GEORGIA INSTITUTE OF TECHNOLOGY
RESEARCH REACTOR
DECOMMISSIONING PROJECT
RADIOLOGICAL CHARACTERIZATION REPORT

NES DOCUMENT NO. 82A9087

May, 1998

Prepared by:
NES, Inc.
44 Shelter Rock Road
Danbury, CT 06810

Book 3 of 3

PART B of a/b

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-3

Sample Size . . . . . 6.80e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-09-97 15:59	Counting Start. 10-09-97 15:59
Sampling Stop 10-09-97 15:59	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:03	Decay Time. . . . . 0.00e+000 Hrs

Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
2	187.21	88	Cu-67	184.50	0.4700	9.64e-003	9.94e-001	2.16e-001
2	187.21	88	Ga-67	184.60	0.2360	9.64e-003	9.96e-001	4.29e-001
^	187.21	88	U-235	185.72	0.5400	9.64e-003	1.00e+000	1.87e-00
	187.21	88	Ra-226	186.20				
	187.21	88	Xe-125	188.43	0.5500	9.64e-003	9.80e-001	1.87e-001
2	187.21	88	In-114m	190.24	0.1564	9.64e-003	1.00e+000	6.45e-001
2	187.21	88	Pt-197	191.31	0.0350	9.64e-003	9.81e-001	2.93e+000
2	187.21	88	Hg-197	191.38	0.0057	9.64e-003	9.95e-001	1.78e+001
2	187.21	88	Zn-72	191.50	0.0940	9.64e-003	9.93e-001	1.08e+000
2	187.21	88	Mo-101	191.93	0.1810	9.64e-003	3.31e-001	1.68e+000
2	187.21	88	Fe-59	192.34	0.0311	9.64e-003	1.00e+000	3.24e+000
3	240.02	305	Fr-223	234.60				
3	240.02	305	Th-227	236.00				
3	240.02	305	U-235	236.00	0.1100	8.21e-003	1.00e+000	3.73e+000
3	240.02	305	TH-232	238.63	0.4310	8.21e-003	1.01e+000	9.43e-001
3	240.02	305	Te-131m	240.93	0.0755	8.21e-003	9.89e-001	5.49e+000
3	240.02	305	Ra-224	241.08				
3	240.02	305	Xe-125	243.40	0.2871	8.21e-003	9.80e-001	1.46e+000
3	240.02	305	IN-116M	244.59	0.0038	8.21e-003	6.99e-001	1.54e+002
3	240.02	305	Eu-152	244.67	0.0772	8.21e-003	1.00e+000	5.31e+000
3	240.02	305	Sm-155	245.73	0.0373	8.21e-003	4.51e-001	2.44e+001
4	296.83	94	Ce-143	293.26	0.4200	6.98e-003	9.90e-001	3.58e-001
4	296.83	94	U-238	295.22	0.1920	6.98e-003	1.00e+000	7.73e-001
4	296.83	94	Ir-192	295.96	0.2872	6.98e-003	1.00e+000	5.18e-001
4	296.83	94	Tl-210	296.00				
4	296.83	94	Ag-113	298.40	0.0900	6.98e-003	9.38e-001	1.76e+000
4	296.83	94	TB-160	298.57	0.2740	6.98e-003	1.00e+000	5.43e-001
4	296.83	94	Pa-231	299.90				
4	296.83	94	Pa-233	300.10	0.0633	6.98e-003	9.99e-001	2.35e+00
	296.83	94	Ga-67	300.20	0.1900	6.98e-003	9.96e-001	7.86e-001
4	296.83	94	Pa-231	302.50				
5	339.61	123	Te-131m	334.27	0.0952	6.25e-003	9.89e-001	2.31e+000
5	339.61	123	Np-239	334.30	0.0200	6.25e-003	9.94e-001	1.09e+001

5	339.61	123	In-115m	336.20	0.4590	6.25e-003	9.27e-001	5.11e-001
5	339.61	123	Ru-95	336.40	0.7100	6.25e-003	8.17e-001	3.75e-001
5	339.61	123	TH-232	338.40	0.1201	6.25e-003	1.01e+000	1.79e+000
5	339.61	123	Ra-223	338.60				
5	339.61	123	Ac-228	338.70				
5	339.61	123	Cs-136	340.60	0.4890	6.25e-003	9.99e-001	4.45e-001
5	339.61	123	Cs-136	340.60	0.4676	6.25e-003	9.99e-001	4.65e-001
5	339.61	123	HF-175	343.40	0.8692	6.25e-003	1.00e+000	2.50e-001
5	339.61	123	EU-152M	344.20	0.0250	6.25e-003	9.64e-001	9.02e+000
5	339.61	123	Eu-152	344.30	0.2720	6.25e-003	1.00e+000	7.99e-001
5	339.61	123	Cd-117	344.46	0.1769	6.25e-003	8.70e-001	1.41e+000
6	353.46	177	Bi-211	351.00				
6	353.46	177	U-235	351.10	0.1200	6.05e-003	1.00e+000	2.69e+000
6	353.46	177	U-238	351.99	0.3710	6.05e-003	1.00e+000	8.69e-001
6	353.46	177	Au-196	355.70	0.8760	6.05e-003	9.98e-001	3.70e-001
6	353.46	177	Ba-133	356.00	0.6200	6.05e-003	1.00e+000	5.21e-001
7	513.07	130	Te-121	507.59	0.1767	4.42e-003	9.99e-001	1.84e+000
7	513.07	130	Tl-208	510.72				
7	513.07	130	Kr-79	511.00	0.1500	4.42e-003	9.90e-001	2.19e+000
7	513.07	130	Annihila	511.00	1.0000	4.42e-003	1.00e+000	3.25e-001
7	513.07	130	Zn-71m	511.55	0.2806	4.42e-003	9.17e-001	1.26e+000
7	513.07	130	Rh-106m	511.70	0.8640	4.42e-003	8.56e-001	4.40e-001
7	513.07	130	KR-85	514.00	0.0041	4.42e-003	1.00e+000	7.93e+001
8	585.27	125	Tl-208	583.14				
8	585.27	125	TH-232	583.14	0.3090	3.95e-003	1.01e+000	1.12e+000
8	585.27	125	Mo-101	590.82	0.1930	3.95e-003	3.31e-001	5.47e+000
9	611.38	163	Kr-79	606.10	0.0810	3.80e-003	9.90e-001	5.90e+000
9	611.38	163	Sb-125	606.82	0.0520	3.80e-003	1.00e+000	9.11e+000
9	611.38	163	Bi-214	609.30				
9	611.38	163	U-238	609.32	0.4609	3.80e-003	1.00e+000	1.02e+000
9	611.38	163	Ir-192	612.45	0.0543	3.80e-003	1.00e+000	8.72e+000
9	611.38	163	Ag-108m	614.37	0.9320	3.80e-003	1.00e+000	5.08e-001
9	611.38	163	Rh-106m	616.10	0.2040	3.80e-003	8.56e-001	2.71e+000
10	914.09	82	TH-232	911.07	0.2900	2.69e-003	1.01e+000	1.15e+000
10	914.09	82	Ac-228	911.20				
10	914.09	82	Sb-129	914.60	0.2140	2.69e-003	9.25e-001	1.70e+000
11	971.52	45	TB-160	966.17	0.2550	2.55e-003	1.00e+000	7.64e-001
11	971.52	45	Ac-228	968.80				
11	971.52	45	TH-232	968.90	0.1746	2.55e-003	1.01e+000	1.10e+000
12	1464.29	405	K-40	1460.81	0.1070	1.79e-003	1.00e+000	2.33e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	1.0239/	1.2813 =	79.9110 %)	0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT	(	1.3247/	1.4997 =	88.3310 %)	0.000
Hg-197	77.35	0.1900	Absent					

Ir-192	295.96	0.2872	Absent					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.0543/	1.9478 =	2.7878 %)	0.000
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Present					
	Total	1.1060	ABSENT	(	0.8760/	1.1060 =	79.2043 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Zn-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.000
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT	(	0.9320/	2.7600 =	33.7681 %)	0.000
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Present					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT	(	1.0680/	1.8150 =	58.8430 %)	0.000
Te-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.000
-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	PRESENT	(	0.0002/	0.0002 =	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.000
KR-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.000
Sb-129	544.70	0.1920	Absent					
	812.80	0.4600	Absent					
	914.60	0.2140	Present					
	1030.10	0.1350	Absent					
	Total	1.0010	ABSENT	(	0.2140/	1.0010 =	21.3786 %)	0.000
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
Sb-124	602.72	0.9830	Present					
	645.82	0.0723	Absent					
	722.78	0.1130	Absent					
	1691.02	0.4900	Absent					
	Total	1.6583	ABSENT	(	0.9830/	1.6583 =	59.2776 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Ag-112	617.40	0.4200	Present					
	1387.70	0.0530	Absent					

	80.20	0.0340	Absent						
	191.38	0.0057	Present						
	268.73	0.0005	Absent						
	Total	0.2302	ABSENT	(	0.0057/	0.2302	=	2.4761 %)	0.000
-197	77.35	0.1700	Absent						
	191.31	0.0350	Present						
	Total	0.2050	ABSENT	(	0.0350/	0.2050	=	17.0732 %)	0.000
Fr-223	80.00	0.0001	Absent						
	234.60	0.0001	Unable to Calc						
	Total	0.0002	ABSENT	(	0.0001/	0.0002	=	50.0000 %)	0.000
Ba-133	81.00	0.3429	Absent						
	276.40	0.0709	Absent						
	302.85	0.1816	Absent						
	356.00	0.6200	Present						
	383.85	0.0897	Absent						
	Total	1.3051	ABSENT	(	0.6200/	1.3051	=	47.5059 %)	0.000
U-235	81.07	0.1480	Absent						
	83.78	0.2460	Absent						
	143.76	0.1050	Absent						
	185.72	0.5400	Present						
	236.00	0.1100	Present						
	269.60	0.1340	Absent						
	351.10	0.1200	Present						
	Total	1.4030	ABSENT	(	0.7700/	1.4030	=	54.8824 %)	0.000
TB-160	86.80	0.1340	Absent						
	197.04	0.0524	Absent						
	215.65	0.0402	Absent						
	298.57	0.2740	Present						
	876.37	0.3000	Absent						
	962.36	0.1000	Absent						
	966.17	0.2550	Present						
	1177.95	0.1550	Absent						
	1271.88	0.0760	Absent						
	Total	1.3866	ABSENT	(	0.5290/	1.3866	=	38.1509 %)	0.000
HF-175	89.36	0.0235	Absent						
	343.40	0.8692	Present						
	432.80	0.0156	Absent						
	Total	0.9083	PRESENT	(	0.8692/	0.9083	=	95.6952 %)	0.000
Cu-67	93.30	0.1690	Absent						
	184.50	0.4700	Present						
	Total	0.6390	ABSENT	(	0.4700/	0.6390	=	73.5524 %)	0.000
Ga-67	93.30	0.3800	Absent						
	184.60	0.2360	Present						
	300.20	0.1900	Present						
	Total	0.8060	ABSENT	(	0.4260/	0.8060	=	52.8536 %)	0.000
Te-131m	102.06	0.0790	Absent						
	149.71	0.2054	Absent						
	200.63	0.0752	Absent						
	240.93	0.0755	Present						
	334.27	0.0952	Present						
	452.30	0.0567	Absent						
	773.67	0.3800	Absent						
	782.49	0.0775	Absent						
	793.75	0.1380	Absent						
	822.78	0.0609	Absent						
	852.21	0.2093	Absent						
	1125.46	0.1137	Absent						
	1206.60	0.0971	Absent						
	Total	1.6635	ABSENT	(	0.1707/	1.6635	=	10.2615 %)	0.000
Sm-155	104.30	0.7464	Absent						

Xe-125	188.43	0.5500	Present					
	243.40	0.2871	Present					
	Total	0.8371	PRESENT (	0.8371/	0.8371 =	100.0000 %)	0.000
In-114m	190.24	0.1564	Present					
	558.43	0.2850	Absent					
	725.24	0.2810	Absent					
	1283.67	0.0003	Absent					
	1299.83	0.0012	Absent					
	Total	0.7239	ABSENT (	0.1564/	0.7239 =	21.6052 %)	0.000
Mo-101	191.93	0.1810	Present					
	505.88	0.1135	Absent					
	590.82	0.1930	Present					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT (	0.3740/	0.6670 =	56.0720 %)	0.000
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Unable to Calc					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Absent					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT (	0.0003/	0.0006 =	50.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT (	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT (	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT (	0.2310/	0.4530 =	50.9934 %)	0.000
Cd-117	273.28	0.2900	Absent					
	344.46	0.1769	Present					
	434.22	0.1047	Absent					
	1303.34	0.1827	Absent					
	1576.80	0.1119	Absent					
	Total	0.8662	ABSENT (	0.1769/	0.8662 =	20.4225 %)	0.000
Pa-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Unable to Calc					
	Total	0.0003	ABSENT (	0.0002/	0.0003 =	66.6667 %)	0.000
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Absent					
	721.96	0.0512	Absent					
	Total	0.5237	PRESENT (	0.4200/	0.5237 =	80.1986 %)	0.000
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT (	0.3415/	1.9478 =	17.5326 %)	0.000
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT (	0.0001/	0.0005 =	20.0000 %)	0.000
Ag-113	298.40	0.0900	Present					
	Total	0.0900	PRESENT (	0.0900/	0.0900 =	100.0000 %)	0.000

	245.73	0.0373	Present					
	Total	0.8039	ABSENT	(	0.0373/	0.8039 =	4.6425 %)	0.000
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Absent					
	778.90	0.1272	Absent					
	964.00	0.1433	Absent					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.0772/	1.3688 =	5.6400 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Present					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.2360/	0.8390 =	28.1287 %)	0.000
Xe-125	188.43	0.5500	Absent					
	243.40	0.2871	Present					
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.000
Mo-101	191.93	0.1810	Absent					
	505.88	0.1135	Absent					
	590.82	0.1930	Present					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1930/	0.6670 =	28.9355 %)	0.000
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Absent					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Absent					
	968.80	0.0001	Absent					
	Total	0.0006	ABSENT	(	0.0001/	0.0006 =	16.6667 %)	0.000
Xe-133m	233.20	0.1000	Present					
	Total	0.1000	PRESENT	(	0.1000/	0.1000 =	100.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000

	Total	0.4730	PRESENT (	0.4200/	0.4730 =	88.7949 %)	0.000
K-40	1460.81	0.1070	Present				
	Total	0.1070	PRESENT (	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
None								

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
Xe-133m	233.20	1.78e+000	+-3.00e-001	5.42e+001	1 of 1	
Ra-224	241.08		BKG	1.00e+012	1 of 1	
Bi-211	351.00		BKG	1.00e+012	1 of 1	
Tl-208	510.72		BKG	1.00e+012	2 of 2	
	583.14		BKG			
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	4.41e+001	+-1.35e+001	9.39e+004	1 of 1	
Ag-112	617.40	7.56e-001	+-1.72e-001	3.14e+000	1 of 2	
K-40	1460.81	1.81e+001	+-1.18e+000	1.12e+013	1 of 1	
TOTAL:		6.48e+001 pCi /g			MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
606.47	1243.72	56	19	33	94	1.55	4.065e+000
913.74	1882.54	70	14	23	42	1.14	7.228e+000
1452.70	3003.03	105	14	20	30	2.57	1.616e+001

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-4

Sample Size	5.75e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-09-97 17:18	Counting Start.	10-09-97 17:18
Sampling Stop	.10-09-97 17:18	Live Time	3600 Sec
Current Date.	.10-14-97 10:06	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	240.07	481.97	324	34	53	339	1.19	
2	296.75	599.81	119	26	43	207	1.42	
3	339.83	689.38	60	20	34	146	1.10	
4	353.53	717.86	179	24	38	158	1.26	
5	512.87	1049.13	97	21	35	121	2.24	
6	585.29	1199.69	111	18	28	87	1.37	
7	611.41	1254.00	116	17	25	67	1.28	
8	663.52	1362.33	56	17	30	84	1.78	
9	913.94	1882.95	115	16	23	43	1.47	
10	971.63	2002.90	60	14	23	46	1.85	
11	1464.29	3027.14	384	20	10	9	2.34	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-4

Sample Size . . . . . 5.75e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-09-97 17:18	Counting Start. 10-09-97 17:18
Sampling Stop 10-09-97 17:18	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:06	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	240.07	324	Fr-223	234.60				
1	240.07	324	Th-227	236.00				
1	240.07	324	U-235	236.00	0.1100	8.21e-003	1.00e+000	4.68e+000
1	240.07	324	TH-232	238.63	0.4310	8.21e-003	1.01e+000	1.18e+000
1	240.07	324	Te-131m	240.93	0.0755	8.21e-003	9.89e-001	6.90e+000
1	240.07	324	Ra-224	241.08				
1	240.07	324	Xe-125	243.40	0.2871	8.21e-003	9.80e-001	1.83e+000
1	240.07	324	IN-116M	244.59	0.0038	8.21e-003	6.99e-001	1.94e+002
1	240.07	324	Eu-152	244.67	0.0772	8.21e-003	1.00e+000	6.67e+000
1	240.07	324	Sm-155	245.73	0.0373	8.21e-003	4.51e-001	3.06e+001
2	296.75	119	Ce-143	293.26	0.4200	6.98e-003	9.90e-001	5.36e-001
2	296.75	119	U-238	295.22	0.1920	6.98e-003	1.00e+000	1.16e+000
2	296.75	119	Ir-192	295.96	0.2872	6.98e-003	1.00e+000	7.75e-001
2	296.75	119	Tl-210	296.00				
2	296.75	119	Ag-113	298.40	0.0900	6.98e-003	9.38e-001	2.64e+000
2	296.75	119	TB-160	298.57	0.2740	6.98e-003	1.00e+000	8.13e-001
2	296.75	119	Pa-231	299.90				
2	296.75	119	Pa-233	300.10	0.0633	6.98e-003	9.99e-001	3.52e+000
2	296.75	119	Ga-67	300.20	0.1900	6.98e-003	9.96e-001	1.18e+000
2	296.75	119	Pa-231	302.50				
3	339.83	60	Te-131m	334.27	0.0952	6.25e-003	9.89e-001	1.33e+000
3	339.83	60	Np-239	334.30	0.0200	6.25e-003	9.94e-001	6.31e+000
3	339.83	60	In-115m	336.20	0.4590	6.25e-003	9.27e-001	2.95e-001
3	339.83	60	Ru-95	336.40	0.7100	6.25e-003	8.17e-001	2.16e-001
3	339.83	60	TH-232	338.40	0.1201	6.25e-003	1.01e+000	1.03e+000
3	339.83	60	Ra-223	338.60				
3	339.83	60	Ac-228	338.70				
3	339.83	60	Cs-136	340.60	0.4890	6.25e-003	9.99e-001	2.57e-001
3	339.83	60	Cs-136	340.60	0.4676	6.25e-003	9.99e-001	2.68e-001
3	339.83	60	HF-175	343.40	0.8692	6.25e-003	1.00e+000	1.44e-001
3	339.83	60	EU-152M	344.20	0.0250	6.25e-003	9.64e-001	5.20e+000
3	339.83	60	Eu-152	344.30	0.2720	6.25e-003	1.00e+000	4.61e-001
3	339.83	60	Cd-117	344.46	0.1769	6.25e-003	8.70e-001	8.15e-001

4	353.53	179	Bi-211	351.00				
4	353.53	179	U-235	351.10	0.1200	6.05e-003	1.00e+000	3.22e+000
4	353.53	179	U-238	351.99	0.3710	6.05e-003	1.00e+000	1.04e+000
4	353.53	179	Au-196	355.70	0.8760	6.05e-003	9.98e-001	4.42e-001
4	353.53	179	Ba-133	356.00	0.6200	6.05e-003	1.00e+000	6.23e-001
5	512.87	97	Te-121	507.59	0.1767	4.42e-003	9.99e-001	1.62e+000
5	512.87	97	Tl-208	510.72				
5	512.87	97	Kr-79	511.00	0.1500	4.42e-003	9.90e-001	1.93e+000
5	512.87	97	Annihila	511.00	1.0000	4.42e-003	1.00e+000	2.87e-001
5	512.87	97	Zn-71m	511.55	0.2806	4.42e-003	9.17e-001	1.11e+000
5	512.87	97	Rh-106m	511.70	0.8640	4.42e-003	8.56e-001	3.88e-001
5	512.87	97	KR-85	514.00	0.0041	4.42e-003	1.00e+000	6.99e+001
6	585.29	111	Tl-208	583.14				
6	585.29	111	TH-232	583.14	0.3090	3.95e-003	1.01e+000	1.18e+000
6	585.29	111	Mo-101	590.82	0.1930	3.95e-003	3.31e-001	5.75e+000
7	611.41	116	Kr-79	606.10	0.0810	3.80e-003	9.90e-001	4.97e+000
7	611.41	116	Sb-125	606.82	0.0520	3.80e-003	1.00e+000	7.66e+000
7	611.41	116	Bi-214	609.30				
7	611.41	116	U-238	609.32	0.4609	3.80e-003	1.00e+000	8.63e-001
7	611.41	116	Ir-192	612.45	0.0543	3.80e-003	1.00e+000	7.34e+000
7	611.41	116	Ag-108m	614.37	0.9320	3.80e-003	1.00e+000	4.28e-001
7	611.41	116	Rh-106m	616.10	0.2040	3.80e-003	8.56e-001	2.28e+000
7	611.41	116	Ag-112	617.40	0.4200	3.80e-003	8.97e-001	1.06e+000
8	663.52	56	Ag-110m	657.75	0.9440	3.54e-003	1.00e+000	2.19e-001
8	663.52	56	Cs-137	661.65	0.8500	3.54e-003	1.00e+000	2.43e-001
8	663.52	56	Ce-143	664.55	0.0525	3.54e-003	9.90e-001	3.97e+000
8	663.52	56	Sb-126	666.30	0.9970	3.54e-003	9.99e-001	2.07e-001
8	663.52	56	I-126	667.00	0.3300	3.54e-003	9.99e-001	6.26e-001
8	663.52	56	I-132	667.70	0.9870	3.54e-003	8.63e-001	2.42e-001
8	663.52	56	I-130	668.54	0.9610	3.54e-003	9.72e-001	2.21e-001
9	913.94	115	TH-232	911.07	0.2900	2.69e-003	1.01e+000	1.91e+000
9	913.94	115	Ac-228	911.20				
9	913.94	115	Sb-129	914.60	0.2140	2.69e-003	9.25e-001	2.82e+000
10	971.63	60	TB-160	966.17	0.2550	2.55e-003	1.00e+000	1.20e+000
10	971.63	60	Ac-228	968.80				
10	971.63	60	TH-232	968.90	0.1746	2.55e-003	1.01e+000	1.74e+000
11	1464.29	384	K-40	1460.81	0.1070	1.79e-003	1.00e+000	2.61e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	1.0239/	1.2813 =	79.9110 %)	0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT	(	1.3247/	1.4997 =	88.3310 %)	0.000
-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ba-133	81.00	0.3429	Absent					

	276.40	0.0709	Absent					
	302.35	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.6200/	1.3051 =	47.5059 %)	0.00
235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(	0.2300/	1.4030 =	16.3934 %)	0.00
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Absent					
	966.17	0.2550	Present					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.5290/	1.3866 =	38.1509 %)	0.000
HF-175	89.36	0.0235	Absent					
	343.40	0.8692	Present					
	432.80	0.0156	Absent					
	Total	0.9083	PRESENT	(	0.8692/	0.9083 =	95.6952 %)	0.000
Ga-67	93.30	0.3800	Absent					
	184.60	0.2360	Absent					
	300.20	0.1900	Present					
	Total	0.8060	ABSENT	(	0.1900/	0.8060 =	23.5732 %)	0.000
e-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Present					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.1707/	1.6635 =	10.2615 %)	0.000
Sm-155	104.30	0.7464	Absent					
	141.41	0.0202	Absent					
	245.73	0.0373	Present					
	Total	0.8039	ABSENT	(	0.0373/	0.8039 =	4.6425 %)	0.000
Np-239	106.10	0.2320	Absent					
	209.80	0.0410	Absent					
	228.10	0.1270	Absent					
	277.60	0.1420	Absent					
	315.90	0.0150	Absent					
	334.30	0.0200	Present					
	Total	0.5770	ABSENT	(	0.0200/	0.5770 =	3.4662 %)	0.000
-152M	121.78	0.0720	Absent					
	344.20	0.0250	Present					
	841.60	0.1470	Absent					
	963.50	0.1200	Absent					

	Total	0.3640	ABSENT	(	0.0250/	0.3640 =	6.8681 %)	0.000
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Present					
	778.90	0.1272	Absent					
	964.00	0.1433	Absent					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.3492/	1.3688 =	25.5114 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Ra-223	144.30	0.0001	Absent					
	154.30	0.0001	Absent					
	269.60	0.0001	Absent					
	338.60	0.0001	Unable to Calc					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Xe-125	188.43	0.5500	Absent					
	243.40	0.2871	Present					
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.000
Mo-101	191.93	0.1810	Absent					
	505.88	0.1135	Absent					
	590.82	0.1930	Present					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1930/	0.6670 =	28.9355 %)	0.000
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Unable to Calc					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Absent					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT	(	0.0003/	0.0006 =	50.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					

	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.00
Cd-117	273.28	0.2900	Absent					
	344.46	0.1769	Present					
	434.22	0.1047	Absent					
	1303.34	0.1827	Absent					
	1576.80	0.1119	Absent					
	Total	0.8662	ABSENT	(	0.1769/	0.8662 =	20.4225 %)	0.00
Pa-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Unable to Calc					
	Total	0.0003	ABSENT	(	0.0002/	0.0003 =	66.6667 %)	0.00
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Present					
	721.96	0.0512	Absent					
	Total	0.5237	PRESENT	(	0.4725/	0.5237 =	90.2234 %)	0.00
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.3415/	1.9478 =	17.5326 %)	0.00
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT	(	0.0001/	0.0005 =	20.0000 %)	0.000
Ag-113	298.40	0.0900	Present					
	Total	0.0900	PRESENT	(	0.0900/	0.0900 =	100.0000 %)	0.000
-233	300.10	0.0633	Present					
	311.90	0.3700	Absent					
	Total	0.4333	ABSENT	(	0.0633/	0.4333 =	14.6088 %)	0.000
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Present					
	Total	1.1060	ABSENT	(	0.8760/	1.1060 =	79.2043 %)	0.000
In-115m	336.20	0.4590	Present					
	Total	0.4590	PRESENT	(	0.4590/	0.4590 =	100.0000 %)	0.000
Ru-95	336.40	0.7100	Present					
	1096.80	0.2100	Absent					
	Total	0.9200	ABSENT	(	0.7100/	0.9200 =	77.1739 %)	0.000
Cs-136	340.60	0.4890	Present					
	340.60	0.4676	Present					
	818.50	0.9970	Absent					
	818.50	0.9970	Absent					
	1048.07	0.7976	Absent					
	1048.10	0.7980	Absent					
	1235.34	0.1974	Absent					
	Total	4.7436	ABSENT	(	0.9566/	4.7436 =	20.1661 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
I-126	386.00	0.3400	Absent					
	667.00	0.3300	Present					
	Total	0.6700	ABSENT	(	0.3300/	0.6700 =	49.2537 %)	0.000
Zn-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.000

Sb-126	414.30	0.8770	Absent					
	666.30	0.9970	Present					
	695.00	0.9970	Absent					
	697.00	0.3190	Absent					
	720.50	0.5780	Absent					
	Total	3.7680	ABSENT	(	0.9970/	3.7680 =	26.4597 %)	0.00
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT	(	0.9320/	2.7600 =	33.7681 %)	0.00
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Present					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT	(	1.0680/	1.8150 =	58.8430 %)	0.000
Te-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	PRESENT	(	0.0002/	0.0002 =	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.000
KR-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.000
I-132	522.65	0.1610	Absent					
	630.20	0.1370	Absent					
	667.70	0.9870	Present					
	772.61	0.7620	Absent					
	954.55	0.1810	Absent					
	Total	2.2280	ABSENT	(	0.9870/	2.2280 =	44.2998 %)	0.000
I-130	536.09	0.9900	Absent					
	668.54	0.9610	Present					
	Total	1.9510	ABSENT	(	0.9610/	1.9510 =	49.2568 %)	0.000
Sb-129	544.70	0.1920	Absent					
	812.80	0.4600	Absent					
	914.60	0.2140	Present					
	1030.10	0.1350	Absent					
	Total	1.0010	ABSENT	(	0.2140/	1.0010 =	21.3786 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Ag-112	617.40	0.4200	Present					
	1387.70	0.0530	Absent					
	Total	0.4730	PRESENT	(	0.4200/	0.4730 =	88.7949 %)	0.000
Ag-110m	657.75	0.9440	Present					
	677.60	0.1057	Absent					
	706.67	0.1631	Absent					
	763.93	0.2226	Absent					
	884.67	0.7278	Absent					
	937.48	0.3427	Absent					
	1384.27	0.2164	Absent					
	1505.00	0.1323	Absent					
	Total	2.8546	ABSENT	(	0.9440/	2.8546 =	33.0694 %)	0.000
Cs-137	661.65	0.8500	Present					
	Total	0.8500	PRESENT	(	0.8500/	0.8500 =	100.0000 %)	0.000
K-40	1460.81	0.1070	Present					

Total	0.1070	PRESENT (	0.1070/	0.1070 =	100.0000 %	0.000

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
1	324	TH-232	911.07	7.80e-004	115	238.63	3.54e-003	324
3	60	TH-232	911.07	7.80e-004	115	338.40	7.50e-004	60
6	111	TH-232	911.07	7.80e-004	115	583.14	1.22e-003	111

PEAK INTERFERENCE CORRECTION

Pk#	New Area	Nuclide	Energy	Status
1	0	Ra-224	241.08	Deleted [Net < Critical Level]
3	0	In-115m	336.20	Deleted [Net < Critical Level]
3	0	HF-175	343.40	Deleted [Net < Critical Level]
6	0	Tl-208	583.14	Deleted [Net < Critical Level]

SECONDARY NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
HF-175	89.36	0.0235	Absent					
	343.40	0.8692	Absent					
	432.80	0.0156	Absent					
	Total	0.9083	ABSENT	(0.0000/	0.9083 =	0.0000 %)		0.000
Ra-224	241.08	0.0001	Absent					
	Total	0.0001	ABSENT	(0.0000/	0.0001 =	0.0000 %)		0.000
In-115m	336.20	0.4590	Absent					
	Total	0.4590	ABSENT	(0.0000/	0.4590 =	0.0000 %)		0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Absent					
	Total	0.0002	ABSENT	(0.0001/	0.0002 =	50.0000 %)		0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
TH-232	Average:	1.29e+000	+-9.14e-002	1.24e+014	5 of 6	0.00
	238.63	1.18e+000	+-1.24e-001			
	338.40	1.03e+000	+-3.53e-001			
	583.14	1.18e+000	+-1.95e-001			
	911.07	1.91e+000	+-2.61e-001			
	968.90	1.74e+000	+-4.07e-001			
Ce-143	Average:	5.67e-001	+-1.16e-001	3.30e+001	2 of 3	2.83
	293.26	5.36e-001	+-1.16e-001			
	664.55	3.97e+000	+-1.22e+000			
Ag-113	298.40	2.64e+000	+-5.72e-001	5.37e+000	1 of 1	
Bi-211	351.00		BKG	1.00e+012	1 of 1	
nihila	511.00		I.D.Only	1.00e+003	1 of 1	
Kr-85	514.00	6.99e+001	+-1.50e+001	9.39e+004	1 of 1	
Ag-112	617.40	1.06e+000	+-1.55e-001	3.14e+000	1 of 2	
Cs-137	661.65	2.43e-001	+-7.46e-002	2.64e+005	1 of 1	24.28

K-40	1460.81	2.61e+001 +-1.38e+000	1.12e+013	1 of 1	
TOTAL:		1.02e+002 pCi /g		MPC Total:	27.12

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-5

Sample Size	5.80e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-10-97 08:47	Counting Start.	10-10-97 08:47
Sampling Stop	.10-10-97 08:47	Live Time	3600 Sec
Current Date.	.10-14-97 10:13	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	77.99	145.00	42	33	57	515	0.46	NET < CL
2	186.53	370.67	79	27	44	301	1.09	
3	238.90	479.54	345	34	51	359	1.15	
4	295.30	596.80	125	23	36	176	0.83	
5	338.33	686.27	70	19	31	136	1.21	
6	352.05	714.79	254	25	35	133	1.29	
7	582.75	1194.42	150	20	30	88	1.50	
8	608.88	1248.74	195	19	24	63	1.28	
9	910.18	1875.13	84	16	26	64	1.69	
10	1458.59	3015.29	410	21	9	7	1.96	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-5

Sample Size . . . . . 5.80e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-10-97 08:47	Counting Start. 10-10-97 08:47
Sampling Stop 10-10-97 08:47	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:13	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
2	186.53	79	Mo-99	181.07	0.0629	9.66e-003	9.95e-001	1.69e+000
2	186.53	79	Cu-67	184.50	0.4700	9.66e-003	9.94e-001	2.26e-001
2	186.53	79	Ga-67	184.60	0.2360	9.66e-003	9.96e-001	4.51e-001
2	186.53	79	U-235	185.72	0.5400	9.66e-003	1.00e+000	1.96e-001
2	186.53	79	Ra-226	186.20				
2	186.53	79	Xe-125	188.43	0.5500	9.66e-003	9.80e-001	1.96e-001
2	186.53	79	In-114m	190.24	0.1564	9.66e-003	1.00e+000	6.77e-001
2	186.53	79	Pt-197	191.31	0.0350	9.66e-003	9.81e-001	3.08e+000
2	186.53	79	Hg-197	191.38	0.0057	9.66e-003	9.95e-001	1.87e+001
2	186.53	79	Zn-72	191.50	0.0940	9.66e-003	9.93e-001	1.13e+000
2	186.53	79	Mo-101	191.93	0.1810	9.66e-003	3.31e-001	1.77e+000
2	186.53	79	Fe-59	192.34	0.0311	9.66e-003	1.00e+000	3.41e+000
3	238.90	345	Xe-133m	233.20	0.1000	8.24e-003	9.94e-001	5.45e+000
3	238.90	345	Fr-223	234.60				
3	238.90	345	Th-227	236.00				
3	238.90	345	U-235	236.00	0.1100	8.24e-003	1.00e+000	4.93e+000
3	238.90	345	TH-232	238.63	0.4310	8.24e-003	1.01e+000	1.25e+000
3	238.90	345	Te-131m	240.93	0.0755	8.24e-003	9.89e-001	7.26e+000
3	238.90	345	Ra-224	241.08				
3	238.90	345	Xe-125	243.40	0.2871	8.24e-003	9.80e-001	1.93e+000
3	238.90	345	IN-116M	244.59	0.0038	8.24e-003	6.99e-001	2.04e+002
3	238.90	345	Eu-152	244.67	0.0772	8.24e-003	1.00e+000	7.02e+000
4	295.30	125	Ce-143	293.26	0.4200	7.00e-003	9.90e-001	5.56e-001
4	295.30	125	U-238	295.22	0.1920	7.00e-003	1.00e+000	1.20e+000
4	295.30	125	Ir-192	295.96	0.2872	7.00e-003	1.00e+000	8.04e-001
4	295.30	125	Tl-210	296.00				
4	295.30	125	Ag-113	298.40	0.0900	7.00e-003	9.38e-001	2.74e+000
4	295.30	125	TB-160	298.57	0.2740	7.00e-003	1.00e+000	8.43e-001
4	295.30	125	Pa-231	299.90				
4	295.30	125	Pa-233	300.10	0.0633	7.00e-003	9.99e-001	3.65e+000
4	295.30	125	Ga-67	300.20	0.1900	7.00e-003	9.96e-001	1.22e+000
5	338.33	70	Mg-27	332.73	0.0100	6.27e-003	2.25e-001	6.43e+001
5	338.33	70	Au-196	332.90	0.2300	6.27e-003	9.98e-001	6.30e-001

