

Sample description
FSS-OOL-12-01-017-F

Spectrum Filename: C:\GammaVision\Spectra\101F_22AUG2006_1254.An1

Acquisition information

Start time: 22-Aug-2006 12:54:59
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9580E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9580E+03) =
5.1073E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	19-Aug-2006 13:05:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.0969

***** S U M M A R Y O F P E A K 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	214.	15.07	1.00	1.658E-02	74.81	9.600	9.081E-01	PB212
77.84	173.	21.00	1.01	1.739E-02	77.11	17.500	3.976E-01	PB212
					77.11	10.700	6.363E-01	PB214
87.26	143.	21.03	1.01	1.922E-02	86.45	32.740	1.577E-01	EU155
90.27	74.	38.15	1.02	1.961E-02	88.04	3.790	PBC<MDA	CD109
93.03	134.	22.05	1.02	1.992E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.25	94.	39.60	1.11	2.109E-02				
185.87	119.	27.79	1.53	1.859E-02				
185.87	119.	27.79	1.53	1.859E-02	185.99	3.280	1.347E+00	RA226
209.68	82.	37.61	1.07	1.719E-02				
238.81	823.	4.12	1.12	1.556E-02	238.63	43.100	8.397E-01	PB212
					241.00	3.900	9.417E+00	RA224
241.61	105.	22.39	1.12	1.541E-02				
246.00	59.	38.84	1.50	1.540E-02	241.92	7.470	PBC<MDA	PB214
270.21	74.	28.62	1.42	1.400E-02				
277.14	66.	37.53	1.10	1.369E-02				
295.42	168.	13.38	1.11	1.291E-02	295.22	19.200	4.613E-01	PB214
300.41	76.	29.74	1.10	1.271E-02				
338.52	206.	13.35	1.12	1.135E-02	338.40	12.010	1.034E+00	AC228
351.95	294.	9.64	1.26	1.093E-02				
351.95	294.	9.64	1.26	1.093E-02	351.99	37.100	4.966E-01	PB214
438.12	26.	40.75	1.50	8.898E-03	433.93	89.881	PBC<MDA	Ag108M
463.00	59.	25.20	1.58	8.351E-03				
463.00	59.	25.20	1.58	8.351E-03	463.51	10.000	4.805E-01	SB125
510.62	91.	18.06	0.93	7.592E-03	510.72	22.500	3.022E-01	TL208
583.14	256.	10.52	1.26	6.685E-03	583.14	86.000	3.043E-01	TL208

609.14	195.	12.05	1.48	6.414E-03	609.32	46.090	4.537E-01	BI214
727.71	65.	20.94	1.41	5.439E-03	727.17	11.800	6.890E-01	BI212
795.11	39.	31.11	1.58	5.020E-03				
795.11	39.	31.11	1.58	5.020E-03	795.76	85.400	6.298E-02	CS134
911.29	182.	9.19	1.47	4.446E-03	911.07	29.000	9.641E-01	AC228
968.40	87.	20.38	1.74	4.214E-03	968.90	17.460	8.097E-01	AC228
1120.59	62.	24.43	1.16	3.711E-03	1120.28	15.040	7.694E-01	BI214
1460.73	736.	3.85	2.10	2.942E-03	1460.75	10.700	1.609E+01	K40
1764.44	39.	16.01	1.53	2.481E-03	1764.51	15.920	6.737E-01	BI214

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***** 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
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Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
149.44	74.93	414.	214.	0.107	45.21	1.005	PB-214 D
155.25	77.84	577.	173.	0.087	63.01	1.007	PB-214 D
174.09	87.27	379.	143.	0.071	63.08	1.014	PB-214 D
180.13	90.28	358.	74.	0.037	114.44	1.016	PB-214 D
185.65	93.04	367.	134.	0.067	66.16	1.018	TH-234 D
258.10	129.25	549.	108.	0.054	96.10	1.107	AC-228 sM
419.04	209.68	358.	82.	0.041	112.82	1.065	NP-239 M
477.31	238.98	164.	823.	0.411	12.37	1.122	PB-212 D
482.93	241.78	223.	105.	0.052	67.17	1.124	PB-214 D
540.14	270.21	169.	74.	0.037	85.85	1.424	AC-228 s
554.01	277.14	207.	78.	0.039	85.39	1.100	TL-208
600.58	300.41	174.	76.	0.038	89.23	1.105	PB-212 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

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***** I D E N T I F I E D P E A K S U M M A R Y *****
Nuclide Peak Centroid Background Net Area Intensity Uncert FWHM
Channel Energy Counts Counts Cts/Sec 3 Sigma % keV
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Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
HG-203	144.78	72.61	1210.	-127.	-0.064	119.01	1.499s
PB-212	148.94	74.69	1100.	184.	0.092	77.31	1.499
PB-212	153.79	77.11	1023.	342.	0.171	42.92	1.499D
PB-214	153.79	77.11	1027.	338.	0.169	42.92	1.499D
EU-155	173.73	87.08	1005.	143.	0.072	97.09	1.499
TH-234	185.63	93.03	966.	128.	0.064	97.65	1.499s
TH-234	185.59	93.00	928.	136.	0.068	94.37	1.499s
RA-226	371.50	185.92	499.	107.	0.053	93.28	1.499s
PB-212	477.25	238.77	378.	647.	0.323	17.17	1.499
PB-214	491.70	246.00	240.	59.	0.030	116.52	1.499s
PB-214	590.64	295.45	230.	166.	0.083	44.60	1.499s
AC-228	676.83	338.52	181.	204.	0.102	40.05	1.121s
PB-214	703.82	352.01	122.	266.	0.133	25.27	1.499s
Ag-108M	876.12	438.12	41.	26.	0.013	122.26	1.499s
SB-125	925.74	462.92	80.	52.	0.026	81.47	1.499s
TL-208	1021.18	510.62	90.	75.	0.037	54.18	0.930s
TL-208	1166.28	583.14	126.	253.	0.127	31.56	1.263

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	1218.32	609.14	107.	194.	0.097	36.15	1.484
BI-212	1455.57	727.71	45.	64.	0.032	62.82	1.407s
CS-134	1590.14	794.96	36.	34.	0.017	89.69	1.502
AC-228	1822.92	911.29	41.	180.	0.090	27.56	1.467s
AC-228	1937.21	968.40	66.	86.	0.043	61.15	1.744
BI-214	2241.76	1120.59	51.	62.	0.031	73.30	1.157s
K-40	2922.49	1460.73	15.	734.	0.367	11.56	2.099
BI-214	3530.31	1764.44	0.	39.	0.019	48.04	1.529

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		9.2204E-02	477.56	9.220E-02	%	3.943E-01 1.16E-01	G
K-40		1.6086E+01	1460.75	1.609E+01	(P	4.574E-01 6.22E-01	G
MN-54		-3.1451E-03	834.81	-3.145E-03	%(P	4.612E-02 1.29E-02	G
CO-57		-8.1785E-04	122.07	-8.178E-04	%(	5.000E-02 1.49E-02	G K
			136.43	-4.479E-02	&	4.143E-01 1.24E-01	G
CO-60		1.2837E-03	1332.51	1.284E-03	%(P	4.943E-02 1.33E-02	G K
			1173.23	-6.016E-03	% P	8.600E-02 2.47E-02	G K
Sr-85		-2.7964E-02	514.00	-2.796E-02	&(	6.340E-02 1.92E-02	G
Kr-85		-6.5028E+02	513.99	-6.503E+02	&(P	1.422E+03 4.29E+02	G
Y-88		0.0000E+00	1836.01	0.000E+00	%(	4.909E-02 1.25E-02	G K
			898.02	2.638E-03	& P	4.724E-02 1.31E-02	G
NB-94		-5.0078E-03	871.10	-5.008E-03	&(P	4.740E-02 1.34E-02	G K
			702.50	6.687E-03	& P	4.451E-02 1.28E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	1.0241E-02	722.95	1.484E-03	% (	9.122E-02	2.66E-02	G K
		614.37	1.890E-04	% P	4.640E-02	1.31E-02	G
		433.93	2.205E-02	?(	2.822E-02	8.98E-03	G
CD-109	1.6732E-01	88.04	1.673E-01	%(P	1.437E+00	4.30E-01	G
SN-113	1.0153E-02	391.71	1.015E-02	% (	6.444E-02	1.89E-02	G K
		255.04	4.445E-01	& P	1.598E+00	4.77E-01	G
SB-125	1.0637E-01	427.95	3.619E-03	%(P	1.444E-01	4.17E-02	G K
		600.77	3.190E-02	% P	2.351E-01	6.79E-02	G
		636.15	1.570E-02	& P	3.638E-01	1.03E-01	G
		463.51	4.319E-01	@(P	3.689E-01	1.21E-01	G
		176.29	1.659E-02	% P	5.557E-01	1.64E-01	G
I-131	-2.8481E-03	364.48	2.848E-03	% (	5.301E-02	1.53E-02	G K
		636.97	4.422E-01	%	7.321E-01	2.26E-01	G
		284.29	6.743E-03	&	8.007E-01	2.34E-01	G
CS-134	1.8373E-02	604.66	1.376E-02	%(P	5.999E-02	1.77E-02	G K
		795.76	5.510E-02	(P	4.981E-02	1.67E-02	G
		569.29	5.925E-02	% P	2.863E-01	8.35E-02	G
		801.84	1.548E-01	%	3.155E-01	9.64E-02	G
CS-137	-2.2747E-03	661.62	2.275E-03	%(P	5.741E-02	1.62E-02	G
CE-139	1.1426E-02	165.85	1.143E-02	%(P	5.271E-02	1.58E-02	G
EU-152	-7.0445E-03	121.78	7.044E-03	&(P	1.451E-01	4.32E-02	G K
		344.30	2.569E-02	& P	1.269E-01	3.74E-02	G
		1408.08	5.809E-02	% P	1.794E-01	5.18E-02	G
		964.00	3.029E-02	% P	3.549E-01	9.99E-02	G
		1112.07	1.477E-03	% P	5.365E-01	1.51E-01	G
		778.90	4.540E-02	& P	3.792E-01	1.09E-01	G
EU-154	-2.0046E-04	123.10	2.005E-04	%(P	1.017E-01	3.02E-02	G K
		1274.80	2.938E-02	& P	1.955E-01	5.60E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	1.064E-01	% P	3.026E-01	9.02E-02	G
		1004.80	1.163E-01	& P	3.786E-01	1.12E-01	G
EU-155	1.5851E-01	86.45	1.585E-01	(	1.663E-01	5.13E-02	G K
		105.31	4.356E-02	%	2.086E-01	6.26E-02	G
HG-203	-1.0306E-02	279.17	1.031E-02	%(	5.515E-02	1.64E-02	G K
		72.87	4.085E-01	% P	1.269E+00	3.82E-01	G
		70.83	1.725E+00	&	2.234E+00	6.84E-01	G
		82.50	8.840E-01	%	2.687E+00	8.11E-01	G
TL-208	3.0382E-01	583.14	3.043E-01	(P	6.595E-02	3.23E-02	G
		510.72	3.022E-01	@(P	1.898E-01	6.63E-02	G
PB-212	7.1297E-01	238.63	6.652E-01	(P	9.597E-02	3.84E-02	G K
							Energy duplication
		77.11	7.829E-01	(	3.479E-01	1.12E-01	G
		74.81	8.000E-01	?(P	6.837E-01	2.12E-01	G
PB-214	4.5600E-01	351.99	4.525E-01	@(P	9.243E-02	3.84E-02	G K
		295.22	4.627E-01	(P	2.042E-01	6.95E-02	G
							Energy duplication
		77.11	1.267E+00	+ P	5.700E-01	1.83E-01	G
		241.92	3.544E-01	- P	4.495E-01	1.39E-01	G
BI-212	6.8905E-01	727.17	6.890E-01	*(P	3.646E-01	1.46E-01	G K
		1620.56	4.058E-01	&	1.553E+00	4.40E-01	G
		785.42	9.378E-01	% P	2.312E+00	6.92E-01	G
BI-214	4.5370E-01	609.32	4.537E-01	(P	1.187E-01	5.50E-02	G K
		1764.51	6.737E-01	+ P	1.288E-01	1.09E-01	G
		1120.28	7.694E-01	+ P	4.442E-01	1.89E-01	G
RA-224	-1.0494E-01	241.00	1.049E-01	%(P	4.233E-01	1.23E-01	G
RA-226	1.2109E+00	185.99	1.211E+00	*(	1.210E+00	3.77E-01	G
AC-228	9.3247E-01	911.07	9.641E-01	(P	1.739E-01	8.95E-02	G K
		968.90	8.097E-01	(P	3.799E-01	1.66E-01	G
		338.40	1.034E+00	@(P	3.309E-01	1.40E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	4.8232E-03	236.00	4.823E-03	&(P	3.930E-01	1.16E-01	G K
		256.25	1.027E-01	& P	5.756E-01	1.71E-01	G
PA-234	-2.6168E-03	98.44	2.617E-03	% (	1.616E-01	4.80E-02	G K
		946.00	5.064E-02	&	2.524E-01	7.28E-02	G
		131.28	3.124E-02	%	2.241E-01	6.70E-02	G
		94.67	1.178E-01	%	3.394E-01	1.02E-01	G
		883.24	4.510E-02	%	3.911E-01	1.11E-01	G
		926.70	3.263E-02	%	5.012E-01	1.42E-01	G
TH-234	1.2886E+00	569.26	7.583E-02	%	4.061E-01	1.18E-01	G
		63.29	7.808E-01	%(P	2.162E+00	6.51E-01	G K
		92.80	1.567E+00	(P	1.673E+00	5.15E-01	G
		92.38	1.734E+00	(P	1.996E+00	6.12E-01	G

AM-241 -2.7917E-02 59.54-2.792E-02 %(P 2.540E-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:

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

Peak Codes:

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	8.8690E-02	9.2204E-02	3.4815E-01	3.4819E-01	3.792E-01
K-40		1.6086E+01	1.6086E+01	1.8653E+00	2.0749E+00	
MN-54	#A	-3.1242E-03	-3.1451E-03	5.7028E-02	5.7028E-02	4.582E-02
CO-57	#B	-8.1159E-04	-8.1785E-04	4.4609E-02	4.4609E-02	4.962E-02
CO-60	#B	1.2823E-03	1.2837E-03	3.9925E-02	3.9925E-02	4.937E-02
Sr-85	#A	-2.7083E-02	-2.7964E-02	5.7496E-02	5.7518E-02	6.140E-02
Kr-85	#A	-6.5027E+02	-6.5028E+02	1.3885E+03	1.3890E+03	1.422E+03
Y-88	#B	0.0000E+00	0.0000E+00	3.7388E-02	3.7388E-02	4.815E-02
NB-94	#B	-5.0078E-03	-5.0078E-03	4.3547E-02	4.3548E-02	4.740E-02
Ag-108M	#B	1.0240E-02	1.0241E-02	1.2520E-02	1.2533E-02	9.122E-02
CD-109	#A	1.6655E-01	1.6732E-01	1.2904E+00	1.2905E+00	1.431E+00
SN-113	#B	9.9713E-03	1.0153E-02	5.6828E-02	5.6831E-02	6.329E-02
SB-125	#B	1.0615E-01	1.0637E-01	8.9065E-02	8.9268E-02	1.441E-01
I-131	#B	-2.2003E-03	-2.8481E-03	4.5983E-02	4.5983E-02	4.095E-02
CS-134	#B	1.8323E-02	1.8373E-02	1.6680E-02	1.6712E-02	5.983E-02
CS-137	#A	-2.2743E-03	-2.2747E-03	1.6033E-01	1.6033E-01	5.740E-02
CE-139	#A	1.1255E-02	1.1426E-02	4.7368E-02	4.7372E-02	5.192E-02
EU-152	#B	-7.0413E-03	-7.0445E-03	1.6629E-01	1.6630E-01	1.450E-01
EU-154	#B	-2.0033E-04	-2.0046E-04	1.5825E-01	1.5825E-01	1.016E-01
EU-155	#A	1.5833E-01	1.5851E-01	1.5390E-01	1.5415E-01	1.661E-01
HG-203	#B	-9.8576E-03	-1.0306E-02	4.9221E-02	4.9224E-02	5.275E-02
TL-208		3.0382E-01	3.0382E-01	9.6772E-02	9.8283E-02	
PB-212	#	7.1297E-01	7.1297E-01	1.2358E-01	1.2998E-01	9.597E-02
PB-214	#	4.5600E-01	4.5600E-01	1.1611E-01	1.1893E-01	9.243E-02
BI-212	#	6.8905E-01	6.8905E-01	4.3746E-01	4.3919E-01	
BI-214		4.5370E-01	4.5370E-01	1.6495E-01	1.6693E-01	
RA-224	#A	-1.0494E-01	-1.0494E-01	4.3100E-01	4.3104E-01	4.233E-01
RA-226	#	1.2109E+00	1.2109E+00	1.1295E+00	1.1316E+00	1.210E+00
AC-228		9.3247E-01	9.3247E-01	2.4505E-01	2.5065E-01	
TH-227	#B	4.8232E-03	4.8232E-03	3.4833E-01	3.4833E-01	3.930E-01
PA-234	#B	-2.6168E-03	-2.6168E-03	1.4388E-01	1.4388E-01	1.616E-01
TH-234	#B	1.2886E+00	1.2886E+00	1.2412E+00	1.2433E+00	2.162E+00
AM-241	#A	-2.7917E-02	-2.7917E-02	2.6127E-01	2.6128E-01	2.540E-01

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

H - Halflife limit exceeded

----- S U M M A R Y -----
Total Activity (252.6 to 1999.1 keV) 1.8465128E+01 pCi/gm
Total Decayed Activity (252.6 to 1999.1 keV) 1.8465128E+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-12-01-015-F

Spectrum Filename: C:\GammaVision\Spectra\101F_22AUG2006_1358.An1

Acquisition information

Start time: 22-Aug-2006 13:58:30
Live time: 2000
Real time: 2002
Dead time: 0.08 %
Detector ID: 1

Detector system

Det 101- DSPE-633

Calibration

Filename: D1_1LSa.Clb
Detector 101 1.0 Liter Marinelli Sand

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.7560E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7560E+03) =
5.6948E+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	19-Aug-2006 13:10:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.0419

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.31	90.	32.33	1.00	1.651E-02				
74.31	90.	32.33	1.00	1.651E-02	74.81	9.600	PBC<MDA	PB212
77.31	255.	11.65	1.01	1.736E-02	77.11	10.700	1.051E+00	PB214
					77.11	17.500	6.522E-01	PB212
93.42	100.	25.76	1.02	1.996E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.79	94.	33.82	1.39	1.859E-02				
185.79	94.	33.82	1.39	1.859E-02	185.99	3.280	1.191E+00	RA226
238.75	514.	5.31	1.12	1.557E-02	238.63	43.100	5.820E-01	PB212
242.16	82.	23.42	1.12	1.539E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
295.21	137.	16.48	1.16	1.292E-02				
295.21	137.	16.48	1.16	1.292E-02	295.22	19.200	4.182E-01	PB214
300.97	60.	32.27	0.78	1.269E-02				
328.32	48.	40.86	1.04	1.169E-02				
338.30	105.	23.15	1.47	1.135E-02				
338.30	105.	23.15	1.47	1.135E-02	338.40	12.010	5.782E-01	AC228
352.08	246.	10.36	1.35	1.092E-02	351.99	37.100	4.626E-01	PB214
463.05	29.	38.72	1.50	8.342E-03	463.51	10.000	PBC<MDA	SB125
510.98	109.	16.61	1.45	7.587E-03	510.72	22.500	4.203E-01	TL208
583.22	172.	11.87	1.48	6.684E-03	583.14	86.000	2.271E-01	TL208
609.58	156.	11.42	1.60	6.410E-03	609.32	46.090	4.046E-01	BI214
661.50	30.	32.66	0.77	5.938E-03	661.62	84.620	PBC<MDA	CS137
911.19	113.	15.65	1.64	4.446E-03	911.07	29.000	6.632E-01	AC228
967.75	86.	15.43	1.24	4.217E-03				
969.03	45.	26.70	1.62	4.212E-03				
969.03	45.	26.70	1.62	4.212E-03	968.90	17.460	4.696E-01	AC228

1120.17	44.	32.26	0.59	3.711E-03	1120.28	15.040	6.014E-01	BI214
1460.81	566.	4.29	1.95	2.942E-03	1460.75	10.700	1.377E+01	K40
1764.53	22.	21.32	1.56	2.481E-03	1764.51	15.920	4.201E-01	BI214


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

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
148.19	74.72	376.	90.	0.045	96.98	1.004	BI-207 D
154.19	77.72	314.	255.	0.128	34.95	1.007	PB-214 D
484.03	242.15	144.	82.	0.041	70.25	1.124	PB-214 LD
601.70	300.97	126.	60.	0.030	88.33	0.778	PB-212 s
656.41	328.32	126.	48.	0.024	122.58	1.038	RH-106M
1935.92	967.75	72.	44.	0.022	94.48	1.240	SB-124 s

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

 This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.79	77.11	694.	240.	0.120	49.56	1.499D
PB-212	153.79	77.11	691.	244.	0.122	49.56	1.499D
TH-234	185.81	93.12	640.	117.	0.059	87.30	1.499s
TH-234	185.79	93.10	614.	123.	0.062	85.18	1.499s
RA-226	372.12	186.23	349.	88.	0.044	95.74	1.499s
PB-212	477.23	238.77	355.	436.	0.218	22.90	1.499
PB-214	590.64	295.45	164.	118.	0.059	52.67	1.499s
AC-228	676.89	338.56	139.	79.	0.039	70.03	1.499s
PB-214	703.99	352.10	112.	214.	0.107	29.02	1.499s
SB-125	926.00	463.05	56.	29.	0.015	116.15	1.499
TL-208	1021.91	510.98	83.	93.	0.047	49.82	1.447s
TL-208	1166.46	583.22	72.	170.	0.085	35.62	1.484
BI-214	1219.20	609.58	54.	155.	0.078	34.25	1.602s
CS-137	1323.38	661.65	33.	23.	0.012	117.86	1.499s
AC-228	1822.83	911.24	40.	91.	0.046	41.87	1.578
AC-228	1938.47	969.03	52.	45.	0.022	80.09	1.616s
BI-214	2240.92	1120.17	45.	44.	0.022	96.78	0.589s
K-40	2922.63	1460.81	9.	564.	0.282	12.88	1.946
BI-214	3530.50	1764.53	0.	22.	0.011	63.96	1.561

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

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****						
- Nuclide -	Average	----- Peak -----				
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm
						COMMENTS
BE-7		6.0422E-02	477.56	6.042E-02	% (	3.993E-01 1.16E-01 G
K-40		1.3774E+01	1460.75	1.377E+01	(P	4.169E-01 5.94E-01 G
MN-54		1.1319E-02	834.81	1.132E-02	&(P	4.263E-02 1.23E-02 G
CO-57		-3.0221E-03	122.07	3.022E-03	% (	4.750E-02 1.41E-02 G K
			136.43	7.930E-02	%	3.709E-01 1.11E-01 G
CO-60		3.2398E-02	1332.51	3.240E-02	% (P	5.188E-02 1.63E-02 G K
			1173.23	2.625E-02	% P	7.959E-02 2.36E-02 G K
Sr-85		-1.2687E-02	514.00	1.269E-02	&(	5.345E-02 1.58E-02 G
Kr-85		-3.1105E+02	513.99	3.111E+02	&(P	1.201E+03 3.53E+02 G
Y-88		-6.8625E-03	1836.01	6.862E-03	% (	4.786E-02 1.27E-02 G K
			898.02	1.819E-02	% P	4.030E-02 1.22E-02 G
NB-94		-8.0423E-03	871.10	8.042E-03	% (P	4.834E-02 1.38E-02 G K
			702.50	5.565E-03	% P	4.789E-02 1.37E-02 G K
Ag-108M		-7.4977E-03	722.95	7.498E-03	&(	6.385E-02 1.84E-02 G K
			614.37	1.369E-03	% P	5.255E-02 1.49E-02 G
			433.93	6.423E-04	%	4.469E-02 1.28E-02 G
CD-109		1.5949E-02	88.04	1.595E-02	&(P	1.388E+00 4.13E-01 G
SN-113		-4.4801E-03	391.71	4.480E-03	% (	4.832E-02 1.38E-02 G K
			255.04	5.224E-01	% P	1.628E+00 4.87E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	5.3481E-02	427.95	1.907E-02	&(P	1.258E-01	3.64E-02	G K
		600.77	4.958E-02	% P	2.544E-01	7.39E-02	G
		636.15	7.991E-03	% P	3.339E-01	9.20E-02	G
		463.51	2.682E-01	(P	3.468E-01	1.09E-01	G
		176.29	2.096E-02	& P	6.002E-01	1.76E-01	G
I-131	1.7448E-02	364.48	1.745E-02	&(	4.644E-02	1.39E-02	G K
		636.97	1.239E-01	%	7.195E-01	2.07E-01	G
		284.29	1.075E-01	%	7.935E-01	2.34E-01	G
CS-134	7.2869E-03	604.66	7.287E-03	&(P	4.292E-02	1.23E-02	G K
		795.76	1.186E-04	% P	6.182E-02	1.72E-02	G
		569.29	1.052E-02	& P	2.083E-01	5.72E-02	G
		801.84	1.964E-01	%	4.543E-01	1.37E-01	G
CS-137	3.5442E-02	661.62	3.544E-02	?(P	4.541E-02	1.45E-02	G
CE-139	1.2546E-02	165.85	1.255E-02	%(P	3.833E-02	1.15E-02	G
EU-152	-9.9828E-03	121.78	9.983E-03	%(P	1.393E-01	4.14E-02	G K
		344.30	1.322E-03	% P	1.359E-01	3.91E-02	G
		1408.08	8.255E-02	& P	1.987E-01	5.92E-02	G
		964.00	4.539E-02	& P	5.738E-01	1.65E-01	G
		1112.07	4.998E-02	% P	3.589E-01	1.00E-01	G
		778.90	9.483E-02	& P	3.976E-01	1.16E-01	G
EU-154	-1.3153E-02	123.10	1.315E-02	%(P	9.924E-02	2.95E-02	G K
		1274.80	5.082E-03	% P	1.814E-01	5.00E-02	G
		723.30	4.057E-02	& P	2.968E-01	8.56E-02	G
		1004.80	2.877E-02	& P	3.431E-01	9.69E-02	G
EU-155	1.0007E-02	86.45	1.001E-02	%(	1.157E-01	3.43E-02	G K
		105.31	5.102E-02	%	1.813E-01	5.44E-02	G
HG-203	-7.2442E-04	279.17	7.244E-04	&(	5.084E-02	1.48E-02	G K
		72.87	5.640E-02	% P	8.736E-01	2.58E-01	G
		70.83	1.610E-02	%	2.401E+00	7.16E-01	G
		82.50	2.363E-01	%	2.579E+00	7.70E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.2707E-01	583.14	2.271E-01	(P	5.670E-02	2.73E-02	G
		510.72	4.203E-01	+ P	2.032E-01	8.18E-02	G
PB-212	4.9982E-01	238.63	4.998E-01	(P	1.037E-01	3.87E-02	G K
		77.11	6.239E-01	+ P	3.200E-01	1.03E-01	G
		74.81	4.019E-01	& P	6.632E-01	2.02E-01	G
PB-214	3.9314E-01	351.99	4.066E-01	*(P	9.897E-02	3.97E-02	G K
		295.22	3.672E-01	@(P	1.936E-01	6.54E-02	G
		77.11	1.005E+00	+ P	5.247E-01	1.69E-01	G
		241.92	2.760E-02	% P	7.407E-01	2.20E-01	G
BI-212	3.0152E-01	727.17	3.015E-01	%(P	4.311E-01	1.35E-01	G K
		1620.56	4.925E-01	%	1.338E+00	3.92E-01	G
		785.42	2.805E-03	% P	2.296E+00	6.33E-01	G
BI-214	4.0857E-01	609.32	4.046E-01	*(P	9.589E-02	4.65E-02	G K
		1764.51	4.201E-01	(P	1.436E-01	9.14E-02	G
		1120.28	6.014E-01	+ P	4.702E-01	1.96E-01	G
RA-224	8.1438E-01	241.00	8.144E-01	%(P	1.235E+00	3.78E-01	G
RA-226	1.1084E+00	185.99	1.108E+00	(	1.133E+00	3.54E-01	G
AC-228	5.0150E-01	911.07	5.447E-01	(P	1.916E-01	7.76E-02	G K
		968.90	4.696E-01	*(P	3.800E-01	1.27E-01	G
		338.40	4.435E-01	(P	3.260E-01	1.06E-01	G
TH-227	-1.2916E-01	236.00	-1.292E-01	%(P	4.238E-01	1.27E-01	G K
		256.25	1.529E-01	% P	5.027E-01	1.50E-01	G
PA-234	3.3463E-02	98.44	3.346E-02	&(	1.598E-01	4.78E-02	G K
		946.00	2.374E-02	&	2.633E-01	7.40E-02	G
		131.28	-1.945E-03	&	1.978E-01	5.86E-02	G
		94.67	-6.067E-03	%	2.295E-01	6.77E-02	G
		883.24	2.921E-03	&	3.438E-01	9.30E-02	G
		926.70	5.461E-02	%	4.272E-01	1.20E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	1.243E-02	&	3.066E-01	8.49E-02 G
TH-234	1.1834E+00	63.29	4.896E-01	%(P	2.093E+00	6.26E-01 G K
		92.80	1.586E+00	*(P	1.524E+00	4.73E-01 G
		92.38	1.766E+00	*(P	1.819E+00	5.62E-01 G

AM-241 -3.7355E-02
 59.54-3.735E-02 %(P 2.957E-01 8.81E-02 G
 (- This peak used in the nuclide activity average.

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

Nuclide Codes:

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

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	5.8089E-02	6.0422E-02	3.4746E-01	3.4748E-01	3.839E-01
K-40		1.3774E+01	1.3774E+01	1.7816E+00	1.9441E+00	
MN-54	#A	1.1243E-02	1.1319E-02	3.6983E-02	3.6988E-02	4.234E-02
CO-57	#B	-2.9987E-03	-3.0221E-03	4.2326E-02	4.2326E-02	4.713E-02
CO-60	#B	3.2363E-02	3.2398E-02	4.9022E-02	4.9056E-02	5.182E-02

Sr-85	#A	-1.2282E-02	-1.2687E-02	4.7345E-02	4.7351E-02	5.175E-02
Kr-85	#A	-3.1105E+02	-3.1105E+02	1.2667E+03	1.2668E+03	1.201E+03
Y-88	#B	-6.7284E-03	-6.8625E-03	3.8191E-02	3.8193E-02	4.692E-02
NB-94	#B	-8.0423E-03	-8.0423E-03	4.3610E-02	4.3612E-02	4.834E-02
Ag-108M	#B	-7.4974E-03	-7.4977E-03	5.5256E-02	5.5257E-02	6.385E-02
CD-109	#A	1.5875E-02	1.5949E-02	1.2381E+00	1.2381E+00	1.382E+00
SN-113	#B	-4.3990E-03	-4.4801E-03	4.1536E-02	4.1537E-02	4.744E-02
SB-125	#B	5.3370E-02	5.3481E-02	6.5216E-02	6.5286E-02	1.255E-01
I-131	#B	1.3432E-02	1.7448E-02	4.1661E-02	4.1673E-02	3.575E-02
CS-134	#B	7.2666E-03	7.2869E-03	3.7039E-02	3.7041E-02	4.280E-02
CS-137	#A	3.5435E-02	3.5442E-02	4.3370E-02	4.3416E-02	4.540E-02
CE-139	#A	1.2356E-02	1.2546E-02	3.4487E-02	3.4494E-02	3.775E-02
EU-152	#B	-9.9783E-03	-9.9828E-03	1.5102E-01	1.5102E-01	1.393E-01
EU-154	#B	-1.3144E-02	-1.3153E-02	1.0043E-01	1.0044E-01	9.918E-02
EU-155	#B	9.9955E-03	1.0007E-02	1.0282E-01	1.0282E-01	1.155E-01
HG-203	#B	-6.9245E-04	-7.2442E-04	4.4545E-02	4.4545E-02	4.859E-02
TL-208		2.2707E-01	2.2707E-01	8.2010E-02	8.3008E-02	
PB-212	#	4.9982E-01	4.9982E-01	1.1608E-01	1.1947E-01	1.037E-01
PB-214	#	3.9314E-01	3.9314E-01	1.1515E-01	1.1727E-01	9.897E-02
BI-212	#B	3.0152E-01	3.0152E-01	4.0421E-01	4.0456E-01	4.311E-01
BI-214		4.0857E-01	4.0857E-01	1.4094E-01	1.4281E-01	
RA-224	#A	8.1438E-01	8.1438E-01	1.1347E+00	1.1357E+00	1.235E+00
RA-226	#A	1.1084E+00	1.1084E+00	1.0613E+00	1.0631E+00	1.133E+00
AC-228	#	5.0150E-01	5.0150E-01	1.9514E-01	1.9719E-01	1.916E-01
TH-227	#B	-1.2916E-01	-1.2916E-01	3.9292E-01	3.9298E-01	4.238E-01
PA-234	#B	3.3463E-02	3.3463E-02	1.4334E-01	1.4335E-01	1.598E-01
TH-234	#B	1.1834E+00	1.1834E+00	1.0586E+00	1.0607E+00	2.093E+00
AM-241	#A	-3.7354E-02	-3.7355E-02	2.9749E-01	2.9749E-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 - Half-life limit exceeded

----- S U M M A R Y -----
 Total Activity (86.2 to 1999.1 keV) 1.4445028E+01 pCi/gm
 Total Decayed Activity (86.2 to 1999.1 keV) 1.4445035E+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-12-01-008-F

Spectrum Filename: C:\GammaVision\Spectra\101F_23AUG2006_1007.An1

Acquisition information

Start time: 24-Aug-2006 10:07:38
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0070E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0070E+03) =
4.9826E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	23-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: 0.0764

***** 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
74.78	221.	15.69	1.00	1.651E-02				
74.78	221.	15.69	1.00	1.651E-02	74.81	9.600	9.161E-01	PB212
77.04	338.	10.35	1.01	1.717E-02	77.11	10.700	1.223E+00	PB214
					77.11	17.500	7.562E-01	PB212
84.21	63.	39.89	0.00	1.874E-02				
87.18	115.	39.79	1.50	1.910E-02	86.45	32.740	PBC<MDA	EU155
					88.04	3.790	PBC<MDA	CD109
93.05	136.	30.93	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.05	125.	33.08	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.99	114.	26.18	1.21	1.858E-02	185.99	3.280	1.255E+00	RA226
209.52	70.	34.17	1.20	1.720E-02				
238.72	752.	4.30	1.12	1.557E-02	238.63	43.100	7.481E-01	PB212
241.42	111.	19.64	1.12	1.543E-02	241.00	3.900	1.227E+00	RA224
					241.92	7.470	6.430E-01	PB214
269.96	123.	21.81	1.04	1.402E-02				
295.25	178.	13.92	1.09	1.292E-02	295.22	19.200	4.797E-01	PB214
338.48	174.	14.60	1.29	1.135E-02	338.40	12.010	8.467E-01	AC228
351.98	258.	9.40	1.16	1.093E-02	351.99	37.100	4.250E-01	PB214
510.66	100.	15.27	1.69	7.591E-03	510.72	22.500	3.291E-01	TL208
583.12	280.	9.12	1.27	6.685E-03	583.14	86.000	3.252E-01	TL208
609.18	218.	10.02	1.30	6.414E-03	609.32	46.090	4.936E-01	BI214
661.95	85.	21.84	1.57	5.935E-03	661.62	84.620	1.125E-01	CS137
911.08	160.	11.67	1.86	4.446E-03	911.07	29.000	8.247E-01	AC228
968.82	113.	14.37	1.85	4.212E-03	968.90	17.460	1.025E+00	AC228
1120.78	33.	31.99	1.71	3.711E-03	1120.28	15.040	3.997E-01	BI214

1460.50	728.	3.88	1.76	2.943E-03	1460.75	10.700	1.552E+01	K40
1764.15	31.	17.96	1.00	2.481E-03	1764.51	15.920	5.209E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
148.93	74.72	499.	214.	0.107	48.74	1.005	BI-207 D
418.72	209.52	251.	70.	0.035	102.50	1.196	AC-228 s
477.14	238.64	146.	752.	0.376	12.88	1.122	PB-212 D
539.65	269.96	221.	123.	0.062	65.43	1.036	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	149.35	74.89	1171.	193.	0.096	76.22	1.499s
PB-214	153.79	77.11	448.	333.	0.166	31.22	1.006D
PB-212	153.79	77.11	1064.	278.	0.139	52.93	1.499D
EU-155	173.94	87.18	991.	115.	0.058	119.37	1.499s
TH-234	185.69	93.05	958.	125.	0.063	99.24	1.499s
TH-234	185.67	93.05	906.	136.	0.068	92.78	1.499s
RA-226	371.64	185.99	492.	117.	0.059	85.06	1.499D
PB-212	476.96	238.63	397.	621.	0.311	17.95	1.499D
PB-214	483.54	241.92	160.	94.	0.047	64.58	1.124D
PB-214	590.25	295.25	177.	177.	0.088	41.76	1.086
AC-228	676.75	338.48	170.	171.	0.086	43.80	1.291s
PB-214	703.75	351.98	139.	256.	0.128	28.20	1.163s
TL-208	1021.25	510.66	69.	83.	0.042	45.80	1.691s
TL-208	1166.24	583.12	100.	278.	0.139	27.37	1.266s
BI-214	1218.39	609.18	79.	217.	0.108	30.05	1.297s
CS-137	1323.98	661.95	79.	84.	0.042	65.51	1.567s
AC-228	1822.51	911.08	57.	158.	0.079	35.00	1.863
AC-228	1938.06	968.82	49.	112.	0.056	43.12	1.846
BI-214	2242.15	1120.78	41.	33.	0.017	95.96	1.713
K-40	2922.01	1460.50	15.	726.	0.363	11.65	1.764
BI-214	3529.74	1764.15	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 -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		8.6505E-02	477.56	8.650E-02	% (	3.522E-01 1.04E-01	G
K-40		1.5516E+01	1460.75	1.552E+01	(P	4.501E-01 6.04E-01	G
MN-54		1.7170E-02	834.81	1.717E-02	%(P	4.529E-02 1.35E-02	G
CO-57		3.0456E-03	122.07	3.046E-03	&(	4.410E-02 1.31E-02	G K
			136.43	6.470E-03	%	4.063E-01 1.21E-01	G
CO-60		1.9742E-02	1332.51	1.974E-02	%(P	5.320E-02 1.58E-02	G K
			1173.23	1.520E-02	& P	7.689E-02 2.24E-02	G K
Sr-85		-1.9873E-02	514.00	1.987E-02	%(	5.193E-02 1.56E-02	G
Kr-85		-4.7914E+02	513.99	4.791E+02	%(P	1.193E+03 3.57E+02	G
Y-88		-5.1383E-03	1836.01	5.138E-03	%(	5.610E-02 1.52E-02	G K
			898.02	6.705E-04	% P	4.163E-02 1.13E-02	G
NB-94		-6.0407E-04	871.10	6.041E-04	%(P	4.278E-02 1.18E-02	G K
			702.50	1.507E-03	% P	4.237E-02 1.19E-02	G K
Ag-108M		5.5585E-04	722.95	5.558E-04	&(	5.606E-02 1.59E-02	G K
			614.37	1.656E-02	% P	4.512E-02 1.35E-02	G
			433.93	1.760E-04	&	4.522E-02 1.30E-02	G
CD-109		-3.3983E-02	88.04	3.398E-02	%(P	1.471E+00 4.39E-01	G
SN-113		-2.6660E-02	391.71	2.666E-02	%(	6.564E-02 1.98E-02	G K
			255.04	4.865E-01	% P	1.892E+00 5.65E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.2843E-03	427.95	7.284E-03	% (P	1.288E-01	3.72E-02	G K
		600.77	3.938E-02	% P	1.900E-01	5.50E-02	G
		636.15	6.273E-02	& P	4.181E-01	1.21E-01	G
		463.51	2.358E-01	% P	3.394E-01	1.05E-01	G
		176.29	7.539E-02	% P	6.372E-01	1.89E-01	G
I-131	1.3449E-02	364.48	1.345E-02	% (	4.626E-02	1.38E-02	G K
		636.97	0.000E+00	&	7.170E-01	2.04E-01	G
		284.29	1.285E-01	&	5.897E-01	1.75E-01	G
CS-134	-2.9365E-03	604.66	2.936E-03	% (P	1.060E-01	3.13E-02	G K
		795.76	2.896E-02	% P	5.291E-02	1.62E-02	G
		569.29	7.992E-02	% P	2.195E-01	6.53E-02	G
		801.84	9.567E-02	&	4.267E-01	1.23E-01	G
CS-137	1.1246E-01	661.62	1.125E-01	*(P	5.917E-02	2.48E-02	G
CE-139	-1.3856E-02	165.85	1.386E-02	& (P	4.762E-02	1.43E-02	G
EU-152	-1.5528E-03	121.78	1.553E-03	% (P	1.112E-01	3.28E-02	G K
		344.30	3.027E-02	% P	1.475E-01	4.36E-02	G
		1408.08	4.471E-02	% P	1.699E-01	4.79E-02	G
		964.00	2.043E-01	% P	4.262E-01	1.29E-01	G
		1112.07	3.828E-02	% P	4.461E-01	1.26E-01	G
		778.90	5.319E-03	& P	3.055E-01	8.45E-02	G
EU-154	-1.3379E-03	123.10	1.338E-03	& (P	9.827E-02	2.92E-02	G K
		1274.80	1.242E-02	% P	1.591E-01	4.44E-02	G
		723.30	1.369E-02	& P	2.693E-01	7.69E-02	G
		1004.80	4.184E-02	% P	3.241E-01	9.27E-02	G
EU-155	1.2400E-01	86.45	1.240E-01	(	1.610E-01	4.93E-02	G K
		105.31	4.484E-02	%	1.993E-01	5.98E-02	G
HG-203	-1.3826E-03	279.17	1.383E-03	& (	4.143E-02	1.21E-02	G K
		72.87	6.259E-01	& P	1.240E+00	3.76E-01	G
		70.83	1.343E+00	&	2.016E+00	6.16E-01	G
		82.50	8.780E-01	%	2.485E+00	7.50E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.2599E-01	583.14	3.252E-01	@(P	5.786E-02	2.99E-02	G
		510.72	3.291E-01	*(P	1.628E-01	5.99E-02	G
PB-212	6.2269E-01	238.63	6.230E-01	(P	9.582E-02	3.76E-02	G K Energy duplication
		77.11	6.219E-01	(	3.460E-01	1.10E-01	G Energy duplication
		74.81	8.170E-01	& P	6.876E-01	2.13E-01	G
PB-214	4.5596E-01	351.99	4.250E-01	(P	9.583E-02	4.03E-02	G K
		295.22	4.797E-01	(P	1.758E-01	6.74E-02	G
		77.11	1.217E+00	+ P	3.708E-01	1.28E-01	G Energy duplication
		241.92	5.489E-01	(P	3.611E-01	1.19E-01	G
BI-212	2.4792E-01	727.17	2.479E-01	%(P	4.650E-01	1.42E-01	G K
		1620.56	3.792E-01	%(	1.377E+00	3.90E-01	G
		785.42	7.677E-01	%(P	1.870E+00	5.59E-01	G
BI-214	5.0065E-01	609.32	4.936E-01	@(P	1.007E-01	4.97E-02	G K
		1764.51	5.209E-01	(P	1.256E-01	9.49E-02	G
		1120.28	3.997E-01	- P	3.931E-01	1.29E-01	G
RA-224	7.7816E-01	241.00	7.782E-01	%(P	1.209E+00	3.70E-01	G
RA-226	1.2932E+00	185.99	1.293E+00	(	1.172E+00	3.67E-01	G Energy duplication
AC-228	8.8909E-01	911.07	8.247E-01	(P	1.980E-01	9.73E-02	G K
		968.90	1.025E+00	(P	3.235E-01	1.48E-01	G
		338.40	8.467E-01	*(P	3.131E-01	1.25E-01	G
TH-227	-1.7530E-01	236.00	-1.753E-01	&(P	4.403E-01	1.33E-01	G K
		256.25	7.790E-03	& P	5.492E-01	1.61E-01	G
PA-234	-3.8474E-03	98.44	-3.847E-03	%(	1.427E-01	4.23E-02	G K
		946.00	-8.896E-03	&	3.607E-01	1.03E-01	G
		131.28	9.795E-02	&	1.815E-01	5.52E-02	G
		94.67	-1.063E-01	&	3.257E-01	9.83E-02	G
		883.24	-1.100E-02	&	3.612E-01	1.00E-01	G

926.70-1.180E-01 % 4.949E-01 1.45E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	1.227E-01	%	3.240E-01	9.67E-02 G
TH-234	1.3065E+00					
		63.29	8.993E-01	%(P	2.109E+00	6.37E-01 G K
		92.80	1.538E+00	(P	1.613E+00	4.97E-01 G
		92.38	1.655E+00	(P	1.939E+00	5.95E-01 G

AM-241 -1.1849E-03
 59.54-1.185E-03 %(P 2.045E-01 6.02E-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:

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

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	8.5568E-02	8.6505E-02	3.1088E-01	3.1092E-01	3.483E-01
K-40		1.5516E+01	1.5516E+01	1.8136E+00	2.0144E+00	
MN-54	#A	1.7138E-02	1.7170E-02	4.0446E-02	4.0457E-02	4.520E-02
CO-57	#B	3.0391E-03	3.0456E-03	3.9357E-02	3.9357E-02	4.400E-02
CO-60	#B	1.9736E-02	1.9742E-02	4.7332E-02	4.7345E-02	5.319E-02

Sr-85	#A	-1.9696E-02	-1.9873E-02	4.6812E-02	4.6825E-02	5.147E-02
Kr-85	#A	-4.7914E+02	-4.7914E+02	1.1861E+03	1.1864E+03	1.193E+03
Y-88	#B	-5.1103E-03	-5.1383E-03	4.5513E-02	4.5514E-02	5.579E-02
NB-94	#B	-6.0407E-04	-6.0407E-04	6.8827E-02	6.8827E-02	4.278E-02
Ag-108M	#B	5.5584E-04	5.5585E-04	4.7757E-02	4.7757E-02	5.606E-02
CD-109	#A	-3.3939E-02	-3.3983E-02	1.7001E+00	1.7001E+00	1.469E+00
SN-113	#B	-2.6526E-02	-2.6660E-02	5.9329E-02	5.9348E-02	6.531E-02
SB-125	#B	7.2801E-03	7.2843E-03	1.1165E-01	1.1165E-01	1.287E-01
I-131	#B	1.2511E-02	1.3449E-02	4.1294E-02	4.1301E-02	4.304E-02
CS-134	#B	-2.9342E-03	-2.9365E-03	1.4845E-01	1.4845E-01	1.059E-01
CS-137	#	1.1246E-01	1.1246E-01	7.4447E-02	7.4718E-02	
CE-139	#A	-1.3797E-02	-1.3856E-02	4.3785E-02	4.3792E-02	4.742E-02
EU-152	#B	-1.5526E-03	-1.5528E-03	3.3939E-01	3.3939E-01	1.112E-01
EU-154	#B	-1.3376E-03	-1.3379E-03	2.9040E-01	2.9040E-01	9.825E-02
EU-155	#A	1.2396E-01	1.2400E-01	1.4802E-01	1.4818E-01	1.609E-01
HG-203	#B	-1.3654E-03	-1.3826E-03	3.6304E-02	3.6304E-02	4.091E-02
TL-208	#	3.2599E-01	3.2599E-01	8.9974E-02	9.1840E-02	
PB-212	#	6.2269E-01	6.2269E-01	1.1287E-01	1.1823E-01	9.582E-02
PB-214		4.5596E-01	4.5596E-01	1.2550E-01	1.2812E-01	
BI-212	#B	2.4792E-01	2.4792E-01	4.2513E-01	4.2536E-01	4.650E-01
BI-214		5.0065E-01	5.0065E-01	1.5120E-01	1.5382E-01	
RA-224	#A	7.7816E-01	7.7816E-01	1.1087E+00	1.1095E+00	1.209E+00
RA-226	#	1.2932E+00	1.2932E+00	1.0999E+00	1.1023E+00	1.172E+00
AC-228		8.8909E-01	8.8909E-01	2.1174E-01	2.1762E-01	
TH-227	#B	-1.7530E-01	-1.7530E-01	4.0652E-01	4.0664E-01	4.403E-01
PA-234	#B	-3.8474E-03	-3.8474E-03	1.2688E-01	1.2688E-01	1.427E-01
TH-234	#B	1.3065E+00	1.3065E+00	1.1202E+00	1.1225E+00	2.109E+00
AM-241	#A	-1.1849E-03	-1.1849E-03	7.5730E-01	7.5730E-01	2.045E-01

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

----- S U M M A R Y -----
 Total Activity (269.6 to 1999.1 keV) 1.7799999E+01 pCi/gm
 Total Decayed Activity (269.6 to 1999.1 keV) 1.7800003E+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-12-01-002-F

Spectrum Filename: C:\GammaVision\Spectra\101F_23AUG2006_1305.An1

Acquisition information

Start time: 23-Aug-2006 13:05:48
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9130E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9130E+03) =
5.2274E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	19-Aug-2006 14:25:00
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. 18 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1079

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
75.26	154.	23.56	1.01	1.668E-02	74.81	9.600	PBC<MDA	PB212
77.70	215.	16.76	1.01	1.736E-02	77.11	17.500	5.044E-01	PB212
					77.11	10.700	8.107E-01	PB214
93.01	117.	36.82	1.50	1.989E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.05	107.	39.06	1.50	1.985E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.36	99.	40.74	0.91	2.109E-02				
185.70	140.	25.78	1.04	1.860E-02				
185.70	140.	25.78	1.04	1.860E-02	185.99	3.280	1.623E+00	RA226
238.79	716.	4.75	1.12	1.558E-02				
238.79	716.	4.75	1.12	1.558E-02	238.63	43.100	7.475E-01	PB212
241.79	83.	30.27	1.12	1.542E-02	241.00	3.900	PBC<MDA	RA224
277.64	65.	32.78	1.47	1.367E-02				
277.64	65.	32.78	1.47	1.367E-02	279.17	81.500	4.400E-02	HG203
295.26	124.	20.37	1.06	1.292E-02	295.22	19.200	3.472E-01	PB214
328.25	61.	33.59	1.21	1.169E-02				
338.58	126.	16.52	1.21	1.134E-02	338.40	12.010	6.406E-01	AC228
351.89	249.	11.68	1.25	1.093E-02				
351.89	249.	11.68	1.25	1.093E-02	351.99	37.100	4.302E-01	PB214
433.73	79.	22.63	1.50	8.902E-03				
433.73	79.	22.63	1.50	8.902E-03	433.93	89.881	6.996E-02	Ag108M
510.75	110.	21.15	1.64	7.590E-03	510.72	22.500	3.879E-01	TL208
583.16	246.	8.63	1.23	6.684E-03	583.14	86.000	2.990E-01	TL208
609.36	160.	15.42	0.95	6.412E-03	609.32	46.090	3.798E-01	BI214
661.65	555.	5.81	1.35	5.937E-03	661.62	84.620	7.797E-01	CS137
723.46	39.	27.68	1.45	5.470E-03	722.95	90.499	5.573E-02	Ag108M

					723.30	19.700	PBC<MDA	EU154
726.96	50.	23.63	1.46	5.446E-03	727.17	11.800	5.398E-01	BI212
794.60	28.	37.95	1.50	5.016E-03	795.76	85.400	PBC<MDA	CS134
911.23	148.	11.51	1.65	4.446E-03	911.07	29.000	7.984E-01	AC228
968.55	122.	15.70	0.91	4.213E-03	968.90	17.460	1.165E+00	AC228
1120.59	39.	29.82	1.37	3.711E-03	1120.28	15.040	4.964E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1173.11	140.	12.66	1.77	3.565E-03	1173.23	99.860	2.779E-01	CO60
1332.29	135.	11.14	1.80	3.191E-03	1332.51	99.980	2.992E-01	CO60
1460.72	739.	3.75	1.80	2.943E-03	1460.75	10.700	1.653E+01	K40
1763.80	32.	17.68	1.83	2.481E-03	1764.51	15.920	5.644E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	Suspected Nuclide
150.08	75.26	584.	154.	0.077	70.67	1.005	PB-214 D
154.97	77.70	542.	215.	0.107	50.29	1.007	PB-214 D
258.33	129.36	588.	142.	0.071	76.50	0.908	AC-228
477.30	238.61	221.	716.	0.358	14.26	1.122	PB-212 D
555.02	277.64	189.	62.	0.031	101.03	1.469	NP-239 s
656.28	328.25	156.	61.	0.031	100.77	1.210	RH-106M
1446.60	723.28	36.	42.	0.021	77.16	1.454	EU-154 D

