01	9.56E-02	G K
		968.90	-2.775E-02	% P	4.364E-01	1.23E-01	G
		338.40	8.530E-01	(	3.517E-01	1.28E-01	G
TH-227	-1.3400E-02						
		236.00	-1.340E-02	&(P	7.300E-01	2.17E-01	G K
		256.25	-2.822E-02	&	5.553E-01	1.61E-01	G
PA-234	-8.9389E-02						
		98.44	-8.939E-02	%(	2.588E-01	7.80E-02	G K
		946.00	0.000E+00	%	3.644E-01	1.01E-01	G
		131.28	4.451E-02	&	2.715E-01	8.10E-02	G
		94.67	-1.392E-01	%	5.446E-01	1.64E-01	G
		883.24	4.502E-02	&	4.755E-01	1.33E-01	G
		926.70	-1.376E-03	%	5.709E-01	1.57E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-4.955E-02 %   5.043E-01 1.44E-01 G

TH-234       8.9287E-01
                           63.29 3.340E-02 &(P 5.419E+00 1.61E+00 G K
                           92.80 2.010E+00 &(  2.729E+00 8.37E-01 G
                           92.38 2.582E-03 & P 3.313E+00 9.84E-01 G

AM-241      -9.0344E-02
                           59.54-9.034E-02 &(  7.831E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	6.8927E-03	7.1690E-03	3.8310E-01	3.8310E-01	4.353E-01
K-40		1.3603E+01	1.3603E+01	1.9681E+00	2.1109E+00	4.227E-01
MN-54	#A	2.1105E-02	2.1247E-02	5.9654E-02	5.9666E-02	6.700E-02
CO-57	#B	1.9195E-03	1.9345E-03	5.5852E-02	5.5852E-02	6.240E-02
CO-60	#B	-1.3986E-02	-1.4001E-02	7.0955E-02	7.0959E-02	8.054E-02

Sr-85	#A	-1.2762E-03	-1.3182E-03	4.6116E-02	4.6116E-02	5.241E-02
Kr-85	#A	-2.8656E+01	-2.8657E+01	1.0305E+03	1.0305E+03	1.210E+03
Y-88	#B	9.5000E-03	9.6888E-03	2.8421E-02	2.8426E-02	3.379E-02
NB-94	#B	1.8229E-03	1.8229E-03	5.1303E-02	5.1303E-02	6.173E-02
Ag-108M	#B	1.1275E-02	1.1276E-02	4.5312E-02	4.5316E-02	5.264E-02
CD-109	#A	9.6632E-01	9.7081E-01	2.1012E+00	2.1019E+00	2.306E+00
SN-113	#B	-1.0030E-02	-1.0215E-02	5.9046E-02	5.9048E-02	6.654E-02
SB-125	#B	1.5110E-01	1.5142E-01	1.3552E-01	1.3578E-01	1.600E-01
I-131	#B	-9.5341E-03	-1.2378E-02	6.0156E-02	6.0160E-02	5.281E-02
CS-134	#B	1.2319E-02	1.2353E-02	4.1979E-02	4.1985E-02	4.788E-02
CS-137	#A	1.7267E-02	1.7271E-02	5.6880E-02	5.6888E-02	6.476E-02
CE-139	#A	1.0752E-03	1.0917E-03	5.4843E-02	5.4843E-02	6.100E-02
EU-152	#B	4.9314E-02	4.9336E-02	1.5781E-01	1.5783E-01	1.754E-01
EU-154	#B	-2.2394E-02	-2.2409E-02	1.2505E-01	1.2505E-01	1.364E-01
EU-155	#B	-2.2505E-02	-2.2531E-02	6.3410E-01	6.3411E-01	3.230E-01
HG-203	#B	2.7286E-03	2.8543E-03	5.0719E-02	5.0719E-02	5.540E-02
TL-208		3.6928E-01	3.6928E-01	1.1205E-01	1.1395E-01	
PB-212	#	7.6891E-01	7.6891E-01	1.5352E-01	1.5946E-01	1.316E-01
PB-214	#	4.1301E-01	4.1301E-01	1.2918E-01	1.3125E-01	1.241E-01
BI-212	#B	-4.6630E-03	-4.6630E-03	4.1305E-01	4.1305E-01	4.943E-01
BI-214		4.8276E-01	4.8276E-01	1.8460E-01	1.8658E-01	
RA-224	#A	1.1404E+00	1.1404E+00	1.4444E+00	1.4458E+00	1.567E+00
RA-226	#A	1.2720E+00	1.2720E+00	1.3785E+00	1.3803E+00	1.487E+00
AC-228		7.4839E-01	7.4839E-01	2.2664E-01	2.3049E-01	2.234E-01
TH-227	#B	-1.3400E-02	-1.3400E-02	8.2583E-01	8.2583E-01	7.300E-01
PA-234	#B	-8.9389E-02	-8.9389E-02	2.3387E-01	2.3392E-01	2.588E-01
TH-234	#B	8.9287E-01	8.9287E-01	1.1150E+00	1.1161E+00	5.419E+00
AM-241	#A	-9.0343E-02	-9.0344E-02	7.0001E-01	7.0003E-01	7.831E-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) 1.5203181E+01 pCi/gm
Total Decayed Activity (1119.8 to 1999.0 keV) 1.5203181E+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: FSS-OOL-02-05-018-F.An1

Sample description
FSS-OOL-02-05-018-F

Spectrum Filename: C:\GammaVision\Spectra\FSS-OOL-02-05-018-F.An1

Acquisition information
Start time: 29-Aug-2006 13:04:42
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: 1.9120E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9120E+03) =
5.2301E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 13:03:00
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: 0.6850

***** S U M M A R Y O F P E A K 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	164.	29.27	1.50	8.847E-03	72.87	6.400	2.332E+00	HG203
					74.81	9.600	1.363E+00	PB212
77.19	258.	18.30	1.50	9.541E-03	77.11	10.700	1.788E+00	PB214
					77.11	17.500	1.094E+00	PB212
77.19	258.	18.30	1.50	9.541E-03	77.11	10.700	1.788E+00	PB214
					77.11	17.500	1.094E+00	PB212
186.41	101.	31.91	1.56	1.625E-02	185.99	3.280	PBC<MDA	RA226
209.08	82.	34.64	0.71	1.520E-02				
239.15	811.	4.19	1.22	1.378E-02	238.63	43.100	9.630E-01	PB212
241.99	135.	22.85	1.22	1.365E-02	241.00	3.900	1.776E+00	RA224
					241.92	7.470	9.381E-01	PB214
271.37	68.	30.52	1.00	1.238E-02				
295.94	156.	12.74	1.26	1.144E-02	295.22	19.200	5.005E-01	PB214
300.65	57.	27.12	1.26	1.127E-02				
328.93	65.	25.13	1.14	1.034E-02				
339.16	141.	15.77	1.17	1.004E-02	338.40	12.010	8.248E-01	AC228
352.62	265.	9.03	1.38	9.662E-03	351.99	37.100	5.208E-01	PB214
464.31	95.	20.13	1.60	7.352E-03	463.51	10.000	8.983E-01	SB125
511.98	132.	15.98	1.65	6.679E-03	510.72	22.500	6.179E-01	TL208
					513.99	0.004	3.254E+03	Kr85
					514.00	99.270	1.471E-01	Sr85
584.14	232.	9.28	1.53	5.880E-03	583.14	86.000	3.237E-01	TL208
610.65	206.	10.64	1.63	5.638E-03	609.32	46.090	5.586E-01	BI214
727.99	63.	23.81	1.37	4.794E-03	727.17	11.800	7.871E-01	BI212
912.83	191.	12.38	1.75	3.915E-03				
970.34	112.	15.85	1.99	3.713E-03	968.90	17.460	1.217E+00	AC228
1122.63	44.	39.93	0.69	3.277E-03				

1463.39	694.	3.87	2.06	2.617E-03	1460.75	10.700	1.748E+01	K40
1768.18	18.	33.12	2.24	2.225E-03	1764.51	15.920	3.643E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
417.77	209.08	316.	82.	0.041	103.91	0.715	AC-228	sM
477.93	239.13	170.	811.	0.405	12.56	1.215	PB-212	D
483.61	241.97	411.	135.	0.068	68.54	1.217	PB-214	D
542.38	271.37	174.	68.	0.034	91.55	0.997	PA-234	sM
600.84	300.59	130.	47.	0.024	113.66	0.949	PB-212	M
657.53	328.93	97.	65.	0.033	75.39	1.142	LA-140	M
1825.81	912.83	83.	194.	0.097	29.42	1.752	AC-228	M
1940.90	970.34	51.	114.	0.057	38.57	1.993	AC-228	M
2245.05	1122.63	40.	40.	0.020	81.28	1.820	TA-182	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: FSS_Rev_1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.51	74.97	1112.	164.	0.082	87.80	1.500s
PB-214	153.80	77.11	988.	258.	0.129	54.89	1.500D
PB-212	153.80	77.11	988.	258.	0.129	54.89	1.500D
RA-226	372.73	186.56	518.	93.	0.046	103.54	1.500s
TH-227	472.82	236.60	759.	-98.	-0.049	122.94	1.500s
PB-212	477.87	239.12	492.	706.	0.353	17.48	1.500
RA-224	483.11	241.74	587.	97.	0.048	109.03	1.500
PB-214	483.66	242.02	613.	91.	0.046	119.07	1.500
PB-214	591.26	295.80	230.	158.	0.079	47.21	1.500
AC-228	677.74	339.03	156.	131.	0.065	48.22	1.500
PB-214	704.91	352.61	157.	238.	0.119	29.55	1.500s
SB-125	928.01	464.13	79.	78.	0.039	57.67	1.500s
TL-208	1023.74	511.98	94.	132.	0.066	47.94	1.650s
TL-208	1168.11	584.14	73.	232.	0.116	27.83	1.528
BI-214	1221.14	610.65	88.	206.	0.103	31.91	1.632s
BI-212	1455.94	727.99	54.	63.	0.032	71.43	1.366
K-40	2927.72	1463.40	1.	676.	0.338	11.54	2.042
BI-214	3537.83	1768.18	9.	18.	0.009	99.36	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		1.0264E-01					
			477.56	1.026E-01	%(	4.005E-01 1.18E-01	G
K-40		1.7043E+01					
			1460.75	1.704E+01	(P	1.858E-01 6.56E-01	G
MN-54		-1.2430E-02					
			834.81	-1.243E-02	%(P	6.308E-02 1.83E-02	G
CO-57		-1.3793E-04					
			122.07	-1.379E-04	&(	5.205E-02 1.54E-02	G K
			136.43	3.921E-02	&	4.964E-01 1.48E-01	G
CO-60		6.8364E-03					
			1332.51	6.836E-03	%(P	6.603E-02 1.84E-02	G K
			1173.23	-2.803E-02	&	1.080E-01 3.19E-02	G K
Sr-85		-2.9340E-03					
			514.00	-2.934E-03	&(	6.164E-02 1.79E-02	G
Kr-85		-6.4561E+01					
			513.99	-6.456E+01	&(	1.363E+03 3.95E+02	G
Y-88		4.3042E-03					
			1836.01	4.304E-03	&(P	5.319E-02 1.39E-02	G K
			898.02	8.434E-04	& P	6.419E-02 1.79E-02	G
NB-94		8.6376E-04					
			871.10	8.638E-04	%(	5.514E-02 1.54E-02	G K
			702.50	2.624E-02	%	4.327E-02 1.34E-02	G K
Ag-108M		-2.3842E-03					
			722.95	-2.384E-03	%(	5.759E-02 1.63E-02	G K
			614.37	-5.760E-02	% P	9.167E-02 2.81E-02	G
			433.93	7.896E-03	%	4.912E-02 1.44E-02	G
CD-109		7.6123E-01					
			88.04	7.612E-01	%(P	2.238E+00 6.75E-01	G
SN-113		2.4296E-04					
			391.71	2.430E-04	&(	7.066E-02 2.04E-02	G K
			255.04	4.596E-01	%	2.182E+00 6.50E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.9604E-01						
		427.95	8.433E-03	%(P	1.513E-01	4.36E-02	G K
		600.77	-8.683E-02	% P	2.882E-01	8.53E-02	G
		636.15	1.341E-01	& P	3.809E-01	1.13E-01	G
		463.51	7.514E-01	*(P	4.243E-01	1.47E-01	G
		176.29	1.343E-01	& P	7.509E-01	2.24E-01	G
I-131	2.0502E-03						
		364.48	2.050E-03	%(	7.773E-02	2.26E-02	G K
		636.97	3.075E-01	%	8.347E-01	2.49E-01	G
		284.29	-2.417E-01	%	1.043E+00	3.11E-01	G
CS-134	1.7371E-02						
		604.66	1.737E-02	&(	4.186E-02	1.26E-02	G K
		795.76	4.287E-02	%	6.772E-02	2.10E-02	G
		569.29	5.997E-02	%	3.059E-01	8.92E-02	G
		801.84	-2.409E-02	% P	6.956E-01	1.97E-01	G
CS-137	1.9140E-02						
		661.62	1.914E-02	%(	5.078E-02	1.51E-02	G
CE-139	-7.1472E-04						
		165.85	-7.147E-04	%(P	6.237E-02	1.85E-02	G
EU-152	-3.6906E-03						
		121.78	-3.691E-03	&(P	1.804E-01	5.36E-02	G K
		344.30	-2.524E-02	&	1.700E-01	5.01E-02	G
		1408.08	-6.166E-02	&	3.469E-01	9.91E-02	G
		964.00	-7.750E-02	& P	5.023E-01	1.45E-01	G
		1112.07	3.216E-02	%	5.854E-01	1.66E-01	G
		778.90	-4.752E-02	% P	3.931E-01	1.12E-01	G
EU-154	1.6594E-02						
		123.10	1.659E-02	%(P	1.358E-01	4.06E-02	G K
		1274.80	8.697E-02	%	1.694E-01	5.19E-02	G
		723.30	3.434E-02	% P	2.705E-01	7.75E-02	G
		1004.80	-7.474E-02	%	4.091E-01	1.19E-01	G
EU-155	-1.0184E-01						
		86.45	-1.018E-01	&(P	2.834E-01	8.54E-02	G K
		105.31	4.390E-02	%	2.743E-01	8.21E-02	G
HG-203	2.6001E-03						
		279.17	2.600E-03	%(P	6.005E-02	1.77E-02	G K
		72.87	-8.321E-01	%	2.491E+00	7.52E-01	G
		70.83	5.855E-02	&	4.356E+00	1.30E+00	G
		82.50	1.410E-01	&	4.185E+00	1.25E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.2370E-01						
		583.14	3.237E-01	(P	5.934E-02	3.01E-02	G
		510.72	6.179E-01	+	2.250E-01	9.90E-02	G
PB-212	8.3820E-01						
		238.63	8.382E-01	(	1.261E-01	4.88E-02	G K
							Energy duplication
		77.11	1.094E+00	+	6.315E-01	2.00E-01	G
		74.81	1.363E+00	& P	1.316E+00	4.06E-01	G
PB-214	4.8192E-01						
		351.99	4.688E-01	*(P	1.203E-01	4.62E-02	G K
		295.22	5.073E-01	(	2.357E-01	7.98E-02	G
							Energy duplication
		77.11	1.788E+00	+	1.033E+00	3.27E-01	G
		241.92	6.338E-01	+	8.184E-01	2.52E-01	G
BI-212	7.8711E-01						
		727.17	7.871E-01	(	4.617E-01	1.88E-01	G K
		1620.56	-1.490E-01	& P	2.162E+00	5.72E-01	G
		785.42	1.961E-02	% P	2.212E+00	6.07E-01	G
BI-214	5.5863E-01						
		609.32	5.586E-01	*(	1.262E-01	5.95E-02	G K
		1764.51	3.643E-01	- P	3.387E-01	1.21E-01	G
		1120.28	1.202E-01	%	6.845E-01	2.00E-01	G
RA-224	1.2820E+00						
		241.00	1.282E+00	&(P	1.530E+00	4.72E-01	G
RA-226	1.2282E+00						
		185.99	1.228E+00	*(P	1.441E+00	4.44E-01	G
AC-228	2.1262E-01						
		911.07	-1.624E-02	%(P	2.669E-01	7.64E-02	G K
		968.90	-2.694E-02	% P	3.657E-01	1.03E-01	G
		338.40	7.652E-01	(	3.559E-01	1.23E-01	G
TH-227	-4.4577E-01						
		236.00	-4.458E-01	&(P	5.941E-01	1.82E-01	G K
		256.25	8.500E-03	%	6.730E-01	1.98E-01	G
PA-234	-4.2388E-02						
		98.44	-4.239E-02	&(	2.589E-01	7.75E-02	G K
		946.00	-4.408E-02	%	2.978E-01	8.52E-02	G
		131.28	-4.368E-03	&	2.607E-01	7.75E-02	G
		94.67	-6.898E-02	%	4.809E-01	1.44E-01	G
		883.24	1.501E-01	&	4.444E-01	1.31E-01	G
		926.70	9.338E-02	&	4.433E-01	1.27E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 8.864E-02 %   4.522E-01 1.32E-01 G

TH-234       8.4331E-01
                           63.29 8.433E-01 &(P 4.358E+00 1.30E+00 G K
                           92.80 1.845E+00 %   2.689E+00 8.22E-01 G
                           92.38-1.569E-01 % P 3.187E+00 9.51E-01 G

AM-241       1.0728E-02
                           59.54 1.073E-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	9.7446E-02	1.0264E-01	3.5317E-01	3.5322E-01	3.802E-01
K-40		1.7043E+01	1.7043E+01	1.9677E+00	2.1878E+00	1.858E-01
MN-54	#A	-1.2320E-02	-1.2430E-02	5.8135E-02	5.8139E-02	6.252E-02
CO-57	#B	-1.3652E-04	-1.3793E-04	4.6174E-02	4.6174E-02	5.152E-02
CO-60	#B	6.8266E-03	6.8364E-03	5.5319E-02	5.5320E-02	6.593E-02

Sr-85	#A	-2.8111E-03	-2.9340E-03	5.3639E-02	5.3640E-02	5.906E-02
Kr-85	#A	-6.4560E+01	-6.4561E+01	1.1864E+03	1.1864E+03	1.363E+03
Y-88	#B	4.1937E-03	4.3042E-03	4.1646E-02	4.1646E-02	5.183E-02
NB-94	#B	8.6376E-04	8.6376E-04	4.6069E-02	4.6069E-02	5.514E-02
Ag-108M	#B	-2.3841E-03	-2.3842E-03	4.8788E-02	4.8788E-02	5.758E-02
CD-109	#A	7.5658E-01	7.6123E-01	2.0251E+00	2.0256E+00	2.224E+00
SN-113	#B	2.3717E-04	2.4296E-04	6.1160E-02	6.1160E-02	6.898E-02
SB-125	#F	1.9550E-01	1.9604E-01	1.1529E-01	1.1582E-01	1.508E-01
I-131	#B	1.4521E-03	2.0502E-03	6.7707E-02	6.7708E-02	5.505E-02
CS-134	#B	1.7307E-02	1.7371E-02	3.7707E-02	3.7720E-02	4.171E-02
CS-137	#A	1.9136E-02	1.9140E-02	4.5426E-02	4.5438E-02	5.076E-02
CE-139	#A	-7.0045E-04	-7.1472E-04	1.0864E-01	1.0864E-01	6.112E-02
EU-152	#B	-3.6884E-03	-3.6906E-03	3.2770E-01	3.2770E-01	1.803E-01
EU-154	#B	1.6579E-02	1.6594E-02	1.2168E-01	1.2169E-01	1.356E-01
EU-155	#B	-1.0169E-01	-1.0184E-01	2.9332E-01	2.9337E-01	2.830E-01
HG-203	#B	2.4499E-03	2.6001E-03	5.2950E-02	5.2950E-02	5.658E-02
TL-208		3.2370E-01	3.2370E-01	9.0237E-02	9.2047E-02	
PB-212	#	8.3820E-01	8.3820E-01	1.4652E-01	1.5389E-01	1.261E-01
PB-214	#	4.8192E-01	4.8192E-01	1.3427E-01	1.3696E-01	1.203E-01
BI-212		7.8711E-01	7.8711E-01	5.6222E-01	5.6395E-01	
BI-214	#	5.5863E-01	5.5863E-01	1.7827E-01	1.8100E-01	
RA-224	#A	1.2820E+00	1.2820E+00	1.4146E+00	1.4164E+00	1.530E+00
RA-226	#A	1.2282E+00	1.2282E+00	1.3329E+00	1.3347E+00	1.441E+00
AC-228	B	2.1262E-01	2.1262E-01	1.0252E-01	1.0321E-01	2.669E-01
TH-227	#A	-4.4577E-01	-4.4577E-01	5.4960E-01	5.5017E-01	5.941E-01
PA-234	#B	-4.2388E-02	-4.2388E-02	2.3244E-01	2.3245E-01	2.589E-01
TH-234	#B	8.4331E-01	8.4331E-01	3.9112E+00	3.9114E+00	4.358E+00
AM-241	#A	1.0728E-02	1.0728E-02	6.6696E-01	6.6696E-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 (1460.5 to 1999.0 keV) 1.8924702E+01 pCi/gm
Total Decayed Activity (1460.5 to 1999.0 keV) 1.8924702E+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_29AUG2006_1426.An1

Sample description
FSS-OOL-02-05-019-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29AUG2006_1426.An1

Acquisition information

Start time:	29-Aug-2006 14:26:15
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:	1.8110E+03
Activity scaling factor:	1.0000E+06/(1.0000E+00* 1.8110E+03) = 5.5218E+02
Detection limit method:	Nureg 4.16
Random error:	1.0000000E+00
Systematic error:	1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 12:55:00
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: 0.6554

***** S U M M A R Y O F P E A K 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	167.	18.79	1.10	8.898E-03	74.81	9.600	1.438E+00	PB212
77.33	325.	10.46	1.10	9.696E-03	77.11	10.700	2.374E+00	PB214
					77.11	17.500	1.452E+00	PB212
93.13	128.	35.29	1.50	1.333E-02	92.80	3.000	PBC<MDA	TH234
129.34	85.	39.32	1.15	1.716E-02				
186.51	114.	26.70	1.43	1.624E-02	185.99	3.280	PBC<MDA	RA226
209.50	89.	38.02	1.11	1.518E-02				
239.13	908.	3.85	1.22	1.379E-02	238.63	43.100	1.139E+00	PB212
242.38	116.	20.17	1.22	1.364E-02	241.00	3.900	1.602E+00	RA224
					241.92	7.470	8.476E-01	PB214
270.68	86.	29.81	0.88	1.241E-02				
277.88	51.	38.56	1.50	1.207E-02	279.17	81.500	PBC<MDA	HG203
295.83	159.	11.87	1.26	1.145E-02	295.22	19.200	5.405E-01	PB214
301.09	58.	29.62	1.26	1.126E-02				
339.17	162.	12.81	1.34	1.004E-02	338.40	12.010	1.001E+00	AC228
352.73	254.	10.80	1.15	9.659E-03	351.99	37.100	5.270E-01	PB214
464.22	45.	34.47	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
511.69	116.	15.81	1.58	6.682E-03	510.72	22.500	5.746E-01	TL208
584.17	314.	7.31	1.60	5.880E-03	583.14	86.000	4.614E-01	TL208
610.35	196.	10.67	1.21	5.640E-03	609.32	46.090	5.628E-01	BI214
728.75	91.	16.70	2.15	4.785E-03	727.17	11.800	1.200E+00	BI212
796.50	26.	38.55	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
912.96	202.	10.06	1.78	3.915E-03				
969.72	121.	15.30	1.67	3.715E-03				
1122.00	73.	24.31	1.12	3.283E-03	1120.28	15.040	1.102E+00	BI214
1463.43	591.	4.16	2.01	2.617E-03	1460.75	10.700	1.573E+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	
148.91	74.97	407.	167.	0.083	56.38	1.098	BI-207	D
154.24	77.64	415.	325.	0.162	31.39	1.100	PB-214	D
258.27	129.34	464.	85.	0.042	112.62	1.150	AC-228	sM
418.63	209.50	391.	89.	0.045	114.05	1.109	AC-228	M
477.89	239.03	158.	908.	0.454	11.56	1.215	PB-212	D
484.40	242.29	215.	116.	0.058	60.51	1.217	XE-138	D
541.00	270.68	221.	86.	0.043	89.43	0.881	AC-228	sM
601.40	300.87	200.	59.	0.030	122.35	1.158	PB-212	M
1457.46	728.75	40.	91.	0.045	50.11	2.151	J-132	l
1826.07	912.96	51.	201.	0.101	25.93	1.781	AC-228	M
1939.64	969.72	59.	121.	0.061	38.29	1.675	AC-228	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: FSS_Rev_1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.47	74.95	1083.	161.	0.081	87.98	1.500
PB-214	153.80	77.11	974.	288.	0.144	49.22	1.500D
PB-212	153.80	77.11	974.	288.	0.144	49.22	1.500D
TH-234	185.84	93.13	952.	128.	0.064	105.87	1.500
RA-226	372.39	186.39	552.	113.	0.056	89.12	1.500s
PB-212	477.82	239.09	508.	761.	0.380	16.62	1.500
HG-203	555.41	277.88	171.	51.	0.026	115.68	1.500s
PB-214	591.29	295.82	222.	156.	0.078	47.13	1.500s
AC-228	677.89	339.11	118.	167.	0.083	36.06	1.500
PB-214	705.02	352.67	141.	230.	0.115	29.47	1.500
SB-125	928.18	464.22	105.	45.	0.022	103.42	1.500s
TL-208	1023.17	511.69	76.	116.	0.058	47.43	1.584s
TL-208	1168.18	584.17	63.	313.	0.157	21.94	1.605
BI-214	1220.56	610.35	74.	196.	0.098	32.01	1.209s
CS-134	1593.02	796.50	38.	26.	0.013	115.64	1.601s
BI-214	2244.40	1122.00	56.	73.	0.036	72.94	1.122s
K-40	2927.86	1463.47	9.	574.	0.287	12.71	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		-1.1368E-02					
			477.56	-1.137E-02	%(	5.436E-01 1.57E-01	G
K-40		1.5266E+01					
			1460.75	1.527E+01	(P	4.420E-01 6.47E-01	G
MN-54		-1.4484E-02					
			834.81	-1.448E-02	%(P	6.369E-02 1.85E-02	G
CO-57		4.2874E-03					
			122.07	4.287E-03	&(	6.131E-02 1.82E-02	G K
			136.43	8.384E-02	&	5.065E-01 1.51E-01	G
CO-60		-2.0514E-04					
			1332.51	-2.051E-04	%(P	8.466E-02 2.35E-02	G K
			1173.23	-2.660E-04	&	7.421E-02 2.06E-02	G K
Sr-85		-1.7908E-02					
			514.00	-1.791E-02	%(	6.707E-02 1.99E-02	G
Kr-85		-3.9581E+02					
			513.99	-3.958E+02	%(	1.483E+03 4.40E+02	G
Y-88		-2.3557E-05					
			1836.01	-2.356E-05	%(P	8.138E-02 2.17E-02	G K
			898.02	-1.171E-02	& P	6.115E-02 1.73E-02	G
NB-94		1.9652E-02					
			871.10	1.965E-02	&(	5.865E-02 1.74E-02	G K
			702.50	1.186E-02	&	5.770E-02 1.68E-02	G K
Ag-108M		-9.7381E-03					
			722.95	-9.738E-03	%(	5.725E-02 1.65E-02	G K
			614.37	-3.284E-02	% P	7.669E-02 2.31E-02	G
			433.93	1.124E-03	%	5.417E-02 1.56E-02	G
CD-109		9.5395E-01					
			88.04	9.539E-01	&(P	2.397E+00 7.25E-01	G
SN-113		-2.5192E-04					
			391.71	-2.519E-04	%(	6.644E-02 1.90E-02	G K
			255.04	-5.284E-01	%	2.261E+00 6.74E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.1642E-01						
		427.95	2.836E-03	%(P	1.491E-01	4.26E-02	G K
		600.77	4.156E-02	% P	2.743E-01	7.92E-02	G
		636.15	-1.069E-01	% P	5.327E-01	1.56E-01	G
		463.51	4.526E-01	*(P	5.121E-01	1.61E-01	G
		176.29	1.163E-01	% P	7.612E-01	2.27E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	%(	8.774E-02	2.55E-02	G K
		636.97	1.744E-02	%	1.054E+00	2.99E-01	G
		284.29	-2.278E-01	%	1.054E+00	3.13E-01	G
CS-134	2.0322E-02						
		604.66	-7.607E-03	%(	5.683E-02	1.65E-02	G K
		795.76	5.224E-02	(	6.262E-02	2.01E-02	G
		569.29	2.278E-02	%	2.842E-01	8.08E-02	G
		801.84	1.487E-03	& P	6.761E-01	1.89E-01	G
CS-137	-9.1368E-03						
		661.62	-9.137E-03	%(	7.631E-02	2.21E-02	G
CE-139	-5.8961E-03						
		165.85	-5.896E-03	&(P	6.077E-02	1.81E-02	G
EU-152	6.7468E-03						
		121.78	6.747E-03	%(P	1.738E-01	5.16E-02	G K
		344.30	-5.796E-03	%	1.421E-01	4.10E-02	G
		1408.08	5.791E-02	%	2.594E-01	7.33E-02	G
		964.00	-3.668E-02	& P	4.692E-01	1.33E-01	G
		1112.07	3.981E-02	%	5.218E-01	1.47E-01	G
		778.90	-9.403E-02	% P	4.790E-01	1.39E-01	G
EU-154	1.0614E-02						
		123.10	1.061E-02	&(P	1.351E-01	4.03E-02	G K
		1274.80	3.843E-02	&	1.799E-01	5.15E-02	G
		723.30	-1.765E-03	% P	4.548E-01	1.31E-01	G
		1004.80	-4.142E-04	%	3.288E-01	9.01E-02	G
EU-155	-1.1321E-02						
		86.45	-1.132E-02	&(P	3.073E-01	9.16E-02	G K
		105.31	0.000E+00	%	2.924E-01	8.69E-02	G
HG-203	4.1379E-02						
		279.17	4.138E-02	*(P	5.131E-02	1.60E-02	G K
		72.87	-1.086E+00	&	2.574E+00	7.79E-01	G
		70.83	1.068E+00	&	3.072E+00	9.25E-01	G
		82.50	-1.564E+00	%	4.913E+00	1.48E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	4.6137E-01						
		583.14	4.614E-01	(P	5.840E-02	3.38E-02	G
		510.72	5.746E-01	+	2.147E-01	9.10E-02	G
PB-212	9.5432E-01						
		238.63	9.543E-01	(	1.351E-01	5.29E-02	G K
							Energy duplication
		77.11	1.288E+00	+	6.620E-01	2.11E-01	G
		74.81	1.418E+00	& P	1.371E+00	4.24E-01	G
PB-214	4.9505E-01						
		351.99	4.779E-01	(P	1.207E-01	4.70E-02	G K
		295.22	5.283E-01	(	2.445E-01	8.30E-02	G
							Energy duplication
		77.11	2.106E+00	+	1.083E+00	3.46E-01	G
		241.92	4.655E-01	%	8.773E-01	2.67E-01	G
BI-212	1.4554E-02						
		727.17	1.455E-02	&(	5.423E-01	1.54E-01	G K
		1620.56	-3.798E-02	% P	2.479E+00	6.53E-01	G
		785.42	1.457E+00	% P	2.784E+00	8.51E-01	G
BI-214	5.6285E-01						
		609.32	5.628E-01	@(	1.223E-01	6.02E-02	G K
		1764.51	1.171E-04	% P	4.596E-01	1.22E-01	G
		1120.28	1.102E+00	+	5.684E-01	2.68E-01	G
RA-224	1.0849E+00						
		241.00	1.085E+00	&(P	1.552E+00	4.75E-01	G
RA-226	1.5763E+00						
		185.99	1.576E+00	(P	1.569E+00	4.87E-01	G
AC-228	3.0637E-01						
		911.07	6.319E-03	%(P	2.606E-01	7.39E-02	G K
		968.90	-6.256E-03	% P	5.508E-01	1.58E-01	G
		338.40	1.031E+00	(	3.290E-01	1.24E-01	G
TH-227	-4.2250E-01						
		236.00	-4.225E-01	%(P	6.413E-01	1.96E-01	G K
		256.25	3.826E-03	%	6.770E-01	1.99E-01	G
PA-234	4.2916E-02						
		98.44	4.292E-02	%(	2.683E-01	8.03E-02	G K
		946.00	-4.302E-02	%	3.154E-01	9.00E-02	G
		131.28	-5.390E-02	&	2.559E-01	7.66E-02	G
		94.67	-2.228E-01	%	5.215E-01	1.58E-01	G
		883.24	0.000E+00	%	5.424E-01	1.52E-01	G
		926.70	-8.638E-02	&	5.324E-01	1.52E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 3.457E-02 %   4.194E-01 1.19E-01 G