5	338.33	70	Te-131m	334.27	0.0952	6.27e-003	9.89e-001	1.54e-00
5	338.33	70	Np-239	334.30	0.0200	6.27e-003	9.94e-001	7.27e-00
5	338.33	70	In-115m	336.20	0.4590	6.27e-003	9.27e-001	3.40e-00
5	338.33	70	Ru-95	336.40	0.7100	6.27e-003	8.17e-001	2.49e-00
5	338.33	70	TH-232	338.40	0.1201	6.27e-003	1.01e+000	1.19e+00
5	338.33	70	Ra-223	338.60				
5	338.33	70	Ac-228	338.70				
5	338.33	70	Cs-136	340.60	0.4890	6.27e-003	9.99e-001	2.96e-001
5	338.33	70	Cs-136	340.60	0.4676	6.27e-003	9.99e-001	3.09e-001
5	338.33	70	HF-175	343.40	0.8692	6.27e-003	1.00e+000	1.66e-001
5	338.33	70	EU-152M	344.20	0.0250	6.27e-003	9.64e-001	6.00e+00
5	338.33	70	Eu-152	344.30	0.2720	6.27e-003	1.00e+000	5.31e-001
6	352.05	254	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	1.06e+00
6	352.05	254	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	6.03e+000
6	352.05	254	Na-24	346.55	0.0100	6.07e-003	9.77e-001	5.54e+001
6	352.05	254	Bi-211	351.00				
6	352.05	254	U-235	351.10	0.1200	6.07e-003	1.00e+000	4.52e+000
6	352.05	254	U-238	351.99	0.3710	6.07e-003	1.00e+000	1.46e+000
6	352.05	254	Au-196	355.70	0.8760	6.07e-003	9.98e-001	6.20e-001
6	352.05	254	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	8.74e-001
7	582.75	150	Tl-208	583.14				
7	582.75	150	TH-232	583.14	0.3090	3.96e-003	1.01e+000	1.57e+000
8	608.88	195	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	6.78e-001
8	608.88	195	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	8.25e+000
8	608.88	195	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	1.27e+001
8	608.88	195	Bi-214	609.30				
8	608.88	195	U-238	609.32	0.4609	3.81e-003	1.00e+000	1.43e+000
8	608.88	195	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	1.22e+001
8	608.88	195	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	7.10e-001
9	910.18	84	TH-232	911.07	0.2900	2.70e-003	1.01e+000	1.38e+000
9	910.18	84	Ac-228	911.20				
9	910.18	84	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	2.03e+000
10	1458.59	410	K-40	1460.81	0.1070	1.80e-003	1.00e+000	2.76e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(1.0239/	1.2813 =	79.9110 %)		0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Absent					
	Total	1.4997	ABSENT	(1.1501/	1.4997 =	76.6887 %)		0.000
Hg-197	77.35	0.1900	Absent					
	80.20	0.0340	Absent					
	191.38	0.0057	Present					
	268.73	0.0005	Absent					
	Total	0.2302	ABSENT	(0.0057/	0.2302 =	2.4761 %)		0.000
Pt-197	77.35	0.1700	Absent					
	191.31	0.0350	Present					
	Total	0.2050	ABSENT	(0.0350/	0.2050 =	17.0732 %)		0.000

Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.6200/	1.3051 =	47.5059 %)	0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Present					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(	0.7700/	1.4030 =	54.8824 %)	0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Absent					
	966.17	0.2550	Absent					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.2740/	1.3866 =	19.7606 %)	0.000
HF-175	89.36	0.0235	Absent					
	343.40	0.8692	Present					
	432.80	0.0156	Absent					
	Total	0.9083	PRESENT	(	0.8692/	0.9083 =	95.6952 %)	0.000
a-67	93.30	0.1690	Absent					
	184.50	0.4700	Present					
	Total	0.6390	ABSENT	(	0.4700/	0.6390 =	73.5524 %)	0.000
Ga-67	93.30	0.3800	Absent					
	184.60	0.2360	Present					
	300.20	0.1900	Present					
	Total	0.8060	ABSENT	(	0.4260/	0.8060 =	52.8536 %)	0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Present					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.1707/	1.6635 =	10.2615 %)	0.000
Np-239	106.10	0.2320	Absent					
	209.80	0.0410	Absent					
	228.10	0.1270	Absent					
	277.60	0.1420	Absent					
	315.90	0.0150	Absent					
	334.30	0.0200	Present					
	Total	0.5770	ABSENT	(	0.0200/	0.5770 =	3.4662 %)	0.000
EU-152M	121.78	0.0720	Absent					

	344.20	0.0250	Present						
	841.60	0.1470	Absent						
	963.50	0.1200	Absent						
	Total	0.3640	ABSENT	(	0.0250/	0.3640	=	6.8681 %)	0.000
-152	121.78	0.3068	Absent						
	244.67	0.0772	Present						
	344.30	0.2720	Present						
	778.90	0.1272	Absent						
	964.00	0.1433	Absent						
	1085.80	0.1010	Absent						
	1112.07	0.1340	Absent						
	1408.08	0.2073	Absent						
	Total	1.3688	ABSENT	(	0.3492/	1.3688	=	25.5114 %)	0.000
IN-116M	137.92	0.0350	Absent						
	244.59	0.0038	Present						
	416.88	0.2937	Absent						
	463.13	0.0083	Absent						
	818.65	0.1372	Absent						
	1097.23	0.6791	Absent						
	1293.49	1.0000	Absent						
	1507.50	0.1186	Absent						
	1601.12	0.0107	Absent						
	1752.42	0.0289	Absent						
	2212.21	0.1858	Absent						
	Total	2.5011	ABSENT	(	0.0038/	2.5011	=	0.1519 %)	0.000
Mo-99	140.51	0.0379	Absent						
	181.07	0.0629	Present						
	739.40	0.1260	Absent						
	Total	0.2268	ABSENT	(	0.0629/	0.2268	=	27.7266 %)	0.000
Fe-59	142.65	0.0103	Absent						
	192.34	0.0311	Present						
	1099.22	0.5680	Absent						
	1291.56	0.4320	Absent						
	Total	1.0414	ABSENT	(	0.0311/	1.0414	=	2.9864 %)	0.000
Ra-223	144.30	0.0001	Absent						
	154.30	0.0001	Absent						
	269.60	0.0001	Absent						
	338.60	0.0001	Unable to Calc						
	Total	0.0004	ABSENT	(	0.0001/	0.0004	=	25.0000 %)	0.000
Zn-72	144.70	0.8300	Absent						
	191.50	0.0940	Present						
	Total	0.9240	ABSENT	(	0.0940/	0.9240	=	10.1732 %)	0.000
Mg-27	170.82	0.0070	Absent						
	332.73	0.0100	Unable to Calc						
	843.80	0.7140	Absent						
	1014.50	0.2860	Absent						
	Total	1.0170	ABSENT	(	0.0100/	1.0170	=	0.9833 %)	0.000
Sb-125	176.29	0.0630	Absent						
	380.51	0.0140	Absent						
	427.95	0.2960	Absent						
	463.51	0.1000	Absent						
	600.77	0.1840	Absent						
	606.82	0.0520	Present						
	636.15	0.1120	Absent						
	671.66	0.0180	Absent						
	Total	0.8390	ABSENT	(	0.0520/	0.8390	=	6.1979 %)	0.000
-226	186.20	0.0001	Unable to Calc						
	Total	0.0001	PRESENT	(	0.0001/	0.0001	=	100.0000 %)	0.000
Xe-125	188.43	0.5500	Present						
	243.40	0.2871	Present						

	Total	0.8371	PRESENT (	0.8371/	0.8371 =	100.0000 %	0.000
In-114m	190.24	0.1564	Present				
	558.43	0.2850	Absent				
	725.24	0.2810	Absent				
	1283.67	0.0003	Absent				
	1299.83	0.0012	Absent				
	Total	0.7239	ABSENT (	0.1564/	0.7239 =	21.6052 %)	0.000
Mo-101	191.93	0.1810	Present				
	505.88	0.1135	Absent				
	590.82	0.1930	Absent				
	695.53	0.0660	Absent				
	1012.35	0.1135	Absent				
	Total	0.6670	ABSENT (	0.1810/	0.6670 =	27.1364 %)	0.000
Ac-228	209.50	0.0001	Absent				
	338.70	0.0001	Unable to Calc				
	790.50	0.0001	Absent				
	911.20	0.0001	Unable to Calc				
	964.40	0.0001	Absent				
	968.80	0.0001	Absent				
	Total	0.0006	ABSENT (	0.0002/	0.0006 =	33.3333 %)	0.000
Xe-133m	233.20	0.1000	Present				
	Total	0.1000	PRESENT (	0.1000/	0.1000 =	100.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc				
	329.90	0.0001	Absent				
	Total	0.0002	ABSENT (	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc				
	Total	0.0001	PRESENT (	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent				
	397.50	0.0950	Absent				
	511.00	0.1500	Absent				
	606.10	0.0810	Present				
	Total	0.4530	ABSENT (	0.0810/	0.4530 =	17.8808 %)	0.000
Pa-231	283.60	0.0001	Absent				
	299.90	0.0001	Unable to Calc				
	302.50	0.0001	Absent				
	Total	0.0003	ABSENT (	0.0001/	0.0003 =	33.3333 %)	0.000
Ce-143	293.26	0.4200	Present				
	664.55	0.0525	Absent				
	721.96	0.0512	Absent				
	Total	0.5237	PRESENT (	0.4200/	0.5237 =	80.1986 %)	0.000
Ir-192	295.96	0.2872	Present				
	308.46	0.2965	Absent				
	316.51	0.8290	Absent				
	468.06	0.4808	Absent				
	612.45	0.0543	Present				
	Total	1.9478	ABSENT (	0.3415/	1.9478 =	17.5326 %)	0.000
Tl-210	296.00	0.0001	Unable to Calc				
	795.00	0.0001	Absent				
	1060.00	0.0001	Absent				
	1210.00	0.0001	Absent				
	1310.00	0.0001	Absent				
	Total	0.0005	ABSENT (	0.0001/	0.0005 =	20.0000 %)	0.000
Ag-113	298.40	0.0900	Present				
	Total	0.0900	PRESENT (	0.0900/	0.0900 =	100.0000 %)	0.000
Pa-233	300.10	0.0633	Present				
	311.90	0.3700	Absent				
	Total	0.4333	ABSENT (	0.0633/	0.4333 =	14.6088 %)	0.000
Ho-167	321.30	0.2390	Absent				
	346.50	0.5700	Present				
	Total	0.8090	ABSENT (	0.5700/	0.8090 =	70.4574 %)	0.000

Au-196	332.90	0.2300	Present					
	355.70	0.8760	Present					
	Total	1.1060	PRESENT (	1.1060/	1.1060 =	100.0000 %)	0.000
In-115m	336.20	0.4590	Present					
	Total	0.4590	PRESENT (	0.4590/	0.4590 =	100.0000 %)	0.000
Nb-95	336.40	0.7100	Present					
	1096.80	0.2100	Absent					
	Total	0.9200	ABSENT (	0.7100/	0.9200 =	77.1739 %)	0.000
Cs-136	340.60	0.4890	Present					
	340.60	0.4676	Present					
	818.50	0.9970	Absent					
	818.50	0.9970	Absent					
	1048.07	0.7976	Absent					
	1048.10	0.7980	Absent					
	1235.34	0.1974	Absent					
	Total	4.7436	ABSENT (	0.9566/	4.7436 =	20.1661 %)	0.000
Pt-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT (	0.1110/	0.1110 =	100.0000 %)	0.000
Na-24	346.55	0.0100	Unable to Calc					
	857.55	0.0100	Absent					
	1368.53	1.0000	Absent					
	1732.10	0.0100	Absent					
	Total	1.0300	ABSENT (	0.0100/	1.0300 =	0.9709 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT (	0.0001/	0.0001 =	100.0000 %)	0.000
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT (	0.9320/	2.7600 =	33.7681 %)	0.000
Tl-208	510.72	0.0001	Absent					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	ABSENT (	0.0001/	0.0002 =	50.0000 %)	0.000
Sb-129	544.70	0.1920	Absent					
	812.80	0.4600	Absent					
	914.60	0.2140	Present					
	1030.10	0.1350	Absent					
	Total	1.0010	ABSENT (	0.2140/	1.0010 =	21.3786 %)	0.000
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT (	0.9756/	2.1554 =	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT (	0.0001/	0.0004 =	25.0000 %)	0.000
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT (	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

			Reference Energy Line ===>>			Calculated Contribution		
#	Old Area	Nuclide	Energy	cts/dis	Ref Area	Energy	cts/dis	New Area
None								

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
nF-175	343.40	1.66e-001	+-4.61e-002	1.68e+003	1 of 3	
Ra-226	186.20		BKG	1.00e+012	1 of 1	
Xe-125	Average:	3.85e-001	+-6.28e-002	1.68e+001	2 of 2	0.00
	188.43	1.96e-001	+-6.66e-002			
	243.40	1.93e+000	+-1.91e-001			
Xe-133m	233.20	5.45e+000	+-5.39e-001	5.42e+001	1 of 1	
Ra-224	241.08		BKG	1.00e+012	1 of 1	
Ce-143	293.26	5.56e-001	+-1.03e-001	3.30e+001	1 of 3	2.78
Ag-113	298.40	2.74e+000	+-5.05e-001	5.37e+000	1 of 1	
Au-196	Average:	6.21e-001	+-5.70e-002	1.48e+002	2 of 2	0.00
	332.90	6.30e-001	+-1.74e-001			
	355.70	6.20e-001	+-6.03e-002			
In-115m	336.20	3.40e-001	+-9.41e-002	4.49e+000	1 of 1	
Pt-197m	346.50	6.03e+000	+-5.87e-001	1.57e+000	1 of 1	
Bi-211	351.00		BKG	1.00e+012	1 of 1	
K-40	1460.81	2.76e+001	+-1.40e+000	1.12e+013	1 of 1	
TOTAL:		4.39e+001 pCi /g			MPC Total:	2.78

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
582.75	1194.42	150	20	30	88	1.50	1.052e+001
608.88	1248.74	195	19	24	63	1.28	1.420e+001
910.18	1875.13	84	16	26	64	1.69	8.644e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-6

Sample Size	6.45e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-10-97 09:56	Counting Start.	10-10-97 09:56
Sampling Stop	.10-10-97 09:56	Live Time	3600 Sec
Current Date.	.10-14-97 10:14	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	239.02	479.80	320	33	51	323	0.93	
2	295.60	597.42	113	25	43	203	1.08	
3	338.76	687.15	69	24	43	187	1.11	
4	352.02	714.73	191	25	38	162	1.55	
5	510.43	1044.04	114	20	32	94	1.95	
6	582.83	1194.57	120	19	31	86	1.48	
7	608.89	1248.76	167	18	22	53	1.80	
8	661.17	1357.45	52	16	28	74	0.93	
9	910.26	1875.30	102	14	20	33	1.67	
10	967.86	1995.05	54	12	19	37	1.50	
11	1458.65	3015.41	312	19	11	11	2.23	
12	1761.84	3645.74	48	8	8	5	2.54	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-6

Sample Size . . . . . 6.45e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-10-97 09:56	Counting Start. 10-10-97 09:56
Sampling Stop 10-10-97 09:56	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:14	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	239.02	320	Xe-133m	233.20	0.1000	8.24e-003	9.94e-001	4.55e+000
1	239.02	320	Fr-223	234.60				
1	239.02	320	Th-227	236.00				
1	239.02	320	U-235	236.00	0.1100	8.24e-003	1.00e+000	4.11e+000
1	239.02	320	TH-232	238.63	0.4310	8.24e-003	1.01e+000	1.04e+000
1	239.02	320	Te-131m	240.93	0.0755	8.24e-003	9.89e-001	6.06e+000
1	239.02	320	Ra-224	241.08				
1	239.02	320	Xe-125	243.40	0.2871	8.24e-003	9.80e-001	1.61e+000
1	239.02	320	IN-116M	244.59	0.0038	8.24e-003	6.99e-001	1.70e+002
1	239.02	320	Eu-152	244.67	0.0772	8.24e-003	1.00e+000	5.86e+000
2	295.60	113	Ce-143	293.26	0.4200	7.00e-003	9.90e-001	4.52e-001
2	295.60	113	U-238	295.22	0.1920	7.00e-003	1.00e+000	9.76e-001
2	295.60	113	Ir-192	295.96	0.2872	7.00e-003	1.00e+000	6.54e-001
2	295.60	113	Tl-210	296.00				
2	295.60	113	Ag-113	298.40	0.0900	7.00e-003	9.38e-001	2.23e+000
2	295.60	113	TB-160	298.57	0.2740	7.00e-003	1.00e+000	6.86e-001
2	295.60	113	Pa-231	299.90				
2	295.60	113	Pa-233	300.10	0.0633	7.00e-003	9.99e-001	2.97e+000
2	295.60	113	Ga-67	300.20	0.1900	7.00e-003	9.96e-001	9.93e-001
3	338.76	69	Au-196	332.90	0.2300	6.27e-003	9.98e-001	5.59e-001
3	338.76	69	Te-131m	334.27	0.0952	6.27e-003	9.89e-001	1.36e+000
3	338.76	69	Np-239	334.30	0.0200	6.27e-003	9.94e-001	6.45e+000
3	338.76	69	In-115m	336.20	0.4590	6.27e-003	9.27e-001	3.01e-001
3	338.76	69	Ru-95	336.40	0.7100	6.27e-003	8.17e-001	2.21e-001
3	338.76	69	TH-232	338.40	0.1201	6.27e-003	1.01e+000	1.06e+000
3	338.76	69	Ra-223	338.60				
3	338.76	69	Ac-228	338.70				
3	338.76	69	Cs-136	340.60	0.4890	6.27e-003	9.99e-001	2.62e-001
3	338.76	69	Cs-136	340.60	0.4676	6.27e-003	9.99e-001	2.74e-001
3	338.76	69	HF-175	343.40	0.8692	6.27e-003	1.00e+000	1.48e-001
3	338.76	69	EU-152M	344.20	0.0250	6.27e-003	9.64e-001	5.32e+000
3	338.76	69	Eu-152	344.30	0.2720	6.27e-003	1.00e+000	4.71e-001
3	338.76	69	Cd-117	344.46	0.1769	6.27e-003	8.70e-001	8.33e-001

4	352.02	191	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	7.17e-001
4	352.02	191	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	4.08e-001
4	352.02	191	Na-24	346.55	0.0100	6.07e-003	9.77e-001	3.75e+001
4	352.02	191	Bi-211	351.00				
4	352.02	191	U-235	351.10	0.1200	6.07e-003	1.00e+000	3.05e+000
4	352.02	191	U-238	351.99	0.3710	6.07e-003	1.00e+000	9.85e-001
4	352.02	191	Au-196	355.70	0.8760	6.07e-003	9.98e-001	4.19e-001
4	352.02	191	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	5.91e-001
5	510.43	114	Mo-101	505.88	0.1135	4.44e-003	3.31e-001	7.96e+000
5	510.43	114	Te-121	507.59	0.1767	4.44e-003	9.99e-001	1.69e+000
5	510.43	114	Tl-208	510.72				
5	510.43	114	Kr-79	511.00	0.1500	4.44e-003	9.90e-001	2.01e+000
5	510.43	114	Annihila	511.00	1.0000	4.44e-003	1.00e+000	2.99e-001
5	510.43	114	Zn-71m	511.55	0.2806	4.44e-003	9.17e-001	1.16e+000
5	510.43	114	Rh-106m	511.70	0.8640	4.44e-003	8.56e-001	4.05e-001
5	510.43	114	KR-85	514.00	0.0041	4.44e-003	1.00e+000	7.30e+001
6	582.83	120	Tl-208	583.14				
6	582.83	120	TH-232	583.14	0.3090	3.96e-003	1.01e+000	1.13e+000
7	608.89	167	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	5.22e-001
7	608.89	167	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	6.36e+000
7	608.89	167	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	9.80e+000
7	608.89	167	Bi-214	609.30				
7	608.89	167	U-238	609.32	0.4609	3.81e-003	1.00e+000	1.10e+000
7	608.89	167	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	9.39e+000
7	608.89	167	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	5.47e-001
8	661.17	52	Cu-61	656.00	0.1170	3.55e-003	9.05e-001	1.61e+000
8	661.17	52	As-76	657.03	0.0608	3.55e-003	9.87e-001	2.84e+000
8	661.17	52	Ag-110m	657.75	0.9440	3.55e-003	1.00e+000	1.80e-001
8	661.17	52	Cs-137	661.65	0.8500	3.55e-003	1.00e+000	2.00e-001
8	661.17	52	Ce-143	664.55	0.0525	3.55e-003	9.90e-001	3.28e+000
8	661.17	52	Sb-126	666.30	0.9970	3.55e-003	9.99e-001	1.71e-001
8	661.17	52	I-126	667.00	0.3300	3.55e-003	9.99e-001	5.17e-001
9	910.26	102	TH-232	911.07	0.2900	2.70e-003	1.01e+000	1.50e+000
9	910.26	102	Ac-228	911.20				
9	910.26	102	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	2.22e+000
10	967.86	54	TB-160	962.36	0.1000	2.56e-003	1.00e+000	2.46e+000
10	967.86	54	EU-152M	963.50	0.1200	2.56e-003	9.64e-001	2.12e+000
10	967.86	54	Eu-152	964.00	0.1433	2.56e-003	1.00e+000	1.71e+000
10	967.86	54	Ac-228	964.40				
10	967.86	54	TB-160	966.17	0.2550	2.56e-003	1.00e+000	9.63e-001
10	967.86	54	Ac-228	968.80				
10	967.86	54	TH-232	968.90	0.1746	2.56e-003	1.01e+000	1.39e+000
11	1458.65	312	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.89e+001
12	1761.84	48	U-238	1764.28	0.1504	1.53e-003	1.00e+000	2.42e+000
12	1761.84	48	Bi-214	1764.50				

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Present					
	Total	1.2813	PRESENT (	1.1743/	1.2813 =	91.6491 %)		0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Present					

	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT	(	1.3247/	1.4997 =	88.3310 %)	0.00(
-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.00(
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.6200/	1.3051 =	47.5059 %)	0.00(
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(	0.2300/	1.4030 =	16.3934 %)	0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Present					
	966.17	0.2550	Present					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.6290/	1.3866 =	45.3628 %)	0.000
.r-175	89.36	0.0235	Absent					
	343.40	0.8692	Present					
	432.80	0.0156	Absent					
	Total	0.9083	PRESENT	(	0.8692/	0.9083 =	95.6952 %)	0.000
Ga-67	93.30	0.3800	Absent					
	184.60	0.2360	Absent					
	300.20	0.1900	Present					
	Total	0.8060	ABSENT	(	0.1900/	0.8060 =	23.5732 %)	0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Present					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.1707/	1.6635 =	10.2615 %)	0.000
Np-239	106.10	0.2320	Absent					
	209.80	0.0410	Absent					
	228.10	0.1270	Absent					
	277.60	0.1420	Absent					
	315.90	0.0150	Absent					
	334.30	0.0200	Present					
	Total	0.5770	ABSENT	(	0.0200/	0.5770 =	3.4662 %)	0.000

EU-152M	121.78	0.0720	Absent					
	344.20	0.0250	Present					
	841.60	0.1470	Absent					
	963.50	0.1200	Present					
	Total	0.3640	ABSENT	(	0.1450/	0.3640 =	39.8352 %)	0.000
.-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Present					
	778.90	0.1272	Absent					
	964.00	0.1433	Present					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.4925/	1.3688 =	35.9804 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Ra-223	144.30	0.0001	Absent					
	154.30	0.0001	Absent					
	269.60	0.0001	Absent					
	338.60	0.0001	Unable to Calc					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Xe-125	188.43	0.5500	Absent					
	243.40	0.2871	Present					
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.000
Mo-101	191.93	0.1810	Absent					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)	0.000
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Unable to Calc					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Unable to Calc					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT	(	0.0004/	0.0006 =	66.6667 %)	0.000
-133m	233.20	0.1000	Present					
	Total	0.1000	PRESENT	(	0.1000/	0.1000 =	100.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					

	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %	0.00
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
Cd-117	273.28	0.2900	Absent					
	344.46	0.1769	Present					
	434.22	0.1047	Absent					
	1303.34	0.1827	Absent					
	1576.80	0.1119	Absent					
	Total	0.8662	ABSENT	(	0.1769/	0.8662 =	20.4225 %)	0.000
Pa-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
Cu-61	283.70	0.1320	Absent					
	656.00	0.1170	Present					
	Total	0.2490	ABSENT	(	0.1170/	0.2490 =	46.9880 %)	0.000
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Present					
	721.96	0.0512	Absent					
	Total	0.5237	PRESENT	(	0.4725/	0.5237 =	90.2234 %)	0.000
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.3415/	1.9478 =	17.5326 %)	0.000
I-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT	(	0.0001/	0.0005 =	20.0000 %)	0.000
Ag-113	298.40	0.0900	Present					
	Total	0.0900	PRESENT	(	0.0900/	0.0900 =	100.0000 %)	0.000
Pa-233	300.10	0.0633	Present					
	311.90	0.3700	Absent					
	Total	0.4333	ABSENT	(	0.0633/	0.4333 =	14.6088 %)	0.000
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %)	0.000
Au-196	332.90	0.2300	Present					
	355.70	0.8760	Present					
	Total	1.1060	PRESENT	(	1.1060/	1.1060 =	100.0000 %)	0.000
In-115m	336.20	0.4590	Present					
	Total	0.4590	PRESENT	(	0.4590/	0.4590 =	100.0000 %)	0.000
Ru-95	336.40	0.7100	Present					
	1096.80	0.2100	Absent					
	Total	0.9200	ABSENT	(	0.7100/	0.9200 =	77.1739 %)	0.000
Cs-136	340.60	0.4890	Present					
	340.60	0.4676	Present					
	818.50	0.9970	Absent					
	818.50	0.9970	Absent					
	1048.07	0.7976	Absent					
	1048.10	0.7980	Absent					
	1235.34	0.1974	Absent					

	Total	4.7436	ABSENT	0.9566/	4.7436 =	20.1661 %	0.000
Pt-197m	346.50	0.1110	Present				
	Total	0.1110	PRESENT (	0.1110/	0.1110 =	100.0000 %)	0.000
Na-24	346.55	0.0100	Unable to Calc				
	857.55	0.0100	Absent				
	1368.53	1.0000	Absent				
	1732.10	0.0100	Absent				
	Total	1.0300	ABSENT (	0.0100/	1.0300 =	0.9709 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc				
	Total	0.0001	PRESENT (	0.0001/	0.0001 =	100.0000 %)	0.000
I-126	386.00	0.3400	Absent				
	667.00	0.3300	Present				
	Total	0.6700	ABSENT (	0.3300/	0.6700 =	49.2537 %)	0.000
Zn-71m	386.28	0.9200	Absent				
	487.34	0.6164	Absent				
	511.55	0.2806	Present				
	596.97	0.2760	Absent				
	620.19	0.5612	Absent				
	Total	2.6542	ABSENT (	0.2806/	2.6542 =	10.5719 %)	0.000
Sb-126	414.80	0.8770	Absent				
	666.30	0.9970	Present				
	695.00	0.9970	Absent				
	697.00	0.3190	Absent				
	720.50	0.5780	Absent				
	Total	3.7680	ABSENT (	0.9970/	3.7680 =	26.4597 %)	0.000
Ag-108m	434.00	0.9050	Absent				
	614.37	0.9320	Present				
	722.95	0.9230	Absent				
	Total	2.7600	ABSENT (	0.9320/	2.7600 =	33:7681 %)	0.000
Rh-106m	450.80	0.2450	Absent				
	511.70	0.8640	Present				
	616.10	0.2040	Absent				
	748.50	0.1950	Absent				
	1046.70	0.3070	Absent				
	Total	1.8150	ABSENT (	0.8640/	1.8150 =	47.6033 %)	0.000
Te-121	507.59	0.1767	Present				
	573.14	0.8030	Absent				
	Total	0.9797	ABSENT (	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc				
	583.14	0.0001	Unable to Calc				
	Total	0.0002	PRESENT (	0.0002/	0.0002 =	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc				
	Total	1.0000	PRESENT (	1.0000/	1.0000 =	100.0000 %)	0.000
KR-85	514.00	0.0041	Present				
	Total	0.0041	PRESENT (	0.0041/	0.0041 =	100.0000 %)	0.000
Sb-129	544.70	0.1920	Absent				
	812.80	0.4600	Absent				
	914.60	0.2140	Present				
	1030.10	0.1350	Absent				
	Total	1.0010	ABSENT (	0.2140/	1.0010 =	21.3786 %)	0.000
As-76	559.10	0.4500	Absent				
	657.03	0.0608	Present				
	Total	0.5108	ABSENT (	0.0608/	0.5108 =	11.9029 %)	0.000
Cs-134	563.26	0.0838	Absent				
	569.29	0.1543	Absent				
	604.66	0.9756	Present				
	795.76	0.8544	Absent				
	801.84	0.0873	Absent				
	Total	2.1554	ABSENT (	0.9756/	2.1554 =	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc				

	768.40	0.0001	Absent						
	1120.30	0.0001	Absent						
	1764.50	0.0001	Unable to Calc						
	Total	0.0004	ABSENT	(	0.0002/	0.0004 =	50.0000 %)	0.000
-110m	657.75	0.9440	Present						
	677.60	0.1057	Absent						
	706.67	0.1631	Absent						
	763.93	0.2226	Absent						
	884.67	0.7278	Absent						
	937.48	0.3427	Absent						
	1384.27	0.2164	Absent						
	1505.00	0.1323	Absent						
	Total	2.8546	ABSENT	(	0.9440/	2.8546 =	33.0694 %)	0.000
Cs-137	661.65	0.8500	Present						
	Total	0.8500	PRESENT	(	0.8500/	0.8500 =	100.0000 %)	0.000
K-40	1460.81	0.1070	Present						
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

			Reference Energy Line ===>>			Calculated Contribution		
Pk#	Old Area	Nuclide	Energy	cts/dis	Ref Area	Energy	cts/dis	New Area
1	320	TH-232	911.07	7.83e-004	102	238.63	3.55e-003	320
2	113	U-238	609.32	1.76e-003	167	295.22	1.34e-003	113
3	69	TH-232	911.07	7.83e-004	102	338.40	7.52e-004	69
4	191	U-238	609.32	1.76e-003	167	351.99	2.25e-003	191
6	120	TH-232	911.07	7.83e-004	102	583.14	1.22e-003	120

PEAK INTERFERENCE CORRECTION

Pk#	New Area	Nuclide	Energy	Status
1	0	Xe-133m	233.20	Deleted [Net < Critical Level]
1	0	Ra-224	241.08	Deleted [Net < Critical Level]
2	0	Ce-143	293.26	Deleted [Net < Critical Level]
2	0	Ag-113	298.40	Deleted [Net < Critical Level]
3	0	Au-196	332.90	Deleted [Net < Critical Level]
3	0	In-115m	336.20	Deleted [Net < Critical Level]
3	0	HF-175	343.40	Deleted [Net < Critical Level]
4	0	Pt-197m	346.50	Deleted [Net < Critical Level]
4	0	Bi-211	351.00	Deleted [Net < Critical Level]
4	0	Au-196	355.70	Deleted [Net < Critical Level]
6	0	Tl-208	583.14	Deleted [Net < Critical Level]

SECONDARY NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
HF-175	89.36	0.0235	Absent					
	343.40	0.8692	Absent					
	432.80	0.0156	Absent					
	Total	0.9083	ABSENT	(	0.0000/	0.9083 =	0.0000 %)	0.000
-133m	233.20	0.1000	Absent					
	Total	0.1000	ABSENT	(	0.0000/	0.1000 =	0.0000 %)	0.000
Ra-224	241.08	0.0001	Absent					
	Total	0.0001	ABSENT	(	0.0000/	0.0001 =	0.0000 %)	0.000

Ce-143	293.26	0.4200	Absent					
	664.55	0.0525	Present					
	721.96	0.0512	Absent					
	Total	0.5237	ABSENT	(	0.0525/	0.5237 =	10.0248 %)	0.00
I-113	298.40	0.0900	Absent					
	Total	0.0900	ABSENT	(	0.0000/	0.0900 =	0.0000 %)	0.00
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Absent					
	Total	1.1060	ABSENT	(	0.0000/	1.1060 =	0.0000 %)	0.00
In-115m	336.20	0.4590	Absent					
	Total	0.4590	ABSENT	(	0.0000/	0.4590 =	0.0000 %)	0.00
Pt-197m	346.50	0.1110	Absent					
	Total	0.1110	ABSENT	(	0.0000/	0.1110 =	0.0000 %)	0.00
Bi-211	351.00	0.0001	Absent					
	Total	0.0001	ABSENT	(	0.0000/	0.0001 =	0.0000 %)	0.00
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.00

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
U-238	Average:	1.09e+000	+-7.84e-002	4.12e+013	4 of 5	0.00
	295.22	9.76e-001	+-2.20e-001			
	351.99	9.85e-001	+-1.28e-001			
	609.32	1.10e+000	+-1.16e-001			
	1764.28	2.42e+000	+-4.01e-001			
Th-232	Average:	1.15e+000	+-8.03e-002	1.24e+014	5 of 6	0.00
	238.63	1.04e+000	+-1.08e-001			
	338.40	1.06e+000	+-3.72e-001			
	583.14	1.13e+000	+-1.82e-001			
	911.07	1.50e+000	+-2.09e-001			
	968.90	1.39e+000	+-3.18e-001			
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	7.30e+001	+-1.26e+001	9.39e+004	1 of 1	
Cs-137	661.65	2.00e-001	+-6.29e-002	2.64e+005	1 of 1	20.04
K-40	1460.81	1.89e+001	+-1.13e+000	1.12e+013	1 of 1	
TOTAL:		9.43e+001 pCi /g			MPC Total:	20.04

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-7

Sample Size	5.65e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-10-97 14:39	Counting Start.	10-10-97 14:39
Sampling Stop	.10-10-97 14:39	Live Time	3600 Sec
Current Date.	.10-14-97 10:16	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	94.31	178.94	114	41	73	588	1.13	
2	186.46	370.52	126	32	53	393	1.00	
3	239.28	480.33	473	34	48	270	1.25	a
4	242.34	486.68	126	25	39	212	1.08	b
5	295.77	597.77	184	29	49	244	1.31	
6	338.70	687.02	101	24	42	180	1.25	
7	352.22	715.13	310	27	37	150	1.22	
8	463.15	945.76	56	20	35	114	1.02	
9	511.05	1045.34	113	20	31	107	1.73	
10	583.14	1195.21	156	21	32	105	1.55	
11	609.13	1249.25	246	21	26	66	1.46	
12	910.53	1875.87	133	16	22	46	1.97	
13	933.08	1922.75	37	11	17	26	0.76	
14	968.30	1995.97	64	13	20	45	1.21	
15	1458.90	3015.93	327	20	16	21	2.18	
16	1761.77	3645.58	49	8	9	7	3.16	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-7

Sample Size . . . . . 5.65e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-10-97 14:39	Counting Start. 10-10-97 14:39
Sampling Stop 10-10-97 14:39	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:16	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	94.31	114	Lu-176	88.35				
1	94.31	114	Ra-221	89.00				
1	94.31	114	HF-175	89.36	0.0235	8.42e-003	1.00e+000	7.65e+000
1	94.31	114	Th-234	92.80				
1	94.31	114	Cu-67	93.30	0.1690	8.42e-003	9.94e-001	1.07e+000
1	94.31	114	Ga-67	93.30	0.3800	8.42e-003	9.96e-001	4.75e-001
1	94.31	114	Gd-153	97.43	0.2730	8.42e-003	1.00e+000	6.59e-001
1	94.31	114	Pt-195m	98.90	0.1110	8.42e-003	9.96e-001	1.63e+000
1	94.31	114	Ac-225	99.80				
1	94.31	114	Ta-182	100.10	0.1411	8.42e-003	1.00e+000	1.27e+000
2	186.46	126	Mo-99	181.07	0.0629	9.66e-003	9.95e-001	2.77e+000
2	186.46	126	Cu-67	184.50	0.4700	9.66e-003	9.94e-001	3.71e-001
2	186.46	126	Ga-67	184.60	0.2360	9.66e-003	9.96e-001	7.38e-001
2	186.46	126	U-235	185.72	0.5400	9.66e-003	1.00e+000	3.21e-001
2	186.46	126	Ra-226	186.20				
2	186.46	126	Xe-125	188.43	0.5500	9.66e-003	9.80e-001	3.22e-001
2	186.46	126	In-114m	190.24	0.1564	9.66e-003	1.00e+000	1.11e+000
2	186.46	126	Pt-197	191.31	0.0350	9.66e-003	9.81e-001	5.05e+000
2	186.46	126	Hg-197	191.38	0.0057	9.66e-003	9.95e-001	3.06e+001
2	186.46	126	Zn-72	191.50	0.0940	9.66e-003	9.93e-001	1.86e+000
2	186.46	126	Mo-101	191.93	0.1810	9.66e-003	3.31e-001	2.89e+000
2	186.46	126	Fe-59	192.34	0.0311	9.66e-003	1.00e+000	5.57e+000
3	239.28	473	Fr-223	234.60				
3	239.28	473	Th-227	236.00				
3	239.28	473	U-235	236.00	0.1100	8.23e-003	1.00e+000	6.94e+000
3	239.28	473	TH-232	238.63	0.4310	8.23e-003	1.01e+000	1.76e+000
4	242.34	126	Te-131m	240.93	0.0755	8.16e-003	9.89e-001	2.75e+000
4	242.34	126	Ra-224	241.08				
4	242.34	126	Xe-125	243.40	0.2871	8.16e-003	9.80e-001	7.30e-001
4	242.34	126	IN-116M	244.59	0.0038	8.16e-003	6.99e-001	7.73e+001
4	242.34	126	Eu-152	244.67	0.0772	8.16e-003	1.00e+000	2.66e+000
4	242.34	126	Sm-155	245.73	0.0373	8.16e-003	4.51e-001	1.22e+001
4	242.34	126	Xe-135	247.79	0.9000	8.16e-003	9.63e-001	2.37e-001