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

 This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %
PB-212	149.23	74.83	1224.	156.	0.078	94.55	1.499
PB-212	153.79	77.11	1057.	322.	0.161	45.98	1.499D
PB-214	153.79	77.11	1061.	318.	0.159	45.98	1.499D
TH-234	185.59	93.01	979.	117.	0.059	110.45	1.499s
RA-226	372.09	186.22	575.	125.	0.062	85.73	1.499s
PB-212	477.33	238.82	517.	586.	0.293	20.34	1.499
RA-224	481.70	241.00	488.	86.	0.043	112.83	1.123D
PB-214	590.48	295.37	294.	131.	0.066	60.41	1.499
AC-228	676.94	338.58	141.	124.	0.062	49.57	1.213
PB-214	703.78	351.99	184.	215.	0.107	33.35	1.499
Ag-108M	867.45	433.79	118.	63.	0.031	82.90	1.499
TL-208	1021.44	510.75	150.	94.	0.047	63.45	1.639s
TL-208	1166.34	583.16	73.	243.	0.122	25.89	1.230
BI-214	1218.76	609.36	133.	159.	0.079	46.26	0.954
CS-137	1323.39	661.65	126.	554.	0.277	17.44	1.353
BI-212	1454.49	727.17	40.	51.	0.025	66.86	1.457D
CS-134	1589.42	794.60	45.	28.	0.014	113.84	1.502
AC-228	1822.82	911.23	52.	146.	0.073	34.54	1.651s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1937.52	968.55	71.	121.	0.061	47.11	0.912s
BI-214	2241.78	1120.59	39.	39.	0.020	89.46	1.373
CO-60	2346.88	1173.11	58.	140.	0.070	37.97	1.768s
CO-60	2665.42	1332.29	19.	135.	0.067	33.42	1.803s
K-40	2922.45	1460.72	10.	737.	0.368	11.26	1.804
BI-214	3529.03	1763.80	0.	32.	0.016	53.03	1.832

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		3.6503E-03	477.56	3.650E-03	%	4.599E-01 1.32E-01	G
K-40		1.6527E+01	1460.75	1.653E+01	(P	3.977E-01 6.22E-01	G
MN-54		-4.9179E-03	834.81	-4.918E-03	&(P	5.237E-02 1.48E-02	G
CO-57		3.1000E-03	122.07	3.100E-03	&(	5.423E-02 1.62E-02	G K
			136.43	1.232E-01	%	3.863E-01 1.16E-01	G
CO-60		2.8858E-01	1332.51	2.992E-01	@(P	5.116E-02 3.34E-02	G K
			1173.23	2.779E-01	*(P	7.600E-02 3.52E-02	G K
Sr-85		-1.0858E-02	514.00	-1.086E-02	%	6.181E-02 1.82E-02	G
Kr-85		-2.6622E+02	513.99	-2.662E+02	%(P	1.373E+03 4.04E+02	G
Y-88		-1.1905E-04	1836.01	-1.191E-04	&(	3.302E-02 7.54E-03	G K
			898.02	7.825E-03	% P	4.215E-02 1.19E-02	G
NB-94		1.8220E-02	871.10	1.822E-02	%(P	4.680E-02 1.40E-02	G K
			702.50	-1.124E-02	% P	5.487E-02 1.61E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	4.8763E-02	722.95	4.236E-02	&(	6.557E-02	2.03E-02	G K
		614.37	2.045E-02	% P	5.895E-02	1.76E-02	G
		433.93	5.521E-02	(	4.709E-02	1.53E-02	G
CD-109	2.9180E-01	88.04	2.918E-01	%(P	1.465E+00	4.40E-01	G
SN-113	-5.0477E-03	391.71	-5.048E-03	&(	7.409E-02	2.17E-02	G K
		255.04	-1.967E-01	% P	2.166E+00	6.41E-01	G
SB-125	-2.7384E-02	427.95	-2.738E-02	%(P	1.613E-01	4.75E-02	G K
		600.77	5.842E-03	& P	2.603E-01	7.43E-02	G
		636.15	7.050E-02	% P	4.356E-01	1.27E-01	G
		463.51	2.614E-01	% P	4.802E-01	1.46E-01	G
		176.29	8.231E-02	& P	6.447E-01	1.92E-01	G
I-131	2.5447E-02	364.48	2.545E-02	%(	7.624E-02	2.28E-02	G K
		636.97	2.324E-02	%	9.493E-01	2.71E-01	G
		284.29	-1.400E-01	&	9.407E-01	2.78E-01	G
CS-134	1.6838E-02	604.66	-9.050E-03	&(P	6.158E-02	1.80E-02	G K
		795.76	4.642E-02	(P	5.595E-02	1.79E-02	G
		569.29	1.008E-01	% P	2.993E-01	8.91E-02	G
		801.84	-9.384E-02	%	6.150E-01	1.78E-01	G
CS-137	7.7969E-01	661.62	7.797E-01	(P	7.725E-02	4.54E-02	G
CE-139	-3.7843E-04	165.85	-3.784E-04	%(P	5.296E-02	1.57E-02	G
EU-152	-2.4920E-04	121.78	-2.492E-04	&(P	1.575E-01	4.68E-02	G K
		344.30	4.499E-02	% P	1.635E-01	4.88E-02	G
		1408.08	-1.949E-03	% P	2.412E-01	6.39E-02	G
		964.00	6.640E-02	% P	5.499E-01	1.60E-01	G
		1112.07	-4.536E-02	% P	4.750E-01	1.35E-01	G
		778.90	-2.454E-02	% P	4.028E-01	1.14E-01	G
EU-154	-4.7078E-03	123.10	-4.708E-03	&(P	1.137E-01	3.39E-02	G K
		1274.80	4.099E-02	& P	1.691E-01	4.89E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	1.980E-01	& P	2.950E-01	9.15E-02	G
		1004.80	6.790E-02	% P	3.601E-01	1.04E-01	G
EU-155	-4.2956E-02	86.45	4.296E-02	&(	1.705E-01	5.13E-02	G K
		105.31	7.829E-02	%	2.169E-01	6.55E-02	G
HG-203	1.9184E-03	279.17	1.918E-03	&(	5.176E-02	1.52E-02	G K
		72.87	2.228E-01	% P	1.336E+00	4.01E-01	G
		70.83	2.173E-02	%	1.882E+00	5.60E-01	G
		82.50	1.438E-01	&	2.671E+00	7.97E-01	G
TL-208	2.9900E-01	583.14	2.990E-01	(P	5.215E-02	2.61E-02	G
		510.72	3.879E-01	+ P	2.475E-01	9.61E-02	G
PB-212	6.3145E-01	238.63	6.170E-01	(P	1.143E-01	4.23E-02	G K
							Energy duplication
		77.11	7.556E-01	+	3.619E-01	1.16E-01	G
		74.81	6.962E-01	&(P	7.373E-01	2.27E-01	G
PB-214	3.7413E-01	351.99	3.742E-01	(P	1.148E-01	4.20E-02	G K
		295.22	3.740E-01	(P	2.354E-01	7.63E-02	G
							Energy duplication
		77.11	1.221E+00	+ P	5.929E-01	1.89E-01	G
		241.92	2.727E-01	% P	7.514E-01	2.27E-01	G
BI-212	5.5678E-01	727.17	5.568E-01	(P	3.555E-01	1.26E-01	G K
		1620.56	2.065E-01	%	1.489E+00	3.99E-01	G
		785.42	1.393E+00	% P	2.346E+00	7.24E-01	G
BI-214	4.4068E-01	609.32	3.798E-01	(P	1.350E-01	5.90E-02	G K
		1764.51	5.644E-01	(P	1.318E-01	1.01E-01	G
		1120.28	4.964E-01	(P	4.016E-01	1.49E-01	G
RA-224	1.0072E+00	241.00	1.007E+00	(P	1.239E+00	3.82E-01	G
RA-226	1.4486E+00	185.99	1.449E+00	*(	1.327E+00	4.14E-01	G
AC-228	7.5216E-01	911.07	7.984E-01	*(P	1.994E-01	9.31E-02	G K
		968.90	1.165E+00	+ P	4.024E-01	1.84E-01	G
		338.40	6.406E-01	(P	3.012E-01	1.08E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	1.9674E-02	236.00	1.967E-02	% (P	3.722E-01	1.10E-01	G K
		256.25	8.010E-02	% P	6.255E-01	1.85E-01	G
PA-234	-3.7644E-02	98.44	3.764E-02	& (	1.973E-01	5.92E-02	G K
		946.00	0.000E+00	&	4.129E-01	1.19E-01	G
		131.28	8.792E-02	%	2.370E-01	7.16E-02	G
		94.67	1.300E-02	&	3.431E-01	1.02E-01	G
		883.24	5.127E-02	%	4.347E-01	1.24E-01	G
		926.70	5.351E-04	&	5.043E-01	1.41E-01	G
TH-234	1.0095E+00	569.26	1.534E-01	%	4.412E-01	1.32E-01	G
		63.29	7.171E-01	% (P	2.173E+00	6.54E-01	G K
		92.80	1.389E+00	(P	1.758E+00	5.38E-01	G
AM-241	-6.1076E-02	92.38	1.486E+00	% P	2.095E+00	6.39E-01	G
		59.54	6.108E-02	& (P	3.293E-01	9.87E-02	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:

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

Peak Codes:

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

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

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
          Time of Count   Time Corrected   Uncertainty   3 Sigma
Nuclide   Activity       Activity       Counting      Total        MDA
          pCi/gm        pCi/gm        pCi/gm       pCi/gm      pCi/gm
-----
BE-7  #A   3.4680E-03   3.6503E-03   3.9714E-01   3.9714E-01   4.370E-01
K-40              1.6527E+01   1.6527E+01   1.8664E+00   2.0870E+00
MN-54 #A   -4.8750E-03  -4.9179E-03   5.7304E-02   5.7305E-02   5.191E-02
CO-57 #B    3.0687E-03   3.1000E-03   4.8519E-02   4.8519E-02   5.369E-02
CO-60 #     2.8817E-01   2.8858E-01   7.3053E-02   7.4850E-02
Sr-85 #A   -1.0409E-02  -1.0858E-02   5.4731E-02   5.4735E-02   5.926E-02
Kr-85 #A   -2.6621E+02  -2.6622E+02   1.4694E+03   1.4695E+03   1.373E+03
Y-88  #B   -1.1604E-04  -1.1905E-04   2.2614E-02   2.2614E-02   3.219E-02
NB-94 #B    1.8220E-02   1.8220E-02   4.1910E-02   4.1922E-02   4.680E-02
Ag-108M#B    4.8760E-02   4.8763E-02   4.0423E-02   4.0517E-02   6.556E-02
CD-109 #A    2.9004E-01   2.9180E-01   1.3193E+00   1.3194E+00   1.456E+00
SN-113 #B   -4.9291E-03  -5.0477E-03   6.5028E-02   6.5028E-02   7.235E-02
SB-125 #B   -2.7310E-02  -2.7384E-02   1.5172E-01   1.5172E-01   1.609E-01
I-131 #B    1.8111E-02   2.5447E-02   6.8522E-02   6.8537E-02   5.426E-02
CS-134 #B    1.6777E-02   1.6838E-02   1.9454E-02   1.9477E-02   6.136E-02
CS-137    7.7950E-01   7.7969E-01   1.3617E-01   1.4311E-01
CE-139 #A   -3.7098E-04  -3.7843E-04   1.0862E-01   1.0862E-01   5.191E-02
EU-152 #B   -2.4905E-04  -2.4920E-04   2.4870E-01   2.4870E-01   1.574E-01
EU-154 #B   -4.7036E-03  -4.7078E-03   1.4031E-01   1.4031E-01   1.136E-01
EU-155 #B   -4.2891E-02  -4.2956E-02   1.5389E-01   1.5391E-01   1.703E-01
HG-203 #B    1.8091E-03   1.9184E-03   4.5584E-02   4.5584E-02   4.881E-02
TL-208    2.9900E-01   2.9900E-01   7.8164E-02   7.9969E-02
PB-212 #     6.3145E-01   6.3145E-01   1.2977E-01   1.3459E-01   1.143E-01
PB-214 #     3.7413E-01   3.7413E-01   1.2593E-01   1.2769E-01   1.148E-01
BI-212    5.5678E-01   5.5678E-01   3.7722E-01   3.7853E-01
BI-214    4.4068E-01   4.4068E-01   1.6890E-01   1.7072E-01
RA-224 A    1.0072E+00   1.0072E+00   1.1459E+00   1.1473E+00
RA-226 #    1.4486E+00   1.4486E+00   1.2419E+00   1.2445E+00   1.327E+00
AC-228    7.5216E-01   7.5216E-01   2.3086E-01   2.3474E-01
TH-227 #B    1.9674E-02   1.9674E-02   3.2992E-01   3.2992E-01   3.722E-01
PA-234 #B   -3.7644E-02  -3.7644E-02   1.7758E-01   1.7759E-01   1.973E-01
TH-234 #B    1.0095E+00   1.0095E+00   1.1736E+00   1.1750E+00   2.173E+00
AM-241 #A   -6.1075E-02  -6.1076E-02   3.1642E-01   3.1643E-01   3.293E-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 (785.4 to 1999.1 keV) 2.0650810E+01 pCi/gm
Total Decayed Activity (785.4 to 1999.1 keV) 2.0651411E+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-12-01-011-F

Spectrum Filename: C:\GammaVision\Spectra\101F_23AUG2006_1507.An1

Acquisition information

Start time: 23-Aug-2006 15:07:13
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.23keV)
Stop channel: 4000 (1999.11keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9400E+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	19-Sep-2006 14:05:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	101_150K_28APR05.Pbc 01-May-2005 05:24:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.2007

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.37	229.	16.44	1.00	1.651E-02	70.83	3.520	2.010E+00	HG203
					74.81	9.600	9.834E-01	PB212
77.52	370.	10.06	1.01	1.740E-02	77.11	17.500	8.558E-01	PB212
					77.11	10.700	1.386E+00	PB214
87.06	196.	16.39	1.01	1.918E-02	86.45	32.740	2.162E-01	EU155
					88.04	3.790	1.785E+00	CD109
89.95	147.	20.42	1.02	1.956E-02				
93.45	108.	28.12	1.02	1.995E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.20	148.	29.05	0.93	1.857E-02	185.99	3.280	1.688E+00	RA226
209.16	69.	33.40	1.21	1.722E-02				
238.78	980.	3.72	1.12	1.557E-02	238.63	43.100	1.010E+00	PB212
238.82	586.	6.82	1.50	1.540E-02	238.63	43.100	PBC<MDA	PB212
241.69	159.	16.29	1.12	1.541E-02	241.00	3.900	1.825E+00	RA224
270.85	88.	32.28	2.07	1.398E-02				
295.35	158.	12.42	1.16	1.292E-02	295.22	19.200	4.394E-01	PB214
300.24	54.	31.67	1.16	1.272E-02				
338.26	189.	14.92	1.08	1.135E-02	338.40	12.010	9.547E-01	AC228
351.91	369.	7.53	1.18	1.093E-02				
351.91	369.	7.53	1.18	1.093E-02	351.99	37.100	6.308E-01	PB214
463.01	65.	29.72	1.32	8.350E-03				
463.01	65.	29.72	1.32	8.350E-03	463.51	10.000	5.243E-01	SB125
510.78	135.	20.00	1.56	7.590E-03	510.72	22.500	4.861E-01	TL208
583.44	304.	9.41	1.20	6.681E-03	583.14	86.000	3.655E-01	TL208
609.36	254.	7.13	1.38	6.412E-03	609.32	46.090	5.969E-01	BI214
726.88	97.	18.58	1.50	5.445E-03	727.17	11.800	1.045E+00	BI212
786.51	40.	31.13	1.57	5.075E-03	785.42	2.000	2.735E+00	BI212

795.10	35.	32.12	1.50	5.016E-03	795.76	85.400	5.528E-02	CS134
860.35	35.	27.82	1.36	4.678E-03				
911.20	205.	9.75	1.44	4.446E-03	911.07	29.000	1.099E+00	AC228
968.49	127.	14.92	2.15	4.214E-03	968.90	17.460	1.200E+00	AC228
1120.18	72.	23.55	1.42	3.711E-03	1120.28	15.040	8.926E-01	BI214
1460.74	660.	3.99	1.87	2.942E-03	1460.75	10.700	1.455E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.70	39.	16.01	1.83	2.481E-03	1764.51	15.920	6.800E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
179.48	89.89	374.	147.	0.073	61.25	1.016	PB-214 LD
417.99	209.16	244.	69.	0.035	100.19	1.210	AC-228
477.28	238.79	174.	979.	0.490	11.16	1.122	PB-212 D
541.43	270.85	275.	88.	0.044	96.84	2.070	AC-228 s
600.19	300.22	135.	42.	0.021	123.41	0.938	PB-212
1720.99	860.35	26.	35.	0.018	83.46	1.364	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	146.34	73.39	1330.	-171.	-0.086	93.23	1.499
PB-212	149.21	74.82	1328.	252.	0.126	62.89	1.499s
PB-212	153.79	77.11	1160.	399.	0.199	39.21	1.499D
PB-214	153.79	77.11	1164.	395.	0.198	39.21	1.499D
EU-155	173.92	87.17	1141.	192.	0.096	77.69	1.499
CD-109	175.66	88.04	522.	94.	0.047	106.57	1.014D
TH-234	185.86	93.14	1063.	117.	0.058	111.18	1.499s
TH-234	185.79	93.10	1031.	119.	0.059	111.93	1.499s
RA-226	372.08	186.21	666.	134.	0.067	85.77	1.499s
PB-212	477.18	238.74	472.	817.	0.408	15.27	1.499
RA-224	481.70	241.00	594.	131.	0.065	82.92	1.123D
PB-214	477.34	238.82	509.	586.	0.293	20.46	1.499s
PB-214	590.44	295.35	252.	158.	0.079	48.14	1.499s
AC-228	676.31	338.26	211.	187.	0.093	44.76	1.077s
PB-214	703.85	352.03	151.	321.	0.161	23.13	1.499s
SB-125	925.94	463.02	104.	48.	0.024	96.54	1.499s
TL-208	1021.48	510.77	170.	119.	0.060	58.94	1.554s
TL-208	1166.88	583.44	145.	302.	0.151	28.24	1.196s
BI-214	1218.81	609.39	85.	268.	0.134	25.80	1.362
BI-212	1453.92	726.88	70.	96.	0.048	55.73	1.495
BI-212	1573.23	786.51	40.	40.	0.020	93.38	1.574
CS-134	1590.42	795.10	47.	35.	0.017	96.36	1.502

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1822.75	911.20	59.	204.	0.102	29.26	1.445
AC-228	1937.39	968.49	62.	127.	0.063	44.77	2.153s
BI-214	2240.95	1120.18	55.	72.	0.036	70.66	1.416s
K-40	2922.50	1460.74	13.	658.	0.329	11.98	1.873
BI-214	3530.85	1764.70	0.	39.	0.019	48.04	1.832

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

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

- Nuclide - Name	Average Code	Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	Value	COMMENTS
BE-7	-1.2177E-01		477.56	1.218E-01	%	2.962E-01	8.92E-02	G
K-40	1.4552E+01		1460.75	1.455E+01	(P	4.357E-01	5.83E-01	G
MN-54	9.2352E-03		834.81	9.235E-03	%(P	5.719E-02	1.66E-02	G
CO-57	1.7750E-03		122.07	1.775E-03	%(	5.193E-02	1.55E-02	G K
			136.43	7.043E-02	%	3.963E-01	1.19E-01	G
CO-60	3.5534E-03		1332.51	3.553E-03	%(P	5.884E-02	1.63E-02	G K
			1173.23	9.825E-03	% P	5.798E-02	1.66E-02	G K
Sr-85	-1.8024E-02		514.00	1.802E-02	&(	4.602E-02	1.39E-02	G
Kr-85	-5.8027E+02		513.99	5.803E+02	&(P	1.421E+03	4.27E+02	G
Y-88	-6.5606E-03		1836.01	6.561E-03	%(	4.335E-02	1.18E-02	G K
			898.02	1.830E-03	& P	4.736E-02	1.33E-02	G
NB-94	-7.7304E-03		871.10	7.730E-03	%(P	4.548E-02	1.30E-02	G K
			702.50	8.436E-03	% P	5.286E-02	1.54E-02	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.0774E-02	722.95	1.077E-02	% (	6.135E-02	1.79E-02	G K
		614.37	1.891E-02	& P	4.907E-02	1.47E-02	G
		433.93	0.000E+00	%	5.428E-02	1.58E-02	G
CD-109	8.6209E-01	88.04	8.621E-01	(P	9.961E-01	3.08E-01	G
SN-113	-5.4660E-03	391.71	5.466E-03	% (	5.467E-02	1.60E-02	G K
		255.04	9.989E-02	% P	1.648E+00	4.86E-01	G
SB-125	1.3759E-01	427.95	5.070E-02	% (P	1.178E-01	3.55E-02	G K
		600.77	1.431E-02	% P	2.557E-01	7.33E-02	G
		636.15	1.123E-01	% P	4.009E-01	1.18E-01	G
		463.51	3.948E-01	*(P	4.119E-01	1.31E-01	G
		176.29	1.264E-01	& P	6.269E-01	1.87E-01	G
I-131	-8.4602E-05	364.48	8.460E-05	% (	4.734E-03	1.37E-03	G K
		636.97	1.337E-02	&	6.218E-02	1.82E-02	G
		284.29	3.275E-03	%	5.983E-02	1.75E-02	G
CS-134	2.0157E-02	604.66	1.057E-02	% (P	5.054E-02	1.48E-02	G K
		795.76	5.528E-02	(P	5.494E-02	1.80E-02	G
		569.29	9.685E-02	% P	2.769E-01	8.25E-02	G
		801.84	8.339E-02	&	5.567E-01	1.60E-01	G
CS-137	4.3490E-03	661.62	4.349E-03	% (P	5.007E-02	1.42E-02	G
CE-139	1.4805E-02	165.85	1.481E-02	& (P	4.704E-02	1.42E-02	G
EU-152	1.1728E-02	121.78	1.173E-02	% (P	1.568E-01	4.68E-02	G K
		344.30	3.380E-02	& P	1.492E-01	4.42E-02	G
		1408.08	6.740E-02	% P	2.218E-01	6.42E-02	G
		964.00	5.474E-02	% P	3.549E-01	1.01E-01	G
		1112.07	1.798E-02	% P	3.470E-01	9.50E-02	G
		778.90	7.423E-02	& P	3.655E-01	1.06E-01	G
EU-154	9.1312E-03	123.10	9.131E-03	& (P	1.131E-01	3.38E-02	G K
		1274.80	9.514E-03	% P	1.900E-01	5.33E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	4.422E-02	% P	2.199E-01	6.36E-02	G
		1004.80	4.504E-02	% P	3.269E-01	9.35E-02	G
EU-155	2.1182E-01	86.45	2.118E-01	(	1.766E-01	5.49E-02	G K
		105.31	7.605E-02	%	2.171E-01	6.55E-02	G
HG-203	-4.9546E-04	279.17	4.955E-04	&(	2.878E-02	8.40E-03	G K
		72.87	2.376E-02	& P	7.884E-01	2.35E-01	G
		70.83	1.500E+00	&	1.513E+00	4.66E-01	G
		82.50	4.639E-01	%	1.885E+00	5.67E-01	G
TL-208	3.6548E-01	583.14	3.655E-01	@(P	7.137E-02	3.47E-02	G
		510.72	4.857E-01	+ P	2.588E-01	1.08E-01	G
PB-212	8.6932E-01	238.63	8.475E-01	(P	1.078E-01	4.35E-02	G K
							Energy duplication
		77.11	9.231E-01	(	3.735E-01	1.21E-01	G
		74.81	1.104E+00	+ P	7.568E-01	2.36E-01	G
PB-214	5.5219E-01	351.99	5.522E-01	*(P	1.031E-01	4.28E-02	G K
		295.22	4.447E-01	- P	2.153E-01	7.22E-02	G
							Energy duplication
		77.11	1.496E+00	+ P	6.118E-01	1.97E-01	G
		241.92	3.551E+00	+ P	6.527E-01	2.42E-01	G
BI-212	1.0447E+00	727.17	1.045E+00	(P	4.513E-01	1.95E-01	G K
		1620.56	2.994E-01	%	1.590E+00	4.38E-01	G
		785.42	2.735E+00	+ P	2.212E+00	8.57E-01	G
BI-214	6.4455E-01	609.32	6.323E-01	(P	1.075E-01	5.46E-02	G K
		1764.51	6.800E-01	(P	1.300E-01	1.10E-01	G
		1120.28	8.926E-01	+ P	4.670E-01	2.11E-01	G
RA-224	1.5106E+00	241.00	1.511E+00	(P	1.345E+00	4.20E-01	G
RA-226	1.5306E+00	185.99	1.531E+00	@(	1.405E+00	4.38E-01	G
AC-228	1.0997E+00	911.07	1.099E+00	(P	2.088E-01	1.08E-01	G K
		968.90	1.200E+00	(P	3.741E-01	1.80E-01	G
		338.40	9.547E-01	*(P	3.599E-01	1.44E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.5726E-01	236.00	1.573E-01	% (P	4.950E-01	1.49E-01	G K
		256.25	1.281E-01	% P	5.996E-01	1.78E-01	G
PA-234	3.6447E-02	98.44	3.645E-02	% (	1.968E-01	5.90E-02	G K
		946.00	2.222E-02	&	2.644E-01	7.48E-02	G
		131.28	4.117E-02	%	2.290E-01	6.86E-02	G
		94.67	1.662E-01	%	3.534E-01	1.07E-01	G
		883.24	1.248E-01	%	3.485E-01	1.03E-01	G
		926.70	8.205E-02	%	3.763E-01	1.08E-01	G
TH-234	1.2342E+00	569.26	1.698E-01	%	4.100E-01	1.23E-01	G
		63.29	8.813E-01	% (P	2.322E+00	7.00E-01	G K
		92.80	1.386E+00	(P	1.778E+00	5.44E-01	G
AM-241	7.7569E-03	92.38	1.592E+00	(P	2.111E+00	6.45E-01	G
		59.54	7.757E-03	% (P	3.266E-01	9.73E-02	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:

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

Peak Codes:

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	-1.7278E-01	-1.2177E-01	2.6750E-01	2.6759E-01	4.203E-01
K-40		1.4552E+01	1.4552E+01	1.7500E+00	1.9336E+00	
MN-54	#A	9.8048E-03	9.2352E-03	4.9776E-02	4.9779E-02	6.071E-02
CO-57	#B	1.9022E-03	1.7750E-03	4.6454E-02	4.6454E-02	5.565E-02
CO-60	#B	3.5880E-03	3.5534E-03	4.8908E-02	4.8908E-02	5.941E-02
Sr-85	#A	-2.4044E-02	-1.8024E-02	4.1557E-02	4.1570E-02	6.138E-02
Kr-85	#A	-5.8039E+02	-5.8027E+02	1.3960E+03	1.3964E+03	1.421E+03
Y-88	#B	-7.8175E-03	-6.5606E-03	3.5504E-02	3.5506E-02	5.165E-02
NB-94	#B	-7.7304E-03	-7.7304E-03	4.1031E-02	4.1034E-02	4.548E-02
Ag-108M	#B	-1.0778E-02	-1.0774E-02	5.3672E-02	5.3675E-02	6.137E-02
CD-109	A	8.9837E-01	8.6209E-01	9.2331E-01	9.2455E-01	
SN-113	#B	-6.4295E-03	-5.4660E-03	4.7945E-02	4.7946E-02	6.431E-02
SB-125	#F	1.4015E-01	1.3759E-01	1.3681E-01	1.3703E-01	1.199E-01
I-131	#B	-8.6434E-04	-8.4602E-05	4.1211E-03	4.1211E-03	4.836E-02
CS-134	#B	2.0663E-02	2.0157E-02	1.9655E-02	1.9688E-02	5.181E-02
CS-137	#A	4.3564E-03	4.3490E-03	4.2634E-02	4.2635E-02	5.016E-02
CE-139	#A	1.6961E-02	1.4805E-02	4.2478E-02	4.2487E-02	5.389E-02
EU-152	#B	1.1775E-02	1.1728E-02	1.4034E-01	1.4034E-01	1.574E-01
EU-154	#B	9.1863E-03	9.1312E-03	1.0126E-01	1.0126E-01	1.138E-01
EU-155	#	2.1402E-01	2.1182E-01	1.6457E-01	1.6499E-01	1.784E-01
HG-203	#B	-7.3992E-04	-4.9546E-04	2.5203E-02	2.5203E-02	4.298E-02
TL-208	#	3.6548E-01	3.6548E-01	1.0402E-01	1.0605E-01	
PB-212	#	8.6932E-01	8.6932E-01	1.3373E-01	1.4247E-01	1.078E-01
PB-214	#	5.5219E-01	5.5219E-01	1.2851E-01	1.3224E-01	1.031E-01
BI-212		1.0447E+00	1.0447E+00	5.8629E-01	5.8925E-01	
BI-214		6.4455E-01	6.4455E-01	1.6700E-01	1.7093E-01	
RA-224		1.5106E+00	1.5106E+00	1.2595E+00	1.2623E+00	
RA-226	#	1.5306E+00	1.5306E+00	1.3128E+00	1.3156E+00	1.406E+00
AC-228		1.0997E+00	1.0997E+00	2.5789E-01	2.6527E-01	
TH-227	#B	-1.5726E-01	-1.5726E-01	4.5688E-01	4.5697E-01	4.950E-01
PA-234	#B	3.6447E-02	3.6447E-02	1.7704E-01	1.7706E-01	1.968E-01
TH-234	#B	1.2342E+00	1.2342E+00	1.2024E+00	1.2043E+00	2.322E+00
AM-241	#A	7.7578E-03	7.7569E-03	2.9204E-01	2.9204E-01	3.267E-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 (250.1 to 1999.1 keV) 2.0115034E+01 pCi/gm
Total Decayed Activity (250.1 to 1999.1 keV) 2.0078753E+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-12-01-019-F

Spectrum Filename: C:\GammaVision\Spectra\102F_22AUG2006_1301.An1

Acquisition information

Start time: 22-Aug-2006 13:02:06
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8960E+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	19-Aug-2006 13:30:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.5598

***** S U M M A R Y O F P E A 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	168.	26.61	1.50	9.541E-03	77.11	10.700	1.173E+00	PB214
					77.11	17.500	7.175E-01	PB212
77.19	168.	26.61	1.50	9.541E-03	77.11	10.700	1.173E+00	PB214
					77.11	17.500	7.175E-01	PB212
93.18	109.	38.69	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	1.947E+00	TH234
129.44	101.	40.36	1.02	1.716E-02				
186.71	90.	35.62	1.47	1.624E-02	185.99	3.280	PBC<MDA	RA226
208.71	120.	29.20	1.13	1.522E-02				
239.09	639.	4.87	1.22	1.379E-02	238.63	43.100	7.650E-01	PB212
242.11	96.	27.54	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.739E-01	PB214
270.31	58.	33.01	1.54	1.243E-02				
277.26	103.	26.24	1.01	1.215E-02				
295.93	149.	12.40	1.26	1.144E-02	295.22	19.200	4.823E-01	PB214
338.87	137.	18.16	1.34	1.005E-02	338.40	12.010	8.064E-01	AC228
352.67	208.	11.87	1.25	9.660E-03	351.99	37.100	4.121E-01	PB214
464.13	44.	29.83	1.35	7.355E-03	463.51	10.000	PBC<MDA	SB125
511.45	78.	18.68	1.35	6.686E-03	510.72	22.500	3.691E-01	TL208
584.16	208.	9.74	1.67	5.880E-03	583.14	86.000	2.920E-01	TL208
610.23	163.	12.81	1.47	5.641E-03	609.32	46.090	4.451E-01	BI214
663.06	28.	41.43	1.51	5.229E-03	661.62	84.620	PBC<MDA	CS137
728.84	61.	25.35	1.39	4.784E-03	727.17	11.800	7.711E-01	BI212
796.50	24.	41.60	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
912.48	148.	11.63	1.68	3.917E-03	911.07	29.000	9.292E-01	AC228
1122.05	52.	29.16	2.23	3.283E-03	1120.28	15.040	7.535E-01	BI214
1463.18	636.	4.08	1.92	2.617E-03	1460.75	10.700	1.617E+01	K40

1621.76 16. 25.00 0.75 2.397E-03 1620.56 2.750 1.694E+00 BI212

***** U N I D E N T I F I E D P E A K S U M M A R Y *****									
Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide		
258.46	129.44	592.	87.	0.044	122.74	1.021	AC-228	s	
417.03	208.71	394.	120.	0.060	87.59	1.131	LU-177	s	
477.81	238.92	163.	639.	0.319	14.60	1.215	PB-212	D	
483.85	241.94	305.	96.	0.048	82.63	1.217	PB-214	D	
540.26	270.31	139.	58.	0.029	99.03	1.538	AC-228	s	
554.17	277.26	190.	117.	0.058	57.25	1.007	TL-208	s	
1940.60	970.20	49.	108.	0.054	47.10	1.821	AC-228	l	

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

 This section based on library: FSS_Rev_1.Lib

***** I D E N T I F I E D P E A K S U M M A R Y *****									
Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV		
PB-214	153.80	77.11	916.	168.	0.084	79.84	1.500D		
PB-212	153.80	77.11	916.	168.	0.084	79.84	1.500D		
TH-234	185.94	93.18	839.	109.	0.055	116.06	1.500s		
RA-226	372.17	186.28	476.	87.	0.044	105.14	1.500s		
PB-212	477.80	239.08	405.	546.	0.273	20.22	1.500		
PB-214	591.47	295.91	182.	148.	0.074	45.98	1.500		
AC-228	677.41	338.87	165.	137.	0.068	54.47	1.341		
PB-214	704.77	352.55	121.	193.	0.097	32.35	1.500		
SB-125	927.13	463.69	78.	33.	0.017	117.56	1.500		
TL-208	1022.68	511.45	56.	78.	0.039	56.05	1.346s		
TL-208	1168.15	584.16	66.	207.	0.104	29.21	1.668		
BI-214	1220.31	610.23	75.	163.	0.081	38.44	1.466		
CS-137	1326.02	663.06	54.	28.	0.014	124.30	1.509s		
BI-212	1456.91	728.48	45.	45.	0.022	77.76	1.554s		
CS-134	1593.02	796.50	38.	24.	0.012	124.79	1.601s		
AC-228	1825.10	912.48	41.	148.	0.074	34.89	1.677s		
BI-214	2244.50	1122.05	53.	52.	0.026	87.48	2.228s		
K-40	2927.35	1463.22	13.	609.	0.304	12.41	2.042		
BI-212	3244.71	1621.76	0.	16.	0.008	75.00	0.749s		

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

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		2.0150E-01	477.56	2.015E-01	% (	3.486E-01 1.07E-01	G
K-40		1.5473E+01	1460.75	1.547E+01	(P	4.968E-01 6.40E-01	G
MN-54		2.4636E-02	834.81	2.464E-02	%(P	5.370E-02 1.62E-02	G
CO-57		-3.6154E-03	122.07	3.615E-03	%(	5.920E-02 1.76E-02	G K
			136.43	8.573E-02	&	4.417E-01 1.32E-01	G
CO-60		2.3109E-02	1332.51	2.311E-02	&(P	5.247E-02 1.58E-02	G K
			1173.23	2.518E-02	%	8.763E-02 2.59E-02	G K
Sr-85		-1.4626E-02	514.00	1.463E-02	%(	6.066E-02 1.80E-02	G
Kr-85		-3.2707E+02	513.99	3.271E+02	%(	1.357E+03 4.01E+02	G
Y-88		-2.2343E-05	1836.01	2.234E-05	%(P	7.719E-02 2.06E-02	G K
			898.02	3.355E-02	% P	5.612E-02 1.74E-02	G
NB-94		-3.6064E-03	871.10	3.606E-03	%(	4.867E-02 1.36E-02	G K
			702.50	0.000E+00	&	5.780E-02 1.64E-02	G K
Ag-108M		-2.5201E-03	722.95	2.520E-03	&(	5.918E-02 1.67E-02	G K
			614.37	1.802E-02	% P	6.806E-02 2.01E-02	G
			433.93	8.287E-04	&	4.911E-02 1.41E-02	G
CD-109		-3.9048E-01	88.04	3.905E-01	%(P	1.994E+00 5.97E-01	G
SN-113		-1.6383E-02	391.71	1.638E-02	%(	6.908E-02 2.04E-02	G K
			255.04	6.179E-02	%	2.118E+00 6.22E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	4.9872E-02	427.95	4.302E-02	% (P	1.654E-01	4.88E-02	G K
		600.77	8.640E-02	% P	2.379E-01	7.08E-02	G
		636.15	3.046E-02	& P	3.888E-01	1.10E-01	G
		463.51	3.248E-01	(P	4.262E-01	1.33E-01	G
		176.29	2.699E-02	% P	6.681E-01	1.97E-01	G
I-131	-3.0711E-03	364.48	3.071E-03	% (	6.480E-02	1.88E-02	G K
		636.97	8.104E-03	&	7.835E-01	2.19E-01	G
		284.29	9.662E-02	%	7.976E-01	2.34E-01	G
CS-134	2.0984E-02	604.66	5.813E-04	% (	4.582E-02	1.29E-02	G K
		795.76	4.563E-02	* (	5.966E-02	1.90E-02	G
		569.29	5.436E-02	%	2.608E-01	7.56E-02	G
		801.84	1.920E-03	& P	6.139E-01	1.71E-01	G
CS-137	4.5501E-02	661.62	4.550E-02	* (	5.971E-02	1.89E-02	G
CE-139	1.2486E-03	165.85	1.249E-03	% (P	5.381E-02	1.59E-02	G
EU-152	-3.3722E-02	121.78	3.372E-02	& (P	1.562E-01	4.67E-02	G K
		344.30	3.190E-02	%	1.663E-01	4.92E-02	G
		1408.08	3.326E-02	%	2.844E-01	7.88E-02	G
		964.00	3.237E-02	& P	4.914E-01	1.39E-01	G
		1112.07	9.660E-02	%	5.464E-01	1.58E-01	G
		778.90	4.942E-02	% P	4.225E-01	1.21E-01	G
EU-154	-1.7407E-02	123.10	1.741E-02	% (P	1.231E-01	3.67E-02	G K
		1274.80	1.993E-02	&	2.218E-01	6.28E-02	G
		723.30	3.268E-02	% P	2.699E-01	7.71E-02	G
		1004.80	3.201E-03	%	3.453E-01	9.57E-02	G
EU-155	4.4342E-02	86.45	4.434E-02	& (P	2.277E-01	6.81E-02	G K
		105.31	3.295E-02	%	2.580E-01	7.70E-02	G
HG-203	-1.0319E-02	279.17	1.032E-02	& (P	5.497E-02	1.63E-02	G K
		72.87	8.158E-01	&	2.261E+00	6.83E-01	G
		70.83	1.582E-01	%	3.956E+00	1.18E+00	G
		82.50	3.098E-01	%	4.219E+00	1.26E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.0795E-01	583.14	2.920E-01	(P	5.688E-02	2.85E-02	G
		510.72	3.691E-01	*(	1.778E-01	6.91E-02	G
PB-212	6.7264E-01	238.63	6.544E-01	(	1.156E-01	4.41E-02	G K
		77.11	7.175E-01	(	6.137E-01	1.91E-01	G
		74.81	7.045E-01	& P	1.287E+00	3.91E-01	G
PB-214	4.1553E-01	351.99	3.832E-01	(P	1.072E-01	4.14E-02	G K
		295.22	4.780E-01	(	2.124E-01	7.33E-02	G
		77.11	1.173E+00	+	1.004E+00	3.12E-01	G
		241.92	4.934E-01	%	7.107E-01	2.18E-01	G
BI-212	5.6566E-01	727.17	5.657E-01	&(	4.291E-01	1.47E-01	G K
		1620.56	1.694E+00	+ P	7.969E-01	4.33E-01	G
		785.42-2.185E-01		& P	2.878E+00	8.18E-01	G
BI-214	4.4509E-01	609.32	4.451E-01	(	1.182E-01	5.71E-02	G K
		1764.51-1.744E-03		% P	1.483E-01	2.01E-02	G
		1120.28	7.535E-01	+	5.279E-01	2.20E-01	G
RA-224	9.5694E-01	241.00	9.569E-01	%(P	1.377E+00	4.22E-01	G
RA-226	1.1670E+00	185.99	1.167E+00	(P	1.395E+00	4.30E-01	G
AC-228	8.9322E-01	911.07	9.292E-01	(P	2.034E-01	1.08E-01	G K
		968.90	2.757E-02	& P	3.280E-01	9.21E-02	G
		338.40	8.064E-01	(	3.694E-01	1.47E-01	G
TH-227	-3.5083E-01	236.00-3.508E-01		%(P	5.451E-01	1.67E-01	G K
		256.25-3.054E-02		&	6.347E-01	1.87E-01	G
PA-234	-4.5562E-02	98.44-4.556E-02		%(	2.238E-01	6.70E-02	G K
		946.00-1.234E-02		%	2.751E-01	7.65E-02	G
		131.28	3.265E-02	&	2.437E-01	7.27E-02	G
		94.67-4.669E-02		&	4.620E-01	1.38E-01	G
		883.24	1.737E-02	&	6.382E-01	1.82E-01	G
		926.70-7.655E-02		%	5.442E-01	1.56E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	1.190E-01	%	3.876E-01	1.14E-01 G
TH-234	1.7794E+00					
		63.29	1.650E+00	&(P	4.514E+00	1.36E+00 G K
		92.80	1.947E+00	(	2.454E+00	7.53E-01 G
		92.38	9.442E-01	& P	2.865E+00	8.63E-01 G

AM-241 -2.5961E-02
 59.54-2.596E-02 %(6.617E-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:

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

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	1.9385E-01	2.0150E-01	3.2225E-01	3.2244E-01	3.354E-01
K-40		1.5473E+01	1.5473E+01	1.9210E+00	2.1081E+00	4.968E-01
MN-54	#A	2.4473E-02	2.4636E-02	4.8677E-02	4.8697E-02	5.335E-02
CO-57	#B	-3.5878E-03	-3.6154E-03	5.2823E-02	5.2823E-02	5.875E-02
CO-60	#B	2.3084E-02	2.3109E-02	4.7392E-02	4.7410E-02	5.241E-02

Sr-85	#A	-1.4168E-02	-1.4626E-02	5.3862E-02	5.3868E-02	5.876E-02
Kr-85	#A	-3.2706E+02	-3.2707E+02	1.2045E+03	1.2046E+03	1.357E+03
Y-88	#B	-2.1914E-05	-2.2343E-05	8.1201E-04	8.1201E-04	7.570E-02
NB-94	#B	-3.6064E-03	-3.6064E-03	4.0704E-02	4.0704E-02	4.867E-02
Ag-108M	#B	-2.5200E-03	-2.5201E-03	5.0218E-02	5.0218E-02	5.918E-02
CD-109	#A	-3.8870E-01	-3.9048E-01	2.0114E+00	2.0115E+00	1.985E+00
SN-113	#B	-1.6092E-02	-1.6383E-02	6.1269E-02	6.1276E-02	6.785E-02
SB-125	#B	4.9770E-02	4.9872E-02	6.1337E-02	6.1401E-02	1.650E-01
I-131	#B	-2.3752E-03	-3.0711E-03	5.6305E-02	5.6306E-02	5.012E-02
CS-134	#B	2.0926E-02	2.0984E-02	2.6185E-02	2.6211E-02	4.569E-02
CS-137	#A	4.5492E-02	4.5501E-02	5.6555E-02	5.6613E-02	5.970E-02
CE-139	#A	1.2300E-03	1.2486E-03	4.7732E-02	4.7732E-02	5.301E-02
EU-152	#B	-3.3707E-02	-3.3722E-02	1.5102E-01	1.5103E-01	1.561E-01
EU-154	#B	-1.7395E-02	-1.7407E-02	1.1295E-01	1.1295E-01	1.230E-01
EU-155	#B	4.4292E-02	4.4342E-02	2.0436E-01	2.0437E-01	2.275E-01
HG-203	#B	-9.8714E-03	-1.0319E-02	4.9561E-02	4.9565E-02	5.259E-02
TL-208		3.0795E-01	3.0795E-01	9.0123E-02	9.1765E-02	
PB-212	#	6.7264E-01	6.7264E-01	1.3604E-01	1.4118E-01	1.156E-01
PB-214	#	4.1553E-01	4.1553E-01	1.1689E-01	1.1919E-01	1.072E-01
BI-212		5.6566E-01	5.6566E-01	4.3984E-01	4.4099E-01	4.291E-01
BI-214		4.4509E-01	4.4509E-01	1.7109E-01	1.7290E-01	
RA-224	#A	9.5694E-01	9.5694E-01	1.2662E+00	1.2674E+00	1.377E+00
RA-226	#A	1.1669E+00	1.1670E+00	1.2896E+00	1.2912E+00	1.395E+00
AC-228		8.9322E-01	8.9322E-01	2.8904E-01	2.9335E-01	
TH-227	#B	-3.5083E-01	-3.5083E-01	5.0323E-01	5.0362E-01	5.451E-01
PA-234	#B	-4.5562E-02	-4.5562E-02	2.0093E-01	2.0094E-01	2.238E-01
TH-234	#B	1.7794E+00	1.7794E+00	2.0652E+00	2.0676E+00	4.514E+00
AM-241	#A	-2.5961E-02	-2.5961E-02	5.8963E-01	5.8963E-01	6.617E-01

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

S U M M A R Y

 Total Activity (270.2 to 1999.0 keV) 1.7684572E+01 pCi/gm
 Total Decayed Activity (270.2 to 1999.0 keV) 1.7684572E+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-12-01-021-F-B

Spectrum Filename: C:\GammaVision\Spectra\102F_23AUG2006_1124.An1

Acquisition information

Start time: 23-Aug-2006 11:24:24
Live time: 2000
Real time: 2025
Dead time: 1.21 %
Detector ID: 3

Detector system

Det 102 - DSPP-468

Calibration

Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8120E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8120E+03) =
5.5188E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	22-Aug-2006 14:30:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.7605

***** S U M M A R Y O F P E A 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	192.	25.05	1.50	9.541E-03	77.11	10.700	1.400E+00	PB214
					77.11	17.500	8.561E-01	PB212
77.08	192.	25.05	1.50	9.541E-03	77.11	10.700	1.400E+00	PB214
					77.11	17.500	8.561E-01	PB212
93.19	113.	41.33	1.50	1.333E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	2.110E+00	TH234
					94.67	15.500	3.979E-01	PA234
129.17	106.	40.26	1.11	1.715E-02				
186.43	134.	24.13	1.49	1.625E-02	185.99	3.280	1.808E+00	RA226
208.66	97.	39.68	1.39	1.522E-02				
239.09	769.	4.53	1.22	1.379E-02	238.63	43.100	9.637E-01	PB212
242.33	97.	24.45	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	7.071E-01	PB214
270.63	91.	33.20	1.34	1.241E-02				
295.83	116.	18.24	0.95	1.144E-02	295.22	19.200	3.947E-01	PB214
329.02	86.	26.05	1.16	1.034E-02				
339.03	198.	15.99	1.38	1.004E-02	338.40	12.010	1.225E+00	AC228
352.45	275.	9.17	1.24	9.666E-03	351.99	37.100	5.712E-01	PB214
463.93	68.	23.87	1.15	7.358E-03	463.51	10.000	6.774E-01	SB125
511.88	90.	20.77	1.45	6.680E-03	510.72	22.500	4.446E-01	TL208
584.13	208.	8.51	1.57	5.880E-03	583.14	86.000	3.056E-01	TL208
610.31	193.	10.69	1.38	5.641E-03	609.32	46.090	5.539E-01	BI214
662.79	206.	10.02	1.30	5.221E-03	661.62	84.620	3.475E-01	CS137
728.59	61.	23.56	1.57	4.786E-03	727.17	11.800	7.989E-01	BI212
796.18	30.	35.49	1.60	4.420E-03	795.76	85.400	PBC<MDA	CS134
912.78	167.	11.68	1.72	3.915E-03	911.07	29.000	1.091E+00	AC228
966.07	43.	22.35	1.72	3.727E-03	964.00	14.580	5.876E-01	EU152

970.59	96.	12.98	1.72	3.712E-03				
1123.33	82.	21.86	0.90	3.275E-03	1120.28	15.040	1.245E+00	BI214
1174.56	37.	39.13	1.04	3.154E-03				
1334.65	23.	33.16	1.96	2.834E-03	1332.51	99.980	6.010E-02	CO60
1463.08	632.	4.02	1.82	2.617E-03	1460.75	10.700	1.680E+01	K40

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

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
257.94	129.17	648.	112.	0.056	100.43	1.113	AC-228 M
416.93	208.66	499.	97.	0.049	119.03	1.388	LU-177 M
477.80	238.94	222.	769.	0.384	13.59	1.215	PB-212 D
484.29	242.18	231.	97.	0.048	73.36	1.217	PB-214 D
540.91	270.63	274.	91.	0.045	99.61	1.337	AC-228 sM
657.72	329.02	160.	86.	0.043	78.16	1.160	LA-140 M
1825.71	912.78	64.	165.	0.083	31.02	1.715	AC-228 M
1932.34	966.04	25.	43.	0.022	67.04	1.716	TB-160 D
1941.38	970.55	29.	96.	0.048	38.93	1.719	AC-228 D
2247.06	1123.33	58.	82.	0.041	65.57	0.904	J-135 1
2349.58	1174.56	57.	37.	0.019	117.40	1.036	CO-56 1

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

 This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-214	153.80	77.11	1057.	192.	0.096	75.15	1.500D
PB-212	153.80	77.11	1057.	192.	0.096	75.15	1.500D
TH-234	185.95	93.19	1037.	113.	0.057	123.99	1.500s
RA-226	372.29	186.34	573.	105.	0.052	96.95	1.500s
PB-212	477.78	239.07	512.	718.	0.359	17.43	1.500s
PB-214	591.38	295.86	263.	117.	0.058	65.25	1.500
AC-228	677.70	339.01	197.	170.	0.085	41.79	1.500
PB-214	704.88	352.60	145.	237.	0.119	28.99	1.500s
SB-125	927.49	463.87	86.	63.	0.032	70.90	1.500s
TL-208	1023.54	511.88	99.	90.	0.045	62.30	1.446s
TL-208	1168.10	584.13	48.	208.	0.104	25.54	1.567
BI-214	1220.47	610.31	76.	193.	0.097	32.08	1.384
CS-137	1325.48	662.79	65.	206.	0.103	30.05	1.301
BI-212	1457.14	728.59	49.	61.	0.030	70.68	1.569
CS-134	1592.37	796.18	42.	30.	0.015	106.48	1.601
CO-60	2670.01	1334.65	17.	23.	0.011	99.48	1.959s
K-40	2927.10	1463.10	11.	604.	0.302	12.42	2.042

s - Peak fails shape tests.
 D - Peak area deconvoluted.