TH-234       1.9192E+00
                           63.29 1.562E+00 %(P 5.277E+00 1.59E+00 G K
                           92.80 2.383E+00  (  2.733E+00 8.41E-01 G
                           92.38 6.887E-01 & P 2.975E+00 8.93E-01 G

AM-241       9.7413E-05
                           59.54 9.741E-05 %(  7.830E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	-1.0784E-02	-1.1368E-02	4.6975E-01	4.6975E-01	5.157E-01
K-40		1.5266E+01	1.5266E+01	1.9413E+00	2.1219E+00	4.420E-01
MN-54	#A	-1.4354E-02	-1.4484E-02	5.8542E-02	5.8547E-02	6.312E-02
CO-57	#B	4.2429E-03	4.2874E-03	5.4708E-02	5.4708E-02	6.067E-02
CO-60	#B	-2.0484E-04	-2.0514E-04	1.0966E-02	1.0966E-02	8.453E-02

Sr-85	#A	-1.7146E-02	-1.7908E-02	5.9766E-02	5.9774E-02	6.422E-02
Kr-85	#A	-3.9580E+02	-3.9581E+02	1.3211E+03	1.3213E+03	1.483E+03
Y-88	#B	-2.2942E-05	-2.3557E-05	8.5612E-04	8.5612E-04	7.926E-02
NB-94	#B	1.9652E-02	1.9652E-02	5.2087E-02	5.2099E-02	5.865E-02
Ag-108M	#B	-9.7375E-03	-9.7381E-03	4.9438E-02	4.9441E-02	5.724E-02
CD-109	#A	9.4804E-01	9.5395E-01	2.1738E+00	2.1745E+00	2.382E+00
SN-113	#B	-2.4583E-04	-2.5192E-04	5.7136E-02	5.7136E-02	6.483E-02
SB-125	#B	1.1609E-01	1.1642E-01	1.2458E-01	1.2476E-01	1.487E-01
I-131	#B	0.0000E+00	0.0000E+00	7.6440E-02	7.6440E-02	6.181E-02
CS-134	#B	2.0246E-02	2.0322E-02	2.3500E-02	2.3528E-02	5.661E-02
CS-137	#A	-9.1345E-03	-9.1368E-03	6.6371E-02	6.6373E-02	7.629E-02
CE-139	#A	-5.7765E-03	-5.8961E-03	5.8878E-02	5.8879E-02	5.954E-02
EU-152	#B	6.7427E-03	6.7468E-03	1.5469E-01	1.5469E-01	1.737E-01
EU-154	#B	1.0604E-02	1.0614E-02	1.2077E-01	1.2077E-01	1.350E-01
EU-155	#B	-1.1304E-02	-1.1321E-02	1.2598E+00	1.2598E+00	3.068E-01
HG-203	#A	3.8952E-02	4.1379E-02	4.7955E-02	4.8011E-02	4.830E-02
TL-208		4.6137E-01	4.6137E-01	1.0133E-01	1.0459E-01	
PB-212	#	9.5432E-01	9.5432E-01	1.5862E-01	1.6741E-01	1.351E-01
PB-214	#	4.9505E-01	4.9505E-01	1.3766E-01	1.4043E-01	1.207E-01
BI-212	#B	1.4554E-02	1.4554E-02	4.6303E-01	4.6303E-01	5.423E-01
BI-214	#	5.6285E-01	5.6285E-01	1.8019E-01	1.8294E-01	
RA-224	#A	1.0849E+00	1.0849E+00	1.4263E+00	1.4276E+00	1.552E+00
RA-226	#	1.5763E+00	1.5763E+00	1.4605E+00	1.4631E+00	1.569E+00
AC-228	F	3.0637E-01	3.0637E-01	1.1046E-01	1.1179E-01	2.606E-01
TH-227	#B	-4.2250E-01	-4.2250E-01	5.9144E-01	5.9191E-01	6.413E-01
PA-234	#B	4.2916E-02	4.2916E-02	2.4083E-01	2.4084E-01	2.683E-01
TH-234	#B	1.9192E+00	1.9192E+00	2.0318E+00	2.0346E+00	5.277E+00
AM-241	#A	9.7411E-05	9.7413E-05	6.9825E-01	6.9825E-01	7.830E-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 (270.7 to 1999.0 keV) 1.6596706E+01 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.6596706E+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_29AUG2006_1507.An1

Sample description
FSS-OOL-02-05-013-F

Spectrum Filename: C:\GammaVision\Spectra\102F_29AUG2006_1507.An1

Acquisition information
Start time: 29-Aug-2006 15:23:46
Live time: 2000
Real time: 2023
Dead time: 1.11 %
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: 1.9990E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9990E+03) =
5.0025E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 13:10:00
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: 0.8089

***** S U M M A R Y O F P E A K 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	156.	30.50	1.50	8.847E-03				
74.91	156.	30.50	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.27	203.	23.96	1.50	9.541E-03	77.11	10.700	1.345E+00	PB214
					77.11	17.500	8.225E-01	PB212
77.27	203.	23.96	1.50	9.541E-03	77.11	10.700	1.345E+00	PB214
					77.11	17.500	8.225E-01	PB212
93.29	114.	40.50	1.50	1.333E-02	92.80	3.000	PBC<MDA	TH234
185.52	127.	25.33	1.14	1.629E-02				
185.52	127.	25.33	1.14	1.629E-02	185.99	3.280	1.553E+00	RA226
239.12	695.	4.54	1.22	1.379E-02	238.63	43.100	7.893E-01	PB212
242.32	91.	23.81	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.041E-01	PB214
295.85	119.	15.92	1.26	1.144E-02	295.22	19.200	3.666E-01	PB214
300.85	55.	29.50	1.26	1.126E-02				
328.65	82.	29.53	1.48	1.035E-02				
339.24	159.	14.68	1.72	1.004E-02	338.40	12.010	8.919E-01	AC228
352.53	245.	13.62	1.09	9.664E-03	351.99	37.100	4.613E-01	PB214
511.75	106.	22.71	1.83	6.682E-03	510.72	22.500	4.775E-01	TL208
584.35	211.	12.05	1.21	5.878E-03	583.14	86.000	2.813E-01	TL208
610.48	159.	9.92	1.42	5.639E-03	609.32	46.090	4.128E-01	BI214
728.62	62.	28.95	1.52	4.785E-03	727.17	11.800	7.433E-01	BI212
795.94	28.	32.60	1.60	4.420E-03	795.76	85.400	5.053E-02	CS134
913.02	140.	13.67	1.49	3.915E-03	911.07	29.000	8.284E-01	AC228
970.10	106.	13.72	1.63	3.714E-03	968.90	17.460	1.104E+00	AC228
1463.46	642.	3.97	1.79	2.617E-03	1460.75	10.700	1.547E+01	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
477.87	239.06	151.	695.	0.347	13.63	1.215	PB-212	D
484.26	242.25	190.	91.	0.046	71.43	1.217	XE-138	D
601.40	300.87	120.	53.	0.026	96.89	0.984	PB-212	M
656.98	328.65	175.	82.	0.041	88.58	1.479	LA-140	M
1826.18	913.02	62.	140.	0.070	34.93	1.493	AC-228	M
1940.40	970.10	30.	109.	0.055	35.77	1.631	AC-228	M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: FSS_Rev_1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.40	74.91	1093.	156.	0.078	91.49	1.500s
PB-214	153.80	77.11	1083.	203.	0.102	71.89	1.500D
PB-212	153.80	77.11	1083.	203.	0.102	71.89	1.500D
TH-234	186.15	93.29	1002.	114.	0.057	121.51	1.500s
RA-226	371.80	186.10	430.	87.	0.044	100.55	1.500s
PB-212	477.84	239.10	470.	610.	0.305	19.37	1.500
PB-214	591.28	295.81	231.	123.	0.061	59.01	1.500
AC-228	677.87	339.10	136.	142.	0.071	43.03	1.500
PB-214	704.84	352.58	152.	206.	0.103	32.77	1.500
TL-208	1023.28	511.75	133.	106.	0.053	68.12	1.832s
TL-208	1168.54	584.35	115.	211.	0.105	36.14	1.211
BI-214	1220.81	610.48	39.	159.	0.079	29.76	1.416
BI-212	1457.20	728.62	73.	62.	0.031	86.85	1.516s
CS-134	1591.90	795.94	28.	28.	0.014	97.81	1.601
K-40	2927.98	1463.54	-2.	617.	0.308	12.03	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	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.7040E-01					
			477.56	1.704E-01	%(	3.652E-01 1.11E-01	G
K-40		1.4873E+01					
			1460.75	1.487E+01	(P	1.777E-01 5.97E-01	G
MN-54		7.8779E-03					
			834.81	7.878E-03	%(P	5.137E-02 1.47E-02	G
CO-57		3.3872E-03					
			122.07	3.387E-03	%(	5.892E-02 1.75E-02	G K
			136.43	1.403E-01	%	4.494E-01 1.35E-01	G
CO-60		9.4523E-03					
			1332.51	9.452E-03	%(P	5.763E-02 1.62E-02	G K
			1173.23	2.409E-02	&	7.167E-02 2.12E-02	G K
Sr-85		-8.9423E-03					
			514.00	-8.942E-03	&(	5.450E-02 1.60E-02	G
Kr-85		-1.9631E+02					
			513.99	-1.963E+02	&(	1.204E+03 3.53E+02	G
Y-88		-2.1345E-05					
			1836.01	-2.135E-05	%(P	5.473E-02 1.39E-02	G K
			898.02	-2.517E-03	& P	6.415E-02 1.79E-02	G
NB-94		-8.5179E-03					
			871.10	-8.518E-03	&(	4.739E-02 1.35E-02	G K
			702.50	-4.771E-03	%	4.780E-02 1.36E-02	G K
Ag-108M		9.5188E-04					
			722.95	9.519E-04	&(	5.650E-02 1.59E-02	G K
			614.37	-3.710E-02	% P	7.456E-02 2.26E-02	G
			433.93	-4.350E-06	%	4.774E-02 1.37E-02	G
CD-109		1.3505E+00					
			88.04	1.351E+00	%(P	2.157E+00 6.57E-01	G
SN-113		8.3312E-03					
			391.71	8.331E-03	&(	7.133E-02 2.09E-02	G K
			255.04	2.316E-01	&	1.884E+00 5.56E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-3.5281E-03						
		427.95	-3.528E-03	%(P	1.490E-01	4.27E-02	G K
		600.77	-7.049E-03	% P	2.366E-01	6.67E-02	G
		636.15	5.799E-02	% P	4.174E-01	1.20E-01	G
		463.51	2.384E-01	% P	3.996E-01	1.22E-01	G
		176.29	4.789E-02	& P	6.481E-01	1.92E-01	G
I-131	3.7396E-03						
		364.48	3.740E-03	%(	5.565E-02	1.60E-02	G K
		636.97	1.393E-01	&	8.522E-01	2.46E-01	G
		284.29	1.141E-01	&	9.746E-01	2.87E-01	G
CS-134	2.5527E-02						
		604.66	3.648E-03	%(	4.115E-02	1.17E-02	G K
		795.76	5.053E-02	(	4.915E-02	1.65E-02	G
		569.29	-2.031E-04	%	2.628E-01	7.38E-02	G
		801.84	-8.172E-02	& P	5.754E-01	1.64E-01	G
CS-137	1.1623E-02						
		661.62	1.162E-02	&(	5.446E-02	1.58E-02	G
CE-139	1.5028E-02						
		165.85	1.503E-02	%(P	5.048E-02	1.52E-02	G
EU-152	-3.7771E-02						
		121.78	-3.777E-02	%(P	1.416E-01	4.24E-02	G K
		344.30	-9.032E-03	%	1.592E-01	4.65E-02	G
		1408.08	2.593E-02	%	2.354E-01	6.42E-02	G
		964.00	-6.663E-02	% P	4.501E-01	1.29E-01	G
		1112.07	1.879E-03	&	4.113E-01	1.13E-01	G
		778.90	1.906E-03	% P	4.326E-01	1.22E-01	G
EU-154	-2.0349E-04						
		123.10	-2.035E-04	%(P	1.180E-01	3.50E-02	G K
		1274.80	5.897E-02	&	1.926E-01	5.66E-02	G
		723.30	2.572E-02	& P	2.584E-01	7.37E-02	G
		1004.80	1.578E-01	%	2.888E-01	8.89E-02	G
EU-155	-1.5765E-02						
		86.45	-1.577E-02	%(P	2.894E-01	8.64E-02	G K
		105.31	-3.990E-02	%	2.481E-01	7.42E-02	G
HG-203	-1.0312E-02						
		279.17	-1.031E-02	&(P	5.782E-02	1.72E-02	G K
		72.87	-9.936E-01	%	2.306E+00	6.98E-01	G
		70.83	1.236E+00	&	2.839E+00	8.59E-01	G
		82.50	-3.465E-01	&	4.493E+00	1.34E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8132E-01						
		583.14	2.813E-01	(P	7.037E-02	3.40E-02	G
		510.72	4.775E-01	+	2.530E-01	1.09E-01	G
PB-212	7.3044E-01						
		238.63	6.930E-01	(	1.179E-01	4.47E-02	G K
							Energy duplication
		77.11	8.225E-01	*(	6.320E-01	1.97E-01	G
		74.81	1.238E+00	& P	1.248E+00	3.85E-01	G
PB-214	3.8482E-01						
		351.99	3.885E-01	(P	1.133E-01	4.25E-02	G K
		295.22	3.777E-01	(	2.259E-01	7.43E-02	G
							Energy duplication
		77.11	1.345E+00	+	1.034E+00	3.22E-01	G
		241.92	-2.117E-02	%	7.157E-01	2.12E-01	G
BI-212	7.4329E-01						
		727.17	7.433E-01	*(	5.075E-01	2.16E-01	G K
		1620.56	-2.452E-01	% P	1.632E+00	4.28E-01	G
		785.42	1.020E+00	% P	2.408E+00	7.24E-01	G
BI-214	4.1281E-01						
		609.32	4.128E-01	(	8.259E-02	4.10E-02	G K
		1764.51	-1.654E-03	% P	3.200E-01	8.10E-02	G
		1120.28	-5.658E-02	&	4.566E-01	1.30E-01	G
RA-224	3.4381E-01						
		241.00	3.438E-01	&(P	1.440E+00	4.31E-01	G
RA-226	1.1043E+00						
		185.99	1.104E+00	*(P	1.259E+00	3.89E-01	G
AC-228	2.3128E-01						
		911.07	-1.572E-03	%(P	2.786E-01	7.96E-02	G K
		968.90	-3.184E-02	% P	3.628E-01	1.03E-01	G
		338.40	7.935E-01	(	3.192E-01	1.14E-01	G
TH-227	-1.9172E-01						
		236.00	-1.917E-01	%(P	5.280E-01	1.59E-01	G K
		256.25	1.777E-02	%	5.808E-01	1.70E-01	G
PA-234	-1.0234E-02						
		98.44	-1.023E-02	&(	2.414E-01	7.18E-02	G K
		946.00	6.993E-02	%	2.313E-01	6.76E-02	G
		131.28	-6.665E-03	%	2.512E-01	7.47E-02	G
		94.67	-1.441E-01	%	4.932E-01	1.49E-01	G
		883.24	9.213E-02	%	3.698E-01	1.07E-01	G
		926.70	-9.566E-02	%	5.005E-01	1.44E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 6.932E-02 %   3.823E-01 1.11E-01 G

TH-234       1.5940E+00
                           63.29 1.343E+00 %(P 4.746E+00 1.43E+00 G K
                           92.80 1.920E+00  (  2.539E+00 7.78E-01 G
                           92.38 5.594E-01 & P 2.664E+00 7.99E-01 G

AM-241       1.3947E-01
                           59.54 1.395E-01 %(  7.267E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	1.6158E-01	1.7040E-01	3.3183E-01	3.3197E-01	3.464E-01
K-40		1.4873E+01	1.4873E+01	1.7898E+00	1.9749E+00	1.777E-01
MN-54	#A	7.8067E-03	7.8779E-03	4.4054E-02	4.4056E-02	5.091E-02
CO-57	#B	3.3518E-03	3.3872E-03	5.2611E-02	5.2612E-02	5.831E-02
CO-60	#B	9.4384E-03	9.4523E-03	4.8668E-02	4.8671E-02	5.755E-02

Sr-85	#A	-8.5595E-03	-8.9423E-03	4.7891E-02	4.7893E-02	5.217E-02
Kr-85	#A	-1.9630E+02	-1.9631E+02	1.0579E+03	1.0579E+03	1.204E+03
Y-88	#B	-2.0785E-05	-2.1345E-05	5.4854E-04	5.4854E-04	5.329E-02
NB-94	#B	-8.5179E-03	-8.5179E-03	4.0648E-02	4.0651E-02	4.739E-02
Ag-108M	#B	9.5182E-04	9.5188E-04	4.7755E-02	4.7755E-02	5.650E-02
CD-109	#A	1.3421E+00	1.3505E+00	1.9721E+00	1.9735E+00	2.143E+00
SN-113	#B	8.1283E-03	8.3312E-03	6.2627E-02	6.2629E-02	6.959E-02
SB-125	#B	-3.5182E-03	-3.5281E-03	1.2509E+00	1.2509E+00	1.485E-01
I-131	#B	2.6277E-03	3.7396E-03	4.7989E-02	4.7989E-02	3.911E-02
CS-134	#B	2.5431E-02	2.5527E-02	2.4967E-02	2.5008E-02	4.099E-02
CS-137	#A	1.1620E-02	1.1623E-02	4.7522E-02	4.7526E-02	5.444E-02
CE-139	#A	1.4721E-02	1.5028E-02	4.5456E-02	4.5464E-02	4.945E-02
EU-152	#B	-3.7748E-02	-3.7771E-02	1.3561E-01	1.3563E-01	1.415E-01
EU-154	#B	-2.0330E-04	-2.0349E-04	4.3129E-02	4.3129E-02	1.179E-01
EU-155	#B	-1.5741E-02	-1.5765E-02	6.3062E-01	6.3062E-01	2.889E-01
HG-203	#B	-9.7026E-03	-1.0312E-02	5.2171E-02	5.2175E-02	5.441E-02
TL-208		2.8132E-01	2.8132E-01	1.0187E-01	1.0309E-01	
PB-212	#	7.3044E-01	7.3044E-01	1.4145E-01	1.4727E-01	1.179E-01
PB-214	#	3.8482E-01	3.8482E-01	1.2634E-01	1.2817E-01	1.133E-01
BI-212	#	7.4329E-01	7.4329E-01	6.4558E-01	6.4693E-01	
BI-214		4.1281E-01	4.1281E-01	1.2283E-01	1.2500E-01	
RA-224	#A	3.4381E-01	3.4381E-01	1.2944E+00	1.2946E+00	1.440E+00
RA-226	#A	1.1043E+00	1.1043E+00	1.1672E+00	1.1688E+00	1.259E+00
AC-228	B	2.3128E-01	2.3128E-01	9.9511E-02	1.0035E-01	2.786E-01
TH-227	#B	-1.9172E-01	-1.9172E-01	4.8399E-01	4.8411E-01	5.280E-01
PA-234	#B	-1.0234E-02	-1.0234E-02	2.1552E-01	2.1552E-01	2.414E-01
TH-234	#B	1.5940E+00	1.5940E+00	1.9369E+00	1.9389E+00	4.746E+00
AM-241	#A	1.3947E-01	1.3947E-01	6.5353E-01	6.5358E-01	7.267E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (295.7 to 1999.0 keV) 1.6541531E+01 pCi/gm
Total Decayed Activity (295.7 to 1999.0 keV) 1.6541531E+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_29AUG2006_1526.An1

Sample description
FSS-OOL-02-05-013-F-RC

Spectrum Filename: C:\GammaVision\Spectra\102F_29AUG2006_1526.An1

Acquisition information
Start time: 29-Aug-2006 15:23:45
Live time: 2000
Real time: 2023
Dead time: 1.11 %
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: 1.9990E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9990E+03) =
5.0025E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 13:10:00
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: 0.8089

***** S U M M A R Y O F P E A K 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	156.	30.50	1.50	8.847E-03				
74.91	156.	30.50	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.27	203.	23.96	1.50	9.541E-03	77.11	10.700	1.345E+00	PB214
					77.11	17.500	8.225E-01	PB212
77.27	203.	23.96	1.50	9.541E-03	77.11	10.700	1.345E+00	PB214
					77.11	17.500	8.225E-01	PB212
93.29	114.	40.50	1.50	1.333E-02	92.80	3.000	PBC<MDA	TH234
185.52	127.	25.33	1.14	1.629E-02				
185.52	127.	25.33	1.14	1.629E-02	185.99	3.280	1.553E+00	RA226
239.12	695.	4.54	1.22	1.379E-02	238.63	43.100	7.893E-01	PB212
242.32	91.	23.81	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.041E-01	PB214
295.85	119.	15.92	1.26	1.144E-02	295.22	19.200	3.666E-01	PB214
300.85	55.	29.50	1.26	1.126E-02				
328.65	82.	29.53	1.48	1.035E-02				
339.24	159.	14.68	1.72	1.004E-02	338.40	12.010	8.919E-01	AC228
352.53	245.	13.62	1.09	9.664E-03	351.99	37.100	4.613E-01	PB214
511.75	106.	22.71	1.83	6.682E-03	510.72	22.500	4.775E-01	TL208
584.35	211.	12.05	1.21	5.878E-03	583.14	86.000	2.813E-01	TL208
610.48	159.	9.92	1.42	5.639E-03	609.32	46.090	4.128E-01	BI214
728.62	62.	28.95	1.52	4.785E-03	727.17	11.800	7.433E-01	BI212
795.94	28.	32.60	1.60	4.420E-03	795.76	85.400	5.053E-02	CS134
913.02	140.	13.67	1.49	3.915E-03	911.07	29.000	8.284E-01	AC228
970.10	106.	13.72	1.63	3.714E-03	968.90	17.460	1.104E+00	AC228
1463.46	642.	3.97	1.79	2.617E-03	1460.75	10.700	1.547E+01	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
477.87	239.06	151.	695.	0.347	13.63	1.215	PB-212	D
484.26	242.25	190.	91.	0.046	71.43	1.217	XE-138	D
601.40	300.87	120.	53.	0.026	96.89	0.984	PB-212	M
656.98	328.65	175.	82.	0.041	88.58	1.479	LA-140	M
1826.18	913.02	62.	140.	0.070	34.93	1.493	AC-228	M
1940.40	970.10	30.	109.	0.055	35.77	1.631	AC-228	M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: FSS_Rev_1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.40	74.91	1093.	156.	0.078	91.49	1.500s
PB-214	153.80	77.11	1083.	203.	0.102	71.89	1.500D
PB-212	153.80	77.11	1083.	203.	0.102	71.89	1.500D
TH-234	186.15	93.29	1002.	114.	0.057	121.51	1.500s
RA-226	371.80	186.10	430.	87.	0.044	100.55	1.500s
PB-212	477.84	239.10	470.	610.	0.305	19.37	1.500
PB-214	591.28	295.81	231.	123.	0.061	59.01	1.500
AC-228	677.87	339.10	136.	142.	0.071	43.03	1.500
PB-214	704.84	352.58	152.	206.	0.103	32.77	1.500
TL-208	1023.28	511.75	133.	106.	0.053	68.12	1.832s
TL-208	1168.54	584.35	115.	211.	0.105	36.14	1.211
BI-214	1220.81	610.48	39.	159.	0.079	29.76	1.416
BI-212	1457.20	728.62	73.	62.	0.031	86.85	1.516s
CS-134	1591.90	795.94	28.	28.	0.014	97.81	1.601
K-40	2927.98	1463.54	-2.	617.	0.308	12.03	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		1.7040E-01					
			477.56	1.704E-01	%(	3.652E-01 1.11E-01	G
K-40		1.4873E+01					
			1460.75	1.487E+01	(P	1.777E-01 5.97E-01	G
MN-54		7.8779E-03					
			834.81	7.878E-03	%(P	5.137E-02 1.47E-02	G
CO-57		3.3872E-03					
			122.07	3.387E-03	%(	5.892E-02 1.75E-02	G K
			136.43	1.403E-01	%	4.494E-01 1.35E-01	G
CO-60		9.4523E-03					
			1332.51	9.452E-03	%(P	5.763E-02 1.62E-02	G K
			1173.23	2.409E-02	&	7.167E-02 2.12E-02	G K
Sr-85		-8.9423E-03					
			514.00	-8.942E-03	&(	5.450E-02 1.60E-02	G
Kr-85		-1.9631E+02					
			513.99	-1.963E+02	&(	1.204E+03 3.53E+02	G
Y-88		-2.1345E-05					
			1836.01	-2.135E-05	%(P	5.473E-02 1.39E-02	G K
			898.02	-2.517E-03	& P	6.415E-02 1.79E-02	G
NB-94		-8.5179E-03					
			871.10	-8.518E-03	&(	4.739E-02 1.35E-02	G K
			702.50	-4.771E-03	%	4.780E-02 1.36E-02	G K
Ag-108M		9.5188E-04					
			722.95	9.519E-04	&(	5.650E-02 1.59E-02	G K
			614.37	-3.710E-02	% P	7.456E-02 2.26E-02	G
			433.93	-4.350E-06	%	4.774E-02 1.37E-02	G
CD-109		1.3505E+00					
			88.04	1.351E+00	%(P	2.157E+00 6.57E-01	G
SN-113		8.3312E-03					
			391.71	8.331E-03	&(	7.133E-02 2.09E-02	G K
			255.04	2.316E-01	&	1.884E+00 5.56E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	-3.5281E-03						
		427.95	-3.528E-03	%(P	1.490E-01	4.27E-02	G K
		600.77	-7.049E-03	% P	2.366E-01	6.67E-02	G
		636.15	5.799E-02	% P	4.174E-01	1.20E-01	G
		463.51	2.384E-01	% P	3.996E-01	1.22E-01	G
		176.29	4.789E-02	& P	6.481E-01	1.92E-01	G
I-131	3.7396E-03						
		364.48	3.740E-03	%(	5.565E-02	1.60E-02	G K
		636.97	1.393E-01	&	8.522E-01	2.46E-01	G
		284.29	1.141E-01	&	9.746E-01	2.87E-01	G
CS-134	2.5527E-02						
		604.66	3.648E-03	%(	4.115E-02	1.17E-02	G K
		795.76	5.053E-02	(	4.915E-02	1.65E-02	G
		569.29	-2.031E-04	%	2.628E-01	7.38E-02	G
		801.84	-8.172E-02	& P	5.754E-01	1.64E-01	G
CS-137	1.1623E-02						
		661.62	1.162E-02	&(	5.446E-02	1.58E-02	G
CE-139	1.5028E-02						
		165.85	1.503E-02	%(P	5.048E-02	1.52E-02	G
EU-152	-3.7771E-02						
		121.78	-3.777E-02	%(P	1.416E-01	4.24E-02	G K
		344.30	-9.032E-03	%	1.592E-01	4.65E-02	G
		1408.08	2.593E-02	%	2.354E-01	6.42E-02	G
		964.00	-6.663E-02	% P	4.501E-01	1.29E-01	G
		1112.07	1.879E-03	&	4.113E-01	1.13E-01	G
		778.90	1.906E-03	% P	4.326E-01	1.22E-01	G
EU-154	-2.0349E-04						
		123.10	-2.035E-04	%(P	1.180E-01	3.50E-02	G K
		1274.80	5.897E-02	&	1.926E-01	5.66E-02	G
		723.30	2.572E-02	& P	2.584E-01	7.37E-02	G
		1004.80	1.578E-01	%	2.888E-01	8.89E-02	G
EU-155	-1.5765E-02						
		86.45	-1.577E-02	%(P	2.894E-01	8.64E-02	G K
		105.31	-3.990E-02	%	2.481E-01	7.42E-02	G
HG-203	-1.0312E-02						
		279.17	-1.031E-02	&(P	5.782E-02	1.72E-02	G K
		72.87	-9.936E-01	%	2.306E+00	6.98E-01	G
		70.83	1.236E+00	&	2.839E+00	8.59E-01	G
		82.50	-3.465E-01	&	4.493E+00	1.34E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.8132E-01						
		583.14	2.813E-01	(P	7.037E-02	3.40E-02	G
		510.72	4.775E-01	+	2.530E-01	1.09E-01	G
PB-212	7.3044E-01						
		238.63	6.930E-01	(	1.179E-01	4.47E-02	G K
							Energy duplication
		77.11	8.225E-01	*(	6.320E-01	1.97E-01	G
		74.81	1.238E+00	& P	1.248E+00	3.85E-01	G
PB-214	3.8482E-01						
		351.99	3.885E-01	(P	1.133E-01	4.25E-02	G K
		295.22	3.777E-01	(	2.259E-01	7.43E-02	G
							Energy duplication
		77.11	1.345E+00	+	1.034E+00	3.22E-01	G
		241.92	-2.117E-02	%	7.157E-01	2.12E-01	G
BI-212	7.4329E-01						
		727.17	7.433E-01	*(	5.075E-01	2.16E-01	G K
		1620.56	-2.452E-01	% P	1.632E+00	4.28E-01	G
		785.42	1.020E+00	% P	2.408E+00	7.24E-01	G
BI-214	4.1281E-01						
		609.32	4.128E-01	(	8.259E-02	4.10E-02	G K
		1764.51	-1.654E-03	% P	3.200E-01	8.10E-02	G
		1120.28	-5.658E-02	&	4.566E-01	1.30E-01	G
RA-224	3.4381E-01						
		241.00	3.438E-01	&(P	1.440E+00	4.31E-01	G
RA-226	1.1043E+00						
		185.99	1.104E+00	*(P	1.259E+00	3.89E-01	G
AC-228	2.3128E-01						
		911.07	-1.572E-03	%(P	2.786E-01	7.96E-02	G K
		968.90	-3.184E-02	% P	3.628E-01	1.03E-01	G
		338.40	7.935E-01	(	3.192E-01	1.14E-01	G
TH-227	-1.9172E-01						
		236.00	-1.917E-01	%(P	5.280E-01	1.59E-01	G K
		256.25	1.777E-02	%	5.808E-01	1.70E-01	G
PA-234	-1.0234E-02						
		98.44	-1.023E-02	&(	2.414E-01	7.18E-02	G K
		946.00	6.993E-02	%	2.313E-01	6.76E-02	G
		131.28	-6.665E-03	%	2.512E-01	7.47E-02	G
		94.67	-1.441E-01	%	4.932E-01	1.49E-01	G
		883.24	9.213E-02	%	3.698E-01	1.07E-01	G
		926.70	-9.566E-02	%	5.005E-01	1.44E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 6.932E-02 %   3.823E-01 1.11E-01 G