4	242.34	126	Eu-154	248.00	0.0660	8.16e-003	1.00e+000	3.11e-000
5	295.77	184	Ce-143	293.26	0.4200	7.00e-003	9.90e-001	8.41e-001
5	295.77	184	U-238	295.22	0.1920	7.00e-003	1.00e+000	1.82e+000
5	295.77	184	Ir-192	295.96	0.2872	7.00e-003	1.00e+000	1.22e+000
5	295.77	184	Tl-210	296.00				
5	295.77	184	Ag-113	298.40	0.0900	7.00e-003	9.38e-001	4.14e+000
5	295.77	184	TB-160	298.57	0.2740	7.00e-003	1.00e+000	1.28e+000
5	295.77	184	Pa-231	299.90				
5	295.77	184	Pa-233	300.10	0.0633	7.00e-003	9.99e-001	5.52e+000
5	295.77	184	Ga-67	300.20	0.1900	7.00e-003	9.96e-001	1.85e+000
6	338.70	101	Mg-27	332.73	0.0100	6.27e-003	2.25e-001	9.53e+001
6	338.70	101	Au-196	332.90	0.2300	6.27e-003	9.98e-001	9.33e-001
6	338.70	101	Te-131m	334.27	0.0952	6.27e-003	9.89e-001	2.28e+000
6	338.70	101	Np-239	334.30	0.0200	6.27e-003	9.94e-001	1.08e+001
6	338.70	101	In-115m	336.20	0.4590	6.27e-003	9.27e-001	5.04e-001
6	338.70	101	Ru-95	336.40	0.7100	6.27e-003	8.17e-001	3.69e-001
6	338.70	101	TH-232	338.40	0.1201	6.27e-003	1.01e+000	1.77e+000
6	338.70	101	Ra-223	338.60				
6	338.70	101	Ac-228	338.70				
6	338.70	101	Cs-136	340.60	0.4890	6.27e-003	9.99e-001	4.38e-001
6	338.70	101	Cs-136	340.60	0.4676	6.27e-003	9.99e-001	4.59e-001
6	338.70	101	HF-175	343.40	0.8692	6.27e-003	1.00e+000	2.46e-001
6	338.70	101	EU-152M	344.20	0.0250	6.27e-003	9.64e-001	8.89e+000
6	338.70	101	Eu-152	344.30	0.2720	6.27e-003	1.00e+000	7.87e-001
6	338.70	101	Cd-117	344.46	0.1769	6.27e-003	8.70e-001	1.39e+000
7	352.22	310	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	1.33e+000
7	352.22	310	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	7.56e+000
7	352.22	310	Na-24	346.55	0.0100	6.07e-003	9.77e-001	6.95e+001
7	352.22	310	Bi-211	351.00				
7	352.22	310	U-235	351.10	0.1200	6.07e-003	1.00e+000	5.66e+000
7	352.22	310	U-238	351.99	0.3710	6.07e-003	1.00e+000	1.83e+000
7	352.22	310	Au-196	355.70	0.8760	6.07e-003	9.98e-001	7.77e-001
7	352.22	310	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	1.10e+000
8	463.15	56	IN-116M	463.13	0.0083	4.82e-003	6.99e-001	2.66e+001
8	463.15	56	Sb-125	463.51	0.1000	4.82e-003	1.00e+000	1.54e+000
8	463.15	56	Ra-220	465.00				
8	463.15	56	Tl-209	467.00				
8	463.15	56	Ir-192	468.06	0.4808	4.82e-003	1.00e+000	3.21e-001
8	463.15	56	Ge-75	468.70	0.0020	4.82e-003	7.86e-001	9.69e+001
9	511.05	113	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	9.02e+000
9	511.05	113	Te-121	507.59	0.1767	4.43e-003	9.99e-001	1.92e+000
9	511.05	113	Tl-208	510.72				
9	511.05	113	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	2.28e+000
9	511.05	113	Annihila	511.00	1.0000	4.43e-003	1.00e+000	3.39e-001
9	511.05	113	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.32e+000
9	511.05	113	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	4.58e-001
9	511.05	113	KR-85	514.00	0.0041	4.43e-003	1.00e+000	8.27e+001
10	583.14	156	Tl-208	583.14				
10	583.14	156	TH-232	583.14	0.3090	3.96e-003	1.01e+000	1.68e+000
11	609.13	246	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	8.79e-001
11	609.13	246	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	1.07e+001
11	609.13	246	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	1.65e+001
11	609.13	246	Bi-214	609.30				
11	609.13	246	U-238	609.32	0.4609	3.81e-003	1.00e+000	1.86e+000
11	609.13	246	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	1.58e+001
11	609.13	246	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	9.20e-001
12	910.53	133	TH-232	911.07	0.2900	2.70e-003	1.01e+000	2.24e+000
12	910.53	133	Ac-228	911.20				
12	910.53	133	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	3.31e+000
13	933.08	37	Ti-51	928.50	0.0500	2.64e-003	1.39e-001	2.67e+001

13	933.08	37	Co-55	931.30	0.7500	2.64e-003	9.81e-001	2.53e-00
13	933.08	37	Y-92	934.50	0.1390	2.64e-003	9.08e-001	1.47e+00
13	933.08	37	Ag-110m	937.48	0.3427	2.64e-003	1.00e+000	5.43e-00
14	968.30	64	TB-160	962.36	0.1000	2.56e-003	1.00e+000	3.32e+00
4	968.30	64	EU-152M	963.50	0.1200	2.56e-003	9.64e-001	2.87e+00
14	968.30	64	Eu-152	964.00	0.1433	2.56e-003	1.00e+000	2.32e+00
14	968.30	64	Ac-228	964.40				
14	968.30	64	TB-160	966.17	0.2550	2.56e-003	1.00e+000	1.30e+00
14	968.30	64	Ac-228	968.80				
14	968.30	64	TH-232	968.90	0.1746	2.56e-003	1.01e+000	1.89e+00
15	1458.90	327	K-40	1460.81	0.1070	1.80e-003	1.00e+000	2.26e+001
16	1761.77	49	U-238	1764.28	0.1504	1.53e-003	1.00e+000	2.83e+00
16	1761.77	49	Bi-214	1764.50				

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Present					
	Total	1.2813	PRESENT	(1.1743/	1.2813 =	91.6491 %)		0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT	(1.3247/	1.4997 =	88.3310 %)		0.000
Hg-197	77.35	0.1900	Absent					
	80.20	0.0340	Absent					
	191.38	0.0057	Present					
	268.73	0.0005	Absent					
	Total	0.2302	ABSENT	(0.0057/	0.2302 =	2.4761 %)		0.000
Pt-197	77.35	0.1700	Absent					
	191.31	0.0350	Present					
	Total	0.2050	ABSENT	(0.0350/	0.2050 =	17.0732 %)		0.000
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(0.0001/	0.0002 =	50.0000 %)		0.000
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(0.6200/	1.3051 =	47.5059 %)		0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Present					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(0.7700/	1.4030 =	54.8824 %)		0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					

	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Present					
	966.17	0.2550	Present					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.6290/	1.3866 =	45.3628 %)	0.000
Lu-176	88.35	0.0001	Unable to Calc					
	201.80	0.0001	Absent					
	306.90	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
Ra-221	89.00	0.0001	Unable to Calc					
	152.00	0.0001	Absent					
	176.00	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
HF-175	89.36	0.0235	Present					
	343.40	0.8692	Present					
	432.80	0.0156	Absent					
	Total	0.9083	PRESENT	(	0.8927/	0.9083 =	98.2825 %)	0.000
Th-234	92.80	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Cu-67	93.30	0.1690	Present					
	184.50	0.4700	Present					
	Total	0.6390	PRESENT	(	0.6390/	0.6390 =	100.0000 %)	0.000
Ga-67	93.30	0.3800	Present					
	184.60	0.2360	Present					
	300.20	0.1900	Present					
	Total	0.8060	PRESENT	(	0.8060/	0.8060 =	100.0000 %)	0.000
Gd-153	97.43	0.2730	Present					
	103.18	0.1992	Absent					
	Total	0.4722	ABSENT	(	0.2730/	0.4722 =	57.8145 %)	0.000
.c-195m	98.90	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.000
Ac-225	99.80	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Ta-182	100.10	0.1411	Present					
	152.43	0.0720	Absent					
	222.10	0.0758	Absent					
	1121.28	0.3510	Absent					
	1189.04	0.1636	Absent					
	1221.42	0.2713	Absent					
	1230.97	0.1155	Absent					
	Total	1.1903	ABSENT	(	0.1411/	1.1903 =	11.8542 %)	0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Present					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.1707/	1.6635 =	10.2615 %)	0.000
sm-155	104.30	0.7464	Absent					
	141.41	0.0202	Absent					
	245.73	0.0373	Present					

	Total	0.8039	ABSENT	(	0.0373/	0.8039 =	4.6425 %	0.000
Np-239	106.10	0.2320	Absent					
	209.80	0.0410	Absent					
	228.10	0.1270	Absent					
	277.60	0.1420	Absent					
	315.90	0.0150	Absent					
	334.30	0.0200	Present					
	Total	0.5770	ABSENT	(	0.0200/	0.5770 =	3.4662 %)	0.000
Tl-209	117.00	0.0001	Absent					
	467.00	0.0001	Unable to Calc					
	1566.00	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
EU-152M	121.78	0.0720	Absent					
	344.20	0.0250	Present					
	841.60	0.1470	Absent					
	963.50	0.1200	Present					
	Total	0.3640	ABSENT	(	0.1450/	0.3640 =	39.8352 %)	0.000
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Present					
	778.90	0.1272	Absent					
	964.00	0.1433	Present					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.4925/	1.3688 =	35.9804 %)	0.000
Eu-154	123.10	0.4047	Absent					
	248.00	0.0660	Present					
	723.30	0.1970	Absent					
	873.19	0.1150	Absent					
	996.32	0.1029	Absent					
	1004.76	0.1736	Absent					
	1274.39	0.3550	Absent					
	Total	1.4143	ABSENT	(	0.0660/	1.4143 =	4.6666 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Present					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0121/	2.5011 =	0.4838 %)	0.000
Mo-99	140.51	0.0379	Absent					
	181.07	0.0629	Present					
	739.40	0.1260	Absent					
	Total	0.2268	ABSENT	(	0.0629/	0.2268 =	27.7266 %)	0.000
Fe-59	142.65	0.0103	Absent					
	192.34	0.0311	Present					
	1099.22	0.5680	Absent					
	1291.56	0.4320	Absent					
	Total	1.0414	ABSENT	(	0.0311/	1.0414 =	2.9864 %)	0.000
Pa-223	144.30	0.0001	Absent					
	154.30	0.0001	Absent					
	269.60	0.0001	Absent					
	338.60	0.0001	Unable to Calc					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000

Zn-72	144.70	0.8300	Absent					
	191.50	0.0940	Present					
	Total	0.9240	ABSENT	(	0.0940/	0.9240 =	10.1732 %)	0.00
Mg-27	170.82	0.0070	Absent					
	332.73	0.0100	Unable to Calc					
	843.80	0.7140	Absent					
	1014.50	0.2860	Absent					
	Total	1.0170	ABSENT	(	0.0100/	1.0170 =	0.9833 %)	0.00
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Present					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.1520/	0.8390 =	18.1168 %)	0.00
Ra-226	186.20	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.00
Xe-125	188.43	0.5500	Present					
	243.40	0.2871	Present					
	Total	0.8371	PRESENT	(	0.8371/	0.8371 =	100.0000 %)	0.00
In-114m	190.24	0.1564	Present					
	558.43	0.2850	Absent					
	725.24	0.2810	Absent					
	1283.67	0.0003	Absent					
	1299.83	0.0012	Absent					
	Total	0.7239	ABSENT	(	0.1564/	0.7239 =	21.6052 %)	0.000
Mo-101	191.93	0.1810	Present					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.2945/	0.6670 =	44.1529 %)	0.000
Ge-75	199.20	0.0084	Absent					
	264.80	0.1120	Absent					
	418.60	0.0028	Absent					
	468.70	0.0020	Present					
	617.80	0.0013	Absent					
	Total	0.1265	ABSENT	(	0.0020/	0.1265 =	1.6022 %)	0.000
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Unable to Calc					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Unable to Calc					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT	(	0.0004/	0.0006 =	66.6667 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Xe-135	247.79	0.9000	Present					
	Total	0.9000	PRESENT	(	0.9000/	0.9000 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
Cd-117	273.28	0.2900	Absent					

	344.46	0.1769	Present					
	434.22	0.1047	Absent					
	1303.34	0.1827	Absent					
	1576.80	0.1119	Absent					
	Total	0.8662	ABSENT	(	0.1769/	0.8662 =	20.4225 %)	0.000
.-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Absent					
	721.96	0.0512	Absent					
	Total	0.5237	PRESENT	(	0.4200/	0.5237 =	80.1986 %)	0.000
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Present					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.8223/	1.9478 =	42.2169 %)	0.000
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT	(	0.0001/	0.0005 =	20.0000 %)	0.000
Ag-113	298.40	0.0900	Present					
	Total	0.0900	PRESENT	(	0.0900/	0.0900 =	100.0000 %)	0.000
Pa-233	300.10	0.0633	Present					
	311.90	0.3700	Absent					
	Total	0.4333	ABSENT	(	0.0633/	0.4333 =	14.6088 %)	0.000
-51	320.00	0.9500	Absent					
	928.50	0.0500	Present					
	Total	1.0000	ABSENT	(	0.0500/	1.0000 =	5.0000 %)	0.000
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %)	0.000
Au-196	332.90	0.2300	Present					
	355.70	0.8760	Present					
	Total	1.1060	PRESENT	(	1.1060/	1.1060 =	100.0000 %)	0.000
In-115m	336.20	0.4590	Present					
	Total	0.4590	PRESENT	(	0.4590/	0.4590 =	100.0000 %)	0.000
Ru-95	336.40	0.7100	Present					
	1096.80	0.2100	Absent					
	Total	0.9200	ABSENT	(	0.7100/	0.9200 =	77.1739 %)	0.000
Cs-136	340.60	0.4890	Present					
	340.60	0.4676	Present					
	818.50	0.9970	Absent					
	818.50	0.9970	Absent					
	1048.07	0.7976	Absent					
	1048.10	0.7980	Absent					
	1235.34	0.1974	Absent					
	Total	4.7436	ABSENT	(	0.9566/	4.7436 =	20.1661 %)	0.000
Pt-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.000
Na-24	346.55	0.0100	Unable to Calc					
	857.55	0.0100	Absent					
	1368.53	1.0000	Absent					
	1732.10	0.0100	Absent					
	Total	1.0300	ABSENT	(	0.0100/	1.0300 =	0.9709 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc					

	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Zn-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.000
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT	(	0.9320/	2.7600 =	33.7681 %)	0.000
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Absent					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT	(	0.8640/	1.8150 =	47.6033 %)	0.000
Ra-220	465.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Co-55	477.20	0.2030	Absent					
	931.30	0.7500	Present					
	1408.70	0.1650	Absent					
	Total	1.1180	ABSENT	(	0.7500/	1.1180 =	67.0841 %)	0.000
Te-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	PRESENT	(	0.0002/	0.0002 =	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.000
K-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.000
Sb-129	544.70	0.1920	Absent					
	812.80	0.4600	Absent					
	914.60	0.2140	Present					
	1030.10	0.1350	Absent					
	Total	1.0010	ABSENT	(	0.2140/	1.0010 =	21.3786 %)	0.000
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Unable to Calc					
	Total	0.0004	ABSENT	(	0.0002/	0.0004 =	50.0000 %)	0.000
Ag-110m	657.75	0.9440	Absent					
	677.60	0.1057	Absent					
	706.67	0.1631	Absent					
	763.93	0.2226	Absent					
	884.67	0.7278	Absent					
	937.48	0.3427	Present					
	1384.27	0.2164	Absent					
	1505.00	0.1323	Absent					
	Total	2.8546	ABSENT	(	0.3427/	2.8546 =	12.0052 %)	0.000
Y-92	934.50	0.1390	Present					
	Total	0.1390	PRESENT	(	0.1390/	0.1390 =	100.0000 %)	0.000

K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.00

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line Energy	cts/dis	Ref Area	===>> Calculated Contribution Energy	cts/dis	New Area
5	184	U-238	609.32	1.76e-003	246	295.22	1.34e-003	184
6	101	TH-232	238.63	3.55e-003	473	338.40	7.53e-004	100
7	310	U-238	609.32	1.76e-003	246	351.99	2.25e-003	310
10	156	TH-232	238.63	3.55e-003	473	583.14	1.22e-003	156

PEAK INTERFERENCE CORRECTION

Pk#	New Area	Nuclide	Energy	Status
5	0	Ce-143	293.26	Deleted [Net < Critical Level]
5	0	Ag-113	298.40	Deleted [Net < Critical Level]
5	0	Ga-67	300.20	Deleted [Net < Critical Level]
6	1	Au-196	332.90	Deleted [Net < Critical Level]
6	1	In-115m	336.20	Deleted [Net < Critical Level]
6	1	HF-175	343.40	Deleted [Net < Critical Level]
7	0	Pt-197m	346.50	Deleted [Net < Critical Level]
7	0	Bi-211	351.00	Deleted [Net < Critical Level]
7	0	Au-196	355.70	Deleted [Net < Critical Level]
10	0	Tl-208	583.14	Deleted [Net < Critical Level]

SECONDARY NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
HF-175	89.36	0.0235	Present					
	343.40	0.8692	Absent					
	432.80	0.0156	Absent					
	Total	0.9083	ABSENT	(	0.0235/	0.9083 =	2.5873 %)	0.000
Ga-67	93.30	0.3800	Present					
	184.60	0.2360	Present					
	300.20	0.1900	Absent					
	Total	0.8060	ABSENT	(	0.6160/	0.8060 =	76.4268 %)	0.000
Ce-143	293.26	0.4200	Absent					
	664.55	0.0525	Absent					
	721.96	0.0512	Absent					
	Total	0.5237	ABSENT	(	0.0000/	0.5237 =	0.0000 %)	0.000
Ag-113	298.40	0.0900	Absent					
	Total	0.0900	ABSENT	(	0.0000/	0.0900 =	0.0000 %)	0.000
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Absent					
	Total	1.1060	ABSENT	(	0.0000/	1.1060 =	0.0000 %)	0.000
In-115m	336.20	0.4590	Absent					
	Total	0.4590	ABSENT	(	0.0000/	0.4590 =	0.0000 %)	0.000
Pt-197m	346.50	0.1110	Absent					
	Total	0.1110	ABSENT	(	0.0000/	0.1110 =	0.0000 %)	0.000
.-211	351.00	0.0001	Absent					
	Total	0.0001	ABSENT	(	0.0000/	0.0001 =	0.0000 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Absent					

Total 0.0002 ABSENT (0.0001/ 0.0002 = 50.0000 % 0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
U-238	Average:	1.88e+000	+-1.01e-001	4.12e+013	4 of 5	0.00
	295.22	1.82e+000	+-2.90e-001			
	351.99	1.83e+000	+-1.56e-001			
	609.32	1.86e+000	+-1.56e-001			
	1764.28	2.83e+000	+-4.79e-001			
TH-232	Average:	1.81e+000	+-9.65e-002	1.24e+014	5 of 6	0.00
	238.63	1.76e+000	+-1.27e-001			
	338.40	1.75e+000	+-4.28e-001			
	583.14	1.68e+000	+-2.27e-001			
	911.07	2.24e+000	+-2.73e-001			
	968.90	1.89e+000	+-3.91e-001			
Th-234	92.80		BKG	1.00e+012	1 of 1	
Cu-67	Average:	4.11e-001	+-9.15e-002	6.20e+001	2 of 2	0.00
	93.30	1.07e+000	+-3.83e-001			
	184.50	3.71e-001	+-9.42e-002			
Pt-195m	98.90	1.63e+000	+-5.81e-001	9.65e+001	1 of 1	
Ac-225	99.80		BKG	1.00e+012	1 of 1	
Ra-226	186.20		BKG	1.00e+012	1 of 1	
Xe-125	Average:	4.21e-001	+-7.10e-002	1.68e+001	2 of 2	0.00
	188.43	3.22e-001	+-8.17e-002			
	243.40	7.30e-001	+-1.44e-001			
Ra-224	241.08		BKG	1.00e+012	1 of 1	
-135	247.79	2.37e-001	+-4.66e-002	9.10e+000	1 of 1	
a-220	465.00		BKG	1.00e+012	1 of 1	
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	8.27e+001	+-1.46e+001	9.39e+004	1 of 1	
Y-92	934.50	1.47e+000	+-4.25e-001	3.54e+000	1 of 1	
K-40	1460.81	2.26e+001	+-1.37e+000	1.12e+013	1 of 1	
TOTAL:		1.13e+002 pCi /g			MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-8

Sample Size	6.80e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-11-97 10:17	Counting Start.	10-11-97 10:17
Sampling Stop	.10-11-97 10:17	Live Time	3600 Sec
Current Date.	.10-14-97 10:23	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	78.09	145.21	59	35	59	550	0.56	
2	94.02	178.34	119	42	75	615	1.19	
3	186.65	370.91	122	35	60	440	1.81	
4	239.11	479.97	400	34	50	349	1.20	
5	295.70	597.63	164	28	45	225	1.12	
6	338.64	686.91	93	23	39	183	1.16	
7	352.24	715.17	265	25	36	156	1.29	
8	510.94	1045.12	115	20	31	107	1.51	
9	582.89	1194.71	162	21	31	103	1.38	
10	609.11	1249.21	243	22	28	79	1.66	
11	726.55	1493.37	49	13	20	45	1.46	
12	910.45	1875.70	107	16	24	54	1.87	
13	968.20	1995.76	66	16	26	59	1.30	
14	1119.36	2310.02	51	14	23	48	1.07	
15	1458.98	3016.10	432	22	16	22	2.13	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-8

Sample Size . . . . . 6.80e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-11-97 10:17	Counting Start. 10-11-97 10:17
Sampling Stop 10-11-97 10:17	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:23	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	78.09	59	U-238	77.11	0.1070	6.27e-003	1.00e+000	9.69e-001
1	78.09	59	TH-232	77.11	0.1750	6.27e-003	1.01e+000	5.89e-001
1	78.09	59	Hg-197	77.35	0.1900	6.27e-003	9.95e-001	5.50e-001
1	78.09	59	Pt-197	77.35	0.1700	6.27e-003	9.81e-001	6.23e-001
1	78.09	59	Fr-223	80.00				
1	78.09	59	Ce-144	80.00	0.0200	6.27e-003	1.00e+000	5.20e+000
1	78.09	59	Hg-197	80.20	0.0340	6.27e-003	9.95e-001	3.07e+000
1	78.09	59	Hg-199m	80.20	0.1110	6.27e-003	3.31e-001	2.83e+000
1	78.09	59	Xe-133	80.99	0.3700	6.27e-003	9.97e-001	2.82e-001
1	78.09	59	Ba-133	81.00	0.3429	6.27e-003	1.00e+000	3.03e-001
1	78.09	59	U-235	81.07	0.1480	6.27e-003	1.00e+000	7.02e-001
1	78.09	59	U-235	83.78	0.2460	6.27e-003	1.00e+000	4.23e-001
2	94.02	119	Lu-176	88.35				
2	94.02	119	Ra-221	89.00				
2	94.02	119	HF-175	89.36	0.0235	8.39e-003	1.00e+000	6.66e+000
2	94.02	119	Th-234	92.80				
2	94.02	119	Cu-67	93.30	0.1690	8.39e-003	9.94e-001	9.32e-001
2	94.02	119	Ga-67	93.30	0.3800	8.39e-003	9.96e-001	4.14e-001
2	94.02	119	Gd-153	97.43	0.2730	8.39e-003	1.00e+000	5.74e-001
2	94.02	119	Pt-195m	98.90	0.1110	8.39e-003	9.96e-001	1.42e+000
2	94.02	119	Ac-225	99.80				
3	186.65	122	Mo-99	181.07	0.0629	9.66e-003	9.95e-001	2.23e+000
3	186.65	122	Cu-67	184.50	0.4700	9.66e-003	9.94e-001	2.98e-001
3	186.65	122	Ga-67	184.60	0.2360	9.66e-003	9.96e-001	5.94e-001
3	186.65	122	U-235	185.72	0.5400	9.66e-003	1.00e+000	2.58e-001
3	186.65	122	Ra-226	186.20				
3	186.65	122	Xe-125	188.43	0.5500	9.66e-003	9.80e-001	2.59e-001
3	186.65	122	In-114m	190.24	0.1564	9.66e-003	1.00e+000	8.92e-001
3	186.65	122	Pt-197	191.31	0.0350	9.66e-003	9.81e-001	4.06e+000
3	186.65	122	Hg-197	191.38	0.0057	9.66e-003	9.95e-001	2.46e+001
3	186.65	122	Zn-72	191.50	0.0940	9.66e-003	9.93e-001	1.49e+000
3	186.65	122	Mo-101	191.93	0.1810	9.66e-003	3.31e-001	2.33e+000
3	186.65	122	Fe-59	192.34	0.0311	9.66e-003	1.00e+000	4.49e+000

4	239.11	400	Xe-133m	233.20	0.1000	8.24e-003	9.94e-001	5.40e-000
4	239.11	400	Fr-223	234.60				
4	239.11	400	Th-227	236.00				
4	239.11	400	U-235	236.00	0.1100	8.24e-003	1.00e+000	4.88e+000
4	239.11	400	TH-232	238.63	0.4310	8.24e-003	1.01e+000	1.23e+000
4	239.11	400	Te-131m	240.93	0.0755	8.24e-003	9.89e-001	7.18e+000
4	239.11	400	Ra-224	241.08				
4	239.11	400	Xe-125	243.40	0.2871	8.24e-003	9.80e-001	1.91e+000
4	239.11	400	IN-116M	244.59	0.0038	8.24e-003	6.99e-001	2.02e+002
4	239.11	400	Eu-152	244.67	0.0772	8.24e-003	1.00e+000	6.95e+000
5	295.70	164	Ce-143	293.26	0.4200	7.00e-003	9.90e-001	6.23e-001
5	295.70	164	U-238	295.22	0.1920	7.00e-003	1.00e+000	1.34e+000
5	295.70	164	Ir-192	295.96	0.2872	7.00e-003	1.00e+000	9.01e-001
5	295.70	164	Tl-210	296.00				
5	295.70	164	Ag-113	298.40	0.0900	7.00e-003	9.38e-001	3.06e+000
5	295.70	164	TB-160	298.57	0.2740	7.00e-003	1.00e+000	9.45e-001
5	295.70	164	Pa-231	299.90				
5	295.70	164	Pa-233	300.10	0.0633	7.00e-003	9.99e-001	4.09e+000
5	295.70	164	Ga-67	300.20	0.1900	7.00e-003	9.96e-001	1.37e+000
6	338.64	93	Mg-27	332.73	0.0100	6.27e-003	2.25e-001	7.29e+001
6	338.64	93	Au-196	332.90	0.2300	6.27e-003	9.98e-001	7.14e-001
6	338.64	93	Te-131m	334.27	0.0952	6.27e-003	9.89e-001	1.74e+000
6	338.64	93	Np-239	334.30	0.0200	6.27e-003	9.94e-001	8.24e+000
6	338.64	93	In-115m	336.20	0.4590	6.27e-003	9.27e-001	3.85e-001
6	338.64	93	Ru-95	336.40	0.7100	6.27e-003	8.17e-001	2.83e-001
6	338.64	93	TH-232	338.40	0.1201	6.27e-003	1.01e+000	1.35e+000
6	338.64	93	Ra-223	338.60				
6	338.64	93	Ac-228	338.70				
6	338.64	93	Cs-136	340.60	0.4890	6.27e-003	9.99e-001	3.35e-001
6	338.64	93	Cs-136	340.60	0.4676	6.27e-003	9.99e-001	3.51e-001
6	338.64	93	HF-175	343.40	0.8692	6.27e-003	1.00e+000	1.89e-001
6	338.64	93	EU-152M	344.20	0.0250	6.27e-003	9.64e-001	6.80e+000
6	338.64	93	Eu-152	344.30	0.2720	6.27e-003	1.00e+000	6.02e-001
6	338.64	93	Cd-117	344.46	0.1769	6.27e-003	8.70e-001	1.07e-000
7	352.24	265	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	9.44e-001
7	352.24	265	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	5.37e+000
7	352.24	265	Na-24	346.55	0.0100	6.07e-003	9.77e-001	4.94e+001
7	352.24	265	Bi-211	351.00				
7	352.24	265	U-235	351.10	0.1200	6.07e-003	1.00e+000	4.02e+000
7	352.24	265	U-238	351.99	0.3710	6.07e-003	1.00e+000	1.30e+000
7	352.24	265	Au-196	355.70	0.8760	6.07e-003	9.98e-001	5.52e-001
7	352.24	265	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	7.78e-001
8	510.94	115	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	7.62e+000
8	510.94	115	Te-121	507.59	0.1767	4.43e-003	9.99e-001	1.62e+000
8	510.94	115	Tl-208	510.72				
8	510.94	115	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	1.93e+000
8	510.94	115	Annihila	511.00	1.0000	4.43e-003	1.00e+000	2.87e-001
8	510.94	115	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.11e+000
8	510.94	115	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	3.87e-001
8	510.94	115	KR-85	514.00	0.0041	4.43e-003	1.00e+000	6.99e+001
9	582.89	162	Tl-208	583.14				
9	582.89	162	TH-232	583.14	0.3090	3.96e-003	1.01e+000	1.45e+000
10	609.11	243	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	7.21e-001
10	609.11	243	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	8.77e+000
10	609.11	243	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	1.35e+001
10	609.11	243	Bi-214	609.30				
10	609.11	243	U-238	609.32	0.4609	3.81e-003	1.00e+000	1.52e+000
10	609.11	243	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	1.30e+001
10	609.11	243	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	7.55e-001
11	726.55	49	Ce-143	721.96	0.0512	3.28e-003	9.90e-001	3.26e+000

11	726.55	49	Sb-124	722.78	0.1130	3.28e-003	1.00e-000	1.46e-000
11	726.55	49	Ag-108m	722.95	0.9230	3.28e-003	1.00e+000	1.79e-001
11	726.55	49	Eu-154	723.30	0.1970	3.28e-003	1.00e+000	8.38e-001
11	726.55	49	Zr-95	724.18	0.3399	3.28e-003	1.00e+000	4.86e-001
11	726.55	49	In-114m	725.24	0.2810	3.28e-003	1.00e+000	5.88e-001
11	726.55	49	Bi-212	727.30				
12	910.45	107	TH-232	911.07	0.2900	2.70e-003	1.01e+000	1.50e+000
12	910.45	107	Ac-228	911.20				
12	910.45	107	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	2.21e+000
13	968.20	66	TB-160	962.36	0.1000	2.56e-003	1.00e+000	2.85e+000
13	968.20	66	EU-152M	963.50	0.1200	2.56e-003	9.64e-001	2.46e+000
13	968.20	66	Eu-152	964.00	0.1433	2.56e-003	1.00e+000	1.99e+000
13	968.20	66	Ac-228	964.40				
13	968.20	66	TB-160	966.17	0.2550	2.56e-003	1.00e+000	1.12e+000
13	968.20	66	Ac-228	968.80				
13	968.20	66	TH-232	968.90	0.1746	2.56e-003	1.01e+000	1.62e+000
14	1119.36	51	Sn-127	1114.30	0.3800	2.26e-003	8.55e-001	7.67e-001
14	1119.36	51	Zn-65	1115.52	0.5075	2.26e-003	1.00e+000	4.91e-001
14	1119.36	51	Ni-65	1115.53	0.1513	2.26e-003	8.76e-001	1.88e+000
14	1119.36	51	Bi-214	1120.30				
14	1119.36	51	Sc-46	1120.51	1.0000	2.26e-003	1.00e+000	2.49e-001
14	1119.36	51	Ta-182	1121.28	0.3510	2.26e-003	1.00e+000	7.10e-001
15	1458.98	432	K-40	1460.81	0.1070	1.80e-003	1.00e+000	2.48e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Present					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	PRESENT (	1.1309/	1.2813 =	88.2619 %)		0.000
TH-232	77.11	0.1750	Present					
	238.63	0.4310	Present					
	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT (	1.4997/	1.4997 =	100.0000 %)		0.000
Hg-197	77.35	0.1900	Present					
	80.20	0.0340	Present					
	191.38	0.0057	Present					
	268.73	0.0005	Absent					
	Total	0.2302	PRESENT (	0.2297/	0.2302 =	99.7828 %)		0.000
Pt-197	77.35	0.1700	Present					
	191.31	0.0350	Present					
	Total	0.2050	PRESENT (	0.2050/	0.2050 =	100.0000 %)		0.000
Fr-223	80.00	0.0001	Unable to Calc					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	PRESENT (	0.0002/	0.0002 =	100.0000 %)		0.000
Ce-144	80.00	0.0200	Present					
	133.54	0.1110	Absent					
	Total	0.1310	ABSENT (	0.0200/	0.1310 =	15.2672 %)		0.000
[illegible]-199m	80.20	0.1110	Present					
	158.37	0.5840	Absent					
	374.10	0.1380	Absent					
	Total	0.8330	ABSENT (	0.1110/	0.8330 =	13.3253 %)		0.000

Xe-133	80.99	0.3700	Present					
	Total	0.3700	PRESENT	(	0.3700/	0.3700 =	100.0000 %)	0.00
Ba-133	81.00	0.3429	Present					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.9629/	1.3051 =	73.7798 %)	0.00
U-235	81.07	0.1480	Present					
	83.78	0.2460	Present					
	143.76	0.1050	Absent					
	185.72	0.5400	Present					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	PRESENT	(	1.1640/	1.4030 =	82.9651 %)	0.00
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Present					
	966.17	0.2550	Present					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.6290/	1.3866 =	45.3628 %)	0.000
Lu-176	88.35	0.0001	Unable to Calc					
	201.80	0.0001	Absent					
	306.90	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
.-221	89.00	0.0001	Unable to Calc					
	152.00	0.0001	Absent					
	176.00	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
HF-175	89.36	0.0235	Present					
	343.40	0.8692	Present					
	432.80	0.0156	Absent					
	Total	0.9083	PRESENT	(	0.8927/	0.9083 =	98.2825 %)	0.000
Th-234	92.80	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Cu-67	93.30	0.1690	Present					
	184.50	0.4700	Present					
	Total	0.6390	PRESENT	(	0.6390/	0.6390 =	100.0000 %)	0.000
Ga-67	93.30	0.3800	Present					
	184.60	0.2360	Present					
	300.20	0.1900	Present					
	Total	0.8060	PRESENT	(	0.8060/	0.8060 =	100.0000 %)	0.000
Gd-153	97.43	0.2730	Present					
	103.18	0.1992	Absent					
	Total	0.4722	ABSENT	(	0.2730/	0.4722 =	57.8145 %)	0.000
Pt-195m	98.90	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.000
Ac-225	99.80	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Ta-182	100.10	0.1411	Absent					
	152.43	0.0720	Absent					
	222.10	0.0758	Absent					
	1121.28	0.3510	Present					
	1189.04	0.1636	Absent					
	1221.42	0.2713	Absent					

	1230.97	0.1155	Absent					
	Total	1.1903	ABSENT	(	0.3510/	1.1903 =	29.4884 %)	0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Present					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.1707/	1.6635 =	10.2615 %)	0.000
Np-239	106.10	0.2320	Absent					
	209.80	0.0410	Absent					
	228.10	0.1270	Absent					
	277.60	0.1420	Absent					
	315.90	0.0150	Absent					
	334.30	0.0200	Present					
	Total	0.5770	ABSENT	(	0.0200/	0.5770 =	3.4662 %)	0.000
EU-152M	121.78	0.0720	Absent					
	344.20	0.0250	Present					
	841.60	0.1470	Absent					
	963.50	0.1200	Present					
	Total	0.3640	ABSENT	(	0.1450/	0.3640 =	39.8352 %)	0.000
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Present					
	778.90	0.1272	Absent					
	964.00	0.1433	Present					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.4925/	1.3688 =	35.9804 %)	0.000
Eu-154	123.10	0.4047	Absent					
	248.00	0.0660	Absent					
	723.30	0.1970	Present					
	873.19	0.1150	Absent					
	996.32	0.1029	Absent					
	1004.76	0.1736	Absent					
	1274.39	0.3550	Absent					
	Total	1.4143	ABSENT	(	0.1970/	1.4143 =	13.9310 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Mo-99	140.51	0.0379	Absent					
	181.07	0.0629	Present					
	739.40	0.1260	Absent					

	Total	0.2268	ABSENT	(	0.0629/	0.2268 =	27.7266 %)	0.00
Fe-59	142.65	0.0103	Absent					
	192.34	0.0311	Present					
	1099.22	0.5680	Absent					
	1291.56	0.4320	Absent					
	Total	1.0414	ABSENT	(	0.0311/	1.0414 =	2.9864 %)	0.00
Ra-223	144.30	0.0001	Absent					
	154.30	0.0001	Absent					
	269.60	0.0001	Absent					
	338.60	0.0001	Unable to Calc					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.00
Zn-72	144.70	0.8300	Absent					
	191.50	0.0940	Present					
	Total	0.9240	ABSENT	(	0.0940/	0.9240 =	10.1732 %)	0.00
Mg-27	170.82	0.0070	Absent					
	332.73	0.0100	Unable to Calc					
	843.80	0.7140	Absent					
	1014.50	0.2860	Absent					
	Total	1.0170	ABSENT	(	0.0100/	1.0170 =	0.9833 %)	0.00
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.00
Ra-226	186.20	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
-125	188.43	0.5500	Present					
	243.40	0.2871	Present					
	Total	0.8371	PRESENT	(	0.8371/	0.8371 =	100.0000 %)	0.000
In-114m	190.24	0.1564	Present					
	558.43	0.2850	Absent					
	725.24	0.2810	Present					
	1283.67	0.0003	Absent					
	1299.83	0.0012	Absent					
	Total	0.7239	ABSENT	(	0.4374/	0.7239 =	60.4227 %)	0.000
Mo-101	191.93	0.1810	Present					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.2945/	0.6670 =	44.1529 %)	0.000
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Unable to Calc					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Unable to Calc					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT	(	0.0004/	0.0006 =	66.6667 %)	0.000
Xe-133m	233.20	0.1000	Present					
	Total	0.1000	PRESENT	(	0.1000/	0.1000 =	100.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					