A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		7.6441E-03	477.56	7.644E-03	&(	5.398E-01 1.56E-01	G
K-40		1.6070E+01	1460.75	1.607E+01	(P	4.794E-01 6.65E-01	G
MN-54		-3.7648E-04	834.81	-3.765E-04	&(P	7.045E-02 1.99E-02	G
CO-57		-1.9802E-03	122.07	-1.980E-03	% (	6.698E-02 1.99E-02	G K
			136.43	-1.682E-02	%	4.667E-01 1.39E-01	G
CO-60		6.0104E-02	1332.51	6.010E-02	(P	5.842E-02 2.00E-02	G K
			1173.23	2.256E-02	%	8.710E-02 2.56E-02	G K
Sr-85		-1.4089E-02	514.00	-1.409E-02	&(	7.037E-02 2.08E-02	G
Kr-85		-3.2193E+02	513.99	-3.219E+02	&(	1.609E+03 4.76E+02	G
Y-88		-5.2336E-03	1836.01	-5.234E-03	% (P	5.042E-02 1.31E-02	G K
			898.02	-5.602E-03	& P	6.777E-02 1.90E-02	G
NB-94		1.1723E-03	871.10	1.172E-03	% (	5.698E-02 1.59E-02	G K
			702.50	2.936E-02	%	3.886E-02 1.25E-02	G K
Ag-108M		5.9433E-03	722.95	5.943E-03	% (	6.030E-02 1.72E-02	G K
			614.37	-4.791E-02	& P	8.419E-02 2.57E-02	G
			433.93	2.352E-03	&	5.094E-02 1.47E-02	G
CD-109		-3.4867E-01	88.04	-3.487E-01	&(P	2.676E+00 8.02E-01	G
SN-113		1.6679E-03	391.71	1.668E-03	&(	6.834E-02 1.97E-02	G K
			255.04	2.533E-01	&	2.234E+00 6.60E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.5693E-01	427.95	6.529E-03	&(P	1.798E-01	5.19E-02	G K
		600.77	6.694E-02	& P	2.545E-01	7.46E-02	G
		636.15	9.883E-03	% P	4.828E-01	1.37E-01	G
		463.51	6.407E-01	@(P	4.662E-01	1.55E-01	G
		176.29	1.073E-02	& P	8.214E-01	2.43E-01	G
I-131	-3.1921E-03	364.48	3.192E-03	% (	5.920E-02	1.72E-02	G K
		636.97	2.137E-02	&	7.245E-01	2.04E-01	G
		284.29	9.588E-02	%	7.900E-01	2.33E-01	G
CS-134	3.2726E-02	604.66	9.104E-03	% (	5.196E-02	1.51E-02	G K
		795.76	5.972E-02	(	6.533E-02	2.12E-02	G
		569.29	9.770E-02	%	2.835E-01	8.42E-02	G
		801.84	2.046E-01	% P	7.472E-01	2.20E-01	G
CS-137	3.4753E-01	661.62	3.475E-01	(	6.779E-02	3.49E-02	G
CE-139	5.6385E-03	165.85	5.639E-03	%(P	6.042E-02	1.80E-02	G
EU-152	-2.3024E-02	121.78	2.302E-02	%(P	1.860E-01	5.55E-02	G K
		344.30	4.807E-02	%	1.725E-01	5.14E-02	G
		1408.08	3.843E-02	%	2.873E-01	7.97E-02	G
		964.00	2.499E-02	% P	5.408E-01	1.54E-01	G
		1112.07	2.195E-01	%	5.405E-01	1.62E-01	G
		778.90	4.193E-02	% P	4.709E-01	1.34E-01	G
EU-154	-1.8739E-02	123.10	1.874E-02	%(P	1.431E-01	4.28E-02	G K
		1274.80	1.270E-02	&	1.974E-01	5.49E-02	G
		723.30	2.306E-02	% P	2.744E-01	7.79E-02	G
		1004.80	0.000E+00	%	4.287E-01	1.20E-01	G
EU-155	-1.1845E-03	86.45	1.185E-03	%(P	3.215E-01	9.59E-02	G K
		105.31	5.075E-03	%	2.725E-01	8.09E-02	G
HG-203	2.5388E-03	279.17	2.539E-03	%(P	6.015E-02	1.77E-02	G K
		72.87	5.177E-01	%	2.401E+00	7.22E-01	G
		70.83	1.844E+00	%	4.501E+00	1.36E+00	G
		82.50	1.250E+00	%	4.840E+00	1.46E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.0564E-01	583.14	3.056E-01	(P	5.172E-02	2.61E-02	G
		510.72	4.446E-01	+	2.432E-01	9.25E-02	G
PB-212	8.8774E-01	238.63	9.006E-01	@(	1.356E-01	5.23E-02	G K
		77.11	8.561E-01	@(	6.888E-01	2.14E-01	G
		74.81	8.190E-01	% P	1.388E+00	4.22E-01	G
PB-214	4.9301E-01	351.99	4.930E-01	*(P	1.223E-01	4.77E-02	G K
		295.22	3.947E-01	-	2.651E-01	8.58E-02	G
		77.11	1.400E+00	+	1.127E+00	3.51E-01	G
		241.92	3.064E-01	%	9.035E-01	2.72E-01	G
BI-212	7.9891E-01	727.17	7.989E-01	(	4.675E-01	1.89E-01	G K
		1620.56	3.260E-02	% P	2.077E+00	5.30E-01	G
		785.42	3.710E-01	% P	2.901E+00	8.30E-01	G
BI-214	5.5394E-01	609.32	5.539E-01	(	1.238E-01	5.93E-02	G K
		1764.51	1.824E-03	& P	4.746E-01	1.26E-01	G
		1120.28	5.059E-04	&	6.226E-01	1.77E-01	G
RA-224	8.4335E-01	241.00	8.433E-01	% (P	1.687E+00	5.12E-01	G
RA-226	1.4653E+00	185.99	1.465E+00	(P	1.598E+00	4.94E-01	G
AC-228	3.1265E-01	911.07	6.316E-03	% (P	2.899E-01	8.28E-02	G K
		968.90	8.485E-02	% P	1.469E-01	4.70E-02	G
		338.40	1.052E+00	(	4.202E-01	1.47E-01	G
TH-227	-3.9414E-01	236.00	3.941E-01	% (P	6.162E-01	1.88E-01	G K
		256.25	2.705E-03	&	6.687E-01	1.96E-01	G
PA-234	-3.5208E-02	98.44	3.521E-02	&(	2.970E-01	8.88E-02	G K
		946.00	2.691E-02	&	3.068E-01	8.66E-02	G
		131.28	4.368E-02	&	2.541E-01	7.60E-02	G
		94.67	3.141E-03	%	5.271E-01	1.57E-01	G
		883.24	5.658E-02	&	4.881E-01	1.39E-01	G
		926.70	7.528E-03	%	4.979E-01	1.37E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	1.441E-01	%	4.211E-01	1.25E-01 G
TH-234	1.8835E+00					
		63.29	1.710E+00	%(P	5.440E+00	1.64E+00 G K
		92.80	2.110E+00	@(	2.848E+00	8.72E-01 G
		92.38-1.482E-01		% P	3.186E+00	9.50E-01 G

AM-241 -5.4133E-02
 59.54-5.413E-02 &(7.829E-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:

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

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	7.5581E-03	7.6441E-03	4.6696E-01	4.6696E-01	5.338E-01
K-40		1.6070E+01	1.6070E+01	1.9958E+00	2.1901E+00	4.794E-01
MN-54	#A	-3.7575E-04	-3.7648E-04	2.5468E-02	2.5468E-02	7.032E-02
CO-57	#B	-1.9758E-03	-1.9802E-03	5.9781E-02	5.9781E-02	6.683E-02
CO-60	#F	6.0085E-02	6.0104E-02	5.9993E-02	6.0088E-02	5.840E-02

Sr-85	#A	-1.3958E-02	-1.4089E-02	6.2420E-02	6.2425E-02	6.971E-02
Kr-85	#A	-3.2193E+02	-3.2193E+02	1.4276E+03	1.4277E+03	1.609E+03
Y-88	#B	-5.2041E-03	-5.2336E-03	3.9715E-02	3.9716E-02	5.013E-02
NB-94	#B	1.1723E-03	1.1723E-03	4.7573E-02	4.7573E-02	5.698E-02
Ag-108M	#B	5.9433E-03	5.9433E-03	5.1578E-02	5.1579E-02	6.030E-02
CD-109	#A	-3.4821E-01	-3.4867E-01	2.7560E+00	2.7561E+00	2.672E+00
SN-113	#B	1.6592E-03	1.6679E-03	5.9083E-02	5.9083E-02	6.799E-02
SB-125	#B	1.5683E-01	1.5693E-01	1.1397E-01	1.1431E-01	1.796E-01
I-131	#B	-2.9612E-03	-3.1921E-03	5.1587E-02	5.1587E-02	5.492E-02
CS-134	#B	3.2699E-02	3.2726E-02	3.4845E-02	3.4893E-02	5.192E-02
CS-137		3.4751E-01	3.4753E-01	1.0442E-01	1.0623E-01	
CE-139	#A	5.6138E-03	5.6385E-03	5.3899E-02	5.3900E-02	6.015E-02
EU-152	#B	-2.3021E-02	-2.3024E-02	1.8677E-01	1.8677E-01	1.859E-01
EU-154	#B	-1.8736E-02	-1.8739E-02	1.3142E-01	1.3143E-01	1.431E-01
EU-155	#B	-1.1841E-03	-1.1845E-03	4.0004E-01	4.0004E-01	3.214E-01
HG-203	#B	2.5061E-03	2.5388E-03	5.3030E-02	5.3030E-02	5.938E-02
TL-208		3.0564E-01	3.0564E-01	7.8218E-02	8.0077E-02	
PB-212	#	8.8774E-01	8.8774E-01	1.5474E-01	1.6256E-01	1.356E-01
PB-214	#	4.9301E-01	4.9301E-01	1.4314E-01	1.4578E-01	1.223E-01
BI-212		7.9891E-01	7.9891E-01	5.6469E-01	5.6647E-01	
BI-214		5.5394E-01	5.5394E-01	1.7772E-01	1.8042E-01	
RA-224	#A	8.4335E-01	8.4335E-01	1.5356E+00	1.5364E+00	1.687E+00
RA-226	#A	1.4653E+00	1.4653E+00	1.4809E+00	1.4832E+00	1.598E+00
AC-228	F	3.1265E-01	3.1265E-01	1.3065E-01	1.3183E-01	2.899E-01
TH-227	#B	-3.9414E-01	-3.9414E-01	5.6825E-01	5.6868E-01	6.162E-01
PA-234	#B	-3.5208E-02	-3.5208E-02	2.6648E-01	2.6648E-01	2.970E-01
TH-234	#B	1.8835E+00	1.8835E+00	2.3354E+00	2.3378E+00	5.440E+00
AM-241	#A	-5.4133E-02	-5.4133E-02	7.0024E-01	7.0025E-01	7.829E-01

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

S U M M A R Y

 Total Activity (1119.8 to 1999.0 keV) 1.8389032E+01 pCi/gm
 Total Decayed Activity (1119.8 to 1999.0 keV) 1.8389051E+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-12-01-020-F

Spectrum Filename: C:\GammaVision\Spectra\102F_23AUG2006_1310.An1

Acquisition information

Start time: 23-Aug-2006 13:10:24
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8330E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8330E+03) =
5.4555E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	19-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. 14 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.6494

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.25	217.	21.09	1.50	9.541E-03	77.11	10.700	1.567E+00	PB214
					77.11	17.500	9.581E-01	PB212
77.25	217.	21.09	1.50	9.541E-03	77.11	10.700	1.567E+00	PB214
					77.11	17.500	9.581E-01	PB212
186.31	96.	32.44	1.56	1.625E-02	185.99	3.280	PBC<MDA	RA226
209.44	99.	32.36	1.66	1.519E-02				
239.10	765.	4.28	1.22	1.379E-02	238.63	43.100	9.485E-01	PB212
242.21	90.	23.48	1.22	1.364E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.528E-01	PB214
295.78	144.	13.09	1.26	1.144E-02	295.22	19.200	4.822E-01	PB214
300.82	55.	28.44	1.26	1.126E-02				
338.83	140.	13.53	1.18	1.005E-02	338.40	12.010	8.518E-01	AC228
352.44	252.	9.50	1.18	9.666E-03	351.99	37.100	5.166E-01	PB214
463.88	50.	24.10	1.52	7.359E-03	463.51	10.000	4.854E-01	SB125
511.64	130.	13.15	1.41	6.683E-03	510.72	22.500	6.338E-01	TL208
					513.99	0.004	3.337E+03	Kr85
					514.00	99.270	1.509E-01	Sr85
584.20	204.	9.83	1.55	5.880E-03	583.14	86.000	2.963E-01	TL208
610.53	191.	10.48	1.17	5.639E-03	609.32	46.090	5.408E-01	BI214
728.82	68.	22.81	1.64	4.784E-03	727.17	11.800	8.836E-01	BI212
796.61	52.	24.57	1.32	4.415E-03	795.76	85.400	1.029E-01	CS134
912.80	130.	11.48	1.75	3.915E-03				
970.42	125.	12.05	2.03	3.713E-03				
1121.57	75.	25.12	1.06	3.283E-03	1120.28	15.040	1.120E+00	BI214
1463.11	598.	4.24	2.08	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
418.50	209.44	355.	99.	0.049	97.09	1.662	AC-228 sM
477.82	239.02	155.	765.	0.383	12.85	1.215	PB-212 D
484.05	242.13	180.	90.	0.045	70.44	1.217	PB-214 D
601.49	300.92	128.	50.	0.025	110.22	1.232	PB-212 M
1593.24	796.61	51.	36.	0.018	99.37	1.322	PA-234 sM
1825.74	912.80	36.	132.	0.066	32.34	1.750	AC-228 sM
1941.05	970.42	56.	103.	0.051	42.80	2.027	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	939.	217.	0.108	63.28	1.500D
PB-212	153.80	77.11	939.	217.	0.108	63.28	1.500D
RA-226	372.60	186.49	474.	88.	0.044	104.33	1.500s
PB-212	477.77	239.07	394.	666.	0.333	17.17	1.500
PB-214	591.21	295.78	181.	142.	0.071	47.55	1.500
AC-228	677.27	338.80	149.	140.	0.070	44.72	1.500
PB-214	704.77	352.54	110.	245.	0.122	26.38	1.500
SB-125	927.54	463.90	59.	57.	0.029	67.08	1.500
TL-208	1023.07	511.64	60.	130.	0.065	39.46	1.412s
TL-208	1168.24	584.20	66.	204.	0.102	29.49	1.546
BI-214	1220.91	610.53	60.	191.	0.095	31.45	1.168s
BI-212	1456.86	728.45	65.	54.	0.027	75.68	1.554
BI-214	2243.53	1121.57	56.	75.	0.038	75.37	1.063s
K-40	2927.31	1463.20	9.	571.	0.286	12.75	2.042

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

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		2.9002E-02	477.56	2.900E-02	&(	3.445E-01 9.75E-02	G
K-40		1.5014E+01	1460.75	1.501E+01	(P	4.475E-01 6.38E-01	G
MN-54		8.0089E-03	834.81	8.009E-03	&(P	6.482E-02 1.86E-02	G
CO-57		9.8745E-03	122.07	9.875E-03	% (	5.960E-02 1.78E-02	G K
			136.43	7.362E-02	%	4.144E-01 1.24E-01	G
CO-60		-2.3557E-03	1332.51	-2.356E-03	&(P	6.199E-02 1.68E-02	G K
			1173.23	-1.927E-02	%	8.661E-02 2.53E-02	G K
Sr-85		-6.8774E-03	514.00	-6.877E-03	% (	5.173E-02 1.50E-02	G
Kr-85		-1.5087E+02	513.99	-1.509E+02	% (	1.180E+03 3.43E+02	G
Y-88		-7.5753E-03	1836.01	-7.575E-03	% (P	5.779E-02 1.55E-02	G K
			898.02	1.081E-02	% P	6.746E-02 1.93E-02	G
NB-94		0.0000E+00	871.10	0.000E+00	% (	6.207E-02 1.73E-02	G K
			702.50	1.217E-02	&	4.870E-02 1.42E-02	G K
Ag-108M		4.8703E-03	722.95	4.870E-03	&(	5.142E-02 1.45E-02	G K
			614.37	-2.526E-02	% P	7.739E-02 2.31E-02	G
			433.93	9.713E-03	%	4.764E-02 1.40E-02	G
CD-109		1.2033E-01	88.04	1.203E-01	&(P	2.056E+00 6.12E-01	G
SN-113		-2.2222E-03	391.71	-2.222E-03	% (	6.219E-02 1.78E-02	G K
			255.04	5.215E-01	%	2.009E+00 5.99E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.4250E-01	427.95	3.756E-03	% (P	1.438E-01	4.09E-02	G K
		600.77	3.261E-02	& P	2.684E-01	7.70E-02	G
		636.15	6.371E-04	& P	4.352E-01	1.22E-01	G
		463.51	5.754E-01	(P	3.857E-01	1.32E-01	G
		176.29	1.788E-01	& P	6.053E-01	1.81E-01	G
I-131	-2.5205E-03	364.48	2.520E-03	% (	6.189E-02	1.78E-02	G K
		636.97	1.645E-01	&	9.236E-01	2.67E-01	G
		284.29	1.112E-01	%	1.065E+00	3.14E-01	G
CS-134	-1.1977E-02	604.66	1.198E-02	% (	5.493E-02	1.61E-02	G K
		795.76	4.787E-02	%	6.581E-02	2.08E-02	G
		569.29	9.419E-02	%	4.053E-01	1.20E-01	G
		801.84	1.736E-01	% P	7.179E-01	2.10E-01	G
CS-137	-1.4299E-02	661.62	1.430E-02	% (	7.136E-02	2.09E-02	G
CE-139	-6.3226E-03	165.85	6.323E-03	% (P	6.119E-02	1.82E-02	G
EU-152	2.4953E-02	121.78	2.495E-02	% (P	1.787E-01	5.33E-02	G K
		344.30	3.821E-02	%	1.578E-01	4.67E-02	G
		1408.08	3.698E-02	%	2.924E-01	8.11E-02	G
		964.00	1.311E-01	% P	5.673E-01	1.66E-01	G
		1112.07	9.582E-02	%	5.773E-01	1.66E-01	G
		778.90	3.744E-02	% P	4.318E-01	1.22E-01	G
EU-154	-1.7311E-02	123.10	1.731E-02	& (P	1.287E-01	3.84E-02	G K
		1274.80	5.608E-02	&	1.930E-01	5.64E-02	G
		723.30	1.078E-01	& P	3.856E-01	1.14E-01	G
		1004.80	4.570E-03	%	3.002E-01	8.19E-02	G
EU-155	-4.4043E-03	86.45	4.404E-03	% (P	2.681E-01	7.97E-02	G K
		105.31	1.008E-01	%	2.767E-01	8.35E-02	G
HG-203	-3.7410E-03	279.17	3.741E-03	& (P	5.865E-02	1.72E-02	G K
		72.87	1.165E+00	&	1.978E+00	6.03E-01	G
		70.83	5.308E-01	%	4.421E+00	1.32E+00	G
		82.50	8.472E-01	%	4.673E+00	1.40E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.9632E-01	583.14	2.963E-01	(P	5.921E-02	2.92E-02	G
		510.72	6.338E-01	+ 1.892E-01		8.35E-02	G
PB-212	8.6358E-01	238.63	8.252E-01	(	1.179E-01	4.72E-02	G K
		77.11	9.581E-01	(	6.425E-01	2.02E-01	G
		74.81	5.945E-01	& P	1.352E+00	4.09E-01	G
PB-214	4.9273E-01	351.99	5.022E-01	(P	1.059E-01	4.42E-02	G K
		295.22	4.745E-01	(	2.192E-01	7.52E-02	G
		77.11	1.567E+00	+ 1.051E+00		3.31E-01	G
		241.92	3.925E-01	%	7.748E-01	2.35E-01	G
BI-212	7.0040E-01	727.17	7.004E-01	&(	5.250E-01	1.77E-01	G K
		1620.56	2.217E-01	% P	1.870E+00	4.97E-01	G
		785.42	1.412E-01	% P	2.537E+00	7.10E-01	G
BI-214	5.4080E-01	609.32	5.408E-01	@(	1.099E-01	5.68E-02	G K
		1764.51	3.640E-02	% P	3.803E-01	1.02E-01	G
		1120.28	1.120E+00	+ 5.611E-01		2.82E-01	G
RA-224	4.9496E-01	241.00	4.950E-01	&(P	1.423E+00	4.28E-01	G
RA-226	1.2141E+00	185.99	1.214E+00	(P	1.439E+00	4.44E-01	G
AC-228	2.3882E-01	911.07	1.695E-02	%(P	2.508E-01	7.14E-02	G K
		968.90	2.516E-01	% P	3.375E-01	1.07E-01	G
		338.40	8.564E-01	(	3.632E-01	1.28E-01	G
TH-227	-2.7000E-01	236.00	2.700E-01	%(P	5.658E-01	1.72E-01	G K
		256.25	4.443E-02	%	5.698E-01	1.67E-01	G
PA-234	-7.8574E-02	98.44	7.857E-02	%(	2.552E-01	7.68E-02	G K
		946.00	4.939E-02	%	2.739E-01	7.83E-02	G
		131.28	3.955E-02	%	2.688E-01	8.04E-02	G
		94.67	1.511E-01	%	5.297E-01	1.60E-01	G
		883.24	6.215E-02	%	4.207E-01	1.19E-01	G
		926.70	7.896E-02	%	5.677E-01	1.62E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	1.391E-01	%	5.991E-01	1.77E-01 G
TH-234	8.1850E-01					
		63.29	8.185E-01	%(P	5.117E+00	1.53E+00 G K
		92.80	1.878E+00	%	2.678E+00	8.19E-01 G
		92.38	1.637E-01	% P	3.179E+00	9.48E-01 G

AM-241 5.4818E-03
 59.54 5.482E-03 &(7.197E-01 2.14E-01 G
 (- This peak used in the nuclide activity average.

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

Nuclide Codes:

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

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	2.7536E-02	2.9002E-02	2.9238E-01	2.9238E-01	3.271E-01
K-40		1.5014E+01	1.5014E+01	1.9155E+00	2.0926E+00	4.475E-01
MN-54	#A	7.9382E-03	8.0089E-03	5.5770E-02	5.5772E-02	6.424E-02
CO-57	#B	9.7737E-03	9.8745E-03	5.3419E-02	5.3421E-02	5.899E-02
CO-60	#B	-2.3523E-03	-2.3557E-03	5.9913E-02	5.9913E-02	6.190E-02

Sr-85	#A	-6.5898E-03	-6.8774E-03	4.5034E-02	4.5036E-02	4.957E-02
Kr-85	#A	-1.5087E+02	-1.5087E+02	1.0282E+03	1.0282E+03	1.180E+03
Y-88	#B	-7.3810E-03	-7.5753E-03	4.6803E-02	4.6805E-02	5.631E-02
NB-94	#B	0.0000E+00	0.0000E+00	5.2047E-02	5.2048E-02	6.207E-02
Ag-108M	#B	4.8700E-03	4.8703E-03	4.3504E-02	4.3505E-02	5.142E-02
CD-109	#A	1.1959E-01	1.2033E-01	1.8361E+00	1.8361E+00	2.043E+00
SN-113	#B	-2.1693E-03	-2.2222E-03	5.3535E-02	5.3536E-02	6.071E-02
SB-125	#B	1.4211E-01	1.4250E-01	9.8167E-02	9.8492E-02	1.435E-01
I-131	#B	-1.7858E-03	-2.5205E-03	5.3260E-02	5.3261E-02	4.385E-02
CS-134	#B	-1.1933E-02	-1.1977E-02	4.8238E-02	4.8243E-02	5.473E-02
CS-137	#A	-1.4295E-02	-1.4299E-02	6.2594E-02	6.2599E-02	7.134E-02
CE-139	#A	-6.1965E-03	-6.3226E-03	5.8943E-02	5.8944E-02	5.997E-02
EU-152	#B	2.4938E-02	2.4953E-02	1.6002E-01	1.6003E-01	1.786E-01
EU-154	#B	-1.7296E-02	-1.7311E-02	1.1816E-01	1.1816E-01	1.285E-01
EU-155	#B	-4.3976E-03	-4.4043E-03	9.9777E-01	9.9777E-01	2.677E-01
HG-203	#B	-3.5250E-03	-3.7410E-03	5.3759E-02	5.3759E-02	5.527E-02
TL-208		2.9632E-01	2.9632E-01	8.7544E-02	8.9110E-02	
PB-212	#	8.6358E-01	8.6358E-01	1.4829E-01	1.5601E-01	1.179E-01
PB-214	#	4.9273E-01	4.9273E-01	1.3018E-01	1.3309E-01	1.059E-01
BI-212		7.0040E-01	7.0040E-01	5.3004E-01	5.3150E-01	5.250E-01
BI-214	#	5.4080E-01	5.4080E-01	1.7010E-01	1.7278E-01	
RA-224	#A	4.9496E-01	4.9496E-01	1.2851E+00	1.2854E+00	1.423E+00
RA-226	#A	1.2141E+00	1.2141E+00	1.3309E+00	1.3327E+00	1.439E+00
AC-228	B	2.3882E-01	2.3882E-01	1.0679E-01	1.0763E-01	2.508E-01
TH-227	#B	-2.7000E-01	-2.7000E-01	5.1977E-01	5.1999E-01	5.658E-01
PA-234	#B	-7.8574E-02	-7.8574E-02	2.3046E-01	2.3050E-01	2.552E-01
TH-234	#B	8.1850E-01	8.1850E-01	4.5935E+00	4.5937E+00	5.117E+00
AM-241	#A	5.4817E-03	5.4818E-03	6.4101E-01	6.4101E-01	7.197E-01

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

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

Total Activity (277.7 to 1999.0 keV) 1.6790770E+01 pCi/gm
 Total Decayed Activity (277.7 to 1999.0 keV) 1.6790770E+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-12-01-009-F

Spectrum Filename: C:\GammaVision\Spectra\102F_23AUG2006_1509.An1

Acquisition information

Start time: 23-Aug-2006 15:09:57
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8830E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8830E+03) =
5.3107E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	19-Sep-2006 14:10:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.6123

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.29	170.	25.09	1.50	9.541E-03	77.11	10.700	1.195E+00	PB214
					77.11	17.500	7.309E-01	PB212
77.29	170.	25.09	1.50	9.541E-03	77.11	10.700	1.195E+00	PB214
					77.11	17.500	7.309E-01	PB212
186.85	84.	29.32	1.05	1.623E-02	185.99	3.280		PBC<MDA RA226
210.71	115.	23.65	1.07	1.512E-02				
239.06	550.	5.17	1.22	1.379E-02	238.63	43.100	6.633E-01	PB212
241.96	108.	22.47	1.22	1.365E-02	241.00	3.900	1.441E+00	RA224
					241.92	7.470	7.630E-01	PB214
295.77	138.	18.46	1.09	1.145E-02	295.22	19.200	4.512E-01	PB214
338.55	143.	16.93	1.13	1.006E-02	338.40	12.010	8.470E-01	AC228
352.47	183.	10.88	1.35	9.666E-03	351.99	37.100	3.644E-01	PB214
464.01	47.	22.96	1.48	7.357E-03	463.51	10.000	4.329E-01	SB125
511.27	102.	18.30	1.41	6.688E-03	510.72	22.500	4.860E-01	TL208
					513.99	0.004	2.558E+03	Kr85
					514.00	99.270	8.308E-02	Sr85
584.20	163.	13.17	1.60	5.880E-03	583.14	86.000	2.304E-01	TL208
610.45	171.	10.23	1.48	5.639E-03	609.32	46.090	4.724E-01	BI214
662.88	32.	38.33	1.51	5.229E-03	661.62	84.620		PBC<MDA CS137
727.91	65.	24.78	1.21	4.790E-03	727.17	11.800	8.208E-01	BI212
912.60	145.	13.08	1.91	3.916E-03	911.07	29.000	9.148E-01	AC228
969.24	75.	17.74	1.43	3.717E-03	968.90	17.460	8.288E-01	AC228
1120.97	46.	23.62	1.16	3.283E-03	1120.28	15.040	6.671E-01	BI214
1463.25	517.	4.44	1.91	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
421.04	210.71	238.	115.	0.057	70.94	1.068	TH-227 sM
477.75	239.01	129.	550.	0.275	15.51	1.215	PB-212 D
483.55	241.91	243.	108.	0.054	67.40	1.217	PB-214 D
676.77	338.55	198.	78.	0.039	84.23	1.130	AC-228 sM
2927.41	1463.25	6.	514.	0.257	13.37	1.914	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	825.	170.	0.085	75.26	1.500D
PB-212	153.80	77.11	825.	170.	0.085	75.26	1.500D
RA-226	372.69	186.54	350.	71.	0.036	109.91	1.500s
PB-212	477.66	239.01	361.	472.	0.236	21.96	1.500
RA-224	483.61	241.99	380.	85.	0.042	101.35	1.500
PB-214	483.74	242.05	399.	73.	0.036	121.60	1.500
PB-214	591.34	295.84	180.	131.	0.066	50.67	1.500
AC-228	677.38	338.85	143.	80.	0.040	71.95	1.500
PB-214	704.66	352.49	117.	187.	0.093	32.87	1.500
SB-125	927.55	463.90	35.	51.	0.026	62.30	1.500s
TL-208	1022.32	511.27	77.	102.	0.051	54.90	1.415s
TL-208	1168.24	584.20	85.	163.	0.081	39.50	1.600
BI-214	1220.76	610.45	49.	171.	0.086	30.69	1.481
CS-137	1325.66	662.88	59.	32.	0.016	114.99	1.509
BI-212	1455.77	727.91	49.	65.	0.032	74.33	1.211s
AC-228	1825.51	912.68	25.	105.	0.052	35.52	1.679
AC-228	1941.32	970.56	29.	53.	0.027	59.23	1.718
BI-214	2242.34	1120.97	23.	46.	0.023	70.85	1.156s

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

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		-2.9830E-02	477.56	-2.983E-02	&(	2.652E-01 7.62E-02	G
K-40		7.0368E-02	1460.75	7.037E-02	%(P	8.657E-01 2.45E-01	G
MN-54		-1.5177E-02	834.81	-1.518E-02	%(P	6.063E-02 1.77E-02	G
CO-57		-1.0943E-02	122.07	-1.094E-02	%(	5.181E-02 1.55E-02	G K
			136.43	3.774E-02	&	3.974E-01 1.18E-01	G
CO-60		-1.2880E-02	1332.51	-1.288E-02	%(P	6.920E-02 1.97E-02	G K
			1173.23	2.626E-02	%(	7.192E-02 2.14E-02	G K
Sr-85		-2.0375E-03	514.00	-2.037E-03	%(	3.256E-02 9.30E-03	G
Kr-85		-5.8919E+01	513.99	-5.892E+01	%(	1.001E+03 2.86E+02	G
Y-88		4.7129E-03	1836.01	4.713E-03	%(P	3.847E-02 1.00E-02	G K
			898.02	-1.155E-02	%(P	4.544E-02 1.30E-02	G
NB-94		-2.0851E-04	871.10	-2.085E-04	%(	3.736E-02 9.91E-03	G K
			702.50	2.887E-02	%(	3.911E-02 1.25E-02	G K
Ag-108M		-3.2729E-04	722.95	-3.273E-04	%(	4.622E-02 1.27E-02	G K
			614.37	-2.119E-02	%(P	6.575E-02 1.95E-02	G
			433.93	4.542E-03	%(	4.403E-02 1.27E-02	G
CD-109		3.7732E-01	88.04	3.773E-01	%(P	1.996E+00 5.98E-01	G
SN-113		-4.3726E-03	391.71	-4.373E-03	&(	5.461E-02 1.58E-02	G K
			255.04	-2.408E-01	%(	1.539E+00 4.55E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.2567E-01	427.95	2.395E-03	% (P	1.296E-01	3.69E-02	G K
		600.77	8.069E-02	% P	1.924E-01	5.77E-02	G
		636.15	4.362E-02	% P	3.967E-01	1.13E-01	G
		463.51	4.906E-01	*(P	2.908E-01	1.05E-01	G
		176.29	1.727E-02	% P	6.425E-01	1.89E-01	G
I-131	1.9683E-04	364.48	1.968E-04	% (	4.783E-03	1.38E-03	G K
		636.97	6.869E-03	%	5.729E-02	1.63E-02	G
		284.29	1.677E-02	%	6.044E-02	1.80E-02	G
CS-134	-4.5605E-03	604.66	4.561E-03	% (	4.690E-02	1.34E-02	G K
		795.76	2.072E-02	%	4.993E-02	1.50E-02	G
		569.29	2.454E-02	%	2.657E-01	7.57E-02	G
		801.84	1.114E-01	% P	4.758E-01	1.37E-01	G
CS-137	5.1668E-02	661.62	5.167E-02	(	6.227E-02	1.98E-02	G
CE-139	-2.4056E-04	165.85	2.406E-04	%(P	4.096E-02	1.20E-02	G
EU-152	9.9367E-03	121.78	9.937E-03	%(P	1.258E-01	3.72E-02	G K
		344.30	5.260E-02	%	1.541E-01	4.61E-02	G
		1408.08	5.319E-03	%	3.029E-01	8.21E-02	G
		964.00	1.183E-01	& P	5.035E-01	1.47E-01	G
		1112.07	2.244E-02	%	4.302E-01	1.19E-01	G
		778.90	7.807E-02	% P	3.640E-01	1.05E-01	G
EU-154	-1.6678E-02	123.10	1.668E-02	%(P	1.069E-01	3.19E-02	G K
		1274.80	3.308E-02	%	1.622E-01	4.61E-02	G
		723.30	1.001E-03	% P	1.629E-01	4.32E-02	G
		1004.80	4.435E-02	&	3.324E-01	9.43E-02	G
EU-155	7.9864E-04	86.45	7.986E-04	&(P	2.572E-01	7.65E-02	G K
		105.31	3.156E-02	%	2.403E-01	7.16E-02	G
HG-203	-5.8783E-03	279.17	5.878E-03	%(P	3.338E-02	9.87E-03	G K
		72.87	1.112E-01	%	1.317E+00	3.93E-01	G
		70.83	4.096E-01	%	1.974E+00	5.91E-01	G
		82.50	7.627E-01	%	2.562E+00	7.71E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.3036E-01	583.14	2.304E-01	(P	6.485E-02	3.05E-02	G
		510.72	4.860E-01	+ 2.077E-01		8.90E-02	G
PB-212	5.6957E-01	238.63	5.696E-01	(	1.101E-01	4.17E-02	G K
		77.11	7.309E-01	+ 5.869E-01		1.83E-01	G
		74.81	5.447E-01	& P 1.206E+00		3.65E-01	G
PB-214	4.0604E-01	351.99	3.733E-01	(P	1.062E-01	4.10E-02	G K
		295.22	4.281E-01	(	2.128E-01	7.23E-02	G
		77.11	1.195E+00	+ 9.599E-01		3.00E-01	G
		241.92	5.120E-01	(	6.737E-01	2.08E-01	G
BI-212	8.2080E-01	727.17	8.208E-01	*(	4.495E-01	2.04E-01	G K
		1620.56	1.254E-01	% P 1.587E+00		3.94E-01	G
		785.42	9.366E-02	% P 2.819E+00		7.94E-01	G
BI-214	4.7242E-01	609.32	4.724E-01	(	9.701E-02	4.84E-02	G K
		1764.51	7.463E-02	% P 3.992E-01		1.11E-01	G
		1120.28	6.671E-01	+ 3.649E-01		1.58E-01	G
RA-224	1.1395E+00	241.00	1.139E+00	&(P	1.257E+00	3.90E-01	G
RA-226	9.5654E-01	185.99	9.565E-01	@(P	1.209E+00	3.72E-01	G
AC-228	6.3291E-01	911.07	6.601E-01	(P	1.637E-01	7.83E-02	G K
		968.90	5.877E-01	(P	3.054E-01	1.16E-01	G
		338.40	4.744E-01	- 3.477E-01		1.14E-01	G
TH-227	-1.1108E-02	236.00	1.111E-02	&(P	5.436E-01	1.61E-01	G K
		256.25	9.116E-02	% 5.257E-01		1.55E-01	G
PA-234	-1.6123E-03	98.44	1.612E-03	&(	2.422E-01	7.19E-02	G K
		946.00	3.769E-02	% 2.469E-01		6.98E-02	G
		131.28	3.671E-03	& 2.199E-01		6.51E-02	G
		94.67	1.467E-01	% 4.524E-01		1.36E-01	G
		883.24	4.063E-02	& 4.563E-01		1.29E-01	G
		926.70	4.425E-02	% 4.930E-01		1.38E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	3.739E-02	%	4.041E-01	1.15E-01 G
TH-234	7.8809E-01					
		63.29	7.881E-01	%(P	4.461E+00	1.33E+00 G K
		92.80	1.530E+00	%	2.403E+00	7.33E-01 G
		92.38-1.369E-01		& P	2.786E+00	8.29E-01 G
AM-241	3.1875E-01					
		59.54	3.187E-01	&(	5.778E-01	1.76E-01 G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:

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

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	-4.2327E-02	-2.9830E-02	2.2853E-01	2.2854E-01	3.762E-01
K-40	A	7.0368E-02	7.0368E-02	7.3552E-01	7.3553E-01	8.657E-01
MN-54	#A	-1.6113E-02	-1.5177E-02	5.5653E-02	5.5660E-02	6.437E-02
CO-57	#B	-1.1727E-02	-1.0943E-02	4.6519E-02	4.6522E-02	5.552E-02
CO-60	#B	-1.3006E-02	-1.2880E-02	6.1031E-02	6.1035E-02	6.988E-02

Sr-85	#A	-2.7180E-03	-2.0375E-03	2.7904E-02	2.7905E-02	4.344E-02
Kr-85	#A	-5.8931E+01	-5.8919E+01	8.5752E+02	8.5753E+02	1.001E+03
Y-88	#B	5.6158E-03	4.7129E-03	3.0114E-02	3.0116E-02	4.584E-02
NB-94	#B	-2.0851E-04	-2.0851E-04	2.9730E-02	2.9730E-02	3.736E-02
Ag-108M	#B	-3.2742E-04	-3.2729E-04	3.8085E-02	3.8085E-02	4.624E-02
CD-109	#A	3.9320E-01	3.7732E-01	1.7940E+00	1.7941E+00	2.080E+00
SN-113	#B	-5.1434E-03	-4.3726E-03	4.7482E-02	4.7483E-02	6.424E-02
SB-125	#B	1.2802E-01	1.2567E-01	8.0660E-02	8.0967E-02	1.320E-01
I-131	#B	2.0112E-03	1.9683E-04	4.1465E-03	4.1465E-03	4.887E-02
CS-134	#B	-4.6751E-03	-4.5605E-03	4.0238E-02	4.0239E-02	4.808E-02
CS-137	#A	5.1756E-02	5.1668E-02	5.9414E-02	5.9484E-02	6.238E-02
CE-139	#A	-2.7558E-04	-2.4056E-04	4.0472E-01	4.0472E-01	4.692E-02
EU-152	#B	9.9768E-03	9.9367E-03	1.1149E-01	1.1149E-01	1.263E-01
EU-154	#B	-1.6779E-02	-1.6678E-02	9.8076E-02	9.8080E-02	1.076E-01
EU-155	#B	8.0692E-04	7.9864E-04	2.2948E-01	2.2948E-01	2.599E-01
HG-203	#B	-8.7788E-03	-5.8783E-03	3.0074E-02	3.0075E-02	4.985E-02
TL-208		2.3036E-01	2.3036E-01	9.1210E-02	9.2122E-02	
PB-212	#	5.6957E-01	5.6957E-01	1.2507E-01	1.2909E-01	1.101E-01
PB-214	#	4.0604E-01	4.0604E-01	1.3372E-01	1.3565E-01	1.062E-01
BI-212	#	8.2080E-01	8.2080E-01	6.1009E-01	6.1183E-01	
BI-214		4.7242E-01	4.7242E-01	1.4499E-01	1.4740E-01	
RA-224	#A	1.1395E+00	1.1395E+00	1.1707E+00	1.1724E+00	1.257E+00
RA-226	#A	9.5657E-01	9.5654E-01	1.1173E+00	1.1185E+00	1.209E+00
AC-228		6.3291E-01	6.3291E-01	2.1878E-01	2.2164E-01	1.637E-01
TH-227	#B	-1.1108E-02	-1.1108E-02	6.1362E-01	6.1362E-01	5.436E-01
PA-234	#B	-1.6123E-03	-1.6123E-03	2.1561E-01	2.1561E-01	2.422E-01
TH-234	#B	7.8809E-01	7.8809E-01	4.0008E+00	4.0011E+00	4.461E+00
AM-241	#A	3.1879E-01	3.1875E-01	5.2767E-01	5.2797E-01	5.778E-01

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

S U M M A R Y

 Total Activity (295.7 to 1999.0 keV) 2.1564884E+00 pCi/gm
 Total Decayed Activity (295.7 to 1999.0 keV) 2.1564884E+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-12-01-004-F

Spectrum Filename: C:\GammaVision\Spectra\102F_24AUG2006_0933.An1

Acquisition information

Start time: 24-Aug-2006 09:32:45
Live time: 2000
Real time: 2028
Dead time: 1.40 %
Detector ID: 3

Detector system

Det 102 - DSPP-468

Calibration

Filename: D2_1LSa.Clb
DET 102 1 Liter Sand Geometry

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9010E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9010E+03) =
5.2604E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	23-Aug-2006 13:30:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.6394

***** S U M M A R Y O F P E A K 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	124.	41.11	1.50	8.847E-03				
74.81	124.	41.11	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.22	249.	20.56	1.50	9.541E-03	77.11	10.700	1.734E+00	PB214
					77.11	17.500	1.060E+00	PB212
77.22	249.	20.56	1.50	9.541E-03	77.11	10.700	1.734E+00	PB214
					77.11	17.500	1.060E+00	PB212
186.45	122.	29.94	1.28	1.625E-02	185.99	3.280	PBC<MDA	RA226
208.95	150.	25.92	0.90	1.521E-02				
239.45	1073.	4.62	1.15	1.377E-02	236.00	11.200	4.888E+00	TH227
					238.63	43.100	1.282E+00	PB212
241.66	102.	35.30	1.50	1.370E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	PBC<MDA	PB214
270.50	79.	31.95	1.65	1.242E-02				
295.26	175.	16.63	1.28	1.146E-02	295.22	19.200	5.645E-01	PB214
301.06	71.	31.14	1.39	1.126E-02				
327.92	67.	32.94	1.17	1.037E-02				
338.62	225.	14.16	1.20	1.005E-02	338.40	12.010	1.325E+00	AC228
352.42	314.	11.27	1.26	9.667E-03	351.99	37.100	6.201E-01	PB214
463.72	84.	24.25	1.31	7.361E-03	463.51	10.000	7.982E-01	SB125
511.68	138.	18.43	2.39	6.683E-03	510.72	22.500	6.494E-01	TL208
584.05	240.	10.14	1.37	5.881E-03	583.14	86.000	3.360E-01	TL208
610.12	160.	12.97	1.41	5.642E-03	609.32	46.090	4.366E-01	BI214
662.59	122.	17.89	1.50	5.222E-03	661.62	84.620	1.963E-01	CS137
727.29	121.	15.43	2.13	4.793E-03	727.17	11.800	1.520E+00	BI212
786.42	24.	41.48	1.33	4.472E-03	785.42	2.000	PBC<MDA	BI212
796.96	67.	23.27	1.66	4.414E-03	795.76	85.400	1.263E-01	CS134
861.73	68.	21.80	1.24	4.118E-03				

912.51	191.	10.24	1.79	3.917E-03	911.07	29.000	1.190E+00	AC228
965.61	26.	36.38	1.72	3.728E-03	964.00	14.580	PBC<MDA	EU152
970.39	93.	13.80	1.72	3.713E-03	968.90	17.460	1.019E+00	AC228
1121.52	50.	22.71	1.71	3.280E-03	1120.28	15.040	7.256E-01	BI214
1462.86	803.	3.59	1.96	2.618E-03	1460.75	10.700	2.036E+01	K40
1766.75	34.	17.15	1.14	2.223E-03				

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

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
417.53	208.95	505.	150.	0.075	77.75	0.902	AC-228 s
478.52	239.45	1316.	204.	0.102	78.24	1.148	PB-212 s
540.64	270.50	234.	79.	0.040	95.85	1.652	AC-228 s
601.78	301.06	179.	71.	0.035	93.41	1.395	PB-212
655.51	327.92	168.	67.	0.034	98.81	1.172	AC-228 s
1723.54	861.73	46.	68.	0.034	65.41	1.241	TL-208 s
1931.67	965.73	32.	27.	0.013	107.75	1.716	TB-160 D
2244.33	1121.52	34.	44.	0.022	71.99	1.820	TA-182 D
3534.97	1766.75	0.	34.	0.017	51.45	1.142	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-214	153.80	77.11	1187.	249.	0.125	61.69	1.500D
PB-212	153.80	77.11	1187.	249.	0.125	61.69	1.500D
RA-226	372.07	186.23	632.	144.	0.072	75.55	1.500
PB-212	477.66	239.02	557.	765.	0.383	16.99	1.500s
RA-224	482.96	241.66	611.	102.	0.051	105.91	1.500
PB-214	590.84	295.59	260.	153.	0.076	50.92	1.500s
AC-228	676.91	338.62	233.	225.	0.113	42.48	1.205s
PB-214	704.68	352.50	152.	282.	0.141	25.71	1.500
SB-125	927.37	463.81	109.	65.	0.032	76.16	1.500
TL-208	1023.15	511.68	140.	138.	0.069	55.29	2.389s
TL-208	1167.93	584.05	104.	239.	0.120	30.41	1.373
BI-214	1220.09	610.12	93.	160.	0.080	38.90	1.415
CS-137	1325.07	662.59	99.	122.	0.061	53.67	1.504
BI-212	1454.53	727.29	65.	121.	0.060	46.28	2.135s
BI-212	1572.84	786.42	35.	24.	0.012	124.44	1.329
CS-134	1591.92	795.95	65.	39.	0.020	99.50	1.601s
AC-228	1825.16	912.51	60.	190.	0.095	30.71	1.788
AC-228	1938.01	968.90	101.	41.	0.021	112.69	1.718D
K-40	2926.70	1462.90	11.	775.	0.387	10.93	2.042

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

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		0.0000E+00	477.56	0.000E+00	% (	5.442E-01 1.57E-01	G
K-40		1.9635E+01	1460.75	1.963E+01	(P	4.596E-01 7.15E-01	G
MN-54		-1.4519E-02	834.81	-1.452E-02	& (P	6.971E-02 2.03E-02	G
CO-57		0.0000E+00	122.07	0.000E+00	& (	6.604E-02 1.96E-02	G K
			136.43	6.589E-02	&	4.760E-01 1.42E-01	G
CO-60		5.8923E-05	1332.51	5.892E-05	% (P	7.224E-02 1.99E-02	G K
			1173.23	-7.245E-03	&	9.771E-02 2.81E-02	G K
Sr-85		-1.1804E-02	514.00	-1.180E-02	% (	6.794E-02 2.00E-02	G
Kr-85		-2.7006E+02	513.99	-2.701E+02	% (	1.554E+03 4.59E+02	G
Y-88		-2.1975E-05	1836.01	-2.198E-05	% (P	2.468E-02 3.35E-03	G K
			898.02	7.130E-03	% P	7.176E-02 2.05E-02	G
NB-94		2.2993E-02	871.10	2.299E-02	& (	5.278E-02 1.59E-02	G K
			702.50	2.389E-03	%	5.802E-02 1.65E-02	G K
Ag-108M		1.3673E-02	722.95	1.367E-02	% (	6.915E-02 2.02E-02	G K
			614.37	-4.121E-02	& P	8.280E-02 2.51E-02	G
			433.93	-8.617E-03	&	5.749E-02 1.69E-02	G
CD-109		3.3985E-01	88.04	3.398E-01	% (P	2.428E+00 7.28E-01	G
SN-113		-1.1049E-02	391.71	-1.105E-02	% (	7.796E-02 2.29E-02	G K
			255.04	-3.237E-01	&	2.348E+00 6.97E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.3844E-01	427.95	2.545E-02	% (P	1.722E-01	5.03E-02	G K
		600.77	2.153E-02	& P	3.017E-01	8.67E-02	G
		636.15	1.733E-01	% P	4.726E-01	1.41E-01	G
		463.51	6.236E-01	(P	4.967E-01	1.62E-01	G
		176.29	4.648E-03	& P	8.055E-01	2.39E-01	G
I-131	-2.3251E-02	364.48	2.325E-02	% (	6.335E-02	1.90E-02	G K
		636.97	1.800E-01	%	6.507E-01	1.91E-01	G
		284.29	1.829E-01	%	8.667E-01	2.58E-01	G
CS-134	3.1413E-02	604.66	5.904E-03	% (	6.136E-02	1.78E-02	G K
		795.76	7.406E-02	@ (	7.607E-02	2.46E-02	G
		569.29	6.411E-02	%	3.351E-01	9.79E-02	G
		801.84	1.831E-01	% P	7.502E-01	2.20E-01	G
CS-137	1.9631E-01	661.62	1.963E-01	(	7.877E-02	3.52E-02	G
CE-139	5.6077E-03	165.85	5.608E-03	% (P	5.950E-02	1.77E-02	G
EU-152	-1.3831E-02	121.78	1.383E-02	% (P	2.009E-01	5.99E-02	G K
		344.30	4.368E-02	%	1.915E-01	5.70E-02	G
		1408.08	0.000E+00	&	3.293E-01	8.97E-02	G
		964.00	2.465E-01	& P	4.856E-01	1.48E-01	G
		1112.07	0.000E+00	%	6.759E-01	1.92E-01	G
		778.90	6.376E-02	& P	5.206E-01	1.51E-01	G
EU-154	3.6960E-02	123.10	3.696E-02	% (P	1.361E-01	4.09E-02	G K
		1274.80	4.373E-02	%	2.654E-01	7.69E-02	G
		723.30	1.024E-01	% P	3.433E-01	1.02E-01	G
		1004.80	1.366E-01	%	3.650E-01	1.09E-01	G
EU-155	1.6038E-01	86.45	1.604E-01	% (P	2.897E-01	8.80E-02	G K
		105.31	2.409E-02	&	2.955E-01	8.82E-02	G
HG-203	2.0335E-02	279.17	2.034E-02	% (P	5.821E-02	1.75E-02	G K
		72.87	1.088E+00	&	2.499E+00	7.57E-01	G
		70.83	2.943E+00	%	4.486E+00	1.37E+00	G
		82.50	1.261E+00	%	4.721E+00	1.42E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	3.3596E-01	583.14	3.360E-01	(P	7.037E-02	3.42E-02	G
		510.72	6.494E-01	+ 2.734E-01		1.20E-01	G
PB-212	9.5662E-01	238.63	9.146E-01	@(	1.346E-01	5.18E-02	G K
		77.11	1.060E+00	(	6.950E-01	2.18E-01	G
		74.81	1.040E+00	& P	1.433E+00	4.38E-01	G
PB-214	5.3584E-01	351.99	5.577E-01	(P	1.190E-01	4.79E-02	G K
		295.22	4.936E-01	@(	2.514E-01	8.38E-02	G
		77.11	1.734E+00	+ 1.137E+00		3.57E-01	G
		241.92	5.632E-01	%	8.433E-01	2.58E-01	G
BI-212	1.5785E+00	727.17	1.520E+00	*(	5.062E-01	2.35E-01	G K
		1620.56	1.141E-01	% P	1.909E+00	4.99E-01	G
		785.42	1.921E+00	(P	2.402E+00	7.99E-01	G
BI-214	4.3655E-01	609.32	4.366E-01	(	1.302E-01	5.67E-02	G K
		1764.51-1.739E-03		% P	3.365E-01	8.52E-02	G
		1120.28	0.000E+00	%	5.932E-01	1.68E-01	G
RA-224	1.3560E+00	241.00	1.356E+00	(P	1.569E+00	4.84E-01	G
RA-226	1.9236E+00	185.99	1.924E+00	(P	1.598E+00	4.99E-01	G
AC-228	1.2294E+00	911.07	1.190E+00	(P	2.418E-01	1.22E-01	G K
		968.90	4.536E-01	- P	5.415E-01	1.71E-01	G
		338.40	1.325E+00	@(	4.343E-01	1.88E-01	G
TH-227	-3.4792E-01	236.00-3.479E-01		%(P	5.582E-01	1.70E-01	G K
		256.25	1.604E-01	%	7.074E-01	2.11E-01	G
PA-234	-3.8067E-02	98.44-3.807E-02		%(	2.985E-01	8.94E-02	G K
		946.00	1.109E-01	%	3.151E-01	9.37E-02	G
		131.28	1.525E-01	&	2.465E-01	7.52E-02	G
		94.67	3.202E-01	%	4.722E-01	1.44E-01	G
		883.24	2.675E-02	&	4.685E-01	1.32E-01	G
		926.70-9.272E-02		%	5.771E-01	1.66E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	9.493E-02	%	4.792E-01	1.40E-01 G
TH-234	4.2546E-02					
		63.29	4.255E-02	&(P	5.310E+00	1.58E+00 G K
		92.80	1.612E+00	&	2.858E+00	8.69E-01 G
		92.38	1.533E-01	& P	3.434E+00	1.03E+00 G
AM-241	2.7692E-03					
		59.54	2.769E-03	%(	6.967E-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:

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

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	0.0000E+00	0.0000E+00	4.7140E-01	4.7140E-01	5.383E-01
K-40		1.9635E+01	1.9635E+01	2.1460E+00	2.4124E+00	4.596E-01
MN-54	#A	-1.4492E-02	-1.4519E-02	6.4101E-02	6.4106E-02	6.958E-02
CO-57	#B	0.0000E+00	0.0000E+00	5.8908E-02	5.8908E-02	6.590E-02
CO-60	#B	5.8905E-05	5.8923E-05	5.9553E-02	5.9553E-02	7.222E-02

Sr-85	#A	-1.1699E-02	-1.1804E-02	6.0139E-02	6.0143E-02	6.733E-02
Kr-85	#A	-2.7006E+02	-2.7006E+02	1.3760E+03	1.3761E+03	1.554E+03
Y-88	#B	-2.1856E-05	-2.1975E-05	1.3185E-04	1.3186E-04	2.454E-02
NB-94	#B	2.2993E-02	2.2993E-02	4.7693E-02	4.7711E-02	5.278E-02
Ag-108M	#B	1.3673E-02	1.3673E-02	6.0609E-02	6.0614E-02	6.914E-02
CD-109	#A	3.3941E-01	3.3985E-01	2.1832E+00	2.1832E+00	2.425E+00
SN-113	#B	-1.0993E-02	-1.1049E-02	6.8755E-02	6.8758E-02	7.757E-02
SB-125	#B	1.3836E-01	1.3844E-01	1.0795E-01	1.0823E-01	1.721E-01
I-131	#B	-2.1636E-02	-2.3251E-02	5.7067E-02	5.7082E-02	5.895E-02
CS-134	#B	3.1389E-02	3.1413E-02	3.1255E-02	3.1305E-02	6.131E-02
CS-137		1.9630E-01	1.9631E-01	1.0536E-01	1.0593E-01	
CE-139	#A	5.5842E-03	5.6077E-03	5.3113E-02	5.3114E-02	5.925E-02
EU-152	#B	-1.3830E-02	-1.3831E-02	2.1602E-01	2.1602E-01	2.009E-01
EU-154	#B	3.6954E-02	3.6960E-02	1.2278E-01	1.2280E-01	1.361E-01
EU-155	#B	1.6033E-01	1.6038E-01	2.6405E-01	2.6420E-01	2.896E-01
HG-203	#B	2.0084E-02	2.0335E-02	5.2482E-02	5.2495E-02	5.749E-02
TL-208		3.3596E-01	3.3596E-01	1.0232E-01	1.0405E-01	
PB-212	#	9.5662E-01	9.5662E-01	1.6252E-01	1.7116E-01	1.346E-01
PB-214	#	5.3584E-01	5.3584E-01	1.3797E-01	1.4120E-01	1.190E-01
BI-212		1.5785E+00	1.5785E+00	7.3061E-01	7.3596E-01	
BI-214		4.3655E-01	4.3655E-01	1.6982E-01	1.7158E-01	
RA-224	#A	1.3560E+00	1.3560E+00	1.4524E+00	1.4544E+00	1.569E+00
RA-226	#	1.9236E+00	1.9236E+00	1.4982E+00	1.5021E+00	1.598E+00
AC-228		1.2294E+00	1.2294E+00	3.2234E-01	3.2964E-01	
TH-227	#B	-3.4792E-01	-3.4792E-01	5.1478E-01	5.1515E-01	5.582E-01
PA-234	#B	-3.8067E-02	-3.8067E-02	2.6820E-01	2.6820E-01	2.985E-01
TH-234	#B	4.2546E-02	4.2546E-02	4.7434E+00	4.7434E+00	5.310E+00
AM-241	#A	2.7692E-03	2.7692E-03	6.2051E-01	6.2051E-01	6.967E-01