TH-234       1.5940E+00
                           63.29 1.343E+00 %(P 4.746E+00 1.43E+00 G K
                           92.80 1.920E+00  (  2.539E+00 7.78E-01 G
                           92.38 5.594E-01 & P 2.664E+00 7.99E-01 G

AM-241       1.3947E-01
                           59.54 1.395E-01 %(  7.267E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	1.6158E-01	1.7040E-01	3.3183E-01	3.3197E-01	3.464E-01
K-40		1.4873E+01	1.4873E+01	1.7898E+00	1.9749E+00	1.777E-01
MN-54	#A	7.8067E-03	7.8779E-03	4.4054E-02	4.4056E-02	5.091E-02
CO-57	#B	3.3518E-03	3.3872E-03	5.2611E-02	5.2612E-02	5.831E-02
CO-60	#B	9.4384E-03	9.4523E-03	4.8668E-02	4.8671E-02	5.755E-02

Sr-85	#A	-8.5595E-03	-8.9423E-03	4.7891E-02	4.7893E-02	5.217E-02
Kr-85	#A	-1.9630E+02	-1.9631E+02	1.0579E+03	1.0579E+03	1.204E+03
Y-88	#B	-2.0785E-05	-2.1345E-05	5.4854E-04	5.4854E-04	5.329E-02
NB-94	#B	-8.5179E-03	-8.5179E-03	4.0648E-02	4.0651E-02	4.739E-02
Ag-108M	#B	9.5182E-04	9.5188E-04	4.7755E-02	4.7755E-02	5.650E-02
CD-109	#A	1.3421E+00	1.3505E+00	1.9721E+00	1.9735E+00	2.143E+00
SN-113	#B	8.1283E-03	8.3312E-03	6.2627E-02	6.2629E-02	6.959E-02
SB-125	#B	-3.5182E-03	-3.5281E-03	1.2509E+00	1.2509E+00	1.485E-01
I-131	#B	2.6277E-03	3.7396E-03	4.7989E-02	4.7989E-02	3.911E-02
CS-134	#B	2.5431E-02	2.5527E-02	2.4967E-02	2.5008E-02	4.099E-02
CS-137	#A	1.1620E-02	1.1623E-02	4.7522E-02	4.7526E-02	5.444E-02
CE-139	#A	1.4721E-02	1.5028E-02	4.5456E-02	4.5464E-02	4.945E-02
EU-152	#B	-3.7748E-02	-3.7771E-02	1.3561E-01	1.3563E-01	1.415E-01
EU-154	#B	-2.0330E-04	-2.0349E-04	4.3129E-02	4.3129E-02	1.179E-01
EU-155	#B	-1.5741E-02	-1.5765E-02	6.3062E-01	6.3062E-01	2.889E-01
HG-203	#B	-9.7026E-03	-1.0312E-02	5.2171E-02	5.2175E-02	5.441E-02
TL-208		2.8132E-01	2.8132E-01	1.0187E-01	1.0309E-01	
PB-212	#	7.3044E-01	7.3044E-01	1.4145E-01	1.4727E-01	1.179E-01
PB-214	#	3.8482E-01	3.8482E-01	1.2634E-01	1.2817E-01	1.133E-01
BI-212	#	7.4329E-01	7.4329E-01	6.4558E-01	6.4693E-01	
BI-214		4.1281E-01	4.1281E-01	1.2283E-01	1.2500E-01	
RA-224	#A	3.4381E-01	3.4381E-01	1.2944E+00	1.2946E+00	1.440E+00
RA-226	#A	1.1043E+00	1.1043E+00	1.1672E+00	1.1688E+00	1.259E+00
AC-228	B	2.3128E-01	2.3128E-01	9.9511E-02	1.0035E-01	2.786E-01
TH-227	#B	-1.9172E-01	-1.9172E-01	4.8399E-01	4.8411E-01	5.280E-01
PA-234	#B	-1.0234E-02	-1.0234E-02	2.1552E-01	2.1552E-01	2.414E-01
TH-234	#B	1.5940E+00	1.5940E+00	1.9369E+00	1.9389E+00	4.746E+00
AM-241	#A	1.3947E-01	1.3947E-01	6.5353E-01	6.5358E-01	7.267E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (295.7 to 1999.0 keV) 1.6541531E+01 pCi/gm
Total Decayed Activity (295.7 to 1999.0 keV) 1.6541531E+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_1SEP2006_0624.An1

Sample description
FSS-OOL-02-05-009-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1SEP2006_0624.An1

Acquisition information
Start time: 01-Sep-2006 06:24:44
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: 1.4950E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.4950E+03) =
6.6890E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 13:50:00
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: 0.1106

***** S U M M A R Y O F P E A K 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	133.	19.64	0.99	9.052E-03	74.81	9.600	1.381E+00	PB212
77.28	181.	12.58	0.99	1.011E-02	77.11	17.500	1.077E+00	PB212
					77.11	10.700	1.762E+00	PB214
87.37	86.	32.06	1.00	1.455E-02	86.45	32.740	1.693E-01	EU155
					88.04	3.790	1.406E+00	CD109
93.28	124.	22.60	1.00	1.669E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.30	116.	33.50	1.28	2.440E-02				
129.30	116.	33.50	1.28	2.440E-02	131.28	20.000	2.119E-01	PA234
186.43	129.	25.72	1.11	2.565E-02	185.99	3.280	PBC<MDA	RA226
209.38	77.	38.99	0.83	2.471E-02				
238.72	1117.	3.46	1.09	2.319E-02	238.63	43.100	9.987E-01	PB212
241.94	150.	16.63	1.10	2.302E-02	241.00	3.900	1.507E+00	RA224
					241.92	7.470	7.883E-01	PB214
270.14	106.	24.12	1.17	2.152E-02				
295.21	221.	13.71	1.20	2.025E-02	295.22	19.200	5.049E-01	PB214
300.21	92.	27.09	1.30	2.001E-02				
328.39	53.	33.38	0.85	1.872E-02				
338.35	240.	12.62	1.12	1.830E-02	338.40	12.010	9.817E-01	AC228
352.05	403.	7.05	1.16	1.775E-02	351.99	37.100	5.453E-01	PB214
409.11	44.	39.21	1.07	1.576E-02				
463.02	75.	26.98	1.71	1.426E-02				
463.02	75.	26.98	1.71	1.426E-02	463.51	10.000	4.661E-01	SB125
510.47	147.	16.62	1.46	1.318E-02	510.72	22.500	3.670E-01	TL208
583.25	376.	7.35	1.45	1.184E-02	583.14	86.000	3.298E-01	TL208
609.41	326.	9.14	1.09	1.144E-02	609.32	46.090	5.478E-01	BI214
727.47	129.	17.82	1.64	9.962E-03	727.17	11.800	9.879E-01	BI212

784.10	69.	25.03	2.18	9.394E-03	785.42	2.000	3.339E+00	BI212
794.64	60.	26.31	1.47	9.311E-03				
860.52	86.	20.98	1.13	8.768E-03				
911.50	261.	8.70	1.31	8.398E-03	911.07	29.000	9.551E-01	AC228
964.42	52.	22.50	1.54	8.053E-03	964.00	14.580	3.999E-01	EU152
969.14	161.	9.45	1.54	8.024E-03	968.90	17.460	1.040E+00	AC228
1120.48	96.	24.16	1.53	7.211E-03	1120.28	15.040	7.834E-01	BI214
1461.00	1198.	2.99	1.91	5.931E-03	1460.75	10.700	1.679E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1620.82	25.	20.00	1.56	5.488E-03	1620.56	2.750	1.495E+00	BI212
1764.65	69.	14.53	1.77	5.141E-03	1764.51	15.920	7.258E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
173.91	87.59	341.	86.	0.043	96.17	1.001	PB-214 lD
257.77	129.30	566.	131.	0.065	81.42	1.283	AC-228 s
417.92	209.38	377.	77.	0.039	116.98	0.826	AC-228
539.44	270.14	240.	106.	0.053	72.35	1.167	AC-228 s
599.57	300.21	218.	92.	0.046	81.27	1.301	PB-212 s
655.91	328.39	130.	53.	0.026	100.14	0.845	RH-106M
817.36	409.11	118.	44.	0.022	117.64	1.073	CS-138
1588.33	794.64	66.	61.	0.031	67.73	1.471	AC-228
1720.09	860.52	68.	86.	0.043	62.94	1.134	TL-208 s
1928.32	964.44	39.	57.	0.028	61.42	1.538	AC-228 D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: FSS_Rev_1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	291.	133.	0.066	58.93	0.993D
PB-212	153.39	77.11	310.	181.	0.090	37.73	0.995A
TH-234	185.38	93.10	815.	134.	0.067	82.60	1.500s
TH-234	185.32	93.07	802.	133.	0.067	82.52	1.500s
RA-226	371.83	186.33	619.	118.	0.059	83.71	1.500
PB-212	476.42	238.63	211.	1105.	0.553	10.46	1.093D
RA-224	481.16	241.00	862.	105.	0.052	123.81	1.095D
PB-214	483.00	241.92	283.	105.	0.052	56.42	1.095A
PB-214	589.56	295.21	273.	217.	0.109	41.14	1.198
AC-228	675.83	338.35	242.	239.	0.119	37.85	1.119
PB-214	703.09	351.97	259.	419.	0.210	24.80	1.161s
SB-125	925.01	462.94	124.	63.	0.032	81.80	1.500s
TL-208	1020.06	510.47	177.	120.	0.060	49.86	1.464s
TL-208	1165.59	583.25	125.	372.	0.186	22.04	1.446
BI-214	1217.91	609.41	162.	320.	0.160	27.42	1.090
BI-212	1454.01	727.47	108.	129.	0.064	53.47	1.639s
BI-212	1567.26	784.10	73.	69.	0.035	75.09	2.178s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1822.03	911.50	83.	257.	0.129	26.09	1.309
EU-152	1928.61	964.80	75.	48.	0.024	87.06	1.538s
AC-228	1936.81	968.90	36.	161.	0.081	28.31	1.541D
BI-214	2239.94	1120.48	115.	94.	0.047	72.49	1.533
K-40	2920.86	1461.00	41.	1179.	0.589	8.97	1.911
BI-212	3240.45	1620.82	0.	25.	0.012	60.00	1.563
BI-214	3528.06	1764.65	10.	66.	0.033	43.59	1.772

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O 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		1.8215E-01					
			477.56	1.821E-01	%(	3.674E-01 1.12E-01	G
K-40		1.6788E+01					
			1460.75	1.679E+01	(P	4.641E-01 5.10E-01	G
MN-54		1.1433E-02					
			834.81	1.143E-02	%(P	4.358E-02 1.28E-02	G
CO-57		8.7478E-03					
			122.07	8.748E-03	%(P	5.828E-02 1.74E-02	G K
			136.43	-9.698E-02	%	4.450E-01 1.33E-01	G
CO-60		-3.6444E-03					
			1332.51	-3.644E-03	%(P	4.129E-02 1.09E-02	G K
			1173.23	-1.927E-03	% P	5.781E-02 1.63E-02	G K
Sr-85		-1.7947E-02					
			514.00	-1.795E-02	%(	5.181E-02 1.56E-02	G
Kr-85		-4.0336E+02					
			513.99	-4.034E+02	%(	1.162E+03 3.49E+02	G
Y-88		-1.1694E-04					
			1836.01	-1.169E-04	%(P	3.040E-02 7.67E-03	G K
			898.02	-7.278E-04	% P	5.501E-02 1.57E-02	G
NB-94		-2.3172E-03					
			871.10	-2.317E-03	&(	3.666E-02 1.04E-02	G K
			702.50	6.881E-03	&	3.965E-02 1.16E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	1.4176E-05						
		722.95	1.418E-05	%(	4.335E-02	1.23E-02	G K
		614.37	-1.092E-02	& P	4.829E-02	1.43E-02	G
		433.93	-5.635E-03	%	4.132E-02	1.21E-02	G
CD-109	1.1834E+00						
		88.04	1.183E+00	&(	2.266E+00	6.88E-01	G
SN-113	0.0000E+00						
		391.71	0.000E+00	%(	5.691E-02	1.65E-02	G K
		255.04	-7.699E-02	%	1.701E+00	5.01E-01	G
SB-125	9.1145E-02						
		427.95	-1.381E-02	%(P	1.271E-01	3.73E-02	G K
		600.77	6.184E-03	& P	2.025E-01	5.82E-02	G
		636.15	-8.874E-02	% P	3.845E-01	1.13E-01	G
		463.51	4.018E-01	(P	3.466E-01	1.12E-01	G
		176.29	1.413E-02	%	6.874E-01	2.04E-01	G
I-131	5.0510E-03						
		364.48	5.051E-03	&(P	5.667E-02	1.66E-02	G K
		636.97	-1.699E-01	%	6.946E-01	2.05E-01	G
		284.29	-2.485E-03	% P	7.202E-01	2.11E-01	G
CS-134	-1.7692E-02						
		604.66	-1.769E-02	%(	5.064E-02	1.52E-02	G K
		795.76	-2.405E-03	% P	4.672E-02	1.33E-02	G
		569.29	-3.039E-03	% P	2.736E-01	7.87E-02	G
		801.84	4.097E-02	% P	4.629E-01	1.32E-01	G
CS-137	1.1892E-02						
		661.62	1.189E-02	%(P	4.916E-02	1.45E-02	G
CE-139	1.5099E-02						
		165.85	1.510E-02	&(	5.109E-02	1.54E-02	G
EU-152	1.3917E-01						
		121.78	2.475E-02	%(P	1.699E-01	5.08E-02	G K
		344.30	-1.425E-02	% P	1.307E-01	3.85E-02	G
		1408.08	5.252E-02	%	1.647E-01	4.82E-02	G
		964.00	3.686E-01	&(P	3.318E-01	1.08E-01	G
		1112.07	8.250E-02	&	4.090E-01	1.20E-01	G
		778.90	-5.192E-02	%	2.729E-01	7.92E-02	G
EU-154	-2.8719E-03						
		123.10	-2.872E-03	&(	1.166E-01	3.46E-02	G K
		1274.80	1.501E-02	%	1.465E-01	4.20E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-1.307E-01 %   3.002E-01 9.07E-02 G
                         1004.80-4.464E-02 &   2.908E-01 8.46E-02 G

EU-155       4.1715E-03
                           86.45 4.171E-03 &(  2.855E-01 8.51E-02 G K
                          105.31-6.134E-04 %   2.385E-01 7.07E-02 G

HG-203      -1.3830E-02
                          279.17-1.383E-02 &(P 5.224E-02 1.56E-02 G K
                           72.87 2.543E-02 % P 3.026E+00 9.04E-01 G
                           70.83 1.983E-01 &   5.694E+00 1.70E+00 G
                           82.50-1.562E+00 &   4.628E+00 1.40E+00 G

TL-208       3.3753E-01
                          583.14 3.298E-01  (P 4.869E-02 2.45E-02 G
                          510.72 3.670E-01 *(P 1.972E-01 7.45E-02 G

PB-212       1.0218E+00
                          238.63 9.993E-01  (P 6.371E-02 3.52E-02 G K
                                                          Energy duplication
                           77.11 9.234E-01 } P 4.329E-01 1.16E-01 G
                           74.81 1.381E+00 + P 8.552E-01 2.78E-01 G

PB-214       5.5007E-01
                          351.99 5.755E-01 @(P 1.066E-01 4.82E-02 G K
                          295.22 5.049E-01  (P 1.853E-01 7.05E-02 G
                                                          Energy duplication
                           77.11 0.000E+00 } P 1.026E+00 0.00E+00 G
                          241.92 5.501E-01 }   4.265E-01 1.03E-01 G

BI-212       1.0837E+00
                          727.17 9.879E-01 *(P 3.940E-01 1.77E-01 G K
                         1620.56 1.495E+00  (P 4.415E-01 3.00E-01 G
                          785.42 3.339E+00 +   2.041E+00 8.35E-01 G

BI-214       5.4781E-01
                          609.32 5.478E-01  (P 1.065E-01 5.11E-02 G K
                         1764.51 7.258E-01 + P 1.949E-01 1.11E-01 G
                         1120.28 7.834E-01 + P 4.390E-01 1.93E-01 G

RA-224       1.0512E+00
                                                          Derived Ave Activity
                          241.00 1.051E+00 }(  1.402E+00 4.43E-01 G

RA-226       1.2713E+00
                          185.99 1.271E+00  (P 1.274E+00 3.94E-01 G

AC-228       9.8630E-01
                          911.07 9.551E-01  (P 1.672E-01 8.42E-02 G K
                          968.90 1.041E+00  (P 1.968E-01 9.83E-02 G
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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          338.40 9.817E-01  (P 3.095E-01 1.24E-01 G

TH-227      -9.0180E-02
                          236.00-9.018E-02 &(  3.894E-01 1.17E-01 G K
                          256.25 1.839E-01 % P 5.481E-01 1.65E-01 G

PA-234      -9.4546E-02
                           98.44-9.455E-02 &(P 2.346E-01 7.08E-02 G K
                          946.00-1.966E-02 % P 1.955E-01 5.58E-02 G
                          131.28-2.970E-02 & P 2.027E-01 6.04E-02 G
                           94.67-1.826E-01 % P 4.914E-01 1.48E-01 G
                          883.24-3.602E-02 %   3.003E-01 8.58E-02 G
                          926.70-4.736E-02 %   3.471E-01 9.96E-02 G
                          569.26-4.498E-03 % P 4.049E-01 1.16E-01 G

TH-234       1.8816E+00
                           63.29 7.869E-01 %(P 7.787E+00 2.32E+00 G K
                           92.80 2.437E+00  (P 2.466E+00 7.59E-01 G
                           92.38 2.894E+00 &(P 2.929E+00 9.02E-01 G

AM-241      -2.4645E-01
                           59.54-2.464E-01 %(P 1.288E+00 3.85E-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
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	1.7590E-01	1.8215E-01	3.3478E-01	3.3495E-01	3.548E-01
K-40		1.6788E+01	1.6788E+01	1.5301E+00	1.8142E+00	
MN-54	#A	1.1365E-02	1.1433E-02	3.8507E-02	3.8513E-02	4.332E-02
CO-57	#B	8.6875E-03	8.7478E-03	5.2280E-02	5.2282E-02	5.788E-02
CO-60	#B	-3.6409E-03	-3.6444E-03	1.8932E+00	1.8932E+00	4.125E-02
Sr-85	#A	-1.7438E-02	-1.7947E-02	4.6656E-02	4.6667E-02	5.034E-02
Kr-85	#A	-4.0336E+02	-4.0336E+02	1.0468E+03	1.0470E+03	1.162E+03
Y-88	#B	-1.1491E-04	-1.1694E-04	2.8980E-03	2.8980E-03	2.987E-02
NB-94	#B	-2.3172E-03	-2.3172E-03	3.1155E-02	3.1156E-02	3.666E-02
Ag-108M	#B	1.4176E-05	1.4176E-05	3.7004E-02	3.7004E-02	4.335E-02
CD-109	#A	1.1785E+00	1.1834E+00	2.0649E+00	2.0659E+00	2.256E+00
SN-113	#B	0.0000E+00	0.0000E+00	4.9645E-02	4.9646E-02	5.599E-02
SB-125	#B	9.0977E-02	9.1145E-02	7.6057E-02	7.6241E-02	1.269E-01
I-131	#B	4.0052E-03	5.0510E-03	4.9919E-02	4.9920E-02	4.494E-02
CS-134	#B	-1.7648E-02	-1.7692E-02	4.5543E-02	4.5554E-02	5.051E-02
CS-137	#A	1.1890E-02	1.1892E-02	4.3398E-02	4.3403E-02	4.915E-02
CE-139	#A	1.4895E-02	1.5099E-02	4.6085E-02	4.6093E-02	5.040E-02
EU-152	#B	1.3912E-01	1.3917E-01	1.2255E-01	1.2279E-01	1.698E-01
EU-154	#B	-2.8702E-03	-2.8719E-03	1.0390E-01	1.0390E-01	1.165E-01
EU-155	#B	4.1672E-03	4.1715E-03	2.5527E-01	2.5527E-01	2.852E-01
HG-203	#B	-1.3287E-02	-1.3830E-02	4.7083E-02	4.7090E-02	5.019E-02
TL-208		3.3753E-01	3.3753E-01	7.5261E-02	7.7770E-02	
PB-212		1.0218E+00	1.0218E+00	1.0799E-01	1.2321E-01	
PB-214		5.5007E-01	5.5007E-01	1.3827E-01	1.4191E-01	
BI-212		1.0837E+00	1.0837E+00	4.3664E-01	4.4115E-01	
BI-214		5.4781E-01	5.4781E-01	1.5323E-01	1.5650E-01	
RA-224	A	1.0512E+00	1.0512E+00	1.3015E+00	1.3029E+00	
RA-226	#A	1.2713E+00	1.2713E+00	1.1807E+00	1.1830E+00	1.274E+00
AC-228		9.8630E-01	9.8630E-01	1.7846E-01	1.8742E-01	
TH-227	#B	-9.0180E-02	-9.0180E-02	3.5002E-01	3.5006E-01	3.894E-01
PA-234	#B	-9.4546E-02	-9.4546E-02	2.2138E-01	2.2144E-01	2.346E-01
TH-234	#B	1.8816E+00	1.8816E+00	1.7585E+00	1.7616E+00	7.787E+00
AM-241	#A	-2.4644E-01	-2.4645E-01	1.1769E+00	1.1770E+00	1.288E+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) 2.2366844E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.2366844E+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_1SEP2006_0707.An1

Sample description
FSS-OOL-02-05-001-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1SEP2006_0707.An1

Acquisition information
Start time: 01-Sep-2006 07:07:07
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: 1.7700E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7700E+03) =
5.6497E+02
Detection limit 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_1SEP2006_0707.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	29-Aug-2006 13:20:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1244

***** S U M M A R Y O F P E A K 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	103.	25.42	0.99	9.052E-03	74.81	9.600	9.018E-01	PB212
77.21	177.	13.79	0.99	1.011E-02	77.11	17.500	8.010E-01	PB212
93.09	121.	31.14	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
93.12	96.	38.14	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
93.12	95.	38.34	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
129.35	108.	37.67	1.37	2.440E-02				
129.35	108.	37.67	1.37	2.440E-02	131.28	20.000	PBC<MDA	PA234
186.16	171.	22.98	1.16	2.566E-02	185.99	3.280	1.433E+00	RA226
208.95	75.	36.49	1.03	2.473E-02				
238.71	994.	3.78	1.09	2.320E-02	238.63	43.100	7.498E-01	PB212
242.13	148.	17.01	1.10	2.302E-02	241.00	3.900	1.256E+00	RA224
					241.92	7.470	6.573E-01	PB214
269.64	77.	35.17	1.08	2.154E-02				
295.15	227.	12.05	1.04	2.025E-02	295.22	19.200	4.374E-01	PB214
300.28	66.	31.75	1.08	2.000E-02				
328.05	90.	28.12	1.10	1.874E-02				
338.52	215.	13.64	0.91	1.830E-02	338.40	12.010	7.441E-01	AC228
351.86	425.	6.77	1.05	1.776E-02	351.99	37.100	4.861E-01	PB214
463.15	99.	22.85	1.10	1.426E-02				
463.15	99.	22.85	1.10	1.426E-02	463.51	10.000	5.231E-01	SB125
510.64	202.	11.65	1.41	1.317E-02	510.72	22.500	4.516E-01	TL208

583.37	324.	7.10	1.34	1.184E-02	583.14	86.000	2.393E-01	TL208
609.44	302.	8.72	1.25	1.144E-02	609.32	46.090	4.287E-01	BI214
727.32	101.	23.63	1.17	9.963E-03	727.17	11.800	6.532E-01	BI212
755.34	28.	37.80	1.52	9.678E-03				
785.78	51.	29.41	1.14	9.391E-03	785.42	2.000	2.072E+00	BI212
795.12	49.	21.89	1.48	9.307E-03				
795.12	49.	21.89	1.48	9.307E-03	795.76	85.400	4.713E-02	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
911.35	258.	7.16	1.92	8.399E-03	911.07	29.000	7.979E-01	AC228
964.93	29.	35.23	1.54	8.050E-03	964.00	14.580	PBC<MDA	EU152
969.15	152.	10.02	1.54	8.024E-03	968.90	17.460	8.277E-01	AC228
1120.47	68.	19.02	1.64	7.211E-03	1120.28	15.040	4.625E-01	BI214
1460.93	1171.	3.08	1.82	5.931E-03	1460.75	10.700	1.386E+01	K40
1764.61	74.	13.10	1.66	5.142E-03	1764.51	15.920	6.597E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
417.06	208.95	337.	75.	0.038	109.47	1.028	AC-228	
538.44	269.64	289.	77.	0.039	105.52	1.082	AC-228	s
599.70	300.28	177.	66.	0.033	95.25	1.081	PB-212	
655.25	328.05	218.	90.	0.045	84.35	1.101	AC-228	s
1509.74	755.34	42.	28.	0.014	113.39	1.516	AC-228	M
1929.45	964.98	41.	26.	0.013	119.25	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	311.	103.	0.051	76.25	0.993D
PB-212	153.39	77.11	329.	177.	0.089	41.36	0.995A
PA-234	185.34	93.09	658.	121.	0.061	93.43	1.500s
RA-226	371.77	186.30	672.	137.	0.068	76.73	1.500s
PB-212	476.66	238.75	516.	1078.	0.539	13.48	1.134
RA-224	483.33	242.09	603.	135.	0.067	81.44	1.500
PB-214	482.39	241.62	709.	101.	0.051	115.51	1.500
PB-214	589.44	295.15	230.	223.	0.111	36.15	1.043
AC-228	676.19	338.52	241.	214.	0.107	40.92	0.910s
PB-214	702.86	351.86	174.	419.	0.210	20.31	1.054s
SB-125	925.90	463.39	127.	51.	0.026	99.72	1.500s
TL-208	1020.40	510.64	137.	175.	0.088	34.96	1.408s
TL-208	1165.84	583.37	83.	319.	0.160	21.29	1.336
BI-214	1217.97	609.44	119.	296.	0.148	26.17	1.252
BI-212	1453.71	727.32	127.	101.	0.050	70.88	1.171
BI-212	1570.31	785.63	61.	30.	0.015	123.50	1.500