	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.00
-d-117	273.28	0.2900	Absent					
	344.46	0.1769	Present					
	434.22	0.1047	Absent					
	1303.34	0.1827	Absent					
	1576.80	0.1119	Absent					
	Total	0.8662	ABSENT	(	0.1769/	0.8662 =	20.4225 %)	0.00
Pa-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.00
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Absent					
	721.96	0.0512	Present					
	Total	0.5237	PRESENT	(	0.4712/	0.5237 =	89.9752 %)	0.00
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.3415/	1.9478 =	17.5326 %)	0.00
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT	(	0.0001/	0.0005 =	20.0000 %)	0.000
-113	298.40	0.0900	Present					
	Total	0.0900	PRESENT	(	0.0900/	0.0900 =	100.0000 %)	0.000
Pa-233	300.10	0.0633	Present					
	311.90	0.3700	Absent					
	Total	0.4333	ABSENT	(	0.0633/	0.4333 =	14.6088 %)	0.000
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %)	0.000
Au-196	332.90	0.2300	Present					
	355.70	0.8760	Present					
	Total	1.1060	PRESENT	(	1.1060/	1.1060 =	100.0000 %)	0.000
In-115m	336.20	0.4590	Present					
	Total	0.4590	PRESENT	(	0.4590/	0.4590 =	100.0000 %)	0.000
Ru-95	336.40	0.7100	Present					
	1096.80	0.2100	Absent					
	Total	0.9200	ABSENT	(	0.7100/	0.9200 =	77.1739 %)	0.000
Cs-136	340.60	0.4890	Present					
	340.60	0.4676	Present					
	818.50	0.9970	Absent					
	818.50	0.9970	Absent					
	1048.07	0.7976	Absent					
	1048.10	0.7980	Absent					
	1235.34	0.1974	Absent					
	Total	4.7436	ABSENT	(	0.9566/	4.7436 =	20.1661 %)	0.000
Pt-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.000
-24	346.55	0.0100	Unable to Calc					
	857.55	0.0100	Absent					
	1368.53	1.0000	Absent					
	1732.10	0.0100	Absent					

	Total	1.0300	ABSENT	(0.0100/	1.0300 =	0.9709 %)	0.00
Bi-211	351.00	0.0001	Unable to Calc				
	Total	0.0001	PRESENT	(0.0001/	0.0001 =	100.0000 %)	0.00
Zn-71m	386.28	0.9200	Absent				
	487.34	0.6164	Absent				
	511.55	0.2806	Present				
	596.97	0.2760	Absent				
	620.19	0.5612	Absent				
	Total	2.6542	ABSENT	(0.2806/	2.6542 =	10.5719 %)	0.00
Ag-108m	434.00	0.9050	Absent				
	614.37	0.9320	Present				
	722.95	0.9230	Present				
	Total	2.7600	ABSENT	(1.8550/	2.7600 =	67.2102 %)	0.00
Rh-106m	450.80	0.2450	Absent				
	511.70	0.8640	Present				
	616.10	0.2040	Absent				
	748.50	0.1950	Absent				
	1046.70	0.3070	Absent				
	Total	1.8150	ABSENT	(0.8640/	1.8150 =	47.6033 %)	0.00
Te-121	507.59	0.1767	Present				
	573.14	0.8030	Absent				
	Total	0.9797	ABSENT	(0.1767/	0.9797 =	18.0361 %)	0.00
Tl-208	510.72	0.0001	Unable to Calc				
	583.14	0.0001	Unable to Calc				
	Total	0.0002	PRESENT	(0.0002/	0.0002 =	100.0000 %)	0.00
Annihila	511.00	1.0000	Unable to Calc				
	Total	1.0000	PRESENT	(1.0000/	1.0000 =	100.0000 %)	0.00
KR-85	514.00	0.0041	Present				
	Total	0.0041	PRESENT	(0.0041/	0.0041 =	100.0000 %)	0.00
Sb-129	544.70	0.1920	Absent				
	812.80	0.4600	Absent				
	914.60	0.2140	Present				
	1030.10	0.1350	Absent				
	Total	1.0010	ABSENT	(0.2140/	1.0010 =	21.3786 %)	0.000
Cs-134	563.26	0.0838	Absent				
	569.29	0.1543	Absent				
	604.66	0.9756	Present				
	795.76	0.8544	Absent				
	801.84	0.0873	Absent				
	Total	2.1554	ABSENT	(0.9756/	2.1554 =	45.2631 %)	0.000
Sb-124	602.72	0.9830	Absent				
	645.82	0.0723	Absent				
	722.78	0.1130	Present				
	1691.02	0.4900	Absent				
	Total	1.6583	ABSENT	(0.1130/	1.6583 =	6.8142 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc				
	768.40	0.0001	Absent				
	1120.30	0.0001	Unable to Calc				
	1764.50	0.0001	Absent				
	Total	0.0004	ABSENT	(0.0002/	0.0004 =	50.0000 %)	0.000
Zr-95	724.18	0.3399	Present				
	756.72	0.5460	Absent				
	Total	0.8859	ABSENT	(0.3399/	0.8859 =	38.3678 %)	0.000
Bi-212	727.30	0.0001	Unable to Calc				
	785.50	0.0001	Absent				
	1620.60	0.0001	Absent				
	Total	0.0003	ABSENT	(0.0001/	0.0003 =	33.3333 %)	0.000
Sn-127	823.10	0.1060	Absent				
	1095.60	0.1940	Absent				
	1114.30	0.3800	Present				

	Total	0.6800	ABSENT	(	0.3800/	0.6800 =	55.8824 %)	0.000
Sc-46	889.25	1.0000	Absent					
	1120.51	1.0000	Present					
	2009.76	0.1000	Absent					
	Total	2.1000	ABSENT	(	1.0000/	2.1000 =	47.6190 %)	0.000
-65	1115.52	0.5075	Present					
	Total	0.5075	PRESENT	(	0.5075/	0.5075 =	100.0000 %)	0.000
Ni-65	1115.53	0.1513	Present					
	1481.84	0.2350	Absent					
	Total	0.3863	ABSENT	(	0.1513/	0.3863 =	39.1665 %)	0.000
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
1	59	U-238	609.32	1.76e-003	243	77.11	6.71e-004	59
1	0	TH-232	911.07	7.83e-004	107	77.11	1.10e-003	0
4	400	TH-232	911.07	7.83e-004	107	238.63	3.55e-003	400
5	164	Ce-143	721.96	1.68e-004	49	293.26	2.94e-003	164
5	0	U-238	609.32	1.76e-003	243	295.22	1.34e-003	0
6	93	TH-232	911.07	7.83e-004	107	338.40	7.53e-004	93
7	265	U-238	609.32	1.76e-003	243	351.99	2.25e-003	265
9	162	TH-232	911.07	7.83e-004	107	583.14	1.22e-003	162

PEAK INTERFERENCE CORRECTION

Pk#	New Area	Nuclide	Energy	Status
1	0	Hg-197	77.35	Deleted [Net < Critical Level]
1	0	Pt-197	77.35	Deleted [Net < Critical Level]
1	0	Fr-223	80.00	Deleted [Net < Critical Level]
1	0	Hg-197	80.20	Deleted [Net < Critical Level]
1	0	Xe-133	80.99	Deleted [Net < Critical Level]
1	0	U-235	81.07	Deleted [Net < Critical Level]
1	0	U-235	83.78	Deleted [Net < Critical Level]
4	0	Xe-133m	233.20	Deleted [Net < Critical Level]
4	0	Fr-223	234.60	Deleted [Net < Critical Level]
4	0	U-235	236.00	Deleted [Net < Critical Level]
4	0	Ra-224	241.08	Deleted [Net < Critical Level]
4	0	Xe-125	243.40	Deleted [Net < Critical Level]
5	0	Ag-113	298.40	Deleted [Net < Critical Level]
5	0	Ga-67	300.20	Deleted [Net < Critical Level]
6	0	Au-196	332.90	Deleted [Net < Critical Level]
6	0	In-115m	336.20	Deleted [Net < Critical Level]
6	0	HF-175	343.40	Deleted [Net < Critical Level]
7	0	Pt-197m	346.50	Deleted [Net < Critical Level]
7	0	Bi-211	351.00	Deleted [Net < Critical Level]
7	0	U-235	351.10	Deleted [Net < Critical Level]
7	0	Au-196	355.70	Deleted [Net < Critical Level]
9	0	Tl-208	583.14	Deleted [Net < Critical Level]

SECONDARY NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status	Halflives

U-238	77.11	0.1070	Present					
	295.22	0.1920	Absent					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	0.9389/	1.2813 =	73.2771 %)	0.00
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT	(	1.3247/	1.4997 =	88.3310 %)	0.00
Hg-197	77.35	0.1900	Absent					
	80.20	0.0340	Absent					
	191.38	0.0057	Present					
	268.73	0.0005	Absent					
	Total	0.2302	ABSENT	(	0.0057/	0.2302 =	2.4761 %)	0.00
Pt-197	77.35	0.1700	Absent					
	191.31	0.0350	Present					
	Total	0.2050	ABSENT	(	0.0350/	0.2050 =	17.0732 %)	0.00
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0000/	0.0002 =	0.0000 %)	0.00
Xe-133	80.99	0.3700	Absent					
	Total	0.3700	ABSENT	(	0.0000/	0.3700 =	0.0000 %)	0.00
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Present					
	236.00	0.1100	Absent					
	269.60	0.1340	Absent					
	351.10	0.1200	Absent					
	Total	1.4030	ABSENT	(	0.5400/	1.4030 =	38.4890 %)	0.000
HF-175	89.36	0.0235	Present					
	343.40	0.8692	Absent					
	432.80	0.0156	Absent					
	Total	0.9083	ABSENT	(	0.0235/	0.9083 =	2.5873 %)	0.000
Ga-67	93.30	0.3800	Present					
	184.60	0.2360	Present					
	300.20	0.1900	Absent					
	Total	0.8060	ABSENT	(	0.6160/	0.8060 =	76.4268 %)	0.000
Xe-125	188.43	0.5500	Present					
	243.40	0.2871	Absent					
	Total	0.8371	ABSENT	(	0.5500/	0.8371 =	65.7030 %)	0.000
Xe-133m	233.20	0.1000	Absent					
	Total	0.1000	ABSENT	(	0.0000/	0.1000 =	0.0000 %)	0.000
Ra-224	241.08	0.0001	Absent					
	Total	0.0001	ABSENT	(	0.0000/	0.0001 =	0.0000 %)	0.000
Ag-113	298.40	0.0900	Absent					
	Total	0.0900	ABSENT	(	0.0000/	0.0900 =	0.0000 %)	0.000
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Absent					
	Total	1.1060	ABSENT	(	0.0000/	1.1060 =	0.0000 %)	0.000
In-115m	336.20	0.4590	Absent					
	Total	0.4590	ABSENT	(	0.0000/	0.4590 =	0.0000 %)	0.000
Pt-197m	346.50	0.1110	Absent					
	Total	0.1110	ABSENT	(	0.0000/	0.1110 =	0.0000 %)	0.000
Bi-211	351.00	0.0001	Absent					

	Total	0.0001	ABSENT	0.0000/	0.0001 =	0.0000 %	0.000
TL-208	510.72	0.0001	Unable to Calc				
	583.14	0.0001	Absent				
	Total	0.0002	ABSENT	(0.0001/	0.0002 =	50.0000 %)	0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
TH-232	Average:	1.33e+000	+-8.08e-002	1.24e+014	5 of 6	0.00
	238.63	1.23e+000	+-1.06e-001			
	338.40	1.35e+000	+-3.38e-001			
	583.14	1.45e+000	+-1.84e-001			
	911.07	1.50e+000	+-2.28e-001			
	968.90	1.62e+000	+-3.85e-001			
Th-234	92.80		BKG	1.00e+012	1 of 1	
Cu-67	Average:	3.38e-001	+-8.20e-002	6.20e+001	2 of 2	0.00
	93.30	9.32e-001	+-3.27e-001			
	184.50	2.98e-001	+-8.47e-002			
Pt-195m	98.90	1.42e+000	+-4.96e-001	9.65e+001	1 of 1	
Ac-225	99.80		BKG	1.00e+012	1 of 1	
Ra-226	186.20		BKG	1.00e+012	1 of 1	
Ce-143	Average:	6.62e-001	+-1.04e-001	3.30e+001	2 of 3	3.31
	293.26	6.23e-001	+-1.05e-001			
	721.96	3.26e+000	+-8.54e-001			
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	6.99e+001	+-1.21e+001	9.39e+004	1 of 1	
Zn-65	1115.52	4.91e-001	+-1.32e-001	5.86e+003	1 of 1	8.19
K0	1460.81	2.48e+001	+-1.28e+000	1.12e+013	1 of 1	
TOTAL:		9.89e+001	pCi /g		MPC Total:	11.49

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
78.09	145.21	59	35	59	550	0.56	2.615e+000
352.24	715.17	265	25	36	156	1.29	1.213e+001
609.11	1249.21	243	22	28	79	1.66	1.771e+001

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-9

Sample Size	5.75e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-11-97 11:41	Counting Start.	10-11-97 11:41
Sampling Stop	.10-11-97 11:41	Live Time	3600 Sec
Current Date.	.10-14-97 10:26	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	75.94	140.76	183	31	46	381	1.11	a
2	78.19	145.44	224	41	69	609	1.00	b
3	93.81	177.90	181	50	91	823	1.46	
4	186.82	371.27	154	34	55	421	1.33	
5	239.20	480.18	519	36	51	301	1.11	a
6	242.30	486.60	195	30	47	277	1.45	b
7	295.66	597.56	351	30	42	219	1.26	
8	338.79	687.22	90	27	48	229	1.11	
9	352.20	715.09	528	33	46	194	1.44	
10	462.59	944.60	48	20	34	130	0.73	
11	511.36	1045.99	140	22	35	127	3.18	
12	583.05	1195.04	173	21	30	98	1.22	
13	609.05	1249.09	387	25	29	90	1.32	
14	910.58	1875.98	118	18	29	72	1.28	
15	967.84	1995.02	60	15	25	64	1.48	
16	1119.18	2309.65	91	15	21	42	1.68	
17	1458.91	3015.94	417	22	16	21	2.02	
18	1761.70	3645.45	73	10	11	9	2.01	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-9

Sample Size . . . . . 5.75e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-11-97 11:41	Counting Start. 10-11-97 11:41
Sampling Stop 10-11-97 11:41	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:26	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
2	78.19	224	U-238	77.11	0.1070	6.28e-003	1.00e+000	4.34e+000
2	78.19	224	TH-232	77.11	0.1750	6.28e-003	1.01e+000	2.64e+000
2	78.19	224	Hg-197	77.35	0.1900	6.28e-003	9.95e-001	2.46e+000
2	78.19	224	Pt-197	77.35	0.1700	6.28e-003	9.81e-001	2.79e+000
2	78.19	224	Fr-223	80.00				
2	78.19	224	Ce-144	80.00	0.0200	6.28e-003	1.00e+000	2.33e+001
2	78.19	224	Hg-197	80.20	0.0340	6.28e-003	9.95e-001	1.38e+001
2	78.19	224	Hg-199m	80.20	0.1110	6.28e-003	3.31e-001	1.27e+001
2	78.19	224	Xe-133	80.99	0.3700	6.28e-003	9.97e-001	1.26e+000
2	78.19	224	Ba-133	81.00	0.3429	6.28e-003	1.00e+000	1.36e+000
2	78.19	224	U-235	81.07	0.1480	6.28e-003	1.00e+000	3.15e+000
2	78.19	224	U-235	83.78	0.2460	6.28e-003	1.00e+000	1.89e+000
3	93.81	181	Lu-176	88.35				
3	93.81	181	Ra-221	89.00				
3	93.81	181	HF-175	89.36	0.0235	8.37e-003	1.00e+000	1.20e+001
3	93.81	181	Th-234	92.80				
3	93.81	181	Cu-67	93.30	0.1690	8.37e-003	9.94e-001	1.68e+000
3	93.81	181	Ga-67	93.30	0.3800	8.37e-003	9.96e-001	7.47e-001
3	93.81	181	Gd-153	97.43	0.2730	8.37e-003	1.00e+000	1.03e+000
3	93.81	181	Pt-195m	98.90	0.1110	8.37e-003	9.96e-001	2.55e+000
3	93.81	181	Ac-225	99.80				
4	186.82	154	Mo-99	181.07	0.0629	9.65e-003	9.95e-001	3.33e+000
4	186.82	154	Cu-67	184.50	0.4700	9.65e-003	9.94e-001	4.46e-001
4	186.82	154	Ga-67	184.60	0.2360	9.65e-003	9.96e-001	8.87e-001
4	186.82	154	U-235	185.72	0.5400	9.65e-003	1.00e+000	3.86e-001
4	186.82	154	Ra-226	186.20				
4	186.82	154	Xe-125	188.43	0.5500	9.65e-003	9.80e-001	3.87e-001
4	186.82	154	In-114m	190.24	0.1564	9.65e-003	1.00e+000	1.33e+000
4	186.82	154	Pt-197	191.31	0.0350	9.65e-003	9.81e-001	6.07e+000
4	186.82	154	Hg-197	191.38	0.0057	9.65e-003	9.95e-001	3.67e+001
4	186.82	154	Zn-72	191.50	0.0940	9.65e-003	9.93e-001	2.23e+000
4	186.82	154	Mo-101	191.93	0.1810	9.65e-003	3.31e-001	3.48e+000
4	186.82	154	Fe-59	192.34	0.0311	9.65e-003	1.00e+000	6.70e+000

5	239.20	519	Fr-223	234.60				
5	239.20	519	Th-227	236.00				
5	239.20	519	U-235	236.00	0.1100	8.23e-003	1.00e+000	7.48e+000
5	239.20	519	TH-232	238.63	0.4310	8.23e-003	1.01e+000	1.89e+000
6	242.30	195	Te-131m	240.93	0.0755	8.16e-003	9.89e-001	4.18e+000
6	242.30	195	Ra-224	241.08				
6	242.30	195	Xe-125	243.40	0.2871	8.16e-003	9.80e-001	1.11e+000
6	242.30	195	IN-116M	244.59	0.0038	8.16e-003	6.99e-001	1.18e+002
6	242.30	195	Eu-152	244.67	0.0772	8.16e-003	1.00e+000	4.04e+000
6	242.30	195	Sm-155	245.73	0.0373	8.16e-003	4.51e-001	1.86e+001
6	242.30	195	Xe-135	247.79	0.9000	8.16e-003	9.63e-001	3.60e-001
6	242.30	195	Eu-154	248.00	0.0660	8.16e-003	1.00e+000	4.73e+000
7	295.66	351	Ce-143	293.26	0.4200	7.00e-003	9.90e-001	1.58e+000
7	295.66	351	U-238	295.22	0.1920	7.00e-003	1.00e+000	3.40e+000
7	295.66	351	Ir-192	295.96	0.2872	7.00e-003	1.00e+000	2.28e+000
7	295.66	351	Tl-210	296.00				
7	295.66	351	Ag-113	298.40	0.0900	7.00e-003	9.38e-001	7.76e+000
7	295.66	351	TB-160	298.57	0.2740	7.00e-003	1.00e+000	2.39e+000
7	295.66	351	Pa-231	299.90				
7	295.66	351	Pa-233	300.10	0.0633	7.00e-003	9.99e-001	1.04e+001
7	295.66	351	Ga-67	300.20	0.1900	7.00e-003	9.96e-001	3.46e+000
8	338.79	90	Au-196	332.90	0.2300	6.26e-003	9.98e-001	8.17e-001
8	338.79	90	Te-131m	334.27	0.0952	6.26e-003	9.89e-001	1.99e+000
8	338.79	90	Np-239	334.30	0.0200	6.26e-003	9.94e-001	9.44e+000
8	338.79	90	In-115m	336.20	0.4590	6.26e-003	9.27e-001	4.41e-001
8	338.79	90	Ru-95	336.40	0.7100	6.26e-003	8.17e-001	3.24e-001
8	338.79	90	TH-232	338.40	0.1201	6.26e-003	1.01e+000	1.55e+000
8	338.79	90	Ra-223	338.60				
8	338.79	90	Ac-228	338.70				
8	338.79	90	Cs-136	340.60	0.4890	6.26e-003	9.99e-001	3.84e-001
8	338.79	90	Cs-136	340.60	0.4676	6.26e-003	9.99e-001	4.02e-001
8	338.79	90	HF-175	343.40	0.8692	6.26e-003	1.00e+000	2.16e-001
8	338.79	90	EU-152M	344.20	0.0250	6.26e-003	9.64e-001	7.79e+000
8	338.79	90	Eu-152	344.30	0.2720	6.26e-003	1.00e+000	6.90e-001
8	338.79	90	Cd-117	344.46	0.1769	6.26e-003	8.70e-001	1.22e+000
9	352.20	528	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	2.22e+000
9	352.20	528	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	1.27e+001
9	352.20	528	Na-24	346.55	0.0100	6.07e-003	9.77e-001	1.16e+002
9	352.20	528	Bi-211	351.00				
9	352.20	528	U-235	351.10	0.1200	6.07e-003	1.00e+000	9.47e+000
9	352.20	528	U-238	351.99	0.3710	6.07e-003	1.00e+000	3.06e+000
9	352.20	528	Au-196	355.70	0.8760	6.07e-003	9.98e-001	1.30e+000
9	352.20	528	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	1.83e+000
10	462.59	48	IN-116M	463.13	0.0083	4.82e-003	6.99e-001	2.24e+001
10	462.59	48	Sb-125	463.51	0.1000	4.82e-003	1.00e+000	1.30e+000
10	462.59	48	Ra-220	465.00				
10	462.59	48	Tl-209	467.00				
10	462.59	48	Ir-192	468.06	0.4808	4.82e-003	1.00e+000	2.70e-001
11	511.36	140	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	1.10e+001
11	511.36	140	Te-121	507.59	0.1767	4.43e-003	9.99e-001	2.34e+000
11	511.36	140	Tl-208	510.72				
11	511.36	140	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	2.78e+000
11	511.36	140	Annihila	511.00	1.0000	4.43e-003	1.00e+000	4.13e-001
11	511.36	140	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.61e+000
11	511.36	140	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	5.58e-001
11	511.36	140	KR-85	514.00	0.0041	4.43e-003	1.00e+000	1.01e+002
12	583.05	173	Tl-208	583.14				
12	583.05	173	TH-232	583.14	0.3090	3.96e-003	1.01e+000	1.83e+000
13	609.05	387	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	1.36e+000
13	609.05	387	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	1.65e+001

13	609.05	387	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	2.55e-00
13	609.05	387	Bi-214	609.30				
13	609.05	387	U-238	609.32	0.4609	3.81e-003	1.00e+000	2.87e+00
13	609.05	387	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	2.44e+00
13	609.05	387	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	1.42e+00
14	910.58	118	TH-232	911.07	0.2900	2.70e-003	1.01e+000	1.95e+00
14	910.58	118	Ac-228	911.20				
14	910.58	118	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	2.88e+00
15	967.84	60	TB-160	962.36	0.1000	2.56e-003	1.00e+000	3.06e+00
15	967.84	60	EU-152M	963.50	0.1200	2.56e-003	9.64e-001	2.65e+00
15	967.84	60	Eu-152	964.00	0.1433	2.56e-003	1.00e+000	2.14e+00
15	967.84	60	Ac-228	964.40				
15	967.84	60	TB-160	966.17	0.2550	2.56e-003	1.00e+000	1.20e+00
15	967.84	60	Ac-228	968.80				
15	967.84	60	TH-232	968.90	0.1746	2.56e-003	1.01e+000	1.74e+00
16	1119.18	91	Sn-127	1114.30	0.3800	2.26e-003	8.55e-001	1.62e+00
16	1119.18	91	Zn-65	1115.52	0.5075	2.26e-003	1.00e+000	1.04e+00
16	1119.18	91	Ni-65	1115.53	0.1513	2.26e-003	8.76e-001	3.97e+00
16	1119.18	91	Bi-214	1120.30				
16	1119.18	91	Sc-46	1120.51	1.0000	2.26e-003	1.00e+000	5.26e-001
16	1119.18	91	Ta-182	1121.28	0.3510	2.26e-003	1.00e+000	1.50e+00
17	1458.91	417	K-40	1460.81	0.1070	1.80e-003	1.00e+000	2.83e+001
18	1761.70	73	U-238	1764.28	0.1504	1.53e-003	1.00e+000	4.14e+000
18	1761.70	73	Bi-214	1764.50				

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
238	77.11	0.1070	Present					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Present					
	Total	1.2813	PRESENT (	1.2813/	1.2813 =	100.0000 %)		0.000
TH-232	77.11	0.1750	Present					
	238.63	0.4310	Present					
	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT (	1.4997/	1.4997 =	100.0000 %)		0.000
Hg-197	77.35	0.1900	Present					
	80.20	0.0340	Present					
	191.38	0.0057	Present					
	268.73	0.0005	Absent					
	Total	0.2302	PRESENT (	0.2297/	0.2302 =	99.7828 %)		0.000
Pt-197	77.35	0.1700	Present					
	191.31	0.0350	Present					
	Total	0.2050	PRESENT (	0.2050/	0.2050 =	100.0000 %)		0.000
Fr-223	80.00	0.0001	Unable to Calc					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	PRESENT (	0.0002/	0.0002 =	100.0000 %)		0.000
Ce-144	80.00	0.0200	Present					
	133.54	0.1110	Absent					
	Total	0.1310	ABSENT (	0.0200/	0.1310 =	15.2672 %)		0.000
Hg-199m	80.20	0.1110	Present					
	158.37	0.5840	Absent					
	374.10	0.1380	Absent					

	Total	0.8330	ABSENT	(	0.1110/	0.8330 =	13.3253 %	0.000
Xe-133	80.99	0.3700	Present					
	Total	0.3700	PRESENT	(	0.3700/	0.3700 =	100.0000 %)	0.000
Ba-133	81.00	0.3429	Present					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.9629/	1.3051 =	73.7798 %)	0.000
U-235	81.07	0.1480	Present					
	83.78	0.2460	Present					
	143.76	0.1050	Absent					
	185.72	0.5400	Present					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	PRESENT	(	1.1640/	1.4030 =	82.9651 %)	0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Present					
	966.17	0.2550	Present					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.6290/	1.3866 =	45.3628 %)	0.000
Lu-176	88.35	0.0001	Unable to Calc					
	201.80	0.0001	Absent					
	306.90	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
Ra-221	89.00	0.0001	Unable to Calc					
	152.00	0.0001	Absent					
	176.00	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
HF-175	89.36	0.0235	Present					
	343.40	0.8692	Present					
	432.80	0.0156	Absent					
	Total	0.9083	PRESENT	(	0.8927/	0.9083 =	98.2825 %)	0.000
Th-234	92.80	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Cu-67	93.30	0.1690	Present					
	184.50	0.4700	Present					
	Total	0.6390	PRESENT	(	0.6390/	0.6390 =	100.0000 %)	0.000
Ga-67	93.30	0.3800	Present					
	184.60	0.2360	Present					
	300.20	0.1900	Present					
	Total	0.8060	PRESENT	(	0.8060/	0.8060 =	100.0000 %)	0.000
Gd-153	97.43	0.2730	Present					
	103.18	0.1992	Absent					
	Total	0.4722	ABSENT	(	0.2730/	0.4722 =	57.8145 %)	0.000
Pt-195m	98.90	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.000
Ac-225	99.80	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Ta-182	100.10	0.1411	Absent					
	152.43	0.0720	Absent					
	222.10	0.0758	Absent					
	1121.28	0.3510	Present					
	1189.04	0.1636	Absent					

	1221.42	0.2713	Absent						
	1230.97	0.1155	Absent						
	Total	1.1903	ABSENT	(	0.3510/	1.1903	=	29.4884 %)	0.000
Te-131m	102.06	0.0790	Absent						
	149.71	0.2054	Absent						
	200.63	0.0752	Absent						
	240.93	0.0755	Present						
	334.27	0.0952	Present						
	452.30	0.0567	Absent						
	773.67	0.3800	Absent						
	782.49	0.0775	Absent						
	793.75	0.1380	Absent						
	822.78	0.0609	Absent						
	852.21	0.2093	Absent						
	1125.46	0.1137	Absent						
	1206.60	0.0971	Absent						
	Total	1.6635	ABSENT	(	0.1707/	1.6635	=	10.2615 %)	0.000
Sm-155	104.30	0.7464	Absent						
	141.41	0.0202	Absent						
	245.73	0.0373	Present						
	Total	0.8039	ABSENT	(	0.0373/	0.8039	=	4.6425 %)	0.000
Np-239	106.10	0.2320	Absent						
	209.80	0.0410	Absent						
	228.10	0.1270	Absent						
	277.60	0.1420	Absent						
	315.90	0.0150	Absent						
	334.30	0.0200	Present						
	Total	0.5770	ABSENT	(	0.0200/	0.5770	=	3.4662 %)	0.000
Tl-209	117.00	0.0001	Absent						
	467.00	0.0001	Unable to Calc						
	1566.00	0.0001	Absent						
	Total	0.0003	ABSENT	(	0.0001/	0.0003	=	33.3333 %)	0.000
EU-152M	121.78	0.0720	Absent						
	344.20	0.0250	Present						
	841.60	0.1470	Absent						
	963.50	0.1200	Present						
	Total	0.3640	ABSENT	(	0.1450/	0.3640	=	39.8352 %)	0.000
Eu-152	121.78	0.3068	Absent						
	244.67	0.0772	Present						
	344.30	0.2720	Present						
	778.90	0.1272	Absent						
	964.00	0.1433	Present						
	1085.80	0.1010	Absent						
	1112.07	0.1340	Absent						
	1408.08	0.2073	Absent						
	Total	1.3688	ABSENT	(	0.4925/	1.3688	=	35.9804 %)	0.000
Eu-154	123.10	0.4047	Absent						
	248.00	0.0660	Present						
	723.30	0.1970	Absent						
	873.19	0.1150	Absent						
	996.32	0.1029	Absent						
	1004.76	0.1736	Absent						
	1274.39	0.3550	Absent						
	Total	1.4143	ABSENT	(	0.0660/	1.4143	=	4.6666 %)	0.000
IN-116M	137.92	0.0350	Absent						
	244.59	0.0038	Present						
	416.88	0.2937	Absent						
	463.13	0.0083	Present						
	818.65	0.1372	Absent						
	1097.23	0.6791	Absent						

	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0121/	2.5011 =	0.4838 %)	0.000
Mo-99	140.51	0.0379	Absent					
	181.07	0.0629	Present					
	739.40	0.1260	Absent					
	Total	0.2268	ABSENT	(	0.0629/	0.2268 =	27.7266 %)	0.000
Fe-59	142.65	0.0103	Absent					
	192.34	0.0311	Present					
	1099.22	0.5680	Absent					
	1291.56	0.4320	Absent					
	Total	1.0414	ABSENT	(	0.0311/	1.0414 =	2.9864 %)	0.000
Ra-223	144.30	0.0001	Absent					
	154.30	0.0001	Absent					
	269.60	0.0001	Absent					
	338.60	0.0001	Unable to Calc					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Zn-72	144.70	0.8300	Absent					
	191.50	0.0940	Present					
	Total	0.9240	ABSENT	(	0.0940/	0.9240 =	10.1732 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Present					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.1520/	0.8390 =	18.1168 %)	0.000
Ra-226	186.20	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Xe-125	188.43	0.5500	Present					
	243.40	0.2871	Present					
	Total	0.8371	PRESENT	(	0.8371/	0.8371 =	100.0000 %)	0.000
In-114m	190.24	0.1564	Present					
	558.43	0.2850	Absent					
	725.24	0.2810	Absent					
	1283.67	0.0003	Absent					
	1299.83	0.0012	Absent					
	Total	0.7239	ABSENT	(	0.1564/	0.7239 =	21.6052 %)	0.000
Mo-101	191.93	0.1810	Present					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.2945/	0.6670 =	44.1529 %)	0.000
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Unable to Calc					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Unable to Calc					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT	(	0.0004/	0.0006 =	66.6667 %)	0.000
-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					

	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %	0.00
Xe-135	247.79	0.9000	Present					
	Total	0.9000	PRESENT	(	0.9000/	0.9000 =	100.0000 %)	0.00
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.00
Cd-117	273.28	0.2900	Absent					
	344.46	0.1769	Present					
	434.22	0.1047	Absent					
	1303.34	0.1827	Absent					
	1576.80	0.1119	Absent					
	Total	0.8662	ABSENT	(	0.1769/	0.8662 =	20.4225 %)	0.00
Pa-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.00
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Absent					
	721.96	0.0512	Absent					
	Total	0.5237	PRESENT	(	0.4200/	0.5237 =	80.1986 %)	0.00
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Present					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.8223/	1.9478 =	42.2169 %)	0.00
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT	(	0.0001/	0.0005 =	20.0000 %)	0.000
Ag-113	298.40	0.0900	Present					
	Total	0.0900	PRESENT	(	0.0900/	0.0900 =	100.0000 %)	0.000
Pa-233	300.10	0.0633	Present					
	311.90	0.3700	Absent					
	Total	0.4333	ABSENT	(	0.0633/	0.4333 =	14.6088 %)	0.000
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %)	0.000
Au-196	332,90	0.2300	Present					
	355.70	0.8760	Present					
	Total	1.1060	PRESENT	(	1.1060/	1.1060 =	100.0000 %)	0.000
In-115m	336.20	0.4590	Present					
	Total	0.4590	PRESENT	(	0.4590/	0.4590 =	100.0000 %)	0.000
Ru-95	336.40	0.7100	Present					
	1096.80	0.2100	Absent					
	Total	0.9200	ABSENT	(	0.7100/	0.9200 =	77.1739 %)	0.000
Cs-136	340.60	0.4890	Present					
	340.60	0.4676	Present					
	818.50	0.9970	Absent					
	818.50	0.9970	Absent					
	1048.07	0.7976	Absent					
	1048.10	0.7980	Absent					
	1235.34	0.1974	Absent					
	Total	4.7436	ABSENT	(	0.9566/	4.7436 =	20.1661 %)	0.000
Pt-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.000

Na-24	346.55	0.0100	Unable to Calc				
	857.55	0.0100	Absent				
	1368.53	1.0000	Absent				
	1732.10	0.0100	Absent				
	Total	1.0300	ABSENT (	0.0100/	1.0300 =	0.9709 %)	0.000
.-211	351.00	0.0001	Unable to Calc				
	Total	0.0001	PRESENT (	0.0001/	0.0001 =	100.0000 %)	0.000
Zn-71m	386.28	0.9200	Absent				
	487.34	0.6164	Absent				
	511.55	0.2806	Present				
	596.97	0.2760	Absent				
	620.19	0.5612	Absent				
	Total	2.6542	ABSENT (	0.2806/	2.6542 =	10.5719 %)	0.000
Ag-108m	434.00	0.9050	Absent				
	614.37	0.9320	Present				
	722.95	0.9230	Absent				
	Total	2.7600	ABSENT (	0.9320/	2.7600 =	33.7681 %)	0.000
Rh-106m	450.80	0.2450	Absent				
	511.70	0.8640	Present				
	616.10	0.2040	Absent				
	748.50	0.1950	Absent				
	1046.70	0.3070	Absent				
	Total	1.8150	ABSENT (	0.8640/	1.8150 =	47.6033 %)	0.000
Ra-220	465.00	0.0001	Unable to Calc				
	Total	0.0001	PRESENT (	0.0001/	0.0001 =	100.0000 %)	0.000
Te-121	507.59	0.1767	Present				
	573.14	0.8030	Absent				
	Total	0.9797	ABSENT (	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc				
	583.14	0.0001	Unable to Calc				
	Total	0.0002	PRESENT (	0.0002/	0.0002 =	100.0000 %)	0.000
.inihila	511.00	1.0000	Unable to Calc				
	Total	1.0000	PRESENT (	1.0000/	1.0000 =	100.0000 %)	0.000
KR-85	514.00	0.0041	Present				
	Total	0.0041	PRESENT (	0.0041/	0.0041 =	100.0000 %)	0.000
Sb-129	544.70	0.1920	Absent				
	812.80	0.4600	Absent				
	914.60	0.2140	Present				
	1030.10	0.1350	Absent				
	Total	1.0010	ABSENT (	0.2140/	1.0010 =	21.3786 %)	0.000
Cs-134	563.26	0.0838	Absent				
	569.29	0.1543	Absent				
	604.66	0.9756	Present				
	795.76	0.8544	Absent				
	801.84	0.0873	Absent				
	Total	2.1554	ABSENT (	0.9756/	2.1554 =	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc				
	768.40	0.0001	Absent				
	1120.30	0.0001	Unable to Calc				
	1764.50	0.0001	Unable to Calc				
	Total	0.0004	ABSENT (	0.0003/	0.0004 =	75.0000 %)	0.000
Sn-127	823.10	0.1060	Absent				
	1095.60	0.1940	Absent				
	1114.30	0.3800	Present				
	Total	0.6800	ABSENT (	0.3800/	0.6800 =	55.8824 %)	0.000
Sc-46	889.25	1.0000	Absent				
	1120.51	1.0000	Present				
	2009.76	0.1000	Absent				
	Total	2.1000	ABSENT (	1.0000/	2.1000 =	47.6190 %)	0.000
Zn-65	1115.52	0.5075	Present				