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

S U M M A R Y

 Total Activity (1766.3 to 1999.0 keV) 2.3411524E+01 pCi/gm
 Total Decayed Activity (1766.3 to 1999.0 keV) 2.3411535E+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-12-01-013-F

Spectrum Filename: C:\GammaVision\Spectra\102F_24AUG2006_1051.An1

Acquisition information

Start time: 24-Aug-2006 10:51:46
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9070E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9070E+03) =
5.2438E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	23-Aug-2006 11:15:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	102_150K_28APR05.Pbc 01-May-2005 05:27:47
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.6924

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
77.15	129.	32.07	1.50	9.541E-03	77.11	10.700	PBC<MDA	PB214
					77.11	17.500	5.479E-01	PB212
77.15	129.	32.07	1.50	9.541E-03	77.11	10.700	8.961E-01	PB214
					77.11	17.500	5.479E-01	PB212
93.14	111.	37.31	1.50	1.333E-02	92.80	3.000	PBC<MDA	TH234
186.24	96.	34.20	1.38	1.626E-02	185.99	3.280	PBC<MDA	RA226
209.26	88.	34.98	0.89	1.519E-02				
239.07	581.	4.91	1.22	1.379E-02	236.00	11.200	2.638E+00	TH227
					238.63	43.100	6.918E-01	PB212
242.02	83.	29.78	1.22	1.365E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	5.784E-01	PB214
278.19	52.	39.66	1.22	1.211E-02				
278.19	52.	39.66	1.22	1.211E-02	279.17	81.500	PBC<MDA	HG203
295.66	129.	16.10	1.09	1.145E-02	295.22	19.200	4.153E-01	PB214
339.04	129.	16.97	1.20	1.004E-02	338.40	12.010	7.590E-01	AC228
352.61	193.	11.09	1.41	9.662E-03	351.99	37.100	3.809E-01	PB214
463.79	37.	32.26	1.50	7.365E-03	463.51	10.000	PBC<MDA	SB125
511.43	107.	19.37	1.65	6.686E-03	510.72	22.500	5.015E-01	TL208
584.22	176.	12.08	1.48	5.880E-03	583.14	86.000	2.459E-01	TL208
610.37	129.	13.66	1.30	5.640E-03	609.32	46.090	3.516E-01	BI214
912.83	120.	11.90	1.94	3.915E-03	911.07	29.000	7.462E-01	AC228
970.01	101.	17.91	2.44	3.714E-03	968.90	17.460	1.102E+00	AC228
1463.03	549.	4.35	1.98	2.617E-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
372.09	186.24	360.	96.	0.048	102.59	1.380	PA-234 l
418.13	209.26	314.	88.	0.044	104.93	0.892	AC-228 sM
477.77	239.01	116.	581.	0.290	14.72	1.215	PB-212 D
483.66	241.96	266.	83.	0.042	89.34	1.217	PB-214 D
1825.80	912.83	26.	122.	0.061	32.30	1.942	AC-228 sM
2245.28	1122.44	32.	62.	0.031	62.93	1.344	TA-182 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-214	153.80	77.11	793.	129.	0.065	96.22	1.500D
PB-212	153.80	77.11	793.	129.	0.065	96.22	1.500D
TH-234	185.86	93.14	803.	111.	0.056	111.93	1.500
PB-212	477.82	239.10	314.	500.	0.250	20.16	1.500
RA-224	483.28	241.83	358.	75.	0.037	110.92	1.500s
PB-214	591.30	295.82	155.	124.	0.062	50.27	1.500s
AC-228	677.58	338.95	128.	105.	0.053	54.10	1.500
PB-214	704.73	352.52	113.	169.	0.084	35.30	1.500s
SB-125	927.33	463.79	59.	37.	0.018	96.79	1.500s
TL-208	1022.65	511.43	86.	107.	0.053	58.10	1.654s
TL-208	1168.27	584.22	73.	176.	0.088	36.23	1.483
BI-214	1220.60	610.37	59.	129.	0.065	40.98	1.302s
AC-228	1941.00	970.40	33.	67.	0.033	51.77	1.718
K-40	2927.01	1463.05	22.	513.	0.256	13.80	2.042

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

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -		Average	----- Peak -----				
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		-5.2867E-02	477.56	5.287E-02	%	4.439E-01 1.29E-01	G
K-40		1.2958E+01	1460.75	1.296E+01	(P	6.236E-01 5.96E-01	G
MN-54		-3.3153E-04	834.81	3.315E-04	&(P	6.038E-02 1.69E-02	G
CO-57		7.0840E-03	122.07	7.084E-03	%	4.721E-02 1.40E-02	G K
			136.43	1.211E-01	%	4.280E-01 1.29E-01	G
CO-60		-3.9437E-03	1332.51	3.944E-03	&(P	6.712E-02 1.85E-02	G K
			1173.23	1.010E-02	%	7.150E-02 2.04E-02	G K
Sr-85		-1.1867E-02	514.00	1.187E-02	&(	6.006E-02 1.77E-02	G
Kr-85		-2.7111E+02	513.99	2.711E+02	&(	1.372E+03 4.04E+02	G
Y-88		-3.9728E-03	1836.01	3.973E-03	%(P	5.154E-02 1.34E-02	G K
			898.02	6.153E-03	% P	5.982E-02 1.69E-02	G
NB-94		1.0934E-04	871.10	1.093E-04	&(	5.116E-02 1.41E-02	G K
			702.50	1.881E-02	%	5.148E-02 1.53E-02	G K
Ag-108M		1.5146E-03	722.95	1.515E-03	%	5.348E-02 1.50E-02	G K
			614.37	3.550E-02	% P	6.678E-02 2.03E-02	G
			433.93	9.686E-04	&	3.832E-02 1.08E-02	G
CD-109		1.1756E+00	88.04	1.176E+00	%(P	2.045E+00 6.22E-01	G
SN-113		-9.3885E-03	391.71	9.389E-03	%	6.304E-02 1.84E-02	G K
			255.04	7.367E-02	&	1.861E+00 5.45E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	8.8899E-02	427.95	1.234E-03	&(P	1.315E-01	3.73E-02	G K
		600.77	4.755E-03	% P	2.507E-01	7.06E-02	G
		636.15	2.850E-02	% P	3.566E-01	1.00E-01	G
		463.51	3.557E-01	*(P	3.719E-01	1.20E-01	G
		176.29	1.163E-01	% P	6.112E-01	1.82E-01	G
I-131	1.0403E-02	364.48	1.040E-02	% (	5.073E-02	1.49E-02	G K
		636.97	0.000E+00	%	6.111E-01	1.69E-01	G
		284.29	1.918E-01	%	7.088E-01	2.11E-01	G
CS-134	9.5296E-03	604.66	9.530E-03	% (	4.235E-02	1.23E-02	G K
		795.76	3.691E-02	%	6.089E-02	1.89E-02	G
		569.29	5.094E-02	%	2.657E-01	7.69E-02	G
		801.84	1.067E-01	% P	6.809E-01	1.96E-01	G
CS-137	-1.1059E-02	661.62	1.106E-02	% (	5.803E-02	1.68E-02	G
CE-139	-1.0735E-02	165.85	1.074E-02	&(P	5.188E-02	1.55E-02	G
EU-152	-5.3445E-02	121.78	5.345E-02	%(P	1.581E-01	4.75E-02	G K
		344.30	1.430E-02	&	1.519E-01	4.44E-02	G
		1408.08	3.119E-02	&	2.654E-01	7.31E-02	G
		964.00	3.751E-02	& P	4.456E-01	1.26E-01	G
		1112.07	1.552E-02	%	5.520E-01	1.55E-01	G
		778.90	9.136E-04	% P	4.396E-01	1.23E-01	G
EU-154	-5.3800E-03	123.10	5.380E-03	%(P	1.145E-01	3.40E-02	G K
		1274.80	3.142E-04	%	2.020E-01	5.57E-02	G
		723.30	1.369E-02	% P	2.402E-01	6.72E-02	G
		1004.80	1.130E-01	&	2.392E-01	7.27E-02	G
EU-155	5.9466E-02	86.45	5.947E-02	%(P	2.614E-01	7.84E-02	G K
		105.31	2.579E-02	&	2.421E-01	7.21E-02	G
HG-203	-1.9910E-04	279.17	1.991E-04	%(P	4.885E-02	1.42E-02	G K
		72.87	7.123E-01	%	2.045E+00	6.17E-01	G
		70.83	4.074E-02	&	3.442E+00	1.02E+00	G
		82.50	6.199E-02	%	4.223E+00	1.26E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.4593E-01	583.14	2.459E-01	(P	5.957E-02	2.98E-02	G
		510.72	5.015E-01	+ 2.165E-01		9.72E-02	G
PB-212	5.8159E-01	238.63	5.953E-01	(	1.016E-01	4.00E-02	G K
		77.11	5.479E-01	(	5.683E-01	1.76E-01	G
		74.81	7.120E-01	& P	1.168E+00	3.56E-01	G
PB-214	3.5572E-01	351.99	3.326E-01	@(P	1.033E-01	3.92E-02	G K
		295.22	4.004E-01	@(	1.955E-01	6.71E-02	G
		77.11	8.961E-01	+ 9.295E-01		2.87E-01	G
		241.92	4.128E-01	% 6.741E-01		2.06E-01	G
BI-212	-3.0302E-02	727.17	3.030E-02	% (	4.447E-01	1.26E-01	G K
		1620.56	2.455E-01	% P	1.846E+00	4.87E-01	G
		785.42	6.345E-01	% P	2.296E+00	6.70E-01	G
BI-214	3.5162E-01	609.32	3.516E-01	(	1.046E-01	4.81E-02	G K
		1764.51	1.734E-03	& P	1.474E-01	2.00E-02	G
		1120.28	1.413E-01	&	5.335E-01	1.57E-01	G
RA-224	9.9238E-01	241.00	9.924E-01	(P	1.205E+00	3.73E-01	G
RA-226	7.2317E-01	185.99	7.232E-01	%(P	1.262E+00	3.84E-01	G
AC-228	3.3698E-01	911.07	1.628E-02	%(P	2.176E-01	6.15E-02	G K
		968.90	7.303E-01	(P	3.230E-01	1.26E-01	G
		338.40	6.182E-01	(	3.250E-01	1.11E-01	G
TH-227	-2.0535E-01	236.00	2.053E-01	&(P	4.442E-01	1.35E-01	G K
		256.25	6.030E-03	% 5.549E-01		1.62E-01	G
PA-234	1.3872E-03	98.44	1.387E-03	%(	2.225E-01	6.59E-02	G K
		946.00	4.953E-02	%	2.394E-01	6.85E-02	G
		131.28	3.664E-02	%	2.345E-01	7.00E-02	G
		94.67	1.117E-01	%	4.726E-01	1.42E-01	G
		883.24	1.532E-03	%	3.893E-01	1.06E-01	G
		926.70	5.209E-03	&	4.214E-01	1.15E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	7.551E-02	%	3.938E-01	1.14E-01 G
TH-234	9.7957E-01					
		63.29	2.191E-01	%(P	4.364E+00	1.30E+00 G K
		92.80	1.968E+00	(	2.388E+00	7.34E-01 G
		92.38	3.153E-02	% P	2.701E+00	8.03E-01 G

AM-241 -3.0480E-02
 59.54-3.048E-02 %(6.835E-01 2.03E-01 G
 (- This peak used in the nuclide activity average.

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

Nuclide Codes:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
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 M - No MDA Calculation
 R - Coincidence Corrected
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Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	-5.2196E-02	-5.2867E-02	3.8615E-01	3.8616E-01	4.383E-01
K-40		1.2958E+01	1.2958E+01	1.7893E+00	1.9314E+00	6.236E-01
MN-54	#A	-3.3081E-04	-3.3153E-04	1.3306E+00	1.3306E+00	6.025E-02
CO-57	#B	7.0661E-03	7.0840E-03	4.2143E-02	4.2145E-02	4.709E-02
CO-60	#B	-3.9424E-03	-3.9437E-03	6.1398E-02	6.1399E-02	6.710E-02

Sr-85	#A	-1.1743E-02	-1.1867E-02	5.3108E-02	5.3112E-02	5.943E-02
Kr-85	#A	-2.7110E+02	-2.7111E+02	1.2132E+03	1.2133E+03	1.372E+03
Y-88	#B	-3.9475E-03	-3.9728E-03	4.0615E-02	4.0615E-02	5.121E-02
NB-94	#B	1.0934E-04	1.0934E-04	4.2310E-02	4.2310E-02	5.116E-02
Ag-108M	#B	1.5145E-03	1.5146E-03	4.4925E-02	4.4925E-02	5.348E-02
CD-109	#A	1.1738E+00	1.1756E+00	1.8669E+00	1.8681E+00	2.042E+00
SN-113	#B	-9.3331E-03	-9.3885E-03	5.5227E-02	5.5229E-02	6.266E-02
SB-125	#B	8.8840E-02	8.8899E-02	8.9648E-02	8.9786E-02	1.314E-01
I-131	#B	9.5567E-03	1.0403E-02	4.4756E-02	4.4759E-02	4.660E-02
CS-134	#B	9.5210E-03	9.5296E-03	3.6918E-02	3.6922E-02	4.231E-02
CS-137	#A	-1.1058E-02	-1.1059E-02	5.0490E-02	5.0494E-02	5.803E-02
CE-139	#A	-1.0682E-02	-1.0735E-02	4.8473E-02	4.8477E-02	5.162E-02
EU-152	#B	-5.3438E-02	-5.3445E-02	1.4956E-01	1.4959E-01	1.581E-01
EU-154	#B	-5.3788E-03	-5.3800E-03	1.1028E-01	1.1028E-01	1.144E-01
EU-155	#B	5.9444E-02	5.9466E-02	2.3535E-01	2.3537E-01	2.613E-01
HG-203	#B	-1.9621E-04	-1.9910E-04	8.6657E-02	8.6657E-02	4.814E-02
TL-208		2.4593E-01	2.4593E-01	8.9310E-02	9.0370E-02	
PB-212	#	5.8159E-01	5.8159E-01	1.1724E-01	1.2170E-01	1.016E-01
PB-214	#	3.5572E-01	3.5572E-01	1.0934E-01	1.1114E-01	1.033E-01
BI-212	#B	-3.0302E-02	-3.0302E-02	3.7848E-01	3.7849E-01	4.447E-01
BI-214	#	3.5162E-01	3.5162E-01	1.4410E-01	1.4544E-01	
RA-224	#A	9.9238E-01	9.9238E-01	1.1178E+00	1.1192E+00	1.205E+00
RA-226	#A	7.2317E-01	7.2317E-01	1.1516E+00	1.1523E+00	1.262E+00
AC-228	F	3.3698E-01	3.3698E-01	1.7454E-01	1.7556E-01	2.176E-01
TH-227	#B	-2.0535E-01	-2.0535E-01	4.0872E-01	4.0888E-01	4.442E-01
PA-234	#B	1.3872E-03	1.3872E-03	1.9778E-01	1.9778E-01	2.225E-01
TH-234	#B	9.7957E-01	9.7957E-01	1.0964E+00	1.0977E+00	4.364E+00
AM-241	#A	-3.0480E-02	-3.0480E-02	6.0969E-01	6.0970E-01	6.835E-01

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

S U M M A R Y

 Total Activity (278.2 to 1999.0 keV) 1.3892530E+01 pCi/gm
 Total Decayed Activity (278.2 to 1999.0 keV) 1.3892530E+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-12-01-001-F

Spectrum Filename: C:\GammaVision\Spectra\102F_24AUG2006_1135.An1

Acquisition information

Start time: 24-Aug-2006 11:35:28
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.22keV)
Stop channel: 4000 (1999.02keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.1820E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1820E+03) =
4.5830E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	23-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. 13 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.6424

***** S U M M A R Y O F P E A 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	134.	33.63	1.50	8.847E-03	74.81	9.600	PBC<MDA	PB212
77.20	127.	35.29	1.50	9.541E-03	77.11	10.700	PBC<MDA	PB214
					77.11	17.500	4.716E-01	PB212
77.20	127.	35.29	1.50	9.541E-03	77.11	10.700	7.713E-01	PB214
					77.11	17.500	4.716E-01	PB212
186.43	96.	33.04	1.13	1.625E-02	185.99	3.280	PBC<MDA	RA226
239.03	608.	5.03	1.22	1.379E-02	238.63	43.100	6.325E-01	PB212
241.67	103.	24.56	1.22	1.367E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	6.232E-01	PB214
271.16	81.	32.85	1.47	1.239E-02				
295.57	111.	17.48	1.19	1.145E-02	295.22	19.200	3.112E-01	PB214
339.09	125.	21.43	1.26	1.004E-02	338.40	12.010	6.392E-01	AC228
352.48	236.	12.24	1.23	9.665E-03	351.99	37.100	4.064E-01	PB214
511.75	83.	29.73	0.89	6.682E-03	510.72	22.500	3.396E-01	TL208
584.19	199.	12.38	1.01	5.880E-03	583.14	86.000	2.426E-01	TL208
610.41	168.	9.78	1.46	5.640E-03	609.32	46.090	3.991E-01	BI214
661.84	50.	26.54	1.59	5.228E-03	661.62	84.620	7.054E-02	CS137
728.21	36.	33.86	0.81	4.788E-03	727.17	11.800	3.996E-01	BI212
912.48	132.	12.58	1.54	3.917E-03	911.07	29.000	7.164E-01	AC228
1121.63	47.	28.92	1.02	3.283E-03	1120.28	15.040	5.895E-01	BI214
1463.05	766.	3.72	1.78	2.617E-03	1460.75	10.700	1.691E+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
372.47	186.43	381.	96.	0.048	99.11	1.131	PA-234 l
477.68	238.95	163.	608.	0.304	15.08	1.215	PB-212 D
482.97	241.59	266.	103.	0.051	73.68	1.217	PB-214 D
541.97	271.16	235.	81.	0.041	86.51	1.466	AC-228 sM
1456.37	728.21	46.	36.	0.018	101.58	0.812	J-132 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	149.57	75.00	989.	134.	0.067	100.89	1.500s
PB-214	153.80	77.11	943.	127.	0.064	105.87	1.500D
PB-212	153.80	77.11	943.	127.	0.064	105.87	1.500D
PB-212	477.74	239.05	453.	508.	0.254	22.21	1.500
PB-214	591.29	295.82	191.	115.	0.058	57.97	1.500
AC-228	677.53	338.93	191.	123.	0.062	54.63	1.500
PB-214	704.58	352.45	154.	203.	0.101	33.42	1.500
TL-208	1023.33	511.78	94.	76.	0.038	74.69	0.880s
TL-208	1168.21	584.19	100.	198.	0.099	37.13	1.012
BI-214	1220.68	610.41	44.	168.	0.084	29.35	1.456
CS-137	1323.58	661.84	48.	50.	0.025	79.62	1.595s
AC-228	1825.70	912.78	37.	120.	0.060	34.73	1.679
BI-214	2243.66	1121.63	51.	47.	0.023	86.75	1.018s
K-40	2927.13	1463.11	12.	720.	0.360	11.37	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 -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		1.1603E-01	477.56	1.160E-01	%	3.886E-01 1.15E-01	G
K-40		1.5901E+01	1460.75	1.590E+01	(P	4.229E-01 6.03E-01	G
MN-54		-1.1586E-02	834.81	-1.159E-02	%(P	5.668E-02 1.65E-02	G
CO-57		-1.5452E-02	122.07	-1.545E-02	%(	5.760E-02 1.73E-02	G K
			136.43	-8.571E-03	&	3.973E-01 1.18E-01	G
CO-60		-5.0206E-03	1332.51	-5.021E-03	%(P	5.985E-02 1.67E-02	G K
			1173.23	-1.973E-02	%	9.017E-02 2.65E-02	G K
Sr-85		6.5996E-03	514.00	6.600E-03	%(	3.219E-02 9.33E-03	G
Kr-85		-2.3043E+01	513.99	-2.304E+01	%(	1.041E+03 2.99E+02	G
Y-88		3.8652E-03	1836.01	3.865E-03	%(P	3.918E-02 1.01E-02	G K
			898.02	9.665E-04	% P	6.869E-02 1.95E-02	G
NB-94		0.0000E+00	871.10	0.000E+00	%(	5.379E-02 1.51E-02	G K
			702.50	8.369E-03	&	5.206E-02 1.51E-02	G K
Ag-108M		1.6851E-02	722.95	1.685E-02	%(	4.848E-02 1.44E-02	G K
			614.37	-2.655E-02	% P	6.394E-02 1.92E-02	G
			433.93	7.567E-03	%	3.764E-02 1.10E-02	G
CD-109		-6.2002E-02	88.04	-6.200E-02	%(P	2.163E+00 6.45E-01	G
SN-113		-4.8402E-04	391.71	-4.840E-04	%(	5.689E-02 1.64E-02	G K
			255.04	5.350E-02	&	1.955E+00 5.76E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.1375E-02	427.95	1.138E-02	% (P	1.339E-01	3.88E-02	G K
		600.77	3.029E-02	& P	2.375E-01	6.84E-02	G
		636.15	3.755E-02	% P	3.328E-01	9.46E-02	G
		463.51	1.965E-01	& P	4.847E-01	1.46E-01	G
		176.29	1.446E-02	& P	6.354E-01	1.88E-01	G
I-131	-1.1339E-02	364.48	1.134E-02	% (	5.149E-02	1.52E-02	G K
		636.97	3.118E-02	%	5.793E-01	1.63E-01	G
		284.29	1.736E-02	%	6.607E-01	1.93E-01	G
CS-134	1.5781E-02	604.66	1.578E-02	% (	4.151E-02	1.24E-02	G K
		795.76	3.717E-02	%	5.599E-02	1.75E-02	G
		569.29	3.625E-03	%	2.360E-01	6.63E-02	G
		801.84	8.545E-02	& P	5.937E-01	1.71E-01	G
CS-137	7.0541E-02	661.62	7.054E-02	* (	4.879E-02	1.87E-02	G
CE-139	-1.9977E-04	165.85	1.998E-04	% (P	5.052E-02	1.49E-02	G
EU-152	-4.4855E-02	121.78	4.486E-02	% (P	1.676E-01	5.04E-02	G K
		344.30	1.862E-03	%	1.532E-01	4.46E-02	G
		1408.08	0.000E+00	&	2.121E-01	5.55E-02	G
		964.00	1.220E-01	& P	3.783E-01	1.12E-01	G
		1112.07	1.889E-01	%	4.783E-01	1.43E-01	G
		778.90	5.971E-03	% P	3.614E-01	1.01E-01	G
EU-154	2.3496E-03	123.10	2.350E-03	% (P	1.155E-01	3.43E-02	G K
		1274.80	3.525E-02	&	2.201E-01	6.36E-02	G
		723.30	4.973E-02	% P	2.642E-01	7.69E-02	G
		1004.80	7.780E-02	%	2.333E-01	6.86E-02	G
EU-155	-7.7047E-03	86.45	7.705E-03	& (P	2.545E-01	7.58E-02	G K
		105.31	7.150E-02	%	2.424E-01	7.30E-02	G
HG-203	1.2310E-02	279.17	1.231E-02	% (P	4.433E-02	1.32E-02	G K
		72.87	4.620E-01	&	1.706E+00	5.13E-01	G
		70.83	6.803E-01	&	3.444E+00	1.03E+00	G
		82.50	9.403E-01	%	3.789E+00	1.14E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5706E-01	583.14	2.426E-01	(P	6.018E-02	3.01E-02	G
		510.72	3.125E-01	(	1.969E-01	7.79E-02	G
PB-212	5.1241E-01	238.63	5.290E-01	(	1.061E-01	3.92E-02	G K
		77.11	4.716E-01	@(	5.409E-01	1.66E-01	G
		74.81	9.737E-01	+ P	1.089E+00	3.35E-01	G
PB-214	3.4082E-01	351.99	3.493E-01	(P	1.045E-01	3.90E-02	G K
		295.22	3.244E-01	(	1.886E-01	6.27E-02	G
		77.11	7.713E-01	+ P	8.846E-01	2.72E-01	G
		241.92	3.467E-01	%	6.660E-01	2.02E-01	G
BI-212	2.5549E-01	727.17	2.555E-01	%(	4.012E-01	1.25E-01	G K
		1620.56	1.331E-01	% P	1.755E+00	4.59E-01	G
		785.42	2.607E-01	& P	2.491E+00	7.12E-01	G
BI-214	3.9912E-01	609.32	3.991E-01	(	8.014E-02	3.91E-02	G K
		1764.51	7.221E-02	% P	3.975E-01	1.12E-01	G
		1120.28	5.895E-01	+	4.514E-01	1.71E-01	G
RA-224	1.8125E-01	241.00	1.813E-01	%(P	1.280E+00	3.81E-01	G
RA-226	8.1754E-01	185.99	8.175E-01	%(P	1.242E+00	3.79E-01	G
AC-228	6.4633E-01	911.07	6.519E-01	(P	1.684E-01	7.56E-02	G K
		968.90	2.540E-03	% P	4.658E-01	1.34E-01	G
		338.40	6.328E-01	(	3.440E-01	1.15E-01	G
TH-227	-9.6476E-02	236.00	9.648E-02	&(P	4.456E-01	1.33E-01	G K
		256.25	9.299E-02	&	6.104E-01	1.81E-01	G
PA-234	1.5735E-02	98.44	1.574E-02	%(	2.490E-01	7.43E-02	G K
		946.00	3.430E-02	&	3.083E-01	8.85E-02	G
		131.28	4.687E-02	%	2.206E-01	6.61E-02	G
		94.67	1.143E-01	%	4.615E-01	1.39E-01	G
		883.24	1.180E-03	&	3.562E-01	9.76E-02	G
		926.70	6.233E-02	%	4.343E-01	1.24E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	-1.141E-02	%	3.510E-01	9.90E-02 G
TH-234	-5.8962E-01					
		63.29	-5.896E-01	&(P	3.630E+00	1.08E+00 G K
		92.80	1.575E+00	%	2.354E+00	7.19E-01 G
		92.38	2.997E-02	% P	2.901E+00	8.66E-01 G

AM-241 -7.1292E-03
 59.54-7.129E-03 &(6.391E-01 1.90E-01 G
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 C - Charged Particle Reaction
 M - No MDA Calculation
 R - Coincidence Corrected
 H - Halflife limit exceeded

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	1.1464E-01	1.1603E-01	3.4590E-01	3.4597E-01	3.839E-01
K-40		1.5901E+01	1.5901E+01	1.8081E+00	2.0163E+00	4.229E-01
MN-54	#A	-1.1562E-02	-1.1586E-02	5.2169E-02	5.2173E-02	5.656E-02
CO-57	#B	-1.5415E-02	-1.5452E-02	5.1959E-02	5.1966E-02	5.746E-02
CO-60	#B	-5.0189E-03	-5.0206E-03	5.3498E-02	5.3499E-02	5.983E-02

Sr-85	#A	6.5343E-03	6.5996E-03	2.7997E-02	2.8000E-02	3.188E-02
Kr-85	#A	-2.3043E+01	-2.3043E+01	8.9692E+02	8.9692E+02	1.041E+03
Y-88	#B	3.8419E-03	3.8652E-03	3.0190E-02	3.0191E-02	3.894E-02
NB-94	#B	0.0000E+00	0.0000E+00	4.5223E-02	4.5223E-02	5.379E-02
Ag-108M	#B	1.6851E-02	1.6851E-02	4.3207E-02	4.3218E-02	4.848E-02
CD-109	#A	-6.1914E-02	-6.2002E-02	3.7372E+00	3.7372E+00	2.160E+00
SN-113	#B	-4.8131E-04	-4.8402E-04	4.9098E-02	4.9098E-02	5.658E-02
SB-125	#B	1.1368E-02	1.1375E-02	1.1631E-01	1.1632E-01	1.338E-01
I-131	#B	-1.0465E-02	-1.1339E-02	4.5694E-02	4.5698E-02	4.752E-02
CS-134	#B	1.5767E-02	1.5781E-02	3.7229E-02	3.7240E-02	4.147E-02
CS-137	#	7.0536E-02	7.0541E-02	5.6164E-02	5.6303E-02	
CE-139	#A	-1.9883E-04	-1.9977E-04	3.9222E-02	3.9222E-02	5.028E-02
EU-152	#B	-4.4849E-02	-4.4855E-02	1.5869E-01	1.5871E-01	1.676E-01
EU-154	#B	2.3491E-03	2.3496E-03	1.0298E-01	1.0298E-01	1.155E-01
EU-155	#B	-7.7020E-03	-7.7047E-03	1.8589E+00	1.8589E+00	2.544E-01
HG-203	#B	1.2140E-02	1.2310E-02	3.9682E-02	3.9688E-02	4.372E-02
TL-208		2.5706E-01	2.5706E-01	9.5652E-02	9.6734E-02	
PB-212	#	5.1241E-01	5.1241E-01	1.1379E-01	1.1737E-01	1.061E-01
PB-214	#	3.4082E-01	3.4082E-01	1.1408E-01	1.1567E-01	1.045E-01
BI-212	#B	2.5549E-01	2.5549E-01	3.7366E-01	3.7393E-01	4.012E-01
BI-214		3.9912E-01	3.9912E-01	1.1713E-01	1.1926E-01	
RA-224	#A	1.8125E-01	1.8125E-01	1.1441E+00	1.1442E+00	1.280E+00
RA-226	#A	8.1754E-01	8.1754E-01	1.1376E+00	1.1385E+00	1.242E+00
AC-228		6.4633E-01	6.4633E-01	2.0931E-01	2.1243E-01	1.684E-01
TH-227	#B	-9.6476E-02	-9.6476E-02	4.0961E-01	4.0964E-01	4.456E-01
PA-234	#B	1.5735E-02	1.5735E-02	2.2301E-01	2.2301E-01	2.490E-01
TH-234	#B	-5.8962E-01	-5.8962E-01	3.3714E+00	3.3716E+00	3.630E+00
AM-241	#A	-7.1292E-03	-7.1292E-03	5.6996E-01	5.6996E-01	6.391E-01

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

S U M M A R Y

Total Activity (270.7 to 1999.0 keV) 1.7273584E+01 pCi/gm
Total Decayed Activity (270.7 to 1999.0 keV) 1.7273588E+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-12-01-016-F

Spectrum Filename: C:\GammaVision\Spectra\103F_22AUG2006_1325.An1

Acquisition information

Start time: 22-Aug-2006 13:26:02
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9230E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9230E+03) =
5.2002E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	19-Aug-2006 11:40:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	103_150K_05AUG05.Pbc 08-Aug-2005 12:54:15
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.2732

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.95	151.	19.58	0.99	9.052E-03	74.81	9.600	1.225E+00	PB212
77.25	226.	10.89	0.99	1.011E-02	77.11	10.700	1.525E+00	PB214
					77.11	17.500	9.325E-01	PB212
86.82	92.	33.35	1.00	1.428E-02	86.45	32.740	1.408E-01	EU155
					88.04	3.790	1.169E+00	CD109
89.85	100.	31.22	1.00	1.542E-02				
93.53	121.	24.80	1.00	1.672E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.14	96.	38.96	1.00	2.438E-02				
186.49	178.	23.91	1.41	2.565E-02	185.99	3.280	1.374E+00	RA226
209.80	83.	34.31	1.10	2.469E-02				
238.82	1270.	3.29	1.09	2.319E-02	238.63	43.100	8.844E-01	PB212
241.79	158.	17.40	1.09	2.304E-02	241.00	3.900	1.234E+00	RA224
					241.92	7.470	6.456E-01	PB214
269.96	128.	26.73	0.91	2.153E-02				
295.36	222.	12.00	0.80	2.024E-02	295.22	19.200	3.938E-01	PB214
300.54	96.	30.35	1.25	1.999E-02				
328.61	88.	32.87	0.86	1.871E-02				
338.46	295.	11.12	0.90	1.830E-02	338.40	12.010	9.397E-01	AC228
352.13	419.	6.79	1.31	1.775E-02	351.99	37.100	4.406E-01	PB214
463.15	87.	26.57	1.40	1.426E-02				
463.15	87.	26.57	1.40	1.426E-02	463.51	10.000	4.228E-01	SB125
510.83	208.	13.24	1.52	1.317E-02	510.72	22.500	4.311E-01	TL208
583.49	466.	6.60	1.42	1.184E-02	583.14	86.000	3.185E-01	TL208
609.49	343.	8.30	1.32	1.144E-02	609.32	46.090	4.485E-01	BI214
					614.37	90.393	2.346E-01	Ag108M
727.35	118.	20.08	1.19	9.963E-03	727.17	11.800	6.999E-01	BI212

768.89	59.	31.61	1.74	9.548E-03				
794.66	60.	27.31	1.26	9.311E-03				
794.66	60.	27.31	1.26	9.311E-03	795.76	85.400	5.351E-02	CS134
860.86	73.	18.06	1.75	8.765E-03				
911.63	341.	6.74	1.68	8.397E-03	911.07	29.000	9.747E-01	AC228
964.57	51.	25.02	1.54	8.052E-03	964.00	14.580	PBC<MDA	EU152
969.46	158.	10.20	1.54	8.022E-03	968.90	17.460	7.918E-01	AC228
1120.31	116.	19.60	2.17	7.212E-03	1120.28	15.040	7.406E-01	BI214
1461.48	1526.	2.62	1.77	5.930E-03	1460.75	10.700	1.669E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1621.93	23.	27.84	1.75	5.488E-03	1620.56	2.750	1.069E+00	BI212
1765.15	68.	12.13	1.14	5.140E-03	1764.51	15.920	5.557E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	Suspected Nuclide
172.82	86.89	429.	92.	0.046	100.05	1.001	TB-160 1D
178.87	89.91	440.	100.	0.050	93.67	1.002	PB-214 1D
418.75	209.80	364.	83.	0.041	102.93	1.097	NP-239
539.08	269.96	398.	128.	0.064	80.19	0.909	AC-228 s
600.23	300.54	304.	96.	0.048	91.05	1.255	PB-212
656.36	328.61	288.	88.	0.044	98.62	0.861	RH-106M s
1536.83	768.89	101.	59.	0.030	94.83	1.744	BI-214 sM
1720.75	860.86	42.	73.	0.036	54.18	1.752	TL-208 s
1929.19	964.59	53.	54.	0.027	70.99	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 %
PB-212	148.79	74.81	384.	151.	0.076	58.74	0.993D
PB-212	153.39	77.11	393.	226.	0.113	32.66	0.995A
TH-234	185.79	93.31	994.	132.	0.066	92.16	1.500s
TH-234	185.75	93.29	966.	138.	0.069	87.51	1.500s
RA-226	371.48	186.16	744.	179.	0.090	72.71	1.411s
PB-212	476.42	238.63	263.	1257.	0.629	9.95	1.093D
RA-224	481.16	241.00	1122.	123.	0.062	119.78	1.095D
PB-214	483.00	241.92	396.	102.	0.051	66.07	1.095A
PB-214	589.88	295.36	236.	218.	0.109	36.01	0.805
AC-228	676.07	338.46	280.	294.	0.147	33.36	0.898
PB-214	703.40	352.13	182.	413.	0.206	20.36	1.311
SB-125	925.77	463.32	168.	86.	0.043	70.18	1.500
TL-208	1020.78	510.83	205.	182.	0.091	39.71	1.515s
TL-208	1166.07	583.49	164.	462.	0.231	19.80	1.417
BI-214	1218.07	609.49	162.	337.	0.168	24.91	1.320
BI-212	1453.67	727.30	152.	126.	0.063	61.98	1.195s
CS-134	1589.42	795.18	75.	41.	0.021	100.53	1.500s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1822.29	911.63	73.	338.	0.169	20.23	1.678
AC-228	1936.81	968.90	57.	153.	0.077	31.90	1.541D
BI-214	2239.59	1120.31	114.	114.	0.057	58.80	2.172s
K-40	2921.83	1461.48	39.	1508.	0.754	7.85	1.770
BI-212	3242.68	1621.93	6.	23.	0.011	83.52	1.754
BI-214	3529.16	1765.20	5.	61.	0.030	39.05	1.139s

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

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

- Nuclide - Name	- Average Code	Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		2.7894E-02	477.56	2.789E-02	%	3.125E-01 9.14E-02	G
K-40		1.6691E+01	1460.75	1.669E+01	(P	3.539E-01 4.42E-01	G
MN-54		-9.0215E-03	834.81	-9.022E-03	&(P	4.185E-02 1.23E-02	G
CO-57		7.3842E-03	122.07	7.384E-03	&(P	5.357E-02 1.60E-02	G K
			136.43	5.973E-02	&	3.574E-01 1.07E-01	G
CO-60		-2.5224E-03	1332.51	-2.522E-03	&(P	3.927E-02 1.07E-02	G K
			1173.23	4.308E-03	& P	4.564E-02 1.31E-02	G K
Sr-85		-2.2855E-02	514.00	-2.285E-02	%	4.450E-02 1.35E-02	G
Kr-85		-5.1065E+02	513.99	-5.106E+02	%	9.941E+02 3.02E+02	G
Y-88		-9.1140E-05	1836.01	-9.114E-05	%(P	2.369E-02 5.98E-03	G K
			898.02	-4.182E-03	& P	3.989E-02 1.15E-02	G
NB-94		7.1199E-04	871.10	7.120E-04	%	2.750E-02 7.72E-03	G K
			702.50	3.054E-03	%	3.409E-02 9.89E-03	G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-1.6579E-02	722.95	1.658E-02	&(	4.898E-02	1.47E-02	G K
		614.37	1.223E-02	% P	4.132E-02	1.23E-02	G
		433.93	1.512E-02	%	2.829E-02	8.63E-03	G
CD-109	6.8549E-01	88.04	6.855E-01	&(	1.836E+00	5.55E-01	G
SN-113	-9.9760E-03	391.71	9.976E-03	% (	5.333E-02	1.58E-02	G K
		255.04	1.872E-02	%	1.718E+00	5.09E-01	G
SB-125	1.1534E-01	427.95	1.010E-02	&(P	9.955E-02	2.92E-02	G K
		600.77	6.809E-04	& P	1.895E-01	5.48E-02	G
		636.15	1.223E-03	% P	3.125E-01	9.00E-02	G
		463.51	4.269E-01	(P	3.116E-01	1.01E-01	G
		176.29	1.079E-01	%	5.257E-01	1.57E-01	G
I-131	-8.4826E-03	364.48	8.483E-03	% (P	3.974E-02	1.17E-02	G K
		636.97	7.122E-02	&	5.626E-01	1.64E-01	G
		284.29	1.324E-01	% P	6.846E-01	2.04E-01	G
CS-134	1.6161E-02	604.66	1.577E-03	% (	3.709E-02	1.08E-02	G K
		795.76	3.643E-02	@(P	3.811E-02	1.22E-02	G
		569.29	6.390E-03	& P	2.196E-01	6.31E-02	G
		801.84	3.351E-03	% P	3.452E-01	9.68E-02	G
CS-137	2.7876E-02	661.62	2.788E-02	% (P	4.437E-02	1.36E-02	G
CE-139	-1.5854E-02	165.85	1.585E-02	% (	4.972E-02	1.50E-02	G
EU-152	2.0945E-02	121.78	2.095E-02	&(P	1.560E-01	4.67E-02	G K
		344.30	1.433E-02	% P	1.231E-01	3.65E-02	G
		1408.08	3.488E-02	&	1.488E-01	4.29E-02	G
		964.00	9.793E-03	% P	4.462E-01	1.30E-01	G
		1112.07	5.981E-04	&	2.986E-01	8.48E-02	G
		778.90	6.209E-02	%	2.817E-01	8.30E-02	G
EU-154	8.5735E-03	123.10	8.573E-03	% (	1.105E-01	3.30E-02	G K
		1274.80	1.903E-02	%	1.213E-01	3.52E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	3.798E-03	%	3.332E-01	9.82E-02	G
		1004.80	2.459E-02	%	2.063E-01	5.95E-02	G
EU-155	1.3686E-01	86.45	1.369E-01	&(	2.385E-01	7.26E-02	G K
		105.31	9.085E-02	%	2.247E-01	6.79E-02	G
HG-203	-1.1139E-02	279.17	1.114E-02	&(P	4.540E-02	1.36E-02	G K
		72.87	7.677E-01	& P	2.309E+00	6.97E-01	G
		70.83	1.140E+00	&	4.598E+00	1.38E+00	G
		82.50	7.900E-01	&	4.117E+00	1.24E+00	G
TL-208	3.1851E-01	583.14	3.185E-01	(P	4.308E-02	2.12E-02	G
		510.72	4.311E-01	+ P	1.647E-01	6.54E-02	G
PB-212	8.9773E-01	238.63	8.836E-01	(P	5.502E-02	2.96E-02	G K
							Energy duplication
		77.11	8.977E-01	} P	3.776E-01	9.77E-02	G
		74.81	1.225E+00	+ P	7.600E-01	2.45E-01	G
PB-214	4.1881E-01	351.99	4.406E-01	(P	6.998E-02	3.03E-02	G K
		295.22	3.938E-01	(P	1.343E-01	4.82E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.927E-01	0.00E+00	G
		241.92	4.188E-01	} P	3.901E-01	9.22E-02	G
BI-212	8.1422E-01	727.17	7.549E-01	@(P	3.592E-01	1.57E-01	G K
		1620.56	1.069E+00	(P	6.597E-01	2.98E-01	G
		785.42	7.617E-01	%	1.834E+00	5.52E-01	G
BI-214	4.6746E-01	609.32	4.485E-01	(P	8.278E-02	3.80E-02	G K
		1764.51	5.222E-01	(P	1.142E-01	7.16E-02	G
		1120.28	7.406E-01	+ P	3.395E-01	1.48E-01	G
RA-224	9.6132E-01						Derived Ave Activity
		241.00	9.613E-01	}(	1.240E+00	3.92E-01	G
RA-226	1.4946E+00	185.99	1.495E+00	*(P	1.084E+00	3.89E-01	G
AC-228	9.6445E-01	911.07	9.747E-01	(P	1.227E-01	6.64E-02	G K
		968.90	7.691E-01	- P	1.894E-01	8.19E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		338.40	9.397E-01	(P	2.580E-01	1.05E-01	G
TH-227	-2.1240E-01						
		236.00	2.124E-01	&(	4.003E-01	1.22E-01	G K
		256.25	2.537E-03	% P	5.098E-01	1.51E-01	G
PA-234	-7.9430E-02						
		98.44	7.943E-02	&(P	2.083E-01	6.29E-02	G K
		946.00	4.828E-02	& P	1.885E-01	5.56E-02	G
		131.28	2.967E-02	& P	2.263E-01	6.78E-02	G
		94.67	1.921E-03	& P	3.951E-01	1.18E-01	G
		883.24	4.612E-02	%	3.348E-01	9.76E-02	G
		926.70	1.045E-01	%	2.686E-01	8.04E-02	G
		569.26	9.454E-03	& P	3.248E-01	9.34E-02	G
TH-234	1.9234E+00						
		63.29	1.709E+00	%(P	6.361E+00	1.91E+00	G K
		92.80	1.959E+00	(P	2.101E+00	6.45E-01	G
		92.38	2.207E+00	&(P	2.509E+00	7.69E-01	G
AM-241	8.0444E-02						
		59.54	8.044E-02	%(P	1.146E+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:

T - Thermal Neutron Activation
 F - Fast Neutron Activation
 I - Fission Product
 N - Naturally Occurring Isotope
 P - Photon Reaction
 C - Charged Particle Reaction

Peak Codes:

G - Gamma Ray
 X - X-Ray
 P - Positron Decay
 S - Single-Escape
 D - Double-Escape
 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 *****
          Time of Count   Time Corrected   Uncertainty   3 Sigma
Nuclide   Activity       Activity       Counting      Total        MDA
          pCi/gm        pCi/gm        pCi/gm       pCi/gm       pCi/gm
-----
BE-7  #A   2.6803E-02   2.7894E-02   2.7424E-01   2.7425E-01   3.003E-01
K-40                   1.6691E+01   1.6691E+01   1.3263E+00   1.6426E+00
MN-54 #A   -8.9602E-03   -9.0215E-03   3.9334E-02   3.9337E-02   4.156E-02
CO-57 #B    7.3262E-03    7.3842E-03   4.8144E-02   4.8146E-02   5.315E-02
CO-60 #B   -2.5196E-03   -2.5224E-03   4.2753E-01   4.2753E-01   3.922E-02
Sr-85 #A   -2.2116E-02   -2.2855E-02   4.0577E-02   4.0599E-02   4.306E-02
Kr-85 #A   -5.1063E+02   -5.1065E+02   9.0651E+02   9.0699E+02   9.941E+02
Y-88  #B   -8.9337E-05   -9.1140E-05   2.2586E-03   2.2586E-03   2.322E-02
NB-94 #B    7.1199E-04    7.1199E-04   2.3151E-02   2.3151E-02   2.750E-02
Ag-108M#B -1.6578E-02   -1.6579E-02   4.4018E-02   4.4028E-02   4.898E-02
CD-109 #A    6.8227E-01    6.8549E-01   1.6637E+00   1.6642E+00   1.827E+00
SN-113 #B   -9.7931E-03   -9.9760E-03   4.7517E-02   4.7520E-02   5.235E-02
SB-125 #F    1.1510E-01    1.1534E-01   8.2140E-02   8.2413E-02   9.934E-02
I-131 #B   -6.5080E-03   -8.4826E-03   3.9080E-02   3.9083E-02   3.049E-02
CS-134 #B    1.6115E-02    1.6161E-02   1.6280E-02   1.6307E-02   3.699E-02
CS-137 #A    2.7871E-02    2.7876E-02   4.0840E-02   4.0872E-02   4.436E-02
CE-139 #A   -1.5610E-02   -1.5854E-02   4.4968E-02   4.4978E-02   4.896E-02
EU-152 #B    2.0935E-02    2.0945E-02   1.4015E-01   1.4016E-01   1.559E-01
EU-154 #B    8.5676E-03    8.5735E-03   9.9031E-02   9.9033E-02   1.104E-01
EU-155 #B    1.3670E-01    1.3686E-01   2.1769E-01   2.1783E-01   2.382E-01
HG-203 #B   -1.0641E-02   -1.1139E-02   4.0928E-02   4.0933E-02   4.337E-02
TL-208          3.1851E-01    3.1851E-01   6.3655E-02   6.6286E-02
PB-212          8.9773E-01    8.9773E-01   9.0158E-02   1.0414E-01
PB-214          4.1881E-01    4.1881E-01   8.6413E-02   8.9769E-02
BI-212          8.1422E-01    8.1422E-01   4.2453E-01   4.2715E-01
BI-214          4.6746E-01    4.6746E-01   1.1301E-01   1.1622E-01
RA-224  A    9.6132E-01    9.6132E-01   1.1515E+00   1.1528E+00
RA-226  #    1.4946E+00    1.4946E+00   1.1654E+00   1.1686E+00
AC-228          9.6445E-01    9.6445E-01   1.8915E-01   1.9727E-01
TH-227 #B   -2.1240E-01   -2.1240E-01   3.6489E-01   3.6509E-01   4.003E-01
PA-234 #B   -7.9430E-02   -7.9430E-02   1.9600E-01   1.9605E-01   2.083E-01
TH-234 #B    1.9234E+00    1.9234E+00   1.8991E+00   1.9021E+00   6.361E+00
AM-241 #A    8.0442E-02    8.0444E-02   1.0251E+00   1.0251E+00   1.146E+00
  
```

- All peaks for activity calculation had bad shape.
 * - Activity omitted from total
 & - Activity omitted from total and all peaks had bad shape.

- < - MDA value printed.
- A - Activity printed, but activity < MDA.
- B - Activity < MDA and failed test.
- C - Area < Critical level.
- F - Failed fraction or key line test.
- H - Half-life limit exceeded

----- S U M M A R Y -----
Total Activity (1120.0 to 2000.7 keV) 2.3028105E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 2.3028111E+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-12-01-006-F

Spectrum Filename: C:\GammaVision\Spectra\103F_22AUG2006_1413.An1

Acquisition information

Start time: 22-Aug-2006 14:13:49
Live time: 2000
Real time: 2002
Dead time: 0.11 %
Detector ID: 4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9300E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9300E+03) =
5.1813E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	19-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. 17 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.2082

***** S U M M A R Y O F P E A K 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	82.	32.75	0.99	9.052E-03	74.81	9.600	PBC<MDA	PB212
77.22	162.	14.39	0.99	1.011E-02	77.11	17.500	7.288E-01	PB212
87.53	117.	24.77	1.00	1.459E-02				
87.53	117.	24.77	1.00	1.459E-02	88.04	3.790	1.473E+00	CD109
93.13	106.	26.92	1.00	1.662E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.47	136.	23.36	1.09	2.565E-02	185.99	3.280	PBC<MDA	RA226
208.78	145.	28.33	1.16	2.474E-02				
238.83	1052.	3.67	1.09	2.319E-02	238.63	43.100	7.281E-01	PB212
242.18	125.	20.23	1.10	2.301E-02	241.00	3.900	9.753E-01	RA224
					241.92	7.470	5.103E-01	PB214
270.52	95.	31.80	0.88	2.150E-02				
278.17	82.	32.66	1.04	2.110E-02				
278.17	82.	32.66	1.04	2.110E-02	279.17	81.500	PBC<MDA	HG203
295.13	296.	11.58	0.96	2.025E-02	295.22	19.200	5.254E-01	PB214
300.25	59.	41.12	0.80	2.001E-02				
338.37	249.	13.42	1.14	1.830E-02	338.40	12.010	7.888E-01	AC228
352.06	397.	6.85	1.11	1.775E-02	351.99	37.100	4.160E-01	PB214
409.86	53.	36.12	1.27	1.573E-02				
463.00	79.	24.89	1.14	1.426E-02				
463.00	79.	24.89	1.14	1.426E-02	463.51	10.000	3.828E-01	SB125
511.03	198.	12.04	1.35	1.317E-02	510.72	22.500	4.040E-01	TL208
583.42	375.	8.16	1.31	1.184E-02	583.14	86.000	2.551E-01	TL208
609.62	283.	9.28	1.46	1.143E-02	609.32	46.090	3.678E-01	BI214
661.64	59.	31.06	0.94	1.072E-02	661.62	84.620	4.470E-02	CS137
727.96	108.	17.57	1.42	9.956E-03	727.17	11.800	6.402E-01	BI212
768.23	44.	39.65	1.18	9.554E-03				

860.70	65.	29.97	2.06	8.766E-03					
911.60	246.	8.47	1.60	8.398E-03	911.07	29.000	6.976E-01	AC228	
964.79	60.	22.08	1.54	8.051E-03	964.00	14.580	3.533E-01	EU152	
969.42	149.	9.94	1.54	8.022E-03	968.90	17.460	7.460E-01	AC228	
1120.22	113.	18.00	1.41	7.212E-03	1120.28	15.040	7.159E-01	BI214	
1333.16	23.	35.21	1.77	6.349E-03	1332.51	99.980	PBC<MDA	CO60	
1461.45	1456.	2.68	1.81	5.930E-03	1460.75	10.700	1.585E+01	K40	
1765.21	56.	15.12	2.54	5.142E-03	1764.51	15.920	4.801E-01	BI214	

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

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
416.71	208.78	575.	145.	0.073	84.99	1.159	LU-177 s
540.19	270.52	327.	95.	0.047	95.39	0.879	AC-228 s
555.48	278.17	277.	82.	0.041	97.98	1.042	SB-126 l
599.64	300.25	233.	59.	0.030	123.35	0.802	PB-212
818.84	409.86	135.	53.	0.026	108.37	1.274	AC-228 s
1322.36	661.64	104.	59.	0.030	93.19	0.938	CS-137 l
1535.52	768.23	97.	44.	0.022	118.95	1.183	BI-214 M
1720.45	860.70	94.	65.	0.032	89.90	2.059	TL-208 s
1929.59	964.82	56.	61.	0.031	64.64	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

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***** IDENTIFIED PEAK SUMMARY *****
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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.	82.	0.041	98.24	0.993D
PB-212	153.39	77.11	350.	162.	0.081	43.16	0.995A
CD-109	174.22	87.52	861.	152.	0.076	85.66	1.500s
TH-234	185.42	93.13	886.	106.	0.053	104.27	1.500s
RA-226	371.61	186.22	670.	141.	0.070	74.85	1.500
PB-212	476.83	238.84	664.	925.	0.462	16.02	0.907
RA-224	482.63	241.74	760.	120.	0.060	101.54	1.500
PB-214	589.42	295.13	317.	292.	0.146	34.73	0.962s
AC-228	675.88	338.37	280.	248.	0.124	40.27	1.138
PB-214	703.27	352.06	162.	391.	0.196	20.56	1.111
SB-125	925.62	463.25	148.	62.	0.031	89.22	1.500s
TL-208	1021.18	511.03	154.	171.	0.086	36.13	1.351s
TL-208	1165.94	583.42	170.	371.	0.186	24.48	1.311
BI-214	1218.33	609.62	147.	277.	0.138	27.83	1.463
BI-212	1454.99	727.96	84.	108.	0.054	52.70	1.421s
AC-228	1822.23	911.60	64.	243.	0.121	25.42	1.599
EU-152	1929.04	965.01	100.	49.	0.025	95.35	1.538s
AC-228	1936.81	968.90	37.	149.	0.075	29.93	1.541D
BI-214	2239.41	1120.22	85.	111.	0.055	54.00	1.408
CO-60	2665.24	1333.16	31.	23.	0.012	105.64	1.765s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	2921.76	1461.45	37.	1437.	0.718	8.03	1.808
BI-214	3529.18	1765.21	9.	56.	0.028	45.36	2.536s

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

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

- Nuclide - Name	- Average Code	Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		4.0486E-02	477.56	4.049E-02	&(	2.965E-01 8.70E-02	G
K-40		1.5851E+01	1460.75	1.585E+01	(P	3.431E-01 4.30E-01	G
MN-54		-2.1795E-04	834.81	-2.179E-04	%(P	3.774E-02 1.08E-02	G
CO-57		6.2337E-04	122.07	6.234E-04	%(P	5.048E-02 1.50E-02	G K
			136.43	-2.037E-02	%	3.654E-01 1.09E-01	G
CO-60		2.5600E-02	1332.51	2.560E-02	@(P	3.169E-02 1.00E-02	G K
			1173.23	3.344E-02	% P	4.943E-02 1.53E-02	G K
Sr-85		-2.1874E-02	514.00	-2.187E-02	%(	4.335E-02 1.32E-02	G
Kr-85		-4.8942E+02	513.99	-4.894E+02	%(	9.692E+02 2.94E+02	G
Y-88		-3.2943E-03	1836.01	-3.294E-03	%(P	2.422E-02 6.51E-03	G K
			898.02	3.872E-04	& P	4.465E-02 1.28E-02	G
NB-94		-1.1506E-03	871.10	-1.151E-03	&(	3.421E-02 9.77E-03	G K
			702.50	-2.888E-03	%	3.651E-02 1.06E-02	G K
Ag-108M		-9.7408E-03	722.95	-9.741E-03	%(	4.506E-02 1.33E-02	G K
			614.37	1.701E-04	% P	2.184E-02 6.07E-03	G
			433.93	-4.694E-03	%	3.370E-02 9.92E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.9106E+00	88.04	1.911E+00	(	1.758E+00	5.46E-01	G
SN-113	-1.1107E-02	391.71-1.111E-02	8.261E-02	&(	4.815E-02	1.43E-02	G K
		255.04	8.261E-02	&	1.302E+00	3.84E-01	G
SB-125	7.7494E-02	427.95	1.319E-05	%(P	1.037E-01	3.02E-02	G K
		600.77	1.747E-03	% P	1.634E-01	4.69E-02	G
		636.15	3.217E-02	% P	2.239E-01	6.43E-02	G
		463.51	3.068E-01	*(P	2.928E-01	9.31E-02	G
		176.29	1.408E-04	%	4.801E-01	1.42E-01	G
I-131	2.3929E-02	364.48	2.393E-02	%(P	4.335E-02	1.32E-02	G K
		636.97	1.371E-01	%	4.863E-01	1.44E-01	G
		284.29	2.286E-03	% P	6.531E-01	1.92E-01	G
CS-134	-1.0304E-03	604.66	1.030E-03	&(	4.024E-02	1.17E-02	G K
		795.76	1.018E-03	% P	4.208E-02	1.21E-02	G
		569.29	4.340E-02	% P	1.847E-01	5.43E-02	G
		801.84	3.552E-02	% P	2.915E-01	8.24E-02	G
CS-137	1.9372E-02	661.62	1.937E-02	%(P	4.277E-02	1.29E-02	G
CE-139	7.5584E-03	165.85	7.558E-03	%(	4.314E-02	1.29E-02	G
EU-152	1.2356E-01	121.78	3.923E-02	%(P	1.401E-01	4.21E-02	G K
		344.30	1.498E-02	% P	1.052E-01	3.11E-02	G
		1408.08	6.955E-03	&	1.175E-01	3.18E-02	G
		964.00	2.927E-01	@(P	2.942E-01	9.41E-02	G
		1112.07	7.437E-02	%	2.425E-01	7.15E-02	G
		778.90	5.846E-02	%	2.264E-01	6.66E-02	G
EU-154	-2.4149E-02	123.10	2.415E-02	&(	1.060E-01	3.19E-02	G K
		1274.80	2.144E-03	%	9.565E-02	2.67E-02	G
		723.30	9.141E-02	%	2.238E-01	6.74E-02	G
		1004.80	4.532E-02	%	1.963E-01	5.74E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-1.7774E-02	86.45	1.777E-02	&(	2.246E-01	6.71E-02	G K
		105.31	4.541E-02	%	1.814E-01	5.44E-02	G
HG-203	1.8227E-02	279.17	1.823E-02	%(P	3.932E-02	1.19E-02	G K
		72.87	1.115E-02	% P	1.605E+00	4.76E-01	G
		70.83	1.065E+00	%	4.105E+00	1.23E+00	G
		82.50	3.344E-01	&	3.722E+00	1.11E+00	G
TL-208	2.5508E-01	583.14	2.551E-01	(P	4.361E-02	2.11E-02	G
		510.72	4.040E-01	+ P	1.430E-01	5.63E-02	G
PB-212	6.6994E-01	238.63	6.475E-01	(P	8.601E-02	3.50E-02	G K
							Energy duplication
		77.11	6.392E-01	} P	3.555E-01	9.20E-02	G
		74.81	6.634E-01	(P	7.260E-01	2.25E-01	G
PB-214	4.1605E-01	351.99	4.160E-01	(P	6.586E-02	2.89E-02	G K
		295.22	5.254E-01	+ P	1.544E-01	6.17E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.747E-01	0.00E+00	G
		241.92	2.846E-01	%	5.594E-01	1.70E-01	G
BI-212	6.4017E-01	727.17	6.402E-01	*(P	2.712E-01	1.13E-01	G K
		1620.56	2.071E-03	% P	1.152E+00	3.11E-01	G
		785.42	6.826E-01	%	1.563E+00	4.71E-01	G
BI-214	3.6777E-01	609.32	3.678E-01	(P	7.865E-02	3.49E-02	G K
		1764.51	4.801E-01	+ P	1.419E-01	7.69E-02	G
		1120.28	7.159E-01	+ P	2.950E-01	1.31E-01	G
RA-224	9.3103E-01	241.00	9.310E-01	(	1.021E+00	3.15E-01	G
RA-226	1.1697E+00	185.99	1.170E+00	(P	1.026E+00	3.19E-01	G
AC-228	7.3084E-01	911.07	6.976E-01	(P	1.151E-01	6.00E-02	G K
		968.90	7.462E-01	(P	1.545E-01	7.45E-02	G
		338.40	7.888E-01	(P	2.572E-01	1.06E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.2685E-02	236.00	1.268E-02	&(	3.106E-01	9.22E-02	G K
		256.25	6.802E-02	% P	4.413E-01	1.31E-01	G
PA-234	-7.8504E-02	98.44	7.850E-02	% (P	2.089E-01	6.30E-02	G K
		946.00	3.625E-02	% P	1.740E-01	5.08E-02	G
		131.28	6.925E-03	& P	2.043E-01	6.09E-02	G
		94.67	4.729E-03	& P	3.666E-01	1.09E-01	G
		883.24	8.457E-02	%	2.597E-01	7.71E-02	G
		926.70	2.586E-02	%	3.022E-01	8.65E-02	G
TH-234	1.5738E+00	569.26	6.421E-02	% P	2.733E-01	8.03E-02	G
		63.29	1.623E+00	% (P	5.968E+00	1.79E+00	G K
		92.80	1.510E+00	(P	2.006E+00	6.12E-01	G
AM-241	-1.4756E-01	92.38	1.606E+00	% P	2.435E+00	7.40E-01	G
		59.54	1.476E-01	% (P	1.052E+00	3.14E-01	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:

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

Peak Codes:

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

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

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
          Time of Count   Time Corrected   Uncertainty   3 Sigma
Nuclide   Activity       Activity       Counting      Total        MDA
          pCi/gm        pCi/gm        pCi/gm       pCi/gm       pCi/gm
-----
BE-7  #A   3.8942E-02   4.0486E-02   2.6099E-01   2.6100E-01   2.852E-01
K-40           1.5851E+01   1.5851E+01   1.2887E+00   1.5835E+00
MN-54 #A   -2.1650E-04  -2.1795E-04   2.5555E-01   2.5555E-01   3.749E-02
CO-57 #B    6.1860E-04   6.2337E-04   4.5108E-02   4.5108E-02   5.009E-02
CO-60 #B    2.5572E-02   2.5600E-02   3.0129E-02   3.0166E-02   3.165E-02
Sr-85 #A   -2.1185E-02  -2.1874E-02   3.9504E-02   3.9525E-02   4.198E-02
Kr-85 #A   -4.8941E+02  -4.8942E+02   8.8331E+02   8.8377E+02   9.692E+02
Y-88  #B   -3.2308E-03  -3.2943E-03   2.0631E-02   2.0632E-02   2.375E-02
NB-94 #B   -1.1506E-03  -1.1506E-03   2.9304E-02   2.9304E-02   3.421E-02
Ag-108M#B  -9.7404E-03  -9.7408E-03   3.9970E-02   3.9974E-02   4.505E-02
CD-109 #    1.9019E+00   1.9106E+00   1.6366E+00   1.6401E+00   1.750E+00
SN-113 #B  -1.0908E-02  -1.1107E-02   4.2955E-02   4.2960E-02   4.729E-02
SB-125 #B   7.7335E-02   7.7494E-02   7.0554E-02   7.0697E-02   1.035E-01
I-131 #B   1.8482E-02   2.3929E-02   3.9632E-02   3.9656E-02   3.348E-02
CS-134 #B  -1.0275E-03  -1.0304E-03   3.5178E-02   3.5178E-02   4.013E-02
CS-137 #A   1.9368E-02   1.9372E-02   3.8716E-02   3.8732E-02   4.277E-02
CE-139 #A   7.4451E-03   7.5584E-03   3.8734E-02   3.8736E-02   4.249E-02
EU-152 #B   1.2351E-01   1.2356E-01   1.1913E-01   1.1933E-01   1.400E-01
EU-154 #B  -2.4133E-02  -2.4149E-02   9.5575E-02   9.5584E-02   1.060E-01
EU-155 #B  -1.7754E-02  -1.7774E-02   2.0138E-01   2.0139E-01   2.244E-01
HG-203 #B   1.7432E-02   1.8227E-02   3.5738E-02   3.5754E-02   3.761E-02
TL-208           2.5508E-01   2.5508E-01   6.3170E-02   6.4883E-02
PB-212           6.6994E-01   6.6994E-01   1.0873E-01   1.1548E-01
PB-214           4.1605E-01   4.1605E-01   8.6769E-02   9.0068E-02
BI-212 #    6.4017E-01   6.4017E-01   3.3895E-01   3.4098E-01
BI-214           3.6777E-01   3.6777E-01   1.0474E-01   1.0689E-01
RA-224 A    9.3103E-01   9.3103E-01   9.4540E-01   9.4694E-01   1.021E+00
RA-226 #    1.1697E+00   1.1697E+00   9.5614E-01   9.5855E-01   1.026E+00
AC-228           7.3084E-01   7.3084E-01   1.3777E-01   1.4416E-01
TH-227 #B  -1.2685E-02  -1.2685E-02   2.7671E-01   2.7671E-01   3.106E-01
PA-234 #B  -7.8504E-02  -7.8504E-02   1.9655E-01   1.9660E-01   2.089E-01
TH-234 #B   1.5738E+00   1.5738E+00   1.9131E+00   1.9151E+00   5.968E+00
AM-241 #A  -1.4756E-01  -1.4756E-01   9.6415E-01   9.6419E-01   1.052E+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) 1.9861485E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.9861485E+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-12-01-022-F-B

Spectrum Filename: C:\GammaVision\Spectra\103F_23AUG2006_1118.An1

Acquisition information

Start time: 23-Aug-2006 11:18:15
Live time: 2000
Real time: 2002
Dead time: 0.09 %
Detector ID: 4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.5800E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.5800E+03) =
6.3291E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	22-Aug-2006 14:35:00
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. 19 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.2074

***** S U M M A R Y O F P E A K 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	122.	20.73	0.99	9.052E-03	74.81	9.600	1.196E+00	PB212
77.23	130.	16.11	0.99	1.011E-02	77.11	17.500	7.813E-01	PB212
					77.11	10.700	1.278E+00	PB214
186.67	117.	27.31	1.26	2.564E-02	185.99	3.280	1.058E+00	RA226
209.37	102.	28.82	0.88	2.471E-02				
238.78	967.	3.72	1.09	2.319E-02	238.63	43.100	8.173E-01	PB212
241.86	128.	18.97	1.10	2.303E-02	241.00	3.900	1.219E+00	RA224
					241.92	7.470	6.379E-01	PB214
270.36	115.	26.68	0.96	2.150E-02				
295.17	191.	13.29	0.87	2.025E-02	295.22	19.200	4.113E-01	PB214
300.13	77.	26.49	1.33	2.001E-02				
327.83	62.	32.46	1.26	1.875E-02				
338.37	189.	14.96	1.48	1.830E-02	338.40	12.010	7.316E-01	AC228
352.04	344.	8.82	1.30	1.775E-02	351.99	37.100	4.387E-01	PB214
462.84	71.	30.75	1.04	1.426E-02				
462.84	71.	30.75	1.04	1.426E-02	463.51	10.000	4.200E-01	SB125
511.00	148.	13.82	1.84	1.317E-02	510.72	22.500	3.501E-01	TL208
583.39	300.	7.04	1.48	1.184E-02	583.14	86.000	2.485E-01	TL208
609.68	292.	9.28	1.27	1.143E-02	609.32	46.090	4.625E-01	BI214
661.77	185.	12.30	1.26	1.072E-02	661.62	84.620	1.730E-01	CS137
727.95	76.	22.94	1.53	9.957E-03	727.17	11.800	5.492E-01	BI212
795.22	44.	41.63	0.95	9.306E-03				
911.55	194.	9.01	1.53	8.398E-03	911.07	29.000	6.685E-01	AC228
968.29	191.	10.47	1.36	8.030E-03	968.90	17.460	1.167E+00	AC228
1120.74	89.	22.37	1.29	7.210E-03	1120.28	15.040	6.892E-01	BI214
1333.06	26.	32.61	1.77	6.349E-03	1332.51	99.980	PBC<MDA	CO60
1461.41	1129.	3.11	1.90	5.930E-03	1460.75	10.700	1.496E+01	K40

1765.02 59. 13.02 1.19 5.141E-03 1764.51 15.920 5.823E-01 BI214

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

Channel	Peak Energy	Centroid	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
	417.89	209.37	333.	102.	0.051	86.46	0.881	AC-228 s
	539.86	270.36	306.	115.	0.058	80.03	0.962	AC-228 s
	599.42	300.13	152.	77.	0.038	79.48	1.332	PB-212 s
	654.80	327.83	164.	62.	0.031	97.38	1.263	AC-228
	1589.50	795.22	93.	41.	0.021	108.96	0.952	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	274.	122.	0.061	62.18	0.993D
PB-212	153.39	77.11	295.	130.	0.065	48.33	0.995A
RA-226	372.51	186.67	407.	104.	0.052	81.94	1.257s
PB-212	476.78	238.81	504.	941.	0.471	14.71	1.043
RA-224	482.69	241.77	595.	120.	0.060	90.22	1.500
PB-214	589.49	295.17	193.	187.	0.093	39.88	0.873
AC-228	675.89	338.37	212.	188.	0.094	44.89	1.481s
PB-214	703.22	352.04	218.	338.	0.169	26.45	1.303
SB-125	925.80	463.34	156.	53.	0.026	105.82	1.500s
TL-208	1021.12	511.00	131.	121.	0.061	41.46	1.840s
TL-208	1165.87	583.39	68.	296.	0.148	21.12	1.485
BI-214	1218.46	609.68	140.	285.	0.143	27.83	1.274
CS-137	1322.63	661.77	108.	184.	0.092	36.89	1.264
BI-212	1454.98	727.95	76.	76.	0.038	68.82	1.527
AC-228	1822.14	911.55	50.	190.	0.095	27.02	1.530s
AC-228	1935.59	968.29	57.	191.	0.096	31.41	1.359s
BI-214	2240.45	1120.74	86.	87.	0.044	67.10	1.290
CO-60	2665.02	1333.06	31.	26.	0.013	97.84	1.765s
K-40	2921.68	1461.41	39.	1110.	0.555	9.32	1.904
BI-214	3528.79	1765.02	3.	56.	0.028	39.06	1.188s

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

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****						
- Nuclide -	Average	----- Peak -----				
Name	Code	Activity	Energy	Activity	Code	MDA Value
		pCi/gm	keV	pCi/gm		pCi/gm
						COMMENTS
BE-7		6.6432E-02	477.56	6.643E-02	&(	2.173E-01 6.42E-02 G
K-40		1.4961E+01	1460.75	1.496E+01	(P	4.272E-01 4.73E-01 G
MN-54		2.3283E-02	834.81	2.328E-02	&(P	3.645E-02 1.13E-02 G
CO-57		-4.1252E-03	122.07	-4.125E-03	&(P	5.141E-02 1.53E-02 G K
			136.43	-8.411E-02	%	4.029E-01 1.21E-01 G
CO-60		3.4789E-02	1332.51	3.479E-02	*(P	3.890E-02 1.25E-02 G K
			1173.23	1.610E-02	% P	5.463E-02 1.61E-02 G K
Sr-85		-1.9550E-02	514.00	-1.955E-02	%(	4.768E-02 1.44E-02 G
Kr-85		-4.4733E+02	513.99	-4.473E+02	%(	1.091E+03 3.29E+02 G
Y-88		3.6699E-03	1836.01	3.670E-03	&(P	1.812E-02 4.77E-03 G K
			898.02	9.864E-03	% P	2.978E-02 8.74E-03 G
NB-94		-1.5328E-05	871.10	-1.533E-05	%(	4.352E-02 1.24E-02 G K
			702.50	8.530E-03	&	3.822E-02 1.12E-02 G K
Ag-108M		-9.2427E-03	722.95	-9.243E-03	%(	4.134E-02 1.21E-02 G K
			614.37	-1.965E-02	% P	4.878E-02 1.47E-02 G
			433.93	6.431E-03	%	3.736E-02 1.10E-02 G
CD-109		9.7996E-01	88.04	9.800E-01	&(	1.959E+00 5.95E-01 G
SN-113		1.2197E-02	391.71	1.220E-02	&(	4.883E-02 1.45E-02 G K
			255.04	-3.880E-03	%	1.660E+00 4.88E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	7.4099E-02	427.95	8.032E-03	% (P	1.161E-01	3.39E-02	G K
		600.77	1.200E-02	% P	2.078E-01	6.02E-02	G
		636.15	9.864E-03	& P	2.956E-01	8.43E-02	G
		463.51	3.172E-01	*(P	3.661E-01	1.15E-01	G
		176.29	1.145E-01	%	5.630E-01	1.68E-01	G
I-131	-6.0008E-03	364.48	6.001E-03	& (P	4.475E-02	1.32E-02	G K
		636.97	1.124E-05	&	5.490E-01	1.57E-01	G
		284.29	1.903E-01	% P	5.553E-01	1.67E-01	G
CS-134	0.0000E+00	604.66	0.000E+00	% (	6.628E-02	1.95E-02	G K
		795.76	2.448E-03	% P	4.745E-02	1.36E-02	G
		569.29	3.406E-02	% P	2.245E-01	6.47E-02	G
		801.84	2.652E-02	% P	4.086E-01	1.16E-01	G
CS-137	1.7300E-01	661.62	1.730E-01	(P	4.831E-02	2.14E-02	G
CE-139	1.3955E-03	165.85	1.396E-03	% (	4.966E-02	1.48E-02	G
EU-152	-1.5811E-02	121.78	1.581E-02	& (P	1.552E-01	4.62E-02	G K
		344.30	9.279E-03	% P	1.246E-01	3.66E-02	G
		1408.08	1.402E-02	%	1.646E-01	4.56E-02	G
		964.00	1.883E-01	% P	2.930E-01	9.06E-02	G
		1112.07	5.643E-02	&	2.973E-01	8.60E-02	G
		778.90	1.616E-03	&	2.050E-01	5.66E-02	G
EU-154	5.2537E-02	123.10	5.254E-02	% (	1.043E-01	3.17E-02	G K
		1274.80	5.995E-04	%	1.050E-01	2.89E-02	G
		723.30	4.017E-02	%	1.364E-01	4.01E-02	G
		1004.80	1.716E-02	%	2.093E-01	5.93E-02	G
EU-155	1.0274E-01	86.45	1.027E-01	% (	2.519E-01	7.62E-02	G K
		105.31	4.900E-02	%	2.389E-01	7.16E-02	G
HG-203	8.4649E-03	279.17	8.465E-03	& (P	4.356E-02	1.30E-02	G K
		72.87	2.969E-02	& P	2.573E+00	7.67E-01	G
		70.83	9.758E-01	&	4.472E+00	1.34E+00	G
		82.50	4.342E-01	%	4.105E+00	1.23E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.4852E-01	583.14	2.485E-01	(P	3.454E-02	1.78E-02	G
		510.72	3.501E-01	+ P	1.615E-01	5.91E-02	G
PB-212	7.9812E-01	238.63	8.050E-01	(P	9.180E-02	4.00E-02	G K
		77.11	6.302E-01	} P	4.001E-01	1.02E-01	G
		74.81	1.196E+00	+ P	7.865E-01	2.54E-01	G
PB-214	4.2937E-01	351.99	4.387E-01	(P	9.290E-02	3.93E-02	G K
		295.22	4.113E-01	(P	1.484E-01	5.58E-02	G
		77.11	0.000E+00	} P	9.801E-01	0.00E+00	G
		241.92	2.674E-01	%	6.249E-01	1.89E-01	G
BI-212	5.4921E-01	727.17	5.492E-01	(P	3.162E-01	1.27E-01	G K
		1620.56	3.512E-02	% P	1.135E+00	3.01E-01	G
		785.42	4.846E-02	%	1.850E+00	5.26E-01	G
BI-214	4.9328E-01	609.32	4.625E-01	(P	9.380E-02	4.39E-02	G K
		1764.51	5.823E-01	@(P	1.164E-01	8.03E-02	G
		1120.28	6.892E-01	+ P	3.613E-01	1.58E-01	G
RA-224	1.1440E+00	241.00	1.144E+00	(	1.106E+00	3.44E-01	G
RA-226	1.0581E+00	185.99	1.058E+00	*(P	9.825E-01	3.25E-01	G
AC-228	6.8698E-01	911.07	6.685E-01	@(P	1.247E-01	6.13E-02	G K
		968.90	1.167E+00	+ P	2.310E-01	1.22E-01	G
		338.40	7.316E-01	(P	2.746E-01	1.10E-01	G
TH-227	-2.3167E-01	236.00	2.317E-01	%(	3.983E-01	1.21E-01	G K
		256.25	4.223E-04	% P	4.942E-01	1.45E-01	G
PA-234	4.2859E-02	98.44	4.286E-02	%(P	2.322E-01	6.95E-02	G K
		946.00	1.144E-02	& P	1.749E-01	4.94E-02	G
		131.28	1.840E-02	% P	2.291E-01	6.83E-02	G
		94.67	9.489E-02	& P	4.277E-01	1.28E-01	G
		883.24	7.043E-02	%	3.031E-01	8.85E-02	G
		926.70	8.113E-02	%	3.046E-01	8.91E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	5.114E-02	% P	3.338E-01	9.63E-02 G
TH-234	1.9673E+00					
		63.29	1.967E+00	%(P	6.500E+00	1.95E+00 G K
		92.80	1.095E+00	& P	2.252E+00	6.79E-01 G
		92.38	9.182E-01	& P	2.734E+00	8.20E-01 G

AM-241 -2.3565E-01
 59.54-2.356E-01 %(P 1.063E+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	Time Corrected	Uncertainty	3 Sigma	MDA
		Activity	Activity	Counting	Total	
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	6.5692E-02	6.6432E-02	1.9256E-01	1.9260E-01	2.149E-01
K-40		1.4961E+01	1.4961E+01	1.4172E+00	1.6622E+00	
MN-54	#A	2.3238E-02	2.3283E-02	3.3876E-02	3.3903E-02	3.638E-02
CO-57	#B	-4.1160E-03	-4.1252E-03	5.0185E-02	5.0186E-02	5.129E-02
CO-60	#B	3.4778E-02	3.4789E-02	3.7528E-02	3.7582E-02	3.888E-02

Sr-85	#A	-1.9370E-02	-1.9550E-02	4.3149E-02	4.3164E-02	4.724E-02
Kr-85	#A	-4.4733E+02	-4.4733E+02	9.8699E+02	9.8733E+02	1.091E+03
Y-88	#B	3.6493E-03	3.6699E-03	1.4312E-02	1.4314E-02	1.802E-02
NB-94	#B	-1.5328E-05	-1.5328E-05	3.7191E-02	3.7191E-02	4.352E-02
Ag-108M	#B	-9.2426E-03	-9.2427E-03	3.6407E-02	3.6411E-02	4.134E-02
CD-109	#A	9.7867E-01	9.7996E-01	1.7841E+00	1.7850E+00	1.957E+00
SN-113	#B	1.2134E-02	1.2197E-02	4.3477E-02	4.3483E-02	4.857E-02
SB-125	#B	7.4055E-02	7.4099E-02	8.0304E-02	8.0419E-02	1.160E-01
I-131	#B	-5.5703E-03	-6.0008E-03	4.5864E-02	4.5866E-02	4.154E-02
CS-134	#B	0.0000E+00	0.0000E+00	5.8465E-02	5.8465E-02	6.623E-02
CS-137		1.7299E-01	1.7300E-01	6.4299E-02	6.5079E-02	
CE-139	#A	1.3895E-03	1.3955E-03	4.4256E-02	4.4256E-02	4.945E-02
EU-152	#B	-1.5809E-02	-1.5811E-02	1.6140E-01	1.6140E-01	1.552E-01
EU-154	#B	5.2526E-02	5.2537E-02	9.5043E-02	9.5088E-02	1.043E-01
EU-155	#B	1.0271E-01	1.0274E-01	2.2851E-01	2.2858E-01	2.518E-01
HG-203	#B	8.3569E-03	8.4649E-03	3.8906E-02	3.8909E-02	4.300E-02
TL-208		2.4852E-01	2.4852E-01	5.3244E-02	5.5164E-02	
PB-212		7.9812E-01	7.9812E-01	1.1888E-01	1.2759E-01	
PB-214		4.2937E-01	4.2937E-01	1.0481E-01	1.0773E-01	
BI-212		5.4921E-01	5.4921E-01	3.8047E-01	3.8180E-01	
BI-214		4.9328E-01	4.9328E-01	1.2381E-01	1.2708E-01	
RA-224		1.1440E+00	1.1440E+00	1.0321E+00	1.0342E+00	1.106E+00
RA-226	#	1.0581E+00	1.0581E+00	9.7487E-01	9.7680E-01	
AC-228		6.8698E-01	6.8698E-01	1.8160E-01	1.8592E-01	
TH-227	#B	-2.3167E-01	-2.3167E-01	3.6402E-01	3.6427E-01	3.983E-01
PA-234	#B	4.2859E-02	4.2859E-02	2.0846E-01	2.0847E-01	2.322E-01
TH-234	#B	1.9673E+00	1.9673E+00	5.8487E+00	5.8497E+00	6.500E+00
AM-241	#A	-2.3565E-01	-2.3565E-01	9.7077E-01	9.7086E-01	1.063E+00

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

----- S U M M A R Y -----
 Total Activity (85.9 to 2000.7 keV) 2.0541470E+01 pCi/gm
 Total Decayed Activity (85.9 to 2000.7 keV) 2.0541481E+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-12-01-012-F

Spectrum Filename: C:\GammaVision\Spectra\103F_23AUG2006_1256.An1

Acquisition information

Start time: 23-Aug-2006 12:57:31
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9880E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.9880E+03) =
5.0302E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	19-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. 19 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
74.96	148.	19.62	0.99	9.052E-03	74.81	9.600	1.159E+00	PB212
77.26	142.	17.66	0.99	1.011E-02	77.11	17.500	7.742E-01	PB212
					77.11	10.700	1.266E+00	PB214
93.21	94.	39.99	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.02	167.	23.46	1.68	2.567E-02	185.99	3.280	1.247E+00	RA226
209.12	121.	29.06	1.09	2.472E-02				
238.78	1142.	3.46	1.09	2.320E-02	238.63	43.100	7.685E-01	PB212
241.51	150.	21.61	1.09	2.305E-02	241.00	3.900	1.134E+00	RA224
					241.92	7.470	5.934E-01	PB214
269.46	137.	24.72	1.79	2.155E-02				
295.37	279.	12.38	1.12	2.024E-02	295.22	19.200	4.814E-01	PB214
300.26	73.	28.17	0.89	2.001E-02				
328.04	50.	32.68	0.92	1.874E-02				
338.70	322.	9.58	1.27	1.829E-02	338.40	12.010	9.924E-01	AC228
352.06	460.	7.26	1.17	1.775E-02	351.99	37.100	4.687E-01	PB214
462.95	80.	23.13	1.36	1.426E-02				
462.95	80.	23.13	1.36	1.426E-02	463.51	10.000	3.786E-01	SB125
511.44	165.	13.98	1.36	1.316E-02	510.72	22.500	3.173E-01	TL208
583.38	403.	7.46	1.35	1.184E-02	583.14	86.000	2.662E-01	TL208
609.49	332.	8.21	1.43	1.144E-02	609.32	46.090	4.193E-01	BI214
661.83	47.	29.69	1.24	1.072E-02	661.62	84.620	3.396E-02	CS137
727.43	100.	20.86	1.23	9.962E-03	727.17	11.800	5.758E-01	BI212
794.95	57.	30.68	1.69	9.308E-03				
794.95	57.	30.68	1.69	9.308E-03	795.76	85.400	4.871E-02	CS134
861.02	55.	32.44	1.08	8.764E-03				
911.58	290.	9.75	1.62	8.398E-03	911.07	29.000	8.003E-01	AC228

964.87	46.	25.31	1.54	8.050E-03	964.00	14.580	PBC<MDA	EU152
969.45	170.	9.23	1.54	8.022E-03	968.90	17.460	8.262E-01	AC228
1120.55	99.	20.57	1.65	7.211E-03	1120.28	15.040	6.111E-01	BI214
1461.43	1393.	2.73	1.83	5.930E-03	1460.75	10.700	1.472E+01	K40
1765.75	75.	13.07	2.40	5.142E-03	1764.51	15.920	6.255E-01	BI214

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

Channel	Peak Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
417.41	209.12	482.	121.	0.060	87.17	1.093	AC-228
538.07	269.46	372.	137.	0.068	74.16	1.791	AC-228 s
599.66	300.26	175.	73.	0.036	84.52	0.894	PB-212
655.23	328.04	118.	50.	0.025	98.04	0.918	AC-228
1721.08	861.02	84.	55.	0.028	97.31	1.079	TL-208
1929.97	964.98	40.	51.	0.025	67.81	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

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	148.79	74.81	368.	148.	0.074	58.87	0.993D
PB-212	153.39	77.11	395.	142.	0.071	52.99	0.995A
RA-226	371.36	186.10	775.	122.	0.061	90.61	1.500s
PB-212	476.74	238.79	799.	1059.	0.529	15.84	1.036
RA-224	482.70	241.77	814.	119.	0.059	105.54	1.500
PB-214	589.88	295.37	332.	275.	0.138	37.14	1.122
AC-228	676.55	338.70	226.	321.	0.160	28.75	1.265s
PB-214	703.26	352.06	257.	454.	0.227	21.77	1.166
SB-125	925.44	463.16	129.	76.	0.038	70.51	1.500
TL-208	1022.00	511.44	163.	138.	0.069	41.94	1.360s
TL-208	1165.85	583.38	156.	399.	0.199	22.37	1.352
BI-214	1218.08	609.49	139.	325.	0.163	24.63	1.435
CS-137	1322.75	661.83	71.	45.	0.023	89.07	1.237
BI-212	1453.94	727.43	116.	100.	0.050	62.59	1.235
CS-134	1589.41	795.18	58.	61.	0.031	65.40	1.500
AC-228	1822.18	911.58	122.	287.	0.143	29.26	1.616
AC-228	1936.81	968.90	41.	170.	0.085	27.89	1.541D
BI-214	2240.08	1120.55	98.	98.	0.049	61.72	1.650
K-40	2921.72	1461.43	34.	1374.	0.687	8.19	1.829
BI-214	3530.25	1765.75	10.	75.	0.038	39.20	2.396s

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

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		3.6116E-02	477.56	3.612E-02	&(	2.131E-01 6.20E-02	G
K-40		1.4718E+01	1460.75	1.472E+01	(P	3.188E-01 4.07E-01	G
MN-54		1.5251E-02	834.81	1.525E-02	&(P	2.995E-02 9.11E-03	G
CO-57		7.8271E-03	122.07	7.827E-03	&(P	4.781E-02 1.43E-02	G K
			136.43	1.024E-01	%	3.985E-01 1.20E-01	G
CO-60		1.0424E-02	1332.51	1.042E-02	&(P	3.623E-02 1.05E-02	G K
			1173.23	1.532E-02	% P	4.837E-02 1.43E-02	G K
Sr-85		-7.6758E-03	514.00	7.676E-03	%(	4.173E-02 1.24E-02	G
Kr-85		-1.6984E+02	513.99	1.698E+02	%(	9.234E+02 2.74E+02	G
Y-88		-8.8668E-05	1836.01	8.867E-05	&(P	1.038E-02 1.41E-03	G K
			898.02	3.811E-03	& P	3.308E-02 9.47E-03	G
NB-94		9.5335E-03	871.10	9.534E-03	%(	2.382E-02 7.13E-03	G K
			702.50	5.281E-03	%	2.939E-02 8.58E-03	G K
Ag-108M		0.0000E+00	722.95	0.000E+00	&(	5.911E-02 1.73E-02	G K
			614.37	1.232E-02	& P	3.801E-02 1.13E-02	G
			433.93	7.831E-03	%	3.041E-02 9.04E-03	G
CD-109		1.0027E+00	88.04	1.003E+00	&(	1.782E+00 5.42E-01	G
SN-113		-1.1879E-03	391.71	1.188E-03	%(	4.607E-02 1.35E-02	G K
			255.04	1.783E-01	%	1.571E+00 4.67E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0999E-01	427.95	2.391E-02	&(P	9.107E-02	2.71E-02	G K
		600.77	8.718E-03	% P	1.622E-01	4.69E-02	G
		636.15	3.182E-03	& P	3.099E-01	8.93E-02	G
		463.51	3.648E-01	(P	2.657E-01	8.72E-02	G
		176.29	9.015E-02	%	5.400E-01	1.62E-01	G
I-131	1.1586E-02	364.48	1.159E-02	%(P	5.099E-02	1.52E-02	G K
		636.97	1.425E-02	&	5.941E-01	1.71E-01	G
		284.29	1.005E-01	& P	7.211E-01	2.14E-01	G
CS-134	2.3309E-02	604.66	2.203E-03	%(	3.059E-02	8.86E-03	G K
		795.76	5.247E-02	(P	3.292E-02	1.15E-02	G
		569.29	2.912E-03	& P	1.818E-01	5.21E-02	G
		801.84	1.337E-02	% P	4.244E-01	1.21E-01	G
CS-137	3.3956E-02	661.62	3.396E-02	(P	3.139E-02	1.04E-02	G
CE-139	-1.4168E-03	165.85	1.417E-03	%(	4.649E-02	1.39E-02	G
EU-152	2.2820E-02	121.78	2.282E-02	&(P	1.389E-01	4.16E-02	G K
		344.30	5.101E-02	% P	1.147E-01	3.47E-02	G
		1408.08	6.205E-02	%	1.119E-01	3.47E-02	G
		964.00	9.474E-03	% P	4.035E-01	1.18E-01	G
		1112.07	1.326E-02	&	3.564E-01	1.03E-01	G
		778.90	2.206E-03	%	2.100E-01	5.93E-02	G
EU-154	2.0256E-04	123.10	2.026E-04	&(	1.037E-01	3.09E-02	G K
		1274.80	3.585E-03	%	1.432E-01	4.12E-02	G
		723.30	3.662E-02	&	1.918E-01	5.65E-02	G
		1004.80	1.777E-02	%	2.065E-01	5.93E-02	G
EU-155	9.6361E-02	86.45	9.636E-02	%(	2.308E-01	6.99E-02	G K
		105.31	4.449E-02	%	2.202E-01	6.61E-02	G
HG-203	1.8888E-02	279.17	1.889E-02	&(P	3.898E-02	1.18E-02	G K
		72.87	6.539E-01	% P	2.170E+00	6.54E-01	G
		70.83	5.139E-02	%	3.775E+00	1.12E+00	G
		82.50	8.059E-01	%	3.943E+00	1.18E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.7678E-01	583.14	2.662E-01	(P	4.066E-02	2.01E-02	G
		510.72	3.173E-01	@(P	1.425E-01	5.30E-02	G
PB-212	7.3559E-01	238.63	7.199E-01	(P	9.140E-02	3.84E-02	G K
		77.11	5.465E-01	} P	3.663E-01	9.65E-02	G
		74.81	1.159E+00	+ P	7.204E-01	2.32E-01	G
PB-214	4.7306E-01	351.99	4.687E-01	(P	7.987E-02	3.44E-02	G K
		295.22	4.814E-01	(P	1.531E-01	6.05E-02	G
		77.11	3.709E-01	} P	8.942E-01	2.12E-01	G
		241.92	9.111E-02	%	5.671E-01	1.70E-01	G
BI-212	5.7582E-01	727.17	5.758E-01	(P	3.063E-01	1.21E-01	G K
		1620.56	3.912E-02	% P	9.539E-01	2.56E-01	G
		785.42	5.753E-02	%	1.781E+00	5.13E-01	G
BI-214	4.1931E-01	609.32	4.193E-01	(P	7.427E-02	3.51E-02	G K
		1764.51	6.255E-01	+ P	1.429E-01	8.53E-02	G
		1120.28	6.111E-01	+ P	3.068E-01	1.28E-01	G
RA-224	8.9746E-01	241.00	8.975E-01	(	1.025E+00	3.16E-01	G
RA-226	9.8448E-01	185.99	9.845E-01	(P	1.070E+00	3.29E-01	G
AC-228	8.4764E-01	911.07	8.003E-01	(P	1.513E-01	7.90E-02	G K
		968.90	8.267E-01	(P	1.571E-01	7.69E-02	G
		338.40	9.924E-01	*(P	2.251E-01	9.55E-02	G
TH-227	-1.3298E-01	236.00	1.330E-01	%(	3.699E-01	1.12E-01	G K
		256.25	1.158E-02	% P	4.521E-01	1.34E-01	G
PA-234	5.0916E-02	98.44	5.092E-02	%(P	2.112E-01	6.35E-02	G K
		946.00	3.305E-02	% P	1.825E-01	5.32E-02	G
		131.28	8.702E-04	% P	2.024E-01	6.03E-02	G
		94.67	1.079E-01	% P	3.969E-01	1.19E-01	G
		883.24	1.315E-03	%	2.333E-01	6.54E-02	G
		926.70	8.852E-02	%	3.188E-01	9.42E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	3.409E-03	& P	2.595E-01	7.41E-02 G
TH-234	4.4497E-01					
		63.29	4.450E-01	%(P	6.081E+00	1.81E+00 G K
		92.80	1.294E+00	& P	2.024E+00	6.15E-01 G
		92.38	1.274E+00	& P	2.431E+00	7.35E-01 G
AM-241	-1.3087E-02					
		59.54	-1.309E-02	%(P	9.986E-01	2.96E-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 - Half-life limit exceeded

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	3.4308E-02	3.6116E-02	1.8614E-01	1.8616E-01	2.025E-01
K-40		1.4718E+01	1.4718E+01	1.2215E+00	1.4907E+00	
MN-54	#A	1.5117E-02	1.5251E-02	2.7338E-02	2.7352E-02	2.969E-02
CO-57	#B	7.7480E-03	7.8271E-03	4.2957E-02	4.2959E-02	4.732E-02
CO-60	#B	1.0409E-02	1.0424E-02	3.1521E-02	3.1527E-02	3.618E-02

Sr-85	#A	-7.3579E-03	-7.6758E-03	3.7155E-02	3.7157E-02	4.000E-02
Kr-85	#A	-1.6983E+02	-1.6984E+02	8.2222E+02	8.2228E+02	9.234E+02
Y-88	#B	-8.6416E-05	-8.8668E-05	5.3201E-04	5.3203E-04	1.011E-02
NB-94	#B	9.5335E-03	9.5335E-03	2.1389E-02	2.1396E-02	2.382E-02
Ag-108M	#B	0.0000E+00	0.0000E+00	5.1962E-02	5.1962E-02	5.910E-02
CD-109	#A	9.9665E-01	1.0027E+00	1.6268E+00	1.6277E+00	1.772E+00
SN-113	#B	-1.1599E-03	-1.1879E-03	4.0391E-02	4.0391E-02	4.498E-02
SB-125	#F	1.0970E-01	1.0999E-01	7.8853E-02	7.9111E-02	9.082E-02
I-131	#B	8.2373E-03	1.1586E-02	4.5498E-02	4.5503E-02	3.625E-02
CS-134	#B	2.3225E-02	2.3309E-02	1.5265E-02	1.5325E-02	3.048E-02
CS-137		3.3948E-02	3.3956E-02	3.1170E-02	3.1232E-02	
CE-139	#A	-1.3888E-03	-1.4168E-03	4.1559E-02	4.1559E-02	4.557E-02
EU-152	#B	2.2807E-02	2.2820E-02	1.2477E-01	1.2478E-01	1.388E-01
EU-154	#B	2.0238E-04	2.0256E-04	9.2684E-02	9.2684E-02	1.036E-01
EU-155	#B	9.6215E-02	9.6361E-02	2.0958E-01	2.0964E-01	2.305E-01
HG-203	#B	1.7809E-02	1.8888E-02	3.5474E-02	3.5491E-02	3.675E-02
TL-208		2.7678E-01	2.7678E-01	6.2591E-02	6.4621E-02	
PB-212		7.3559E-01	7.3559E-01	1.1781E-01	1.2532E-01	
PB-214		4.7306E-01	4.7306E-01	1.0327E-01	1.0686E-01	
BI-212		5.7582E-01	5.7582E-01	3.6222E-01	3.6376E-01	
BI-214		4.1931E-01	4.1931E-01	1.0535E-01	1.0812E-01	
RA-224	#A	8.9746E-01	8.9746E-01	9.4720E-01	9.4863E-01	1.025E+00
RA-226	#A	9.8448E-01	9.8448E-01	9.8687E-01	9.8853E-01	1.070E+00
AC-228		8.4764E-01	8.4764E-01	1.4092E-01	1.4926E-01	
TH-227	#B	-1.3298E-01	-1.3298E-01	3.3503E-01	3.3512E-01	3.699E-01
PA-234	#B	5.0916E-02	5.0916E-02	1.9038E-01	1.9041E-01	2.112E-01
TH-234	#B	4.4497E-01	4.4497E-01	5.4285E+00	5.4285E+00	6.081E+00
AM-241	#A	-1.3087E-02	-1.3087E-02	1.1463E+00	1.1463E+00	9.986E-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 - Half-life limit exceeded

----- S U M M A R Y -----
 Total Activity (1120.0 to 2000.7 keV) 1.8079897E+01 pCi/gm
 Total Decayed Activity (1120.0 to 2000.7 keV) 1.8079905E+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-12-01-018-F

Spectrum Filename: C:\GammaVision\Spectra\103F_23AUG2006_1500.An1

Acquisition information

Start time: 23-Aug-2006 15:00:41
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8660E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8660E+03) =
5.3591E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	19-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. 21 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.2138

***** S U M M A R Y O F P E A K 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	145.	19.33	0.99	9.052E-03	74.81	9.600	1.208E+00	PB212
77.21	172.	13.49	0.99	1.011E-02	77.11	17.500	8.149E-01	PB212
92.98	99.	39.80	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
92.99	129.	31.08	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
186.58	154.	25.46	0.89	2.565E-02	185.99	3.280	1.217E+00	RA226
209.62	107.	31.60	1.14	2.470E-02				
238.80	1203.	3.36	1.09	2.319E-02	238.63	43.100	8.629E-01	PB212
241.86	144.	18.01	1.10	2.303E-02	241.00	3.900	1.157E+00	RA224
					241.92	7.470	6.052E-01	PB214
270.71	96.	35.10	1.40	2.149E-02				
278.00	90.	30.87	1.21	2.111E-02				
278.00	90.	30.87	1.21	2.111E-02	279.17	81.500	4.017E-02	HG203
295.23	284.	11.17	1.21	2.025E-02	295.22	19.200	5.222E-01	PB214
300.57	112.	24.73	1.12	1.999E-02				
328.02	48.	41.14	1.03	1.874E-02				
338.35	247.	13.29	1.03	1.830E-02	338.40	12.010	8.105E-01	AC228
352.00	413.	7.55	1.20	1.775E-02	351.99	37.100	4.475E-01	PB214
463.07	88.	28.34	1.59	1.426E-02				
463.07	88.	28.34	1.59	1.426E-02	463.51	10.000	4.421E-01	SB125
511.12	203.	13.55	1.56	1.316E-02	510.72	22.500	4.311E-01	TL208
583.46	383.	6.69	1.31	1.184E-02	583.14	86.000	2.691E-01	TL208
609.63	314.	7.73	1.20	1.143E-02	609.32	46.090	4.224E-01	BI214
661.92	120.	22.35	1.01	1.072E-02	661.62	84.620	9.470E-02	CS137

727.43	95.	20.92	1.55	9.962E-03	727.17	11.800	5.821E-01	BI212
782.62	59.	32.41	0.65	9.420E-03				
795.57	39.	35.32	1.50	9.301E-03	795.76	85.400	PBC<MDA	CS134
911.75	274.	8.60	1.48	8.397E-03	911.07	29.000	8.044E-01	AC228
964.81	56.	22.26	1.54	8.051E-03	964.00	14.580	3.408E-01	EU152
969.55	139.	10.68	1.54	8.022E-03	968.90	17.460	7.183E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.62	70.	25.12	1.22	7.210E-03	1120.28	15.040	4.574E-01	BI214
1461.55	1377.	2.76	1.90	5.930E-03	1460.75	10.700	1.549E+01	K40
1620.94	21.	37.82	1.27	5.488E-03	1620.56	2.750	1.010E+00	BI212
1765.20	51.	14.43	1.07	5.142E-03	1764.51	15.920	4.550E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	Suspected Nuclide
418.41	209.62	469.	107.	0.053	94.80	1.137	NP-239 s
540.57	270.71	386.	96.	0.048	105.31	1.399	AC-228 s
600.30	300.57	260.	112.	0.056	74.19	1.119	PB-212 s
655.19	328.02	171.	48.	0.024	123.43	1.032	AC-228
1564.30	782.62	103.	42.	0.021	113.83	0.650	- sM
1929.57	964.73	49.	56.	0.028	66.03	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 %
PB-212	148.79	74.81	338.	145.	0.072	57.99	0.993D
PB-212	153.39	77.11	341.	172.	0.086	40.47	0.995A
TH-234	185.16	92.99	990.	129.	0.065	93.25	1.500s
RA-226	371.81	186.33	750.	139.	0.070	79.42	1.500s
PB-212	476.80	238.82	774.	1210.	0.605	14.70	1.035
RA-224	483.06	241.95	675.	110.	0.055	104.12	1.500
HG-203	554.46	277.65	299.	75.	0.037	103.81	1.500s
PB-214	589.61	295.23	273.	280.	0.140	33.52	1.212s
AC-228	675.85	338.35	288.	246.	0.123	39.88	1.030
PB-214	703.14	352.00	220.	407.	0.203	22.65	1.198
SB-125	925.68	463.28	156.	65.	0.033	87.59	1.500s
TL-208	1021.35	511.12	195.	176.	0.088	40.65	1.555s
TL-208	1166.02	583.46	102.	378.	0.189	20.06	1.306
BI-214	1218.35	609.63	108.	308.	0.154	23.20	1.196s
CS-137	1322.92	661.92	163.	119.	0.059	67.05	1.008s
BI-212	1453.94	727.43	100.	95.	0.047	62.76	1.550s
CS-134	1590.20	795.57	75.	39.	0.019	105.95	1.500s
AC-228	1822.53	911.75	91.	271.	0.135	25.81	1.476

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	1928.96	964.97	90.	44.	0.022	99.78	1.538
AC-228	1936.81	968.90	42.	139.	0.069	32.20	1.541D
BI-214	2240.20	1120.62	85.	69.	0.034	75.37	1.224
K-40	2921.96	1461.55	31.	1358.	0.679	8.27	1.900
BI-212	3240.70	1620.94	10.	21.	0.011	113.45	1.266s
BI-214	3529.15	1765.20	6.	51.	0.026	43.29	1.067s

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

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

- Nuclide - Name	- Average Code	Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		1.5471E-03	477.56	1.547E-03	&(	3.502E-01	1.02E-01 G
K-40		1.5494E+01	1460.75	1.549E+01	(P	3.270E-01	4.33E-01 G
MN-54		5.7586E-04	834.81	5.759E-04	%(P	4.300E-02	1.24E-02 G
CO-57		1.3002E-02	122.07	1.300E-02	%(P	4.812E-02	1.45E-02 G K
			136.43	2.745E-02	%	3.232E-01	9.62E-02 G
CO-60		-1.5928E-03	1332.51	1.593E-03	&(P	4.387E-02	1.22E-02 G K
			1173.23	1.182E-02	& P	5.205E-02	1.51E-02 G K
Sr-85		-1.3201E-02	514.00	1.320E-02	%(	4.455E-02	1.33E-02 G
Kr-85		-2.9148E+02	513.99	2.915E+02	%(	9.846E+02	2.95E+02 G
Y-88		-3.0475E-03	1836.01	3.048E-03	%(P	2.636E-02	7.07E-03 G K
			898.02	3.492E-03	& P	3.914E-02	1.12E-02 G
NB-94		5.2298E-03	871.10	5.230E-03	%(	2.905E-02	8.40E-03 G K
			702.50	5.558E-03	&	3.559E-02	1.04E-02 G K

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ag-108M	-2.5630E-02	722.95	2.563E-02	&(	4.844E-02	1.48E-02	G K
		614.37	2.123E-02	% P	4.437E-02	1.34E-02	G
		433.93	8.590E-03	%	3.496E-02	1.04E-02	G
CD-109	7.9725E-01	88.04	7.973E-01	% (	1.946E+00	5.89E-01	G
SN-113	3.5253E-03	391.71	3.525E-03	% (	5.117E-02	1.50E-02	G K
		255.04	2.583E-01	&	1.632E+00	4.86E-01	G
SB-125	7.7487E-02	427.95	8.646E-03	% (P	9.193E-02	2.68E-02	G K
		600.77	3.169E-02	% P	1.704E-01	5.00E-02	G
		636.15	7.511E-02	& P	2.149E-01	6.38E-02	G
		463.51	3.324E-01	*(P	3.109E-01	9.90E-02	G
		176.29	3.722E-03	&	4.192E-01	1.24E-01	G
I-131	7.6820E-03	364.48	7.682E-03	% (P	3.827E-02	1.12E-02	G K
		636.97	1.540E-01	%	5.128E-01	1.52E-01	G
		284.29	3.789E-02	& P	6.824E-01	2.01E-01	G
CS-134	1.6210E-02	604.66	6.889E-04	&(	5.787E-02	1.70E-02	G K
		795.76	3.552E-02	(P	3.942E-02	1.26E-02	G
		569.29	1.074E-02	% P	2.524E-01	7.31E-02	G
		801.84	2.088E-02	& P	3.922E-01	1.12E-01	G
CS-137	9.4698E-02	661.62	9.470E-02	*(P	4.972E-02	2.14E-02	G
CE-139	-1.3404E-02	165.85	1.340E-02	% (	5.044E-02	1.52E-02	G
EU-152	1.1592E-01	121.78	3.721E-02	% (P	1.398E-01	4.20E-02	G K
		344.30	1.049E-02	% P	8.936E-02	2.62E-02	G
		1408.08	7.494E-02	%	1.510E-01	4.60E-02	G
		964.00	2.738E-01	(P	2.890E-01	9.22E-02	G
		1112.07	2.659E-02	&	3.708E-01	1.07E-01	G
		778.90	5.274E-02	%	2.785E-01	8.16E-02	G
EU-154	1.8539E-02	123.10	1.854E-02	&(	9.356E-02	2.80E-02	G K
		1274.80	1.339E-03	%	1.088E-01	3.05E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		723.30	1.289E-03	&	1.787E-01	5.12E-02	G
		1004.80	1.137E-02	&	1.839E-01	5.20E-02	G
EU-155	-1.0432E-02						
		86.45	1.043E-02	% (	2.078E-01	6.19E-02	G K
		105.31	3.146E-02	%	2.397E-01	7.18E-02	G
HG-203	3.3595E-02						
		279.17	3.360E-02	& (P	3.734E-02	1.16E-02	G K
		72.87	3.975E-02	% P	1.955E+00	5.81E-01	G
		70.83	1.946E-01	&	4.924E+00	1.47E+00	G
		82.50	7.026E-01	%	4.041E+00	1.21E+00	G
TL-208	2.6909E-01						
		583.14	2.691E-01	(P	3.531E-02	1.82E-02	G
		510.72	4.311E-01	+ P	1.655E-01	6.73E-02	G
PB-212	8.5851E-01						
		238.63	8.762E-01	(P	9.588E-02	4.34E-02	G K
							Energy duplication
		77.11	7.036E-01	} P	3.630E-01	9.49E-02	G
		74.81	1.208E+00	+ P	7.369E-01	2.38E-01	G
PB-214	4.7297E-01						
		351.99	4.475E-01	(P	7.899E-02	3.42E-02	G K
		295.22	5.222E-01	@(P	1.484E-01	5.92E-02	G
							Energy duplication
		77.11	0.000E+00	} P	8.771E-01	0.00E+00	G
		241.92	2.548E-02	%	6.335E-01	1.89E-01	G
BI-212	6.6302E-01						
		727.17	5.821E-01	(P	3.044E-01	1.22E-01	G K
		1620.56	1.010E+00	(P	8.353E-01	3.83E-01	G
		785.42	1.025E+00	%	1.378E+00	4.35E-01	G
BI-214	4.3597E-01						
		609.32	4.224E-01	@(P	7.039E-02	3.34E-02	G K
		1764.51	4.550E-01	(P	1.213E-01	6.98E-02	G
		1120.28	4.574E-01	(P	3.058E-01	1.18E-01	G
RA-224	8.8585E-01						
		241.00	8.858E-01	(	9.960E-01	3.07E-01	G
RA-226	1.1993E+00						
		185.99	1.199E+00	*(P	1.121E+00	3.47E-01	G
AC-228	7.7990E-01						
		911.07	8.044E-01	(P	1.405E-01	7.01E-02	G K
		968.90	7.180E-01	(P	1.702E-01	7.72E-02	G
		338.40	8.105E-01	(P	2.695E-01	1.08E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	5.8980E-03	236.00	5.898E-03	&(	4.611E-01	1.38E-01	G K
		256.25	9.808E-02	& P	4.841E-01	1.45E-01	G
PA-234	1.1702E-04	98.44	1.170E-04	&(P	2.335E-01	6.96E-02	G K
		946.00	1.556E-03	& P	1.760E-01	4.98E-02	G
		131.28	3.296E-02	& P	2.105E-01	6.31E-02	G
		94.67	6.321E-03	% P	3.840E-01	1.14E-01	G
		883.24	5.112E-02	%	2.695E-01	7.83E-02	G
		926.70	3.283E-02	&	3.348E-01	9.64E-02	G
TH-234	-1.3342E-01	59.54	2.038E-01	&(P	1.080E+00	3.23E-01	G
		63.29	1.697E+00	%(P	5.926E+00	1.77E+00	G K
		92.80	1.900E+00	(P	2.191E+00	6.71E-01	G
AM-241	2.0376E-01	92.38	1.717E+00	% P	2.648E+00	8.05E-01	G
		59.54	2.038E-01	&(P	1.080E+00	3.23E-01	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:

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

Peak Codes:

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

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