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	1589.11	795.03	48.	53.	0.026	69.13	1.500
AC-228	1821.73	911.35	35.	255.	0.127	21.48	1.915s
AC-228	1936.81	968.90	36.	152.	0.076	29.54	1.541D
BI-214	2239.92	1120.47	46.	66.	0.033	57.05	1.645
K-40	2920.73	1460.93	44.	1152.	0.576	9.25	1.825
BI-214	3527.98	1764.61	7.	71.	0.035	39.31	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	Peak Energy keV	Peak Activity pCi/gm	Peak Code	Peak MDA Value pCi/gm	COMMENTS
BE-7		6.6922E-02					
			477.56	6.692E-02	&(	3.358E-01 9.92E-02	G
K-40		1.3858E+01					
			1460.75	1.386E+01	(P	4.041E-01 4.34E-01	G
MN-54		8.4585E-03					
			834.81	8.459E-03	%(P	3.501E-02 1.03E-02	G
CO-57		-7.3499E-04					
			122.07	-7.350E-04	&(P	5.272E-02 1.57E-02	G K
			136.43	-9.905E-02	%	3.816E-01 1.15E-01	G
CO-60		-1.8326E-03					
			1332.51	-1.833E-03	%(P	3.186E-02 8.32E-03	G K
			1173.23	-4.674E-03	% P	4.504E-02 1.27E-02	G K
Sr-85		-9.3759E-03					
			514.00	-9.376E-03	%(	3.960E-02 1.18E-02	G
Kr-85		-2.1017E+02					
			513.99	-2.102E+02	%(	8.878E+02 2.64E+02	G
Y-88		-1.7456E-03					
			1836.01	-1.746E-03	&(P	2.961E-02 7.84E-03	G K
			898.02	3.408E-03	% P	3.870E-02 1.11E-02	G
NB-94		1.0741E-02					
			871.10	1.074E-02	%(	2.794E-02 8.34E-03	G K
			702.50	8.992E-03	&	3.607E-02 1.07E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	1.7944E-03						
		722.95	1.794E-03	%(	7.208E-02	2.12E-02	G K
		614.37	-1.058E-02	% P	3.987E-02	1.18E-02	G
		433.93	1.036E-03	%	3.263E-02	9.47E-03	G
CD-109	0.0000E+00						
		88.04	0.000E+00	&(	2.010E+00	5.99E-01	G
SN-113	4.8436E-04						
		391.71	4.844E-04	&(	5.138E-02	1.50E-02	G K
		255.04	-3.899E-03	&	1.554E+00	4.58E-01	G
SB-125	7.9049E-02						
		427.95	1.295E-02	%(P	9.246E-02	2.71E-02	G K
		600.77	-5.100E-05	& P	2.076E-01	6.01E-02	G
		636.15	6.085E-02	% P	2.760E-01	8.09E-02	G
		463.51	2.747E-01	@(P	2.965E-01	9.36E-02	G
		176.29	1.349E-03	%	5.952E-01	1.77E-01	G
I-131	-5.2514E-03						
		364.48	-5.251E-03	&(P	4.326E-02	1.27E-02	G K
		636.97	-8.364E-02	%	6.030E-01	1.76E-01	G
		284.29	3.921E-02	% P	6.891E-01	2.04E-01	G
CS-134	2.4460E-02						
		604.66	1.451E-03	%(	6.631E-02	1.96E-02	G K
		795.76	5.076E-02	(P	3.360E-02	1.17E-02	G
		569.29	5.592E-02	% P	1.852E-01	5.47E-02	G
		801.84	-1.551E-02	% P	3.843E-01	1.07E-01	G
CS-137	1.3070E-02						
		661.62	1.307E-02	%(P	3.910E-02	1.16E-02	G
CE-139	-1.1381E-02						
		165.85	-1.138E-02	%(	4.590E-02	1.38E-02	G
EU-152	-5.7920E-03						
		121.78	-5.792E-03	&(P	1.538E-01	4.58E-02	G K
		344.30	-1.990E-02	& P	1.122E-01	3.32E-02	G
		1408.08	3.735E-02	%	1.315E-01	3.81E-02	G
		964.00	1.286E-01	% P	2.734E-01	8.27E-02	G
		1112.07	1.160E-01	%	2.714E-01	8.17E-02	G
		778.90	5.973E-02	%	2.643E-01	7.75E-02	G
EU-154	2.0238E-02						
		123.10	2.024E-02	&(	1.104E-01	3.31E-02	G K
		1274.80	1.503E-02	%	1.156E-01	3.31E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          723.30-5.825E-02 &   2.309E-01 6.85E-02 G
                         1004.80-2.790E-02 &   2.151E-01 6.20E-02 G

EU-155       1.1452E-01
                           86.45 1.145E-01 %(  2.409E-01 7.31E-02 G K
                          105.31 7.975E-02 %   2.296E-01 6.93E-02 G

HG-203      -7.5131E-04
                          279.17-7.513E-04 %(P 4.047E-02 1.19E-02 G K
                           72.87-8.662E-01 % P 2.329E+00 7.03E-01 G
                           70.83 8.262E-03 &   4.111E+00 1.22E+00 G
                           82.50-3.644E-02 %   3.911E+00 1.16E+00 G

TL-208       2.3931E-01
                          583.14 2.393E-01  (P 3.379E-02 1.72E-02 G
                          510.72 4.516E-01 + P 1.473E-01 6.06E-02 G

PB-212       8.2839E-01
                          238.63 8.232E-01  (P 8.290E-02 3.74E-02 G K
                                                          Energy duplication
                           77.11 7.654E-01 } P 3.764E-01 1.06E-01 G
                           74.81 9.018E-01  (P 7.463E-01 2.36E-01 G

PB-214       4.6718E-01
                          351.99 4.861E-01 @(P 7.432E-02 3.34E-02 G K
                          295.22 4.374E-01  (P 1.442E-01 5.37E-02 G
                                                          Energy duplication
                           77.11 0.000E+00 } P 8.383E-01 0.00E+00 G
                          241.92 4.496E-01  (  5.631E-01 1.73E-01 G

BI-212       7.3450E-01
                          727.17 6.532E-01  (P 3.591E-01 1.55E-01 G K
                         1620.56 4.495E-01 % P 7.717E-01 2.44E-01 G
                          785.42 1.214E+00  (  1.585E+00 5.00E-01 G

BI-214       4.3699E-01
                          609.32 4.287E-01  (P 7.753E-02 3.82E-02 G K
                         1764.51 6.597E-01 + P 1.425E-01 9.04E-02 G
                         1120.28 4.625E-01  (P 2.423E-01 9.05E-02 G

RA-224       1.1447E+00
                          241.00 1.145E+00  (  9.941E-01 3.11E-01 G

RA-226       1.2413E+00
                          185.99 1.241E+00 *(P 1.120E+00 3.48E-01 G

AC-228       7.9570E-01
                          911.07 7.979E-01  (P 9.533E-02 5.79E-02 G K
                          968.90 8.275E-01  (P 1.674E-01 8.15E-02 G
                          338.40 7.441E-01 @(P 2.606E-01 1.02E-01 G
```

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.8835E-01
                          236.00-1.884E-01 &(  4.081E-01 1.24E-01 G K
                          256.25 1.274E-01 & P 4.340E-01 1.30E-01 G

PA-234       9.7689E-02
                           98.44-5.809E-02 %(P 2.196E-01 6.60E-02 G K
                          946.00 4.288E-02 & P 1.456E-01 4.27E-02 G
                          131.28 1.338E-01 & P 1.823E-01 5.59E-02 G
                           94.67 3.500E-01 ?(P 3.524E-01 1.09E-01 G
                          883.24-5.365E-02 &   2.764E-01 8.03E-02 G
                          926.70 8.047E-02 %   2.274E-01 6.73E-02 G
                          569.26 8.350E-02 % P 2.738E-01 8.09E-02 G

TH-234       9.5095E-01
                           63.29 9.510E-01 %(P 6.633E+00 1.98E+00 G K
                           92.80 1.468E+00 % P 2.195E+00 6.67E-01 G
                           92.38 1.747E+00 & P 2.594E+00 7.89E-01 G

AM-241      -2.9864E-02
                           59.54-2.986E-02 %(P 1.152E+00 3.42E-01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
```

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	6.4582E-02	6.6922E-02	2.9774E-01	2.9777E-01	3.241E-01
K-40		1.3858E+01	1.3858E+01	1.3020E+00	1.5305E+00	
MN-54	#A	8.4072E-03	8.4585E-03	3.0801E-02	3.0805E-02	3.480E-02
CO-57	#B	-7.2983E-04	-7.3499E-04	7.4333E-02	7.4333E-02	5.235E-02
CO-60	#B	-1.8308E-03	-1.8326E-03	9.2568E-02	9.2568E-02	3.183E-02
Sr-85	#A	-9.1052E-03	-9.3759E-03	3.5293E-02	3.5298E-02	3.846E-02
Kr-85	#A	-2.1017E+02	-2.1017E+02	7.9125E+02	7.9135E+02	8.878E+02
Y-88	#B	-1.7148E-03	-1.7456E-03	2.6349E-02	2.6349E-02	2.909E-02
NB-94	#B	1.0741E-02	1.0741E-02	2.5025E-02	2.5032E-02	2.794E-02
Ag-108M	#B	1.7943E-03	1.7944E-03	6.3650E-02	6.3650E-02	7.208E-02
CD-109	#A	0.0000E+00	0.0000E+00	1.7957E+00	1.7957E+00	2.001E+00
SN-113	#B	4.7643E-04	4.8436E-04	4.4984E-02	4.4985E-02	5.054E-02
SB-125	#B	7.8901E-02	7.9049E-02	8.0793E-02	8.0923E-02	9.229E-02
I-131	#B	-4.1462E-03	-5.2514E-03	4.5500E-02	4.5501E-02	3.416E-02
CS-134	#B	2.4398E-02	2.4460E-02	1.6937E-02	1.6996E-02	6.614E-02
CS-137	#A	1.3068E-02	1.3070E-02	3.4836E-02	3.4844E-02	3.909E-02
CE-139	#A	-1.1225E-02	-1.1381E-02	4.1338E-02	4.1344E-02	4.527E-02
EU-152	#B	-5.7897E-03	-5.7920E-03	1.9938E-01	1.9938E-01	1.538E-01
EU-154	#B	2.0225E-02	2.0238E-02	9.9317E-02	9.9323E-02	1.104E-01
EU-155	#B	1.1440E-01	1.1452E-01	2.1915E-01	2.1924E-01	2.406E-01
HG-203	#B	-7.2129E-04	-7.5131E-04	3.7483E-02	3.7483E-02	3.885E-02
TL-208		2.3931E-01	2.3931E-01	5.1639E-02	5.3476E-02	
PB-212		8.2839E-01	8.2839E-01	1.1295E-01	1.2276E-01	
PB-214		4.6718E-01	4.6718E-01	9.6180E-02	9.9931E-02	
BI-212		7.3450E-01	7.3450E-01	5.2320E-01	5.2493E-01	
BI-214		4.3699E-01	4.3699E-01	1.1685E-01	1.1958E-01	
RA-224		1.1447E+00	1.1447E+00	9.3224E-01	9.3460E-01	9.941E-01
RA-226	#	1.2413E+00	1.2413E+00	1.0426E+00	1.0451E+00	1.120E+00
AC-228		7.9570E-01	7.9570E-01	1.4623E-01	1.5335E-01	
TH-227	#B	-1.8835E-01	-1.8835E-01	3.7104E-01	3.7120E-01	4.081E-01
PA-234	#B	9.7689E-02	9.7689E-02	9.1526E-02	9.1686E-02	2.196E-01
TH-234	#B	9.5095E-01	9.5095E-01	5.9369E+00	5.9372E+00	6.633E+00
AM-241	#A	-2.9864E-02	-2.9864E-02	1.1633E+00	1.1633E+00	1.152E+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) 1.8504532E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.8504532E+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_1SEP2006_0758.An1

Sample description
FSS-OOL-02-05-003-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1SEP2006_0758.An1

Acquisition information
Start time: 01-Sep-2006 07:58:26
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: 1.7990E+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	29-Aug-2006 13:35:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.1184

***** S U M M A R Y O F P E A 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	117.	24.16	0.99	9.052E-03	74.81	9.600	1.010E+00	PB212
77.32	173.	13.54	0.99	1.011E-02	77.11	17.500	7.613E-01	PB212
86.95	96.	30.32	1.00	1.431E-02	86.45	32.740	1.571E-01	EU155
					88.04	3.790	1.304E+00	CD109
89.90	92.	32.96	1.00	1.542E-02				
93.61	134.	21.50	1.00	1.673E-02	92.80	3.000	PBC<MDA	TH234
186.40	168.	20.94	0.86	2.565E-02	185.99	3.280	1.383E+00	RA226
209.50	122.	30.42	0.83	2.470E-02				
238.73	1243.	3.28	1.09	2.320E-02	238.63	43.100	9.249E-01	PB212
241.92	135.	20.43	1.10	2.302E-02	241.00	3.900	1.124E+00	RA224
270.49	124.	19.81	1.55	2.150E-02				
277.17	99.	27.43	1.36	2.115E-02				
295.34	286.	8.43	1.13	2.024E-02	295.22	19.200	5.452E-01	PB214
300.12	84.	22.97	1.13	2.001E-02				
328.03	71.	41.42	1.00	1.874E-02				
338.52	282.	10.88	1.18	1.830E-02	338.40	12.010	9.607E-01	AC228
351.97	489.	7.20	1.31	1.775E-02	351.99	37.100	5.513E-01	PB214
463.14	74.	30.28	1.10	1.426E-02				
463.14	74.	30.28	1.10	1.426E-02	463.51	10.000	3.837E-01	SB125
510.87	204.	12.94	1.54	1.317E-02	510.72	22.500	4.504E-01	TL208
583.19	422.	7.49	1.61	1.184E-02	583.14	86.000	3.080E-01	TL208
609.35	342.	8.91	1.25	1.144E-02	609.32	46.090	4.783E-01	BI214
727.33	95.	24.94	1.04	9.963E-03	727.17	11.800	6.063E-01	BI212
794.76	74.	26.50	1.30	9.310E-03				
794.76	74.	26.50	1.30	9.310E-03	795.76	85.400	7.026E-02	CS134
837.34	65.	24.95	1.36	8.950E-03				
860.53	67.	25.87	1.08	8.768E-03				

911.14	291.	7.43	1.63	8.401E-03	911.07	29.000	8.868E-01	AC228
964.49	65.	17.89	1.54	8.052E-03	964.00	14.580	4.121E-01	EU152
969.09	168.	9.36	1.54	8.024E-03	968.90	17.460	8.980E-01	AC228
1120.20	86.	20.32	1.46	7.212E-03	1120.28	15.040	5.811E-01	BI214
1237.78	56.	35.64	1.57	6.703E-03				
1460.96	1321.	2.87	1.99	5.931E-03	1460.75	10.700	1.541E+01	K40
1620.99	27.	21.89	1.15	5.488E-03	1620.56	2.750	1.367E+00	BI212
1764.68	54.	14.32	0.73	5.142E-03	1764.51	15.920	4.958E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
173.08	86.97	380.	96.	0.048	90.95	1.001	TB-160	lD
178.97	89.91	415.	92.	0.046	98.87	1.002	PB-214	lD
418.16	209.50	519.	122.	0.061	91.25	0.834	AC-228	s
540.14	270.49	220.	124.	0.062	59.44	1.550	AC-228	s
553.49	277.17	267.	98.	0.049	76.96	1.363	TL-208	s
599.39	300.12	228.	66.	0.033	108.29	0.970	PB-212	s
655.21	328.03	296.	71.	0.036	124.27	1.002	AC-228	
1588.57	794.76	100.	75.	0.038	66.09	1.299	AC-228	
1673.72	837.34	62.	69.	0.035	60.16	1.356	J-135	s
1720.10	860.53	70.	67.	0.034	77.61	1.076	TL-208	s
1928.63	964.66	34.	66.	0.033	52.46	1.538	AC-228	D
2474.50	1237.78	108.	56.	0.028	106.92	1.566	J-133	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: FSS_Rev_1.Lib

********** I D E N T I F I E D P E A K S U M 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	363.	117.	0.058	72.47	0.993D
PB-212	153.39	77.11	372.	173.	0.087	40.62	0.995A
TH-234	185.91	93.37	925.	145.	0.073	81.84	1.500
RA-226	371.95	186.40	499.	155.	0.078	62.81	0.857
PB-212	476.83	238.84	597.	1322.	0.661	12.14	1.127
RA-224	482.06	241.45	804.	125.	0.063	99.82	1.500s
PB-214	589.82	295.33	263.	268.	0.134	32.45	1.018
AC-228	676.19	338.52	246.	281.	0.141	32.65	1.178
PB-214	703.08	351.97	256.	483.	0.242	21.59	1.308
SB-125	925.49	463.18	169.	53.	0.027	108.35	1.500
TL-208	1020.85	510.87	186.	178.	0.089	38.81	1.541s
TL-208	1165.49	583.19	169.	418.	0.209	22.48	1.609s
BI-214	1217.79	609.35	179.	336.	0.168	26.73	1.252
BI-212	1453.73	727.33	143.	95.	0.047	74.81	1.041
AC-228	1821.32	911.14	66.	288.	0.144	22.29	1.631
EU-152	1928.46	964.72	84.	52.	0.026	84.70	1.538s
AC-228	1936.81	968.90	33.	168.	0.084	27.37	1.541D
BI-214	2239.38	1120.20	70.	84.	0.042	60.97	1.457s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2920.79	1460.96	42.	1302.	0.651	8.61	1.993
BI-212	3240.80	1620.99	3.	27.	0.014	65.68	1.151s
BI-214	3528.11	1764.68	6.	54.	0.027	42.95	0.730s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O 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		1.1573E-02					
			477.56	1.157E-02	%(	3.180E-01 9.24E-02	G
K-40		1.5407E+01					
			1460.75	1.541E+01	(P	3.900E-01 4.48E-01	G
MN-54		-3.8898E-03					
			834.81	-3.890E-03	&(P	4.476E-02 1.30E-02	G
CO-57		3.8261E-03					
			122.07	3.826E-03	&(P	5.519E-02 1.65E-02	G K
			136.43	-1.121E-01	%	4.253E-01 1.28E-01	G
CO-60		1.1923E-02					
			1332.51	1.192E-02	%(P	3.674E-02 1.07E-02	G K
			1173.23	1.078E-02	% P	5.098E-02 1.49E-02	G K
Sr-85		-1.8543E-02					
			514.00	-1.854E-02	%(	4.805E-02 1.45E-02	G
Kr-85		-4.1547E+02					
			513.99	-4.155E+02	%(	1.077E+03 3.25E+02	G
Y-88		-1.5041E-03					
			1836.01	-1.504E-03	%(P	2.460E-02 6.34E-03	G K
			898.02	-1.054E-02	% P	4.222E-02 1.24E-02	G
NB-94		-4.3277E-03					
			871.10	-4.328E-03	%(	3.458E-02 9.97E-03	G K
			702.50	8.198E-03	%	3.371E-02 9.94E-03	G K
Ag-108M		-1.0758E-02					
			722.95	-1.076E-02	&(	5.261E-02 1.56E-02	G K
			614.37	-6.432E-03	% P	4.228E-02 1.24E-02	G
			433.93	-5.384E-03	&	3.572E-02 1.05E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	7.4397E-01						
		88.04	7.440E-01	&(	1.895E+00	5.73E-01	G
SN-113	1.8851E-02						
		391.71	1.885E-02	%(	4.742E-02	1.43E-02	G K
		255.04	-9.998E-02	&	1.675E+00	4.96E-01	G
SB-125	8.2421E-02						
		427.95	1.503E-02	&(P	1.067E-01	3.14E-02	G K
		600.77	-1.433E-02	& P	1.939E-01	5.64E-02	G
		636.15	7.016E-02	& P	2.967E-01	8.74E-02	G
		463.51	2.819E-01	(P	3.340E-01	1.04E-01	G
		176.29	-1.667E-01	%	5.975E-01	1.80E-01	G
I-131	-1.3218E-02						
		364.48	-1.322E-02	%(P	4.870E-02	1.45E-02	G K
		636.97	-7.681E-02	%	6.148E-01	1.79E-01	G
		284.29	-1.920E-03	& P	7.084E-01	2.09E-01	G
CS-134	0.0000E+00						
		604.66	0.000E+00	&(	7.216E-02	2.13E-02	G K
		795.76	-1.092E-03	% P	5.117E-02	1.48E-02	G
		569.29	-3.561E-02	& P	2.368E-01	6.90E-02	G
		801.84	-2.519E-02	& P	4.429E-01	1.26E-01	G
CS-137	-2.6782E-04						
		661.62	-2.678E-04	&(P	5.025E-02	1.45E-02	G
CE-139	1.8208E-02						
		165.85	1.821E-02	&(	3.965E-02	1.20E-02	G
EU-152	1.1142E-01						
		121.78	1.021E-03	&(P	1.615E-01	4.81E-02	G K
		344.30	-3.045E-02	% P	1.287E-01	3.84E-02	G
		1408.08	7.771E-02	%	1.374E-01	4.26E-02	G
		964.00	3.328E-01	(P	2.912E-01	9.50E-02	G
		1112.07	-4.263E-02	%	3.362E-01	9.74E-02	G
		778.90	0.000E+00	%	2.961E-01	8.48E-02	G
EU-154	1.2147E-02						
		123.10	1.215E-02	&(	1.076E-01	3.22E-02	G K
		1274.80	2.157E-03	%	1.020E-01	2.84E-02	G
		723.30	-5.234E-02	&	2.494E-01	7.39E-02	G
		1004.80	-6.056E-02	%	2.222E-01	6.55E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.5700E-01						
		86.45	1.570E-01	%(	2.428E-01	7.41E-02	G K
		105.31	6.937E-02	&	2.383E-01	7.17E-02	G
HG-203	4.6808E-04						
		279.17	4.681E-04	&(P	4.451E-02	1.31E-02	G K
		72.87	-5.906E-01	% P	2.295E+00	6.90E-01	G
		70.83	-1.378E-01	%	4.211E+00	1.25E+00	G
		82.50	-1.430E+00	&	4.201E+00	1.27E+00	G
TL-208	3.0801E-01						
		583.14	3.080E-01	(P	4.671E-02	2.33E-02	G
		510.72	4.504E-01	+ P	1.681E-01	6.71E-02	G
PB-212	9.9633E-01						
		238.63	9.934E-01	(P	8.756E-02	4.06E-02	G K
							Energy duplication
		77.11	7.355E-01	} P	3.927E-01	9.96E-02	G
		74.81	1.010E+00	(P	7.905E-01	2.50E-01	G
PB-214	5.4003E-01						
		351.99	5.513E-01	(P	8.807E-02	4.02E-02	G K
		295.22	5.183E-01	(P	1.512E-01	5.69E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.448E-01	0.00E+00	G
		241.92	-2.866E-01	%	5.786E-01	1.76E-01	G
BI-212	6.0629E-01						
		727.17	6.063E-01	(P	3.734E-01	1.52E-01	G K
		1620.56	1.367E+00	+ P	5.049E-01	3.00E-01	G
		785.42	9.994E-01	%	1.915E+00	5.84E-01	G
BI-214	5.0199E-01						
		609.32	4.783E-01	(P	9.276E-02	4.34E-02	G K
		1764.51	4.958E-01	@(P	1.294E-01	7.53E-02	G
		1120.28	5.811E-01	@(P	2.890E-01	1.21E-01	G
RA-224	1.0448E+00						
		241.00	1.045E+00	(	1.126E+00	3.48E-01	G
RA-226	1.3834E+00						
		185.99	1.383E+00	(P	9.530E-01	3.14E-01	G
AC-228	9.0546E-01						
		911.07	8.868E-01	(P	1.254E-01	6.67E-02	G K
		968.90	8.984E-01	(P	1.589E-01	8.20E-02	G
		338.40	9.607E-01	(P	2.590E-01	1.05E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.2817E-01
                          236.00-2.282E-01 &(  4.131E-01 1.26E-01 G K
                          256.25 1.613E-01 & P 5.029E-01 1.51E-01 G

PA-234      -9.8816E-03
                           98.44-9.882E-03 %(P 2.400E-01 7.15E-02 G K
                          946.00-4.295E-02 & P 2.343E-01 6.88E-02 G
                          131.28 8.346E-02 & P 2.059E-01 6.23E-02 G
                           94.67-1.222E-01 % P 4.359E-01 1.31E-01 G
                          883.24-3.652E-02 %   2.634E-01 7.57E-02 G
                          926.70-8.847E-03 %   3.515E-01 1.00E-01 G
                          569.26-5.268E-02 & P 3.504E-01 1.02E-01 G

TH-234       1.2043E+00
                           63.29 4.286E-01 %(P 6.556E+00 1.95E+00 G K
                           92.80 2.213E+00  (P 2.198E+00 6.77E-01 G
                           92.38-1.095E-02 & P 2.607E+00 7.73E-01 G

AM-241       4.0729E-03
                           59.54 4.073E-03 &(P 1.034E+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		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	1.1165E-02	1.1573E-02	2.7710E-01	2.7710E-01	3.068E-01
K-40		1.5407E+01	1.5407E+01	1.3450E+00	1.6153E+00	
MN-54	#A	-3.8660E-03	-3.8898E-03	4.5515E-02	4.5516E-02	4.449E-02
CO-57	#B	3.7990E-03	3.8261E-03	4.9447E-02	4.9448E-02	5.480E-02
CO-60	#B	1.1911E-02	1.1923E-02	3.2025E-02	3.2032E-02	3.670E-02
Sr-85	#A	-1.8003E-02	-1.8543E-02	4.3440E-02	4.3454E-02	4.665E-02
Kr-85	#A	-4.1547E+02	-4.1547E+02	9.7359E+02	9.7389E+02	1.077E+03
Y-88	#B	-1.4773E-03	-1.5041E-03	2.1666E-02	2.1666E-02	2.416E-02
NB-94	#B	-4.3277E-03	-4.3277E-03	2.9920E-02	2.9921E-02	3.458E-02
Ag-108M	#B	-1.0757E-02	-1.0758E-02	4.6718E-02	4.6723E-02	5.261E-02
CD-109	#A	7.4083E-01	7.4397E-01	1.7188E+00	1.7193E+00	1.887E+00
SN-113	#B	1.8540E-02	1.8851E-02	4.2841E-02	4.2855E-02	4.663E-02
SB-125	#B	8.2265E-02	8.2421E-02	9.1441E-02	9.1566E-02	1.065E-01
I-131	#B	-1.0413E-02	-1.3218E-02	4.6676E-02	4.6683E-02	3.837E-02
CS-134	#B	0.0000E+00	0.0000E+00	6.4046E-02	6.4046E-02	7.198E-02
CS-137	#A	-2.6777E-04	-2.6782E-04	7.0068E-02	7.0068E-02	5.024E-02
CE-139	#A	1.7956E-02	1.8208E-02	3.6036E-02	3.6051E-02	3.910E-02
EU-152	#B	1.1138E-01	1.1142E-01	9.5362E-02	9.5562E-02	1.614E-01
EU-154	#B	1.2140E-02	1.2147E-02	9.6457E-02	9.6459E-02	1.075E-01
EU-155	#B	1.5683E-01	1.5700E-01	2.2232E-01	2.2249E-01	2.426E-01
HG-203	#B	4.4921E-04	4.6808E-04	3.9424E-02	3.9424E-02	4.272E-02
TL-208		3.0801E-01	3.0801E-01	6.9940E-02	7.2190E-02	
PB-212		9.9633E-01	9.9633E-01	1.2201E-01	1.3503E-01	
PB-214		5.4003E-01	5.4003E-01	1.0672E-01	1.1123E-01	
BI-212		6.0629E-01	6.0629E-01	4.5594E-01	4.5730E-01	
BI-214		5.0199E-01	5.0199E-01	1.3678E-01	1.3985E-01	
RA-224	#A	1.0448E+00	1.0448E+00	1.0429E+00	1.0447E+00	1.126E+00
RA-226		1.3834E+00	1.3834E+00	9.4154E-01	9.4496E-01	
AC-228		9.0546E-01	9.0546E-01	1.4579E-01	1.5498E-01	
TH-227	#B	-2.2817E-01	-2.2817E-01	3.7689E-01	3.7712E-01	4.131E-01
PA-234	#B	-9.8816E-03	-9.8816E-03	2.9894E-01	2.9894E-01	2.400E-01
TH-234	#B	1.2043E+00	1.2043E+00	1.1052E+00	1.1072E+00	6.556E+00
AM-241	#A	4.0729E-03	4.0729E-03	9.1857E-01	9.1857E-01	1.034E+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) 2.0648697E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.0648701E+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_1SEP2006_0835.An1