	Total	0.5075	PRESENT	(	0.5075/	0.5075 =	100.0000 %)	0.000
Ni-65	1115.53	0.1513	Present					
	1481.84	0.2350	Absent					
	Total	0.3863	ABSENT	(	0.1513/	0.3863 =	39.1665 %)	0.000
[illegible]-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
2	224	U-238	609.32	1.76e-003	387	77.11	6.72e-004	148
2	76	TH-232	911.07	7.82e-004	118	77.11	1.10e-003	76
5	519	TH-232	911.07	7.82e-004	118	238.63	3.55e-003	519
7	351	U-238	609.32	1.76e-003	387	295.22	1.34e-003	296
8	90	TH-232	911.07	7.82e-004	118	338.40	7.52e-004	90
9	528	U-238	609.32	1.76e-003	387	351.99	2.25e-003	496
12	173	TH-232	911.07	7.82e-004	118	583.14	1.22e-003	173

PEAK INTERFERENCE CORRECTION

Pk#	New Area	Nuclide	Energy	Status
2	0	Hg-197	77.35	Deleted [Net < Critical Level]
2	0	Pt-197	77.35	Deleted [Net < Critical Level]
2	0	Fr-223	80.00	Deleted [Net < Critical Level]
2	0	Hg-197	80.20	Deleted [Net < Critical Level]
2	0	Xe-133	80.99	Deleted [Net < Critical Level]
2	0	U-235	81.07	Deleted [Net < Critical Level]
2	0	U-235	83.78	Deleted [Net < Critical Level]
5	0	Fr-223	234.60	Deleted [Net < Critical Level]
5	0	U-235	236.00	Deleted [Net < Critical Level]
7	55	Ce-143	293.26	Net Counts Corrected
7	55	Ag-113	298.40	Net Counts Corrected
7	55	Ga-67	300.20	Net Counts Corrected
8	0	Au-196	332.90	Deleted [Net < Critical Level]
8	0	In-115m	336.20	Deleted [Net < Critical Level]
8	0	HF-175	343.40	Deleted [Net < Critical Level]
9	32	Pt-197m	346.50	Deleted [Net < Critical Level]
9	32	Bi-211	351.00	Deleted [Net < Critical Level]
9	32	U-235	351.10	Deleted [Net < Critical Level]
9	32	Au-196	355.70	Deleted [Net < Critical Level]
12	0	Tl-208	583.14	Deleted [Net < Critical Level]

SECONDARY NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
Hg-197	77.35	0.1900	Absent					
	80.20	0.0340	Absent					
	191.38	0.0057	Present					
	268.73	0.0005	Absent					
	Total	0.2302	ABSENT	(	0.0057/	0.2302 =	2.4761 %)	0.000
Pt-197	77.35	0.1700	Absent					
	191.31	0.0350	Present					
	Total	0.2050	ABSENT	(	0.0350/	0.2050 =	17.0732 %)	0.000

Fr-223	80.00	0.0001	Absent						
	234.60	0.0001	Absent						
	Total	0.0002	ABSENT	(	0.0000/	0.0002	=	0.0000 %)	0.000
Xe-133	80.99	0.3700	Absent						
	Total	0.3700	ABSENT	(	0.0000/	0.3700	=	0.0000 %)	0.000
235	81.07	0.1480	Absent						
	83.78	0.2460	Absent						
	143.76	0.1050	Absent						
	185.72	0.5400	Present						
	236.00	0.1100	Absent						
	269.60	0.1340	Absent						
	351.10	0.1200	Absent						
	Total	1.4030	ABSENT	(	0.5400/	1.4030	=	38.4890 %)	0.000
HF-175	89.36	0.0235	Present						
	343.40	0.8692	Absent						
	432.80	0.0156	Absent						
	Total	0.9083	ABSENT	(	0.0235/	0.9083	=	2.5873 %)	0.000
Au-196	332.90	0.2300	Absent						
	355.70	0.8760	Absent						
	Total	1.1060	ABSENT	(	0.0000/	1.1060	=	0.0000 %)	0.000
In-115m	336.20	0.4590	Absent						
	Total	0.4590	ABSENT	(	0.0000/	0.4590	=	0.0000 %)	0.000
Pt-197m	346.50	0.1110	Absent						
	Total	0.1110	ABSENT	(	0.0000/	0.1110	=	0.0000 %)	0.000
Bi-211	351.00	0.0001	Absent						
	Total	0.0001	ABSENT	(	0.0000/	0.0001	=	0.0000 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc						
	583.14	0.0001	Absent						
	Total	0.0002	ABSENT	(	0.0001/	0.0002	=	50.0000 %)	0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
U-238	Average:	2.92e+000	+-1.17e-001	4.12e+013	5 of 5	0.00
	77.11	2.87e+000	+-7.99e-001			
	295.22	2.87e+000	+-2.90e-001			
	351.99	2.87e+000	+-1.92e-001			
	609.32	2.87e+000	+-1.85e-001			
	1764.28	4.14e+000	+-5.69e-001			
TH-232	Average:	1.82e+000	+-9.81e-002	1.24e+014	6 of 6	0.00
	77.11	8.94e-001	+-4.85e-001			
	238.63	1.89e+000	+-1.31e-001			
	338.40	1.55e+000	+-4.62e-001			
	583.14	1.83e+000	+-2.19e-001			
	911.07	1.95e+000	+-3.04e-001			
	968.90	1.74e+000	+-4.40e-001			
Th-234	92.80		BKG	1.00e+012	1 of 1	
Cu-67	Average:	4.98e-001	+-9.53e-002	6.20e+001	2 of 2	0.00
	93.30	1.68e+000	+-4.65e-001			
	184.50	4.46e-001	+-9.73e-002			
Ga-67	Average:	7.69e-001	+-1.27e-001	7.82e+001	3 of 3	0.00
	93.30	7.47e-001	+-2.07e-001			
	184.60	8.87e-001	+-1.94e-001			
	300.20	5.42e-001	+-2.95e-001			
c-195m	98.90	2.55e+000	+-7.07e-001	9.65e+001	1 of 1	
Ac-225	99.80		BKG	1.00e+012	1 of 1	
Ra-226	186.20		BKG	1.00e+012	1 of 1	

Xe-125	Average:	5.31e-001	+-7.55e-002	1.68e-001	2 of	2	0.00
	188.43	3.87e-001	+-8.44e-002				
	243.40	1.11e+000	+-1.69e-001				
Ra-224	241.08		BKG	1.00e+012	1 of	1	
[illegible]-135	247.79	3.60e-001	+-5.49e-002	9.10e+000	1 of	1	
[illegible]-143	293.26	2.47e-001	+-1.34e-001	3.30e+001	1 of	3	1.23
Ag-113	298.40	1.22e+000	+-6.61e-001	5.37e+000	1 of	1	
Ra-220	465.00		BKG	1.00e+012	1 of	1	
Annihila	511.00		I.D.Only	1.00e+003	1 of	1	
KR-85	514.00	1.01e+002	+-1.61e+001	9.39e+004	1 of	1	
Zn-65	1115.52	1.04e+000	+-1.66e-001	5.86e+003	1 of	1	17.27
K-40	1460.81	2.83e+001	+-1.49e+000	1.12e+013	1 of	1	
TOTAL:		1.41e+002 pCi /g			MPC Total:		18.51

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
75.94	140.76	183	31	46	381	1.11	8.553e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-10

Sample Size	5.55e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-11-97 13:48	Counting Start.	10-11-97 13:48
Sampling Stop	.10-11-97 13:48	Live Time	3600 Sec
Current Date.	.10-14-97 10:28	Real Time	0 Sec

Detector #: 22

Energy(keV) = 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	186.63	370.87	121	31	52	330	1.46	
2	239.15	480.06	313	31	45	284	1.37	
3	295.39	596.98	102	26	45	207	1.18	
4	338.54	686.70	41	29	55	243	1.18	NET < CL
5	352.16	715.01	176	23	36	140	1.35	
6	510.78	1044.78	98	18	29	90	2.07	
7	582.97	1194.87	102	18	27	80	1.59	
8	609.17	1249.33	166	18	23	53	1.56	
9	910.38	1875.54	74	14	20	38	1.31	
10	968.40	1996.18	50	14	22	46	1.42	
11	1119.27	2309.83	62	11	15	22	1.19	
12	1459.12	3016.39	333	20	18	26	1.93	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-10

Sample Size . . . . . 5.55e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-11-97 13:48	Counting Start. 10-11-97 13:48
Sampling Stop 10-11-97 13:48	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:28	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef ID.	Library File. . .c:\gdr\library\nes.lib IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	186.63	121	Mo-99	181.07	0.0629	9.66e-003	9.95e-001	2.71e+000
1	186.63	121	Cu-67	184.50	0.4700	9.66e-003	9.94e-001	3.63e-001
1	186.63	121	Ga-67	184.60	0.2360	9.66e-003	9.96e-001	7.21e-001
1	186.63	121	U-235	185.72	0.5400	9.66e-003	1.00e+000	3.14e-001
1	186.63	121	Ra-226	186.20				
1	186.63	121	Xe-125	188.43	0.5500	9.66e-003	9.80e-001	3.15e-001
1	186.63	121	In-114m	190.24	0.1564	9.66e-003	1.00e+000	1.08e+000
1	186.63	121	Pt-197	191.31	0.0350	9.66e-003	9.81e-001	4.93e+000
1	186.63	121	Hg-197	191.38	0.0057	9.66e-003	9.95e-001	2.99e+001
1	186.63	121	Zn-72	191.50	0.0940	9.66e-003	9.93e-001	1.82e+000
1	186.63	121	Mo-101	191.93	0.1810	9.66e-003	3.31e-001	2.83e+000
1	186.63	121	Fe-59	192.34	0.0311	9.66e-003	1.00e+000	5.45e+000
2	239.15	313	Xe-133m	233.20	0.1000	8.23e-003	9.94e-001	5.17e+000
2	239.15	313	Fr-223	234.60				
2	239.15	313	Th-227	236.00				
2	239.15	313	U-235	236.00	0.1100	8.23e-003	1.00e+000	4.67e+000
2	239.15	313	TH-232	238.63	0.4310	8.23e-003	1.01e+000	1.18e+000
2	239.15	313	Te-131m	240.93	0.0755	8.23e-003	9.89e-001	6.89e+000
2	239.15	313	Ra-224	241.08				
2	239.15	313	Xe-125	243.40	0.2871	8.23e-003	9.80e-001	1.83e+000
2	239.15	313	IN-116M	244.59	0.0038	8.23e-003	6.99e-001	1.94e+002
2	239.15	313	Eu-152	244.67	0.0772	8.23e-003	1.00e+000	6.66e+000
3	295.39	102	Ce-143	293.26	0.4200	7.00e-003	9.90e-001	4.74e-001
3	295.39	102	U-238	295.22	0.1920	7.00e-003	1.00e+000	1.02e+000
3	295.39	102	Ir-192	295.96	0.2872	7.00e-003	1.00e+000	6.86e-001
3	295.39	102	Tl-210	296.00				
3	295.39	102	Ag-113	298.40	0.0900	7.00e-003	9.38e-001	2.33e+000
3	295.39	102	TB-160	298.57	0.2740	7.00e-003	1.00e+000	7.19e-001
3	295.39	102	Pa-231	299.90				
3	295.39	102	Pa-233	300.10	0.0633	7.00e-003	9.99e-001	3.11e+000
3	295.39	102	Ga-67	300.20	0.1900	7.00e-003	9.96e-001	1.04e+000
5	352.16	176	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	7.68e-001
5	352.16	176	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	4.37e+000

5	352.16	176	Na-24	346.55	0.0100	6.07e-003	9.77e-001	4.02e-001
5	352.16	176	Bi-211	351.00				
5	352.16	176	U-235	351.10	0.1200	6.07e-003	1.00e+000	3.27e+000
5	352.16	176	U-238	351.99	0.3710	6.07e-003	1.00e+000	1.05e+000
5	352.16	176	Au-196	355.70	0.8760	6.07e-003	9.98e-001	4.49e-001
5	352.16	176	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	6.33e-001
6	510.78	98	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	7.96e+000
6	510.78	98	Te-121	507.59	0.1767	4.43e-003	9.99e-001	1.69e+000
6	510.78	98	Tl-208	510.72				
6	510.78	98	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	2.01e+000
6	510.78	98	Annihila	511.00	1.0000	4.43e-003	1.00e+000	2.99e-001
6	510.78	98	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.16e+000
6	510.78	98	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	4.04e-001
6	510.78	98	KR-85	514.00	0.0041	4.43e-003	1.00e+000	7.29e+001
7	582.97	102	Tl-208	583.14				
7	582.97	102	TH-232	583.14	0.3090	3.96e-003	1.01e+000	1.12e+000
8	609.17	166	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	6.04e-001
8	609.17	166	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	7.34e+000
8	609.17	166	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	1.13e+001
8	609.17	166	Bi-214	609.30				
8	609.17	166	U-238	609.32	0.4609	3.81e-003	1.00e+000	1.27e+000
8	609.17	166	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	1.09e+001
8	609.17	166	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	6.32e-001
9	910.38	74	TH-232	911.07	0.2900	2.70e-003	1.01e+000	1.27e+000
9	910.38	74	Ac-228	911.20				
9	910.38	74	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	1.87e+000
10	968.40	50	EU-152M	963.50	0.1200	2.56e-003	9.64e-001	2.29e+000
10	968.40	50	Eu-152	964.00	0.1433	2.56e-003	1.00e+000	1.84e+000
10	968.40	50	Ac-228	964.40				
10	968.40	50	TB-160	966.17	0.2550	2.56e-003	1.00e+000	1.04e+000
0	968.40	50	Ac-228	968.80				
10	968.40	50	TH-232	968.90	0.1746	2.56e-003	1.01e+000	1.50e+000
11	1119.27	62	Sn-127	1114.30	0.3800	2.26e-003	8.55e-001	1.14e+000
11	1119.27	62	Zn-65	1115.52	0.5075	2.26e-003	1.00e+000	7.32e-001
11	1119.27	62	Ni-65	1115.53	0.1513	2.26e-003	8.76e-001	2.80e+000
11	1119.27	62	Bi-214	1120.30				
11	1119.27	62	Sc-46	1120.51	1.0000	2.26e-003	1.00e+000	3.71e-001
11	1119.27	62	Ta-182	1121.28	0.3510	2.26e-003	1.00e+000	1.06e+000
12	1459.12	333	K-40	1460.81	0.1070	1.80e-003	1.00e+000	2.34e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	1.0239/	1.2813 =	79.9110 %)	0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Absent					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT	(	1.2046/	1.4997 =	80.3227 %)	0.000
Hg-197	77.35	0.1900	Absent					
	80.20	0.0340	Absent					

	191.38	0.0057	Present					
	268.73	0.0005	Absent					
	Total	0.2302	ABSENT	(	0.0057/	0.2302 =	2.4761 %)	0.000
Pt-197	77.35	0.1700	Absent					
	191.31	0.0350	Present					
	Total	0.2050	ABSENT	(	0.0350/	0.2050 =	17.0732 %)	0.000
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.6200/	1.3051 =	47.5059 %)	0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Present					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(	0.7700/	1.4030 =	54.8824 %)	0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Absent					
	966.17	0.2550	Present					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.5290/	1.3866 =	38.1509 %)	0.000
Cu-67	93.30	0.1690	Absent					
	184.50	0.4700	Present					
	Total	0.6390	ABSENT	(	0.4700/	0.6390 =	73.5524 %)	0.000
Ga-67	93.30	0.3800	Absent					
	184.60	0.2360	Present					
	300.20	0.1900	Present					
	Total	0.8060	ABSENT	(	0.4260/	0.8060 =	52.8536 %)	0.000
Ta-182	100.10	0.1411	Absent					
	152.43	0.0720	Absent					
	222.10	0.0758	Absent					
	1121.28	0.3510	Present					
	1189.04	0.1636	Absent					
	1221.42	0.2713	Absent					
	1230.97	0.1155	Absent					
	Total	1.1903	ABSENT	(	0.3510/	1.1903 =	29.4884 %)	0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Absent					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					

	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.0755/	1.6635 =	4.5386 %)	0.00
EU-152M	121.78	0.0720	Absent					
	344.20	0.0250	Absent					
	841.60	0.1470	Absent					
	963.50	0.1200	Present					
	Total	0.3640	ABSENT	(	0.1200/	0.3640 =	32.9670 %)	0.00
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Absent					
	778.90	0.1272	Absent					
	964.00	0.1433	Present					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.2205/	1.3688 =	16.1090 %)	0.00
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.00
Mo-99	140.51	0.0379	Absent					
	181.07	0.0629	Present					
	739.40	0.1260	Absent					
	Total	0.2268	ABSENT	(	0.0629/	0.2268 =	27.7266 %)	0.00
Fe-59	142.65	0.0103	Absent					
	192.34	0.0311	Present					
	1099.22	0.5680	Absent					
	1291.56	0.4320	Absent					
	Total	1.0414	ABSENT	(	0.0311/	1.0414 =	2.9864 %)	0.000
Zn-72	144.70	0.8300	Absent					
	191.50	0.0940	Present					
	Total	0.9240	ABSENT	(	0.0940/	0.9240 =	10.1732 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Ra-226	186.20	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Xe-125	188.43	0.5500	Present					
	243.40	0.2871	Present					
	Total	0.8371	PRESENT	(	0.8371/	0.8371 =	100.0000 %)	0.000
In-114m	190.24	0.1564	Present					
	558.43	0.2850	Absent					
	725.24	0.2810	Absent					
	1283.67	0.0003	Absent					
	1299.83	0.0012	Absent					
	Total	0.7239	ABSENT	(	0.1564/	0.7239 =	21.6052 %)	0.000

Mo-101	191.93	0.1810	Present					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.2945/	0.6670 =	44.1529 %)	0.00
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Absent					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Unable to Calc					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT	(	0.0003/	0.0006 =	50.0000 %)	0.00
Xe-133m	233.20	0.1000	Present					
	Total	0.1000	PRESENT	(	0.1000/	0.1000 =	100.0000 %)	0.00
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.00
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.00
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.00
Pa-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Absent					
	721.96	0.0512	Absent					
	Total	0.5237	PRESENT	(	0.4200/	0.5237 =	80.1986 %)	0.000
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.3415/	1.9478 =	17.5326 %)	0.000
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT	(	0.0001/	0.0005 =	20.0000 %)	0.000
Ag-113	298.40	0.0900	Present					
	Total	0.0900	PRESENT	(	0.0900/	0.0900 =	100.0000 %)	0.000
Pa-233	300.10	0.0633	Present					
	311.90	0.3700	Absent					
	Total	0.4333	ABSENT	(	0.0633/	0.4333 =	14.6088 %)	0.000
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %)	0.000
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Present					
	Total	1.1060	ABSENT	(	0.8760/	1.1060 =	79.2043 %)	0.000
Au-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.000
Na-24	346.55	0.0100	Unable to Calc					
	857.55	0.0100	Absent					

	1368.53	1.0000	Absent					
	1732.10	0.0100	Absent					
	Total	1.0300	ABSENT	(	0.0100/	1.0300 =	0.9709 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
.-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.000
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT	(	0.9320/	2.7600 =	33.7681 %)	0.000
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Absent					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT	(	0.8640/	1.8150 =	47.6033 %)	0.000
Te-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	PRESENT	(	0.0002/	0.0002 =	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.000
KR-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.000
.o-129	544.70	0.1920	Absent					
	812.80	0.4600	Absent					
	914.60	0.2140	Present					
	1030.10	0.1350	Absent					
	Total	1.0010	ABSENT	(	0.2140/	1.0010 =	21.3786 %)	0.000
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Unable to Calc					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0002/	0.0004 =	50.0000 %)	0.000
Sn-127	823.10	0.1060	Absent					
	1095.60	0.1940	Absent					
	1114.30	0.3800	Present					
	Total	0.6800	ABSENT	(	0.3800/	0.6800 =	55.8824 %)	0.000
Sc-46	889.25	1.0000	Absent					
	1120.51	1.0000	Present					
	2009.76	0.1000	Absent					
	Total	2.1000	ABSENT	(	1.0000/	2.1000 =	47.6190 %)	0.000
⁻·-65	1115.52	0.5075	Present					
	Total	0.5075	PRESENT	(	0.5075/	0.5075 =	100.0000 %)	0.000
Ni-65	1115.53	0.1513	Present					
	1481.84	0.2350	Absent					
	Total	0.3863	ABSENT	(	0.1513/	0.3863 =	39.1665 %)	0.000

K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT (	0.1070/	0.1070 =	100.0000 %)	0.00

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line Energy	cts/dis	Ref Area	===>> Calculated Contribution Energy	cts/dis	New Area
2	313	TH-232	911.07	7.83e-004	74	238.63	3.55e-003	313
7	102	TH-232	911.07	7.83e-004	74	583.14	1.22e-003	102

PEAK INTERFERENCE CORRECTION

Pk#	New Area	Nuclide	Energy	Status
2	0	Xe-133m	233.20	Deleted [Net < Critical Level]
2	0	Ra-224	241.08	Deleted [Net < Critical Level]
2	0	Xe-125	243.40	Deleted [Net < Critical Level]
7	0	Tl-208	583.14	Deleted [Net < Critical Level]

SECONDARY NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
Xe-125	188.43	0.5500	Present					
	243.40	0.2871	Absent					
	Total	0.8371	ABSENT	(0.5500/	0.8371 =	65.7030 %)		0.000
Xe-133m	233.20	0.1000	Absent					
	Total	0.1000	ABSENT	(0.0000/	0.1000 =	0.0000 %)		0.000
Ra-224	241.08	0.0001	Absent					
	Total	0.0001	ABSENT	(0.0000/	0.0001 =	0.0000 %)		0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Absent					
	Total	0.0002	ABSENT	(0.0001/	0.0002 =	50.0000 %)		0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
TH-232	Average:	1.20e+000	+-8.98e-002	1.24e+014	4 of 6	0.00
	238.63	1.18e+000	+-1.17e-001			
	583.14	1.12e+000	+-1.93e-001			
	911.07	1.27e+000	+-2.34e-001			
	968.90	1.50e+000	+-4.07e-001			
Ra-226	186.20		BKG	1.00e+012	1 of 1	
Ce-143	293.26	4.74e-001	+-1.21e-001	3.30e+001	1 of 3	2.37
Ag-113	298.40	2.33e+000	+-5.98e-001	5.37e+000	1 of 1	
Pt-197m	346.50	4.37e+000	+-5.80e-001	1.57e+000	1 of 1	
Bi-211	351.00		BKG	1.00e+012	1 of 1	
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
Kr-85	514.00	7.29e+001	+-1.36e+001	9.39e+004	1 of 1	
Zn-65	1115.52	7.32e-001	+-1.33e-001	5.86e+003	1 of 1	12.19
K-40	1460.81	2.34e+001	+-1.43e+000	1.12e+013	1 of 1	
TOTAL:		1.05e+002 pCi /g			MPC Total:	14.56

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
609.17	1249.33	166	18	23	53	1.56	1.210e+001

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-11

Sample Size	4.90e+002 g	Spectrum File	.TEMP.SP(
Sampling Start.	.10-11-97 14:54	Counting Start.	10-11-97 14:5
Sampling Stop	.10-11-97 14:54	Live Time	3600 Se(
Current Date.	.10-14-97 10:30	Real Time	0 Se(

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:4

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:4
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 409
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	186.64	370.89	60	34	63	443	1.06	NET < CL
2	239.11	479.98	125	28	46	288	0.97	
3	295.75	597.74	145	23	36	159	1.16	
4	352.16	715.01	223	24	34	127	1.46	
5	511.06	1045.35	88	20	35	112	3.16	
6	583.06	1195.04	74	16	25	68	1.24	
7	609.18	1249.35	211	18	21	46	1.62	
8	661.12	1357.34	93	17	25	72	1.47	
9	910.32	1875.43	58	13	19	37	1.68	
10	1459.12	3016.39	189	15	11	11	2.08	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-11

Sample Size . . . . . 4.90e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-11-97 14:54	Counting Start. 10-11-97 14:54
Sampling Stop 10-11-97 14:54	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:30	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
2	239.11	125	Xe-133m	233.20	0.1000	8.24e-003	9.94e-001	2.34e+000
2	239.11	125	Fr-223	234.60				
2	239.11	125	Th-227	236.00				
2	239.11	125	U-235	236.00	0.1100	8.24e-003	1.00e+000	2.11e+000
2	239.11	125	TH-232	238.63	0.4310	8.24e-003	1.01e+000	5.35e-001
2	239.11	125	Te-131m	240.93	0.0755	8.24e-003	9.89e-001	3.12e+000
2	239.11	125	Ra-224	241.08				
2	239.11	125	Xe-125	243.40	0.2871	8.24e-003	9.80e-001	8.27e-001
2	239.11	125	IN-116M	244.59	0.0038	8.24e-003	6.99e-001	8.76e+001
2	239.11	125	Eu-152	244.67	0.0772	8.24e-003	1.00e+000	3.01e+000
3	295.75	145	Ce-143	293.26	0.4200	7.00e-003	9.90e-001	7.64e-001
3	295.75	145	U-238	295.22	0.1920	7.00e-003	1.00e+000	1.65e+000
3	295.75	145	Ir-192	295.96	0.2872	7.00e-003	1.00e+000	1.11e+000
3	295.75	145	Tl-210	296.00				
3	295.75	145	Ag-113	298.40	0.0900	7.00e-003	9.38e-001	3.76e+000
3	295.75	145	TB-160	298.57	0.2740	7.00e-003	1.00e+000	1.16e+000
3	295.75	145	Pa-231	299.90				
3	295.75	145	Pa-233	300.10	0.0633	7.00e-003	9.99e-001	5.02e+000
3	295.75	145	Ga-67	300.20	0.1900	7.00e-003	9.96e-001	1.68e+000
4	352.16	223	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	1.10e+000
4	352.16	223	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	6.27e+000
4	352.16	223	Na-24	346.55	0.0100	6.07e-003	9.77e-001	5.76e+001
4	352.16	223	Bi-211	351.00				
4	352.16	223	U-235	351.10	0.1200	6.07e-003	1.00e+000	4.69e+000
4	352.16	223	U-238	351.99	0.3710	6.07e-003	1.00e+000	1.51e+000
4	352.16	223	Au-196	355.70	0.8760	6.07e-003	9.98e-001	6.44e-001
4	352.16	223	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	9.08e-001
5	511.06	88	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	8.10e+000
5	511.06	88	Te-121	507.59	0.1767	4.43e-003	9.99e-001	1.72e+000
5	511.06	88	Tl-208	510.72				
5	511.06	88	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	2.05e+000
5	511.06	88	Annihila	511.00	1.0000	4.43e-003	1.00e+000	3.04e-001
5	511.06	88	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.18e+000

5	511.06	88	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	4.12e-00
5	511.06	88	KR-85	514.00	0.0041	4.43e-003	1.00e+000	7.42e-00
6	583.06	74	Tl-208	583.14				
6	583.06	74	TH-232	583.14	0.3090	3.96e-003	1.01e+000	9.19e-00
7	609.18	211	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	8.69e-00
7	609.18	211	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	1.06e+00
7	609.18	211	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	1.63e+00
7	609.18	211	Bi-214	609.30				
7	609.18	211	U-238	609.32	0.4609	3.81e-003	1.00e+000	1.84e+00
7	609.18	211	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	1.56e+00
7	609.18	211	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	9.10e-00
8	661.12	93	Cu-61	656.00	0.1170	3.55e-003	9.05e-001	3.79e+00
8	661.12	93	As-76	657.03	0.0608	3.55e-003	9.87e-001	6.68e+00
8	661.12	93	Ag-110m	657.75	0.9440	3.55e-003	1.00e+000	4.25e-00
8	661.12	93	Cs-137	661.65	0.8500	3.55e-003	1.00e+000	4.72e-00
8	661.12	93	Ce-143	664.55	0.0525	3.55e-003	9.90e-001	7.72e+00
8	661.12	93	Sb-126	666.30	0.9970	3.55e-003	9.99e-001	4.03e-00
8	661.12	93	I-126	667.00	0.3300	3.55e-003	9.99e-001	1.22e+00
9	910.32	58	TH-232	911.07	0.2900	2.70e-003	1.01e+000	1.13e+00
9	910.32	58	Ac-228	911.20				
9	910.32	58	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	1.66e+00
10	1459.12	189	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.51e+00

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(1.0239/	1.2813 =	79.9110 %)		0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Absent					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Absent					
	Total	1.4997	ABSENT	(1.0300/	1.4997 =	68.6804 %)		0.000
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(0.0001/	0.0002 =	50.0000 %)		0.000
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(0.6200/	1.3051 =	47.5059 %)		0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(0.2300/	1.4030 =	16.3934 %)		0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					

	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Absent					
	966.17	0.2550	Absent					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.2740/	1.3866 =	19.7606 %)	0.00(
Ga-67	93.30	0.3800	Absent					
	184.60	0.2360	Absent					
	300.20	0.1900	Present					
	Total	0.8060	ABSENT	(	0.1900/	0.8060 =	23.5732 %)	0.00(
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Absent					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.0755/	1.6635 =	4.5386 %)	0.000
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Absent					
	778.90	0.1272	Absent					
	964.00	0.1433	Absent					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.0772/	1.3688 =	5.6400 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
[illegible]-125	188.43	0.5500	Absent					
	243.40	0.2871	Present					
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.000
Mo-101	191.93	0.1810	Absent					

	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)	0.000
c-228	209.50	0.0001	Absent					
	338.70	0.0001	Absent					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Absent					
	968.80	0.0001	Absent					
	Total	0.0006	ABSENT	(	0.0001/	0.0006 =	16.6667 %)	0.000
Xe-133m	233.20	0.1000	Present					
	Total	0.1000	PRESENT	(	0.1000/	0.1000 =	100.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
Pa-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
Cu-61	283.70	0.1320	Absent					
	656.00	0.1170	Present					
	Total	0.2490	ABSENT	(	0.1170/	0.2490 =	46.9880 %)	0.000
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Present					
	721.96	0.0512	Absent					
	Total	0.5237	PRESENT	(	0.4725/	0.5237 =	90.2234 %)	0.000
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.3415/	1.9478 =	17.5326 %)	0.000
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT	(	0.0001/	0.0005 =	20.0000 %)	0.000
Ag-113	298.40	0.0900	Present					
	Total	0.0900	PRESENT	(	0.0900/	0.0900 =	100.0000 %)	0.000
Pa-233	300.10	0.0633	Present					
	311.90	0.3700	Absent					
	Total	0.4333	ABSENT	(	0.0633/	0.4333 =	14.6088 %)	0.000
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %)	0.000
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Present					
	Total	1.1060	ABSENT	(	0.8760/	1.1060 =	79.2043 %)	0.000
Pt-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.000

Na-24	346.55	0.0100	Unable to Calc					
	857.55	0.0100	Absent					
	1368.53	1.0000	Absent					
	1732.10	0.0100	Absent					
	Total	1.0300	ABSENT	(	0.0100/	1.0300 =	0.9709 %)	0.00
I-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.00
I-126	386.00	0.3400	Absent					
	667.00	0.3300	Present					
	Total	0.6700	ABSENT	(	0.3300/	0.6700 =	49.2537 %)	0.00(
Zn-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.00(
Sb-126	414.80	0.8770	Absent					
	666.30	0.9970	Present					
	695.00	0.9970	Absent					
	697.00	0.3190	Absent					
	720.50	0.5780	Absent					
	Total	3.7680	ABSENT	(	0.9970/	3.7680 =	26.4597 %)	0.00(
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT	(	0.9320/	2.7600 =	33.7681 %)	0.00(
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Absent					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT	(	0.8640/	1.8150 =	47.6033 %)	0.000
Te-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	PRESENT	(	0.0002/	0.0002 =	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.000
KR-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.000
Sb-129	544.70	0.1920	Absent					
	812.80	0.4600	Absent					
	914.60	0.2140	Present					
	1030.10	0.1350	Absent					
	Total	1.0010	ABSENT	(	0.2140/	1.0010 =	21.3786 %)	0.000
As-76	559.10	0.4500	Absent					
	657.03	0.0608	Present					
	Total	0.5108	ABSENT	(	0.0608/	0.5108 =	11.9029 %)	0.000
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					

	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.00
Ag-110m	657.75	0.9440	Present					
	677.60	0.1057	Absent					
	706.67	0.1631	Absent					
	763.93	0.2226	Absent					
	884.67	0.7278	Absent					
	937.48	0.3427	Absent					
	1384.27	0.2164	Absent					
	1505.00	0.1323	Absent					
	Total	2.8546	ABSENT	(	0.9440/	2.8546 =	33.0694 %)	0.00
Cs-137	661.65	0.8500	Present					
	Total	0.8500	PRESENT	(	0.8500/	0.8500 =	100.0000 %)	0.00
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.00

PEAK CONTRIBUTION CORRECTION

Pk# Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
None							

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
[illegible]-133m	233.20	2.34e+000	+-5.19e-001	5.42e+001	1 of 1	
[illegible]a-224	241.08		BKG	1.00e+012	1 of 1	
Ce-143	Average:	8.19e-001	+-1.22e-001	3.30e+001	2 of 3	4.09
	293.26	7.64e-001	+-1.22e-001			
	664.55	7.72e+000	+-1.37e+000			
Ag-113	298.40	3.76e+000	+-6.02e-001	5.37e+000	1 of 1	
Pt-197m	346.50	6.27e+000	+-6.63e-001	1.57e+000	1 of 1	
Bi-211	351.00		BKG	1.00e+012	1 of 1	
Tl-208	510.72		BKG	1.00e+012	2 of 2	
	583.14		BKG			
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	7.42e+001	+-1.72e+001	9.39e+004	1 of 1	
Cs-137	661.65	4.72e-001	+-8.39e-002	2.64e+005	1 of 1	47.17
K-40	1460.81	1.51e+001	+-1.19e+000	1.12e+013	1 of 1	
TOTAL:		1.03e+002 pCi /g			MPC Total:	51.27

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
609.18	1249.35	211	18	21	46	1.62	1.538e+001
910.32	1875.43	58	13	19	37	1.68	5.969e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-12

Sample Size	5.85e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-11-97 17:03	Counting Start.	10-11-97 17:03
Sampling Stop	.10-11-97 17:03	Live Time	3600 Sec
Current Date.	.10-14-97 10:32	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	186.67	370.95	50	29	51	360	0.71	NET < CL
2	239.16	480.09	503	33	43	236	1.12	a
3	241.98	485.95	93	24	39	206	1.32	b
4	295.84	597.92	79	23	39	191	1.00	
5	338.64	686.89	106	27	49	220	1.23	
6	352.21	715.11	159	23	35	155	1.02	
7	510.96	1045.15	111	19	29	95	2.67	
8	582.84	1194.60	175	20	30	88	1.61	
9	609.26	1249.52	144	18	26	73	1.32	
10	661.32	1357.75	41	15	27	68	1.87	
11	910.69	1876.19	103	15	21	44	1.79	
12	968.10	1995.56	71	16	27	63	1.87	
13	1459.16	3016.46	395	21	15	20	2.02	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-12

Sample Size . . . . . 5.85e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-11-97 17:03	Counting Start. 10-11-97 17:03
Sampling Stop 10-11-97 17:03	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:32	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
2	239.16	503	Xe-133m	233.20	0.1000	8.23e-003	9.94e-001	7.89e+000
2	239.16	503	Fr-223	234.60				
2	239.16	503	Th-227	236.00				
2	239.16	503	U-235	236.00	0.1100	8.23e-003	1.00e+000	7.13e+000
2	239.16	503	TH-232	238.63	0.4310	8.23e-003	1.01e+000	1.80e+000
3	241.98	93	Te-131m	240.93	0.0755	8.16e-003	9.89e-001	1.96e+000
3	241.98	93	Ra-224	241.08				
3	241.98	93	Xe-125	243.40	0.2871	8.16e-003	9.80e-001	5.20e-001
3	241.98	93	IN-116M	244.59	0.0038	8.16e-003	6.99e-001	5.50e+001
3	241.98	93	Eu-152	244.67	0.0772	8.16e-003	1.00e+000	1.89e+000
3	241.98	93	Sm-155	245.73	0.0373	8.16e-003	4.51e-001	8.69e+000
3	241.98	93	Xe-135	247.79	0.9000	8.16e-003	9.63e-001	1.69e-001
4	295.84	79	Ce-143	293.26	0.4200	6.99e-003	9.90e-001	3.49e-001
4	295.84	79	U-238	295.22	0.1920	6.99e-003	1.00e+000	7.53e-001
4	295.84	79	Ir-192	295.96	0.2872	6.99e-003	1.00e+000	5.05e-001
4	295.84	79	Tl-210	296.00				
4	295.84	79	Ag-113	298.40	0.0900	6.99e-003	9.38e-001	1.72e+000
4	295.84	79	TB-160	298.57	0.2740	6.99e-003	1.00e+000	5.29e-001
4	295.84	79	Pa-231	299.90				
4	295.84	79	Pa-233	300.10	0.0633	6.99e-003	9.99e-001	2.29e+000
4	295.84	79	Ga-67	300.20	0.1900	6.99e-003	9.96e-001	7.66e-001
5	338.64	106	Mg-27	332.73	0.0100	6.27e-003	2.25e-001	9.66e+001
5	338.64	106	Au-196	332.90	0.2300	6.27e-003	9.98e-001	9.46e-001
5	338.64	106	Te-131m	334.27	0.0952	6.27e-003	9.89e-001	2.31e+000
5	338.64	106	Np-239	334.30	0.0200	6.27e-003	9.94e-001	1.09e+001
5	338.64	106	In-115m	336.20	0.4590	6.27e-003	9.27e-001	5.10e-001
5	338.64	106	Ru-95	336.40	0.7100	6.27e-003	8.17e-001	3.74e-001
5	338.64	106	TH-232	338.40	0.1201	6.27e-003	1.01e+000	1.79e+000
5	338.64	106	Ra-223	338.60				
5	338.64	106	Ac-228	338.70				
5	338.64	106	Cs-136	340.60	0.4890	6.27e-003	9.99e-001	4.44e-001
5	338.64	106	Cs-136	340.60	0.4676	6.27e-003	9.99e-001	4.65e-001
5	338.64	106	HF-175	343.40	0.8692	6.27e-003	1.00e+000	2.50e-001