```

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****
          Time of Count   Time Corrected   Uncertainty   3 Sigma
Nuclide   Activity       Activity       Counting      Total        MDA
          pCi/gm        pCi/gm        pCi/gm       pCi/gm       pCi/gm
-----
BE-7  #A   1.4674E-03   1.5471E-03   3.0577E-01   3.0577E-01   3.321E-01
K-40           1.5494E+01   1.5494E+01   1.2986E+00   1.5798E+00
MN-54 #A   5.7068E-04   5.7586E-04   3.7168E-02   3.7168E-02   4.261E-02
CO-57 #B   1.2867E-02   1.3002E-02   4.3395E-02   4.3401E-02   4.761E-02
CO-60 #B  -1.5905E-03  -1.5928E-03   1.1768E-01   1.1768E-01   4.380E-02
Sr-85 #A  -1.2639E-02  -1.3201E-02   3.9998E-02   4.0005E-02   4.265E-02
Kr-85 #A  -2.9147E+02  -2.9148E+02   8.8403E+02   8.8419E+02   9.846E+02
Y-88  #B  -2.9679E-03  -3.0475E-03   2.2556E-02   2.2556E-02   2.568E-02
NB-94 #B   5.2298E-03   5.2298E-03   2.5187E-02   2.5189E-02   2.905E-02
Ag-108M#B -2.5629E-02  -2.5630E-02   4.4260E-02   4.4285E-02   4.843E-02
CD-109 #A   7.9231E-01   7.9725E-01   1.7661E+00   1.7666E+00   1.934E+00
SN-113 #B   3.4400E-03   3.5253E-03   4.5092E-02   4.5093E-02   4.994E-02
SB-125 #B   7.7271E-02   7.7487E-02   6.9196E-02   6.9342E-02   9.168E-02
I-131 #B   5.4086E-03   7.6820E-03   3.3742E-02   3.3745E-02   2.694E-02
CS-134 #B   1.6149E-02   1.6210E-02   1.7213E-02   1.7239E-02   5.765E-02
CS-137 #    9.4673E-02   9.4698E-02   6.4242E-02   6.4477E-02
CE-139 #A  -1.3132E-02  -1.3404E-02   4.5518E-02   4.5525E-02   4.941E-02
EU-152 #B   1.1585E-01   1.1592E-01   1.1708E-01   1.1726E-01   1.397E-01
EU-154 #B   1.8522E-02   1.8539E-02   8.4069E-02   8.4076E-02   9.348E-02
EU-155 #B  -1.0416E-02  -1.0432E-02   1.8572E-01   1.8573E-01   2.075E-01
HG-203 #A   3.1621E-02   3.3595E-02   3.4892E-02   3.4947E-02   3.515E-02
TL-208      2.6909E-01   2.6909E-01   5.4584E-02   5.6775E-02
PB-212      8.5851E-01   8.5851E-01   1.2747E-01   1.3687E-01
PB-214      4.7297E-01   4.7297E-01   9.7024E-02   1.0083E-01
BI-212      6.6302E-01   6.6302E-01   4.1830E-01   4.2007E-01
BI-214      4.3597E-01   4.3597E-01   1.0325E-01   1.0631E-01
RA-224  A    8.8585E-01   8.8585E-01   9.2238E-01   9.2381E-01   9.960E-01
RA-226 #    1.1993E+00   1.1993E+00   1.0410E+00   1.0433E+00   1.121E+00
AC-228      7.7990E-01   7.7990E-01   1.4994E-01   1.5663E-01
TH-227 #B   5.8980E-03   5.8980E-03   4.1317E-01   4.1317E-01   4.611E-01
PA-234 #B   1.1702E-04   1.1702E-04   2.0865E-01   2.0865E-01   2.335E-01
TH-234 #B  -1.3342E-01  -1.3342E-01   1.4139E-01   1.4158E-01   5.926E+00
AM-241 #A   2.0376E-01   2.0376E-01   9.7011E-01   9.7018E-01   1.080E+00
  
```

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

H - Halflife limit exceeded

----- S U M M A R Y -----
Total Activity (1120.0 to 2000.7 keV) 1.9954010E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.9954035E+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-12-01-018-F-RC

Spectrum Filename: C:\GammaVision\Spectra\103F_23AUG2006_1603.An1

Acquisition information

Start time: 23-Aug-2006 16:03:18
Live time: 2000
Real time: 2002
Dead time: 0.11 %
Detector ID: 4

Detector system

Det 103 - DSPE-471

Calibration

Filename: D3_1LSa.Clb
Detector_103 1.0 Liter Sand Geometry

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8660E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8660E+03) =
5.3591E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	19-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: 0.2432

***** S U M M A R Y O F P E A K 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	145.	20.65	0.99	9.011E-03	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	1.180E+00	PB212
77.26	200.	15.06	0.99	1.014E-02	77.11	17.500	8.040E-01	PB212
					77.11	10.700	1.315E+00	PB214
86.86	77.	39.84	1.00	1.423E-02	86.45	32.740	1.208E-01	EU155
					88.04	3.790	1.005E+00	CD109
93.19	136.	21.36	1.00	1.655E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.92	169.	23.27	1.34	2.567E-02				
185.92	169.	23.27	1.34	2.567E-02	185.99	3.280	1.342E+00	RA226
209.44	95.	26.20	1.08	2.472E-02				
238.79	1096.	3.63	1.09	2.319E-02	238.63	43.100	7.850E-01	PB212
241.73	156.	17.52	1.09	2.304E-02	241.00	3.900	1.260E+00	RA224
					241.92	7.470	6.590E-01	PB214
270.22	107.	25.97	1.51	2.151E-02				
295.28	270.	12.84	0.97	2.025E-02	295.22	19.200	4.954E-01	PB214
300.22	77.	26.96	1.24	2.001E-02				
328.22	68.	31.32	1.23	1.873E-02				
338.48	193.	15.19	1.26	1.830E-02	338.40	12.010	6.336E-01	AC228
351.97	484.	7.75	1.24	1.775E-02	351.99	37.100	5.258E-01	PB214
462.90	73.	31.50	1.31	1.426E-02				
462.90	73.	31.50	1.31	1.426E-02	463.51	10.000	3.666E-01	SB125
511.05	258.	12.56	0.98	1.317E-02	510.72	22.500	5.652E-01	TL208
583.50	374.	7.27	1.48	1.184E-02	583.14	86.000	2.628E-01	TL208
609.44	333.	8.40	1.44	1.144E-02	609.32	46.090	4.488E-01	BI214
661.79	70.	21.24	1.40	1.072E-02	661.62	84.620	5.510E-02	CS137
727.61	98.	17.72	1.25	9.960E-03	727.17	11.800	6.036E-01	BI212

769.64	58.	25.99	1.22	9.541E-03				
795.74	47.	27.08	1.50	9.301E-03	795.76	85.400	4.321E-02	CS134
911.61	292.	7.01	1.70	8.398E-03	911.07	29.000	8.579E-01	AC228
965.12	65.	17.47	1.54	8.049E-03	964.00	14.580	3.975E-01	EU152
969.50	147.	10.30	1.54	8.022E-03	968.90	17.460	7.612E-01	AC228
1121.47	106.	16.55	1.49	7.206E-03	1120.28	15.040	6.951E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.54	1393.	2.73	1.86	5.930E-03	1460.75	10.700	1.568E+01	K40
1765.45	54.	14.52	1.57	5.140E-03	1764.51	15.920	4.488E-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 %	Suspected Nuclide
172.90	86.77	431.	77.	0.038	119.51	1.001	BI-207 LD
417.26	209.05	484.	92.	0.046	112.69	0.756	AC-228
539.59	270.22	290.	107.	0.054	77.92	1.508	AC-228 s
599.60	300.22	177.	77.	0.038	80.89	1.243	PB-212
655.58	328.22	185.	68.	0.034	93.96	1.228	AC-228
1538.34	769.64	63.	58.	0.029	77.96	1.219	BI-214 M
1930.14	965.08	38.	57.	0.028	61.32	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 %
PB-212	148.79	74.81	375.	144.	0.072	60.82	0.993D
PB-212	153.39	77.11	354.	131.	0.066	55.45	0.995A
TH-234	185.15	92.99	912.	133.	0.067	87.46	1.500
TH-234	185.07	92.95	887.	135.	0.068	85.27	1.500
RA-226	371.73	186.28	754.	131.	0.065	84.08	1.500s
PB-212	476.90	238.87	607.	1121.	0.561	13.40	1.078
RA-224	482.49	241.67	781.	148.	0.074	83.58	1.500s
PB-214	589.71	295.28	337.	266.	0.133	38.53	0.973
AC-228	676.10	338.48	259.	192.	0.096	45.57	1.258
PB-214	703.08	351.97	294.	478.	0.239	23.25	1.236s
SB-125	925.80	463.34	157.	52.	0.026	106.70	1.500s
TL-208	1021.21	511.05	230.	231.	0.116	37.67	0.982s
TL-208	1166.10	583.50	126.	370.	0.185	21.82	1.481
BI-214	1217.97	609.44	147.	327.	0.163	25.21	1.443
CS-137	1322.66	661.79	71.	69.	0.035	63.71	1.399
BI-212	1454.28	727.61	83.	98.	0.049	53.17	1.250
CS-134	1590.53	795.74	58.	47.	0.024	81.24	1.500s
AC-228	1822.24	911.61	54.	289.	0.144	21.04	1.697
EU-152	1929.14	965.06	89.	36.	0.018	120.94	1.538s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	1936.81	968.90	43.	146.	0.073	31.24	1.541D
BI-214	2241.91	1121.47	74.	104.	0.052	49.64	1.488s
K-40	2921.95	1461.54	30.	1374.	0.687	8.20	1.855
BI-214	3529.65	1765.45	6.	51.	0.025	43.57	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 - Average ----- Peak -----
 Name Code Activity Energy Activity Code MDA Value COMMENTS
 pCi/gm keV pCi/gm pCi/gm

BE-7		8.9376E-03	477.56	8.938E-03	% (	3.481E-01	1.01E-01	G
K-40		1.5675E+01	1460.75	1.568E+01	(P	3.227E-01	4.34E-01	G
MN-54		-1.3772E-02	834.81	-1.377E-02	%(P	3.835E-02	1.14E-02	G
CO-57		-4.8449E-04	122.07	-4.845E-04	&(P	4.207E-02	1.25E-02	G K
			136.43	8.076E-02	%	3.965E-01	1.19E-01	G
CO-60		-3.0066E-03	1332.51	-3.007E-03	%(P	3.655E-02	9.81E-03	G K
			1173.23	-2.028E-03	& P	5.929E-02	1.70E-02	G K
Sr-85		-1.5946E-02	514.00	-1.595E-02	%(	4.887E-02	1.47E-02	G
Kr-85		-3.5239E+02	513.99	-3.524E+02	%(	1.080E+03	3.24E+02	G
Y-88		-9.4561E-05	1836.01	-9.456E-05	&(P	1.107E-02	1.50E-03	G K
			898.02	6.345E-03	% P	3.585E-02	1.04E-02	G
NB-94		-1.3868E-03	871.10	-1.387E-03	%(	2.815E-02	7.93E-03	G K
			702.50	-7.280E-03	&	3.485E-02	1.02E-02	G K
Ag-108M		-2.4365E-04	722.95	-2.437E-04	%(	3.663E-02	1.05E-02	G K
			614.37	-1.422E-03	% P	3.758E-02	1.09E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		433.93	1.058E-02	%	3.546E-02	1.06E-02	G
CD-109	1.3581E+00	88.04	1.358E+00	%	1.880E+00	5.75E-01	G
SN-113	-8.3320E-03	391.71	8.332E-03	&(	4.933E-02	1.46E-02	G K
		255.04	1.807E-01	&	1.574E+00	4.68E-01	G
SB-125	7.5317E-02	427.95	1.053E-02	&(P	1.059E-01	3.11E-02	G K
		600.77	1.445E-02	% P	1.684E-01	4.88E-02	G
		636.15	5.674E-02	% P	3.002E-01	8.79E-02	G
		463.51	2.671E-01	@(P	3.111E-01	9.73E-02	G
		176.29	7.637E-02	%	5.841E-01	1.75E-01	G
I-131	1.0972E-02	364.48	1.097E-02	%(P	5.159E-02	1.53E-02	G K
		636.97	7.650E-03	&	6.315E-01	1.81E-01	G
		284.29	2.106E-02	% P	6.461E-01	1.90E-01	G
CS-134	1.9798E-02	604.66	6.889E-04	&(	6.380E-02	1.88E-02	G K
		795.76	4.321E-02	*(P	3.509E-02	1.17E-02	G
		569.29	3.796E-02	% P	2.113E-01	6.15E-02	G
		801.84	3.264E-02	& P	3.655E-01	1.04E-01	G
CS-137	5.5098E-02	661.62	5.510E-02	(P	3.351E-02	1.19E-02	G
CE-139	6.0162E-03	165.85	6.016E-03	%	4.892E-02	1.46E-02	G
EU-152	7.4505E-02	121.78	2.089E-03	&(P	1.416E-01	4.21E-02	G K
		344.30	2.381E-02	% P	1.163E-01	3.46E-02	G
		1408.08	7.206E-03	%	1.830E-01	5.13E-02	G
		964.00	2.197E-01	?(P	2.875E-01	8.99E-02	G
		1112.07	3.271E-02	%	3.213E-01	9.27E-02	G
		778.90	7.761E-03	&	2.349E-01	6.68E-02	G
EU-154	1.0434E-04	123.10	1.043E-04	&(	1.051E-01	3.13E-02	G K
		1274.80	8.292E-03	%	9.965E-02	2.81E-02	G
		723.30	1.111E-01	%	2.290E-01	6.95E-02	G
		1004.80	3.685E-02	&	1.987E-01	5.77E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	-5.0159E-03	86.45	5.016E-03	% (	2.415E-01	7.21E-02	G K
		105.31	7.559E-02	%	2.323E-01	7.00E-02	G
HG-203	-1.6610E-03	279.17	1.661E-03	& (P	4.440E-02	1.31E-02	G K
		72.87	1.519E-01	% P	2.266E+00	6.77E-01	G
		70.83	1.183E+00	&	4.697E+00	1.41E+00	G
		82.50	2.730E-02	%	4.159E+00	1.24E+00	G
TL-208	2.6283E-01	583.14	2.628E-01	(P	3.916E-02	1.93E-02	G
		510.72	5.652E-01	+ P	1.792E-01	7.92E-02	G
PB-212	8.1049E-01	238.63	8.120E-01	(P	8.512E-02	3.67E-02	G K
							Energy duplication
		77.11	5.379E-01	} P	3.697E-01	9.94E-02	G
		74.81	1.201E+00	+ P	7.745E-01	2.49E-01	G
PB-214	5.1541E-01	351.99	5.258E-01	@ (P	9.081E-02	4.12E-02	G K
		295.22	4.954E-01	(P	1.644E-01	6.46E-02	G
							Energy duplication
		77.11	4.079E-01	} P	9.265E-01	2.16E-01	G
		241.92	3.964E-01	%	5.872E-01	1.79E-01	G
BI-212	6.0361E-01	727.17	6.036E-01	(P	2.782E-01	1.08E-01	G K
		1620.56	1.507E-01	% P	1.012E+00	2.81E-01	G
		785.42	8.316E-01	%	1.456E+00	4.48E-01	G
BI-214	4.4879E-01	609.32	4.488E-01	(P	8.140E-02	3.85E-02	G K
		1764.51	4.488E-01	(P	1.272E-01	6.94E-02	G
		1120.28	6.951E-01	+ P	2.856E-01	1.17E-01	G
RA-224	1.1951E+00	241.00	1.195E+00	(	1.070E+00	3.33E-01	G
RA-226	1.1266E+00	185.99	1.127E+00	*(P	1.124E+00	3.47E-01	G
AC-228	8.1922E-01	911.07	8.579E-01	(P	1.102E-01	6.09E-02	G K
		968.90	7.549E-01	(P	1.718E-01	7.87E-02	G
		338.40	6.336E-01	- P	2.559E-01	9.68E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-1.6435E-01	236.00	1.643E-01	&(	3.997E-01	1.21E-01	G K
		256.25	8.840E-02	% P	4.572E-01	1.36E-01	G
PA-234	-1.9506E-02	98.44	1.951E-02	&(P	2.065E-01	6.15E-02	G K
		946.00	1.300E-03	& P	1.820E-01	5.16E-02	G
		131.28	4.156E-02	& P	2.096E-01	6.29E-02	G
		94.67	1.337E-01	% P	3.961E-01	1.19E-01	G
		883.24	1.418E-03	%	2.588E-01	7.28E-02	G
		926.70	7.194E-02	%	2.940E-01	8.61E-02	G
TH-234	1.8457E+00	569.26	5.660E-02	% P	3.123E-01	9.09E-02	G
		63.29	1.434E+00	%(P	6.258E+00	1.87E+00	G K
		92.80	1.987E+00	(P	2.077E+00	6.38E-01	G
AM-241	-2.5157E-01	92.38	2.306E+00	(P	2.479E+00	7.61E-01	G
		59.54	2.516E-01	&(P	1.080E+00	3.24E-01	G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:

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

Peak Codes:

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	8.4729E-03	8.9376E-03	3.0449E-01	3.0449E-01	3.300E-01
K-40		1.5675E+01	1.5675E+01	1.3022E+00	1.5887E+00	
MN-54	#A	-1.3647E-02	-1.3772E-02	3.5799E-02	3.5807E-02	3.800E-02
CO-57	#B	-4.7940E-04	-4.8449E-04	7.3330E-02	7.3330E-02	4.163E-02
CO-60	#B	-3.0021E-03	-3.0066E-03	1.0272E+01	1.0272E+01	3.650E-02
Sr-85	#A	-1.5260E-02	-1.5946E-02	4.4015E-02	4.4025E-02	4.677E-02
Kr-85	#A	-3.5238E+02	-3.5239E+02	9.7246E+02	9.7267E+02	1.080E+03
Y-88	#B	-9.2066E-05	-9.4561E-05	5.6737E-04	5.6739E-04	1.077E-02
NB-94	#B	-1.3868E-03	-1.3868E-03	2.3792E-02	2.3793E-02	2.815E-02
Ag-108M	#B	-2.4364E-04	-2.4365E-04	3.1409E-02	3.1409E-02	3.663E-02
CD-109	#A	1.3496E+00	1.3581E+00	1.7262E+00	1.7278E+00	1.868E+00
SN-113	#B	-8.1282E-03	-8.3320E-03	4.3773E-02	4.3776E-02	4.812E-02
SB-125	#B	7.5105E-02	7.5317E-02	8.2319E-02	8.2435E-02	1.056E-01
I-131	#B	7.6961E-03	1.0972E-02	4.5918E-02	4.5923E-02	3.619E-02
CS-134	#B	1.9723E-02	1.9798E-02	1.6114E-02	1.6155E-02	6.356E-02
CS-137		5.5084E-02	5.5098E-02	3.5809E-02	3.5952E-02	
CE-139	#A	5.8928E-03	6.0162E-03	4.3883E-02	4.3884E-02	4.792E-02
EU-152	#B	7.4460E-02	7.4505E-02	9.1483E-02	9.1576E-02	1.416E-01
EU-154	#B	1.0424E-04	1.0434E-04	9.3827E-02	9.3827E-02	1.050E-01
EU-155	#B	-5.0080E-03	-5.0159E-03	2.1618E-01	2.1618E-01	2.411E-01
HG-203	#B	-1.5624E-03	-1.6610E-03	4.0225E-02	4.0225E-02	4.176E-02
TL-208		2.6283E-01	2.6283E-01	5.8019E-02	5.9992E-02	
PB-212		8.1049E-01	8.1049E-01	1.0976E-01	1.1942E-01	
PB-214		5.1541E-01	5.1541E-01	1.1763E-01	1.2138E-01	
BI-212		6.0361E-01	6.0361E-01	3.2255E-01	3.2445E-01	
BI-214		4.4879E-01	4.4879E-01	1.1536E-01	1.1827E-01	
RA-224	#	1.1951E+00	1.1951E+00	9.9880E-01	1.0012E+00	1.070E+00
RA-226	#	1.1266E+00	1.1266E+00	1.0409E+00	1.0430E+00	1.124E+00
AC-228		8.1922E-01	8.1922E-01	1.5494E-01	1.6208E-01	
TH-227	#B	-1.6435E-01	-1.6435E-01	3.6279E-01	3.6291E-01	3.997E-01
PA-234	#B	-1.9506E-02	-1.9506E-02	2.1683E-01	2.1684E-01	2.065E-01
TH-234	#B	1.8457E+00	1.8457E+00	1.7791E+00	1.7820E+00	6.258E+00
AM-241	#A	-2.5156E-01	-2.5157E-01	9.8512E-01	9.8522E-01	1.080E+00

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

H - Halflife limit exceeded

----- S U M M A R Y -----
Total Activity (1120.0 to 2000.7 keV) 1.9190874E+01 pCi/gm
Total Decayed Activity (1120.0 to 2000.7 keV) 1.9190886E+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-12-01-005-F

Spectrum Filename: C:\GammaVision\Spectra\103F_24AUG2006_1002.An1

Acquisition information

Start time: 24-Aug-2006 10:02:32
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.41keV)
Stop channel: 4000 (2000.67keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0680E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0680E+03) =
4.8356E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	23-Aug-2006 13:43:00
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. 21 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1902

***** S U M M A R Y O F P E A K 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	158.	18.83	0.99	9.052E-03	74.81	9.600	1.185E+00	PB212
77.20	150.	16.19	0.99	1.011E-02	77.11	17.500	6.653E-01	PB212
					77.11	10.700	1.088E+00	PB214
93.19	107.	37.71	1.50	1.631E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.20	103.	38.96	1.50	1.645E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.50	172.	24.04	1.01	2.565E-02	185.99	3.280	1.235E+00	RA226
209.25	105.	31.08	0.95	2.472E-02				
238.77	1158.	3.48	1.09	2.320E-02	238.63	43.100	7.487E-01	PB212
241.81	154.	17.60	1.09	2.303E-02	241.00	3.900	1.121E+00	RA224
					241.92	7.470	5.863E-01	PB214
269.92	106.	28.60	1.39	2.153E-02				
295.54	222.	15.21	1.24	2.023E-02	295.22	19.200	3.663E-01	PB214
300.73	70.	41.64	0.99	1.998E-02				
338.47	261.	12.19	1.23	1.830E-02	338.40	12.010	7.733E-01	AC228
351.99	470.	8.77	1.24	1.775E-02	351.99	37.100	4.612E-01	PB214
463.20	88.	23.65	1.24	1.425E-02				
463.20	88.	23.65	1.24	1.425E-02	463.51	10.000	3.980E-01	SB125
511.31	179.	14.93	1.36	1.316E-02	510.72	22.500	3.354E-01	TL208
583.32	409.	7.77	1.25	1.184E-02	583.14	86.000	2.594E-01	TL208
609.57	328.	7.86	1.09	1.144E-02	609.32	46.090	3.990E-01	BI214
661.81	164.	16.09	1.52	1.072E-02	661.62	84.620	1.171E-01	CS137
727.61	111.	16.90	1.30	9.960E-03	727.17	11.800	6.119E-01	BI212
860.31	84.	22.19	1.52	8.769E-03				
911.14	263.	8.16	1.56	8.401E-03	911.07	29.000	6.961E-01	AC228
965.28	58.	19.47	1.54	8.048E-03	964.00	14.580	PBC<MDA	EU152

969.30	168.	9.31	1.54	8.023E-03	968.90	17.460	7.846E-01	AC228
1119.91	104.	16.77	0.81	7.214E-03	1120.28	15.040	6.127E-01	BI214
1407.82	22.	38.76	1.81	6.096E-03	1408.08	21.210	PBC<MDA	EU152
1461.20	1514.	2.61	1.90	5.931E-03	1460.75	10.700	1.539E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1620.55	17.	32.73	1.09	5.488E-03	1620.56	2.750	7.255E-01	BI212
1764.96	63.	13.19	2.14	5.141E-03	1764.51	15.920	4.768E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	Suspected Nuclide
417.66	209.25	454.	105.	0.052	93.23	0.951	AC-228
538.98	269.92	342.	106.	0.053	85.81	1.395	AC-228 s
600.61	300.73	316.	70.	0.035	124.92	0.987	PB-212
1719.66	860.31	81.	84.	0.042	66.56	1.518	TL-208
1930.43	965.37	45.	47.	0.023	75.42	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.	158.	0.079	56.50	0.993D	
PB-212	153.39	77.11	374.	150.	0.075	48.58	0.995A	
RA-226	371.79	186.32	755.	148.	0.074	75.67	1.500s	
PB-212	476.71	238.78	831.	1054.	0.527	16.12	1.019	
RA-224	482.51	241.68	843.	131.	0.066	97.37	1.500	
PB-214	590.23	295.54	344.	218.	0.109	45.63	1.240	
AC-228	676.07	338.47	280.	260.	0.130	36.57	1.225	
PB-214	703.12	351.99	358.	465.	0.232	26.32	1.243s	
SB-125	925.44	463.16	147.	87.	0.044	66.21	1.500	
TL-208	1021.74	511.31	199.	152.	0.076	44.79	1.357s	
TL-208	1165.75	583.32	171.	404.	0.202	23.31	1.250	
BI-214	1218.24	609.57	127.	322.	0.161	23.58	1.089	
CS-137	1322.70	661.81	141.	163.	0.081	48.26	1.517	
BI-212	1454.30	727.61	89.	110.	0.055	50.69	1.296	
AC-228	1821.31	911.14	76.	260.	0.130	24.48	1.562s	
AC-228	1936.81	968.90	42.	168.	0.084	28.39	1.541D	
BI-214	2238.80	1119.91	70.	102.	0.051	50.32	0.806s	
EU-152	2814.52	1407.82	27.	22.	0.011	116.27	1.812s	
K-40	2921.26	1461.20	32.	1495.	0.747	7.84	1.898	
BI-212	3239.91	1620.55	3.	17.	0.008	98.20	1.093s	
BI-214	3528.67	1764.96	5.	60.	0.030	39.56	2.138	

s - Peak fails shape tests.
 D - Peak area deconvoluted.

A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		9.0648E-02	477.56	9.065E-02	% (	2.929E-01 8.75E-02	G
K-40		1.5389E+01	1460.75	1.539E+01	(P	3.002E-01 4.07E-01	G
MN-54		1.4280E-02	834.81	1.428E-02	&(P	3.290E-02 9.91E-03	G
CO-57		-6.0381E-03	122.07	-6.038E-03	% (P	4.993E-02 1.49E-02	G K
			136.43	9.006E-02	%	3.541E-01 1.06E-01	G
CO-60		1.6115E-02	1332.51	1.612E-02	% (P	3.342E-02 1.00E-02	G K
			1173.23	1.125E-02	% P	4.768E-02 1.40E-02	G K
Sr-85		-6.6034E-03	514.00	-6.603E-03	% (	3.677E-02 1.09E-02	G
Kr-85		-1.5004E+02	513.99	-1.500E+02	% (	8.411E+02 2.49E+02	G
Y-88		-2.0088E-03	1836.01	-2.009E-03	% (P	2.323E-02 6.15E-03	G K
			898.02	-9.132E-03	% P	3.766E-02 1.10E-02	G
NB-94		-1.0331E-02	871.10	-1.033E-02	% (	3.361E-02 9.98E-03	G K
			702.50	5.156E-03	%	3.287E-02 9.62E-03	G K
Ag-108M		-1.7638E-02	722.95	-1.764E-02	% (	4.082E-02 1.23E-02	G K
			614.37	-7.169E-03	% P	3.884E-02 1.15E-02	G
			433.93	6.056E-03	&	3.058E-02 9.04E-03	G
CD-109		8.9203E-01	88.04	8.920E-01	&(	1.659E+00 5.04E-01	G
SN-113		9.9789E-03	391.71	9.979E-03	% (	4.183E-02 1.24E-02	G K
			255.04	-2.475E-01	%	1.536E+00 4.58E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	1.0095E-01	427.95	5.426E-05	% (P	1.024E-01	2.99E-02	G K
		600.77	3.793E-03	% P	1.488E-01	4.28E-02	G
		636.15	3.622E-02	% P	1.985E-01	5.74E-02	G
		463.51	3.999E-01	(P	2.721E-01	8.96E-02	G
		176.29	1.091E-01	%	5.317E-01	1.59E-01	G
I-131	-7.7973E-03	364.48	7.797E-03	% (P	3.875E-02	1.15E-02	G K
		636.97	1.620E-02	&	4.255E-01	1.23E-01	G
		284.29	1.073E-01	& P	5.046E-01	1.51E-01	G
CS-134	-2.4789E-03	604.66	2.479E-03	& (	5.905E-02	1.75E-02	G K
		795.76	2.419E-02	% P	3.791E-02	1.17E-02	G
		569.29	6.173E-03	& P	1.618E-01	4.58E-02	G
		801.84	1.057E-01	% P	3.366E-01	9.93E-02	G
CS-137	1.1712E-01	661.62	1.171E-01	(P	4.186E-02	1.90E-02	G
CE-139	-6.7039E-04	165.85	6.704E-04	& (	4.123E-02	1.23E-02	G
EU-152	4.7336E-02	121.78	6.442E-04	% (P	1.449E-01	4.32E-02	G K
		344.30	5.142E-02	& P	8.022E-02	2.47E-02	G
		1408.08	1.135E-01	(	1.353E-01	4.40E-02	G
		964.00	3.038E-03	% P	3.968E-01	1.16E-01	G
		1112.07	4.097E-02	&	2.893E-01	8.40E-02	G
		778.90	3.220E-02	%	2.103E-01	6.09E-02	G
EU-154	-1.6326E-02	123.10	1.633E-02	% (	1.034E-01	3.10E-02	G K
		1274.80	4.524E-02	&	8.728E-02	2.67E-02	G
		723.30	3.530E-03	%	3.149E-01	9.29E-02	G
		1004.80	6.167E-02	%	1.713E-01	5.10E-02	G
EU-155	1.1593E-01	86.45	1.159E-01	% (	2.162E-01	6.57E-02	G K
		105.31	3.480E-02	%	2.189E-01	6.56E-02	G
HG-203	-7.4538E-03	279.17	7.454E-03	% (P	3.919E-02	1.17E-02	G K
		72.87	7.690E-01	% P	2.028E+00	6.13E-01	G
		70.83	2.352E+00	&	4.049E+00	1.23E+00	G
		82.50	5.533E-01	&	3.567E+00	1.07E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.5935E-01	583.14	2.594E-01	(P	4.080E-02	2.04E-02	G
		510.72	3.354E-01	+ P	1.509E-01	5.89E-02	G
PB-212	6.8187E-01	238.63	6.886E-01	(P	8.958E-02	3.74E-02	G K
		77.11	5.521E-01	} P	3.426E-01	8.94E-02	G
		74.81	1.185E+00	+ P	7.039E-01	2.28E-01	G
PB-214	4.6121E-01	351.99	4.612E-01	@(P	9.018E-02	4.10E-02	G K
		295.22	3.663E-01	- P	1.498E-01	5.68E-02	G
		77.11	0.000E+00	} P	8.067E-01	0.00E+00	G
		241.92	3.573E-01	%	5.271E-01	1.61E-01	G
BI-212	6.3338E-01	727.17	6.119E-01	(P	2.592E-01	1.04E-01	G K
		1620.56	7.255E-01	(P	4.808E-01	2.38E-01	G
		785.42	5.274E-01	%	1.589E+00	4.73E-01	G
BI-214	4.1897E-01	609.32	3.990E-01	(P	6.847E-02	3.20E-02	G K
		1764.51	4.768E-01	(P	1.070E-01	6.63E-02	G
		1120.28	6.127E-01	+ P	2.517E-01	1.05E-01	G
RA-224	9.5363E-01	241.00	9.536E-01	(	1.002E+00	3.10E-01	G
RA-226	1.1472E+00	185.99	1.147E+00	*(P	1.015E+00	3.15E-01	G
AC-228	7.3758E-01	911.07	6.961E-01	@(P	1.166E-01	5.75E-02	G K
		968.90	7.819E-01	(P	1.540E-01	7.41E-02	G
		338.40	7.733E-01	(P	2.398E-01	9.47E-02	G
TH-227	-1.7289E-01	236.00	-1.729E-01	%(	3.778E-01	1.15E-01	G K
		256.25	8.617E-02	% P	4.503E-01	1.34E-01	G
PA-234	-4.8886E-03	98.44	-4.889E-03	%(P	2.132E-01	6.35E-02	G K
		946.00	6.934E-03	& P	1.848E-01	5.31E-02	G
		131.28	-1.393E-02	& P	1.988E-01	5.94E-02	G
		94.67	-1.570E-01	% P	3.994E-01	1.21E-01	G
		883.24	1.389E-02	%	2.382E-01	6.77E-02	G
		926.70	1.253E-03	%	2.819E-01	7.97E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	1.210E-03	& P	2.989E-01	8.61E-02 G
TH-234	7.6964E-01					
		63.29	7.696E-01	&(P	5.903E+00	1.76E+00 G K
		92.80	1.362E+00	% P	2.045E+00	6.22E-01 G
		92.38	1.669E+00	% P	2.409E+00	7.33E-01 G
AM-241	-1.8972E-01					
		59.54	1.897E-01	%(P	1.086E+00	3.25E-01 G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:

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

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	8.9657E-02	9.0648E-02	2.6259E-01	2.6264E-01	2.897E-01
K-40		1.5389E+01	1.5389E+01	1.2212E+00	1.5132E+00	
MN-54	#A	1.4253E-02	1.4280E-02	2.9744E-02	2.9756E-02	3.284E-02
CO-57	#B	-6.0250E-03	-6.0381E-03	4.6975E-02	4.6976E-02	4.982E-02
CO-60	#B	1.6110E-02	1.6115E-02	3.0027E-02	3.0041E-02	3.341E-02

Sr-85	#A	-6.5439E-03	-6.6034E-03	3.2691E-02	3.2694E-02	3.644E-02
Kr-85	#A	-1.5004E+02	-1.5004E+02	7.4772E+02	7.4777E+02	8.411E+02
Y-88	#B	-1.9977E-03	-2.0088E-03	2.0057E-02	2.0057E-02	2.310E-02
NB-94	#B	-1.0331E-02	-1.0331E-02	2.9938E-02	2.9944E-02	3.361E-02
Ag-108M	#B	-1.7638E-02	-1.7638E-02	3.6967E-02	3.6981E-02	4.082E-02
CD-109	#A	8.9087E-01	8.9203E-01	1.5130E+00	1.5138E+00	1.657E+00
SN-113	#B	9.9281E-03	9.9789E-03	3.7300E-02	3.7304E-02	4.162E-02
SB-125	#B	1.0090E-01	1.0095E-01	6.7816E-02	6.8069E-02	1.023E-01
I-131	#B	-7.2482E-03	-7.7973E-03	3.7662E-02	3.7665E-02	3.602E-02
CS-134	#B	-2.4770E-03	-2.4789E-03	5.2453E-02	5.2453E-02	5.901E-02
CS-137		1.1712E-01	1.1712E-01	5.7005E-02	5.7409E-02	
CE-139	#A	-6.6754E-04	-6.7039E-04	3.6782E-02	3.6782E-02	4.105E-02
EU-152	#B	4.7330E-02	4.7336E-02	5.5038E-02	5.5100E-02	1.449E-01
EU-154	#B	-1.6323E-02	-1.6326E-02	9.3019E-02	9.3023E-02	1.034E-01
EU-155	#B	1.1589E-01	1.1593E-01	1.9713E-01	1.9724E-01	2.161E-01
HG-203	#B	-7.3605E-03	-7.4538E-03	3.5241E-02	3.5243E-02	3.870E-02
TL-208		2.5935E-01	2.5935E-01	6.1090E-02	6.2918E-02	
PB-212		6.8187E-01	6.8187E-01	1.1116E-01	1.1800E-01	
PB-214		4.6121E-01	4.6121E-01	1.2287E-01	1.2576E-01	
BI-212		6.3338E-01	6.3338E-01	3.2252E-01	3.2461E-01	
BI-214		4.1897E-01	4.1897E-01	1.0077E-01	1.0366E-01	
RA-224	A	9.5363E-01	9.5363E-01	9.2858E-01	9.3023E-01	1.002E+00
RA-226	#	1.1472E+00	1.1472E+00	9.4419E-01	9.4654E-01	1.015E+00
AC-228		7.3758E-01	7.3758E-01	1.2942E-01	1.3632E-01	
TH-227	#B	-1.7289E-01	-1.7289E-01	3.4350E-01	3.4365E-01	3.778E-01
PA-234	#B	-4.8886E-03	-4.8886E-03	3.4524E-01	3.4524E-01	2.132E-01
TH-234	#B	7.6964E-01	7.6964E-01	5.2839E+00	5.2841E+00	5.903E+00
AM-241	#A	-1.8972E-01	-1.8972E-01	9.9207E-01	9.9212E-01	1.086E+00

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

----- S U M M A R Y -----
 Total Activity (1120.0 to 2000.7 keV) 1.9652079E+01 pCi/gm
 Total Decayed Activity (1120.0 to 2000.7 keV) 1.9652084E+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-12-01-016-F-S

Spectrum Filename: C:\GammaVision\Spectra\107F_21AUG2006_1526.An1

Acquisition information

Start time: 21-Aug-2006 15:26:46
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.1320E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1320E+03) =
4.6904E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	19-Aug-2006 11:40:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 25 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1019

***** S U M M A R Y O F P E A K 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	486.	10.14	1.18	2.851E-02	74.81	9.600	1.117E+00	PB212
77.11	692.	7.68	1.18	2.958E-02	77.11	10.700	1.376E+00	PB214
					77.11	17.500	8.470E-01	PB212
87.26	200.	22.36	1.19	3.310E-02	86.45	32.740	1.179E-01	EU155
					88.04	3.790	1.006E+00	CD109
89.95	158.	26.29	1.19	3.377E-02				
93.13	227.	18.35	1.19	3.448E-02	92.38	2.570	1.578E+00	TH234
					92.80	3.000	1.276E+00	TH234
186.44	201.	22.50	1.45	3.607E-02	185.99	3.280	1.075E+00	RA226
209.76	110.	35.50	1.03	3.425E-02				
238.72	1686.	3.05	1.30	3.187E-02	238.63	43.100	7.702E-01	PB212
241.42	264.	13.76	1.30	3.165E-02	241.00	3.900	1.342E+00	RA224
					241.92	7.470	7.043E-01	PB214
270.77	121.	30.30	1.44	2.941E-02				
277.79	58.	40.58	1.21	2.889E-02				
295.31	328.	8.45	1.34	2.767E-02	295.22	19.200	3.856E-01	PB214
300.44	116.	20.90	1.34	2.733E-02				
328.30	106.	22.29	1.96	2.559E-02				
338.50	376.	11.32	1.42	2.500E-02	338.40	12.010	7.873E-01	AC228
352.06	624.	6.89	1.44	2.425E-02	351.99	37.100	4.360E-01	PB214
409.74	93.	27.28	1.74	2.154E-02				
462.85	149.	21.51	1.46	1.955E-02				
462.85	149.	21.51	1.46	1.955E-02	463.51	10.000	4.759E-01	SB125
510.70	246.	11.38	1.67	1.808E-02	510.72	22.500	3.315E-01	TL208
583.20	656.	6.61	1.71	1.629E-02	583.14	86.000	2.948E-01	TL208
609.23	468.	7.21	1.33	1.574E-02	609.32	46.090	4.047E-01	BI214
661.59	65.	24.56	1.59	1.477E-02	661.62	84.620	3.129E-02	CS137

727.74	207.	14.61	1.62	1.373E-02	727.17	11.800	8.041E-01	BI212
794.81	99.	22.15	1.18	1.285E-02				
794.81	99.	22.15	1.18	1.285E-02	795.76	85.400	5.715E-02	CS134
835.48	52.	30.72	1.03	1.238E-02				
859.97	112.	21.41	2.04	1.212E-02				
911.22	432.	6.48	1.56	1.161E-02	911.07	29.000	8.054E-01	AC228
968.01	328.	9.13	1.63	1.110E-02	968.90	17.460	1.068E+00	AC228
1120.36	138.	17.31	2.05	9.969E-03	1120.28	15.040	5.775E-01	BI214
1460.82	2033.	2.29	2.12	8.191E-03	1460.75	10.700	1.467E+01	K40
1588.43	60.	18.41	0.96	7.686E-03				
1621.40	19.	34.33	1.37	7.569E-03	1620.56	2.750	5.755E-01	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.48	83.	11.99	2.03	7.084E-03	1764.51	15.920	4.626E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
174.19	87.40	897.	200.	0.100	67.07	1.187	PB-214 D
179.57	90.09	781.	158.	0.079	78.88	1.189	PB-214 D
185.91	93.26	757.	227.	0.114	55.05	1.191	U-235 D
419.15	209.76	638.	110.	0.055	106.51	1.029	NP-239 s
541.16	270.77	474.	121.	0.061	90.89	1.444	AC-228 s
555.21	277.79	260.	58.	0.029	124.74	1.212	NP-239
600.45	300.42	382.	114.	0.057	86.45	1.516	PB-212 M
656.23	328.30	217.	106.	0.053	66.87	1.957	RH-106M s
819.08	409.74	213.	93.	0.047	81.84	1.736	AC-228 s
1719.51	859.97	119.	112.	0.056	64.22	2.043	TL-208 s
3176.48	1588.43	16.	60.	0.030	55.23	0.957	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
HG-203	146.41	73.37	2157.	-195.	-0.098	103.29	1.500s
PB-212	149.29	74.81	983.	474.	0.237	30.99	1.178D
PB-212	153.89	77.11	1068.	646.	0.323	18.76	1.179A
EU-155	174.13	87.23	1946.	166.	0.083	115.19	1.500
CD-109	173.97	87.15	1640.	168.	0.084	104.78	1.500
TH-234	186.06	93.20	1792.	187.	0.093	88.92	1.500s
RA-226	372.52	186.44	767.	201.	0.100	67.51	1.452s
TH-227	471.76	236.06	1577.	-197.	-0.098	88.41	1.500s
PB-212	476.89	238.63	420.	1668.	0.834	8.89	1.297D
RA-224	481.63	241.00	1683.	149.	0.074	118.40	1.299D
PB-214	483.47	241.92	685.	159.	0.079	56.57	1.299A
PB-214	590.20	295.29	384.	295.	0.148	34.83	1.280
AC-228	676.61	338.50	452.	373.	0.186	33.95	1.418
PB-214	703.73	352.06	400.	619.	0.310	20.66	1.437
SB-125	926.31	463.36	237.	80.	0.040	84.70	1.500s
TL-208	1020.99	510.70	226.	213.	0.106	34.13	1.670s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1165.99	583.20	283.	652.	0.326	19.84	1.708
BI-214	1218.04	609.23	207.	463.	0.232	21.62	1.329
CS-137	1322.82	661.62	87.	62.	0.031	69.99	1.594D
BI-212	1455.06	727.74	178.	206.	0.103	43.84	1.616s
CS-134	1589.48	794.95	101.	57.	0.028	83.78	1.684
AC-228	1822.00	911.22	114.	428.	0.214	19.44	1.564
AC-228	1935.59	968.01	142.	326.	0.163	27.40	1.634s
BI-214	2240.30	1120.36	123.	137.	0.068	51.92	2.048
K-40	2921.25	1460.82	34.	2029.	1.014	6.88	2.121
BI-212	3242.42	1621.40	10.	19.	0.009	102.99	1.371s
BI-214	3528.62	1764.48	6.	82.	0.041	35.97	2.029

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

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

- Nuclide - Name Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7	2.8583E-02	477.56	2.858E-02	%	2.338E-01 6.89E-02	G
K-40	1.4671E+01	1460.75	1.467E+01	(P	2.171E-01 3.37E-01	G
MN-54	-5.7314E-03	834.81	-5.731E-03	%(P	2.869E-02 8.44E-03	G
CO-57	-1.2279E-03	122.07	-1.228E-03	%(P	3.505E-02 1.05E-02	G K
		136.43	3.655E-02	& P	2.642E-01 7.92E-02	G
CO-60	9.3109E-03	1332.51	9.311E-03	%(P	2.996E-02 8.77E-03	G K
		1173.23	3.505E-03	% P	3.884E-02 1.13E-02	G K
Sr-85	-2.3457E-02	514.00	-2.346E-02	%(	3.417E-02 1.05E-02	G
Kr-85	-5.5369E+02	513.99	-5.537E+02	%(P	7.737E+02 2.37E+02	G
Y-88	1.4655E-03	1836.01	1.466E-03	%(P	2.117E-02 5.71E-03	G K
		898.02	4.407E-03	& P	2.986E-02 8.70E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-2.4210E-03	871.10	2.421E-03	&(P	2.294E-02	6.61E-03	G K
		702.50	1.130E-02	% P	2.555E-02	7.71E-03	G K
Ag-108M	-1.9013E-02	722.95	1.901E-02	% (	3.790E-02	1.15E-02	G K
		614.37	8.375E-05	&	3.145E-02	9.18E-03	G
		433.93	1.702E-03	% P	2.603E-02	7.62E-03	G
CD-109	8.4634E-01	88.04	8.463E-01	(P	9.656E-01	2.96E-01	G
SN-113	2.2600E-03	391.71	2.260E-03	&(P	3.126E-02	9.15E-03	G K
		255.04	1.084E-01	&	1.149E+00	3.42E-01	G
SB-125	6.6088E-02	427.95	7.917E-05	%(P	7.912E-02	2.31E-02	G K
		600.77	2.351E-02	% P	1.380E-01	4.05E-02	G
		636.15	8.535E-02	& P	1.205E-01	3.78E-02	G
		463.51	2.615E-01	*(P	2.422E-01	7.64E-02	G
		176.29	4.689E-02	% P	4.103E-01	1.23E-01	G
I-131	0.0000E+00	364.48	0.000E+00	&(	3.548E-02	1.04E-02	G K
		636.97	1.655E-01	%	3.914E-01	1.18E-01	G
		284.29	1.799E-01	%	5.096E-01	1.54E-01	G
CS-134	2.0314E-02	604.66	9.200E-03	%(P	1.819E-02	5.53E-03	G K
		795.76	3.302E-02	(P	2.867E-02	9.31E-03	G
		569.29	1.984E-02	&	1.608E-01	4.73E-02	G
		801.84	2.229E-02	% P	2.956E-01	8.56E-02	G
CS-137	3.1365E-02	661.62	3.136E-02	(P	2.344E-02	7.74E-03	G
CE-139	4.2099E-03	165.85	4.210E-03	%(P	3.287E-02	9.84E-03	G
EU-152	2.0272E-03	121.78	2.027E-03	%(P	9.657E-02	2.89E-02	G K
		344.30	9.759E-04	& P	8.345E-02	2.45E-02	G
		1408.08	3.233E-02	& P	1.079E-01	3.16E-02	G
		964.00	1.200E-02	% P	3.110E-01	9.14E-02	G
		1112.07	1.846E-02	& P	2.647E-01	7.68E-02	G
		778.90	3.193E-02	% P	1.800E-01	5.26E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	7.5016E-03	123.10	7.502E-03	% (P	7.112E-02	2.13E-02	G K
		1274.80	9.428E-03	& P	9.359E-02	2.71E-02	G
		723.30	9.774E-02	% P	1.847E-01	5.61E-02	G
		1004.80	1.822E-02	& P	1.844E-01	5.37E-02	G
EU-155	9.7878E-02	86.45	9.788E-02	(	1.229E-01	3.76E-02	G K
		105.31	2.756E-02	% P	1.449E-01	4.36E-02	G
HG-203	5.4616E-03	279.17	5.462E-03	& (P	2.878E-02	8.59E-03	G K
		72.87	6.776E-01	% P	9.685E-01	2.95E-01	G
		70.83	1.382E+00	+	1.553E+00	4.76E-01	G
		82.50	1.766E-01	%	1.625E+00	4.87E-01	G
TL-208	3.0243E-01	583.14	2.948E-01	(P	3.672E-02	1.96E-02	G
		510.72	3.315E-01	*(P	1.134E-01	4.37E-02	G
PB-212	7.9073E-01	238.63	7.693E-01	(P	4.526E-02	2.30E-02	G K
		77.11	7.907E-01	}	1.899E-01	4.95E-02	G
		74.81	1.098E+00	+ P	3.448E-01	1.14E-01	G
PB-214	4.2570E-01	351.99	4.360E-01	(P	6.754E-02	3.03E-02	G K
		295.22	3.520E-01	- P	1.121E-01	4.15E-02	G
		77.11	1.350E-02	}	4.068E-01	1.09E-01	G
		241.92	4.257E-01	}	3.345E-01	8.03E-02	G
BI-212	8.0406E-01	727.17	8.041E-01	*(P	2.538E-01	1.18E-01	G K
		1620.56	5.755E-01	- P	5.336E-01	2.03E-01	G
		785.42	8.208E-01	% P	1.211E+00	3.74E-01	G
BI-214	4.1958E-01	609.32	4.047E-01	(P	6.090E-02	2.94E-02	G K
		1764.51	4.626E-01	(P	7.774E-02	5.61E-02	G
		1120.28	5.775E-01	+ P	2.303E-01	1.01E-01	G
RA-224	7.6329E-01					Derived Ave Activity	
		241.00	7.633E-01	}(P	9.940E-01	3.15E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RA-226	1.0748E+00	185.99	1.075E+00	(	7.054E-01	2.42E-01	G
AC-228	8.0012E-01	911.07	8.054E-01	(P	9.888E-02	5.27E-02	G K
		968.90	1.068E+00	+ P	1.904E-01	9.81E-02	G
		338.40	7.873E-01	(P	2.148E-01	8.99E-02	G
TH-227	-3.4661E-01	236.00	-3.466E-01	?(P	3.309E-01	1.02E-01	G K
		256.25	7.507E-02	% P	3.441E-01	1.03E-01	G
PA-234	-1.4790E-02	98.44	-1.479E-02	&(	1.220E-01	3.66E-02	G K
		946.00	6.052E-02	%	1.060E-01	3.26E-02	G
		131.28	-2.308E-02	&	1.501E-01	4.51E-02	G
		94.67	-1.512E-01	%	2.450E-01	7.46E-02	G
		883.24	3.769E-02	&	1.939E-01	5.67E-02	G
		926.70	0.000E+00	%	2.614E-01	7.52E-02	G
		569.26	2.931E-02	&	2.381E-01	7.00E-02	G
TH-234	7.7718E-01	63.29	4.916E-01	%(P	1.566E+00	4.72E-01	G K
		92.80	1.148E+00	(P	1.229E+00	3.76E-01	G
		92.38	-6.500E-02	% P	1.456E+00	4.35E-01	G
AM-241	1.6337E-03	59.54	1.634E-03	&(P	2.074E-01	6.20E-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	2.7793E-02	2.8583E-02	2.0678E-01	2.0679E-01	2.274E-01
K-40		1.4671E+01	1.4671E+01	1.0113E+00	1.3317E+00	
MN-54	#A	-5.7040E-03	-5.7314E-03	2.7348E-02	2.7350E-02	2.855E-02
CO-57	#B	-1.2211E-03	-1.2279E-03	3.4353E-02	3.4353E-02	3.485E-02
CO-60	#B	9.3037E-03	9.3109E-03	2.6323E-02	2.6328E-02	2.994E-02
Sr-85	#A	-2.2922E-02	-2.3457E-02	3.1456E-02	3.1486E-02	3.339E-02
Kr-85	#A	-5.5368E+02	-5.5369E+02	7.7538E+02	7.7607E+02	7.737E+02
Y-88	#B	1.4451E-03	1.4655E-03	1.7126E-02	1.7126E-02	2.088E-02
NB-94	#B	-2.4210E-03	-2.4210E-03	2.1058E-02	2.1058E-02	2.294E-02
Ag-108M	#B	-1.9013E-02	-1.9013E-02	3.4536E-02	3.4554E-02	3.790E-02
CD-109	#A	8.4355E-01	8.4634E-01	8.8849E-01	8.8973E-01	9.624E-01
SN-113	#B	2.2308E-03	2.2600E-03	2.7456E-02	2.7457E-02	3.085E-02
SB-125	#B	6.5990E-02	6.6088E-02	5.7935E-02	5.8067E-02	7.901E-02
I-131	#B	0.0000E+00	0.0000E+00	3.1325E-02	3.1325E-02	2.946E-02
CS-134	#F	2.0274E-02	2.0314E-02	1.7177E-02	1.7219E-02	1.815E-02
CS-137		3.1360E-02	3.1365E-02	2.3206E-02	2.3280E-02	
CE-139	#A	4.1644E-03	4.2099E-03	2.9534E-02	2.9535E-02	3.252E-02
EU-152	#B	2.0265E-03	2.0272E-03	8.6566E-02	8.6566E-02	9.654E-02
EU-154	#B	7.4980E-03	7.5016E-03	6.3940E-02	6.3941E-02	7.108E-02
EU-155	#A	9.7797E-02	9.7878E-02	1.1275E-01	1.1288E-01	1.228E-01
HG-203	#B	5.2891E-03	5.4616E-03	2.5767E-02	2.5769E-02	2.787E-02
TL-208		3.0243E-01	3.0243E-01	6.0415E-02	6.3000E-02	
PB-212		7.9073E-01	7.9073E-01	7.0973E-02	8.4960E-02	
PB-214		4.2570E-01	4.2570E-01	8.8681E-02	9.2176E-02	
BI-212		8.0406E-01	8.0406E-01	3.5470E-01	3.5786E-01	
BI-214		4.1958E-01	4.1958E-01	8.8967E-02	9.2353E-02	
RA-224	A	7.6329E-01	7.6329E-01	9.1730E-01	9.1841E-01	
RA-226	#	1.0748E+00	1.0748E+00	7.2567E-01	7.2844E-01	
AC-228		8.0012E-01	8.0012E-01	1.5712E-01	1.6407E-01	
TH-227	#A	-3.4661E-01	-3.4661E-01	3.0686E-01	3.0754E-01	3.309E-01
PA-234	#B	-1.4790E-02	-1.4790E-02	1.0976E-01	1.0976E-01	1.220E-01
TH-234	#B	7.7718E-01	7.7718E-01	7.6398E-01	7.6519E-01	1.566E+00

AM-241 #A 1.6337E-03 1.6337E-03 1.8611E-01 1.8611E-01 2.074E-01

- # - All peaks for activity calculation had bad shape.
- * - Activity omitted from total
- & - Activity omitted from total and all peaks had bad shape.
- < - MDA value printed.
- A - Activity printed, but activity < MDA.
- B - Activity < MDA and failed test.
- 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) 2.0083593E+01 pCi/gm
Total Decayed Activity (726.7 to 2000.1 keV) 2.0083599E+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-12-01-014-F

Spectrum Filename: C:\GammaVision\Spectra\107F_22AUG2006_1351.An1

Acquisition information

Start time: 22-Aug-2006 13:53:48
Live time: 2000
Real time: 2002
Dead time: 0.11 %
Detector ID: 2

Detector system

Det 107- DSPE- 634

Calibration

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

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.8900E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.8900E+03) =
5.2910E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	19-Aug-2006 13:50:00
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. 19 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.0150

***** S U M M A R Y O F P E A K 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	307.	13.84	1.18	2.849E-02	72.87	6.400	1.305E+00	HG203
					74.81	9.600	8.022E-01	PB212
77.06	287.	13.70	1.18	2.957E-02	77.11	17.500	5.969E-01	PB212
					77.11	10.700	9.655E-01	PB214
77.29	119.	40.63	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
86.96	153.	39.17	1.06	3.298E-02	86.45	32.740	1.021E-01	EU155
92.86	112.	36.84	1.00	3.440E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
128.79	182.	30.10	1.14	3.817E-02				
185.95	176.	25.57	1.52	3.610E-02	185.99	3.280	1.064E+00	RA226
238.80	1045.	4.29	1.30	3.188E-02	238.63	43.100	5.351E-01	PB212
241.15	182.	22.69	1.30	3.169E-02	241.00	3.900	1.042E+00	RA224
					241.92	7.470	5.478E-01	PB214
295.37	242.	10.52	1.34	2.767E-02	295.22	19.200	3.192E-01	PB214
300.43	73.	28.80	1.34	2.733E-02				
338.59	275.	10.57	1.62	2.499E-02	338.40	12.010	6.471E-01	AC228
352.12	467.	8.93	1.95	2.425E-02	351.99	37.100	3.673E-01	PB214
409.18	51.	37.83	0.99	2.156E-02				
463.22	96.	26.27	1.99	1.954E-02				
463.22	96.	26.27	1.99	1.954E-02	463.51	10.000	3.419E-01	SB125
478.09	34.	41.39	0.84	1.905E-02	477.56	10.300	1.287E-01	BE7
511.26	227.	13.67	1.59	1.807E-02	510.72	22.500	3.395E-01	TL208
583.18	482.	6.89	1.76	1.629E-02	583.14	86.000	2.435E-01	TL208
609.49	374.	8.40	2.00	1.574E-02	609.32	46.090	3.643E-01	BI214
662.15	115.	17.05	2.07	1.476E-02	661.62	84.620	6.355E-02	CS137
727.97	131.	18.26	2.34	1.373E-02	727.17	11.800	5.710E-01	BI212

795.21	47.	31.67	1.68	1.284E-02	795.76	85.400	3.055E-02	CS134
911.58	307.	8.14	2.39	1.160E-02	911.07	29.000	6.431E-01	AC228
968.71	283.	9.88	1.94	1.109E-02	968.90	17.460	1.035E+00	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1121.09	122.	21.86	2.14	9.970E-03	1120.28	15.040	5.823E-01	BI214
1461.10	1925.	2.30	2.51	8.189E-03	1460.75	10.700	1.567E+01	K40
1764.54	68.	12.94	1.25	7.084E-03	1764.51	15.920	4.331E-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 %	Suspected Nuclide
173.59	86.96	1330.	153.	0.077	117.51	1.060	TB-160 l
257.25	128.79	960.	234.	0.117	59.44	1.139	AC-228 s
600.35	300.37	266.	68.	0.034	115.94	1.099	PB-212 M
817.96	409.18	139.	51.	0.025	113.50	0.988	CS-138
955.78	478.09	82.	34.	0.017	124.16	0.839	BE-7 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 %
PB-212	149.29	74.81	773.	307.	0.153	41.51	1.178D
PB-212	153.89	77.11	799.	287.	0.143	41.09	1.179A
RA-226	371.55	185.95	687.	176.	0.088	76.72	1.521s
TH-227	471.77	236.07	1292.	-147.	-0.074	106.77	1.500s
PB-212	476.89	238.63	429.	1028.	0.514	12.43	1.297D
PB-214	483.47	241.92	543.	163.	0.081	64.46	1.299D
PB-214	590.24	295.31	405.	253.	0.126	43.97	1.388s
AC-228	676.79	338.59	231.	272.	0.136	31.71	1.624s
PB-214	703.85	352.12	359.	462.	0.231	26.78	1.955s
SB-125	926.52	463.46	156.	66.	0.033	84.42	1.500s
TL-208	1022.11	511.26	227.	193.	0.097	41.00	1.592s
TL-208	1165.95	583.18	172.	477.	0.239	20.67	1.760s
BI-214	1218.57	609.49	179.	370.	0.185	25.19	1.999s
CS-137	1323.88	662.15	99.	111.	0.056	51.15	2.071s
BI-212	1455.51	727.97	123.	130.	0.065	54.79	2.343s
CS-134	1589.99	795.21	89.	47.	0.023	95.00	1.684s
AC-228	1822.72	911.58	103.	303.	0.151	24.41	2.388s
AC-228	1936.99	968.71	121.	280.	0.140	29.65	1.943s
BI-214	2241.75	1121.09	151.	122.	0.061	65.58	2.139s
K-40	2921.79	1461.10	12.	1920.	0.960	6.89	2.508s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3528.74	1764.54	5.	68.	0.034	38.83	1.246s

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

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

- Nuclide - Name	- Average Code Activity pCi/gm	----- Energy keV	----- Peak Activity pCi/gm	----- Code MDA Value pCi/gm	----- COMMENTS
BE-7	1.1408E-01	477.56	1.141E-01	%(2.184E-01 6.65E-02	G
K-40	1.5667E+01	1460.75	1.567E+01	@(P 1.512E-01 3.61E-01	G
MN-54	2.3372E-03	834.81	2.337E-03	%(P 3.316E-02 9.65E-03	G
CO-57	-2.9377E-05	122.07-2.938E-05		&(P 3.079E-02 9.16E-03	G K
		136.43-2.819E-03		% P 2.665E-01 7.94E-02	G
CO-60	-1.4719E-03	1332.51-1.472E-03		&(P 2.946E-02 8.04E-03	G K
		1173.23 7.679E-03		% P 3.649E-02 1.06E-02	G K
Sr-85	-1.3757E-02	514.00-1.376E-02		&(3.446E-02 1.04E-02	G
Kr-85	-3.3522E+02	513.99-3.352E+02		&(P 7.741E+02 2.32E+02	G
Y-88	-3.9503E-03	1836.01-3.950E-03		%(P 2.232E-02 6.02E-03	G K
		898.02-1.022E-03		% P 3.721E-02 1.07E-02	G
NB-94	-5.5411E-03	871.10-5.541E-03		%(P 2.778E-02 8.14E-03	G K
		702.50 1.113E-02		% P 2.555E-02 7.70E-03	G K
Ag-108M	-1.8600E-02	722.95-1.860E-02		%(3.542E-02 1.08E-02	G K
		614.37-2.031E-02		% 3.670E-02 1.12E-02	G
		433.93 4.286E-03		& P 2.476E-02 7.29E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	-2.6081E-02	88.04	2.608E-02	% (P	1.094E+00	3.27E-01	G
SN-113	3.9642E-03	391.71	3.964E-03	% (P	2.943E-02	8.60E-03	G K
		255.04	1.287E-01	&	1.088E+00	3.23E-01	G
SB-125	4.5935E-02	427.95	2.028E-02	% (P	7.979E-02	2.36E-02	G K
		600.77	2.180E-02	& P	1.150E-01	3.36E-02	G
		636.15	1.648E-02	% P	1.842E-01	5.30E-02	G
		463.51	2.419E-01	(P	2.232E-01	7.10E-02	G
		176.29	9.946E-02	% P	4.130E-01	1.24E-01	G
I-131	-4.2956E-03	364.48	4.296E-03	& (	3.652E-02	1.08E-02	G K
		636.97	7.987E-02	%	3.644E-01	1.07E-01	G
		284.29	6.731E-03	%	4.908E-01	1.45E-01	G
CS-134	1.3852E-02	604.66	7.547E-04	% (P	5.515E-02	1.64E-02	G K
		795.76	3.055E-02	* (P	3.049E-02	9.78E-03	G
		569.29	5.271E-04	&	1.565E-01	4.52E-02	G
		801.84	1.720E-03	% P	3.105E-01	8.88E-02	G
CS-137	6.3546E-02	661.62	6.355E-02	* (P	2.807E-02	1.12E-02	G
CE-139	1.5193E-03	165.85	1.519E-03	% (P	3.274E-02	9.75E-03	G
EU-152	7.8690E-03	121.78	7.869E-03	& (P	9.500E-02	2.84E-02	G K
		344.30	3.377E-02	& P	8.104E-02	2.44E-02	G
		1408.08	6.261E-03	& P	1.205E-01	3.35E-02	G
		964.00	5.665E-03	% P	2.325E-01	6.71E-02	G
		1112.07	9.748E-03	& P	2.859E-01	8.25E-02	G
		778.90	2.453E-02	% P	1.851E-01	5.36E-02	G
EU-154	1.6130E-03	123.10	1.613E-03	& (P	6.565E-02	1.96E-02	G K
		1274.80	2.513E-02	& P	1.113E-01	3.27E-02	G
		723.30	4.032E-02	& P	8.627E-02	2.61E-02	G
		1004.80	6.891E-04	& P	1.674E-01	4.76E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	7.5701E-02	86.45	7.570E-02	% (	1.215E-01	3.70E-02	G K
		105.31	4.226E-02	% P	1.424E-01	4.29E-02	G
HG-203	4.4730E-03	279.17	4.473E-03	% (P	3.078E-02	9.15E-03	G K
		72.87	5.355E-01	% P	8.608E-01	2.62E-01	G
		70.83-9.196E-01		&	1.569E+00	4.77E-01	G
		82.50-6.214E-01		%	1.882E+00	5.68E-01	G
TL-208	2.4348E-01	583.14	2.435E-01	@ (P	3.257E-02	1.69E-02	G
		510.72	3.395E-01	+ P	1.281E-01	5.45E-02	G
PB-212	5.5256E-01	238.63	5.346E-01	(P	5.163E-02	2.25E-02	G K
							Energy duplication
		77.11	3.964E-01	}	1.857E-01	5.43E-02	G
		74.81	8.022E-01	+ P	3.458E-01	1.12E-01	G
PB-214	3.5792E-01	351.99	3.673E-01	*(P	7.227E-02	3.32E-02	G K
		295.22	3.398E-01	*(P	1.299E-01	5.07E-02	G
							Energy duplication
		77.11	2.692E-01	} P	4.005E-01	1.09E-01	G
		241.92	4.931E-01	+ P	3.368E-01	1.07E-01	G
BI-212	5.7104E-01	727.17	5.710E-01	*(P	2.403E-01	1.05E-01	G K
		1620.56	2.873E-01	% P	7.518E-01	2.22E-01	G
		785.42	3.509E-01	% P	1.335E+00	3.94E-01	G
BI-214	3.8195E-01	609.32	3.643E-01	*(P	6.417E-02	3.10E-02	G K
		1764.51	4.331E-01	(P	8.121E-02	5.68E-02	G
		1120.28	5.823E-01	+ P	2.859E-01	1.28E-01	G
RA-224	-1.2909E-02	241.00-1.291E-02	% (P	8.526E-01	2.54E-01	G	
RA-226	1.0639E+00	185.99	1.064E+00	*(	7.538E-01	2.72E-01	G
AC-228	6.4426E-01	911.07	6.431E-01	*(P	1.063E-01	5.31E-02	G K
		968.90	1.035E+00	+ P	1.990E-01	1.03E-01	G
		338.40	6.471E-01	*(P	1.752E-01	6.92E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-227	-2.9243E-01	236.00	2.924E-01	?(P	3.384E-01	1.04E-01	G K
		256.25	7.878E-03	& P	3.632E-01	1.07E-01	G
PA-234	0.0000E+00	98.44	0.000E+00	&(	1.268E-01	3.78E-02	G K
		946.00	8.651E-03	&	1.535E-01	4.43E-02	G
		131.28	5.106E-02	&	1.509E-01	4.55E-02	G
		94.67	1.054E-01	&	2.456E-01	7.44E-02	G
		883.24	3.562E-03	&	1.944E-01	5.50E-02	G
		926.70	1.221E-02	%	2.409E-01	6.90E-02	G
		569.26	4.273E-02	&	2.328E-01	6.85E-02	G
TH-234	2.2495E-01	63.29	2.249E-01	%(P	1.500E+00	4.49E-01	G K
		92.80	8.182E-01	% P	1.246E+00	3.79E-01	G
		92.38	1.063E+00	% P	1.464E+00	4.47E-01	G

AM-241 4.8910E-02 59.54 4.891E-02 %(P 1.870E-01 5.63E-02 G

(- This peak used in the nuclide activity average.

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

Nuclide Codes:

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

Peak Codes:

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

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

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

Nuclide		Time of Count Activity pCi/gm	Time Corrected Activity pCi/gm	Uncertainty Counting pCi/gm	3 Sigma Total pCi/gm	MDA pCi/gm
BE-7	#A	1.0971E-01	1.1408E-01	1.9945E-01	1.9956E-01	2.100E-01
K-40	#	1.5667E+01	1.5667E+01	1.0822E+00	1.4238E+00	
MN-54	#A	2.3217E-03	2.3372E-03	2.8945E-02	2.8945E-02	3.294E-02
CO-57	#B	-2.9151E-05	-2.9377E-05	7.8233E-02	7.8233E-02	3.056E-02
CO-60	#B	-1.4703E-03	-1.4719E-03	6.8562E-02	6.8562E-02	2.943E-02
Sr-85	#A	-1.3323E-02	-1.3757E-02	3.1186E-02	3.1196E-02	3.337E-02
Kr-85	#A	-3.3522E+02	-3.3522E+02	8.2258E+02	8.2282E+02	7.741E+02
Y-88	#B	-3.8739E-03	-3.9503E-03	2.8233E-02	2.8234E-02	2.189E-02
NB-94	#B	-5.5411E-03	-5.5411E-03	2.5138E-02	2.5140E-02	2.778E-02
Ag-108M	#B	-1.8599E-02	-1.8600E-02	3.2350E-02	3.2369E-02	3.542E-02
CD-109	#A	-2.5962E-02	-2.6081E-02	1.1301E+00	1.1301E+00	1.089E+00
SN-113	#B	3.8932E-03	3.9642E-03	2.5808E-02	2.5809E-02	2.890E-02
SB-125	#B	4.5840E-02	4.5935E-02	4.0434E-02	4.0525E-02	7.963E-02
I-131	#B	-3.3159E-03	-4.2956E-03	3.2347E-02	3.2348E-02	2.819E-02
CS-134	#B	1.3814E-02	1.3852E-02	1.3309E-02	1.3334E-02	5.500E-02
CS-137	#	6.3534E-02	6.3546E-02	3.3535E-02	3.3744E-02	
CE-139	#A	1.4965E-03	1.5193E-03	2.9262E-02	2.9262E-02	3.225E-02
EU-152	#B	7.8655E-03	7.8690E-03	8.5169E-02	8.5170E-02	9.496E-02
EU-154	#B	1.6119E-03	1.6130E-03	5.8673E-02	5.8673E-02	6.561E-02
EU-155	#B	7.5614E-02	7.5701E-02	1.1103E-01	1.1111E-01	1.214E-01
HG-203	#B	4.2776E-03	4.4730E-03	2.7450E-02	2.7451E-02	2.944E-02
TL-208	#	2.4348E-01	2.4348E-01	5.0804E-02	5.2800E-02	
PB-212		5.5256E-01	5.5256E-01	6.9759E-02	7.7016E-02	
PB-214		3.5792E-01	3.5792E-01	9.3607E-02	9.5964E-02	
BI-212	#	5.7104E-01	5.7104E-01	3.1600E-01	3.1779E-01	
BI-214		3.8195E-01	3.8195E-01	8.9519E-02	9.2318E-02	
RA-224	#A	-1.2909E-02	-1.2909E-02	3.3983E+00	3.3983E+00	8.526E-01
RA-226	#	1.0639E+00	1.0639E+00	8.1627E-01	8.1869E-01	
AC-228	#	6.4426E-01	6.4426E-01	1.3053E-01	1.3597E-01	
TH-227	#A	-2.9243E-01	-2.9243E-01	3.1281E-01	3.1329E-01	3.384E-01
PA-234	#B	0.0000E+00	0.0000E+00	1.1345E-01	1.1345E-01	1.268E-01
TH-234	#B	2.2495E-01	2.2495E-01	1.3462E+00	1.3462E+00	1.500E+00
AM-241	#A	4.8910E-02	4.8910E-02	1.6883E-01	1.6885E-01	1.870E-01

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

H - Halflife limit exceeded

----- S U M M A R Y -----
Total Activity (295.2 to 2000.1 keV) 1.9546017E+01 pCi/gm
Total Decayed Activity (295.2 to 2000.1 keV) 1.9546032E+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-12-01-010-F

Spectrum Filename: C:\GammaVision\Spectra\107F_23AUG2006_1034.An1

Acquisition information

Start time: 24-Aug-2006 10:33:51
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.1290E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.1290E+03) =
4.6970E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	23-Aug-2006 11:22:00
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: 0.1587

***** S U M M A R Y O F P E A K 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	319.	13.85	1.18	2.849E-02	74.81	9.600	7.317E-01	PB212
77.09	443.	10.50	1.18	2.956E-02	77.11	17.500	5.437E-01	PB212
					77.11	10.700	8.797E-01	PB214
92.99	139.	35.34	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.00	135.	39.99	1.50	3.429E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.29	259.	19.12	1.54	3.608E-02	185.99	3.280	1.388E+00	RA226
209.61	106.	39.62	1.76	3.426E-02				
238.78	1109.	4.19	1.30	3.187E-02	238.63	43.100	5.047E-01	PB212
					241.00	3.900	5.681E+00	RA224
241.94	206.	17.59	1.30	3.162E-02	241.92	7.470	5.489E-01	PB214
270.30	118.	22.82	1.10	2.944E-02				
295.41	241.	10.54	1.34	2.767E-02	295.22	19.200	2.828E-01	PB214
300.13	69.	31.30	1.34	2.735E-02				
338.27	293.	15.42	1.61	2.501E-02	338.40	12.010	6.121E-01	AC228
351.85	553.	8.27	1.75	2.427E-02	351.99	37.100	3.861E-01	PB214
462.77	106.	25.93	1.21	1.955E-02				
462.77	106.	25.93	1.21	1.955E-02	463.51	10.000	3.369E-01	SB125
510.43	234.	14.42	1.80	1.809E-02	510.72	22.500	3.126E-01	TL208
583.27	458.	6.68	1.66	1.629E-02	583.14	86.000	2.056E-01	TL208
609.44	424.	7.59	1.72	1.574E-02	609.32	46.090	3.671E-01	BI214
661.25	128.	21.75	1.95	1.478E-02	661.62	84.620	6.331E-02	CS137
727.87	96.	18.34	1.03	1.374E-02	727.17	11.800	3.754E-01	BI212
794.63	86.	26.16	1.75	1.285E-02				
794.63	86.	26.16	1.75	1.285E-02	795.76	85.400	4.952E-02	CS134
911.32	355.	8.45	1.95	1.161E-02	911.07	29.000	6.618E-01	AC228

968.51	224.	13.84	1.47	1.110E-02	968.90	17.460	7.284E-01	AC228
1121.02	150.	17.20	2.05	9.970E-03	1120.28	15.040	6.354E-01	BI214
1461.02	1906.	2.31	2.23	8.190E-03	1460.75	10.700	1.377E+01	K40
1765.13	76.	12.25	2.27	7.084E-03	1764.51	15.920	4.284E-01	BI214

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***** 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
```

Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
418.85	209.61	635.	106.	0.053	118.87	1.758	NP-239 s
540.24	270.30	276.	118.	0.059	68.46	1.098	AC-228
599.87	300.04	199.	69.	0.035	93.89	1.341	PB-212 1D

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

 This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.29	74.81	822.	315.	0.157	41.60	1.178D
PB-212	153.89	77.11	862.	269.	0.134	41.20	1.179A
PB-214	153.89	77.11	1392.	166.	0.083	89.14	1.500A
TH-234	185.63	92.99	1523.	139.	0.070	106.02	1.500
RA-226	372.23	186.29	783.	259.	0.130	57.35	1.538s
TH-227	471.75	236.06	1435.	-185.	-0.092	89.77	1.500s
PB-212	476.89	238.63	464.	1093.	0.547	12.11	1.297D
RA-224	477.22	238.79	743.	1066.	0.533	14.19	1.500
PB-214	483.47	241.92	560.	198.	0.099	54.51	1.299D
PB-214	590.27	295.32	331.	231.	0.116	40.61	1.463
AC-228	676.15	338.27	462.	290.	0.145	46.25	1.615s
PB-214	703.32	351.85	400.	547.	0.274	24.82	1.753s
SB-125	926.40	463.40	185.	55.	0.028	106.42	1.500
TL-208	1020.45	510.43	266.	200.	0.100	43.26	1.803s
TL-208	1166.13	583.27	154.	454.	0.227	20.03	1.660
BI-214	1218.46	609.44	179.	420.	0.210	22.78	1.724s
CS-137	1322.08	661.25	174.	125.	0.062	65.24	1.948s
BI-212	1455.31	727.87	86.	96.	0.048	55.01	1.035s
CS-134	1590.23	795.33	102.	51.	0.025	93.38	1.684s
AC-228	1822.20	911.32	123.	351.	0.175	25.36	1.947s
AC-228	1936.57	968.51	167.	222.	0.111	41.51	1.469s
BI-214	2241.62	1121.02	120.	150.	0.075	51.60	2.047s
K-40	2921.64	1461.02	14.	1901.	0.951	6.94	2.234
BI-214	3529.91	1765.13	4.	76.	0.038	36.76	2.265

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

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

- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA	Value
		pCi/gm	keV	pCi/gm		pCi/gm	
							COMMENTS
BE-7		1.2371E-02	477.56	1.237E-02	&(	2.050E-01	5.99E-02 G
K-40		1.3769E+01	1460.75	1.377E+01	(P	1.447E-01	3.19E-01 G
MN-54		-4.9379E-04	834.81	-4.938E-04	%(P	2.197E-02	6.24E-03 G
CO-57		-6.0317E-03	122.07	-6.032E-03	%(P	3.099E-02	9.30E-03 G K
			136.43	3.486E-02	% P	2.276E-01	6.82E-02 G
CO-60		9.5999E-03	1332.51	9.600E-03	%(P	2.707E-02	7.94E-03 G K
			1173.23	2.163E-02	% P	3.401E-02	1.04E-02 G K
Sr-85		-1.4713E-02	514.00	-1.471E-02	%(	3.025E-02	9.18E-03 G
Kr-85		-3.6076E+02	513.99	-3.608E+02	%(P	6.945E+02	2.10E+02 G
Y-88		-1.6141E-03	1836.01	-1.614E-03	%(P	1.707E-02	4.34E-03 G K
			898.02	-8.958E-04	% P	3.119E-02	8.93E-03 G
NB-94		-8.3747E-03	871.10	-8.375E-03	&(P	2.710E-02	8.06E-03 G K
			702.50	8.863E-03	& P	2.259E-02	6.78E-03 G K
Ag-108M		1.4641E-04	722.95	1.464E-04	&(	2.680E-02	7.72E-03 G K
			614.37	-1.468E-02	%	3.209E-02	9.72E-03 G
			433.93	-2.817E-03	% P	2.423E-02	7.10E-03 G
CD-109		5.2142E-01	88.04	5.214E-01	%(P	9.207E-01	2.80E-01 G
SN-113		-7.9662E-03	391.71	-7.966E-03	&(P	3.192E-02	9.45E-03 G K
			255.04	-1.145E-01	&	7.724E-01	2.29E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	4.1271E-02	427.95	5.363E-03	% (P	7.178E-02	2.10E-02	G K
		600.77	9.634E-03	& P	1.199E-01	3.48E-02	G
		636.15	4.668E-03	& P	2.052E-01	5.91E-02	G
		463.51	1.793E-01	(P	2.150E-01	6.69E-02	G
		176.29	2.583E-03	& P	3.697E-01	1.10E-01	G
I-131	-3.8285E-04	364.48	3.828E-04	& (	2.734E-02	8.01E-03	G K
		636.97	4.802E-02	&	3.524E-01	1.03E-01	G
		284.29	1.982E-01	%	3.608E-01	1.10E-01	G
CS-134	1.4794E-02	604.66	2.052E-03	% (P	5.306E-02	1.58E-02	G K
		795.76	2.936E-02	* (P	2.882E-02	9.23E-03	G
		569.29	2.297E-02	%	1.425E-01	4.19E-02	G
		801.84	2.650E-02	% P	2.453E-01	7.06E-02	G
CS-137	6.3312E-02	661.62	6.331E-02	(P	3.262E-02	1.42E-02	G
CE-139	-2.8935E-04	165.85	2.893E-04	& (P	3.058E-02	9.11E-03	G
EU-152	-1.7297E-02	121.78	1.730E-02	& (P	9.008E-02	2.70E-02	G K
		344.30	1.262E-02	% P	7.890E-02	2.34E-02	G
		1408.08	3.749E-03	% P	8.532E-02	2.27E-02	G
		964.00	5.991E-02	& P	2.456E-01	7.29E-02	G
		1112.07	4.948E-02	% P	2.654E-01	7.80E-02	G
		778.90	5.291E-02	& P	1.850E-01	5.48E-02	G
EU-154	-1.0343E-02	123.10	1.034E-02	% (P	5.864E-02	1.76E-02	G K
		1274.80	2.424E-02	% P	8.544E-02	2.52E-02	G
		723.30	9.265E-03	& P	1.185E-01	3.43E-02	G
		1004.80	3.444E-02	& P	1.662E-01	4.88E-02	G
EU-155	5.2446E-02	86.45	5.245E-02	% (	1.134E-01	3.44E-02	G K
		105.31	3.205E-02	& P	1.261E-01	3.79E-02	G
HG-203	-6.9237E-03	279.17	6.924E-03	& (P	2.847E-02	8.51E-03	G K
		72.87	1.129E-01	% P	7.007E-01	2.10E-01	G
		70.83	6.938E-01	%	9.898E-01	3.03E-01	G
		82.50	3.608E-01	&	1.657E+00	4.99E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.0563E-01	583.14	2.056E-01	(P	2.744E-02	1.39E-02	G
		510.72	3.126E-01	+ P	1.227E-01	5.27E-02	G
PB-212	5.1604E-01	238.63	5.047E-01	(P	4.759E-02	2.07E-02	G K
		77.11	3.299E-01	}	1.711E-01	4.53E-02	G
		74.81	7.309E-01	+ P	3.163E-01	1.03E-01	G
PB-214	3.8613E-01	351.99	3.861E-01	*(P	6.760E-02	3.22E-02	G K
		295.22	2.763E-01	- P	1.045E-01	3.81E-02	G
		77.11	3.337E-01	} P	3.541E-01	9.92E-02	G
		241.92	5.325E-01	+ P	3.035E-01	9.75E-02	G
BI-212	3.7542E-01	727.17	3.754E-01	(P	1.798E-01	6.98E-02	G K
		1620.56	1.241E-01	% P	6.638E-01	1.86E-01	G
		785.42	4.598E-01	% P	1.230E+00	3.68E-01	G
BI-214	3.8286E-01	609.32	3.671E-01	*(P	5.696E-02	2.82E-02	G K
		1764.51	4.284E-01	(P	6.702E-02	5.31E-02	G
		1120.28	6.354E-01	+ P	2.275E-01	1.10E-01	G
RA-224	5.4710E+00	241.00	5.471E+00	(P	6.661E-01	2.59E-01	G
RA-226	1.3883E+00	185.99	1.388E+00	*(	7.135E-01	2.66E-01	G
AC-228	6.7147E-01	911.07	6.618E-01	@(P	1.026E-01	5.66E-02	G K
		968.90	7.284E-01	*(P	2.061E-01	1.02E-01	G
		338.40	6.121E-01	@(P	2.175E-01	9.54E-02	G
TH-227	-3.2642E-01	236.00	-3.264E-01	&(P	3.163E-01	9.75E-02	G K
		256.25	-9.792E-02	% P	3.332E-01	9.98E-02	G
PA-234	-7.5922E-04	98.44	-7.592E-04	&(	1.153E-01	3.44E-02	G K
		946.00	-1.847E-02	&	1.444E-01	4.21E-02	G
		131.28	5.284E-04	%	1.333E-01	3.98E-02	G
		94.67	-6.763E-02	%	2.212E-01	6.68E-02	G
		883.24	4.059E-02	%	1.911E-01	5.60E-02	G
		926.70	4.000E-02	%	1.909E-01	5.56E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	3.413E-02	%	2.112E-01	6.21E-02 G
TH-234	4.3065E-01	63.29	1.018E-01	%(P	1.444E+00	4.31E-01 G K
		92.80	8.582E-01	(P	1.136E+00	3.46E-01 G
		92.38	9.702E-01	% P	1.347E+00	4.11E-01 G

AM-241 3.4063E-02
 59.54 3.406E-02 %(P 1.876E-01 5.64E-02 G
 (- This peak used in the nuclide activity average.

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

Nuclide Codes:

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

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	1.2217E-02	1.2371E-02	1.7956E-01	1.7956E-01	2.024E-01
K-40		1.3769E+01	1.3769E+01	9.5746E-01	1.2562E+00	
MN-54	#A	-4.9273E-04	-4.9379E-04	4.8867E-02	4.8867E-02	2.192E-02
CO-57	#B	-6.0167E-03	-6.0317E-03	2.8418E-02	2.8420E-02	3.091E-02
CO-60	#B	9.5965E-03	9.5999E-03	2.3819E-02	2.3826E-02	2.706E-02

Sr-85	#A	-1.4562E-02	-1.4713E-02	2.7534E-02	2.7548E-02	2.994E-02
Kr-85	#A	-3.6076E+02	-3.6076E+02	7.2099E+02	7.2130E+02	6.945E+02
Y-88	#B	-1.6040E-03	-1.6141E-03	3.6283E-02	3.6283E-02	1.697E-02
NB-94	#B	-8.3747E-03	-8.3747E-03	2.4606E-02	2.4611E-02	2.710E-02
Ag-108M	#B	1.4641E-04	1.4641E-04	2.3162E-02	2.3162E-02	2.680E-02
CD-109	#A	5.2065E-01	5.2142E-01	8.3998E-01	8.4048E-01	9.194E-01
SN-113	#B	-7.9200E-03	-7.9662E-03	3.4765E-02	3.4768E-02	3.174E-02
SB-125	#B	4.1244E-02	4.1271E-02	4.6163E-02	4.6228E-02	7.173E-02
I-131	#B	-3.5224E-04	-3.8285E-04	2.4029E-02	2.4029E-02	2.515E-02
CS-134	#B	1.4780E-02	1.4794E-02	1.3958E-02	1.3985E-02	5.302E-02
CS-137		6.3308E-02	6.3312E-02	4.2475E-02	4.2639E-02	
CE-139	#A	-2.8794E-04	-2.8935E-04	4.5665E-02	4.5665E-02	3.043E-02
EU-152	#B	-1.7295E-02	-1.7297E-02	8.1891E-02	8.1896E-02	9.007E-02
EU-154	#B	-1.0341E-02	-1.0343E-02	5.5038E-02	5.5041E-02	5.863E-02
EU-155	#B	5.2427E-02	5.2446E-02	1.0318E-01	1.0322E-01	1.134E-01
HG-203	#B	-6.8248E-03	-6.9237E-03	2.8293E-02	2.8296E-02	2.807E-02
TL-208		2.0563E-01	2.0563E-01	4.1610E-02	4.3346E-02	
PB-212		5.1604E-01	5.1604E-01	6.3416E-02	7.0359E-02	
PB-214		3.8613E-01	3.8613E-01	9.6746E-02	9.9397E-02	
BI-212	#	3.7542E-01	3.7542E-01	2.0929E-01	2.1046E-01	
BI-214		3.8286E-01	3.8286E-01	8.3719E-02	8.6719E-02	
RA-224	#	5.4710E+00	5.4710E+00	7.7770E-01	8.4216E-01	6.661E-01
RA-226	#	1.3883E+00	1.3883E+00	7.9620E-01	8.0041E-01	
AC-228	#	6.7147E-01	6.7147E-01	1.5186E-01	1.5696E-01	
TH-227	#A	-3.2642E-01	-3.2642E-01	2.9347E-01	2.9411E-01	3.163E-01
PA-234	#B	-7.5922E-04	-7.5922E-04	1.0327E-01	1.0327E-01	1.153E-01
TH-234	#B	4.3065E-01	4.3065E-01	5.2114E-01	5.2169E-01	1.444E+00
AM-241	#A	3.4063E-02	3.4063E-02	1.6911E-01	1.6912E-01	1.876E-01

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

----- S U M M A R Y -----
 Total Activity (270.2 to 2000.1 keV) 1.7758673E+01 pCi/gm
 Total Decayed Activity (270.2 to 2000.1 keV) 1.7758678E+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-12-01-003-F

Spectrum Filename: C:\GammaVision\Spectra\107F_23AUG2006_1301.An1

Acquisition information

Start time: 23-Aug-2006 13:00:48
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.9200E+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	19-Aug-2006 14:30:00
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. 17 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1224

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
75.40	248.	19.94	1.18	2.867E-02	74.81	9.600	6.276E-01	PB212
76.99	463.	10.99	1.18	2.942E-02	77.11	17.500	6.298E-01	PB212
					77.11	10.700	1.019E+00	PB214
86.68	209.	30.98	1.81	3.290E-02	86.45	32.740	1.368E-01	EU155
					88.04	3.790	1.170E+00	CD109
93.19	168.	34.78	1.56	3.447E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
185.92	208.	23.22	2.18	3.611E-02	185.99	3.280	1.238E+00	RA226
209.27	199.	22.83	1.43	3.429E-02				
239.22	1571.	4.48	1.69	3.185E-02	238.63	43.100	7.965E-01	PB212
242.07	157.	23.62	1.30	3.163E-02	241.00	3.900	PBC<MDA	RA224
					241.92	7.470	4.684E-01	PB214
252.36	58.	38.64	0.93	3.081E-02				
295.27	274.	9.80	1.34	2.768E-02	295.22	19.200	3.572E-01	PB214
300.59	112.	20.56	1.34	2.732E-02				
338.74	289.	13.42	1.69	2.498E-02	338.40	12.010	6.689E-01	AC228
352.07	604.	5.57	1.91	2.425E-02	351.99	37.100	4.688E-01	PB214
409.07	66.	34.30	1.30	2.156E-02				
462.83	112.	30.18	0.73	1.955E-02				
462.83	112.	30.18	0.73	1.955E-02	463.51	10.000	3.943E-01	SB125
510.82	205.	16.26	1.90	1.808E-02	510.72	22.500	2.970E-01	TL208
583.36	471.	7.72	1.96	1.629E-02	583.14	86.000	2.343E-01	TL208
609.58	472.	6.18	2.48	1.574E-02	609.32	46.090	4.537E-01	BI214
727.54	157.	15.76	1.59	1.374E-02	727.17	11.800	6.758E-01	BI212
795.34	51.	30.92	1.68	1.284E-02	795.76	85.400	3.254E-02	CS134
860.69	78.	27.59	1.45	1.211E-02				
911.47	341.	8.03	2.11	1.160E-02	911.07	29.000	7.041E-01	AC228

968.30	276.	11.20	2.37	1.110E-02	968.90	17.460	9.930E-01	AC228
1120.13	120.	16.34	2.68	9.970E-03	1120.28	15.040	5.638E-01	BI214
1461.07	2136.	2.24	2.51	8.190E-03	1460.75	10.700	1.711E+01	K40
1764.73	75.	12.11	1.76	7.084E-03	1764.51	15.920	4.662E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV	Suspected Nuclide
418.18	209.27	694.	199.	0.100	68.49	1.431	AC-228 s
504.35	252.36	211.	77.	0.039	86.89	0.929	- s
600.62	300.50	298.	97.	0.049	86.22	0.777	PB-212 sM
817.74	409.07	182.	66.	0.033	102.90	1.303	CS-138 s
1720.94	860.69	110.	78.	0.039	82.76	1.447	TL-208

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

 This section based on library: FSS_Rev_1.Lib

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

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma %	FWHM keV
PB-212	149.29	74.81	955.	284.	0.142	48.78	1.178D
PB-212	153.89	77.11	962.	279.	0.139	42.10	1.179A
PB-214	153.89	77.11	1652.	191.	0.096	81.44	1.500A
EU-155	173.97	87.15	1754.	150.	0.075	120.66	1.500s
CD-109	173.95	87.14	1494.	164.	0.082	102.48	1.500s
RA-226	371.48	185.92	789.	208.	0.104	69.67	2.180s
TH-227	472.00	236.19	1608.	-165.	-0.082	105.97	1.500s
PB-212	476.89	238.63	512.	1072.	0.536	12.59	1.297D
PB-214	483.47	241.92	625.	157.	0.079	70.87	1.299D
PB-214	590.72	295.55	489.	414.	0.207	31.76	1.574s
AC-228	677.10	338.74	382.	285.	0.143	40.25	1.692s
PB-214	703.75	352.07	217.	599.	0.300	16.71	1.910s
SB-125	925.57	462.99	172.	67.	0.034	86.89	1.500s
TL-208	1021.22	510.82	279.	172.	0.086	48.78	1.896s
TL-208	1166.29	583.36	229.	466.	0.233	23.16	1.962s
BI-214	1218.75	609.58	130.	468.	0.234	18.53	2.482s
BI-212	1454.66	727.54	131.	156.	0.078	47.27	1.591s
CS-134	1590.24	795.34	99.	51.	0.025	92.75	1.684s
AC-228	1822.51	911.47	124.	337.	0.168	24.08	2.109s
AC-228	1936.16	968.30	153.	273.	0.137	33.61	2.369s
BI-214	2239.82	1120.13	91.	120.	0.060	49.03	2.678s
K-40	2921.73	1461.07	40.	2131.	1.066	6.71	2.507
BI-214	3529.11	1764.73	3.	75.	0.037	36.32	1.760

s - Peak fails shape tests.
 D - Peak area deconvoluted.

A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****							
- Nuclide -	Average	----- Peak -----					
Name	Code	Activity	Energy	Activity	Code	MDA Value	COMMENTS
		pCi/gm	keV	pCi/gm		pCi/gm	
BE-7		1.5043E-03	477.56	1.504E-03	% (	2.162E-01 6.26E-02	G
K-40		1.7114E+01	1460.75	1.711E+01	(P	2.582E-01 3.84E-01	G
MN-54		-6.0604E-03	834.81	-6.060E-03	%(P	3.234E-02 9.50E-03	G
CO-57		-4.1000E-03	122.07	-4.100E-03	&(P	3.598E-02 1.08E-02	G K
			136.43	-5.315E-02	% P	2.725E-01 8.18E-02	G
CO-60		-3.0232E-03	1332.51	-3.023E-03	%(P	3.586E-02 9.98E-03	G K
			1173.23	2.341E-02	% P	4.296E-02 1.30E-02	G K
Sr-85		-1.2980E-02	514.00	-1.298E-02	%(	3.487E-02 1.05E-02	G
Kr-85		-3.1461E+02	513.99	-3.146E+02	%(P	7.754E+02 2.32E+02	G
Y-88		-8.6116E-04	1836.01	-8.612E-04	%(P	2.446E-02 6.41E-03	G K
			898.02	-1.013E-03	% P	3.833E-02 1.10E-02	G
NB-94		-1.3586E-03	871.10	-1.359E-03	%(P	3.026E-02 8.74E-03	G K
			702.50	-3.435E-03	% P	3.054E-02 8.93E-03	G K
Ag-108M		-1.1981E-02	722.95	-1.198E-02	%(	3.817E-02 1.14E-02	G K
			614.37	-1.015E-02	%	3.357E-02 1.00E-02	G
			433.93	-2.744E-05	% P	2.281E-02 6.59E-03	G
CD-109		9.2131E-01	88.04	9.213E-01	&(P	1.027E+00 3.15E-01	G
SN-113		-1.0234E-02	391.71	-1.023E-02	%(P	4.078E-02 1.21E-02	G K
			255.04	-2.681E-01	&	1.214E+00 3.63E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	4.6676E-02	427.95	1.936E-02	% (P	8.024E-02	2.38E-02	G K
		600.77	9.994E-03	& P	1.372E-01	3.99E-02	G
		636.15	5.298E-02	% P	2.375E-01	7.00E-02	G
		463.51	2.421E-01	(P	2.309E-01	7.31E-02	G
		176.29	1.155E-01	% P	4.083E-01	1.23E-01	G
I-131	-3.9196E-03	364.48	3.920E-03	& (	4.048E-02	1.19E-02	G K
		636.97	9.578E-02	%	4.789E-01	1.41E-01	G
		284.29	9.195E-02	%	5.901E-01	1.76E-01	G
CS-134	-2.3864E-02	604.66	2.386E-02	% (P	3.473E-02	1.07E-02	G K
		795.76	3.254E-02	+ P	3.169E-02	1.02E-02	G
		569.29	3.227E-02	%	1.645E-01	4.86E-02	G
		801.84	2.809E-02	& P	2.996E-01	8.66E-02	G
CS-137	1.5748E-02	661.62	1.575E-02	% (P	3.441E-02	1.04E-02	G
CE-139	-1.0588E-02	165.85	1.059E-02	% (P	3.663E-02	1.10E-02	G
EU-152	-1.4368E-02	121.78	1.437E-02	& (P	1.080E-01	3.24E-02	G K
		344.30	6.414E-03	& P	8.933E-02	2.63E-02	G
		1408.08	3.573E-02	% P	1.034E-01	3.04E-02	G
		964.00	4.816E-02	& P	3.460E-01	1.02E-01	G
		1112.07	1.261E-01	% P	2.601E-01	7.88E-02	G
		778.90	5.152E-02	% P	2.178E-01	6.41E-02	G
EU-154	3.7237E-03	123.10	3.724E-03	& (P	7.424E-02	2.22E-02	G K
		1274.80	2.701E-02	& P	9.220E-02	2.73E-02	G
		723.30	5.447E-02	% P	1.734E-01	5.18E-02	G
		1004.80	2.120E-02	% P	1.834E-01	5.33E-02	G
EU-155	9.8614E-02	86.45	9.861E-02	(	1.297E-01	3.97E-02	G K
		105.31	3.912E-02	% P	1.403E-01	4.23E-02	G
HG-203	1.3213E-02	279.17	1.321E-02	& (P	3.005E-02	9.09E-03	G K
		72.87	2.728E-01	% P	1.010E+00	3.05E-01	G
		70.83	8.714E-01	%	1.647E+00	5.00E-01	G
		82.50	8.175E-01	%	2.132E+00	6.45E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	2.3435E-01	583.14	2.343E-01	*	(P 3.675E-02	1.83E-02	G
		510.72	2.970E-01	+	P 1.394E-01	5.78E-02	G
PB-212	5.4866E-01	238.63	5.487E-01	(P	5.540E-02	2.34E-02	G K
		77.11	3.792E-01	}	2.002E-01	5.32E-02	G
		74.81	7.306E-01	+	P 3.775E-01	1.20E-01	G
PB-214	4.9286E-01	351.99	4.688E-01	*	(P 5.576E-02	2.63E-02	G K
		295.22	5.490E-01	*	(P 1.400E-01	5.88E-02	G
		77.11	4.253E-01	}	P 4.274E-01	1.15E-01	G
		241.92	4.684E-01	(P	3.550E-01	1.12E-01	G
BI-212	6.7583E-01	727.17	6.758E-01	*	(P 2.435E-01	1.07E-01	G K
		1620.56	2.943E-01	&	P 7.250E-01	2.15E-01	G
		785.42	7.498E-01	&	P 1.440E+00	4.38E-01	G
BI-214	4.5690E-01	609.32	4.537E-01	*	(P 5.424E-02	2.83E-02	G K
		1764.51	4.662E-01	(P	6.972E-02	5.71E-02	G
		1120.28	5.638E-01	+	P 2.212E-01	9.28E-02	G
RA-224	2.7892E-01	241.00	2.789E-01	%	(P 9.549E-01	2.88E-01	G
RA-226	1.2375E+00	185.99	1.238E+00	*	(7.940E-01	2.87E-01	G
AC-228	6.9380E-01	911.07	7.041E-01	*	(P 1.143E-01	5.72E-02	G K
		968.90	9.930E-01	+	P 2.192E-01	1.12E-01	G
		338.40	6.689E-01	*	(P 2.197E-01	9.08E-02	G
TH-227	-3.2269E-01	236.00	-3.227E-01	?	(P 3.711E-01	1.14E-01	G K
		256.25	-7.043E-02	&	P 3.735E-01	1.11E-01	G
PA-234	-5.8930E-03	98.44	-5.893E-03	&	(1.373E-01	4.11E-02	G K
		946.00	-3.185E-02	%	1.682E-01	4.95E-02	G
		131.28	7.200E-02	%	1.372E-01	4.17E-02	G
		94.67	-7.301E-02	%	2.522E-01	7.61E-02	G
		883.24	7.268E-02	&	2.266E-01	6.74E-02	G
		926.70	2.123E-02	%	2.702E-01	7.82E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		569.26	4.771E-02	%	2.432E-01	7.18E-02 G
TH-234	1.7263E-01					
		63.29	1.726E-01	%(P	1.632E+00	4.88E-01 G K
		92.80	8.646E-01	% P	1.307E+00	3.97E-01 G
		92.38	1.402E-01	% P	1.592E+00	4.76E-01 G

AM-241 5.2116E-04
 59.54 5.212E-04 &(P 2.147E-01 6.42E-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:

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

Peak Codes:

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

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	MDA
		Activity	Activity	Counting	Total	MDA
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	1.4293E-03	1.5043E-03	1.8768E-01	1.8768E-01	2.054E-01
K-40		1.7114E+01	1.7114E+01	1.1513E+00	1.5320E+00	
MN-54	#A	-6.0076E-03	-6.0604E-03	3.0923E-02	3.0925E-02	3.205E-02
CO-57	#B	-4.0587E-03	-4.1000E-03	3.3301E-02	3.3302E-02	3.562E-02
CO-60	#B	-3.0189E-03	-3.0232E-03	2.2532E-01	2.2532E-01	3.581E-02

Sr-85	#A	-1.2445E-02	-1.2980E-02	3.1501E-02	3.1511E-02	3.343E-02
Kr-85	#A	-3.1460E+02	-3.1461E+02	8.2937E+02	8.2958E+02	7.753E+02
Y-88	#B	-8.3939E-04	-8.6116E-04	3.1289E-02	3.1289E-02	2.384E-02
NB-94	#B	-1.3586E-03	-1.3586E-03	2.9482E-02	2.9482E-02	3.026E-02
Ag-108M	#B	-1.1980E-02	-1.1981E-02	3.4256E-02	3.4263E-02	3.816E-02
CD-109	#A	9.1578E-01	9.2131E-01	9.4601E-01	9.4739E-01	1.021E+00
SN-113	#B	-9.9938E-03	-1.0234E-02	4.3480E-02	4.3485E-02	3.983E-02
SB-125	#B	4.6551E-02	4.6676E-02	4.2258E-02	4.2347E-02	8.002E-02
I-131	#B	-2.7912E-03	-3.9196E-03	3.5839E-02	3.5840E-02	2.883E-02
CS-134	#B	-2.3778E-02	-2.3864E-02	3.2663E-02	3.2694E-02	3.460E-02
CS-137	#A	1.5744E-02	1.5748E-02	3.1083E-02	3.1097E-02	3.440E-02
CE-139	#A	-1.0380E-02	-1.0588E-02	3.3611E-02	3.3617E-02	3.591E-02
EU-152	#B	-1.4359E-02	-1.4368E-02	9.8329E-02	9.8332E-02	1.079E-01
EU-154	#B	3.7204E-03	3.7237E-03	6.6564E-02	6.6564E-02	7.417E-02
EU-155	#A	9.8465E-02	9.8614E-02	1.1898E-01	1.1911E-01	1.296E-01
HG-203	#B	1.2461E-02	1.3213E-02	2.7257E-02	2.7268E-02	2.834E-02
TL-208	#	2.3435E-01	2.3435E-01	5.4805E-02	5.6526E-02	
PB-212		5.4866E-01	5.4866E-01	7.0064E-02	7.7194E-02	
PB-214		4.9286E-01	4.9286E-01	8.3043E-02	8.7997E-02	
BI-212	#	6.7583E-01	6.7583E-01	3.2211E-01	3.2458E-01	
BI-214		4.5690E-01	4.5690E-01	8.5450E-02	8.9610E-02	
RA-224	#A	2.7892E-01	2.7892E-01	8.6330E-01	8.6346E-01	9.549E-01
RA-226	#	1.2375E+00	1.2375E+00	8.6220E-01	8.6529E-01	
AC-228	#	6.9380E-01	6.9380E-01	1.6460E-01	1.6962E-01	
TH-227	#A	-3.2269E-01	-3.2269E-01	3.4252E-01	3.4305E-01	3.711E-01
PA-234	#B	-5.8930E-03	-5.8930E-03	1.2325E-01	1.2325E-01	1.373E-01
TH-234	#B	1.7263E-01	1.7263E-01	1.4651E+00	1.4652E+00	1.632E+00
AM-241	#A	5.2115E-04	5.2116E-04	1.9247E-01	1.9247E-01	2.147E-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 (252.2 to 2000.1 keV) 2.1453695E+01 pCi/gm
 Total Decayed Activity (252.2 to 2000.1 keV) 2.1453701E+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-12-01-008-F-S

Spectrum Filename: C:\GammaVision\Spectra\107F_23AUG2006_1504.An1

Acquisition information

Start time: 23-Aug-2006 15:04:07
Live time: 2000
Real time: 2003
Dead time: 0.14 %
Detector ID: 2

Detector system

Det 107- DSPE- 634

Calibration

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

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.2890E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.2890E+03) =
4.3687E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	23-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. 18 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1646