Sample description
FSS-OOL-02-05-010-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1SEP2006_0835.An1

Acquisition information
Start time: 01-Sep-2006 08:36:02
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: 1.6330E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.6330E+03) =
6.1237E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 13:55:00
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. 16 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0920

***** S U M M A R Y O F P E A K 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	99.	26.88	0.99	9.052E-03	74.81	9.600	9.403E-01	PB212
77.23	142.	20.28	0.99	1.011E-02	77.11	17.500	9.440E-01	PB212
					77.11	10.700	1.544E+00	PB214
186.37	177.	20.65	1.06	2.565E-02	185.99	3.280	1.613E+00	RA226
209.56	84.	37.85	0.97	2.470E-02				
238.72	1046.	3.63	1.09	2.320E-02	238.63	43.100	8.555E-01	PB212
242.02	151.	17.35	1.10	2.302E-02	241.00	3.900	1.393E+00	RA224
					241.92	7.470	7.290E-01	PB214
270.43	152.	20.27	1.84	2.150E-02				
278.51	84.	32.37	0.76	2.108E-02				
278.51	84.	32.37	0.76	2.108E-02	279.17	81.500	PBC<MDA	HG203
295.27	257.	8.94	1.13	2.024E-02	295.22	19.200	5.381E-01	PB214
299.83	55.	32.53	1.13	2.002E-02				
327.99	79.	34.27	0.71	1.874E-02				
338.34	260.	12.67	1.24	1.830E-02	338.40	12.010	9.759E-01	AC228
351.95	457.	7.33	1.03	1.775E-02	351.99	37.100	5.671E-01	PB214
408.89	68.	36.59	1.04	1.576E-02				
462.95	92.	29.28	1.26	1.426E-02				
462.95	92.	29.28	1.26	1.426E-02	463.51	10.000	5.280E-01	SB125
510.97	156.	17.83	1.42	1.317E-02	510.72	22.500	3.603E-01	TL208
583.20	393.	6.68	1.35	1.184E-02	583.14	86.000	3.161E-01	TL208
590.20	36.	38.49	0.84	1.173E-02				
609.37	304.	7.33	1.49	1.144E-02	609.32	46.090	4.678E-01	BI214
727.31	79.	17.65	1.81	9.963E-03	727.17	11.800	5.546E-01	BI212
769.78	61.	28.72	0.77	9.539E-03				
785.25	46.	39.38	1.16	9.396E-03				
785.25	46.	39.38	1.16	9.396E-03	785.42	2.000	2.022E+00	BI212

794.85	46.	28.63	1.26	9.309E-03				
794.85	46.	28.63	1.26	9.309E-03	795.76	85.400	PBC<MDA	CS134
860.30	82.	19.98	1.79	8.769E-03				
911.32	275.	7.80	1.62	8.400E-03	911.07	29.000	9.240E-01	AC228
964.74	45.	25.94	1.54	8.051E-03	964.00	14.580	PBC<MDA	EU152
968.99	146.	9.99	1.54	8.025E-03	968.90	17.460	8.632E-01	AC228
1120.39	80.	28.94	1.35	7.211E-03	1120.28	15.040	5.959E-01	BI214
1460.91	1293.	2.82	1.92	5.932E-03	1460.75	10.700	1.661E+01	K40
1764.85	56.	13.36	2.00	5.141E-03	1764.51	15.920	5.331E-01	BI214

********** U N I D E N T I F I E D P E A K S U 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	209.56	403.	84.	0.042	113.55	0.967	AC-228	
540.02	270.43	298.	152.	0.076	60.82	1.842	AC-228	s
556.17	278.51	266.	84.	0.042	97.12	0.764	SB-126	l
598.96	299.91	164.	49.	0.024	118.88	1.330	TH-227	
655.13	327.99	253.	79.	0.040	102.80	0.712	AC-228	s
816.92	408.89	190.	68.	0.034	109.76	1.037	CS-138	
1179.50	590.20	66.	36.	0.018	115.46	0.839	EU-154	s
1538.62	769.78	82.	61.	0.031	86.17	0.773	BI-214	sM
1588.76	794.85	51.	46.	0.023	79.34	1.260	AC-228	s
1719.65	860.30	52.	82.	0.041	59.95	1.793	TL-208	s
1928.85	964.84	44.	45.	0.022	77.19	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	327.	99.	0.049	80.65	0.993D
PB-212	153.39	77.11	355.	142.	0.071	60.84	0.995A
RA-226	371.59	186.21	632.	135.	0.067	75.52	1.500s
PB-212	476.42	238.63	209.	1033.	0.517	10.89	1.093D
PB-214	483.00	241.92	308.	117.	0.059	53.10	1.095A
PB-214	589.84	295.35	219.	264.	0.132	30.84	1.196
AC-228	675.83	338.34	268.	259.	0.130	38.00	1.241
PB-214	703.03	351.95	228.	451.	0.226	22.00	1.033
SB-125	925.30	463.09	142.	75.	0.038	74.33	1.500s
TL-208	1021.05	510.97	213.	129.	0.065	53.48	1.419s
TL-208	1165.50	583.20	107.	389.	0.195	20.05	1.346
BI-214	1217.84	609.37	91.	298.	0.149	22.00	1.487
BI-212	1453.69	727.31	51.	79.	0.039	52.95	1.813s
BI-212	1570.10	785.52	47.	27.	0.014	121.83	1.500
AC-228	1821.67	911.32	70.	272.	0.136	23.41	1.616
AC-228	1936.81	968.90	34.	146.	0.073	29.98	1.541D
BI-214	2239.76	1120.39	116.	78.	0.039	86.82	1.354
K-40	2920.69	1460.91	31.	1274.	0.637	8.46	1.919

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3528.45	1764.85	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	Peak COMMENTS
BE-7		3.8998E-02					
			477.56	3.900E-02	&(	3.171E-01	9.26E-02 G
K-40		1.6614E+01					
			1460.75	1.661E+01	(P	3.721E-01	4.75E-01 G
MN-54		1.3524E-02					
			834.81	1.352E-02	&(P	4.069E-02	1.21E-02 G
CO-57		8.0516E-03					
			122.07	8.052E-03	%(P	5.519E-02	1.65E-02 G K
			136.43	1.165E-01	%	4.326E-01	1.30E-01 G
CO-60		7.4037E-04					
			1332.51	7.404E-04	&(P	3.578E-02	9.60E-03 G K
			1173.23	8.220E-03	& P	5.417E-02	1.57E-02 G K
Sr-85		-1.2699E-02					
			514.00	-1.270E-02	&(	4.862E-02	1.45E-02 G
Kr-85		-2.8452E+02					
			513.99	-2.845E+02	&(	1.090E+03	3.25E+02 G
Y-88		-4.5200E-03					
			1836.01	-4.520E-03	&(P	3.454E-02	9.47E-03 G K
			898.02	-9.567E-03	% P	4.569E-02	1.33E-02 G
NB-94		9.3546E-03					
			871.10	9.355E-03	&(	3.552E-02	1.04E-02 G K
			702.50	4.246E-04	%	3.804E-02	1.09E-02 G K
Ag-108M		-1.5716E-02					
			722.95	-1.572E-02	&(	5.138E-02	1.53E-02 G K
			614.37	-2.481E-02	% P	4.578E-02	1.40E-02 G
			433.93	-1.270E-03	&	2.565E-02	7.33E-03 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.0811E+00						
		88.04	1.081E+00	&(	2.016E+00	6.13E-01	G
SN-113	-2.8002E-03						
		391.71	-2.800E-03	&(	5.603E-02	1.64E-02	G K
		255.04	2.955E-01	&	1.716E+00	5.11E-01	G
SB-125	1.0997E-01						
		427.95	-6.674E-04	%(P	1.123E-01	3.26E-02	G K
		600.77	-2.305E-02	% P	2.102E-01	6.13E-02	G
		636.15	-3.740E-02	% P	3.334E-01	9.66E-02	G
		463.51	4.375E-01	*(P	3.394E-01	1.10E-01	G
		176.29	5.672E-02	%	6.100E-01	1.82E-01	G
I-131	9.6375E-03						
		364.48	9.638E-03	%(P	4.884E-02	1.44E-02	G K
		636.97	-1.020E-01	%	6.824E-01	2.00E-01	G
		284.29	1.244E-01	% P	5.411E-01	1.61E-01	G
CS-134	1.5724E-03						
		604.66	1.572E-03	&(	8.169E-02	2.42E-02	G K
		795.76	-9.109E-05	% P	4.816E-02	1.37E-02	G
		569.29	-6.388E-02	% P	2.189E-01	6.42E-02	G
		801.84	-1.682E-02	% P	4.531E-01	1.28E-01	G
CS-137	1.5167E-02						
		661.62	1.517E-02	%(P	4.202E-02	1.25E-02	G
CE-139	1.3426E-05						
		165.85	1.343E-05	%(	5.091E-02	1.51E-02	G
EU-152	6.6133E-02						
		121.78	6.613E-02	%(P	1.394E-01	4.23E-02	G K
		344.30	-2.818E-02	% P	1.324E-01	3.94E-02	G
		1408.08	2.623E-02	%	1.568E-01	4.43E-02	G
		964.00	3.849E-03	& P	5.878E-01	1.73E-01	G
		1112.07	9.718E-03	&	4.953E-01	1.44E-01	G
		778.90	7.176E-03	%	3.289E-01	9.45E-02	G
EU-154	1.4914E-02						
		123.10	1.491E-02	&(	1.136E-01	3.40E-02	G K
		1274.80	2.265E-02	%	1.071E-01	3.09E-02	G
		723.30	-8.333E-02	%	2.482E-01	7.43E-02	G
		1004.80	-1.968E-02	%	2.387E-01	6.83E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.2408E-01						
		86.45	1.241E-01	%(	2.566E-01	7.78E-02	G K
		105.31	3.208E-03	%	2.117E-01	6.27E-02	G
HG-203	1.3695E-02						
		279.17	1.370E-02	%(P	4.474E-02	1.34E-02	G K
		72.87	-5.390E-01	% P	2.340E+00	7.02E-01	G
		70.83	-3.564E-01	&	4.768E+00	1.42E+00	G
		82.50	-1.139E+00	%	4.358E+00	1.31E+00	G
TL-208	3.2525E-01						
		583.14	3.161E-01	(P	4.134E-02	2.14E-02	G
		510.72	3.603E-01	*(P	1.974E-01	7.75E-02	G
PB-212	8.8905E-01						
		238.63	8.553E-01	(P	5.802E-02	3.14E-02	G K
							Energy duplication
		77.11	6.634E-01	} P	4.232E-01	1.35E-01	G
		74.81	9.403E-01	(P	8.282E-01	2.61E-01	G
PB-214	5.6309E-01						
		351.99	5.671E-01	(P	9.174E-02	4.21E-02	G K
		295.22	5.629E-01	(P	1.524E-01	5.88E-02	G
							Energy duplication
		77.11	4.426E-01	} P	1.054E+00	2.48E-01	G
		241.92	5.631E-01	}	4.066E-01	9.97E-02	G
BI-212	5.5461E-01						
		727.17	5.546E-01	(P	2.537E-01	9.85E-02	G K
		1620.56	2.559E-01	% P	8.969E-01	2.56E-01	G
		785.42	1.197E+00	+	1.531E+00	4.86E-01	G
BI-214	4.8453E-01						
		609.32	4.678E-01	(P	7.402E-02	3.51E-02	G K
		1764.51	5.331E-01	(P	1.126E-01	7.57E-02	G
		1120.28	5.959E-01	+ P	4.034E-01	1.77E-01	G
RA-224	8.9053E-01						
							Derived Ave Activity
		241.00	8.905E-01	}(	1.274E+00	4.03E-01	G
RA-226	1.3269E+00						
		185.99	1.327E+00	*(P	1.179E+00	3.66E-01	G
AC-228	9.1650E-01						
		911.07	9.240E-01	(P	1.416E-01	7.30E-02	G K
		968.90	8.632E-01	(P	1.761E-01	8.63E-02	G
		338.40	9.759E-01	(P	2.973E-01	1.24E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -2.2376E-01
                          236.00-2.238E-01 &(  4.360E-01 1.32E-01 G K
                          256.25 8.285E-02 & P 4.867E-01 1.45E-01 G

PA-234      -5.7060E-02
                           98.44-5.706E-02 %(P 2.290E-01 6.87E-02 G K
                          946.00-1.070E-04 & P 2.377E-01 6.80E-02 G
                          131.28-1.394E-02 & P 2.286E-01 6.81E-02 G
                           94.67-1.197E-01 & P 4.232E-01 1.27E-01 G
                          883.24 1.076E-01 &   2.824E-01 8.44E-02 G
                          926.70 1.234E-01 &   2.884E-01 8.68E-02 G
                          569.26-9.454E-02 % P 3.239E-01 9.50E-02 G

TH-234       1.4073E+00
                           63.29 1.407E+00 %(P 6.752E+00 2.02E+00 G K
                           92.80 1.390E+00 % P 2.318E+00 7.03E-01 G
                           92.38 1.430E+00 % P 2.783E+00 8.41E-01 G

AM-241      -1.9349E-01
                           59.54-1.935E-01 %(P 1.273E+00 3.81E-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		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	3.7617E-02	3.8998E-02	2.7769E-01	2.7770E-01	3.058E-01
K-40		1.6614E+01	1.6614E+01	1.4259E+00	1.7215E+00	
MN-54	#A	1.3441E-02	1.3524E-02	3.6310E-02	3.6318E-02	4.044E-02
CO-57	#B	7.9943E-03	8.0516E-03	4.9522E-02	4.9524E-02	5.480E-02
CO-60	#B	7.3963E-04	7.4037E-04	2.8809E-02	2.8810E-02	3.575E-02
Sr-85	#A	-1.2328E-02	-1.2699E-02	4.3517E-02	4.3524E-02	4.720E-02
Kr-85	#A	-2.8452E+02	-2.8452E+02	9.7523E+02	9.7537E+02	1.090E+03
Y-88	#B	-4.4391E-03	-4.5200E-03	2.9781E-02	2.9782E-02	3.392E-02
NB-94	#B	9.3546E-03	9.3546E-03	3.1295E-02	3.1299E-02	3.552E-02
Ag-108M	#B	-1.5715E-02	-1.5716E-02	4.5948E-02	4.5957E-02	5.137E-02
CD-109	#A	1.0765E+00	1.0811E+00	1.8381E+00	1.8391E+00	2.007E+00
SN-113	#B	-2.7537E-03	-2.8002E-03	4.9236E-02	4.9237E-02	5.510E-02
SB-125	#B	1.0976E-01	1.0997E-01	8.3132E-02	8.3377E-02	1.121E-01
I-131	#B	7.5846E-03	9.6375E-03	4.3334E-02	4.3338E-02	3.844E-02
CS-134	#B	1.5684E-03	1.5724E-03	7.2625E-02	7.2625E-02	8.148E-02
CS-137	#A	1.5165E-02	1.5167E-02	3.7562E-02	3.7572E-02	4.202E-02
CE-139	#A	1.3240E-05	1.3426E-05	4.5356E-02	4.5356E-02	5.020E-02
EU-152	#B	6.6106E-02	6.6133E-02	1.2675E-01	1.2681E-01	1.393E-01
EU-154	#B	1.4905E-02	1.4914E-02	1.0187E-01	1.0188E-01	1.135E-01
EU-155	#B	1.2395E-01	1.2408E-01	2.3351E-01	2.3361E-01	2.563E-01
HG-203	#B	1.3141E-02	1.3695E-02	4.0269E-02	4.0276E-02	4.293E-02
TL-208		3.2525E-01	3.2525E-01	6.5918E-02	6.8569E-02	
PB-212		8.8905E-01	8.8905E-01	9.7927E-02	1.1070E-01	
PB-214		5.6309E-01	5.6309E-01	1.2542E-01	1.2961E-01	
BI-212		5.5461E-01	5.5461E-01	2.9552E-01	2.9727E-01	
BI-214		4.8453E-01	4.8453E-01	1.0894E-01	1.1251E-01	
RA-224	A	8.9053E-01	8.9053E-01	1.1817E+00	1.1828E+00	
RA-226	#	1.3268E+00	1.3269E+00	1.0981E+00	1.1008E+00	1.179E+00
AC-228		9.1650E-01	9.1650E-01	1.6503E-01	1.7340E-01	
TH-227	#B	-2.2376E-01	-2.2376E-01	3.9722E-01	3.9744E-01	4.360E-01
PA-234	#B	-5.7060E-02	-5.7060E-02	2.1937E-01	2.1939E-01	2.290E-01
TH-234	#B	1.4073E+00	1.4073E+00	6.0541E+00	6.0546E+00	6.752E+00
AM-241	#A	-1.9349E-01	-1.9349E-01	1.1656E+00	1.1657E+00	1.273E+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) 2.1237078E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.1237078E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JJM

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab

Sample description
FSS-OOL-02-05-012-F

Spectrum Filename: C:\GammaVision\Spectra\103F_1SEP2006_0928.An1

Acquisition information
Start time: 01-Sep-2006 09:28:15
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: 1.5950E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5950E+03) =
6.2696E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 14:00:00
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: 0.0663

***** S U M M A R Y O F P E A K 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	101.	26.39	0.99	9.052E-03	74.81	9.600	9.881E-01	PB212
77.27	176.	16.04	0.99	1.011E-02	77.11	17.500	9.947E-01	PB212
					77.11	10.700	1.627E+00	PB214
86.84	102.	40.18	0.92	1.426E-02	86.45	32.740	1.881E-01	EU155
					88.04	3.790	1.562E+00	CD109
185.99	73.	41.66	1.35	2.567E-02				
185.99	73.	41.66	1.35	2.567E-02	185.99	3.280	PBC<MDA	RA226
209.99	116.	28.33	0.89	2.468E-02				
238.69	1132.	3.37	1.09	2.320E-02	238.63	43.100	9.491E-01	PB212
241.29	146.	19.30	1.09	2.306E-02	241.00	3.900	1.371E+00	RA224
270.73	120.	23.70	1.11	2.149E-02				
295.33	273.	8.42	1.13	2.024E-02	295.22	19.200	5.864E-01	PB214
300.09	92.	20.41	1.13	2.001E-02				
328.10	62.	35.82	1.32	1.874E-02				
338.41	246.	12.87	1.03	1.830E-02	338.40	12.010	9.429E-01	AC228
351.95	391.	7.74	1.02	1.775E-02	351.99	37.100	4.957E-01	PB214
409.38	44.	38.31	1.46	1.575E-02				
463.50	86.	25.11	1.43	1.425E-02				
463.50	86.	25.11	1.43	1.425E-02	463.51	10.000	5.024E-01	SB125
511.30	187.	14.79	1.03	1.316E-02	510.72	22.500	4.583E-01	TL208
583.25	336.	7.38	1.40	1.184E-02	583.14	86.000	2.761E-01	TL208
609.25	312.	8.26	1.51	1.144E-02	609.32	46.090	4.903E-01	BI214
726.84	98.	23.53	1.27	9.968E-03	727.17	11.800	6.990E-01	BI212
795.17	54.	24.50	1.39	9.307E-03				
795.17	54.	24.50	1.39	9.307E-03	795.76	85.400	5.819E-02	CS134
911.15	296.	7.93	1.74	8.401E-03	911.07	29.000	1.016E+00	AC228
964.65	48.	24.60	1.54	8.052E-03	964.00	14.580	PBC<MDA	EU152

969.05	163.	9.94	1.54	8.025E-03	968.90	17.460	9.827E-01	AC228
1120.88	124.	17.36	2.05	7.209E-03	1120.28	15.040	9.538E-01	BI214
1460.88	1504.	2.65	1.81	5.932E-03	1460.75	10.700	1.982E+01	K40
1764.67	74.	12.59	2.11	5.141E-03	1764.51	15.920	7.310E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
172.86	86.84	692.	102.	0.051	120.55	0.921	TB-160	l
419.14	209.99	420.	116.	0.058	84.99	0.891	NP-239	s
540.61	270.73	287.	120.	0.060	71.10	1.110	AC-228	s
599.33	300.09	173.	89.	0.045	70.30	1.092	PB-212	
655.35	328.10	207.	62.	0.031	107.47	1.324	AC-228	s
817.89	409.38	117.	44.	0.022	114.92	1.461	AC-228	s
1928.67	964.69	44.	50.	0.025	70.06	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	331.	101.	0.051	79.17	0.993D
PB-212	153.39	77.11	351.	176.	0.088	48.13	0.995A
PB-212	476.60	238.72	554.	1050.	0.525	13.73	1.098
RA-224	482.57	241.71	632.	135.	0.068	83.04	1.500
PB-214	589.81	295.33	189.	262.	0.131	28.83	1.061
AC-228	675.96	338.41	261.	245.	0.122	38.62	1.026
PB-214	703.05	351.95	216.	385.	0.193	23.22	1.021
SB-125	926.14	463.51	138.	69.	0.035	79.04	1.500D
TL-208	1021.72	511.30	192.	160.	0.080	44.36	1.027s
TL-208	1165.59	583.25	108.	332.	0.166	22.15	1.402
BI-214	1217.60	609.25	120.	305.	0.153	24.79	1.514
BI-212	1452.74	726.84	123.	97.	0.049	70.59	1.269s
CS-134	1589.29	795.12	51.	40.	0.020	88.20	1.500s
AC-228	1821.34	911.15	76.	292.	0.146	23.79	1.739
AC-228	1936.81	968.90	49.	163.	0.081	29.80	1.541D
BI-214	2240.74	1120.88	89.	122.	0.061	52.08	2.050s
K-40	2920.62	1460.88	37.	1485.	0.742	7.96	1.810
BI-214	3528.09	1764.67	6.	71.	0.035	37.78	2.106s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		4.3672E-02					
			477.56	4.367E-02	%(	3.840E-01 1.13E-01	G
K-40		1.9819E+01					
			1460.75	1.982E+01	(P	4.157E-01 5.32E-01	G
MN-54		-5.8193E-03					
			834.81	-5.819E-03	%(P	4.441E-02 1.29E-02	G
CO-57		-1.9921E-03					
			122.07	-1.992E-03	&(P	5.880E-02 1.75E-02	G K
			136.43	1.098E-01	%	4.281E-01 1.29E-01	G
CO-60		2.9089E-03					
			1332.51	2.909E-03	%(P	5.181E-02 1.46E-02	G K
			1173.23	2.125E-02	% P	5.393E-02 1.61E-02	G K
Sr-85		-2.0188E-02					
			514.00	-2.019E-02	&(	5.156E-02 1.55E-02	G
Kr-85		-4.5227E+02					
			513.99	-4.523E+02	&(	1.155E+03 3.48E+02	G
Y-88		-4.8374E-04					
			1836.01	-4.837E-04	&(P	3.131E-02 8.09E-03	G K
			898.02	2.637E-03	& P	4.559E-02 1.30E-02	G
NB-94		-3.5268E-03					
			871.10	-3.527E-03	%(	4.198E-02 1.21E-02	G K
			702.50	1.036E-02	%	3.699E-02 1.09E-02	G K
Ag-108M		-1.1023E-02					
			722.95	-1.102E-02	%(	4.937E-02 1.46E-02	G K
			614.37	2.625E-04	% P	4.298E-02 1.24E-02	G
			433.93	5.686E-03	%	3.734E-02 1.10E-02	G
CD-109		1.3739E+00					
			88.04	1.374E+00	%(	2.086E+00 6.37E-01	G
SN-113		-9.6884E-03					
			391.71	-9.688E-03	&(	5.374E-02 1.59E-02	G K
			255.04	1.643E-01	&	1.685E+00 4.99E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.1666E-01						
		427.95	1.698E-02	%(P	1.076E-01	3.16E-02	G K
		600.77	-2.572E-02	% P	2.049E-01	5.98E-02	G
		636.15	1.064E-01	% P	2.158E-01	6.55E-02	G
							Energy duplication
		463.51	4.117E-01	*(P	3.423E-01	1.10E-01	G
		176.29	1.974E-01	%	6.450E-01	1.94E-01	G
I-131	2.9252E-04						
		364.48	2.925E-04	%(P	5.370E-02	1.57E-02	G K
		636.97	8.092E-02	&	5.556E-01	1.61E-01	G
		284.29	-2.653E-03	% P	7.614E-01	2.24E-01	G
CS-134	2.0147E-02						
		604.66	0.000E+00	%(	8.198E-02	2.43E-02	G K
		795.76	4.317E-02	*(P	3.835E-02	1.27E-02	G
		569.29	-1.256E-02	% P	2.548E-01	7.32E-02	G
		801.84	1.093E-01	& P	3.999E-01	1.17E-01	G
CS-137	2.0517E-02						
		661.62	2.052E-02	%(P	4.208E-02	1.27E-02	G
CE-139	1.5483E-02						
		165.85	1.548E-02	%(	5.188E-02	1.56E-02	G
EU-152	-6.4518E-03						
		121.78	-6.452E-03	%(P	1.667E-01	4.96E-02	G K
		344.30	1.366E-02	% P	1.198E-01	3.53E-02	G
		1408.08	1.501E-02	%	1.774E-01	4.95E-02	G
		964.00	2.811E-02	% P	4.478E-01	1.31E-01	G
		1112.07	2.013E-01	%	3.373E-01	1.04E-01	G
		778.90	-5.401E-02	%	3.310E-01	9.67E-02	G
EU-154	2.6660E-02						
		123.10	2.666E-02	&(	1.158E-01	3.48E-02	G K
		1274.80	1.313E-02	&	1.389E-01	3.98E-02	G
		723.30	-5.091E-02	%	2.243E-01	6.62E-02	G
		1004.80	-1.685E-02	&	2.279E-01	6.49E-02	G
EU-155	1.5810E-01						
		86.45	1.581E-01	%(	2.648E-01	8.07E-02	G K
		105.31	6.948E-02	%	2.628E-01	7.90E-02	G
HG-203	-1.0750E-03						
		279.17	-1.075E-03	&(P	4.882E-02	1.44E-02	G K
		72.87	-5.819E-01	% P	2.660E+00	7.99E-01	G
		70.83	-2.476E+00	%	4.890E+00	1.48E+00	G
		82.50	-1.613E+00	%	4.681E+00	1.41E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7613E-01						
		583.14	2.761E-01	(P	4.253E-02	2.07E-02	G
		510.72	4.583E-01	+ P	1.922E-01	7.91E-02	G
PB-212	9.2947E-01						
		238.63	8.899E-01	(P	9.522E-02	4.12E-02	G K
							Energy duplication
		77.11	8.409E-01	} P	4.310E-01	1.35E-01	G
		74.81	9.881E-01	(P	8.527E-01	2.69E-01	G
PB-214	5.2149E-01						
		351.99	4.957E-01	(P	9.151E-02	3.89E-02	G K
		295.22	5.713E-01	(P	1.455E-01	5.58E-02	G
							Energy duplication
		77.11	2.540E-02	} P	1.041E+00	2.58E-01	G
		241.92	4.755E-02	%	6.758E-01	2.02E-01	G
BI-212	6.9897E-01						
		727.17	6.990E-01	@(P	3.919E-01	1.65E-01	G K
		1620.56	5.112E-03	% P	1.047E+00	2.72E-01	G
		785.42	6.211E-01	%	2.107E+00	6.25E-01	G
BI-214	4.9033E-01						
		609.32	4.903E-01	(P	8.634E-02	4.14E-02	G K
		1764.51	7.310E-01	+ P	1.498E-01	9.63E-02	G
		1120.28	9.538E-01	+ P	3.644E-01	1.68E-01	G
RA-224	1.2720E+00						
		241.00	1.272E+00	(	1.128E+00	3.52E-01	G
RA-226	8.4922E-01						
							Energy duplication
		185.99	8.492E-01	%(P	1.314E+00	4.00E-01	G
AC-228	9.9108E-01						
		911.07	1.016E+00	(P	1.506E-01	8.15E-02	G K
		968.90	9.830E-01	(P	2.144E-01	9.77E-02	G
		338.40	9.429E-01	(P	3.009E-01	1.22E-01	G
TH-227	-2.4194E-01						
		236.00	-2.419E-01	&(	4.406E-01	1.34E-01	G K
		256.25	1.573E-02	& P	5.305E-01	1.57E-01	G
PA-234	-5.2764E-02						
		98.44	-5.276E-02	%(P	2.514E-01	7.54E-02	G K
		946.00	-4.015E-02	& P	2.078E-01	6.05E-02	G
		131.28	-1.306E-03	& P	2.151E-01	6.38E-02	G
		94.67	1.148E-02	% P	4.594E-01	1.37E-01	G
		883.24	-7.424E-02	&	3.470E-01	1.02E-01	G
		926.70	-3.173E-03	%	3.701E-01	1.05E-01	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26-1.858E-02 % P 3.770E-01 1.08E-01 G

TH-234       2.4432E+00
                           63.29 2.443E+00 %(P 7.241E+00 2.18E+00 G K
                           92.80 1.311E+00 % P 2.479E+00 7.50E-01 G
                           92.38 1.626E+00 & P 2.915E+00 8.83E-01 G

AM-241      -1.1525E-01
                           59.54-1.152E-01 %(P 1.334E+00 3.98E-01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	4.2107E-02	4.3672E-02	3.3809E-01	3.3810E-01	3.703E-01
K-40		1.9819E+01	1.9819E+01	1.5970E+00	1.9683E+00	
MN-54	#A	-5.7831E-03	-5.8193E-03	4.3418E-02	4.3420E-02	4.414E-02
CO-57	#B	-1.9778E-03	-1.9921E-03	6.3182E-02	6.3182E-02	5.838E-02
CO-60	#B	2.9059E-03	2.9089E-03	4.3791E-02	4.3792E-02	5.176E-02