5	338.64	106	EU-152M	344.20	0.0250	6.27e-003	9.64e-001	9.01e+000
5	338.64	106	Eu-152	344.30	0.2720	6.27e-003	1.00e+000	7.98e-001
5	338.64	106	Cd-117	344.46	0.1769	6.27e-003	8.70e-001	1.41e+000
6	352.21	159	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	6.59e-001
6	352.21	159	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	3.75e+000
6	352.21	159	Na-24	346.55	0.0100	6.07e-003	9.77e-001	3.44e+001
6	352.21	159	Bi-211	351.00				
6	352.21	159	U-235	351.10	0.1200	6.07e-003	1.00e+000	2.80e+000
6	352.21	159	U-238	351.99	0.3710	6.07e-003	1.00e+000	9.04e-001
6	352.21	159	Au-196	355.70	0.8760	6.07e-003	9.98e-001	3.85e-001
6	352.21	159	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	5.43e-001
7	510.96	111	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	8.55e+000
7	510.96	111	Te-121	507.59	0.1767	4.43e-003	9.99e-001	1.82e+000
7	510.96	111	Tl-208	510.72				
7	510.96	111	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	2.16e+000
7	510.96	111	Annihila	511.00	1.0000	4.43e-003	1.00e+000	3.22e-001
7	510.96	111	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.25e+000
7	510.96	111	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	4.35e-001
7	510.96	111	KR-85	514.00	0.0041	4.43e-003	1.00e+000	7.84e+001
8	582.84	175	Tl-208	583.14				
8	582.84	175	TH-232	583.14	0.3090	3.96e-003	1.01e+000	1.82e+000
9	609.26	144	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	4.97e-001
9	609.26	144	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	6.05e+000
9	609.26	144	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	9.32e+000
9	609.26	144	Bi-214	609.30				
9	609.26	144	U-238	609.32	0.4609	3.81e-003	1.00e+000	1.05e+000
9	609.26	144	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	8.93e+000
9	609.26	144	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	5.20e-001
10	661.32	41	Cu-61	656.00	0.1170	3.55e-003	9.05e-001	1.40e+000
10	661.32	41	As-76	657.03	0.0608	3.55e-003	9.87e-001	2.47e+000
0	661.32	41	Ag-110m	657.75	0.9440	3.55e-003	1.00e+000	1.57e-001
10	661.32	41	Cs-137	661.65	0.8500	3.55e-003	1.00e+000	1.74e-001
10	661.32	41	Ce-143	664.55	0.0525	3.55e-003	9.90e-001	2.85e+000
10	661.32	41	Sb-126	666.30	0.9970	3.55e-003	9.99e-001	1.49e-001
10	661.32	41	I-126	667.00	0.3300	3.55e-003	9.99e-001	4.49e-001
11	910.69	103	TH-232	911.07	0.2900	2.70e-003	1.01e+000	1.67e+000
11	910.69	103	Ac-228	911.20				
11	910.69	103	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	2.47e+000
12	968.10	71	TB-160	962.36	0.1000	2.56e-003	1.00e+000	3.56e+000
12	968.10	71	EU-152M	963.50	0.1200	2.56e-003	9.64e-001	3.08e+000
12	968.10	71	Eu-152	964.00	0.1433	2.56e-003	1.00e+000	2.48e+000
12	968.10	71	Ac-228	964.40				
12	968.10	71	TB-160	966.17	0.2550	2.56e-003	1.00e+000	1.40e+000
12	968.10	71	Ac-228	968.80				
12	968.10	71	TH-232	968.90	0.1746	2.56e-003	1.01e+000	2.02e+000
13	1459.16	395	K-40	1460.81	0.1070	1.80e-003	1.00e+000	2.64e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	1.0239/	1.2813 =	79.9110 %)	0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					

	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT	(	1.3247/	1.4997 =	88.3310 %)	0.000
:-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.6200/	1.3051 =	47.5059 %)	0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(	0.2300/	1.4030 =	16.3934 %)	0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Present					
	966.17	0.2550	Present					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.6290/	1.3866 =	45.3628 %)	0.000
HF-175	89.36	0.0235	Absent					
	343.40	0.8692	Present					
	432.80	0.0156	Absent					
	Total	0.9083	PRESENT	(	0.8692/	0.9083 =	95.6952 %)	0.000
Ga-67	93.30	0.3800	Absent					
	184.60	0.2360	Absent					
	300.20	0.1900	Present					
	Total	0.8060	ABSENT	(	0.1900/	0.8060 =	23.5732 %)	0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Present					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.1707/	1.6635 =	10.2615 %)	0.000
Sm-155	104.30	0.7464	Absent					
	141.41	0.0202	Absent					
	245.73	0.0373	Present					
	Total	0.8039	ABSENT	(	0.0373/	0.8039 =	4.6425 %)	0.000
Np-239	106.10	0.2320	Absent					
	209.80	0.0410	Absent					

	228.10	0.1270	Absent						
	277.60	0.1420	Absent						
	315.90	0.0150	Absent						
	334.30	0.0200	Present						
	Total	0.5770	ABSENT	(	0.0200/	0.5770 =	3.4662 %)	0.000
-152M	121.78	0.0720	Absent						
	344.20	0.0250	Present						
	841.60	0.1470	Absent						
	963.50	0.1200	Present						
	Total	0.3640	ABSENT	(	0.1450/	0.3640 =	39.8352 %)	0.000
Eu-152	121.78	0.3068	Absent						
	244.67	0.0772	Present						
	344.30	0.2720	Present						
	778.90	0.1272	Absent						
	964.00	0.1433	Present						
	1085.80	0.1010	Absent						
	1112.07	0.1340	Absent						
	1408.08	0.2073	Absent						
	Total	1.3688	ABSENT	(	0.4925/	1.3688 =	35.9804 %)	0.000
IN-116M	137.92	0.0350	Absent						
	244.59	0.0038	Present						
	416.88	0.2937	Absent						
	463.13	0.0083	Absent						
	818.65	0.1372	Absent						
	1097.23	0.6791	Absent						
	1293.49	1.0000	Absent						
	1507.50	0.1186	Absent						
	1601.12	0.0107	Absent						
	1752.42	0.0289	Absent						
	2212.21	0.1858	Absent						
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
a-223	144.30	0.0001	Absent						
	154.30	0.0001	Absent						
	269.60	0.0001	Absent						
	338.60	0.0001	Unable to Calc						
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Mg-27	170.82	0.0070	Absent						
	332.73	0.0100	Unable to Calc						
	843.80	0.7140	Absent						
	1014.50	0.2860	Absent						
	Total	1.0170	ABSENT	(	0.0100/	1.0170 =	0.9833 %)	0.000
Sb-125	176.29	0.0630	Absent						
	380.51	0.0140	Absent						
	427.95	0.2960	Absent						
	463.51	0.1000	Absent						
	600.77	0.1840	Absent						
	606.82	0.0520	Present						
	636.15	0.1120	Absent						
	671.66	0.0180	Absent						
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Xe-125	188.43	0.5500	Absent						
	243.40	0.2871	Present						
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.000
Mo-101	191.93	0.1810	Absent						
	505.88	0.1135	Present						
	590.82	0.1930	Absent						
	695.53	0.0660	Absent						
	1012.35	0.1135	Absent						
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)	0.000
Ac-228	209.50	0.0001	Absent						

	338.70	0.0001	Unable to Calc					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Unable to Calc					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT	(	0.0004/	0.0006 =	66.6667 %)	0.000
Xe-133m	233.20	0.1000	Present					
	Total	0.1000	PRESENT	(	0.1000/	0.1000 =	100.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Xe-135	247.79	0.9000	Present					
	Total	0.9000	PRESENT	(	0.9000/	0.9000 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
Cd-117	273.28	0.2900	Absent					
	344.46	0.1769	Present					
	434.22	0.1047	Absent					
	1303.34	0.1827	Absent					
	1576.80	0.1119	Absent					
	Total	0.8662	ABSENT	(	0.1769/	0.8662 =	20.4225 %)	0.000
Pa-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
-61	283.70	0.1320	Absent					
	656.00	0.1170	Present					
	Total	0.2490	ABSENT	(	0.1170/	0.2490 =	46.9880 %)	0.000
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Present					
	721.96	0.0512	Absent					
	Total	0.5237	PRESENT	(	0.4725/	0.5237 =	90.2234 %)	0.000
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.3415/	1.9478 =	17.5326 %)	0.000
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT	(	0.0001/	0.0005 =	20.0000 %)	0.000
Ag-113	298.40	0.0900	Present					
	Total	0.0900	PRESENT	(	0.0900/	0.0900 =	100.0000 %)	0.000
Pa-233	300.10	0.0633	Present					
	311.90	0.3700	Absent					
	Total	0.4333	ABSENT	(	0.0633/	0.4333 =	14.6088 %)	0.000
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %)	0.000
u-196	332.90	0.2300	Present					
	355.70	0.8760	Present					
	Total	1.1060	PRESENT	(	1.1060/	1.1060 =	100.0000 %)	0.000

In-115m	336.20	0.4590	Present					
	Total	0.4590	PRESENT (	0.4590/	0.4590 =	100.0000 %)	0.000
Ru-95	336.40	0.7100	Present					
	1096.80	0.2100	Absent					
	Total	0.9200	ABSENT (	0.7100/	0.9200 =	77.1739 %)	0.000
ɜ-136	340.60	0.4890	Present					
	340.60	0.4676	Present					
	818.50	0.9970	Absent					
	818.50	0.9970	Absent					
	1048.07	0.7976	Absent					
	1048.10	0.7980	Absent					
	1235.34	0.1974	Absent					
	Total	4.7436	ABSENT (	0.9566/	4.7436 =	20.1661 %)	0.000
Pt-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT (	0.1110/	0.1110 =	100.0000 %)	0.000
Na-24	346.55	0.0100	Unable to Calc					
	857.55	0.0100	Absent					
	1368.53	1.0000	Absent					
	1732.10	0.0100	Absent					
	Total	1.0300	ABSENT (	0.0100/	1.0300 =	0.9709 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT (	0.0001/	0.0001 =	100.0000 %)	0.000
I-126	386.00	0.3400	Absent					
	667.00	0.3300	Present					
	Total	0.6700	ABSENT (	0.3300/	0.6700 =	49.2537 %)	0.000
Zn-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT (	0.2806/	2.6542 =	10.5719 %)	0.000
ɔb-126	414.80	0.8770	Absent					
	666.30	0.9970	Present					
	695.00	0.9970	Absent					
	697.00	0.3190	Absent					
	720.50	0.5780	Absent					
	Total	3.7680	ABSENT (	0.9970/	3.7680 =	26.4597 %)	0.000
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT (	0.9320/	2.7600 =	33.7681 %)	0.000
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Absent					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT (	0.8640/	1.8150 =	47.6033 %)	0.000
Te-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT (	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	PRESENT (	0.0002/	0.0002 =	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT (	1.0000/	1.0000 =	100.0000 %)	0.000
?-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT (	0.0041/	0.0041 =	100.0000 %)	0.000
ɔb-129	544.70	0.1920	Absent					
	812.80	0.4600	Absent					
	914.60	0.2140	Present					

	1030.10	0.1350	Absent					
	Total	1.0010	ABSENT	(	0.2140/	1.0010 =	21.3786 %)	0.000
As-76	559.10	0.4500	Absent					
	657.03	0.0608	Present					
	Total	0.5108	ABSENT	(	0.0608/	0.5108 =	11.9029 %)	0.000
-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Ag-110m	657.75	0.9440	Present					
	677.60	0.1057	Absent					
	706.67	0.1631	Absent					
	763.93	0.2226	Absent					
	884.67	0.7278	Absent					
	937.48	0.3427	Absent					
	1384.27	0.2164	Absent					
	1505.00	0.1323	Absent					
	Total	2.8546	ABSENT	(	0.9440/	2.8546 =	33.0694 %)	0.000
Cs-137	661.65	0.8500	Present					
	Total	0.8500	PRESENT	(	0.8500/	0.8500 =	100.0000 %)	0.000
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

			Reference Energy Line ===>>			Calculated Contribution		
Pk#	Old Area	Nuclide	Energy	cts/dis	Ref Area	Energy	cts/dis	New Area
2	503	TH-232	911.07	7.82e-004	103	238.63	3.55e-003	467
5	106	TH-232	911.07	7.82e-004	103	338.40	7.53e-004	99
8	175	TH-232	911.07	7.82e-004	103	583.14	1.22e-003	161

PEAK INTERFERENCE CORRECTION

Pk#	New Area	Nuclide	Energy	Status
2	36	Xe-133m	233.20	Deleted [Net < Critical Level]
5	7	Au-196	332.90	Deleted [Net < Critical Level]
5	7	In-115m	336.20	Deleted [Net < Critical Level]
5	7	HF-175	343.40	Deleted [Net < Critical Level]
8	14	Tl-208	583.14	Deleted [Net < Critical Level]

SECONDARY NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
-175	89.36	0.0235	Absent					
	343.40	0.8692	Absent					
	432.80	0.0156	Absent					
	Total	0.9083	ABSENT	(	0.0000/	0.9083 =	0.0000 %)	0.000

Xe-133m	233.20	0.1000	Absent						
	Total	0.1000	ABSENT	(	0.0000/	0.1000	=	0.0000 %)	0.000
Au-196	332.90	0.2300	Absent						
	355.70	0.8760	Present						
	Total	1.1060	ABSENT	(	0.8760/	1.1060	=	79.2043 %)	0.000
-115m	336.20	0.4590	Absent						
	Total	0.4590	ABSENT	(	0.0000/	0.4590	=	0.0000 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc						
	583.14	0.0001	Absent						
	Total	0.0002	ABSENT	(	0.0001/	0.0002	=	50.0000 %)	0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
TH-232	Average:	1.69e+000	+-9.12e-002	1.24e+014	5 of 6	0.00
	238.63	1.67e+000	+-1.18e-001			
	338.40	1.67e+000	+-4.65e-001			
	583.14	1.67e+000	+-2.12e-001			
	911.07	1.67e+000	+-2.44e-001			
	968.90	2.02e+000	+-4.57e-001			
Ra-224	241.08	BKG		1.00e+012	1 of 1	
Xe-135	247.79	1.69e-001	+-4.34e-002	9.10e+000	1 of 1	
Ce-143	Average:	3.72e-001	+-1.03e-001	3.30e+001	2 of 3	1.86
	293.26	3.49e-001	+-1.03e-001			
	664.55	2.85e+000	+-1.06e+000			
Ag-113	298.40	1.72e+000	+-5.09e-001	5.37e+000	1 of 1	
Pt-197m	346.50	3.75e+000	+-5.46e-001	1.57e+000	1 of 1	
-211	351.00	BKG		1.00e+012	1 of 1	
nihila	511.00	I.D.Only		1.00e+003	1 of 1	
KR-85	514.00	7.84e+001	+-1.35e+001	9.39e+004	1 of 1	
Cs-137	661.65	1.74e-001	+-6.49e-002	2.64e+005	1 of 1	17.42
K-40	1460.81	2.64e+001	+-1.43e+000	1.12e+013	1 of 1	
TOTAL:		1.13e+002 pCi /g			MPC Total:	19.29

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
609.26	1249.52	144	18	26	73	1.32	1.049e+001

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-13

Sample Size	6.45e+002 g	Spectrum File	.TEMP.SP(
Sampling Start.	.10-13-97 09:23	Counting Start.	10-13-97 09:2
Sampling Stop	.10-13-97 09:23	Live Time	3600 Sec
Current Date.	.10-14-97 10:35	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:4

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:4
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	78.42	145.91	63	41	74	668	0.69	NET < CL
2	186.89	371.42	92	41	75	567	1.38	
3	239.37	480.53	431	34	49	283	1.10	a
4	242.39	486.79	99	25	40	221	1.16	b
5	295.85	597.95	158	26	41	207	1.33	
6	338.72	687.07	82	24	42	197	1.42	
7	352.37	715.44	269	28	43	202	1.38	
8	511.07	1045.39	136	21	33	106	1.64	
9	583.12	1195.19	153	19	28	87	1.52	
10	609.27	1249.54	237	21	28	81	1.30	
11	726.62	1493.52	48	14	22	59	1.51	
12	910.45	1875.69	134	16	22	46	2.13	
13	968.03	1995.41	51	14	23	55	1.08	
14	1118.92	2309.11	56	15	26	54	1.88	
15	1458.98	3016.10	475	23	12	13	2.33	
16	1762.40	3646.91	44	10	15	16	1.65	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-13

Sample Size . . . . . 6.45e+002 g	Spectrum File . . . . . .TEMP.SP(
Sampling Start. 10-13-97 09:23	Counting Start. 10-13-97 09:2
Sampling Stop 10-13-97 09:23	Buildup Time. . . . . 0.00e+000 Hr
Current Date. 10-14-97 10:35	Decay Time. . . . . 0.00e+000 Hr
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.li
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:4

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
2	186.89	92	Mo-99	181.07	0.0629	9.65e-003	9.95e-001	1.77e+00
2	186.89	92	Cu-67	184.50	0.4700	9.65e-003	9.94e-001	2.37e-001
2	186.89	92	Ga-67	184.60	0.2360	9.65e-003	9.96e-001	4.72e-001
2	186.89	92	U-235	185.72	0.5400	9.65e-003	1.00e+000	2.06e-001
2	186.89	92	Ra-226	186.20				
2	186.89	92	Xe-125	188.43	0.5500	9.65e-003	9.80e-001	2.06e-001
2	186.89	92	In-114m	190.24	0.1564	9.65e-003	1.00e+000	7.10e-001
2	186.89	92	Pt-197	191.31	0.0350	9.65e-003	9.81e-001	3.23e+000
2	186.89	92	Hg-197	191.38	0.0057	9.65e-003	9.95e-001	1.96e+001
2	186.89	92	Zn-72	191.50	0.0940	9.65e-003	9.93e-001	1.19e+000
2	186.89	92	Mo-101	191.93	0.1810	9.65e-003	3.31e-001	1.85e+000
2	186.89	92	Fe-59	192.34	0.0311	9.65e-003	1.00e+000	3.57e+000
3	239.37	431	Fr-223	234.60				
3	239.37	431	Th-227	236.00				
3	239.37	431	U-235	236.00	0.1100	8.23e-003	1.00e+000	5.54e+000
3	239.37	431	TH-232	238.63	0.4310	8.23e-003	1.01e+000	1.40e+000
4	242.39	99	Te-131m	240.93	0.0755	8.15e-003	9.89e-001	1.89e+000
4	242.39	99	Ra-224	241.08				
4	242.39	99	Xe-125	243.40	0.2871	8.15e-003	9.80e-001	5.02e-001
4	242.39	99	IN-116M	244.59	0.0038	8.15e-003	6.99e-001	5.32e+001
4	242.39	99	Eu-152	244.67	0.0772	8.15e-003	1.00e+000	1.83e+000
4	242.39	99	Sm-155	245.73	0.0373	8.15e-003	4.51e-001	8.40e+000
4	242.39	99	Xe-135	247.79	0.9000	8.15e-003	9.63e-001	1.63e-001
4	242.39	99	Eu-154	248.00	0.0660	8.15e-003	1.00e+000	2.14e+000
5	295.85	158	Ce-143	293.26	0.4200	6.99e-003	9.90e-001	6.33e-001
5	295.85	158	U-238	295.22	0.1920	6.99e-003	1.00e+000	1.37e+000
5	295.85	158	Ir-192	295.96	0.2872	6.99e-003	1.00e+000	9.16e-001
5	295.85	158	Tl-210	296.00				
5	295.85	158	Ag-113	298.40	0.0900	6.99e-003	9.38e-001	3.11e+000
5	295.85	158	TB-160	298.57	0.2740	6.99e-003	1.00e+000	9.60e-001
5	295.85	158	Pa-231	299.90				
5	295.85	158	Pa-233	300.10	0.0633	6.99e-003	9.99e-001	4.16e+000
5	295.85	158	Ga-67	300.20	0.1900	6.99e-003	9.96e-001	1.39e+000

6	338.72	82	Mg-27	332.73	0.0100	6.27e-003	2.25e-001	6.78e-00
6	338.72	82	Au-196	332.90	0.2300	6.27e-003	9.98e-001	6.64e-00
6	338.72	82	Te-131m	334.27	0.0952	6.27e-003	9.89e-001	1.62e+00
6	338.72	82	Np-239	334.30	0.0200	6.27e-003	9.94e-001	7.66e+00
6	338.72	82	In-115m	336.20	0.4590	6.27e-003	9.27e-001	3.58e-00
6	338.72	82	Ru-95	336.40	0.7100	6.27e-003	8.17e-001	2.63e-00
6	338.72	82	TH-232	338.40	0.1201	6.27e-003	1.01e+000	1.26e+00
6	338.72	82	Ra-223	338.60				
6	338.72	82	Ac-228	338.70				
6	338.72	82	Cs-136	340.60	0.4890	6.27e-003	9.99e-001	3.12e-00
6	338.72	82	Cs-136	340.60	0.4676	6.27e-003	9.99e-001	3.26e-00
6	338.72	82	HF-175	343.40	0.8692	6.27e-003	1.00e+000	1.75e-00
6	338.72	82	EU-152M	344.20	0.0250	6.27e-003	9.64e-001	6.32e+00
6	338.72	82	Eu-152	344.30	0.2720	6.27e-003	1.00e+000	5.60e-00
6	338.72	82	Cd-117	344.46	0.1769	6.27e-003	8.70e-001	9.90e-00
7	352.37	269	Ho-167	346.50	0.5700	6.06e-003	8.96e-001	1.01e+00
7	352.37	269	Pt-197m	346.50	0.1110	6.06e-003	8.09e-001	5.75e+00
7	352.37	269	Na-24	346.55	0.0100	6.06e-003	9.77e-001	5.28e+00
7	352.37	269	Bi-211	351.00				
7	352.37	269	U-235	351.10	0.1200	6.06e-003	1.00e+000	4.30e+00
7	352.37	269	U-238	351.99	0.3710	6.06e-003	1.00e+000	1.39e+00
7	352.37	269	Au-196	355.70	0.8760	6.06e-003	9.98e-001	5.91e-001
7	352.37	269	Ba-133	356.00	0.6200	6.06e-003	1.00e+000	8.33e-001
8	511.07	136	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	9.51e+00
8	511.07	136	Te-121	507.59	0.1767	4.43e-003	9.99e-001	2.02e+00
8	511.07	136	Tl-208	510.72				
8	511.07	136	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	2.41e+00
8	511.07	136	Annihila	511.00	1.0000	4.43e-003	1.00e+000	3.57e-001
8	511.07	136	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.39e+00
8	511.07	136	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	4.83e-001
8	511.07	136	KR-85	514.00	0.0041	4.43e-003	1.00e+000	8.71e+001
9	583.12	153	Tl-208	583.14				
9	583.12	153	TH-232	583.14	0.3090	3.96e-003	1.01e+000	1.44e+000
10	609.27	237	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	7.42e-001
10	609.27	237	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	9.02e+000
10	609.27	237	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	1.39e+001
10	609.27	237	Bi-214	609.30				
10	609.27	237	U-238	609.32	0.4609	3.81e-003	1.00e+000	1.57e+000
10	609.27	237	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	1.33e+001
10	609.27	237	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	7.77e-001
11	726.62	48	Ce-143	721.96	0.0512	3.28e-003	9.90e-001	3.37e+000
11	726.62	48	Sb-124	722.78	0.1130	3.28e-003	1.00e+000	1.51e+000
11	726.62	48	Ag-108m	722.95	0.9230	3.28e-003	1.00e+000	1.85e-001
11	726.62	48	Eu-154	723.30	0.1970	3.28e-003	1.00e+000	8.65e-001
11	726.62	48	Zr-95	724.18	0.3399	3.28e-003	1.00e+000	5.02e-001
11	726.62	48	In-114m	725.24	0.2810	3.28e-003	1.00e+000	6.07e-001
11	726.62	48	Bi-212	727.30				
12	910.45	134	TH-232	911.07	0.2900	2.70e-003	1.01e+000	1.97e+000
12	910.45	134	Ac-228	911.20				
12	910.45	134	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	2.92e+000
13	968.03	51	TB-160	962.36	0.1000	2.56e-003	1.00e+000	2.32e+000
13	968.03	51	EU-152M	963.50	0.1200	2.56e-003	9.64e-001	2.01e+000
13	968.03	51	Eu-152	964.00	0.1433	2.56e-003	1.00e+000	1.62e+000
13	968.03	51	Ac-228	964.40				
13	968.03	51	TB-160	966.17	0.2550	2.56e-003	1.00e+000	9.10e-001
13	968.03	51	Ac-228	968.80				
13	968.03	51	TH-232	968.90	0.1746	2.56e-003	1.01e+000	1.32e+000
14	1118.92	56	Sn-127	1114.30	0.3800	2.26e-003	8.55e-001	8.87e-001
14	1118.92	56	Zn-65	1115.52	0.5075	2.26e-003	1.00e+000	5.68e-001
14	1118.92	56	Ni-65	1115.53	0.1513	2.26e-003	8.76e-001	2.18e+000

14	1118.92	56	Bi-214	1120.30				
14	1118.92	56	Sc-46	1120.51	1.0000	2.26e-003	1.00e+000	2.89e-00
14	1118.92	56	Ta-182	1121.28	0.3510	2.26e-003	1.00e+000	8.22e-00
15	1458.98	475	K-40	1460.81	0.1070	1.80e-003	1.00e+000	2.87e+00
16	1762.40	44	U-238	1764.28	0.1504	1.53e-003	1.00e+000	2.22e+00
16	1762.40	44	Bi-214	1764.50				

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Present					
	Total	1.2813	PRESENT	(	1.1743/	1.2813 =	91.6491 %)	0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT	(	1.3247/	1.4997 =	88.3310 %)	0.000
Hg-197	77.35	0.1900	Absent					
	80.20	0.0340	Absent					
	191.38	0.0057	Present					
	268.73	0.0005	Absent					
	Total	0.2302	ABSENT	(	0.0057/	0.2302 =	2.4761 %)	0.000
-197	77.35	0.1700	Absent					
	191.31	0.0350	Present					
	Total	0.2050	ABSENT	(	0.0350/	0.2050 =	17.0732 %)	0.000
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.6200/	1.3051 =	47.5059 %)	0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Present					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(	0.7700/	1.4030 =	54.8824 %)	0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Present					
	966.17	0.2550	Present					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.6290/	1.3866 =	45.3628 %)	0.000

HF-175	89.36	0.0235	Absent						
	343.40	0.8692	Present						
	432.80	0.0156	Absent						
	Total	0.9083	PRESENT	(	0.8692/	0.9083	=	95.6952 %)	0.000
Tl-67	93.30	0.1690	Absent						
	184.50	0.4700	Present						
	Total	0.6390	ABSENT	(	0.4700/	0.6390	=	73.5524 %)	0.000
Ga-67	93.30	0.3800	Absent						
	184.60	0.2360	Present						
	300.20	0.1900	Present						
	Total	0.8060	ABSENT	(	0.4260/	0.8060	=	52.8536 %)	0.000
Ta-182	100.10	0.1411	Absent						
	152.43	0.0720	Absent						
	222.10	0.0758	Absent						
	1121.28	0.3510	Present						
	1189.04	0.1636	Absent						
	1221.42	0.2713	Absent						
	1230.97	0.1155	Absent						
	Total	1.1903	ABSENT	(	0.3510/	1.1903	=	29.4884 %)	0.000
Te-131m	102.06	0.0790	Absent						
	149.71	0.2054	Absent						
	200.63	0.0752	Absent						
	240.93	0.0755	Present						
	334.27	0.0952	Present						
	452.30	0.0567	Absent						
	773.67	0.3800	Absent						
	782.49	0.0775	Absent						
	793.75	0.1380	Absent						
	822.78	0.0609	Absent						
	852.21	0.2093	Absent						
	1125.46	0.1137	Absent						
	1206.60	0.0971	Absent						
	Total	1.6635	ABSENT	(	0.1707/	1.6635	=	10.2615 %)	0.000
Sm-155	104.30	0.7464	Absent						
	141.41	0.0202	Absent						
	245.73	0.0373	Present						
	Total	0.8039	ABSENT	(	0.0373/	0.8039	=	4.6425 %)	0.000
Np-239	106.10	0.2320	Absent						
	209.80	0.0410	Absent						
	228.10	0.1270	Absent						
	277.60	0.1420	Absent						
	315.90	0.0150	Absent						
	334.30	0.0200	Present						
	Total	0.5770	ABSENT	(	0.0200/	0.5770	=	3.4662 %)	0.000
EU-152M	121.78	0.0720	Absent						
	344.20	0.0250	Present						
	841.60	0.1470	Absent						
	963.50	0.1200	Present						
	Total	0.3640	ABSENT	(	0.1450/	0.3640	=	39.8352 %)	0.000
Eu-152	121.78	0.3068	Absent						
	244.67	0.0772	Present						
	344.30	0.2720	Present						
	778.90	0.1272	Absent						
	964.00	0.1433	Present						
	1085.80	0.1010	Absent						
	1112.07	0.1340	Absent						
	1408.08	0.2073	Absent						
	Total	1.3688	ABSENT	(	0.4925/	1.3688	=	35.9804 %)	0.000
Eu-154	123.10	0.4047	Absent						
	248.00	0.0660	Present						

	723.30	0.1970	Present					
	873.19	0.1150	Absent					
	996.32	0.1029	Absent					
	1004.76	0.1736	Absent					
	1274.39	0.3550	Absent					
	Total	1.4143	ABSENT	(	0.2630/	1.4143 =	18.5976 %)	0.00
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.00(
Mo-99	140.51	0.0379	Absent					
	181.07	0.0629	Present					
	739.40	0.1260	Absent					
	Total	0.2268	ABSENT	(	0.0629/	0.2268 =	27.7266 %)	0.00(
Fe-59	142.65	0.0103	Absent					
	192.34	0.0311	Present					
	1099.22	0.5680	Absent					
	1291.56	0.4320	Absent					
	Total	1.0414	ABSENT	(	0.0311/	1.0414 =	2.9864 %)	0.00(
Ra-223	144.30	0.0001	Absent					
	154.30	0.0001	Absent					
	269.60	0.0001	Absent					
	338.60	0.0001	Unable to Calc					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.00(
Zn-72	144.70	0.8300	Absent					
	191.50	0.0940	Present					
	Total	0.9240	ABSENT	(	0.0940/	0.9240 =	10.1732 %)	0.000
Mg-27	170.82	0.0070	Absent					
	332.73	0.0100	Unable to Calc					
	843.80	0.7140	Absent					
	1014.50	0.2860	Absent					
	Total	1.0170	ABSENT	(	0.0100/	1.0170 =	0.9833 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Ra-226	186.20	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Xe-125	188.43	0.5500	Present					
	243.40	0.2871	Present					
	Total	0.8371	PRESENT	(	0.8371/	0.8371 =	100.0000 %)	0.000
In-114m	190.24	0.1564	Present					
	558.43	0.2850	Absent					
	725.24	0.2810	Present					
	1283.67	0.0003	Absent					
	1299.83	0.0012	Absent					
	Total	0.7239	ABSENT	(	0.4374/	0.7239 =	60.4227 %)	0.000

Mo-101	191.93	0.1810	Present					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.2945/	0.6670 =	44.1529 %)	0.00(
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Unable to Calc					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Unable to Calc					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT	(	0.0004/	0.0006 =	66.6667 %)	0.00(
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.00(
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.00(
Xe-135	247.79	0.9000	Present					
	Total	0.9000	PRESENT	(	0.9000/	0.9000 =	100.0000 %)	0.00(
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
Cd-117	273.28	0.2900	Absent					
	344.46	0.1769	Present					
	434.22	0.1047	Absent					
	1303.34	0.1827	Absent					
	1576.80	0.1119	Absent					
	Total	0.8662	ABSENT	(	0.1769/	0.8662 =	20.4225 %)	0.000
a-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Absent					
	721.96	0.0512	Present					
	Total	0.5237	PRESENT	(	0.4712/	0.5237 =	89.9752 %)	0.000
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.3415/	1.9478 =	17.5326 %)	0.000
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT	(	0.0001/	0.0005 =	20.0000 %)	0.000
Ag-113	298.40	0.0900	Present					
	Total	0.0900	PRESENT	(	0.0900/	0.0900 =	100.0000 %)	0.000
Pa-233	300.10	0.0633	Present					
	311.90	0.3700	Absent					
	Total	0.4333	ABSENT	(	0.0633/	0.4333 =	14.6088 %)	0.000
-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %)	0.000
Au-196	332.90	0.2300	Present					

	355.70	0.8760	Present					
	Total	1.1060	PRESENT	(	1.1060/	1.1060 =	100.0000 %)	0.00
In-115m	336.20	0.4590	Present					
	Total	0.4590	PRESENT	(	0.4590/	0.4590 =	100.0000 %)	0.00
-95	336.40	0.7100	Present					
	1096.80	0.2100	Absent					
	Total	0.9200	ABSENT	(	0.7100/	0.9200 =	77.1739 %)	0.00
Cs-136	340.60	0.4890	Present					
	340.60	0.4676	Present					
	818.50	0.9970	Absent					
	818.50	0.9970	Absent					
	1048.07	0.7976	Absent					
	1048.10	0.7980	Absent					
	1235.34	0.1974	Absent					
	Total	4.7436	ABSENT	(	0.9566/	4.7436 =	20.1661 %)	0.00
Pt-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.00
Na-24	346.55	0.0100	Unable to Calc					
	857.55	0.0100	Absent					
	1368.53	1.0000	Absent					
	1732.10	0.0100	Absent					
	Total	1.0300	ABSENT	(	0.0100/	1.0300 =	0.9709 %)	0.00
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.00
Zn-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.000
-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Present					
	Total	2.7600	ABSENT	(	1.8550/	2.7600 =	67.2102 %)	0.000
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Absent					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT	(	0.8640/	1.8150 =	47.6033 %)	0.000
Te-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	PRESENT	(	0.0002/	0.0002 =	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.000
KR-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.000
Sb-129	544.70	0.1920	Absent					
	812.80	0.4600	Absent					
	914.60	0.2140	Present					
	1030.10	0.1350	Absent					
	Total	1.0010	ABSENT	(	0.2140/	1.0010 =	21.3786 %)	0.000
-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					

	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.00
Sb-124	602.72	0.9830	Absent					
	645.82	0.0723	Absent					
	722.78	0.1130	Present					
	1691.02	0.4900	Absent					
	Total	1.6583	ABSENT	(	0.1130/	1.6583 =	6.8142 %)	0.00
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Unable to Calc					
	1764.50	0.0001	Unable to Calc					
	Total	0.0004	ABSENT	(	0.0003/	0.0004 =	75.0000 %)	0.00
Zr-95	724.18	0.3399	Present					
	756.72	0.5460	Absent					
	Total	0.8859	ABSENT	(	0.3399/	0.8859 =	38.3678 %)	0.00
Bi-212	727.30	0.0001	Unable to Calc					
	785.50	0.0001	Absent					
	1620.60	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.00
Sn-127	823.10	0.1060	Absent					
	1095.60	0.1940	Absent					
	1114.30	0.3800	Present					
	Total	0.6800	ABSENT	(	0.3800/	0.6800 =	55.8824 %)	0.000
Sc-46	889.25	1.0000	Absent					
	1120.51	1.0000	Present					
	2009.76	0.1000	Absent					
	Total	2.1000	ABSENT	(	1.0000/	2.1000 =	47.6190 %)	0.000
Zn-65	1115.52	0.5075	Present					
	Total	0.5075	PRESENT	(	0.5075/	0.5075 =	100.0000 %)	0.000
Ni-65	1115.53	0.1513	Present					
	1481.84	0.2350	Absent					
	Total	0.3863	ABSENT	(	0.1513/	0.3863 =	39.1665 %)	0.000
-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

			Reference Energy Line ===>>			Calculated Contribution		
Pk#	Old Area	Nuclide	Energy	cts/dis	Ref Area	Energy	cts/dis	New Area
5	158	Ce-143	721.96	1.68e-004	48	293.26	2.94e-003	158
5	0	U-238	609.32	1.76e-003	237	295.22	1.34e-003	0
6	82	TH-232	238.63	3.55e-003	431	338.40	7.53e-004	82
7	269	U-238	609.32	1.76e-003	237	351.99	2.25e-003	269
9	153	TH-232	238.63	3.55e-003	431	583.14	1.22e-003	149