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

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/gm	Nuc
74.48	187.	36.02	1.50	2.747E-02	72.87	6.400	PBC<MDA	HG203
					74.81	9.600	PBC<MDA	PB212
74.77	381.	12.33	1.18	2.849E-02	72.87	6.400	1.279E+00	HG203
					74.81	9.600	8.216E-01	PB212
77.07	357.	11.39	1.18	2.957E-02	77.11	17.500	6.363E-01	PB212
					77.11	10.700	1.032E+00	PB214
77.20	188.	28.69	1.50	2.957E-02	77.11	17.500	PBC<MDA	PB212
					77.11	10.700	PBC<MDA	PB214
93.20	129.	41.05	1.50	3.438E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
93.21	153.	37.30	1.50	3.429E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
186.10	219.	22.81	2.44	3.609E-02	185.99	3.280	1.093E+00	RA226
209.80	126.	33.23	1.55	3.424E-02				
238.79	1251.	3.95	1.30	3.187E-02	238.63	43.100	5.306E-01	PB212
241.76	222.	16.98	1.30	3.164E-02	241.00	3.900	1.050E+00	RA224
					241.92	7.470	5.516E-01	PB214
270.32	140.	28.82	1.36	2.944E-02				
277.40	62.	41.64	1.55	2.892E-02				
277.40	62.	41.64	1.55	2.892E-02	279.17	81.500	PBC<MDA	HG203
295.45	294.	9.60	1.34	2.767E-02	295.22	19.200	3.214E-01	PB214
300.54	75.	31.16	1.34	2.733E-02				
328.18	76.	37.44	1.77	2.559E-02				
338.69	311.	12.77	1.80	2.499E-02	338.40	12.010	6.051E-01	AC228
351.84	633.	6.61	1.92	2.427E-02	351.99	37.100	4.120E-01	PB214
462.95	85.	30.99	1.96	1.955E-02				
462.95	85.	30.99	1.96	1.955E-02	463.51	10.000	2.497E-01	SB125

510.82	237.	13.25	1.56	1.808E-02	510.72	22.500	2.955E-01	TL208
583.34	483.	7.83	1.91	1.629E-02	583.14	86.000	2.015E-01	TL208
609.48	440.	7.05	1.90	1.574E-02	609.32	46.090	3.549E-01	BI214
661.63	128.	25.34	1.75	1.477E-02	661.62	84.620	5.888E-02	CS137
727.39	179.	17.86	2.10	1.374E-02	727.17	11.800	6.484E-01	BI212
768.99	112.	24.42	1.53	1.317E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
786.21	53.	32.70	2.19	1.297E-02	785.42	2.000	1.210E+00	BI212
911.39	390.	8.15	2.00	1.160E-02	911.07	29.000	6.762E-01	AC228
965.36	76.	21.65	1.80	1.112E-02				
969.12	174.	10.72	1.80	1.109E-02	968.90	17.460	5.224E-01	AC228
1120.45	141.	17.21	1.87	9.969E-03	1120.28	15.040	5.524E-01	BI214
1131.27	46.	35.00	1.03	9.899E-03				
1461.05	1972.	2.32	2.27	8.190E-03	1460.75	10.700	1.325E+01	K40
1620.29	37.	27.77	1.16	7.569E-03	1620.56	2.750	1.049E+00	BI212
1764.85	109.	11.46	1.44	7.083E-03	1764.51	15.920	5.670E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	Suspected Nuclide
419.25	209.80	673.	126.	0.063	99.68	1.551	NP-239 s
540.26	270.32	535.	140.	0.070	86.46	1.361	AC-228
600.52	300.45	318.	78.	0.039	108.84	1.117	PB-212 sM
655.97	328.18	302.	76.	0.038	112.33	1.771	AC-228 s
1537.54	768.99	159.	112.	0.056	55.54	1.532	BI-214 s
1931.03	965.61	107.	67.	0.034	74.60	1.797	TB-160 D
2262.11	1131.27	78.	46.	0.023	105.00	1.028	J-135 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 %
HG-203	148.63	74.48	2208.	187.	0.093	108.06	1.500s
PB-212	149.29	74.81	936.	381.	0.190	37.00	1.178D
PB-212	153.89	77.11	993.	357.	0.178	34.17	1.179A
PB-214	153.89	77.11	1828.	188.	0.094	86.08	1.500A
TH-234	186.09	93.21	1727.	153.	0.076	111.90	1.500s
RA-226	371.30	185.83	1005.	150.	0.075	93.16	1.500s
TH-227	471.79	236.08	1658.	-176.	-0.088	101.10	1.500s
PB-212	476.89	238.63	524.	1230.	0.615	11.45	1.297D
PB-214	483.47	241.92	622.	201.	0.101	56.17	1.299D
PB-214	590.34	295.36	326.	298.	0.149	31.53	1.420
AC-228	676.99	338.69	399.	308.	0.154	38.32	1.799s
PB-214	703.30	351.84	355.	628.	0.314	19.83	1.917s
SB-125	925.86	463.13	196.	81.	0.040	77.99	1.500s
TL-208	1021.23	510.82	261.	204.	0.102	39.75	1.555s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1166.26	583.34	254.	478.	0.239	23.50	1.911s
BI-214	1218.54	609.48	185.	436.	0.218	21.14	1.895s
Ag-108M	1223.16	611.79	352.	-116.	-0.058	74.13	1.561s
CS-137	1322.84	661.63	241.	125.	0.062	76.03	1.754
BI-212	1454.36	727.39	203.	178.	0.089	53.57	2.102s
BI-212	1571.99	786.21	95.	53.	0.027	98.11	2.187s
AC-228	1822.34	911.39	151.	386.	0.193	24.44	2.002s
AC-228	1937.36	968.90	113.	165.	0.082	35.40	1.799D
BI-214	2240.46	1120.45	126.	140.	0.070	51.63	1.867
K-40	2921.71	1461.05	33.	1967.	0.984	6.97	2.266
BI-212	3240.20	1620.29	17.	37.	0.018	83.31	1.158s
BI-214	3529.35	1764.85	10.	108.	0.054	34.39	1.440s

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

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

Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		-3.8165E-02	477.56	3.817E-02	&(	2.159E-01	6.39E-02 G
K-40		1.3252E+01	1460.75	1.325E+01	(P	1.978E-01	3.09E-01 G
MN-54		1.0870E-02	834.81	1.087E-02	%(P	2.555E-02	7.70E-03 G
CO-57		7.4830E-03	122.07	7.483E-03	&(P	3.044E-02	9.16E-03 G K
			136.43	8.301E-02	%(P	2.578E-01	7.78E-02 G
CO-60		7.6407E-03	1332.51	7.641E-03	%(P	2.676E-02	7.79E-03 G K
			1173.23	9.241E-03	%(P	3.782E-02	1.12E-02 G K
Sr-85		-1.4835E-02	514.00	1.483E-02	%(	2.980E-02	9.05E-03 G
Kr-85		-3.6513E+02	513.99	3.651E+02	%(P	6.904E+02	2.09E+02 G
Y-88		5.3860E-04	1836.01	5.386E-04	&(P	1.751E-02	4.59E-03 G K
			898.02	5.185E-03	%(P	2.520E-02	7.37E-03 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	-4.1334E-03	871.10	4.133E-03	&(P	2.430E-02	7.11E-03	G K
		702.50	2.030E-04	% P	2.674E-02	7.76E-03	G K
Ag-108M	-9.2579E-03	722.95	9.258E-03	% (	3.390E-02	1.01E-02	G K
		614.37	4.837E-02	+	3.762E-02	1.20E-02	G
		433.93	2.766E-03	& P	2.485E-02	7.30E-03	G
CD-109	2.3426E-02	88.04	2.343E-02	% (P	9.819E-01	2.94E-01	G
SN-113	-9.6647E-04	391.71	9.665E-04	&(P	2.878E-02	8.36E-03	G K
		255.04	3.314E-02	&	1.079E+00	3.20E-01	G
SB-125	5.3682E-02	427.95	1.042E-02	&(P	7.150E-02	2.11E-02	G K
		600.77	1.216E-02	& P	1.174E-01	3.42E-02	G
		636.15	7.013E-04	& P	1.899E-01	5.47E-02	G
		463.51	2.434E-01	(P	2.053E-01	6.55E-02	G
		176.29	4.994E-03	% P	3.277E-01	9.72E-02	G
I-131	3.2829E-03	364.48	3.283E-03	&(	2.337E-02	6.91E-03	G K
		636.97	0.000E+00	&	2.871E-01	8.27E-02	G
		284.29	0.000E+00	&	3.805E-01	1.13E-01	G
CS-134	6.4269E-04	604.66	6.427E-04	&(P	5.492E-02	1.64E-02	G K
		795.76	1.782E-02	% P	2.919E-02	8.96E-03	G
		569.29	3.194E-02	%	1.321E-01	3.91E-02	G
		801.84	7.191E-02	% P	2.781E-01	8.23E-02	G
CS-137	5.8883E-02	661.62	5.888E-02	(P	3.547E-02	1.53E-02	G
CE-139	3.6892E-03	165.85	3.689E-03	% (P	3.039E-02	9.10E-03	G
EU-152	2.3800E-02	121.78	2.380E-02	% (P	9.151E-02	2.76E-02	G K
		344.30	2.188E-02	% P	8.311E-02	2.48E-02	G
		1408.08	4.076E-02	% P	9.513E-02	2.85E-02	G
		964.00	9.687E-04	& P	2.532E-01	7.39E-02	G
		1112.07	7.327E-02	% P	1.653E-01	4.98E-02	G
		778.90	1.535E-02	% P	1.660E-01	4.80E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	-9.5163E-03	123.10	9.516E-03	&(P	6.756E-02	2.03E-02	G K
		1274.80	2.014E-02	% P	8.580E-02	2.52E-02	G
		723.30	4.556E-02	% P	1.568E-01	4.68E-02	G
		1004.80	3.641E-02	& P	1.583E-01	4.66E-02	G
EU-155	7.5440E-02	86.45	7.544E-02	% (	1.159E-01	3.53E-02	G K
		105.31	3.972E-02	% P	1.262E-01	3.81E-02	G
HG-203	4.4909E-02	279.17	8.058E-04	&(P	2.658E-02	7.86E-03	G K
		72.87	6.271E-01	?(P	7.449E-01	2.28E-01	G
		70.83	5.058E-01	%	1.381E+00	4.18E-01	G
		82.50	6.356E-01	%	1.774E+00	5.36E-01	G
TL-208	2.0154E-01	583.14	2.015E-01	(P	3.242E-02	1.59E-02	G
		510.72	2.955E-01	+ P	1.133E-01	4.56E-02	G
PB-212	5.2845E-01	238.63	5.284E-01	(P	4.695E-02	2.04E-02	G K
		77.11	4.070E-01	}	1.706E-01	4.64E-02	G
		74.81	8.216E-01	+ P	3.136E-01	1.02E-01	G
PB-214	4.1201E-01	351.99	4.120E-01	*(P	5.937E-02	2.75E-02	G K
		295.22	3.309E-01	- P	9.651E-02	3.53E-02	G
		77.11	3.510E-01	} P	3.768E-01	1.01E-01	G
		241.92	5.033E-01	+ P	2.971E-01	9.49E-02	G
BI-212	6.4843E-01	727.17	6.484E-01	*(P	2.515E-01	1.17E-01	G K
		1620.56	1.049E+00	+ P	6.219E-01	2.95E-01	G
		785.42	1.210E+00	+ P	1.095E+00	4.05E-01	G
BI-214	3.5491E-01	609.32	3.549E-01	(P	5.376E-02	2.53E-02	G K
		1764.51	5.670E-01	+ P	9.015E-02	6.55E-02	G
		1120.28	5.524E-01	+ P	2.164E-01	9.57E-02	G
RA-224	1.3534E-01	241.00	1.353E-01	%(P	8.489E-01	2.55E-01	G
RA-226	7.4598E-01	185.99	7.460E-01	*(	7.499E-01	2.32E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	6.5537E-01	911.07	6.762E-01	@(P	1.053E-01	5.57E-02	G K
		968.90	5.026E-01	- P	1.593E-01	6.01E-02	G
		338.40	6.051E-01	*(P	1.884E-01	7.82E-02	G
TH-227	-2.8828E-01	236.00-2.883E-01		?(P	3.160E-01	9.70E-02	G K
		256.25-6.300E-03		& P	3.522E-01	1.04E-01	G
PA-234	-1.5401E-03	98.44-1.540E-03		&(	1.170E-01	3.50E-02	G K
		946.00	3.361E-02	%	1.227E-01	3.63E-02	G
		131.28-2.041E-03		&	1.230E-01	3.67E-02	G
		94.67	2.242E-02	%	1.773E-01	5.31E-02	G
		883.24	9.341E-03	%	1.975E-01	5.69E-02	G
		926.70-4.027E-02		&	2.575E-01	7.55E-02	G
		569.26	4.583E-02	%	1.961E-01	5.81E-02	G
TH-234	5.4675E-01	63.29	2.322E-01	%(P	1.421E+00	4.26E-01	G K
		92.80	7.378E-01	% P	1.149E+00	3.49E-01	G
		92.38	1.024E+00	(P	1.315E+00	4.02E-01	G

AM-241 -9.0613E-03
 59.54-9.061E-03 %(P 1.550E-01 4.63E-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 *****						
Time of Count	Time Corrected	Uncertainty	3 Sigma			
Nuclide	Activity	Activity	Counting	Total	MDA	
	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm	
BE-7 #A	-3.8143E-02	-3.8165E-02	1.9185E-01	1.9186E-01	2.158E-01	
K-40	1.3252E+01	1.3252E+01	9.2561E-01	1.2121E+00		
MN-54 #A	1.0869E-02	1.0870E-02	2.3096E-02	2.3105E-02	2.555E-02	
CO-57 #B	7.4822E-03	7.4830E-03	2.7491E-02	2.7495E-02	3.044E-02	
CO-60 #B	7.6405E-03	7.6407E-03	2.3373E-02	2.3378E-02	2.676E-02	
Sr-85 #A	-1.4827E-02	-1.4835E-02	2.7139E-02	2.7153E-02	2.978E-02	
Kr-85 #A	-3.6513E+02	-3.6513E+02	7.0976E+02	7.1009E+02	6.904E+02	
Y-88 #B	5.3845E-04	5.3860E-04	1.3760E-02	1.3760E-02	1.751E-02	
NB-94 #B	-4.1334E-03	-4.1334E-03	2.2022E-02	2.2023E-02	2.430E-02	
Ag-108M#B	-9.2579E-03	-9.2579E-03	3.0355E-02	3.0360E-02	3.390E-02	
CD-109 #A	2.3424E-02	2.3426E-02	8.8291E-01	8.8291E-01	9.818E-01	
SN-113 #B	-9.6621E-04	-9.6647E-04	1.9672E-01	1.9672E-01	2.877E-02	
SB-125 #B	5.3680E-02	5.3682E-02	4.3330E-02	4.3445E-02	7.150E-02	
I-131 #B	3.2703E-03	3.2829E-03	2.0735E-02	2.0736E-02	2.328E-02	
CS-134 #B	6.4267E-04	6.4269E-04	4.9078E-02	4.9078E-02	5.492E-02	
CS-137	5.8883E-02	5.8883E-02	4.6037E-02	4.6169E-02		
CE-139 #A	3.6884E-03	3.6892E-03	2.7301E-02	2.7302E-02	3.038E-02	
EU-152 #B	2.3800E-02	2.3800E-02	8.2687E-02	8.2697E-02	9.151E-02	
EU-154 #B	-9.5162E-03	-9.5163E-03	6.3527E-02	6.3529E-02	6.756E-02	
EU-155 #B	7.5439E-02	7.5440E-02	1.0591E-01	1.0599E-01	1.159E-01	
HG-203 #F	4.4879E-02	4.4909E-02	4.8973E-02	4.9045E-02	2.656E-02	
TL-208 #	2.0154E-01	2.0154E-01	4.7803E-02	4.9263E-02		
PB-212	5.2845E-01	5.2845E-01	6.1273E-02	6.8764E-02		
PB-214	4.1201E-01	4.1201E-01	8.2384E-02	8.5903E-02		
BI-212	6.4843E-01	6.4843E-01	3.4985E-01	3.5194E-01		
BI-214	3.5491E-01	3.5491E-01	7.5789E-02	7.8634E-02		
RA-224 #A	1.3534E-01	1.3534E-01	7.6458E-01	7.6462E-01	8.489E-01	
RA-226 #A	7.4598E-01	7.4598E-01	6.9499E-01	6.9638E-01	7.499E-01	
AC-228	6.5537E-01	6.5537E-01	1.5051E-01	1.5541E-01		
TH-227 #A	-2.8828E-01	-2.8828E-01	2.9191E-01	2.9240E-01	3.160E-01	
PA-234 #B	-1.5401E-03	-1.5401E-03	1.0496E-01	1.0496E-01	1.170E-01	
TH-234 #B	5.4675E-01	5.4675E-01	6.4371E-01	6.4442E-01	1.421E+00	
AM-241 #A	-9.0613E-03	-9.0613E-03	1.6021E-01	1.6021E-01	1.550E-01	

Sample description
FSSOOL-12-01-007-F

Spectrum Filename: C:\GammaVision\Spectra\107F_24AUG2006_0955.An1

Acquisition information

Start time: 24-Aug-2006 09:54:49
Live time: 2000
Real time: 2003
Dead time: 0.16 %
Detector ID: 2

Detector system

Det 107- DSPE- 634

Calibration

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

Energy Calibration

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

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 2.0920E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 2.0920E+03) =
4.7801E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

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

Corrections	Status	Comments
Decay correct to date:	YES	23-Aug-2006 11:40:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	107_150K_28APR05.Pbc 01-May-2005 05:30:33
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff 20.00000 %
 Energy Calibration
 Normalized diff: 0.1546

***** S U M M A R Y O F P E A K 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	362.	21.00	1.50	2.849E-02				
74.74	362.	21.00	1.50	2.849E-02	74.81	9.600	8.547E-01	PB212
77.05	626.	11.72	1.50	2.957E-02	77.11	17.500	7.818E-01	PB212
					77.11	10.700	1.269E+00	PB214
77.05	622.	11.72	1.50	2.957E-02	77.11	17.500	7.759E-01	PB212
					77.11	10.700	1.269E+00	PB214
83.69	178.	24.14	0.70	3.202E-02				
87.31	187.	24.67	1.19	3.311E-02	86.45	32.740	1.121E-01	EU155
					88.04	3.790		PBC<MDA CD109
93.36	134.	41.59	1.44	3.450E-02	92.80	3.000		PBC<MDA TH234
128.89	157.	40.75	1.12	3.818E-02				
186.10	224.	17.89	1.74	3.609E-02	185.99	3.280	1.222E+00	RA226
209.32	188.	25.48	1.17	3.428E-02				
238.75	1739.	3.17	1.30	3.188E-02	238.63	43.100	8.097E-01	PB212
					241.00	3.900	9.072E+00	RA224
241.63	283.	14.00	1.30	3.165E-02				
270.48	233.	17.03	1.83	2.943E-02				
277.91	137.	27.69	1.63	2.888E-02				
277.91	137.	27.69	1.63	2.888E-02	279.17	81.500	3.776E-02	HG203
295.33	317.	9.68	1.34	2.767E-02	295.22	19.200	3.797E-01	PB214
300.66	86.	28.35	1.34	2.731E-02				
327.58	120.	29.18	1.88	2.563E-02				
338.52	464.	9.93	1.93	2.500E-02	338.40	12.010	9.903E-01	AC228
352.01	705.	6.64	1.52	2.426E-02	351.99	37.100	5.025E-01	PB214
463.34	118.	20.38	1.46	1.953E-02				
463.34	118.	20.38	1.46	1.953E-02	463.51	10.000	3.800E-01	SB125
510.78	277.	11.12	2.26	1.808E-02	510.72	22.500	3.867E-01	TL208

583.27	707.	5.05	2.04	1.629E-02	583.14	86.000	3.239E-01	TL208
609.33	595.	6.62	1.88	1.574E-02	609.32	46.090	5.259E-01	BI214
661.99	161.	20.57	1.35	1.476E-02	661.62	84.620	8.138E-02	CS137
727.60	138.	18.29	1.87	1.374E-02	727.17	11.800	5.458E-01	BI212
794.96	72.	31.37	1.74	1.285E-02				
794.96	72.	31.37	1.74	1.285E-02	795.76	85.400	4.214E-02	CS134
860.14	111.	21.43	1.58	1.211E-02				
911.29	426.	6.33	1.88	1.161E-02	911.07	29.000	8.103E-01	AC228
964.48	90.	19.05	1.80	1.113E-02				
969.13	277.	7.77	1.80	1.109E-02	968.90	17.460	9.176E-01	AC228
1120.86	130.	21.21	1.60	9.966E-03	1120.28	15.040	5.558E-01	BI214
1238.98	75.	27.03	1.24	9.258E-03				
1460.92	2428.	2.09	2.29	8.190E-03	1460.75	10.700	1.786E+01	K40

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1620.01	36.	25.07	0.92	7.569E-03	1620.56	2.750	1.117E+00	BI212
1764.50	120.	9.79	1.28	7.084E-03	1764.51	15.920	6.834E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	Suspected Nuclide
257.45	128.89	1470.	151.	0.075	110.56	1.122	AC-228 s
418.27	209.32	848.	188.	0.094	76.45	1.166	AC-228 s
477.13	238.81	652.	1739.	0.869	9.52	1.297	PB-212 D
482.89	241.68	645.	283.	0.142	42.01	1.299	PB-214 D
540.58	270.48	515.	233.	0.116	51.10	1.827	AC-228 s
600.93	300.63	257.	86.	0.043	85.04	1.341	PB-212 LD
654.77	327.58	422.	120.	0.060	87.54	1.876	AC-228 s
1719.84	860.14	130.	111.	0.056	64.30	1.580	TL-208 s
1929.13	964.57	98.	95.	0.047	53.98	1.796	AC-228 D
2477.53	1238.98	124.	75.	0.037	81.10	1.237	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 %
HG-203	133.04	66.69	1301.	-222.	-0.111	71.81	1.500
PB-212	149.15	74.74	2771.	362.	0.181	62.99	1.500s
PB-212	153.89	77.11	2383.	626.	0.313	35.17	1.500D
PB-214	153.89	77.11	2388.	622.	0.311	35.17	1.500D
EU-155	174.32	87.33	2188.	185.	0.093	109.50	1.500
TH-234	185.71	93.02	2071.	171.	0.085	103.16	1.500
RA-226	371.84	186.10	659.	224.	0.112	53.68	1.739s
TH-227	471.68	236.03	1841.	-239.	-0.119	78.81	1.500s
PB-212	477.10	238.73	1197.	1771.	0.885	10.82	1.500s
RA-224	477.16	238.76	901.	1719.	0.859	10.34	1.500s
HG-203	554.82	277.60	425.	82.	0.041	109.39	1.500s
PB-214	590.37	295.37	574.	326.	0.163	34.78	1.500s
AC-228	676.66	338.52	505.	460.	0.230	29.78	1.929s
PB-214	703.79	352.09	379.	632.	0.316	17.53	1.500s
SB-125	925.82	463.11	219.	113.	0.056	60.87	1.500
TL-208	1021.15	510.78	265.	244.	0.122	33.35	2.263s
TL-208	1166.13	583.27	195.	702.	0.351	15.16	2.041s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	1218.23	609.33	256.	591.	0.295	19.87	1.884s
CS-137	1323.56	661.99	264.	157.	0.079	61.72	1.350s
BI-212	1454.77	727.60	163.	137.	0.069	54.86	1.868
CS-134	1589.92	795.18	143.	58.	0.029	94.52	1.684s
AC-228	1822.14	911.29	109.	422.	0.211	19.00	1.880
AC-228	1937.36	968.90	119.	275.	0.138	24.43	1.799D
BI-214	2241.28	1120.86	171.	129.	0.065	63.64	1.597
K-40	2921.43	1460.92	33.	2424.	1.212	6.27	2.291
BI-212	3239.64	1620.01	11.	36.	0.018	75.22	0.922s
BI-214	3528.65	1764.50	5.	119.	0.060	29.37	1.277s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		3.1942E-03	477.56	3.194E-03	&(	2.556E-01 7.49E-02	G
K-40		1.7863E+01	1460.75	1.786E+01	(P	2.186E-01 3.74E-01	G
MN-54		2.2688E-03	834.81	2.269E-03	%(P	2.493E-02 7.21E-03	G
CO-57		5.9670E-03	122.07	5.967E-03	%(P	3.732E-02 1.12E-02	G K
			136.43	3.593E-02	& P	2.765E-01 8.29E-02	G
CO-60		1.2231E-02	1332.51	1.223E-02	%(P	3.078E-02 9.13E-03	G K
			1173.23	2.020E-02	% P	4.655E-02 1.40E-02	G K
Sr-85		-2.6503E-02	514.00	-2.650E-02	&(	3.775E-02 1.16E-02	G
Kr-85		-6.3081E+02	513.99	-6.308E+02	&(P	8.655E+02 2.65E+02	G
Y-88		-6.2164E-04	1836.01	-6.216E-04	%(P	2.100E-02 5.47E-03	G K
			898.02	-2.470E-03	% P	3.143E-02 9.04E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	1.0212E-02	871.10	1.021E-02	&(P	2.539E-02	7.63E-03	G K
		702.50	8.641E-03	% P	2.569E-02	7.68E-03	G K
Ag-108M	1.8002E-03	722.95	1.800E-03	&(	5.577E-02	1.65E-02	G K
		614.37	1.123E-02	%	3.661E-02	1.10E-02	G
		433.93	7.458E-03	& P	2.427E-02	7.24E-03	G
CD-109	4.2051E-02	88.04	4.205E-02	%(P	1.178E+00	3.54E-01	G
SN-113	-5.5086E-03	391.71	5.509E-03	&(P	4.108E-02	1.21E-02	G K
		255.04	1.684E-01	&	1.164E+00	3.47E-01	G
SB-125	1.0988E-01	427.95	2.106E-02	%(P	7.722E-02	2.30E-02	G K
		600.77	1.714E-02	% P	1.422E-01	4.16E-02	G
		636.15	3.508E-02	& P	2.404E-01	7.07E-02	G
		463.51	3.728E-01	(P	2.374E-01	7.75E-02	G
		176.29	1.160E-01	% P	4.606E-01	1.38E-01	G
I-131	-8.5554E-04	364.48	8.555E-04	%(	3.183E-02	9.38E-03	G K
		636.97	7.395E-02	&	3.718E-01	1.10E-01	G
		284.29	1.259E-03	&	4.410E-01	1.31E-01	G
CS-134	1.2930E-02	604.66	5.882E-03	&(P	2.020E-02	5.97E-03	G K
		795.76	3.443E-02	*(P	3.450E-02	1.09E-02	G
		569.29	1.918E-02	&	1.365E-01	4.00E-02	G
		801.84	7.604E-02	& P	3.410E-01	1.01E-01	G
CS-137	8.1383E-02	661.62	8.138E-02	*(P	4.050E-02	1.71E-02	G
CE-139	-1.2382E-02	165.85	1.238E-02	&(P	3.759E-02	1.13E-02	G
EU-152	9.5287E-05	121.78	9.529E-05	%(P	1.065E-01	3.19E-02	G K
		344.30	1.840E-02	& P	9.776E-02	2.91E-02	G
		1408.08	2.234E-02	% P	1.175E-01	3.35E-02	G
		964.00	9.027E-02	& P	1.918E-01	5.81E-02	G
		1112.07	6.467E-02	% P	2.729E-01	8.08E-02	G
		778.90	8.025E-02	% P	2.320E-01	6.94E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	1.6190E-02	123.10	1.619E-02	% (P	7.367E-02	2.22E-02	G K
		1274.80	3.918E-03	& P	1.008E-01	2.90E-02	G
		723.30	1.001E-01	& P	1.887E-01	5.74E-02	G
		1004.80	2.291E-02	& P	1.932E-01	5.65E-02	G
EU-155	1.1119E-01	86.45	1.112E-01	(	1.326E-01	4.06E-02	G K
		105.31	5.110E-02	% P	1.565E-01	4.73E-02	G
HG-203	2.2989E-02	279.17	2.299E-02	*(P	2.756E-02	8.51E-03	G K
		72.87	4.307E-01	& P	9.996E-01	3.03E-01	G
		70.83	1.574E+00	&	1.211E+00	3.77E-01	G
		82.50	1.204E+00	&	1.958E+00	5.96E-01	G
TL-208	3.2390E-01	583.14	3.239E-01	*(P	3.122E-02	1.65E-02	G
		510.72	3.867E-01	+ P	1.249E-01	4.89E-02	G
PB-212	8.2266E-01	238.63	8.321E-01	*(P	7.702E-02	3.03E-02	G K
		77.11	7.818E-01	*(	2.873E-01	9.17E-02	G
		74.81	8.547E-01	*(P	5.857E-01	1.81E-01	G
PB-214	4.3403E-01	351.99	4.534E-01	*(P	6.703E-02	2.67E-02	G K
		295.22	3.966E-01	*(P	1.390E-01	4.66E-02	G
		77.11	1.269E+00	+ P	4.704E-01	1.50E-01	G
		241.92	3.618E-01	% P	5.302E-01	1.62E-01	G
BI-212	5.4577E-01	727.17	5.458E-01	(P	2.478E-01	1.01E-01	G K
		1620.56	1.117E+00	+ P	5.638E-01	2.84E-01	G
		785.42	4.912E-01	% P	1.483E+00	4.43E-01	G
BI-214	5.3324E-01	609.32	5.259E-01	@(P	6.884E-02	3.51E-02	G K
		1764.51	6.834E-01	+ P	7.337E-02	6.74E-02	G
		1120.28	5.558E-01	(P	2.742E-01	1.19E-01	G
RA-224	8.9804E+00	241.00	8.980E+00	?(P	7.448E-01	3.10E-01	G
RA-226	1.2225E+00	185.99	1.222E+00	(	6.673E-01	2.19E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AC-228	8.7940E-01	911.07	8.103E-01	(P	9.844E-02	5.18E-02	G K
		968.90	9.179E-01	(P	1.784E-01	7.54E-02	G
		338.40	9.903E-01	*(P	2.310E-01	9.90E-02	G
TH-227	-4.2861E-01	236.00	4.286E-01	?(P	3.641E-01	1.12E-01	G K
		256.25	5.011E-02	% P	3.785E-01	1.13E-01	G
PA-234	-4.1399E-02	98.44	4.140E-02	&(	1.290E-01	3.89E-02	G K
		946.00	0.000E+00	&	1.840E-01	5.35E-02	G
		131.28	5.396E-03	&	1.622E-01	4.86E-02	G
		94.67	8.277E-02	%	2.418E-01	7.31E-02	G
		883.24	2.964E-02	&	2.421E-01	7.07E-02	G
		926.70	6.744E-02	%	2.805E-01	8.30E-02	G
		569.26	3.115E-02	&	2.019E-01	5.92E-02	G
TH-234	9.5473E-01	63.29	8.662E-01	%(P	1.598E+00	4.85E-01	G K
		92.80	1.070E+00	(P	1.345E+00	4.10E-01	G
		92.38	6.285E-02	% P	1.301E+00	3.88E-01	G

AM-241 -5.6275E-02
 59.54-5.627E-02 %(P 2.103E-01 6.34E-02 G
 (- This peak used in the nuclide activity average.

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

Nuclide Codes: Peak Codes:
 T - Thermal Neutron Activation G - Gamma Ray
 F - Fast Neutron Activation X - X-Ray

I - Fission Product P - Positron Decay
 N - Naturally Occurring Isotope S - Single-Escape
 P - Photon Reaction D - Double-Escape
 C - Charged Particle Reaction K - Key Line
 M - No MDA Calculation A - Not in Average
 R - Coincidence Corrected C - Coincidence Peak
 H - Halflife limit exceeded

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****						
Nuclide		Time of Count	Time Corrected	Uncertainty	3 Sigma	MDA
		Activity	Activity	Counting	Total	
		pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7	#A	3.1560E-03	3.1942E-03	2.2473E-01	2.2473E-01	2.526E-01
K-40		1.7863E+01	1.7863E+01	1.1219E+00	1.5400E+00	
MN-54	#A	2.2642E-03	2.2688E-03	2.1627E-02	2.1627E-02	2.487E-02
CO-57	#B	5.9529E-03	5.9670E-03	3.3645E-02	3.3646E-02	3.723E-02
CO-60	#B	1.2227E-02	1.2231E-02	2.7381E-02	2.7390E-02	3.077E-02
Sr-85	#A	-2.6242E-02	-2.6503E-02	3.4742E-02	3.4777E-02	3.737E-02
Kr-85	#A	-6.3080E+02	-6.3081E+02	8.5960E+02	8.6041E+02	8.655E+02
Y-88	#B	-6.1791E-04	-6.2164E-04	1.4935E-01	1.4935E-01	2.087E-02
NB-94	#B	1.0212E-02	1.0212E-02	2.2890E-02	2.2898E-02	2.539E-02
Ag-108M	#B	1.8002E-03	1.8002E-03	4.9583E-02	4.9583E-02	5.577E-02
CD-109	#A	4.1992E-02	4.2051E-02	1.0605E+00	1.0605E+00	1.176E+00
SN-113	#B	-5.4779E-03	-5.5086E-03	4.9246E-02	4.9247E-02	4.085E-02
SB-125	#F	1.0981E-01	1.0988E-01	6.8552E-02	6.8859E-02	7.717E-02
I-131	#B	-7.8983E-04	-8.5554E-04	2.8133E-02	2.8133E-02	2.939E-02
CS-134	#B	1.2919E-02	1.2930E-02	1.2333E-02	1.2356E-02	2.019E-02
CS-137	#	8.1379E-02	8.1383E-02	5.1353E-02	5.1578E-02	
CE-139	#A	-1.2324E-02	-1.2382E-02	3.4448E-02	3.4456E-02	3.741E-02
EU-152	#B	9.5273E-05	9.5287E-05	9.5561E-02	9.5561E-02	1.065E-01
EU-154	#B	1.6187E-02	1.6190E-02	6.6492E-02	6.6498E-02	7.366E-02
EU-155	#A	1.1115E-01	1.1119E-01	1.2176E-01	1.2192E-01	1.326E-01
HG-203	#A	2.2674E-02	2.2989E-02	2.5542E-02	2.5578E-02	2.718E-02
TL-208	#	3.2390E-01	3.2390E-01	4.9432E-02	5.3004E-02	
PB-212	#	8.2266E-01	8.2266E-01	8.9765E-02	1.0207E-01	7.702E-02
PB-214	#	4.3403E-01	4.3403E-01	7.6680E-02	8.0851E-02	6.703E-02
BI-212		5.4577E-01	5.4577E-01	3.0222E-01	3.0393E-01	
BI-214		5.3324E-01	5.3324E-01	1.0672E-01	1.1127E-01	
RA-224	#	8.9804E+00	8.9804E+00	9.2960E-01	1.0703E+00	7.448E-01
RA-226	#	1.2225E+00	1.2225E+00	6.5621E-01	6.6017E-01	
AC-228		8.7940E-01	8.7940E-01	1.2691E-01	1.3713E-01	
TH-227	#A	-4.2861E-01	-4.2861E-01	3.3819E-01	3.3913E-01	3.641E-01
PA-234	#B	-4.1399E-02	-4.1399E-02	1.1678E-01	1.1680E-01	1.290E-01
TH-234	#B	9.5473E-01	9.5473E-01	9.7142E-01	9.7287E-01	1.598E+00
AM-241	#A	-5.6275E-02	-5.6275E-02	1.9499E-01	1.9501E-01	2.103E-01

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

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

Total Activity (1120.2 to 2000.1 keV) 2.1448753E+01 pCi/gm
Total Decayed Activity (1120.2 to 2000.1 keV) 2.1448759E+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-12-01-023-F

Spectrum Filename: C:\GammaVision\Spectra\107F_30AUG2006_1558.An1

Acquisition information

Start time: 30-Aug-2006 15:58:36
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/channel²

Efficiency Calibration

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

Library Files

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

Analysis parameters

Analysis engine: Env32 G53W4.20
Start channel: 100 (50.16keV)
Stop channel: 4000 (2000.15keV)
Peak rejection level: 41.667%
Peak search sensitivity: 3
Sample Size: 1.7570E+03
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.7570E+03) =
5.6915E+02
Detection limit method: Nureg 4.16
Random error: 1.0000000E+00
Systematic error: 1.0000000E+00

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

Half lives decay limit: 12.000
 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 08:07:00
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: 0.1974

***** 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
74.86	353.	12.19	1.18	2.849E-02	74.81	9.600	9.919E-01	PB212
77.16	481.	7.60	1.18	2.957E-02	77.11	10.700	1.325E+00	PB214
					77.11	17.500	8.174E-01	PB212
86.85	194.	18.67	1.19	3.294E-02	86.45	32.740	1.391E-01	EU155
89.57	127.	30.29	1.19	3.364E-02				
93.57	178.	21.05	1.19	3.454E-02	92.38	2.570	PBC<MDA	TH234
					92.80	3.000	PBC<MDA	TH234
129.67	138.	34.96	1.37	3.820E-02				
129.67	138.	34.96	1.37	3.820E-02	131.28	20.000	1.388E-01	PA234
186.30	282.	13.39	1.79	3.608E-02	185.99	3.280	1.829E+00	RA226
209.29	157.	29.52	1.12	3.429E-02				
238.79	1299.	3.50	1.30	3.188E-02	238.63	43.100	7.177E-01	PB212
241.76	275.	12.73	1.30	3.164E-02	241.00	3.900	1.695E+00	RA224
					241.92	7.470	8.895E-01	PB214
270.50	116.	25.59	1.96	2.943E-02				
278.47	83.	39.88	1.79	2.884E-02				
278.47	83.	39.88	1.79	2.884E-02	279.17	81.500	PBC<MDA	HG203
295.42	349.	8.26	1.34	2.766E-02	295.22	19.200	4.993E-01	PB214
300.44	90.	24.15	1.34	2.733E-02				
328.87	123.	25.77	2.05	2.555E-02				
338.70	289.	11.30	1.79	2.499E-02	338.40	12.010	7.314E-01	AC228
352.02	688.	6.67	1.46	2.426E-02	351.99	37.100	5.833E-01	PB214
409.52	53.	36.00	1.46	2.154E-02				
463.17	131.	19.49	1.23	1.954E-02				
463.17	131.	19.49	1.23	1.954E-02	463.51	10.000	5.057E-01	SB125
510.97	258.	13.62	1.56	1.807E-02	510.72	22.500	4.249E-01	TL208
583.48	457.	7.94	1.90	1.628E-02	583.14	86.000	2.485E-01	TL208

609.48	483.	6.57	1.66	1.574E-02	609.32	46.090	5.078E-01	BI214
661.78	174.	9.68	1.59	1.477E-02	661.62	84.620	1.049E-01	CS137
665.92	42.	32.41	1.60	1.470E-02				
727.65	92.	19.47	1.54	1.374E-02	727.17	11.800	4.302E-01	BI212
795.18	92.	16.53	1.88	1.285E-02				
795.18	92.	16.53	1.88	1.285E-02	795.76	85.400	6.402E-02	CS134
860.02	83.	21.04	1.69	1.212E-02				
911.36	353.	8.32	1.95	1.161E-02	911.07	29.000	7.973E-01	AC228
968.55	274.	9.96	1.51	1.110E-02	968.90	17.460	1.079E+00	AC228
1121.12	153.	18.60	1.71	9.964E-03	1120.28	15.040	7.823E-01	BI214
1332.62	29.	33.85	2.03	8.773E-03	1332.51	99.980	PBC<MDA	CO60

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.22	1561.	2.60	2.12	8.189E-03	1460.75	10.700	1.366E+01	K40
1620.77	24.	29.90	1.61	7.569E-03	1620.56	2.750	8.757E-01	BI212
1765.13	109.	10.77	1.33	7.082E-03	1764.51	15.920	7.380E-01	BI214

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

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 3 Sigma	FWHM %	Suspected Nuclide
178.80	89.52	675.	127.	0.063	90.87	1.189	PB-214 LD
418.21	209.29	715.	157.	0.079	88.55	1.116	AC-228 s
540.62	270.50	316.	116.	0.058	76.76	1.960	AC-228 s
556.57	278.47	366.	89.	0.045	96.14	1.790	SB-126 s
600.43	300.41	252.	82.	0.041	92.29	1.516	PB-212 M
657.36	328.87	304.	123.	0.062	77.31	2.045	LA-140 s
818.64	409.52	146.	53.	0.026	108.00	1.458	AC-228
1331.60	665.85	72.	40.	0.020	102.17	1.597	SB-126 D
1719.60	860.02	74.	83.	0.041	63.12	1.689	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 %
PB-212	149.29	74.81	771.	353.	0.176	36.58	1.178D
PB-212	153.89	77.11	824.	481.	0.241	22.80	1.179A
EU-155	173.91	87.12	1532.	203.	0.102	84.31	1.500
TH-234	185.75	93.04	1389.	194.	0.097	76.30	1.500
PA-234	257.78	129.06	759.	131.	0.065	92.98	1.500s
RA-226	372.24	186.30	518.	282.	0.141	40.17	1.789s
TH-227	472.47	236.42	1398.	-152.	-0.076	107.51	1.500s
PB-212	476.89	238.63	340.	1278.	0.639	10.22	1.297D
PB-214	483.47	241.92	564.	190.	0.095	36.05	1.299A
PB-214	590.51	295.45	469.	479.	0.240	27.52	1.754s
AC-228	677.01	338.70	280.	286.	0.143	33.90	1.793s
PB-214	703.66	352.02	389.	682.	0.341	20.02	1.462s
SB-125	926.26	463.33	153.	90.	0.045	64.25	1.500s
TL-208	1021.53	510.97	267.	225.	0.112	40.87	1.563s
TL-208	1166.55	583.48	209.	453.	0.226	23.82	1.901s
BI-214	1218.55	609.48	150.	479.	0.240	19.70	1.659s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ag-108M	1225.06	612.74	230.	-55.	-0.028	123.51	1.561
CS-137	1322.82	661.62	59.	170.	0.085	29.05	1.594D
BI-212	1454.87	727.65	89.	91.	0.045	58.41	1.540
CS-134	1589.47	794.95	76.	85.	0.042	53.89	1.684s
AC-228	1822.29	911.36	123.	349.	0.174	24.97	1.953
AC-228	1936.66	968.55	114.	272.	0.136	29.87	1.512s
BI-214	2241.80	1121.12	141.	153.	0.076	55.80	1.707s
CO-60	2664.83	1332.62	49.	29.	0.014	101.54	2.031s
K-40	2922.03	1461.22	26.	1557.	0.778	7.81	2.117
BI-212	3241.16	1620.77	9.	24.	0.012	89.70	1.614
BI-214	3529.92	1765.13	6.	108.	0.054	32.30	1.329s

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

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

- Nuclide - Name	Code	Average Activity pCi/gm	Energy keV	Peak Activity pCi/gm	Code	MDA Value pCi/gm	COMMENTS
BE-7		7.3879E-02	477.56	7.388E-02	%	2.448E-01 7.30E-02	G
K-40		1.3660E+01	1460.75	1.366E+01	(P	2.340E-01 3.57E-01	G
MN-54		-5.7162E-03	834.81	-5.716E-03	%(P	2.842E-02 8.30E-03	G
CO-57		1.2032E-03	122.07	1.203E-03	&(P	3.817E-02 1.14E-02	G K
			136.43	8.099E-02	% P	2.763E-01 8.32E-02	G
CO-60		2.5429E-02	1332.51	2.543E-02	(P	3.094E-02 9.72E-03	G K
			1173.23	1.357E-02	& P	4.101E-02 1.21E-02	G K
Sr-85		-1.8451E-02	514.00	-1.845E-02	&(	3.720E-02 1.13E-02	G
Kr-85		-4.4529E+02	513.99	-4.453E+02	&(P	8.417E+02 2.54E+02	G
Y-88		2.2731E-04	1836.01	2.273E-04	%(P	2.381E-02 6.22E-03	G K
			898.02	2.892E-03	% P	2.931E-02 8.39E-03	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
NB-94	1.0669E-02	871.10	1.067E-02	% (P	2.776E-02	8.32E-03	G K
		702.50	5.284E-03	% P	3.154E-02	9.26E-03	G K
Ag-108M	-9.6457E-03	722.95	9.646E-03	% (	3.664E-02	1.09E-02	G K
		614.37	3.000E-02	&	3.994E-02	1.24E-02	G
		433.93	3.329E-03	& P	2.858E-02	8.36E-03	G
CD-109	-1.5185E-01	88.04	1.518E-01	% (P	1.186E+00	3.56E-01	G
SN-113	-8.9179E-03	391.71	8.918E-03	% (P	4.176E-02	1.24E-02	G K
		255.04	9.860E-02	%	1.345E+00	4.00E-01	G
SB-125	7.1255E-02	427.95	2.418E-02	% (P	8.916E-02	2.65E-02	G K
		600.77	2.008E-02	% P	1.378E-01	4.00E-02	G
		636.15	1.466E-02	% P	2.217E-01	6.40E-02	G
		463.51	3.537E-01	(P	2.379E-01	7.81E-02	G
		176.29	9.949E-02	% P	4.352E-01	1.31E-01	G
I-131	6.3360E-04	364.48	6.336E-04	& (	3.149E-02	9.17E-03	G K
		636.97	3.740E-02	%	3.987E-01	1.15E-01	G
		284.29	8.033E-02	%	4.961E-01	1.48E-01	G
CS-134	2.8305E-02	604.66	8.391E-04	% (P	6.547E-02	1.95E-02	G K
		795.76	5.970E-02	* (P	3.039E-02	1.08E-02	G
		569.29	6.272E-02	%	1.645E-01	4.94E-02	G
		801.84	4.974E-03	% P	3.006E-01	8.55E-02	G
CS-137	1.0492E-01	661.62	1.049E-01	(P	2.360E-02	1.04E-02	G
CE-139	5.9901E-03	165.85	5.990E-03	& (P	3.204E-02	9.59E-03	G
EU-152	-1.0540E-04	121.78	1.054E-04	& (P	1.085E-01	3.24E-02	G K
		344.30	2.257E-02	% P	9.452E-02	2.81E-02	G
		1408.08	1.741E-02	% P	1.154E-01	3.24E-02	G
		964.00	1.265E-01	% P	3.284E-01	9.88E-02	G
		1112.07	5.589E-02	% P	2.891E-01	8.47E-02	G
		778.90	2.315E-02	% P	1.993E-01	5.76E-02	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	-1.6267E-03	123.10	1.627E-03	& (P	6.858E-02	2.04E-02	G K
		1274.80	3.605E-02	% P	8.624E-02	2.59E-02	G
		723.30	4.641E-02	% P	1.671E-01	4.96E-02	G
		1004.80	5.194E-02	% P	1.539E-01	4.57E-02	G
EU-155	1.4563E-01	86.45	1.456E-01	(	1.325E-01	4.09E-02	G K
		105.31	4.232E-03	% P	1.392E-01	4.15E-02	G
HG-203	-2.7090E-03	279.17	2.709E-03	% (P	3.456E-02	1.02E-02	G K
		72.87	2.577E-01	% P	1.017E+00	3.07E-01	G
		70.83	3.946E-02	%	1.567E+00	4.69E-01	G
		82.50	6.525E-01	%	1.759E+00	5.32E-01	G
TL-208	2.4851E-01	583.14	2.485E-01	@ (P	3.850E-02	1.99E-02	G
		510.72	4.249E-01	+ P	1.491E-01	6.66E-02	G
PB-212	7.1488E-01	238.63	7.149E-01	(P	4.961E-02	2.47E-02	G K
		77.11	7.149E-01	}	2.028E-01	5.43E-02	G
		74.81	9.919E-01	+ P	3.715E-01	1.22E-01	G
PB-214	6.1878E-01	351.99	5.833E-01	@ (P	8.081E-02	3.92E-02	G K
		295.22	6.937E-01	* (P	1.500E-01	6.43E-02	G
		77.11	1.384E-01	}	4.235E-01	1.26E-01	G
		241.92	6.188E-01	}	3.690E-01	7.44E-02	G
BI-212	4.3024E-01	727.17	4.302E-01	(P	2.217E-01	8.50E-02	G K
		1620.56	8.757E-01	+ P	6.253E-01	2.67E-01	G
		785.42	9.535E-01	% P	1.367E+00	4.24E-01	G
BI-214	5.0784E-01	609.32	5.078E-01	@ (P	6.336E-02	3.37E-02	G K
		1764.51	7.380E-01	+ P	9.500E-02	8.01E-02	G
		1120.28	7.823E-01	+ P	2.982E-01	1.46E-01	G
RA-224	7.7484E-01					Derived Ave Activity	
		241.00	7.748E-01	}(P	1.106E+00	3.39E-01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RA-226	1.8291E+00	185.99	1.829E+00	*	(	7.068E-01	2.45E-01 G
AC-228	7.7802E-01	911.07	7.973E-01	(P	1.243E-01	6.72E-02	G K
		968.90	1.079E+00	+ P	2.086E-01	1.08E-01	G
		338.40	7.314E-01	@(P	2.068E-01	8.36E-02	G
TH-227	-3.2462E-01	236.00	-3.246E-01	?(P	3.785E-01	1.16E-01	G K
		256.25	1.661E-03	& P	4.037E-01	1.19E-01	G
PA-234	1.0145E-01	98.44	7.729E-02	%	(	1.351E-01	4.11E-02 G K
		946.00	-3.881E-02	&	1.771E-01	5.22E-02	G
		131.28	1.318E-01	&	(	1.318E-01	4.08E-02 G
		94.67	-1.398E-01	%		2.665E-01	8.09E-02 G
		883.24	-6.432E-03	&		2.495E-01	7.15E-02 G
		926.70	8.590E-02	%		2.257E-01	6.75E-02 G
		569.26	9.285E-02	%		2.435E-01	7.31E-02 G
TH-234	9.9718E-01	63.29	6.520E-01	%	(P	1.634E+00	4.93E-01 G K
		92.80	1.446E+00	(P	1.315E+00	4.05E-01	G
		92.38	6.047E-02	%	P	1.537E+00	4.59E-01 G
AM-241	1.5981E-04	59.54	1.598E-04	%	(P	2.157E-01	6.44E-02 G

(- This peak used in the nuclide activity average.

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

to be found directly.

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

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

Nuclide	Time of Count	Time Corrected	Uncertainty	3 Sigma	MDA
	Activity	Activity	Counting	Total	
	pCi/gm	pCi/gm	pCi/gm	pCi/gm	pCi/gm
BE-7 #A	7.1680E-02	7.3879E-02	2.1914E-01	2.1918E-01	2.375E-01
K-40	1.3660E+01	1.3660E+01	1.0695E+00	1.3397E+00	
MN-54 #A	-5.6867E-03	-5.7162E-03	2.7341E-02	2.7343E-02	2.827E-02
CO-57 #B	1.1961E-03	1.2032E-03	3.4197E-02	3.4197E-02	3.794E-02
CO-60 #B	2.5407E-02	2.5429E-02	2.9174E-02	2.9213E-02	3.092E-02
Sr-85 #A	-1.7998E-02	-1.8451E-02	3.3881E-02	3.3899E-02	3.629E-02
Kr-85 #A	-4.4529E+02	-4.4529E+02	8.7222E+02	8.7262E+02	8.417E+02
Y-88 #B	2.2390E-04	2.2731E-04	1.8659E-02	1.8659E-02	2.345E-02
NB-94 #B	1.0669E-02	1.0669E-02	2.4946E-02	2.4954E-02	2.776E-02
Ag-108M#B	-9.6454E-03	-9.6457E-03	3.2664E-02	3.2669E-02	3.663E-02
CD-109 #A	-1.5131E-01	-1.5185E-01	1.0966E+00	1.0967E+00	1.182E+00
SN-113 #B	-8.7938E-03	-8.9179E-03	4.6310E-02	4.6313E-02	4.118E-02
SB-125 #B	7.1141E-02	7.1255E-02	4.7220E-02	4.7407E-02	8.902E-02
I-131 #B	5.1840E-04	6.3360E-04	2.7513E-02	2.7513E-02	2.577E-02
CS-134 #B	2.8245E-02	2.8305E-02	1.5348E-02	1.5439E-02	6.533E-02
CS-137	1.0491E-01	1.0492E-01	3.1112E-02	3.1724E-02	
CE-139 #A	5.9202E-03	5.9901E-03	2.8769E-02	2.8772E-02	3.167E-02
EU-152 #B	-1.0536E-04	-1.0540E-04	2.0523E+00	2.0523E+00	1.085E-01
EU-154 #B	-1.6259E-03	-1.6267E-03	8.5680E-02	8.5680E-02	6.854E-02
EU-155 #	1.4550E-01	1.4563E-01	1.2278E-01	1.2304E-01	1.324E-01
HG-203 #B	-2.6168E-03	-2.7090E-03	4.2578E-02	4.2578E-02	3.338E-02
TL-208 #	2.4851E-01	2.4851E-01	5.9779E-02	6.1555E-02	
PB-212	7.1488E-01	7.1488E-01	7.3979E-02	8.5179E-02	
PB-214	6.1878E-01	6.1878E-01	1.2483E-01	1.3007E-01	
BI-212	4.3024E-01	4.3024E-01	2.5485E-01	2.5611E-01	
BI-214	5.0784E-01	5.0784E-01	1.0095E-01	1.0531E-01	
RA-224 A	7.7484E-01	7.7484E-01	1.0135E+00	1.0146E+00	
RA-226 #	1.8291E+00	1.8291E+00	7.3482E-01	7.4272E-01	
AC-228	7.7802E-01	7.7802E-01	1.6567E-01	1.7193E-01	
TH-227 #A	-3.2462E-01	-3.2462E-01	3.4963E-01	3.5015E-01	3.785E-01
PA-234 #B	1.0145E-01	1.0145E-01	9.3699E-02	9.3868E-02	1.351E-01
TH-234 #B	9.9718E-01	9.9718E-01	8.3826E-01	8.4008E-01	1.634E+00

AM-241 #A 1.5981E-04 1.5981E-04 1.9313E-01 1.9313E-01 2.157E-01