Sr-85	#A	-1.9590E-02	-2.0188E-02	4.6613E-02	4.6628E-02	5.003E-02
Kr-85	#A	-4.5226E+02	-4.5227E+02	1.0443E+03	1.0446E+03	1.155E+03
Y-88	#B	-4.7498E-04	-4.8374E-04	3.8485E-02	3.8485E-02	3.074E-02
NB-94	#B	-3.5268E-03	-3.5268E-03	3.6247E-02	3.6248E-02	4.198E-02
Ag-108M	#B	-1.1023E-02	-1.1023E-02	4.3714E-02	4.3719E-02	4.937E-02
CD-109	#A	1.3680E+00	1.3739E+00	1.9111E+00	1.9127E+00	2.077E+00
SN-113	#B	-9.5258E-03	-9.6884E-03	4.7658E-02	4.7661E-02	5.284E-02
SB-125	#F	1.1644E-01	1.1666E-01	9.3907E-02	9.4151E-02	1.074E-01
I-131	#B	2.2956E-04	2.9252E-04	4.6973E-02	4.6973E-02	4.214E-02
CS-134	#B	2.0095E-02	2.0147E-02	1.7809E-02	1.7847E-02	8.177E-02
CS-137	#A	2.0513E-02	2.0517E-02	3.8185E-02	3.8204E-02	4.207E-02
CE-139	#A	1.5265E-02	1.5483E-02	4.6834E-02	4.6842E-02	5.115E-02
EU-152	#B	-6.4491E-03	-6.4518E-03	2.1567E-01	2.1568E-01	1.667E-01
EU-154	#B	2.6643E-02	2.6660E-02	1.0429E-01	1.0430E-01	1.158E-01
EU-155	#B	1.5793E-01	1.5810E-01	2.4199E-01	2.4215E-01	2.645E-01
HG-203	#B	-1.0310E-03	-1.0750E-03	4.4860E-02	4.4860E-02	4.682E-02
TL-208		2.7613E-01	2.7613E-01	6.1944E-02	6.3985E-02	
PB-212		9.2947E-01	9.2947E-01	1.2905E-01	1.3988E-01	
PB-214		5.2149E-01	5.2149E-01	9.7980E-02	1.0255E-01	
BI-212	#	6.9897E-01	6.9897E-01	4.9588E-01	4.9754E-01	
BI-214		4.9033E-01	4.9033E-01	1.2414E-01	1.2737E-01	
RA-224		1.2720E+00	1.2720E+00	1.0563E+00	1.0588E+00	1.128E+00
RA-226	#A	8.4921E-01	8.4922E-01	1.1988E+00	1.1998E+00	1.314E+00
AC-228		9.9108E-01	9.9108E-01	1.8015E-01	1.8912E-01	
TH-227	#B	-2.4194E-01	-2.4194E-01	4.0203E-01	4.0228E-01	4.406E-01
PA-234	#B	-5.2764E-02	-5.2764E-02	2.4235E-01	2.4236E-01	2.514E-01
TH-234	#B	2.4432E+00	2.4432E+00	6.5357E+00	6.5371E+00	7.241E+00
AM-241	#A	-1.1524E-01	-1.1525E-01	1.2368E+00	1.2368E+00	1.334E+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) 2.4998573E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.4998573E+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_25AUG2006_1508.An1

Sample description
FSS-OOL-02-05-008-F-S

Spectrum Filename: C:\GammaVision\Spectra\103F_25AUG2006_1508.An1

Acquisition information
Start time: 25-Aug-2006 15:08:24
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: 1.9830E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9830E+03) =
5.0429E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 13:12:00
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. 15 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2606

***** S U M M A R Y O F P E A K 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	110.	26.03	0.99	9.100E-03	74.81	9.600	8.375E-01	PB212
77.33	239.	12.84	0.99	1.032E-02	77.11	17.500	9.074E-01	PB212
84.41	70.	39.62	1.00	1.329E-02				
89.90	81.	37.82	1.00	1.542E-02				
93.50	102.	30.28	1.00	1.670E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.26	118.	36.83	1.07	2.439E-02				
186.35	174.	19.24	1.12	2.566E-02	185.99	3.280	1.304E+00	RA226
209.62	89.	34.87	0.81	2.470E-02				
238.75	1255.	3.30	1.09	2.319E-02	238.63	43.100	8.469E-01	PB212
241.64	166.	15.93	1.09	2.304E-02	241.00	3.900	1.259E+00	RA224
270.53	82.	31.77	1.25	2.150E-02				
295.21	273.	13.00	1.14	2.025E-02	295.22	19.200	4.718E-01	PB214
300.48	85.	23.24	1.13	2.000E-02				
327.65	66.	41.04	1.43	1.876E-02				
338.52	261.	11.63	1.01	1.830E-02	338.40	12.010	8.064E-01	AC228
352.07	419.	8.01	1.08	1.775E-02	351.99	37.100	4.277E-01	PB214
463.08	74.	21.37	1.84	1.426E-02				
463.08	74.	21.37	1.84	1.426E-02	463.51	10.000	3.493E-01	SB125
511.34	206.	12.58	1.57	1.316E-02	510.72	22.500	4.135E-01	TL208
583.37	419.	6.29	1.38	1.184E-02	583.14	86.000	2.774E-01	TL208
600.89	34.	29.94	1.50	1.151E-02	600.77	18.400	PBC<MDA	SB125
					604.66	97.600	2.060E-02	CS134
609.64	349.	7.06	1.26	1.143E-02	609.32	46.090	4.425E-01	BI214
727.66	112.	18.25	1.78	9.960E-03	727.17	11.800	6.462E-01	BI212
795.14	73.	29.15	1.41	9.307E-03				
795.14	73.	29.15	1.41	9.307E-03	795.76	85.400	6.221E-02	CS134

860.78	65.	25.12	0.76	8.766E-03				
911.56	260.	7.41	1.45	8.398E-03	911.07	29.000	7.175E-01	AC228
964.96	51.	23.85	1.54	8.050E-03	964.00	14.580	2.953E-01	EU152
969.45	160.	9.84	1.54	8.023E-03	968.90	17.460	7.754E-01	AC228
1120.40	110.	20.93	1.86	7.211E-03	1120.28	15.040	6.792E-01	BI214
1461.39	1340.	2.76	1.85	5.930E-03	1460.75	10.700	1.418E+01	K40
1621.66	21.	29.74	1.40	5.488E-03	1620.56	2.750	9.463E-01	BI212
1765.25	70.	11.96	1.11	5.142E-03	1764.51	15.920	5.847E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
167.99	84.43	347.	70.	0.035	118.86	0.999	TA-182	lD
178.96	89.91	423.	81.	0.040	113.47	1.002	PB-214	lD
257.69	129.26	746.	136.	0.068	88.97	1.068	AC-228	s
418.39	209.62	437.	89.	0.045	104.60	0.810	NP-239	
540.22	270.53	285.	82.	0.041	95.31	1.255	AC-228	
599.80	300.33	179.	68.	0.034	89.27	0.907	PB-212	
654.44	327.65	267.	66.	0.033	123.11	1.426	AC-228	s
1720.60	860.78	72.	65.	0.032	75.36	0.757	TL-208	s
1929.86	964.91	47.	54.	0.027	67.60	1.539	AC-228	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: FSS_Rev_1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	392.	120.	0.060	73.05	0.993D
PB-212	153.39	77.11	395.	217.	0.109	34.20	0.995A
TH-234	185.46	93.15	1018.	122.	0.061	99.58	1.500s
TH-234	185.44	93.13	1012.	120.	0.060	100.34	1.500s
RA-226	371.86	186.35	744.	163.	0.081	69.16	1.500s
PB-212	476.73	238.79	767.	1223.	0.612	13.90	1.144
RA-224	482.87	241.86	846.	123.	0.061	104.30	1.500
PB-214	589.57	295.21	357.	269.	0.135	38.99	1.138s
AC-228	676.19	338.52	246.	260.	0.130	34.88	1.008
PB-214	703.20	352.03	367.	449.	0.225	26.76	1.084s
SB-125	925.32	463.10	140.	73.	0.037	75.70	1.500s
TL-208	1021.79	511.34	188.	180.	0.090	37.74	1.565s
TL-208	1165.83	583.37	106.	415.	0.207	18.87	1.385
CS-134	1200.88	600.89	35.	34.	0.017	89.81	1.500s
BI-214	1218.37	609.64	106.	342.	0.171	21.19	1.263s
BI-212	1454.40	727.66	102.	112.	0.056	54.76	1.777s
CS-134	1589.32	795.13	69.	62.	0.031	68.02	1.500
AC-228	1822.15	911.56	51.	257.	0.128	22.22	1.449
AC-228	1936.81	968.90	44.	163.	0.082	29.12	1.541D
BI-214	2239.77	1120.40	107.	108.	0.054	62.79	1.860s
K-40	2921.65	1461.39	26.	1321.	0.661	8.27	1.846

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3242.13	1621.66	6.	21.	0.010	89.21	1.398
BI-214	3529.24	1765.25	5.	70.	0.035	35.87	1.111s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O 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		9.3499E-02					
			477.56	9.350E-02	%(	2.795E-01 8.36E-02	G
K-40		1.4184E+01					
			1460.75	1.418E+01	(P	2.838E-01 3.97E-01	G
MN-54		-1.0809E-03					
			834.81	-1.081E-03	%(P	3.724E-02 1.07E-02	G
CO-57		-9.0440E-03					
			122.07	-9.044E-03	&(P	5.061E-02 1.52E-02	G K
			136.43	6.410E-02	&	3.757E-01 1.13E-01	G
CO-60		-9.2164E-03					
			1332.51	-9.216E-03	&(P	3.972E-02 1.12E-02	G K
			1173.23	3.498E-03	% P	4.207E-02 1.20E-02	G K
Sr-85		-1.4757E-02					
			514.00	-1.476E-02	%(	4.215E-02 1.27E-02	G
Kr-85		-3.4003E+02					
			513.99	-3.400E+02	%(	9.722E+02 2.92E+02	G
Y-88		8.6495E-04					
			1836.01	8.650E-04	&(P	2.507E-02 6.56E-03	G K
			898.02	-1.040E-02	& P	4.023E-02 1.18E-02	G
NB-94		-2.2868E-03					
			871.10	-2.287E-03	%(	2.733E-02 7.76E-03	G K
			702.50	2.800E-04	%	3.214E-02 9.22E-03	G K
Ag-108M		-4.8149E-03					
			722.95	-4.815E-03	%(	3.633E-02 1.06E-02	G K
			614.37	-1.844E-02	% P	4.374E-02 1.32E-02	G
			433.93	8.468E-03	%	3.238E-02 9.64E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	3.9008E-02						
		88.04	3.901E-02	%(	2.002E+00	5.98E-01	G
SN-113	-8.5640E-04						
		391.71	-8.564E-04	&(	4.301E-02	1.25E-02	G K
		255.04	3.117E-01	%	1.565E+00	4.68E-01	G
SB-125	9.1848E-02						
		427.95	4.891E-03	&(P	8.485E-02	2.47E-02	G K
		600.77	2.722E-02	& P	1.567E-01	4.59E-02	G
		636.15	-1.554E-03	% P	2.317E-01	6.56E-02	G
		463.51	3.492E-01	(P	2.766E-01	8.97E-02	G
		176.29	2.283E-02	%	5.692E-01	1.70E-01	G
I-131	9.2446E-03						
		364.48	9.245E-03	&(P	3.328E-02	9.92E-03	G K
		636.97	2.088E-02	%	3.984E-01	1.15E-01	G
		284.29	1.498E-01	% P	4.826E-01	1.45E-01	G
CS-134	2.0601E-02						
		604.66	2.060E-02	(	1.830E-02	6.17E-03	G K
		795.76	5.354E-02	+ P	3.559E-02	1.22E-02	G
		569.29	-9.104E-02	% P	1.994E-01	5.98E-02	G
		801.84	-1.751E-02	% P	3.321E-01	9.28E-02	G
CS-137	1.0613E-02						
		661.62	1.061E-02	%(P	4.070E-02	1.20E-02	G
CE-139	9.2659E-03						
		165.85	9.266E-03	%(	4.547E-02	1.36E-02	G
EU-152	-2.7557E-02						
		121.78	-2.756E-02	&(P	1.531E-01	4.59E-02	G K
		344.30	-1.192E-02	% P	9.767E-02	2.88E-02	G
		1408.08	6.616E-02	%	1.149E-01	3.58E-02	G
		964.00	2.117E-01	% P	2.886E-01	8.98E-02	G
		1112.07	4.626E-02	&	3.079E-01	8.96E-02	G
		778.90	6.955E-02	%	2.258E-01	6.69E-02	G
EU-154	2.2381E-02						
		123.10	2.238E-02	%(	1.076E-01	3.23E-02	G K
		1274.80	-3.011E-02	%	1.226E-01	3.60E-02	G
		723.30	9.625E-04	%	1.699E-01	4.88E-02	G
		1004.80	-1.284E-03	&	2.199E-01	6.27E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	1.1463E-01						
		86.45	1.146E-01	%(	2.247E-01	6.82E-02	G K
		105.31	1.062E-01	%	2.231E-01	6.77E-02	G
HG-203	-1.0572E-02						
		279.17	-1.057E-02	%(P	3.898E-02	1.17E-02	G K
		72.87	5.073E-02	& P	1.650E+00	4.91E-01	G
		70.83	5.752E-02	%	4.530E+00	1.35E+00	G
		82.50	-1.273E+00	&	3.750E+00	1.13E+00	G
TL-208	2.7743E-01						
		583.14	2.774E-01	(P	3.396E-02	1.76E-02	G
		510.72	4.135E-01	+ P	1.532E-01	5.98E-02	G
PB-212	8.6864E-01						
		238.63	8.337E-01	(P	8.979E-02	3.90E-02	G K
							Energy duplication
		77.11	8.372E-01	} P	3.668E-01	9.54E-02	G
		74.81	9.423E-01	(P	7.447E-01	2.35E-01	G
PB-214	4.6721E-01						
		351.99	4.648E-01	@(P	9.514E-02	4.20E-02	G K
		295.22	4.718E-01	@(P	1.591E-01	6.23E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.509E-01	0.00E+00	G
		241.92	-3.375E-01	%	5.577E-01	1.70E-01	G
BI-212	7.0295E-01						
		727.17	6.462E-01	*(P	2.891E-01	1.19E-01	G K
		1620.56	9.463E-01	(P	6.398E-01	2.82E-01	G
		785.42	6.883E-01	%	1.631E+00	4.91E-01	G
BI-214	4.4247E-01						
		609.32	4.425E-01	@(P	6.542E-02	3.19E-02	G K
		1764.51	5.847E-01	+ P	1.073E-01	7.32E-02	G
		1120.28	6.792E-01	+ P	3.197E-01	1.45E-01	G
RA-224	9.2816E-01						
		241.00	9.282E-01	(	1.047E+00	3.23E-01	G
RA-226	1.3161E+00						
		185.99	1.316E+00	*(P	1.051E+00	3.28E-01	G
AC-228	7.5827E-01						
		911.07	7.175E-01	(P	1.011E-01	5.39E-02	G K
		968.90	7.928E-01	(P	1.635E-01	7.70E-02	G
		338.40	8.064E-01	(P	2.350E-01	9.42E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227      -1.9801E-01
                          236.00-1.980E-01 %(  3.884E-01 1.18E-01 G K
                          256.25 1.206E-01 % P 4.298E-01 1.29E-01 G

PA-234      -3.0822E-02
                           98.44-3.082E-02 %(P 2.233E-01 6.68E-02 G K
                          946.00-4.606E-03 % P 2.107E-01 6.06E-02 G
                          131.28-7.936E-02 % P 2.194E-01 6.63E-02 G
                           94.67-2.305E-02 % P 3.900E-01 1.16E-01 G
                          883.24-8.424E-02 &   3.199E-01 9.46E-02 G
                          926.70 6.397E-02 %   2.604E-01 7.61E-02 G
                          569.26-1.332E-01 % P 2.950E-01 8.84E-02 G

TH-234       1.2922E+00
                           63.29 5.566E-01 &(P 6.288E+00 1.87E+00 G K
                           92.80 1.660E+00 *(P 2.084E+00 6.37E-01 G
                           92.38 1.979E+00 *(P 2.462E+00 7.52E-01 G

AM-241      -1.9354E-01
                           59.54-1.935E-01 %(P 1.047E+00 3.13E-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		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	9.3401E-02	9.3499E-02	2.5083E-01	2.5089E-01	2.792E-01
K-40		1.4184E+01	1.4184E+01	1.1897E+00	1.4469E+00	
MN-54	#A	-1.0807E-03	-1.0809E-03	5.3604E-02	5.3604E-02	3.723E-02
CO-57	#B	-9.0421E-03	-9.0440E-03	4.7026E-02	4.7029E-02	5.060E-02
CO-60	#B	-9.2162E-03	-9.2164E-03	6.3574E-02	6.3577E-02	3.972E-02
Sr-85	#A	-1.4745E-02	-1.4757E-02	3.8010E-02	3.8020E-02	4.212E-02
Kr-85	#A	-3.4003E+02	-3.4003E+02	8.7667E+02	8.7690E+02	9.722E+02
Y-88	#B	8.6450E-04	8.6495E-04	1.9673E-02	1.9673E-02	2.505E-02
NB-94	#B	-2.2868E-03	-2.2868E-03	2.3292E-02	2.3292E-02	2.733E-02
Ag-108M	#B	-4.8149E-03	-4.8149E-03	3.1737E-02	3.1738E-02	3.633E-02
CD-109	#A	3.9003E-02	3.9008E-02	1.7938E+00	1.7938E+00	2.002E+00
SN-113	#B	-8.5599E-04	-8.5640E-04	3.7618E-02	3.7618E-02	4.299E-02
SB-125	#F	9.1843E-02	9.1848E-02	7.0748E-02	7.0949E-02	8.484E-02
I-131	#B	9.1804E-03	9.2446E-03	2.9756E-02	2.9761E-02	3.305E-02
CS-134	#	2.0600E-02	2.0601E-02	1.8502E-02	1.8541E-02	1.829E-02
CS-137	#A	1.0613E-02	1.0613E-02	3.6105E-02	3.6111E-02	4.070E-02
CE-139	#A	9.2622E-03	9.2659E-03	4.0926E-02	4.0930E-02	4.545E-02
EU-152	#B	-2.7556E-02	-2.7557E-02	1.4758E-01	1.4759E-01	1.531E-01
EU-154	#B	2.2380E-02	2.2381E-02	9.6912E-02	9.6920E-02	1.076E-01
EU-155	#B	1.1463E-01	1.1463E-01	2.0468E-01	2.0478E-01	2.247E-01
HG-203	#B	-1.0559E-02	-1.0572E-02	3.5153E-02	3.5158E-02	3.894E-02
TL-208		2.7743E-01	2.7743E-01	5.2887E-02	5.5285E-02	
PB-212		8.6864E-01	8.6864E-01	1.2188E-01	1.3190E-01	
PB-214	#	4.6721E-01	4.6721E-01	1.1206E-01	1.1529E-01	
BI-212		7.0295E-01	7.0295E-01	3.6895E-01	3.7120E-01	
BI-214		4.4247E-01	4.4247E-01	9.5512E-02	9.8906E-02	
RA-224	#A	9.2816E-01	9.2816E-01	9.6804E-01	9.6953E-01	1.047E+00
RA-226	#	1.3161E+00	1.3161E+00	9.8282E-01	9.8578E-01	1.051E+00
AC-228		7.5827E-01	7.5827E-01	1.2846E-01	1.3579E-01	
TH-227	#B	-1.9801E-01	-1.9801E-01	3.5380E-01	3.5399E-01	3.884E-01
PA-234	#B	-3.0822E-02	-3.0822E-02	2.2061E-01	2.2062E-01	2.233E-01
TH-234	#B	1.2922E+00	1.2922E+00	1.4734E+00	1.4752E+00	6.288E+00
AM-241	#A	-1.9354E-01	-1.9354E-01	9.5625E-01	9.5631E-01	1.047E+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_25AUG2006_1508.An1

---------- S U M M A R Y ----------

Total Activity (1120.0 to 2000.7 keV) 1.7700645E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.7700645E+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_29AUG2006_1449.An1

Sample description
FSS-OOL-02-05-016-F

Spectrum Filename: C:\GammaVision\Spectra\103F_29AUG2006_1449.An1

Acquisition information
Start time: 29-Aug-2006 14:49:30
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: 1.8560E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8560E+03) =
5.3879E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 13:30:00
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: 0.3150

***** S U M M A R Y O F P E A K 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	109.	25.35	0.99	9.052E-03	74.81	9.600	9.145E-01	PB212
77.22	148.	15.77	0.99	1.011E-02	77.11	17.500	8.169E-01	PB212
					77.11	10.700	1.336E+00	PB214
92.98	81.	41.10	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
92.99	82.	40.76	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.89	132.	26.35	1.32	2.567E-02				
185.89	132.	26.35	1.32	2.567E-02	185.99	3.280	PBC<MDA	RA226
238.85	836.	4.22	1.09	2.319E-02	238.63	43.100	5.998E-01	PB212
241.96	129.	19.02	1.10	2.303E-02	241.00	3.900	1.040E+00	RA224
					241.92	7.470	5.442E-01	PB214
270.54	80.	35.98	0.90	2.150E-02				
295.48	233.	10.58	1.37	2.024E-02	295.22	19.200	4.284E-01	PB214
300.34	48.	40.93	1.47	2.000E-02				
328.04	57.	34.54	0.71	1.874E-02				
338.37	234.	13.42	1.18	1.830E-02	338.40	12.010	7.699E-01	AC228
352.21	390.	8.20	1.17	1.774E-02	351.99	37.100	4.255E-01	PB214
409.87	59.	33.55	0.99	1.573E-02				
463.21	68.	31.62	1.01	1.425E-02				
463.21	68.	31.62	1.01	1.425E-02	463.51	10.000	3.430E-01	SB125
511.41	143.	17.63	1.27	1.316E-02	510.72	22.500	2.858E-01	TL208
583.52	299.	7.88	1.38	1.184E-02	583.14	86.000	2.108E-01	TL208
609.73	304.	8.25	1.43	1.143E-02	609.32	46.090	4.109E-01	BI214
728.26	96.	21.12	1.17	9.953E-03	727.17	11.800	5.939E-01	BI212
795.50	36.	34.13	1.36	9.304E-03				
795.50	36.	34.13	1.36	9.304E-03	795.76	85.400	3.323E-02	CS134

911.75	219.	10.10	1.38	8.397E-03	911.07	29.000	6.456E-01	AC228
965.71	41.	23.94	1.54	8.045E-03				
969.50	113.	11.58	1.54	8.022E-03	968.90	17.460	5.863E-01	AC228
1121.90	107.	19.13	1.17	7.204E-03	1120.28	15.040	7.056E-01	BI214
1461.69	1162.	3.02	2.04	5.929E-03	1460.75	10.700	1.311E+01	K40
1765.39	61.	12.50	2.00	5.142E-03	1764.51	15.920	5.402E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
540.24	270.54	296.	80.	0.040	107.94	0.905	AC-228	s
599.84	300.34	169.	48.	0.024	122.79	1.466	PB-212	s
655.23	328.04	156.	57.	0.028	103.61	0.706	AC-228	s
818.87	409.87	128.	59.	0.030	100.65	0.995	AC-228	
1931.60	965.76	37.	33.	0.017	93.81	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	352.	109.	0.055	76.06	0.993D
PB-212	153.39	77.11	311.	148.	0.074	47.31	0.995A
RA-226	371.63	186.24	631.	121.	0.060	82.93	1.500s
PB-212	476.95	238.90	514.	836.	0.418	16.24	1.129
RA-224	482.85	241.85	618.	96.	0.048	113.66	1.500
PB-214	590.10	295.48	182.	229.	0.114	31.75	1.370s
AC-228	675.89	338.37	243.	232.	0.116	40.26	1.183s
PB-214	703.56	352.21	224.	385.	0.192	24.59	1.166
SB-125	925.57	463.22	120.	55.	0.027	91.65	1.500
TL-208	1021.94	511.41	181.	116.	0.058	52.90	1.273s
TL-208	1166.13	583.52	96.	295.	0.147	23.65	1.377
BI-214	1218.55	609.73	111.	298.	0.149	24.76	1.426
BI-212	1455.58	728.26	94.	96.	0.048	63.37	1.170s
CS-134	1590.41	795.68	30.	37.	0.018	80.71	1.500
AC-228	1822.54	911.75	73.	216.	0.108	30.29	1.377s
AC-228	1936.81	968.90	32.	112.	0.056	35.33	1.541D
BI-214	2240.69	1120.86	100.	83.	0.041	76.97	1.119
K-40	2922.25	1461.69	38.	1143.	0.572	9.05	2.037
BI-214	3529.53	1765.39	3.	61.	0.030	37.50	2.004

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O 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		1.8989E-03					
			477.56	1.899E-03	%(	2.741E-01 7.88E-02	G
K-40		1.3112E+01					
			1460.75	1.311E+01	(P	3.603E-01 4.02E-01	G
MN-54		-7.0860E-04					
			834.81	-7.086E-04	%(P	3.092E-02 8.70E-03	G
CO-57		6.1867E-03					
			122.07	6.187E-03	%(P	4.370E-02 1.30E-02	G K
			136.43	-2.533E-02	&	3.591E-01 1.07E-01	G
CO-60		4.2559E-03					
			1332.51	4.256E-03	&(P	3.511E-02 9.78E-03	G K
			1173.23	2.854E-03	% P	4.415E-02 1.26E-02	G K
Sr-85		-1.3375E-02					
			514.00	-1.337E-02	%(	4.048E-02 1.21E-02	G
Kr-85		-2.9554E+02					
			513.99	-2.955E+02	%(	8.949E+02 2.68E+02	G
Y-88		7.3328E-04					
			1836.01	7.333E-04	%(P	1.980E-02 4.87E-03	G K
			898.02	-9.815E-03	% P	3.592E-02 1.05E-02	G
NB-94		-6.8200E-03					
			871.10	-6.820E-03	&(	3.062E-02 8.93E-03	G K
			702.50	-2.296E-03	%	2.814E-02 8.06E-03	G K
Ag-108M		-7.0843E-03					
			722.95	-7.084E-03	%(	3.866E-02 1.13E-02	G K
			614.37	-7.359E-03	% P	3.654E-02 1.07E-02	G
			433.93	7.031E-03	&	2.943E-02 8.71E-03	G
CD-109		1.1493E+00					
			88.04	1.149E+00	&(	1.644E+00 5.03E-01	G
SN-113		7.5855E-04					
			391.71	7.585E-04	%(	4.534E-02 1.32E-02	G K
			255.04	-9.582E-02	%	1.470E+00 4.35E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.7238E-02						
		427.95	-1.843E-02	%(P	9.797E-02	2.89E-02	G K
		600.77	3.224E-02	% P	1.408E-01	4.13E-02	G
		636.15	6.620E-02	% P	2.525E-01	7.43E-02	G
		463.51	2.812E-01	(P	2.758E-01	8.79E-02	G
		176.29	-3.001E-02	&	5.358E-01	1.59E-01	G
I-131	-1.2869E-03						
		364.48	-1.287E-03	%(P	5.093E-02	1.48E-02	G K
		636.97	-6.051E-02	%	5.103E-01	1.47E-01	G
		284.29	4.172E-02	& P	7.154E-01	2.11E-01	G
CS-134	1.2770E-02						
		604.66	-5.460E-03	%(	3.263E-02	9.56E-03	G K
		795.76	3.360E-02	(P	2.609E-02	9.06E-03	G
		569.29	5.741E-02	& P	1.606E-01	4.76E-02	G
		801.84	-1.047E-01	% P	3.417E-01	9.91E-02	G
CS-137	-1.4371E-02						
		661.62	-1.437E-02	%(P	3.676E-02	1.09E-02	G
CE-139	2.1381E-03						
		165.85	2.138E-03	%(	4.123E-02	1.23E-02	G
EU-152	-2.1488E-03						
		121.78	-2.149E-03	&(P	1.322E-01	3.92E-02	G K
		344.30	8.583E-03	% P	8.771E-02	2.56E-02	G
		1408.08	2.818E-02	%	1.348E-01	3.84E-02	G
		964.00	-3.380E-03	% P	3.432E-01	9.88E-02	G
		1112.07	4.241E-02	&	2.616E-01	7.54E-02	G
		778.90	3.542E-02	%	2.221E-01	6.42E-02	G
EU-154	1.4371E-02						
		123.10	1.437E-02	%(	9.630E-02	2.88E-02	G K
		1274.80	3.919E-02	%	9.162E-02	2.76E-02	G
		723.30	0.000E+00	%	2.879E-01	8.43E-02	G
		1004.80	1.111E-03	%	1.764E-01	4.92E-02	G
EU-155	1.3536E-01						
		86.45	1.354E-01	%(	2.076E-01	6.34E-02	G K
		105.31	9.682E-02	%	1.897E-01	5.76E-02	G
HG-203	1.7486E-02						
		279.17	1.749E-02	&(P	3.653E-02	1.11E-02	G K
		72.87	-3.584E-01	& P	2.202E+00	6.60E-01	G
		70.83	-4.255E-01	%	4.437E+00	1.33E+00	G
		82.50	-1.009E+00	%	3.715E+00	1.12E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.1078E-01						
		583.14	2.108E-01	(P	3.459E-02	1.69E-02	G
		510.72	2.858E-01	+ P	1.605E-01	6.20E-02	G
PB-212	6.0843E-01						
		238.63	6.084E-01	(P	7.894E-02	3.34E-02	G K
							Energy duplication
		77.11	6.084E-01	} P	3.494E-01	9.60E-02	G
		74.81	9.145E-01	+ P	7.551E-01	2.38E-01	G
PB-214	4.2646E-01						
		351.99	4.255E-01	(P	8.012E-02	3.54E-02	G K
		295.22	4.284E-01	(P	1.229E-01	4.62E-02	G
							Energy duplication
		77.11	5.107E-02	} P	8.625E-01	2.25E-01	G
		241.92	2.235E-03	%	5.454E-01	1.62E-01	G
BI-212	5.9386E-01						
		727.17	5.939E-01	*(P	2.967E-01	1.26E-01	G K
		1620.56	1.989E-02	% P	7.922E-01	2.03E-01	G
		785.42	-1.672E-01	%	1.604E+00	4.62E-01	G
BI-214	4.1088E-01						
		609.32	4.109E-01	(P	7.169E-02	3.47E-02	G K
		1764.51	5.402E-01	+ P	9.908E-02	7.12E-02	G
		1120.28	5.538E-01	+ P	3.318E-01	1.45E-01	G
RA-224	7.7992E-01						
		241.00	7.799E-01	(	9.597E-01	2.95E-01	G
RA-226	1.0459E+00						
		185.99	1.046E+00	*(P	1.036E+00	3.20E-01	G
AC-228	6.5266E-01						
		911.07	6.456E-01	@(P	1.271E-01	6.62E-02	G K
		968.90	5.837E-01	(P	1.503E-01	6.88E-02	G
		338.40	7.699E-01	*(P	2.494E-01	1.04E-01	G
TH-227	-7.7849E-03						
		236.00	-7.785E-03	&(	2.744E-01	8.11E-02	G K
		256.25	1.378E-04	% P	4.390E-01	1.29E-01	G
PA-234	6.5100E-02						
		98.44	6.510E-02	&(P	1.871E-01	5.64E-02	G K
		946.00	3.196E-02	& P	1.567E-01	4.55E-02	G
		131.28	4.534E-02	% P	1.826E-01	5.48E-02	G
		94.67	-5.340E-02	% P	3.798E-01	1.14E-01	G
		883.24	0.000E+00	%	2.351E-01	6.55E-02	G
		926.70	8.494E-02	%	2.459E-01	7.29E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments
                          569.26 8.533E-02 % P 2.426E-01 7.20E-02 G