PEAK INTERFERENCE CORRECTION

Pk#	New Area	Nuclide	Energy	Status
5	0	Ag-113	298.40	Deleted [Net < Critical Level]
6	0	Au-196	332.90	Deleted [Net < Critical Level]
6	0	In-115m	336.20	Deleted [Net < Critical Level]
6	0	HF-175	343.40	Deleted [Net < Critical Level]
7	0	Pt-197m	346.50	Deleted [Net < Critical Level]
7	0	Bi-211	351.00	Deleted [Net < Critical Level]
7	0	Au-196	355.70	Deleted [Net < Critical Level]
9	4	Tl-208	583.14	Deleted [Net < Critical Level]

SECONDARY NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status							Halflives
238	77.11	0.1070	Absent							
	295.22	0.1920	Absent							
	351.99	0.3710	Present							
	609.32	0.4609	Present							
	1764.28	0.1504	Present							
	Total	1.2813	ABSENT	(	0.9823/	1.2813	=	76.6643	%)	0.00(
HF-175	89.36	0.0235	Absent							
	343.40	0.8692	Absent							
	432.80	0.0156	Absent							
	Total	0.9083	ABSENT	(	0.0000/	0.9083	=	0.0000	%)	0.00(
Ag-113	298.40	0.0900	Absent							
	Total	0.0900	ABSENT	(	0.0000/	0.0900	=	0.0000	%)	0.00(
Au-196	332.90	0.2300	Absent							
	355.70	0.8760	Absent							
	Total	1.1060	ABSENT	(	0.0000/	1.1060	=	0.0000	%)	0.00(
In-115m	336.20	0.4590	Absent							
	Total	0.4590	ABSENT	(	0.0000/	0.4590	=	0.0000	%)	0.00(
Pt-197m	346.50	0.1110	Absent							
	Total	0.1110	ABSENT	(	0.0000/	0.1110	=	0.0000	%)	0.00(
Bi-211	351.00	0.0001	Absent							
	Total	0.0001	ABSENT	(	0.0000/	0.0001	=	0.0000	%)	0.00(
Tl-208	510.72	0.0001	Unable to Calc							
	583.14	0.0001	Absent							
	Total	0.0002	ABSENT	(	0.0001/	0.0002	=	50.0000	%)	0.00(

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
TH-232	Average:	1.46e+000	+-8.34e-002	1.24e+014	5 of 6	0.00
	238.63	1.40e+000	+-1.11e-001			
	338.40	1.26e+000	+-3.72e-001			
	583.14	1.41e+000	+-1.83e-001			
	911.07	1.97e+000	+-2.40e-001			
	968.90	1.32e+000	+-3.64e-001			
Ra-226	186.20		BKG	1.00e+012	1 of 1	
Xe-125	Average:	3.08e-001	+-7.36e-002	1.68e+001	2 of 2	0.00
	188.43	2.06e-001	+-9.09e-002			
	243.40	5.02e-001	+-1.25e-001			
Ra-224	241.08		BKG	1.00e+012	1 of 1	
Xe-135	247.79	1.63e-001	+-4.06e-002	9.10e+000	1 of 1	
Ce-143	Average:	6.65e-001	+-1.03e-001	3.30e+001	2 of 3	3.32
	293.26	6.33e-001	+-1.04e-001			
	721.96	3.37e+000	+-9.53e-001			
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	8.71e+001	+-1.33e+001	9.39e+004	1 of 1	
Zn-65	1115.52	5.68e-001	+-1.54e-001	5.86e+003	1 of 1	9.47
K-40	1460.81	2.87e+001	+-1.37e+000	1.12e+013	1 of 1	
)TAL:		1.19e+002 pCi /g			MPC Total:	12.80

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
352.37	715.44	269	28	43	202	1.38	1.232e+001
609.27	1249.54	237	21	28	81	1.30	1.727e+001
1762.40	3646.91	44	10	15	16	1.65	8.000e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-14

Sample Size	7.25e+002 g	Spectrum File	.TEMP.SP(
Sampling Start.	.10-13-97 11:15	Counting Start.	10-13-97 11:1!
Sampling Stop	.10-13-97 11:15	Live Time	3600 Se(
Current Date.	.10-14-97 10:37	Real Time	0 Se(

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:4'

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:4'
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 409!
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	78.17	145.37	115	39	67	627	1.02	
2	239.11	479.98	662	41	60	438	1.35	
3	295.77	597.77	72	29	52	275	1.03	
4	338.67	686.97	157	28	47	220	1.50	
5	352.01	714.70	147	24	36	164	1.20	
6	510.77	1044.76	145	22	35	133	1.85	
7	582.95	1194.82	214	22	31	108	1.74	
8	609.11	1249.22	135	18	26	73	1.25	
9	910.44	1875.68	179	19	25	58	1.68	
10	968.15	1995.66	112	17	26	64	2.03	
11	1458.87	3015.87	584	26	16	20	2.12	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-14

Sample Size . . . . . 7.25e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-13-97 11:15	Counting Start. 10-13-97 11:15
Sampling Stop 10-13-97 11:15	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:37	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	78.17	115	U-238	77.11	0.1070	6.28e-003	1.00e+000	1.77e+000
1	78.17	115	TH-232	77.11	0.1750	6.28e-003	1.01e+000	1.07e+000
1	78.17	115	Hg-197	77.35	0.1900	6.28e-003	9.95e-001	1.00e+000
1	78.17	115	Pt-197	77.35	0.1700	6.28e-003	9.81e-001	1.14e+000
1	78.17	115	Fr-223	80.00				
1	78.17	115	Ce-144	80.00	0.0200	6.28e-003	1.00e+000	9.48e+000
1	78.17	115	Hg-197	80.20	0.0340	6.28e-003	9.95e-001	5.61e+000
1	78.17	115	Hg-199m	80.20	0.1110	6.28e-003	3.31e-001	5.17e+000
1	78.17	115	Xe-133	80.99	0.3700	6.28e-003	9.97e-001	5.14e-001
1	78.17	115	Ba-133	81.00	0.3429	6.28e-003	1.00e+000	5.53e-001
1	78.17	115	U-235	81.07	0.1480	6.28e-003	1.00e+000	1.28e+000
1	78.17	115	U-235	83.78	0.2460	6.28e-003	1.00e+000	7.71e-001
2	239.11	662	Xe-133m	233.20	0.1000	8.24e-003	9.94e-001	8.38e+000
2	239.11	662	Fr-223	234.60				
2	239.11	662	Th-227	236.00				
2	239.11	662	U-235	236.00	0.1100	8.24e-003	1.00e+000	7.57e+000
2	239.11	662	TH-232	238.63	0.4310	8.24e-003	1.01e+000	1.91e+000
2	239.11	662	Te-131m	240.93	0.0755	8.24e-003	9.89e-001	1.12e+001
2	239.11	662	Ra-224	241.08				
2	239.11	662	Xe-125	243.40	0.2871	8.24e-003	9.80e-001	2.96e+000
2	239.11	662	IN-116M	244.59	0.0038	8.24e-003	6.99e-001	3.13e+002
2	239.11	662	Eu-152	244.67	0.0772	8.24e-003	1.00e+000	1.08e+001
3	295.77	72	Ce-143	293.26	0.4200	7.00e-003	9.90e-001	2.56e-001
3	295.77	72	U-238	295.22	0.1920	7.00e-003	1.00e+000	5.54e-001
3	295.77	72	Ir-192	295.96	0.2872	7.00e-003	1.00e+000	3.71e-001
3	295.77	72	Tl-210	296.00				
3	295.77	72	Ag-113	298.40	0.0900	7.00e-003	9.38e-001	1.26e+000
3	295.77	72	TB-160	298.57	0.2740	7.00e-003	1.00e+000	3.89e-001
3	295.77	72	Pa-231	299.90				
3	295.77	72	Pa-233	300.10	0.0633	7.00e-003	9.99e-001	1.68e+000
3	295.77	72	Ga-67	300.20	0.1900	7.00e-003	9.96e-001	5.63e-001
4	338.67	157	Mg-27	332.73	0.0100	6.27e-003	2.25e-001	1.15e+002
4	338.67	157	Au-196	332.90	0.2300	6.27e-003	9.98e-001	1.13e+000

4	338.67	157	Te-131m	334.27	0.0952	6.27e-003	9.89e-001	2.76e-00
4	338.67	157	Np-239	334.30	0.0200	6.27e-003	9.94e-001	1.31e+00
4	338.67	157	In-115m	336.20	0.4590	6.27e-003	9.27e-001	6.10e-00
4	338.67	157	Ru-95	336.40	0.7100	6.27e-003	8.17e-001	4.48e-00
4	338.67	157	TH-232	338.40	0.1201	6.27e-003	1.01e+000	2.14e+00
4	338.67	157	Ra-223	338.60				
4	338.67	157	Ac-228	338.70				
4	338.67	157	Cs-136	340.60	0.4890	6.27e-003	9.99e-001	5.31e-00
4	338.67	157	Cs-136	340.60	0.4676	6.27e-003	9.99e-001	5.55e-00
4	338.67	157	HF-175	343.40	0.8692	6.27e-003	1.00e+000	2.99e-00
4	338.67	157	EU-152M	344.20	0.0250	6.27e-003	9.64e-001	1.08e+00
4	338.67	157	Eu-152	344.30	0.2720	6.27e-003	1.00e+000	9.54e-00
4	338.67	157	Cd-117	344.46	0.1769	6.27e-003	8.70e-001	1.69e+00
5	352.01	147	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	4.91e-00
5	352.01	147	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	2.79e+00
5	352.01	147	Na-24	346.55	0.0100	6.07e-003	9.77e-001	2.57e+00
5	352.01	147	Bi-211	351.00				
5	352.01	147	U-235	351.10	0.1200	6.07e-003	1.00e+000	2.09e+00
5	352.01	147	U-238	351.99	0.3710	6.07e-003	1.00e+000	6.74e-00
5	352.01	147	Au-196	355.70	0.8760	6.07e-003	9.98e-001	2.87e-00
5	352.01	147	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	4.05e-00
6	510.77	145	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	9.01e+00
6	510.77	145	Te-121	507.59	0.1767	4.43e-003	9.99e-001	1.92e+00
6	510.77	145	Tl-208	510.72				
6	510.77	145	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	2.28e+00
6	510.77	145	Annihila	511.00	1.0000	4.43e-003	1.00e+000	3.39e-001
6	510.77	145	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.32e+00
6	510.77	145	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	4.58e-001
6	510.77	145	KR-85	514.00	0.0041	4.43e-003	1.00e+000	8.26e+001
7	582.95	214	Tl-208	583.14				
7	582.95	214	TH-232	583.14	0.3090	3.96e-003	1.01e+000	1.80e+00
8	609.11	135	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	3.76e-001
8	609.11	135	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	4.57e+000
8	609.11	135	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	7.05e+000
8	609.11	135	Bi-214	609.30				
8	609.11	135	U-238	609.32	0.4609	3.81e-003	1.00e+000	7.94e-001
8	609.11	135	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	6.75e+000
8	609.11	135	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	3.93e-001
9	910.44	179	TH-232	911.07	0.2900	2.70e-003	1.01e+000	2.35e+000
9	910.44	179	Ac-228	911.20				
9	910.44	179	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	3.47e+000
10	968.15	112	TB-160	962.36	0.1000	2.56e-003	1.00e+000	4.53e+000
10	968.15	112	EU-152M	963.50	0.1200	2.56e-003	9.64e-001	3.92e+000
10	968.15	112	Eu-152	964.00	0.1433	2.56e-003	1.00e+000	3.16e+000
10	968.15	112	Ac-228	964.40				
10	968.15	112	TB-160	966.17	0.2550	2.56e-003	1.00e+000	1.78e+000
10	968.15	112	Ac-228	968.80				
10	968.15	112	TH-232	968.90	0.1746	2.56e-003	1.01e+000	2.57e+000
11	1458.87	584	K-40	1460.81	0.1070	1.80e-003	1.00e+000	3.14e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status	Halflives
238	77.11	0.1070	Present	
	295.22	0.1920	Present	
	351.99	0.3710	Present	
	609.32	0.4609	Present	
	1764.28	0.1504	Absent	

	Total	1.2813	PRESENT	(	1.1309/	1.2813 =	88.2619 %)	0.000
TH-232	77.11	0.1750	Present					
	238.63	0.4310	Present					
	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT	(	1.4997/	1.4997 =	100.0000 %)	0.000
Hg-197	77.35	0.1900	Present					
	80.20	0.0340	Present					
	191.38	0.0057	Absent					
	268.73	0.0005	Absent					
	Total	0.2302	PRESENT	(	0.2240/	0.2302 =	97.3067 %)	0.000
Pt-197	77.35	0.1700	Present					
	191.31	0.0350	Absent					
	Total	0.2050	PRESENT	(	0.1700/	0.2050 =	82.9268 %)	0.000
Fr-223	80.00	0.0001	Unable to Calc					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	PRESENT	(	0.0002/	0.0002 =	100.0000 %)	0.000
Ce-144	80.00	0.0200	Present					
	133.54	0.1110	Absent					
	Total	0.1310	ABSENT	(	0.0200/	0.1310 =	15.2672 %)	0.000
Hg-199m	80.20	0.1110	Present					
	158.37	0.5840	Absent					
	374.10	0.1380	Absent					
	Total	0.8330	ABSENT	(	0.1110/	0.8330 =	13.3253 %)	0.000
Xe-133	80.99	0.3700	Present					
	Total	0.3700	PRESENT	(	0.3700/	0.3700 =	100.0000 %)	0.000
Ba-133	81.00	0.3429	Present					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.9629/	1.3051 =	73.7798 %)	0.000
U-235	81.07	0.1480	Present					
	83.78	0.2460	Present					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(	0.6240/	1.4030 =	44.4761 %)	0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Present					
	966.17	0.2550	Present					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.6290/	1.3866 =	45.3628 %)	0.000
HF-175	89.36	0.0235	Absent					
	343.40	0.8692	Present					
	432.80	0.0156	Absent					
	Total	0.9083	PRESENT	(	0.8692/	0.9083 =	95.6952 %)	0.000
-67	93.30	0.3800	Absent					
	184.60	0.2360	Absent					
	300.20	0.1900	Present					
	Total	0.8060	ABSENT	(	0.1900/	0.8060 =	23.5732 %)	0.000

Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Present					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.1707/	1.6635 =	10.2615 %)	0.000
Np-239	106.10	0.2320	Absent					
	209.80	0.0410	Absent					
	228.10	0.1270	Absent					
	277.60	0.1420	Absent					
	315.90	0.0150	Absent					
	334.30	0.0200	Present					
	Total	0.5770	ABSENT	(	0.0200/	0.5770 =	3.4662 %)	0.000
EU-152M	121.78	0.0720	Absent					
	344.20	0.0250	Present					
	841.60	0.1470	Absent					
	963.50	0.1200	Present					
	Total	0.3640	ABSENT	(	0.1450/	0.3640 =	39.8352 %)	0.000
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Present					
	778.90	0.1272	Absent					
	964.00	0.1433	Present					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.4925/	1.3688 =	35.9804 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Ra-223	144.30	0.0001	Absent					
	154.30	0.0001	Absent					
	269.60	0.0001	Absent					
	338.60	0.0001	Unable to Calc					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Mg-27	170.82	0.0070	Absent					
	332.73	0.0100	Unable to Calc					
	843.80	0.7140	Absent					
	1014.50	0.2860	Absent					
	Total	1.0170	ABSENT	(	0.0100/	1.0170 =	0.9833 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					

	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Xe-125	188.43	0.5500	Absent					
	243.40	0.2871	Present					
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.000
Mo-101	191.93	0.1810	Absent					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)	0.000
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Unable to Calc					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Unable to Calc					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT	(	0.0004/	0.0006 =	66.6667 %)	0.000
Xe-133m	233.20	0.1000	Present					
	Total	0.1000	PRESENT	(	0.1000/	0.1000 =	100.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
Cd-117	273.28	0.2900	Absent					
	344.46	0.1769	Present					
	434.22	0.1047	Absent					
	1303.34	0.1827	Absent					
	1576.80	0.1119	Absent					
	Total	0.8662	ABSENT	(	0.1769/	0.8662 =	20.4225 %)	0.000
Pa-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Absent					
	721.96	0.0512	Absent					
	Total	0.5237	PRESENT	(	0.4200/	0.5237 =	80.1986 %)	0.000
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.3415/	1.9478 =	17.5326 %)	0.000
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT	(	0.0001/	0.0005 =	20.0000 %)	0.000

Ag-113	298.40	0.0900	Present						
	Total	0.0900	PRESENT	(	0.0900/	0.0900	=	100.0000 %)	0.000
Pa-233	300.10	0.0633	Present						
	311.90	0.3700	Absent						
	Total	0.4333	ABSENT	(	0.0633/	0.4333	=	14.6088 %)	0.000
Lo-167	321.30	0.2390	Absent						
	346.50	0.5700	Present						
	Total	0.8090	ABSENT	(	0.5700/	0.8090	=	70.4574 %)	0.000
Au-196	332.90	0.2300	Present						
	355.70	0.8760	Present						
	Total	1.1060	PRESENT	(	1.1060/	1.1060	=	100.0000 %)	0.000
In-115m	336.20	0.4590	Present						
	Total	0.4590	PRESENT	(	0.4590/	0.4590	=	100.0000 %)	0.000
Ru-95	336.40	0.7100	Present						
	1096.80	0.2100	Absent						
	Total	0.9200	ABSENT	(	0.7100/	0.9200	=	77.1739 %)	0.000
Cs-136	340.60	0.4890	Present						
	340.60	0.4676	Present						
	818.50	0.9970	Absent						
	818.50	0.9970	Absent						
	1048.07	0.7976	Absent						
	1048.10	0.7980	Absent						
	1235.34	0.1974	Absent						
	Total	4.7436	ABSENT	(	0.9566/	4.7436	=	20.1661 %)	0.000
Pt-197m	346.50	0.1110	Present						
	Total	0.1110	PRESENT	(	0.1110/	0.1110	=	100.0000 %)	0.000
Na-24	346.55	0.0100	Unable to Calc						
	857.55	0.0100	Absent						
	1368.53	1.0000	Absent						
	1732.10	0.0100	Absent						
	Total	1.0300	ABSENT	(	0.0100/	1.0300	=	0.9709 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc						
	Total	0.0001	PRESENT	(	0.0001/	0.0001	=	100.0000 %)	0.000
Zn-71m	386.28	0.9200	Absent						
	487.34	0.6164	Absent						
	511.55	0.2806	Present						
	596.97	0.2760	Absent						
	620.19	0.5612	Absent						
	Total	2.6542	ABSENT	(	0.2806/	2.6542	=	10.5719 %)	0.000
Ag-108m	434.00	0.9050	Absent						
	614.37	0.9320	Present						
	722.95	0.9230	Absent						
	Total	2.7600	ABSENT	(	0.9320/	2.7600	=	33.7681 %)	0.000
Rh-106m	450.80	0.2450	Absent						
	511.70	0.8640	Present						
	616.10	0.2040	Absent						
	748.50	0.1950	Absent						
	1046.70	0.3070	Absent						
	Total	1.8150	ABSENT	(	0.8640/	1.8150	=	47.6033 %)	0.000
Te-121	507.59	0.1767	Present						
	573.14	0.8030	Absent						
	Total	0.9797	ABSENT	(	0.1767/	0.9797	=	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc						
	583.14	0.0001	Unable to Calc						
	Total	0.0002	PRESENT	(	0.0002/	0.0002	=	100.0000 %)	0.000
nihila	511.00	1.0000	Unable to Calc						
	Total	1.0000	PRESENT	(	1.0000/	1.0000	=	100.0000 %)	0.000
KR-85	514.00	0.0041	Present						
	Total	0.0041	PRESENT	(	0.0041/	0.0041	=	100.0000 %)	0.000
Sb-129	544.70	0.1920	Absent						

	812.80	0.4600	Absent					
	914.60	0.2140	Present					
	1030.10	0.1350	Absent					
	Total	1.0010	ABSENT	(	0.2140/	1.0010 =	21.3786 %)	0.000
-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

			Reference Energy Line ===>>			Calculated Contribution		
Pk#	Old Area	Nuclide	Energy	cts/dis	Ref Area	Energy	cts/dis	New Area
1	115	U-238	609.32	1.76e-003	135	77.11	6.72e-004	52
1	63	TH-232	911.07	7.83e-004	179	77.11	1.10e-003	63
2	662	TH-232	911.07	7.83e-004	179	238.63	3.55e-003	662
3	72	U-238	609.32	1.76e-003	135	295.22	1.34e-003	72
4	157	TH-232	911.07	7.83e-004	179	338.40	7.53e-004	157
5	147	U-238	609.32	1.76e-003	135	351.99	2.25e-003	147
7	214	TH-232	911.07	7.83e-004	179	583.14	1.22e-003	214

PEAK INTERFERENCE CORRECTION

Pk#	New Area	Nuclide	Energy	Status
1	0	Hg-197	77.35	Deleted [Net < Critical Level]
1	0	Pt-197	77.35	Deleted [Net < Critical Level]
1	0	Fr-223	80.00	Deleted [Net < Critical Level]
1	0	Hg-197	80.20	Deleted [Net < Critical Level]
1	0	Xe-133	80.99	Deleted [Net < Critical Level]
2	0	Xe-133m	233.20	Deleted [Net < Critical Level]
2	0	Fr-223	234.60	Deleted [Net < Critical Level]
2	0	Ra-224	241.08	Deleted [Net < Critical Level]
3	0	Ce-143	293.26	Deleted [Net < Critical Level]
3	0	Ag-113	298.40	Deleted [Net < Critical Level]
4	0	Au-196	332.90	Deleted [Net < Critical Level]
4	0	In-115m	336.20	Deleted [Net < Critical Level]
4	0	HF-175	343.40	Deleted [Net < Critical Level]
5	0	Pt-197m	346.50	Deleted [Net < Critical Level]
5	0	Bi-211	351.00	Deleted [Net < Critical Level]
5	0	Au-196	355.70	Deleted [Net < Critical Level]
7	0	Tl-208	583.14	Deleted [Net < Critical Level]

SECONDARY NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status	Halflives

Hg-197	77.35	0.1900	Absent					
	80.20	0.0340	Absent					
	191.38	0.0057	Absent					
	268.73	0.0005	Absent					
	Total	0.2302	ABSENT	(	0.0000/	0.2302 =	0.0000 %)	0.00
-197	77.35	0.1700	Absent					
	191.31	0.0350	Absent					
	Total	0.2050	ABSENT	(	0.0000/	0.2050 =	0.0000 %)	0.00
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0000/	0.0002 =	0.0000 %)	0.00
Xe-133	80.99	0.3700	Absent					
	Total	0.3700	ABSENT	(	0.0000/	0.3700 =	0.0000 %)	0.00
HF-175	89.36	0.0235	Absent					
	343.40	0.8692	Absent					
	432.80	0.0156	Absent					
	Total	0.9083	ABSENT	(	0.0000/	0.9083 =	0.0000 %)	0.00
Xe-133m	233.20	0.1000	Absent					
	Total	0.1000	ABSENT	(	0.0000/	0.1000 =	0.0000 %)	0.00
Ra-224	241.08	0.0001	Absent					
	Total	0.0001	ABSENT	(	0.0000/	0.0001 =	0.0000 %)	0.00
Ce-143	293.26	0.4200	Absent					
	664.55	0.0525	Absent					
	721.96	0.0512	Absent					
	Total	0.5237	ABSENT	(	0.0000/	0.5237 =	0.0000 %)	0.00
Ag-113	298.40	0.0900	Absent					
	Total	0.0900	ABSENT	(	0.0000/	0.0900 =	0.0000 %)	0.000
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Absent					
	Total	1.1060	ABSENT	(	0.0000/	1.1060 =	0.0000 %)	0.000
-115m	336.20	0.4590	Absent					
	Total	0.4590	ABSENT	(	0.0000/	0.4590 =	0.0000 %)	0.000
Pt-197m	346.50	0.1110	Absent					
	Total	0.1110	ABSENT	(	0.0000/	0.1110 =	0.0000 %)	0.000
Bi-211	351.00	0.0001	Absent					
	Total	0.0001	ABSENT	(	0.0000/	0.0001 =	0.0000 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)	Halflife (hrs)	Peaks Found	MPC Fraction
U-238	Average:	7.17e-001 +-7.14e-002	4.12e+013	4 of 5	0.00
	77.11	7.99e-001 +-6.00e-001			
	295.22	5.54e-001 +-2.22e-001			
	351.99	6.74e-001 +-1.08e-001			
	609.32	7.94e-001 +-1.07e-001			
TH-232	Average:	1.91e+000 +-8.57e-002	1.24e+014	6 of 6	0.00
	77.11	5.88e-001 +-3.64e-001			
	238.63	1.91e+000 +-1.20e-001			
	338.40	2.14e+000 +-3.78e-001			
	583.14	1.80e+000 +-1.86e-001			
	911.07	2.35e+000 +-2.44e-001			
	968.90	2.57e+000 +-3.95e-001			
Annihila	511.00	I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	8.26e+001 +-1.27e+001	9.39e+004	1 of 1	

K-40	1460.81	3.14e+001	+-1.37e+000	1.12e+013	1 of 1

TOTAL: 1.17e+002 pCi /g MPC Total: 0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-15

Sample Size	5.70e+002 g	Spectrum File	.TEMP.SP
Sampling Start.	.10-13-97 17:52	Counting Start.	10-13-97 17:5
Sampling Stop	.10-13-97 17:52	Live Time	3600 Se
Current Date.	.10-14-97 10:40	Real Time	0 Se

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:4

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:4
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 409
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	76.26	141.41	83	32	53	427	0.59	a
2	78.45	145.97	94	37	64	533	0.82	b
3	94.29	178.89	72	38	68	572	0.93	
4	239.44	480.67	559	36	50	261	1.14	a
5	242.56	487.14	110	25	40	203	1.53	b
6	295.77	597.78	136	29	49	260	1.08	
7	338.69	687.02	109	26	46	209	1.39	
8	352.62	715.96	265	28	43	183	1.24	
9	511.39	1046.04	168	21	31	99	1.82	
10	583.28	1195.51	173	21	30	92	1.51	
11	609.40	1249.81	200	21	29	90	1.55	
12	727.16	1494.63	46	15	27	66	1.21	
13	910.79	1876.40	131	15	20	39	1.53	
14	968.53	1996.44	66	14	21	44	1.54	
15	1459.30	3016.75	376	22	19	28	1.76	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-15

Sample Size . . . . . 5.70e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-13-97 17:52	Counting Start. 10-13-97 17:52
Sampling Stop 10-13-97 17:52	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 10:40	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	76.26	83	U-238	77.11	0.1070	5.99e-003	1.00e+000	1.70e+000
1	76.26	83	TH-232	77.11	0.1750	5.99e-003	1.01e+000	1.03e+000
1	76.26	83	Hg-197	77.35	0.1900	5.99e-003	9.95e-001	9.66e-001
1	76.26	83	Pt-197	77.35	0.1700	5.99e-003	9.81e-001	1.09e+000
2	78.45	94	Fr-223	80.00				
2	78.45	94	Ce-144	80.00	0.0200	6.32e-003	1.00e+000	9.79e+000
2	78.45	94	Hg-197	80.20	0.0340	6.32e-003	9.95e-001	5.79e+000
2	78.45	94	Hg-199m	80.20	0.1110	6.32e-003	3.31e-001	5.33e+000
2	78.45	94	Xe-133	80.99	0.3700	6.32e-003	9.97e-001	5.31e-001
2	78.45	94	Ba-133	81.00	0.3429	6.32e-003	1.00e+000	5.71e-001
2	78.45	94	U-235	81.07	0.1480	6.32e-003	1.00e+000	1.32e+000
2	78.45	94	U-235	83.78	0.2460	6.32e-003	1.00e+000	7.96e-001
2	78.45	94	Th-228	84.40				
3	94.29	72	Lu-176	88.35				
3	94.29	72	Ra-221	89.00				
3	94.29	72	HF-175	89.36	0.0235	8.42e-003	1.00e+000	4.79e+000
3	94.29	72	Th-234	92.80				
3	94.29	72	Cu-67	93.30	0.1690	8.42e-003	9.94e-001	6.70e-001
3	94.29	72	Ga-67	93.30	0.3800	8.42e-003	9.96e-001	2.98e-001
3	94.29	72	Gd-153	97.43	0.2730	8.42e-003	1.00e+000	4.13e-001
3	94.29	72	Pt-195m	98.90	0.1110	8.42e-003	9.96e-001	1.02e+000
3	94.29	72	Ac-225	99.80				
3	94.29	72	Ta-182	100.10	0.1411	8.42e-003	1.00e+000	7.98e-001
4	239.44	559	Fr-223	234.60				
4	239.44	559	Th-227	236.00				
4	239.44	559	U-235	236.00	0.1100	8.23e-003	1.00e+000	8.14e+000
4	239.44	559	TH-232	238.63	0.4310	8.23e-003	1.01e+000	2.06e+000
4	239.44	559	Te-131m	240.93	0.0755	8.23e-003	9.89e-001	1.20e+001
5	242.56	110	Ra-224	241.08				
5	242.56	110	Xe-125	243.40	0.2871	8.15e-003	9.80e-001	6.32e-001
5	242.56	110	IN-116M	244.59	0.0038	8.15e-003	6.99e-001	6.69e+001
5	242.56	110	Eu-152	244.67	0.0772	8.15e-003	1.00e+000	2.30e+000
5	242.56	110	Sm-155	245.73	0.0373	8.15e-003	4.51e-001	1.06e+001

5	242.56	110	Xe-135	247.79	0.9000	8.15e-003	9.63e-001	2.05e-00
5	242.56	110	Eu-154	248.00	0.0660	8.15e-003	1.00e+000	2.69e+00
6	295.77	136	Ce-143	293.26	0.4200	7.00e-003	9.90e-001	6.16e-00
6	295.77	136	U-238	295.22	0.1920	7.00e-003	1.00e+000	1.33e+00
6	295.77	136	Ir-192	295.96	0.2872	7.00e-003	1.00e+000	8.92e-00
6	295.77	136	Tl-210	296.00				
6	295.77	136	Ag-113	298.40	0.0900	7.00e-003	9.38e-001	3.03e+00
6	295.77	136	TB-160	298.57	0.2740	7.00e-003	1.00e+000	9.35e-00
6	295.77	136	Pa-231	299.90				
6	295.77	136	Pa-233	300.10	0.0633	7.00e-003	9.99e-001	4.05e+00
6	295.77	136	Ga-67	300.20	0.1900	7.00e-003	9.96e-001	1.35e+00
7	338.69	109	Mg-27	332.73	0.0100	6.27e-003	2.25e-001	1.02e+00
7	338.69	109	Au-196	332.90	0.2300	6.27e-003	9.98e-001	9.98e-00
7	338.69	109	Te-131m	334.27	0.0952	6.27e-003	9.89e-001	2.43e+00
7	338.69	109	Np-239	334.30	0.0200	6.27e-003	9.94e-001	1.15e+00
7	338.69	109	In-115m	336.20	0.4590	6.27e-003	9.27e-001	5.39e-00
7	338.69	109	Ru-95	336.40	0.7100	6.27e-003	8.17e-001	3.95e-00
7	338.69	109	TH-232	338.40	0.1201	6.27e-003	1.01e+000	1.89e+00
7	338.69	109	Ra-223	338.60				
7	338.69	109	Ac-228	338.70				
7	338.69	109	Cs-136	340.60	0.4890	6.27e-003	9.99e-001	4.69e-00
7	338.69	109	Cs-136	340.60	0.4676	6.27e-003	9.99e-001	4.91e-00
7	338.69	109	HF-175	343.40	0.8692	6.27e-003	1.00e+000	2.64e-00
7	338.69	109	EU-152M	344.20	0.0250	6.27e-003	9.64e-001	9.51e+00
7	338.69	109	Eu-152	344.30	0.2720	6.27e-003	1.00e+000	8.42e-00
7	338.69	109	Cd-117	344.46	0.1769	6.27e-003	8.70e-001	1.49e+00
8	352.62	265	Bi-211	351.00				
8	352.62	265	U-235	351.10	0.1200	6.06e-003	1.00e+000	4.80e+00
8	352.62	265	U-238	351.99	0.3710	6.06e-003	1.00e+000	1.55e+00
8	352.62	265	Au-196	355.70	0.8760	6.06e-003	9.98e-001	6.59e-00
8	352.62	265	Ba-133	356.00	0.6200	6.06e-003	1.00e+000	9.29e-00
9	511.39	168	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	1.33e+00
9	511.39	168	Te-121	507.59	0.1767	4.43e-003	9.99e-001	2.83e+00
9	511.39	168	Tl-208	510.72				
9	511.39	168	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	3.36e+00
9	511.39	168	Annihila	511.00	1.0000	4.43e-003	1.00e+000	5.00e-001
9	511.39	168	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.94e+000
9	511.39	168	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	6.76e-001
9	511.39	168	KR-85	514.00	0.0041	4.43e-003	1.00e+000	1.22e+002
10	583.28	173	Tl-208	583.14				
10	583.28	173	TH-232	583.14	0.3090	3.96e-003	1.01e+000	1.85e+000
11	609.40	200	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	7.09e-001
11	609.40	200	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	8.62e+000
11	609.40	200	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	1.33e+001
11	609.40	200	Bi-214	609.30				
11	609.40	200	U-238	609.32	0.4609	3.81e-003	1.00e+000	1.50e+000
11	609.40	200	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	1.27e+001
11	609.40	200	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	7.42e-001
12	727.16	46	Ce-143	721.96	0.0512	3.27e-003	9.90e-001	3.65e+000
12	727.16	46	Sb-124	722.78	0.1130	3.27e-003	1.00e+000	1.64e+000
12	727.16	46	Ag-108m	722.95	0.9230	3.27e-003	1.00e+000	2.00e-001
12	727.16	46	Eu-154	723.30	0.1970	3.27e-003	1.00e+000	9.39e-001
12	727.16	46	Zr-95	724.18	0.3399	3.27e-003	1.00e+000	5.44e-001
12	727.16	46	In-114m	725.24	0.2810	3.27e-003	1.00e+000	6.59e-001
12	727.16	46	Bi-212	727.30				
13	910.79	131	TH-232	911.07	0.2900	2.70e-003	1.01e+000	2.19e+000
13	910.79	131	Ac-228	911.20				
13	910.79	131	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	3.23e+000
14	968.53	66	EU-152M	963.50	0.1200	2.56e-003	9.64e-001	2.94e+000
14	968.53	66	Eu-152	964.00	0.1433	2.56e-003	1.00e+000	2.37e+000

14	968.53	66	Ac-228	964.40				
14	968.53	66	TB-160	966.17	0.2550	2.56e-003	1.00e+000	1.33e-000
14	968.53	66	Ac-228	968.80				
14	968.53	66	TH-232	968.90	0.1746	2.56e-003	1.01e+000	1.93e+000
5	1459.30	376	K-40	1460.81	0.1070	1.80e-003	1.00e+000	2.57e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Present					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	PRESENT (	1.1309/	1.2813 =	88.2619 %)		0.000
TH-232	77.11	0.1750	Present					
	238.63	0.4310	Present					
	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT (	1.4997/	1.4997 =	100.0000 %)		0.000
Hg-197	77.35	0.1900	Present					
	80.20	0.0340	Present					
	191.38	0.0057	Absent					
	268.73	0.0005	Absent					
	Total	0.2302	PRESENT (	0.2240/	0.2302 =	97.3067 %)		0.000
Pt-197	77.35	0.1700	Present					
	191.31	0.0350	Absent					
	Total	0.2050	PRESENT (	0.1700/	0.2050 =	82.9268 %)		0.000
Fr-223	80.00	0.0001	Unable to Calc					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	PRESENT (	0.0002/	0.0002 =	100.0000 %)		0.000
Ce-144	80.00	0.0200	Present					
	133.54	0.1110	Absent					
	Total	0.1310	ABSENT (	0.0200/	0.1310 =	15.2672 %)		0.000
Hg-199m	80.20	0.1110	Present					
	158.37	0.5840	Absent					
	374.10	0.1380	Absent					
	Total	0.8330	ABSENT (	0.1110/	0.8330 =	13.3253 %)		0.000
Xe-133	80.99	0.3700	Present					
	Total	0.3700	PRESENT (	0.3700/	0.3700 =	100.0000 %)		0.000
Ba-133	81.00	0.3429	Present					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT (	0.9629/	1.3051 =	73.7798 %)		0.000
U-235	81.07	0.1480	Present					
	83.78	0.2460	Present					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT (	0.6240/	1.4030 =	44.4761 %)		0.000
Th-228	84.40	0.0001	Unable to Calc					
	Total	0.0001	PRESENT (	0.0001/	0.0001 =	100.0000 %)		0.000