TH-234       6.7184E-01
                           63.29 6.718E-01 %(P 5.620E+00 1.67E+00 G K
                           92.80 1.192E+00 % P 1.969E+00 5.97E-01 G
                           92.38 1.421E+00 % P 2.321E+00 7.04E-01 G

AM-241      -1.7725E-03
                           59.54-1.772E-03 %(P 1.082E+00 3.21E-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

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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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	1.8015E-03	1.8989E-03	2.3650E-01	2.3650E-01	2.600E-01
K-40		1.3112E+01	1.3112E+01	1.2055E+00	1.4257E+00	
MN-54	#A	-7.0225E-04	-7.0860E-04	6.2933E-02	6.2933E-02	3.064E-02
CO-57	#B	6.1226E-03	6.1867E-03	3.9141E-02	3.9142E-02	4.325E-02
CO-60	#B	4.2497E-03	4.2559E-03	2.9343E-02	2.9344E-02	3.506E-02

Sr-85	#A	-1.2807E-02	-1.3375E-02	3.6394E-02	3.6403E-02	3.876E-02
Kr-85	#A	-2.9553E+02	-2.9554E+02	8.0456E+02	8.0474E+02	8.949E+02
Y-88	#B	7.1420E-04	7.3328E-04	1.4600E-02	1.4600E-02	1.928E-02
NB-94	#B	-6.8200E-03	-6.8200E-03	2.6787E-02	2.6790E-02	3.062E-02
Ag-108M	#B	-7.0839E-03	-7.0843E-03	3.3978E-02	3.3980E-02	3.866E-02
CD-109	#A	1.1422E+00	1.1493E+00	1.5101E+00	1.5114E+00	1.634E+00
SN-113	#B	7.4025E-04	7.5855E-04	3.9583E-02	3.9583E-02	4.425E-02
SB-125	#B	5.7079E-02	5.7238E-02	5.3675E-02	5.3778E-02	9.770E-02
I-131	#B	-9.0720E-04	-1.2869E-03	1.0179E-01	1.0179E-01	3.590E-02
CS-134	#B	1.2722E-02	1.2770E-02	1.0331E-02	1.0357E-02	3.251E-02
CS-137	#A	-1.4367E-02	-1.4371E-02	3.8230E-02	3.8239E-02	3.675E-02
CE-139	#A	2.0948E-03	2.1381E-03	3.6752E-02	3.6752E-02	4.040E-02
EU-152	#B	-2.1475E-03	-2.1488E-03	3.2914E-01	3.2914E-01	1.322E-01
EU-154	#B	1.4358E-02	1.4371E-02	8.6370E-02	8.6374E-02	9.622E-02
EU-155	#B	1.3515E-01	1.3536E-01	1.9023E-01	1.9038E-01	2.073E-01
HG-203	#B	1.6462E-02	1.7486E-02	3.3229E-02	3.3245E-02	3.439E-02
TL-208		2.1078E-01	2.1078E-01	5.0573E-02	5.2033E-02	
PB-212		6.0843E-01	6.0843E-01	1.0020E-01	1.0624E-01	
PB-214		4.2646E-01	4.2646E-01	8.7043E-02	9.0496E-02	
BI-212	#	5.9386E-01	5.9386E-01	3.7827E-01	3.7984E-01	
BI-214		4.1088E-01	4.1088E-01	1.0395E-01	1.0665E-01	
RA-224	A	7.7992E-01	7.7992E-01	8.8642E-01	8.8758E-01	9.597E-01
RA-226	#	1.0459E+00	1.0459E+00	9.6031E-01	9.6223E-01	1.036E+00
AC-228		6.5266E-01	6.5266E-01	1.3472E-01	1.3994E-01	
TH-227	#B	-7.7849E-03	-7.7849E-03	2.4340E-01	2.4340E-01	2.744E-01
PA-234	#B	6.5100E-02	6.5100E-02	1.6912E-01	1.6916E-01	1.871E-01
TH-234	#B	6.7184E-01	6.7184E-01	5.0117E+00	5.0119E+00	5.620E+00
AM-241	#A	-1.7725E-03	-1.7725E-03	3.8294E-01	3.8294E-01	1.082E+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) 1.6795370E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.6795370E+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_29AUG2006_1254.An1

Sample description
FSS-OOL-02-05-008-F

Spectrum Filename: C:\GammaVision\Spectra\107F_29AUG2006_1254.An1

Acquisition information
Start time: 29-Aug-2006 12:54:48
Live time: 2000
Real time: 2003
Dead time: 0.14 %
Detector ID: 2

Detector system
Det 107- DSPE- 634

Calibration
Filename: D7_1LSa.Clb
Detector 107 Calibration for 1 Liter Sand Marinelli

Energy Calibration
Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel^2

Efficiency Calibration
Created: 29-Oct-2004 06:51:32
Type: Polynomial
Uncertainty: 1.174 %
Coefficients: -0.279532 -4.778179 0.614896
-0.087174 0.005356 -0.000131

Library Files
Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8880E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8880E+03) =
5.2966E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
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-2006 13:12:00
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: 0.3199

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
63.17	144.	40.90	1.43	2.002E-02				
63.17	144.	40.90	1.43	2.002E-02	63.29	3.900	PBC<MDA	TH234
74.77	409.	11.72	1.18	2.849E-02	74.81	9.600	1.071E+00	PB212
77.07	503.	8.22	1.18	2.957E-02	77.11	10.700	1.453E+00	PB214
					77.11	17.500	8.952E-01	PB212
77.14	137.	41.48	1.50	2.957E-02	77.11	10.700	PBC<MDA	PB214
					77.11	17.500	PBC<MDA	PB212
87.81	172.	27.02	1.19	3.324E-02	86.45	32.740	1.147E-01	EU155
					88.04	3.790	PBC<MDA	CD109
92.65	182.	23.83	1.19	3.438E-02				
92.65	182.	23.83	1.19	3.438E-02	92.80	3.000	PBC<MDA	TH234
185.82	282.	15.50	1.86	3.611E-02	185.99	3.280	1.703E+00	RA226
239.16	1875.	3.76	1.65	3.185E-02	238.63	43.100	9.679E-01	PB212
242.03	195.	20.62	1.30	3.163E-02	241.00	3.900	1.128E+00	RA224
					241.92	7.470	5.900E-01	PB214
270.32	157.	23.78	1.70	2.944E-02				
295.08	360.	10.70	1.42	2.769E-02	295.22	19.200	4.794E-01	PB214
338.43	369.	11.37	1.66	2.500E-02	338.40	12.010	8.728E-01	AC228
352.17	677.	5.66	1.95	2.425E-02	351.99	37.100	5.347E-01	PB214
410.14	48.	40.78	1.16	2.152E-02				
463.92	113.	23.62	2.15	1.951E-02	463.51	10.000	4.035E-01	SB125
511.11	296.	11.66	1.64	1.807E-02	510.72	22.500	4.623E-01	TL208
583.47	594.	6.54	2.11	1.628E-02	583.14	86.000	3.013E-01	TL208
609.48	558.	5.60	1.98	1.574E-02	609.32	46.090	5.458E-01	BI214
728.28	161.	16.02	2.00	1.373E-02	727.17	11.800	7.058E-01	BI212
795.64	83.	22.65	1.70	1.284E-02				
795.64	83.	22.65	1.70	1.284E-02	795.76	85.400	5.403E-02	CS134

911.41	431.	7.11	2.44	1.160E-02	911.07	29.000	9.066E-01	AC228
934.60	84.	29.85	2.05	1.139E-02				
968.22	366.	7.90	1.96	1.110E-02	968.90	17.460	1.345E+00	AC228
1120.35	134.	21.64	2.52	9.970E-03	1120.28	15.040	6.373E-01	BI214
1461.17	2190.	2.22	2.46	8.189E-03	1460.75	10.700	1.785E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1765.15	100.	10.71	2.86	7.084E-03	1764.51	15.920	6.316E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
126.02	63.17	1340.	144.	0.072	122.71	1.432	PA-234	l
540.27	270.32	477.	157.	0.079	71.33	1.701	AC-228	s
819.88	410.14	162.	48.	0.024	122.33	1.158	AC-228	
1868.77	934.60	120.	89.	0.045	61.00	2.047	BI-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	969.	409.	0.205	35.16	1.178D
PB-212	153.89	77.11	1029.	503.	0.251	24.65	1.179A
EU-155	174.32	87.33	1971.	168.	0.084	114.71	1.500s
CD-109	174.33	87.33	1764.	193.	0.097	94.46	1.500
RA-226	371.28	185.82	707.	282.	0.141	46.51	1.863s
TH-227	471.65	236.01	1858.	-230.	-0.115	82.10	1.500s
PB-212	476.89	238.63	575.	1335.	0.667	11.04	1.297D
PB-214	483.47	241.92	722.	195.	0.097	61.87	1.299D
PB-214	589.78	295.08	438.	356.	0.178	32.11	1.421s
AC-228	676.47	338.43	439.	366.	0.183	34.10	1.661s
PB-214	703.95	352.17	288.	672.	0.336	16.97	1.949s
SB-125	926.22	463.31	201.	91.	0.045	71.06	1.500s
TL-208	1021.80	511.11	283.	263.	0.131	34.99	1.636s
TL-208	1166.52	583.47	259.	590.	0.295	19.63	2.113s
BI-214	1218.54	609.48	154.	553.	0.277	16.81	1.976s
Ag-108M	1223.41	611.91	348.	-117.	-0.058	73.30	1.561s
Ag-108M	1454.17	727.30	75.	98.	0.049	48.41	1.635s
BI-212	1456.13	728.28	150.	160.	0.080	48.07	1.997s
CS-134	1590.40	795.41	128.	65.	0.033	82.02	1.684s
AC-228	1822.39	911.41	145.	426.	0.213	21.32	2.436s
AC-228	1936.01	968.22	117.	364.	0.182	23.69	1.960s
BI-214	2240.27	1120.35	174.	134.	0.067	64.93	2.520s
K-40	2921.93	1461.17	43.	2186.	1.093	6.66	2.456
BI-214	3529.94	1765.15	5.	100.	0.050	32.12	2.856s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O 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		4.7583E-02					
			477.56	4.758E-02	%(	2.757E-01 8.16E-02	G
K-40		1.7851E+01					
			1460.75	1.785E+01	(P	2.724E-01 3.97E-01	G
MN-54		-9.5784E-04					
			834.81	-9.578E-04	%(P	3.991E-02 1.16E-02	G
CO-57		-1.2589E-02					
			122.07	-1.259E-02	%(P	3.869E-02 1.17E-02	G K
			136.43	-1.946E-02	& P	3.043E-01 9.11E-02	G
CO-60		-1.2091E-02					
			1332.51	-1.209E-02	%(P	3.404E-02 9.78E-03	G K
			1173.23	-7.870E-03	& P	4.803E-02 1.39E-02	G K
Sr-85		-2.2185E-02					
			514.00	-2.219E-02	%(	4.001E-02 1.22E-02	G
Kr-85		-5.1861E+02					
			513.99	-5.186E+02	%(P	8.885E+02 2.70E+02	G
Y-88		8.2277E-04					
			1836.01	8.228E-04	%(P	2.045E-02 5.31E-03	G K
			898.02	-8.766E-03	% P	3.694E-02 1.08E-02	G
NB-94		3.3796E-04					
			871.10	3.380E-04	%(P	2.602E-02 7.42E-03	G K
			702.50	8.847E-03	% P	2.968E-02 8.84E-03	G K
Ag-108M		5.5956E-02					
			722.95	5.596E-02	?(	2.473E-02 9.03E-03	G K
			614.37	-5.910E-02	-	4.541E-02 1.44E-02	G
			433.93	-6.513E-04	% P	2.701E-02 7.85E-03	G
CD-109		1.1049E+00					
			88.04	1.105E+00	(P	1.134E+00 3.48E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	-1.4072E-03						
		391.71	-1.407E-03	&(P	4.328E-02	1.27E-02	G K
		255.04	-2.332E-01	&	1.399E+00	4.18E-01	G
SB-125	9.3937E-02						
		427.95	1.328E-02	&(P	8.632E-02	2.55E-02	G K
		600.77	3.754E-02	% P	1.507E-01	4.47E-02	G
		636.15	-5.678E-02	% P	2.542E-01	7.51E-02	G
		463.51	3.327E-01	(P	2.525E-01	8.13E-02	G
		176.29	-4.853E-02	& P	4.721E-01	1.41E-01	G
I-131	1.2954E-02						
		364.48	1.295E-02	%(	4.119E-02	1.23E-02	G K
		636.97	-1.040E-01	&	5.156E-01	1.52E-01	G
		284.29	1.594E-01	%	6.132E-01	1.84E-01	G
CS-134	1.8939E-02						
		604.66	-1.782E-03	&(P	7.165E-02	2.14E-02	G K
		795.76	4.262E-02	(P	3.638E-02	1.17E-02	G
		569.29	2.067E-02	%	1.729E-01	5.07E-02	G
		801.84	6.906E-05	% P	3.048E-01	8.71E-02	G
CS-137	1.0591E-02						
		661.62	1.059E-02	%(P	3.695E-02	1.10E-02	G
CE-139	5.6398E-03						
		165.85	5.640E-03	%(P	3.728E-02	1.12E-02	G
EU-152	-3.4252E-02						
		121.78	-3.425E-02	%(P	1.149E-01	3.46E-02	G K
		344.30	7.927E-03	& P	9.700E-02	2.87E-02	G
		1408.08	5.864E-02	% P	1.069E-01	3.28E-02	G
		964.00	-2.097E-03	& P	2.236E-01	6.42E-02	G
		1112.07	-2.696E-03	& P	3.120E-01	9.02E-02	G
		778.90	8.212E-02	% P	1.836E-01	5.54E-02	G
EU-154	-1.7197E-02						
		123.10	-1.720E-02	%(P	7.478E-02	2.25E-02	G K
		1274.80	-1.272E-02	% P	1.167E-01	3.39E-02	G
		723.30	-9.591E-02	% P	2.038E-01	6.17E-02	G
		1004.80	-2.817E-02	& P	1.855E-01	5.41E-02	G
EU-155	1.1177E-01						
		86.45	1.118E-01	&(	1.397E-01	4.27E-02	G K
		105.31	2.951E-02	% P	1.605E-01	4.82E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

HG-203      -7.6366E-04
                          279.17-7.637E-04 &(P 3.468E-02 1.03E-02 G K
                           72.87-6.813E-01 % P 1.092E+00 3.32E-01 G
                           70.83-7.487E-01 &   1.735E+00 5.26E-01 G
                           82.50-5.525E-01 %   1.829E+00 5.52E-01 G

TL-208       3.0127E-01
                          583.14 3.013E-01 *(P 3.973E-02 1.99E-02 G
                          510.72 4.623E-01 + P 1.428E-01 6.08E-02 G

PB-212       6.9504E-01
                          238.63 6.950E-01  (P 5.960E-02 2.59E-02 G K
                                                          Energy duplication
                           77.11 6.950E-01 }   2.105E-01 5.71E-02 G
                           74.81 1.071E+00 + P 3.866E-01 1.27E-01 G

PB-214       5.2450E-01
                          351.99 5.347E-01 *(P 6.502E-02 3.05E-02 G K
                          295.22 4.794E-01 *(P 1.350E-01 5.19E-02 G
                                                          Energy duplication
                           77.11 3.092E-01 } P 4.423E-01 1.28E-01 G
                          241.92 5.900E-01  (P 3.876E-01 1.23E-01 G

BI-212       7.0582E-01
                          727.17 7.058E-01 *(P 2.639E-01 1.14E-01 G K
                         1620.56 1.697E-01 % P 7.789E-01 2.20E-01 G
                          785.42-2.030E-03 % P 1.796E+00 5.21E-01 G

BI-214       5.8139E-01
                          609.32 5.458E-01 *(P 5.967E-02 3.08E-02 G K
                         1764.51 6.316E-01 @(P 8.654E-02 6.83E-02 G
                         1120.28 6.373E-01 *(P 3.068E-01 1.39E-01 G

RA-224       1.1725E-02
                          241.00 1.172E-02 %(P 9.389E-01 2.80E-01 G

RA-226       1.7034E+00
                          185.99 1.703E+00 *(  7.655E-01 2.64E-01 G

AC-228       8.9668E-01
                          911.07 9.066E-01  (P 1.249E-01 6.51E-02 G K
                          968.90 1.345E+00 + P 1.963E-01 1.07E-01 G
                          338.40 8.728E-01 *(P 2.391E-01 1.00E-01 G

TH-227      -4.5732E-01
                          236.00-4.573E-01 ?(P 4.052E-01 1.25E-01 G K
                          256.25-6.582E-02 & P 3.887E-01 1.16E-01 G
```

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234      -2.0047E-02
                           98.44-2.005E-02 &(  1.441E-01 4.33E-02 G K
                          946.00 4.567E-02 %   1.451E-01 4.31E-02 G
                          131.28 7.391E-02 %   1.484E-01 4.50E-02 G
                           94.67-7.843E-02 %   2.770E-01 8.36E-02 G
                          883.24 0.000E+00 %   2.713E-01 7.82E-02 G
                          926.70-6.346E-02 %   2.696E-01 7.95E-02 G
                          569.26 3.070E-02 %   2.556E-01 7.50E-02 G

TH-234       7.4928E-01
                           63.29 7.493E-01 %(P 1.757E+00 5.31E-01 G K
                           92.80 1.035E+00 % P 1.435E+00 4.37E-01 G
                           92.38-1.415E-01 % P 1.677E+00 5.02E-01 G

AM-241      -1.6876E-03
                           59.54-1.688E-03 %(P 2.338E-01 6.99E-02 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	4.5183E-02	4.7583E-02	2.4494E-01	2.4496E-01	2.618E-01
K-40		1.7851E+01	1.7851E+01	1.1912E+00	1.5907E+00	
MN-54	#A	-9.4940E-04	-9.5784E-04	5.9581E-02	5.9581E-02	3.956E-02
CO-57	#B	-1.2461E-02	-1.2589E-02	3.5378E-02	3.5385E-02	3.830E-02
CO-60	#B	-1.2073E-02	-1.2091E-02	4.9342E-02	4.9347E-02	3.399E-02
Sr-85	#A	-2.1259E-02	-2.2185E-02	3.6559E-02	3.6583E-02	3.834E-02
Kr-85	#A	-5.1860E+02	-5.1861E+02	9.0002E+02	9.0055E+02	8.884E+02
Y-88	#B	8.0171E-04	8.2277E-04	1.5944E-02	1.5944E-02	1.993E-02
NB-94	#B	3.3796E-04	3.3796E-04	2.2245E-02	2.2245E-02	2.602E-02
Ag-108M	#	5.5953E-02	5.5956E-02	2.7089E-02	2.7290E-02	2.473E-02
CD-109	#A	1.0981E+00	1.1049E+00	1.0454E+00	1.0472E+00	1.127E+00
SN-113	#B	-1.3738E-03	-1.4072E-03	1.8563E-01	1.8563E-01	4.225E-02
SB-125	#F	9.3680E-02	9.3937E-02	6.8829E-02	6.9052E-02	8.608E-02
I-131	#B	9.1855E-03	1.2954E-02	3.7040E-02	3.7048E-02	2.921E-02
CS-134	#B	1.8869E-02	1.8939E-02	1.5659E-02	1.5699E-02	7.139E-02
CS-137	#A	1.0589E-02	1.0591E-02	3.2906E-02	3.2912E-02	3.694E-02
CE-139	#A	5.5275E-03	5.6398E-03	3.3519E-02	3.3521E-02	3.654E-02
EU-152	#B	-3.4232E-02	-3.4252E-02	1.0448E-01	1.0450E-01	1.148E-01
EU-154	#B	-1.7181E-02	-1.7197E-02	6.9452E-02	6.9459E-02	7.471E-02
EU-155	#A	1.1160E-01	1.1177E-01	1.2821E-01	1.2836E-01	1.395E-01
HG-203	#B	-7.1967E-04	-7.6366E-04	1.0557E-01	1.0557E-01	3.268E-02
TL-208	#	3.0127E-01	3.0127E-01	5.9590E-02	6.2189E-02	
PB-212		6.9504E-01	6.9504E-01	7.7622E-02	8.7808E-02	
PB-214		5.2450E-01	5.2450E-01	8.9697E-02	9.4895E-02	
BI-212	#	7.0582E-01	7.0582E-01	3.4201E-01	3.4454E-01	
BI-214	#	5.8139E-01	5.8139E-01	9.8482E-02	1.0430E-01	
RA-224	#A	1.1725E-02	1.1725E-02	8.4046E-01	8.4046E-01	9.389E-01
RA-226	#	1.7034E+00	1.7034E+00	7.9217E-01	7.9853E-01	
AC-228	#	8.9668E-01	8.9668E-01	1.8195E-01	1.8950E-01	
TH-227	#A	-4.5732E-01	-4.5732E-01	3.7590E-01	3.7687E-01	4.052E-01
PA-234	#B	-2.0047E-02	-2.0047E-02	1.2981E-01	1.2982E-01	1.441E-01
TH-234	#B	7.4928E-01	7.4928E-01	1.5932E+00	1.5938E+00	1.757E+00
AM-241	#A	-1.6876E-03	-1.6876E-03	5.7456E-01	5.7456E-01	2.338E-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_29AUG2006_1254.An1

---------- S U M M A R Y ----------

Total Activity (270.2 to 2000.1 keV) 2.3258627E+01 pCi/gm
Total Decayed Activity (270.2 to 2000.1 keV) 2.3258635E+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_29AUG2006_1340.An1

Sample description
FSS-OOL-02-05-007-F

Spectrum Filename: C:\GammaVision\Spectra\107F_29AUG2006_1340.An1

Acquisition information
Start time: 29-Aug-2006 13:40:40
Live time: 2000
Real time: 2013
Dead time: 0.63 %
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: 1.9200E+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	25-Aug-2006 13:05:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2891

***** S U M M A R Y O F P E A K 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	407.	11.87	1.18	2.849E-02	74.81	9.600	1.046E+00	PB212
77.10	399.	10.17	1.18	2.957E-02	77.11	17.500	7.988E-01	PB212
					77.11	10.700	1.296E+00	PB214
77.29	170.	32.88	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
87.42	207.	31.89	1.50	3.310E-02	86.45	32.740	1.355E-01	EU155
					88.04	3.790	1.159E+00	CD109
93.21	189.	28.22	1.80	3.447E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.74	144.	35.99	1.51	3.817E-02				
186.12	231.	22.28	1.39	3.609E-02	185.99	3.280	1.374E+00	RA226
209.36	174.	22.88	1.13	3.428E-02				
238.79	1482.	3.50	1.30	3.187E-02	238.63	43.100	7.506E-01	PB212
					241.00	3.900	8.422E+00	RA224
242.07	257.	12.52	1.30	3.161E-02	241.92	7.470	7.626E-01	PB214
270.09	182.	21.23	2.02	2.946E-02				
277.90	115.	33.40	1.07	2.888E-02				
295.30	323.	8.80	1.34	2.767E-02	295.22	19.200	4.221E-01	PB214
300.38	96.	25.10	1.34	2.733E-02				
338.80	323.	12.11	1.83	2.498E-02	338.40	12.010	7.504E-01	AC228
352.06	613.	7.08	1.82	2.425E-02	351.99	37.100	4.753E-01	PB214
408.59	91.	27.60	1.85	2.158E-02				
463.08	103.	27.65	2.01	1.954E-02				
463.08	103.	27.65	2.01	1.954E-02	463.51	10.000	3.621E-01	SB125
511.66	278.	11.90	2.54	1.805E-02	510.72	22.500	4.224E-01	TL208
					513.99	0.004	2.500E+03	Kr85
					514.00	99.270	1.143E-01	Sr85

583.42	577.	6.95	2.18	1.628E-02	583.14	86.000	2.876E-01	TL208
609.51	511.	6.52	1.92	1.574E-02	609.32	46.090	4.918E-01	BI214
727.61	135.	13.04	2.05	1.374E-02	727.17	11.800	5.795E-01	BI212
786.35	37.	37.54	1.89	1.297E-02	785.42	2.000	PBC<MDA	BI212
795.37	64.	23.82	1.68	1.284E-02	795.76	85.400	4.138E-02	CS134
860.34	118.	16.30	2.17	1.211E-02				
911.40	363.	6.46	1.26	1.160E-02	911.07	29.000	7.501E-01	AC228
935.12	65.	37.23	0.81	1.139E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
965.33	77.	20.32	1.80	1.112E-02	964.00	14.580	PBC<MDA	EU152
969.21	225.	9.15	1.80	1.109E-02	968.90	17.460	8.104E-01	AC228
1120.94	177.	15.15	2.52	9.966E-03	1120.28	15.040	8.248E-01	BI214
1461.23	2049.	2.25	2.19	8.189E-03	1460.75	10.700	1.642E+01	K40
1621.89	22.	31.98	1.36	7.569E-03	1620.56	2.750	7.540E-01	BI212
1764.95	109.	9.53	2.12	7.084E-03	1764.51	15.920	6.809E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
257.14	128.74	993.	160.	0.080	86.94	1.509	AC-228	s
418.36	209.36	618.	174.	0.087	68.65	1.134	AC-228	s
539.80	270.09	468.	182.	0.091	63.68	2.025	AC-228	s
555.44	277.90	472.	125.	0.063	78.45	1.068	NP-239	s
600.31	300.34	279.	99.	0.049	79.65	0.969	PB-212	M
816.78	408.59	216.	91.	0.045	82.81	1.853	CS-138	s
1720.25	860.34	84.	118.	0.059	48.90	2.170	TL-208	s
1869.80	935.12	120.	70.	0.035	75.97	0.806	BI-214	s
1930.57	965.22	85.	75.	0.037	62.86	1.797	AC-228	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: FSS_Rev_1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.29	74.81	984.	407.	0.203	35.60	1.178D
PB-212	153.89	77.11	1064.	399.	0.199	30.50	1.179A
PB-214	153.89	77.11	1774.	170.	0.085	98.63	1.500A
EU-155	173.94	87.14	1713.	217.	0.109	83.29	1.500s
CD-109	173.93	87.13	1500.	206.	0.103	82.49	1.500s
TH-234	186.24	93.29	1586.	193.	0.097	86.41	1.500s
TH-234	186.24	93.29	1632.	189.	0.094	84.27	1.500s
RA-226	371.88	186.12	896.	231.	0.116	66.83	1.388s
TH-227	471.85	236.11	1711.	-217.	-0.108	83.64	1.500s
PB-212	476.89	238.63	548.	1452.	0.726	10.29	1.297D
RA-224	477.25	238.81	792.	1482.	0.741	11.18	1.500s
PB-214	483.47	241.92	662.	253.	0.127	46.74	1.299D
PB-214	590.25	295.32	548.	460.	0.230	30.31	1.785s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	677.22	338.80	394.	320.	0.160	36.34	1.835s
PB-214	703.74	352.06	389.	608.	0.304	21.23	1.821s
SB-125	925.73	463.06	202.	71.	0.036	88.23	1.500s
TL-208	1022.92	511.66	260.	244.	0.122	35.69	2.541s
TL-208	1166.42	583.42	263.	572.	0.286	20.86	2.183s
BI-214	1218.60	609.51	186.	507.	0.253	19.56	1.918s
BI-212	1454.79	727.61	80.	134.	0.067	39.12	2.045s
BI-212	1572.27	786.35	73.	37.	0.019	112.62	1.885
CS-134	1590.31	795.37	87.	64.	0.032	71.45	1.684s
AC-228	1822.37	911.40	76.	359.	0.179	19.39	1.265
AC-228	1937.36	968.90	115.	223.	0.111	28.31	1.799D
BI-214	2241.45	1120.94	126.	176.	0.088	45.45	2.520s
K-40	2922.06	1461.23	25.	2044.	1.022	6.76	2.187
BI-212	3243.41	1621.89	10.	22.	0.011	95.94	1.365s
BI-214	3529.55	1764.95	1.	109.	0.055	28.60	2.125

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/gm	Peak Energy keV	Peak Activity pCi/gm	Peak Code	MDA Value pCi/gm	COMMENTS
BE-7		4.1467E-02					
			477.56	4.147E-02	&(	2.384E-01	7.04E-02 G
K-40		1.6418E+01					
			1460.75	1.642E+01	(P	2.071E-01	3.71E-01 G
MN-54		-1.1687E-02					
			834.81	-1.169E-02	%(P	3.168E-02	9.48E-03 G
CO-57		3.5080E-03					
			122.07	3.508E-03	%(P	3.645E-02	1.09E-02 G K
			136.43	-5.025E-02	& P	3.017E-01	9.06E-02 G
CO-60		-2.9500E-04					
			1332.51	-2.950E-04	%(P	2.865E-02	7.87E-03 G K
			1173.23	-1.040E-03	% P	4.867E-02	1.41E-02 G K
Sr-85		-2.0156E-02					
			514.00	-2.016E-02	&(	3.760E-02	1.14E-02 G
Kr-85		-4.7309E+02					
			513.99	-4.731E+02	&(P	8.349E+02	2.53E+02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-88	-3.9478E-03						
		1836.01	-3.948E-03	%(P	2.527E-02	6.90E-03	G K
		898.02	6.421E-04	% P	3.124E-02	8.93E-03	G
NB-94	5.4584E-03						
		871.10	5.458E-03	&(P	2.326E-02	6.81E-03	G K
		702.50	3.394E-03	% P	3.041E-02	8.91E-03	G K
Ag-108M	-6.6679E-03						
		722.95	-6.668E-03	%(	3.400E-02	1.00E-02	G K
		614.37	-1.485E-02	&	3.722E-02	1.12E-02	G
		433.93	-6.320E-04	& P	2.935E-02	8.57E-03	G
CD-109	1.1547E+00						
		88.04	1.155E+00	(P	1.029E+00	3.18E-01	G
SN-113	-3.5969E-03						
		391.71	-3.597E-03	&(P	4.015E-02	1.18E-02	G K
		255.04	-4.263E-01	%	1.355E+00	4.08E-01	G
SB-125	6.9608E-02						
		427.95	6.296E-03	%(P	8.660E-02	2.54E-02	G K
		600.77	2.766E-02	% P	1.358E-01	4.00E-02	G
		636.15	2.668E-02	% P	1.901E-01	5.52E-02	G
		463.51	2.570E-01	@(P	2.493E-01	7.86E-02	G
		176.29	-8.437E-03	% P	4.422E-01	1.32E-01	G
I-131	4.5266E-03						
		364.48	4.527E-03	%(	4.333E-02	1.28E-02	G K
		636.97	8.663E-02	&	4.728E-01	1.39E-01	G
		284.29	5.288E-02	%	6.028E-01	1.79E-01	G
CS-134	-2.3314E-02						
		604.66	-2.331E-02	&(P	3.784E-02	1.16E-02	G K
		795.76	4.138E-02	+ P	2.976E-02	9.94E-03	G
		569.29	-4.989E-02	%	1.770E-01	5.28E-02	G
		801.84	-4.588E-03	% P	2.646E-01	7.51E-02	G
CS-137	-2.5138E-03						
		661.62	-2.514E-03	%(P	4.042E-02	1.17E-02	G
CE-139	2.3904E-03						
		165.85	2.390E-03	&(P	3.674E-02	1.10E-02	G
EU-152	-1.6905E-02						
		121.78	-1.690E-02	&(P	1.011E-01	3.03E-02	G K
		344.30	-2.268E-02	% P	1.011E-01	3.02E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1408.08	-2.796E-03	% P	1.316E-01	3.64E-02	G
		964.00	-9.559E-02	& P	3.396E-01	1.02E-01	G
		1112.07	-3.977E-02	% P	2.646E-01	7.71E-02	G
		778.90	3.162E-02	% P	2.358E-01	6.90E-02	G
EU-154	1.8625E-04						
		123.10	1.862E-04	%(P	7.039E-02	2.10E-02	G K
		1274.80	-7.332E-04	% P	1.238E-01	3.57E-02	G
		723.30	-3.667E-02	% P	1.581E-01	4.68E-02	G
		1004.80	-5.992E-03	% P	1.741E-01	4.99E-02	G
EU-155	1.4254E-01						
		86.45	1.425E-01	(	1.282E-01	3.96E-02	G K
		105.31	7.249E-02	% P	1.494E-01	4.53E-02	G
HG-203	-3.7358E-03						
		279.17	-3.736E-03	%(P	3.691E-02	1.10E-02	G K
		72.87	-3.250E-01	% P	1.059E+00	3.20E-01	G
		70.83	-8.574E-03	%	1.670E+00	5.00E-01	G
		82.50	-9.432E-01	%	2.074E+00	6.29E-01	G
TL-208	2.8760E-01						
		583.14	2.876E-01	*(P	3.930E-02	2.02E-02	G
		510.72	4.224E-01	+ P	1.346E-01	5.72E-02	G
PB-212	7.5936E-01						
		238.63	7.433E-01	(P	5.725E-02	2.58E-02	G K
							Energy duplication
		77.11	5.423E-01	}	2.104E-01	5.51E-02	G
		74.81	1.046E+00	+ P	3.832E-01	1.25E-01	G
PB-214	4.7532E-01						
		351.99	4.753E-01	*(P	7.402E-02	3.39E-02	G K
		295.22	6.094E-01	+ P	1.481E-01	6.22E-02	G
							Energy duplication
		77.11	3.786E-01	} P	4.426E-01	1.24E-01	G
		241.92	7.545E-01	+ P	3.651E-01	1.18E-01	G
BI-212	6.1246E-01						
		727.17	5.795E-01	(P	1.932E-01	7.63E-02	G K
		1620.56	7.540E-01	*(P	5.825E-01	2.47E-01	G
		785.42	1.013E+00	+ P	1.152E+00	3.94E-01	G
BI-214	4.9180E-01						
		609.32	4.918E-01	*(P	6.429E-02	3.23E-02	G K
		1764.51	6.809E-01	+ P	4.600E-02	6.55E-02	G
		1120.28	8.248E-01	+ P	2.585E-01	1.26E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RA-224	8.4376E+00						
		241.00	8.438E+00	?(P	7.618E-01	3.15E-01	G
RA-226	1.3736E+00						
		185.99	1.374E+00	*(	8.452E-01	3.06E-01	G
AC-228	7.6797E-01						
		911.07	7.501E-01	(P	9.074E-02	4.91E-02	G K
		968.90	8.097E-01	(P	1.916E-01	7.72E-02	G
		338.40	7.504E-01	*(P	2.231E-01	9.18E-02	G
TH-227	-4.2400E-01						
		236.00	-4.240E-01	&(P	3.826E-01	1.18E-01	G K
		256.25	-1.220E-01	% P	3.748E-01	1.12E-01	G
PA-234	-4.2272E-02						
		98.44	-4.227E-02	%(	1.271E-01	3.84E-02	G K
		946.00	-1.899E-02	&	1.631E-01	4.76E-02	G
		131.28	-2.555E-02	&	1.619E-01	4.86E-02	G
		94.67	-9.803E-02	%	2.278E-01	6.90E-02	G
		883.24	0.000E+00	%	2.990E-01	8.67E-02	G
		926.70	-5.762E-02	%	2.782E-01	8.18E-02	G
		569.26	-7.400E-02	%	2.617E-01	7.80E-02	G
TH-234	8.2248E-01						
		63.29	-1.105E-02	&(P	1.634E+00	4.87E-01	G K
		92.80	1.289E+00	(P	1.303E+00	4.00E-01	G
		92.38	1.543E+00	(P	1.504E+00	4.63E-01	G
AM-241	2.0744E-02						
		59.54	2.074E-02	&(P	2.046E-01	6.13E-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	3.9357E-02	4.1467E-02	2.1110E-01	2.1111E-01	2.263E-01
K-40		1.6418E+01	1.6418E+01	1.1130E+00	1.4762E+00	
MN-54	#A	-1.1583E-02	-1.1687E-02	2.9662E-02	2.9670E-02	3.140E-02
CO-57	#B	3.4719E-03	3.5080E-03	3.2753E-02	3.2754E-02	3.608E-02
CO-60	#B	-2.9457E-04	-2.9500E-04	2.8700E-02	2.8700E-02	2.861E-02
Sr-85	#A	-1.9307E-02	-2.0156E-02	3.4327E-02	3.4347E-02	3.602E-02
Kr-85	#A	-4.7307E+02	-4.7309E+02	8.5183E+02	8.5228E+02	8.349E+02
Y-88	#B	-3.8459E-03	-3.9478E-03	3.2268E-02	3.2269E-02	2.461E-02
NB-94	#B	5.4584E-03	5.4584E-03	2.0437E-02	2.0440E-02	2.326E-02
Ag-108M	#B	-6.6675E-03	-6.6679E-03	3.0134E-02	3.0136E-02	3.400E-02
CD-109	#	1.1477E+00	1.1547E+00	9.5403E-01	9.5618E-01	1.023E+00
SN-113	#B	-3.5108E-03	-3.5969E-03	5.9441E-02	5.9441E-02	3.919E-02
SB-125	#B	6.9417E-02	6.9608E-02	6.3844E-02	6.3977E-02	8.636E-02
I-131	#B	3.1994E-03	4.5266E-03	3.8448E-02	3.8449E-02	3.063E-02
CS-134	#B	-2.3228E-02	-2.3314E-02	3.5413E-02	3.5439E-02	3.770E-02
CS-137	#A	-2.5132E-03	-2.5138E-03	3.0209E-01	3.0209E-01	4.041E-02
CE-139	#A	2.3424E-03	2.3904E-03	3.2931E-02	3.2931E-02	3.600E-02
EU-152	#B	-1.6895E-02	-1.6905E-02	9.1968E-02	9.1972E-02	1.011E-01
EU-154	#B	1.8608E-04	1.8625E-04	6.2949E-02	6.2949E-02	7.032E-02
EU-155	#	1.4232E-01	1.4254E-01	1.1872E-01	1.1898E-01	1.280E-01
HG-203	#B	-3.5187E-03	-3.7358E-03	4.1104E-02	4.1105E-02	3.477E-02
TL-208	#	2.8760E-01	2.8760E-01	6.0457E-02	6.2798E-02	
PB-212		7.5936E-01	7.5936E-01	7.8964E-02	9.0811E-02	
PB-214		4.7532E-01	4.7532E-01	1.0174E-01	1.0554E-01	
BI-212		6.1246E-01	6.1246E-01	2.4193E-01	2.4461E-01	
BI-214		4.9180E-01	4.9180E-01	9.6998E-02	1.0125E-01	
RA-224	#	8.4376E+00	8.4376E+00	9.4515E-01	1.0685E+00	7.618E-01
RA-226	#	1.3736E+00	1.3736E+00	9.1794E-01	9.2152E-01	
AC-228		7.6797E-01	7.6797E-01	1.2925E-01	1.3698E-01	
TH-227	#A	-4.2400E-01	-4.2400E-01	3.5507E-01	3.5595E-01	3.826E-01

PA-234 #B	-4.2272E-02	-4.2272E-02	1.1505E-01	1.1508E-01	1.271E-01

TH-234 #B	8.2248E-01	8.2248E-01	7.4000E-01	7.4140E-01	1.634E+00
AM-241 #A	2.0744E-02	2.0744E-02	1.8391E-01	1.8391E-01	2.046E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1120.2 to 2000.1 keV) 2.1186460E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 2.1186468E+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_29AUG2006_1420.An1

Sample description
FSS-OOL-02-05-022-F-I

Spectrum Filename: C:\GammaVision\Spectra\107F_29AUG2006_1420.An1

Acquisition information
Start time: 29-Aug-2006 14:20:30
Live time: 2000
Real time: 2003
Dead time: 0.14 %
Detector ID: 2

Detector system
Det 107- DSPE- 634

Calibration
Filename: D7_1LSa.Clb
Detector 107 Calibration for 1 Liter Sand Marinelli

Energy Calibration
Created: 29-Oct-2004 06:48:53
Zero offset: 0.157 keV
Gain: 0.500 keV/channel
Quadratic: -1.676E-08 keV/channel^2

Efficiency Calibration
Created: 29-Oct-2004 06:51:32
Type: Polynomial
Uncertainty: 1.174 %
Coefficients: -0.279532 -4.778179 0.614896
-0.087174 0.005356 -0.000131

Library Files
Main analysis library: FSS_Rev_1.Lib
Library Match Width: 1.000
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9100E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9100E+03) =
5.2356E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

Fraction Limit:	0.000%
Background width:	average of five points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	28-Aug-2006 15:35:00
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. 19 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.2329

***** S U M M A R Y O F P E A K 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	383.	12.27	1.18	2.849E-02	74.81	9.600	9.913E-01	PB212
77.16	382.	10.67	1.18	2.957E-02	77.11	17.500	7.654E-01	PB212
					77.11	10.700	1.241E+00	PB214
77.20	168.	32.74	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
87.02	169.	39.58	0.97	3.300E-02	86.45	32.740	1.113E-01	EU155
93.45	157.	36.48	0.82	3.452E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
106.22	140.	38.77	1.18	3.658E-02	105.31	21.800	PBC<MDA	EU155
186.23	240.	20.34	1.99	3.608E-02	185.99	3.280	1.434E+00	RA226
239.12	2035.	3.64	1.57	3.186E-02	238.63	43.100	1.039E+00	PB212
					241.00	3.900	1.163E+01	RA224
242.07	218.	18.00	1.30	3.163E-02	241.92	7.470	6.528E-01	PB214
270.39	120.	24.87	2.32	2.943E-02				
295.40	224.	12.41	1.34	2.768E-02	295.22	19.200	2.921E-01	PB214
300.49	87.	26.88	1.34	2.734E-02				
338.56	359.	9.57	1.88	2.499E-02	338.40	12.010	8.387E-01	AC228
352.01	564.	7.86	1.67	2.426E-02	351.99	37.100	4.395E-01	PB214
462.97	163.	19.33	1.69	1.955E-02				
462.97	163.	19.33	1.69	1.955E-02	463.51	10.000	5.815E-01	SB125
511.20	256.	10.53	2.01	1.807E-02	510.72	22.500	3.858E-01	TL208
583.32	562.	7.02	2.33	1.629E-02	583.14	86.000	2.814E-01	TL208
609.21	401.	8.13	2.13	1.574E-02	609.32	46.090	3.864E-01	BI214
727.94	135.	15.80	2.16	1.373E-02	727.17	11.800	5.816E-01	BI212
795.14	55.	28.99	1.68	1.284E-02	795.76	85.400	3.565E-02	CS134
861.14	95.	22.93	1.68	1.210E-02				
911.45	404.	8.81	2.01	1.160E-02	911.07	29.000	8.398E-01	AC228

964.47	54.	26.67	1.80	1.113E-02				
969.27	222.	8.88	1.80	1.109E-02	968.90	17.460	8.036E-01	AC228
1121.20	104.	22.02	1.65	9.964E-03	1120.28	15.040	4.847E-01	BI214
1461.19	2402.	2.07	2.48	8.189E-03	1460.75	10.700	1.935E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1765.15	75.	15.34	1.87	7.084E-03	1764.51	15.920	4.712E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide	
173.71	87.02	1656.	169.	0.084	118.74	0.972	PB-214	l
212.10	106.22	1114.	140.	0.070	116.32	1.178	NP-239	l
540.40	270.39	349.	120.	0.060	74.62	2.321	AC-228	s
600.22	300.30	272.	74.	0.037	100.78	1.573	PB-212	M
925.53	462.97	338.	70.	0.035	117.03	1.695	AC-228	s
1721.85	861.14	115.	95.	0.047	68.79	1.676	TL-208	s
1929.66	964.72	67.	63.	0.031	67.45	1.797	AC-228	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: FSS_Rev_1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.29	74.81	939.	383.	0.192	36.81	1.178D
PB-212	153.89	77.11	1046.	382.	0.191	32.02	1.179A
PB-214	153.89	77.11	1711.	168.	0.084	98.23	1.500A
TH-234	185.96	93.15	1790.	152.	0.076	114.41	1.500
RA-226	372.11	186.23	824.	240.	0.120	61.01	1.986s
PB-212	476.89	238.63	543.	1383.	0.692	10.62	1.297D
RA-224	477.26	238.81	907.	1309.	0.655	12.78	1.500s
PB-214	483.47	241.92	672.	218.	0.109	54.01	1.299D
PB-214	590.03	295.21	477.	236.	0.118	48.60	1.814s
AC-228	676.73	338.56	320.	356.	0.178	28.72	1.876s
PB-214	703.63	352.01	418.	559.	0.280	23.59	1.668s
SB-125	925.83	463.11	198.	90.	0.045	70.74	1.500s
TL-208	1022.00	511.20	195.	222.	0.111	31.59	2.008s
TL-208	1166.22	583.32	260.	557.	0.279	21.07	2.326s
BI-214	1218.01	609.21	199.	396.	0.198	24.40	2.126s
Ag-108M	1223.25	611.84	298.	-96.	-0.048	81.83	1.561s
BI-212	1455.44	727.94	115.	133.	0.067	47.39	2.160s
CS-134	1589.85	795.14	103.	55.	0.028	86.98	1.684s
AC-228	1822.47	911.45	191.	400.	0.200	26.42	2.007
AC-228	1937.36	968.90	98.	220.	0.110	27.44	1.799D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2241.98	1121.20	135.	103.	0.051	66.05	1.653s
K-40	2921.98	1461.19	20.	2397.	1.198	6.20	2.481
BI-214	3529.94	1765.15	13.	75.	0.038	46.03	1.867s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O 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		8.4392E-02					
			477.56	8.439E-02	%(	2.442E-01	7.32E-02 G
K-40		1.9348E+01					
			1460.75	1.935E+01	(P	1.911E-01	4.01E-01 G
MN-54		1.6948E-02					
			834.81	1.695E-02	%(P	3.160E-02	9.63E-03 G
CO-57		1.3649E-03					
			122.07	1.365E-03	%(P	3.364E-02	1.00E-02 G K
			136.43	-9.563E-03	% P	2.765E-01	8.26E-02 G
CO-60		-1.6656E-03					
			1332.51	-1.666E-03	&(P	3.236E-02	8.95E-03 G K
			1173.23	-8.410E-03	& P	4.208E-02	1.21E-02 G K
Sr-85		-1.7022E-02					
			514.00	-1.702E-02	%(	3.677E-02	1.11E-02 G
Kr-85		-4.1637E+02					
			513.99	-4.164E+02	%(P	8.437E+02	2.55E+02 G
Y-88		9.3825E-04					
			1836.01	9.383E-04	%(P	1.936E-02	5.03E-03 G K
			898.02	-5.211E-03	% P	3.520E-02	1.02E-02 G
NB-94		2.1856E-05					
			871.10	2.186E-05	&(P	3.075E-02	8.85E-03 G K
			702.50	1.115E-02	% P	2.519E-02	7.60E-03 G K
Ag-108M		-1.3852E-02					
			722.95	-1.385E-02	&(	3.983E-02	1.20E-02 G K
			614.37	-4.825E-02	+	4.159E-02	1.32E-02 G
			433.93	3.027E-03	& P	2.049E-02	5.98E-03 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	4.1841E-03						
		88.04	4.184E-03	%(P	1.172E+00	3.51E-01	G
SN-113	-4.9254E-03						
		391.71	-4.925E-03	&(P	4.020E-02	1.18E-02	G K
		255.04	-2.005E-01	%	1.275E+00	3.81E-01	G
SB-125	9.4548E-02						
		427.95	1.579E-02	%(P	7.906E-02	2.34E-02	G K
		600.77	-4.519E-02	% P	1.555E-01	4.61E-02	G
		636.15	-4.280E-02	% P	2.433E-01	7.15E-02	G
		463.51	3.277E-01	*(P	2.474E-01	7.97E-02	G
		176.29	-7.910E-03	& P	3.828E-01	1.14E-01	G
I-131	0.0000E+00						
		364.48	0.000E+00	%(	3.329E-02	9.77E-03	G K
		636.97	-7.818E-02	%	3.886E-01	1.15E-01	G
		284.29	-1.151E-01	%	4.817E-01	1.44E-01	G
CS-134	1.7049E-02						
		604.66	7.709E-04	&(P	5.808E-02	1.73E-02	G K
		795.76	3.565E-02	(P	3.232E-02	1.04E-02	G
		569.29	3.599E-02	%	1.782E-01	5.28E-02	G
		801.84	1.074E-01	% P	2.757E-01	8.26E-02	G
CS-137	1.2581E-02						
		661.62	1.258E-02	%(P	3.381E-02	1.01E-02	G
CE-139	1.0173E-02						
		165.85	1.017E-02	%(P	3.544E-02	1.07E-02	G
EU-152	7.2384E-03						
		121.78	7.238E-03	%(P	1.047E-01	3.13E-02	G K
		344.30	-7.036E-03	% P	9.165E-02	2.70E-02	G
		1408.08	7.199E-02	% P	1.132E-01	3.52E-02	G
		964.00	-7.993E-02	% P	3.028E-01	9.02E-02	G
		1112.07	-2.664E-03	& P	2.921E-01	8.42E-02	G
		778.90	-3.701E-02	% P	2.598E-01	7.62E-02	G
EU-154	3.1203E-03						
		123.10	3.120E-03	%(P	7.835E-02	2.34E-02	G K
		1274.80	3.917E-02	& P	9.571E-02	2.87E-02	G
		723.30	-9.034E-02	% P	1.953E-01	5.91E-02	G
		1004.80	-3.651E-02	& P	2.110E-01	6.20E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	6.0326E-02						
		86.45	6.033E-02	%(	1.350E-01	4.09E-02	G K
		105.31	7.667E-02	% P	1.566E-01	4.75E-02	G
HG-203	-3.1643E-03						
		279.17	-3.164E-03	%(P	3.457E-02	1.03E-02	G K
		72.87	-3.995E-01	% P	9.516E-01	2.88E-01	G
		70.83	-1.106E+00	&	1.669E+00	5.09E-01	G
		82.50	-3.517E-01	%	1.705E+00	5.13E-01	G
TL-208	2.8143E-01						
		583.14	2.814E-01	*(P	3.930E-02	1.99E-02	G
		510.72	3.858E-01	+ P	1.179E-01	4.68E-02	G
PB-212	7.2733E-01						
		238.63	7.119E-01	(P	5.728E-02	2.55E-02	G K
							Energy duplication
		77.11	5.218E-01	}	2.098E-01	5.57E-02	G
		74.81	9.913E-01	+ P	3.763E-01	1.23E-01	G
PB-214	4.3952E-01						
		351.99	4.395E-01	*(P	7.702E-02	3.49E-02	G K
		295.22	3.141E-01	- P	1.391E-01	5.18E-02	G
							Energy duplication
		77.11	3.767E-01	} P	4.370E-01	1.23E-01	G
		241.92	6.528E-01	+ P	3.698E-01	1.18E-01	G
BI-212	5.8163E-01						
		727.17	5.816E-01	*(P	2.296E-01	9.28E-02	G K
		1620.56	4.584E-01	& P	7.963E-01	2.46E-01	G
		785.42	5.822E-01	% P	1.694E+00	5.06E-01	G
BI-214	4.2311E-01						
		609.32	3.864E-01	*(P	6.670E-02	3.18E-02	G K
		1764.51	4.712E-01	@(P	1.220E-01	7.32E-02	G
		1120.28	4.847E-01	(P	2.685E-01	1.08E-01	G
RA-224	7.4908E+00						
		241.00	7.491E+00	?(P	8.187E-01	3.20E-01	G
RA-226	1.4340E+00						
		185.99	1.434E+00	*(	8.154E-01	2.92E-01	G
AC-228	8.2890E-01						
		911.07	8.398E-01	(P	1.412E-01	7.48E-02	G K
		968.90	8.041E-01	(P	1.783E-01	7.43E-02	G
		338.40	8.387E-01	*(P	2.028E-01	8.11E-02	G

```
 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

TH-227       4.7986E-02
                          236.00 4.799E-02 %(P 3.617E-01 1.09E-01 G K
                          256.25-1.932E-02 & P 3.906E-01 1.16E-01 G

PA-234       4.1172E-04
                           98.44 4.117E-04 %(  1.202E-01 3.58E-02 G K
                          946.00-3.005E-02 %   1.804E-01 5.31E-02 G
                          131.28-3.215E-02 &   1.634E-01 4.91E-02 G
                           94.67-3.058E-02 %   2.605E-01 7.82E-02 G
                          883.24 5.967E-02 %   2.061E-01 6.09E-02 G
                          926.70 1.252E-01 %   2.413E-01 7.36E-02 G
                          569.26 5.332E-02 %   2.642E-01 7.82E-02 G

TH-234       8.0162E-01
                           63.29 5.255E-01 %(P 1.681E+00 5.06E-01 G K
                           92.80 9.731E-01 % P 1.360E+00 4.14E-01 G
                           92.38 1.221E+00  (P 1.605E+00 4.90E-01 G

AM-241      -7.7579E-04
                           59.54-7.758E-04 %(P 2.239E-01 6.69E-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	8.3360E-02	8.4392E-02	2.1973E-01	2.1979E-01	2.412E-01
K-40		1.9348E+01	1.9348E+01	1.2024E+00	1.6588E+00	
MN-54	#A	1.6912E-02	1.6948E-02	2.8891E-02	2.8908E-02	3.154E-02
CO-57	#B	1.3615E-03	1.3649E-03	3.0131E-02	3.0131E-02	3.356E-02
CO-60	#B	-1.6650E-03	-1.6656E-03	9.2104E-02	9.2104E-02	3.235E-02
Sr-85	#A	-1.6851E-02	-1.7022E-02	3.3423E-02	3.3438E-02	3.640E-02
Kr-85	#A	-4.1637E+02	-4.1637E+02	8.7128E+02	8.7162E+02	8.437E+02
Y-88	#B	9.3248E-04	9.3825E-04	1.5080E-02	1.5080E-02	1.924E-02
NB-94	#B	2.1856E-05	2.1856E-05	2.6538E-02	2.6538E-02	3.075E-02
Ag-108M	#B	-1.3851E-02	-1.3852E-02	3.5866E-02	3.5876E-02	3.983E-02
CD-109	#A	4.1781E-03	4.1841E-03	1.0529E+00	1.0529E+00	1.170E+00
SN-113	#B	-4.8974E-03	-4.9254E-03	5.1417E-02	5.1418E-02	3.997E-02
SB-125	#F	9.4486E-02	9.4548E-02	6.8965E-02	6.9191E-02	7.900E-02
I-131	#B	0.0000E+00	0.0000E+00	2.9319E-02	2.9319E-02	3.067E-02
CS-134	#B	1.7034E-02	1.7049E-02	1.4970E-02	1.5004E-02	5.803E-02
CS-137	#A	1.2581E-02	1.2581E-02	3.0289E-02	3.0298E-02	3.381E-02
CE-139	#A	1.0124E-02	1.0173E-02	3.2021E-02	3.2026E-02	3.527E-02
EU-152	#B	7.2374E-03	7.2384E-03	9.3922E-02	9.3923E-02	1.046E-01
EU-154	#B	3.1196E-03	3.1203E-03	7.0283E-02	7.0283E-02	7.834E-02
EU-155	#B	6.0305E-02	6.0326E-02	1.2272E-01	1.2276E-01	1.349E-01
HG-203	#B	-3.1200E-03	-3.1643E-03	3.9625E-02	3.9625E-02	3.409E-02
TL-208	#	2.8143E-01	2.8143E-01	5.9785E-02	6.2053E-02	
PB-212		7.2733E-01	7.2733E-01	7.8134E-02	8.9163E-02	
PB-214		4.3952E-01	4.3952E-01	1.0462E-01	1.0779E-01	
BI-212	#	5.8163E-01	5.8163E-01	2.7831E-01	2.8042E-01	
BI-214	#	4.2311E-01	4.2311E-01	1.0437E-01	1.0732E-01	
RA-224	#	7.4908E+00	7.4908E+00	9.5908E-01	1.0562E+00	8.187E-01
RA-226	#	1.4340E+00	1.4340E+00	8.7491E-01	8.7900E-01	
AC-228		8.2890E-01	8.2890E-01	1.3313E-01	1.4185E-01	
TH-227	#B	4.7986E-02	4.7986E-02	3.2571E-01	3.2572E-01	3.617E-01
PA-234	#B	4.1172E-04	4.1172E-04	1.0744E-01	1.0744E-01	1.202E-01
TH-234	#B	8.0162E-01	8.0162E-01	9.6518E-01	9.6620E-01	1.681E+00
AM-241	#A	-7.7578E-04	-7.7579E-04	2.5513E-01	2.5513E-01	2.239E-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_29AUG2006_1420.An1

---------- S U M M A R Y ----------

Total Activity (1120.2 to 2000.1 keV) 2.4064224E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 2.4064226E+01 pCi/gm

The library has energies which are not separable.

Analyzed by: _____
JPK

Reviewed by: _____
Supervisor

Laboratory: YAEC Chemistry Lab