TB-160	86.30	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Absent					
	966.17	0.2550	Present					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.5290/	1.3866 =	38.1509 %)	0.00(
Lu-176	88.35	0.0001	Unable to Calc					
	201.80	0.0001	Absent					
	306.90	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.00(
Ra-221	89.00	0.0001	Unable to Calc					
	152.00	0.0001	Absent					
	176.00	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.00(
HF-175	89.36	0.0235	Present					
	343.40	0.8692	Present					
	432.80	0.0156	Absent					
	Total	0.9083	PRESENT	(	0.8927/	0.9083 =	98.2825 %)	0.00(
Th-234	92.80	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.00(
Cu-67	93.30	0.1690	Present					
	184.50	0.4700	Absent					
	Total	0.6390	ABSENT	(	0.1690/	0.6390 =	26.4476 %)	0.00(
Ga-67	93.30	0.3800	Present					
	184.60	0.2360	Absent					
	300.20	0.1900	Present					
	Total	0.8060	ABSENT	(	0.5700/	0.8060 =	70.7196 %)	0.000
Gd-153	97.43	0.2730	Present					
	103.18	0.1992	Absent					
	Total	0.4722	ABSENT	(	0.2730/	0.4722 =	57.8145 %)	0.000
Pt-195m	98.90	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.000
Ac-225	99.80	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Ta-182	100.10	0.1411	Present					
	152.43	0.0720	Absent					
	222.10	0.0758	Absent					
	1121.28	0.3510	Absent					
	1189.04	0.1636	Absent					
	1221.42	0.2713	Absent					
	1230.97	0.1155	Absent					
	Total	1.1903	ABSENT	(	0.1411/	1.1903 =	11.8542 %)	0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Present					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.1707/	1.6635 =	10.2615 %)	0.000

Sm-155	104.30	0.7464	Absent					
	141.41	0.0202	Absent					
	245.73	0.0373	Present					
	Total	0.8039	ABSENT	(	0.0373/	0.8039 =	4.6425 %)	0.00
)-239	106.10	0.2320	Absent					
	209.80	0.0410	Absent					
	228.10	0.1270	Absent					
	277.60	0.1420	Absent					
	315.90	0.0150	Absent					
	334.30	0.0200	Present					
	Total	0.5770	ABSENT	(	0.0200/	0.5770 =	3.4662 %)	0.00
EU-152M	121.78	0.0720	Absent					
	344.20	0.0250	Present					
	841.60	0.1470	Absent					
	963.50	0.1200	Present					
	Total	0.3640	ABSENT	(	0.1450/	0.3640 =	39.8352 %)	0.00
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Present					
	778.90	0.1272	Absent					
	964.00	0.1433	Present					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.4925/	1.3688 =	35.9804 %)	0.00
Eu-154	123.10	0.4047	Absent					
	248.00	0.0660	Present					
	723.30	0.1970	Present					
	873.19	0.1150	Absent					
	996.32	0.1029	Absent					
	1004.76	0.1736	Absent					
	1274.39	0.3550	Absent					
	Total	1.4143	ABSENT	(	0.2630/	1.4143 =	18.5976 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Ra-223	144.30	0.0001	Absent					
	154.30	0.0001	Absent					
	269.60	0.0001	Absent					
	338.60	0.0001	Unable to Calc					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Mg-27	170.82	0.0070	Absent					
	332.73	0.0100	Unable to Calc					
	843.80	0.7140	Absent					
	1014.50	0.2860	Absent					
	Total	1.0170	ABSENT	(	0.0100/	1.0170 =	0.9833 %)	0.000
)-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					

	606.32	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.00
-125	188.43	0.5500	Absent					
	243.40	0.2871	Present					
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.00
In-114m	190.24	0.1564	Absent					
	558.43	0.2850	Absent					
	725.24	0.2810	Present					
	1283.67	0.0003	Absent					
	1299.83	0.0012	Absent					
	Total	0.7239	ABSENT	(	0.2810/	0.7239 =	38.8175 %)	0.00
Mo-101	191.93	0.1810	Absent					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)	0.00
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Unable to Calc					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Unable to Calc					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT	(	0.0004/	0.0006 =	66.6667 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
e-135	247.79	0.9000	Present					
	Total	0.9000	PRESENT	(	0.9000/	0.9000 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
Cd-117	273.28	0.2900	Absent					
	344.46	0.1769	Present					
	434.22	0.1047	Absent					
	1303.34	0.1827	Absent					
	1576.80	0.1119	Absent					
	Total	0.8662	ABSENT	(	0.1769/	0.8662 =	20.4225 %)	0.000
Pa-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Absent					
	721.96	0.0512	Present					
	Total	0.5237	PRESENT	(	0.4712/	0.5237 =	89.9752 %)	0.000
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.3415/	1.9478 =	17.5326 %)	0.000
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					

	1060.00	0.0001	Absent						
	1210.00	0.0001	Absent						
	1310.00	0.0001	Absent						
	Total	0.0005	ABSENT	(	0.0001/	0.0005	=	20.0000 %)	0.00
I-113	298.40	0.0900	Present						
	Total	0.0900	PRESENT	(	0.0900/	0.0900	=	100.0000 %)	0.00
Pa-233	300.10	0.0633	Present						
	311.90	0.3700	Absent						
	Total	0.4333	ABSENT	(	0.0633/	0.4333	=	14.6088 %)	0.00
Au-196	332.90	0.2300	Present						
	355.70	0.8760	Present						
	Total	1.1060	PRESENT	(	1.1060/	1.1060	=	100.0000 %)	0.00
In-115m	336.20	0.4590	Present						
	Total	0.4590	PRESENT	(	0.4590/	0.4590	=	100.0000 %)	0.00
Ru-95	336.40	0.7100	Present						
	1096.80	0.2100	Absent						
	Total	0.9200	ABSENT	(	0.7100/	0.9200	=	77.1739 %)	0.00
Cs-136	340.60	0.4890	Present						
	340.60	0.4676	Present						
	818.50	0.9970	Absent						
	818.50	0.9970	Absent						
	1048.07	0.7976	Absent						
	1048.10	0.7980	Absent						
	1235.34	0.1974	Absent						
	Total	4.7436	ABSENT	(	0.9566/	4.7436	=	20.1661 %)	0.00
Bi-211	351.00	0.0001	Unable to Calc						
	Total	0.0001	PRESENT	(	0.0001/	0.0001	=	100.0000 %)	0.00
Zn-71m	386.28	0.9200	Absent						
	487.34	0.6164	Absent						
	511.55	0.2806	Present						
	596.97	0.2760	Absent						
	620.19	0.5612	Absent						
	Total	2.6542	ABSENT	(	0.2806/	2.6542	=	10.5719 %)	0.00
Ag-108m	434.00	0.9050	Absent						
	614.37	0.9320	Present						
	722.95	0.9230	Present						
	Total	2.7600	ABSENT	(	1.8550/	2.7600	=	67.2102 %)	0.000
Rh-106m	450.80	0.2450	Absent						
	511.70	0.8640	Present						
	616.10	0.2040	Absent						
	748.50	0.1950	Absent						
	1046.70	0.3070	Absent						
	Total	1.8150	ABSENT	(	0.8640/	1.8150	=	47.6033 %)	0.000
Te-121	507.59	0.1767	Present						
	573.14	0.8030	Absent						
	Total	0.9797	ABSENT	(	0.1767/	0.9797	=	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc						
	583.14	0.0001	Unable to Calc						
	Total	0.0002	PRESENT	(	0.0002/	0.0002	=	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc						
	Total	1.0000	PRESENT	(	1.0000/	1.0000	=	100.0000 %)	0.000
KR-85	514.00	0.0041	Present						
	Total	0.0041	PRESENT	(	0.0041/	0.0041	=	100.0000 %)	0.000
Sb-129	544.70	0.1920	Absent						
	812.80	0.4600	Absent						
	914.60	0.2140	Present						
	1030.10	0.1350	Absent						
	Total	1.0010	ABSENT	(	0.2140/	1.0010	=	21.3786 %)	0.000
Cs-134	563.26	0.0838	Absent						
	569.29	0.1543	Absent						

	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
-124	602.72	0.9830	Absent					
	645.82	0.0723	Absent					
	722.78	0.1130	Present					
	1691.02	0.4900	Absent					
	Total	1.6583	ABSENT	(	0.1130/	1.6583 =	6.8142 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Zr-95	724.18	0.3399	Present					
	756.72	0.5460	Absent					
	Total	0.8859	ABSENT	(	0.3399/	0.8859 =	38.3678 %)	0.000
Bi-212	727.30	0.0001	Unable to Calc					
	785.50	0.0001	Absent					
	1620.60	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.000
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

			Reference Energy Line ===>>			Calculated Contribution		
Pk#	Old Area	Nuclide	Energy	cts/dis	Ref Area	Energy	cts/dis	New Area
1	83	U-238	609.32	1.76e-003	200	77.11	6.41e-004	73
1	10	TH-232	911.07	7.82e-004	131	77.11	1.05e-003	10
4	559	TH-232	911.07	7.82e-004	131	238.63	3.55e-003	559
6	136	Ce-143	721.96	1.68e-004	46	293.26	2.94e-003	136
6	0	U-238	609.32	1.76e-003	200	295.22	1.34e-003	0
7	109	TH-232	911.07	7.82e-004	131	338.40	7.53e-004	109
8	265	U-238	609.32	1.76e-003	200	351.99	2.25e-003	256
10	173	TH-232	911.07	7.82e-004	131	583.14	1.22e-003	173

PEAK INTERFERENCE CORRECTION

Pk#	New Area	Nuclide	Energy	Status
1	0	Hg-197	77.35	Deleted [Net < Critical Level]
1	0	Pt-197	77.35	Deleted [Net < Critical Level]
4	0	Fr-223	234.60	Deleted [Net < Critical Level]
6	0	Ag-113	298.40	Deleted [Net < Critical Level]
7	0	Au-196	332.90	Deleted [Net < Critical Level]
7	0	In-115m	336.20	Deleted [Net < Critical Level]
7	0	HF-175	343.40	Deleted [Net < Critical Level]
8	9	Bi-211	351.00	Deleted [Net < Critical Level]
8	9	Au-196	355.70	Deleted [Net < Critical Level]
10	0	Tl-208	583.14	Deleted [Net < Critical Level]

SECONDARY NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status	Halflives

U-238	77.11	0.1070	Present					
	295.22	0.1920	Absent					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	0.9389/	1.2813 =	73.2771 %)	0.00
Hg-197	77.35	0.1900	Absent					
	80.20	0.0340	Present					
	191.38	0.0057	Absent					
	268.73	0.0005	Absent					
	Total	0.2302	ABSENT	(	0.0340/	0.2302 =	14.7698 %)	0.00
Pt-197	77.35	0.1700	Absent					
	191.31	0.0350	Absent					
	Total	0.2050	ABSENT	(	0.0000/	0.2050 =	0.0000 %)	0.00
Fr-223	80.00	0.0001	Unable to Calc					
	234.60	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.00
HF-175	89.36	0.0235	Present					
	343.40	0.8692	Absent					
	432.80	0.0156	Absent					
	Total	0.9083	ABSENT	(	0.0235/	0.9083 =	2.5873 %)	0.00
Ag-113	298.40	0.0900	Absent					
	Total	0.0900	ABSENT	(	0.0000/	0.0900 =	0.0000 %)	0.00
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Absent					
	Total	1.1060	ABSENT	(	0.0000/	1.1060 =	0.0000 %)	0.00
In-115m	336.20	0.4590	Absent					
	Total	0.4590	ABSENT	(	0.0000/	0.4590 =	0.0000 %)	0.00
Bi-211	351.00	0.0001	Absent					
	Total	0.0001	ABSENT	(	0.0000/	0.0001 =	0.0000 %)	0.00
-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.00

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
TH-232	Average:	1.91e+000	+-9.49e-002	1.24e+014	6 of 6	0.00
	77.11	1.24e-001	+-4.00e-001			
	238.63	2.06e+000	+-1.31e-001			
	338.40	1.89e+000	+-4.55e-001			
	583.14	1.85e+000	+-2.20e-001			
	911.07	2.19e+000	+-2.57e-001			
	968.90	1.93e+000	+-4.03e-001			
Xe-133	80.99	5.31e-001	+-2.10e-001	1.26e+002	1 of 1	
Th-228	84.40		BKG	1.00e+012	1 of 1	
Th-234	92.80		BKG	1.00e+012	1 of 1	
Pt-195m	98.90	1.02e+000	+-5.42e-001	9.65e+001	1 of 1	
Ac-225	99.80		BKG	1.00e+012	1 of 1	
Ra-224	241.08		BKG	1.00e+012	1 of 1	
Xe-135	247.79	2.05e-001	+-4.60e-002	9.10e+000	1 of 1	
Ce-143	Average:	6.50e-001	+-1.28e-001	3.30e+001	2 of 3	3.25
	293.26	6.16e-001	+-1.29e-001			
	721.96	3.65e+000	+-1.22e+000			
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	1.22e+002	+-1.54e+001	9.39e+004	1 of 1	
K-40	1460.81	2.57e+001	+-1.48e+000	1.12e+013	1 of 1	

TOTAL: 1.52e+002 pCi /g MPC Total: 3.25

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
352.62	715.96	265	28	43	183	1.24	1.215e+001
609.40	1249.81	200	21	29	90	1.55	1.458e+001

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : SC-16

Sample Size	7.05e+002 g	Spectrum File	.TEMP.SP(
Sampling Start.	.10-14-97 12:05	Counting Start.	10-14-97 12:0
Sampling Stop	.10-14-97 12:05	Live Time	3600 Sec
Current Date.	.10-14-97 14:15	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	77.96	144.95	119	32	51	480	1.20	
2	93.49	177.24	86	41	72	633	0.84	
3	186.28	370.14	123	36	62	467	0.95	
4	238.81	479.35	481	34	48	267	1.11	a
5	241.80	485.58	107	27	46	258	1.16	b
6	295.14	596.46	182	26	41	210	1.15	
7	338.55	686.70	102	27	46	232	1.51	
8	351.80	714.27	332	29	43	182	1.28	
9	510.59	1044.39	119	20	32	110	2.40	
10	582.62	1194.13	139	20	30	98	1.49	
11	608.75	1248.46	279	22	25	72	1.48	
12	859.54	1769.86	35	15	27	58	1.85	
13	910.09	1874.95	119	17	26	62	1.78	
14	968.00	1995.34	58	13	20	45	0.87	
15	1118.67	2308.59	79	15	22	50	1.45	
16	1458.59	3015.27	473	23	16	22	1.98	
17	1761.85	3645.77	57	9	11	9	1.56	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: SC-16

Sample Size . . . . . 7.05e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-14-97 12:05	Counting Start. 10-14-97 12:05
Sampling Stop 10-14-97 12:05	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-14-97 14:15	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	77.96	119	U-238	77.11	0.1070	6.25e-003	1.00e+000	1.89e+000
1	77.96	119	TH-232	77.11	0.1750	6.25e-003	1.01e+000	1.15e+000
1	77.96	119	Hg-197	77.35	0.1900	6.25e-003	9.95e-001	1.07e+000
1	77.96	119	Pt-197	77.35	0.1700	6.25e-003	9.81e-001	1.22e+000
1	77.96	119	Fr-223	80.00				
1	77.96	119	Ce-144	80.00	0.0200	6.25e-003	1.00e+000	1.01e+001
1	77.96	119	Hg-197	80.20	0.0340	6.25e-003	9.95e-001	6.00e+000
1	77.96	119	Hg-199m	80.20	0.1110	6.25e-003	3.31e-001	5.52e+000
1	77.96	119	Xe-133	80.99	0.3700	6.25e-003	9.97e-001	5.50e-001
1	77.96	119	Ba-133	81.00	0.3429	6.25e-003	1.00e+000	5.92e-001
1	77.96	119	U-235	81.07	0.1480	6.25e-003	1.00e+000	1.37e+000
1	77.96	119	U-235	83.78	0.2460	6.25e-003	1.00e+000	8.25e-001
2	93.49	86	Sm-156	87.60	0.2400	8.33e-003	9.64e-001	4.75e-001
2	93.49	86	Sn-126	87.60	0.3700	8.33e-003	1.00e+000	2.97e-001
2	93.49	86	Lu-176	88.35				
2	93.49	86	Ra-221	89.00				
2	93.49	86	HF-175	89.36	0.0235	8.33e-003	1.00e+000	4.68e+000
2	93.49	86	Th-234	92.80				
2	93.49	86	Cu-67	93.30	0.1690	8.33e-003	9.94e-001	6.54e-001
2	93.49	86	Ga-67	93.30	0.3800	8.33e-003	9.96e-001	2.91e-001
2	93.49	86	Gd-153	97.43	0.2730	8.33e-003	1.00e+000	4.03e-001
2	93.49	86	Pt-195m	98.90	0.1110	8.33e-003	9.96e-001	9.94e-001
3	186.28	123	Mo-99	181.07	0.0629	9.67e-003	9.95e-001	2.17e+000
3	186.28	123	Cu-67	184.50	0.4700	9.67e-003	9.94e-001	2.90e-001
3	186.28	123	Ga-67	184.60	0.2360	9.67e-003	9.96e-001	5.77e-001
3	186.28	123	U-235	185.72	0.5400	9.67e-003	1.00e+000	2.51e-001
3	186.28	123	Ra-226	186.20				
3	186.28	123	Xe-125	188.43	0.5500	9.67e-003	9.80e-001	2.51e-001
3	186.28	123	In-114m	190.24	0.1564	9.67e-003	1.00e+000	8.67e-001
3	186.28	123	Pt-197	191.31	0.0350	9.67e-003	9.81e-001	3.95e+000
3	186.28	123	Hg-197	191.38	0.0057	9.67e-003	9.95e-001	2.39e+001
3	186.28	123	Zn-72	191.50	0.0940	9.67e-003	9.93e-001	1.45e+000
3	186.28	123	Mo-101	191.93	0.1810	9.67e-003	3.31e-001	2.26e+000

4	238.81	481	Xe-133m	233.20	0.1000	8.24e-003	9.94e-001	6.25e-000
4	238.81	481	Fr-223	234.60				
4	238.81	481	Th-227	236.00				
4	238.81	481	U-235	236.00	0.1100	8.24e-003	1.00e+000	5.65e+000
4	238.81	481	TH-232	238.63	0.4310	8.24e-003	1.01e+000	1.43e+000
5	241.80	107	Te-131m	240.93	0.0755	8.17e-003	9.89e-001	1.87e+000
5	241.80	107	Ra-224	241.08				
5	241.80	107	Xe-125	243.40	0.2871	8.17e-003	9.80e-001	4.96e-001
5	241.80	107	IN-116M	244.59	0.0038	8.17e-003	6.99e-001	5.25e+001
5	241.80	107	Eu-152	244.67	0.0772	8.17e-003	1.00e+000	1.81e+000
5	241.80	107	Sm-155	245.73	0.0373	8.17e-003	4.51e-001	8.30e+000
5	241.80	107	Xe-135	247.79	0.9000	8.17e-003	9.63e-001	1.61e-001
6	295.14	182	Ce-143	293.26	0.4200	7.01e-003	9.90e-001	6.65e-001
6	295.14	182	U-238	295.22	0.1920	7.01e-003	1.00e+000	1.44e+000
6	295.14	182	Ir-192	295.96	0.2872	7.01e-003	1.00e+000	9.63e-001
6	295.14	182	Tl-210	296.00				
6	295.14	182	Ag-113	298.40	0.0900	7.01e-003	9.38e-001	3.28e+000
6	295.14	182	TB-160	298.57	0.2740	7.01e-003	1.00e+000	1.01e+000
6	295.14	182	Pa-231	299.90				
6	295.14	182	Pa-233	300.10	0.0633	7.01e-003	9.99e-001	4.37e+000
6	295.14	182	Ga-67	300.20	0.1900	7.01e-003	9.96e-001	1.46e+000
7	338.55	102	Mg-27	332.73	0.0100	6.27e-003	2.25e-001	7.71e+001
7	338.55	102	Au-196	332.90	0.2300	6.27e-003	9.98e-001	7.55e-001
7	338.55	102	Te-131m	334.27	0.0952	6.27e-003	9.89e-001	1.84e+000
7	338.55	102	Np-239	334.30	0.0200	6.27e-003	9.94e-001	8.72e+000
7	338.55	102	In-115m	336.20	0.4590	6.27e-003	9.27e-001	4.07e-001
7	338.55	102	Ru-95	336.40	0.7100	6.27e-003	8.17e-001	2.99e-001
7	338.55	102	TH-232	338.40	0.1201	6.27e-003	1.01e+000	1.43e+000
7	338.55	102	Ra-223	338.60				
7	338.55	102	Ac-228	338.70				
7	338.55	102	Cs-136	340.60	0.4890	6.27e-003	9.99e-001	3.55e-001
7	338.55	102	Cs-136	340.60	0.4676	6.27e-003	9.99e-001	3.71e-001
7	338.55	102	HF-175	343.40	0.8692	6.27e-003	1.00e+000	1.99e-001
7	338.55	102	EU-152M	344.20	0.0250	6.27e-003	9.64e-001	7.19e+000
7	338.55	102	Eu-152	344.30	0.2720	6.27e-003	1.00e+000	6.37e-001
7	338.55	102	Cd-117	344.46	0.1769	6.27e-003	8.70e-001	1.13e+000
8	351.80	332	HF-181	345.95	0.1400	6.07e-003	1.00e+000	4.16e+000
8	351.80	332	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	1.14e+000
8	351.80	332	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	6.48e+000
8	351.80	332	Na-24	346.55	0.0100	6.07e-003	9.77e-001	5.96e+001
8	351.80	332	Bi-211	351.00				
8	351.80	332	U-235	351.10	0.1200	6.07e-003	1.00e+000	4.85e+000
8	351.80	332	U-238	351.99	0.3710	6.07e-003	1.00e+000	1.57e+000
8	351.80	332	Au-196	355.70	0.8760	6.07e-003	9.98e-001	6.66e-001
8	351.80	332	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	9.39e-001
9	510.59	119	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	7.60e+000
9	510.59	119	Te-121	507.59	0.1767	4.43e-003	9.99e-001	1.62e+000
9	510.59	119	Tl-208	510.72				
9	510.59	119	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	1.92e+000
9	510.59	119	Annihila	511.00	1.0000	4.43e-003	1.00e+000	2.86e-001
9	510.59	119	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.11e+000
9	510.59	119	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	3.87e-001
9	510.59	119	KR-85	514.00	0.0041	4.43e-003	1.00e+000	6.97e+001
10	582.62	139	Tl-208	583.14				
10	582.62	139	TH-232	583.14	0.3090	3.96e-003	1.01e+000	1.20e+000
11	608.75	279	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	7.98e-001
11	608.75	279	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	9.71e+000
11	608.75	279	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	1.50e+001
11	608.75	279	Bi-214	609.30				
11	608.75	279	U-238	609.32	0.4609	3.81e-003	1.00e+000	1.69e+000

11	608.75	279	Ir-192	612.45	0.0543	3.81e-003	1.00e-000	1.43e-00
11	608.75	279	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	8.36e-00
12	859.54	35	Na-24	857.55	0.0100	2.84e-003	9.77e-001	1.34e+00
12	859.54	35	Cd-117m	860.47	0.0835	2.84e-003	9.02e-001	1.74e+00
13	910.09	119	TH-232	911.07	0.2900	2.70e-003	1.01e+000	1.60e+00
13	910.09	119	Ac-228	911.20				
13	910.09	119	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	2.37e+00
14	968.00	58	TB-160	962.36	0.1000	2.56e-003	1.00e+000	2.41e+00
14	968.00	58	EU-152M	963.50	0.1200	2.56e-003	9.64e-001	2.09e+00
14	968.00	58	Eu-152	964.00	0.1433	2.56e-003	1.00e+000	1.68e+00
14	968.00	58	Ac-228	964.40				
14	968.00	58	TB-160	966.17	0.2550	2.56e-003	1.00e+000	9.46e-00
14	968.00	58	Ac-228	968.80				
14	968.00	58	TH-232	968.90	0.1746	2.56e-003	1.01e+000	1.37e+00
15	1118.67	79	Sn-127	1114.30	0.3800	2.26e-003	8.55e-001	1.15e+00
15	1118.67	79	Zn-65	1115.52	0.5075	2.26e-003	1.00e+000	7.34e-00
15	1118.67	79	Ni-65	1115.53	0.1513	2.26e-003	8.76e-001	2.81e+00
15	1118.67	79	Bi-214	1120.30				
15	1118.67	79	Sc-46	1120.51	1.0000	2.26e-003	1.00e+000	3.72e-00
15	1118.67	79	Ta-182	1121.28	0.3510	2.26e-003	1.00e+000	1.06e+00
16	1458.59	473	K-40	1460.81	0.1070	1.80e-003	1.00e+000	2.62e+00
17	1761.85	57	U-238	1764.28	0.1504	1.53e-003	1.00e+000	2.63e+00
17	1761.85	57	Bi-214	1764.50				

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Present					
	295.22	0.1920	Present					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Present					
	Total	1.2813	PRESENT	(1.2813/	1.2813 =	100.0000 %)		0.000
TH-232	77.11	0.1750	Present					
	238.63	0.4310	Present					
	338.40	0.1201	Present					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Present					
	Total	1.4997	PRESENT	(1.4997/	1.4997 =	100.0000 %)		0.000
Hg-197	77.35	0.1900	Present					
	80.20	0.0340	Present					
	191.38	0.0057	Present					
	268.73	0.0005	Absent					
	Total	0.2302	PRESENT	(0.2297/	0.2302 =	99.7828 %)		0.000
Pt-197	77.35	0.1700	Present					
	191.31	0.0350	Present					
	Total	0.2050	PRESENT	(0.2050/	0.2050 =	100.0000 %)		0.000
Fr-223	80.00	0.0001	Unable to Calc					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	PRESENT	(0.0002/	0.0002 =	100.0000 %)		0.000
Ce-144	80.00	0.0200	Present					
	133.54	0.1110	Absent					
	Total	0.1310	ABSENT	(0.0200/	0.1310 =	15.2672 %)		0.000
Ag-199m	80.20	0.1110	Present					
	158.37	0.5840	Absent					
	374.10	0.1380	Absent					
	Total	0.8330	ABSENT	(0.1110/	0.8330 =	13.3253 %)		0.000

Xe-133	80.99	0.3700	Present					
	Total	0.3700	PRESENT	(	0.3700/	0.3700 =	100.0000 %)	0.00
Ba-133	81.00	0.3429	Present					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.9629/	1.3051 =	73.7798 %)	0.00
U-235	81.07	0.1480	Present					
	83.78	0.2460	Present					
	143.76	0.1050	Absent					
	185.72	0.5400	Present					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	PRESENT	(	1.1640/	1.4030 =	82.9651 %)	0.00
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Present					
	876.37	0.3000	Absent					
	962.36	0.1000	Present					
	966.17	0.2550	Present					
	1177.95	0.1550	Absent					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.6290/	1.3866 =	45.3628 %)	0.00
Sn-126	86.90	0.0890	Absent					
	87.60	0.3700	Present					
	Total	0.4590	PRESENT	(	0.3700/	0.4590 =	80.6100 %)	0.00
Sm-156	87.60	0.2400	Present					
	165.80	0.1100	Absent					
	204.00	0.2100	Absent					
	Total	0.5600	ABSENT	(	0.2400/	0.5600 =	42.8571 %)	0.00
Lu-176	88.35	0.0001	Unable to Calc					
	201.80	0.0001	Absent					
	306.90	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.00
Ra-221	89.00	0.0001	Unable to Calc					
	152.00	0.0001	Absent					
	176.00	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.00
HF-175	89.36	0.0235	Present					
	343.40	0.8692	Present					
	432.80	0.0156	Absent					
	Total	0.9083	PRESENT	(	0.8927/	0.9083 =	98.2825 %)	0.00
Th-234	92.80	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.00
Cu-67	93.30	0.1690	Present					
	184.50	0.4700	Present					
	Total	0.6390	PRESENT	(	0.6390/	0.6390 =	100.0000 %)	0.00
Ga-67	93.30	0.3800	Present					
	184.60	0.2360	Present					
	300.20	0.1900	Present					
	Total	0.8060	PRESENT	(	0.8060/	0.8060 =	100.0000 %)	0.00
Gd-153	97.43	0.2730	Present					
	103.18	0.1992	Absent					
	Total	0.4722	ABSENT	(	0.2730/	0.4722 =	57.8145 %)	0.00
Pt-195m	98.90	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.00
Ta-182	100.10	0.1411	Absent					

	152.43	0.0720	Absent						
	222.10	0.0758	Absent						
	1121.28	0.3510	Present						
	1189.04	0.1636	Absent						
	1221.42	0.2713	Absent						
	1230.97	0.1155	Absent						
	Total	1.1903	ABSENT	(	0.3510/	1.1903 =	29.4884 %)	0.00(	
Te-131m	102.06	0.0790	Absent						
	149.71	0.2054	Absent						
	200.63	0.0752	Absent						
	240.93	0.0755	Present						
	334.27	0.0952	Present						
	452.30	0.0567	Absent						
	773.67	0.3800	Absent						
	782.49	0.0775	Absent						
	793.75	0.1380	Absent						
	822.78	0.0609	Absent						
	852.21	0.2093	Absent						
	1125.46	0.1137	Absent						
	1206.60	0.0971	Absent						
	Total	1.6635	ABSENT	(	0.1707/	1.6635 =	10.2615 %)	0.00(	
Sm-155	104.30	0.7464	Absent						
	141.41	0.0202	Absent						
	245.73	0.0373	Present						
	Total	0.8039	ABSENT	(	0.0373/	0.8039 =	4.6425 %)	0.00(	
Np-239	106.10	0.2320	Absent						
	209.80	0.0410	Absent						
	228.10	0.1270	Absent						
	277.60	0.1420	Absent						
	315.90	0.0150	Absent						
	334.30	0.0200	Present						
	Total	0.5770	ABSENT	(	0.0200/	0.5770 =	3.4662 %)	0.00(	
EU-152M	121.78	0.0720	Absent						
	344.20	0.0250	Present						
	841.60	0.1470	Absent						
	963.50	0.1200	Present						
	Total	0.3640	ABSENT	(	0.1450/	0.3640 =	39.8352 %)	0.000	
Eu-152	121.78	0.3068	Absent						
	244.67	0.0772	Present						
	344.30	0.2720	Present						
	778.90	0.1272	Absent						
	964.00	0.1433	Present						
	1085.80	0.1010	Absent						
	1112.07	0.1340	Absent						
	1408.08	0.2073	Absent						
	Total	1.3688	ABSENT	(	0.4925/	1.3688 =	35.9804 %)	0.000	
HF-181	133.05	0.4300	Absent						
	136.25	0.0610	Absent						
	345.95	0.1400	Present						
	482.16	0.8600	Absent						
	Total	1.4910	ABSENT	(	0.1400/	1.4910 =	9.3897 %)	0.000	
IN-116M	137.92	0.0350	Absent						
	244.59	0.0038	Present						
	416.88	0.2937	Absent						
	463.13	0.0083	Absent						
	818.65	0.1372	Absent						
	1097.23	0.6791	Absent						
	1293.49	1.0000	Absent						
	1507.50	0.1186	Absent						
	1601.12	0.0107	Absent						

	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Mo-99	140.51	0.0379	Absent					
	181.07	0.0629	Present					
	739.40	0.1260	Absent					
	Total	0.2268	ABSENT	(	0.0629/	0.2268 =	27.7266 %)	0.000
Ra-223	144.30	0.0001	Absent					
	154.30	0.0001	Absent					
	269.60	0.0001	Absent					
	338.60	0.0001	Unable to Calc					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Zn-72	144.70	0.8300	Absent					
	191.50	0.0940	Present					
	Total	0.9240	ABSENT	(	0.0940/	0.9240 =	10.1732 %)	0.000
Mg-27	170.82	0.0070	Absent					
	332.73	0.0100	Unable to Calc					
	843.80	0.7140	Absent					
	1014.50	0.2860	Absent					
	Total	1.0170	ABSENT	(	0.0100/	1.0170 =	0.9833 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
[illegible]-226	186.20	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
[illegible]e-125	188.43	0.5500	Present					
	243.40	0.2871	Present					
	Total	0.8371	PRESENT	(	0.8371/	0.8371 =	100.0000 %)	0.000
In-114m	190.24	0.1564	Present					
	558.43	0.2850	Absent					
	725.24	0.2810	Absent					
	1283.67	0.0003	Absent					
	1299.83	0.0012	Absent					
	Total	0.7239	ABSENT	(	0.1564/	0.7239 =	21.6052 %)	0.000
Mo-101	191.93	0.1810	Present					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.2945/	0.6670 =	44.1529 %)	0.000
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Unable to Calc					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Unable to Calc					
	968.80	0.0001	Unable to Calc					
	Total	0.0006	ABSENT	(	0.0004/	0.0006 =	66.6667 %)	0.000
Xe-133m	233.20	0.1000	Present					
	Total	0.1000	PRESENT	(	0.1000/	0.1000 =	100.0000 %)	0.000
[illegible]-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000

Xe-135	247.79	0.9000	Present					
	Total	0.9000	PRESENT	(	0.9000/	0.9000 =	100.0000 %)	0.00
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.00
Cd-117	273.28	0.2900	Absent					
	344.46	0.1769	Present					
	434.22	0.1047	Absent					
	1303.34	0.1827	Absent					
	1576.80	0.1119	Absent					
	Total	0.8662	ABSENT	(	0.1769/	0.8662 =	20.4225 %)	0.00
Pa-231	283.60	0.0001	Absent					
	299.90	0.0001	Unable to Calc					
	302.50	0.0001	Absent					
	Total	0.0003	ABSENT	(	0.0001/	0.0003 =	33.3333 %)	0.00
Ce-143	293.26	0.4200	Present					
	664.55	0.0525	Absent					
	721.96	0.0512	Absent					
	Total	0.5237	PRESENT	(	0.4200/	0.5237 =	80.1986 %)	0.00
Ir-192	295.96	0.2872	Present					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.3415/	1.9478 =	17.5326 %)	0.00
Tl-210	296.00	0.0001	Unable to Calc					
	795.00	0.0001	Absent					
	1060.00	0.0001	Absent					
	1210.00	0.0001	Absent					
	1310.00	0.0001	Absent					
	Total	0.0005	ABSENT	(	0.0001/	0.0005 =	20.0000 %)	0.000
Ag-113	298.40	0.0900	Present					
	Total	0.0900	PRESENT	(	0.0900/	0.0900 =	100.0000 %)	0.000
Pa-233	300.10	0.0633	Present					
	311.90	0.3700	Absent					
	Total	0.4333	ABSENT	(	0.0633/	0.4333 =	14.6088 %)	0.000
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %)	0.000
Au-196	332.90	0.2300	Present					
	355.70	0.8760	Present					
	Total	1.1060	PRESENT	(	1.1060/	1.1060 =	100.0000 %)	0.000
In-115m	336.20	0.4590	Present					
	Total	0.4590	PRESENT	(	0.4590/	0.4590 =	100.0000 %)	0.000
Ru-95	336.40	0.7100	Present					
	1096.80	0.2100	Absent					
	Total	0.9200	ABSENT	(	0.7100/	0.9200 =	77.1739 %)	0.000
Cs-136	340.60	0.4890	Present					
	340.60	0.4676	Present					
	818.50	0.9970	Absent					
	818.50	0.9970	Absent					
	1048.07	0.7976	Absent					
	1048.10	0.7980	Absent					
	1235.34	0.1974	Absent					
	Total	4.7436	ABSENT	(	0.9566/	4.7436 =	20.1661 %)	0.000
Pt-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.000
Na-24	346.55	0.0100	Unable to Calc					

	357.55	0.0100	Unable to Calc				
	1368.53	1.0000	Absent				
	1732.10	0.0100	Absent				
	Total	1.0300	ABSENT (	0.0200/	1.0300 =	1.9417 %)	0.000
-211	351.00	0.0001	Unable to Calc				
	Total	0.0001	PRESENT (	0.0001/	0.0001 =	100.0000 %)	0.000
Zn-71m	386.28	0.9200	Absent				
	487.34	0.6164	Absent				
	511.55	0.2806	Present				
	596.97	0.2760	Absent				
	620.19	0.5612	Absent				
	Total	2.6542	ABSENT (	0.2806/	2.6542 =	10.5719 %)	0.000
Ag-108m	434.00	0.9050	Absent				
	614.37	0.9320	Present				
	722.95	0.9230	Absent				
	Total	2.7600	ABSENT (	0.9320/	2.7600 =	33.7681 %)	0.000
Rh-106m	450.80	0.2450	Absent				
	511.70	0.8640	Present				
	616.10	0.2040	Absent				
	748.50	0.1950	Absent				
	1046.70	0.3070	Absent				
	Total	1.8150	ABSENT (	0.8640/	1.8150 =	47.6033 %)	0.000
Te-121	507.59	0.1767	Present				
	573.14	0.8030	Absent				
	Total	0.9797	ABSENT (	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc				
	583.14	0.0001	Unable to Calc				
	Total	0.0002	PRESENT (	0.0002/	0.0002 =	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc				
	Total	1.0000	PRESENT (	1.0000/	1.0000 =	100.0000 %)	0.000
-85	514.00	0.0041	Present				
	Total	0.0041	PRESENT (	0.0041/	0.0041 =	100.0000 %)	0.000
Sb-129	544.70	0.1920	Absent				
	812.80	0.4600	Absent				
	914.60	0.2140	Present				
	1030.10	0.1350	Absent				
	Total	1.0010	ABSENT (	0.2140/	1.0010 =	21.3786 %)	0.000
Cs-134	563.26	0.0838	Absent				
	569.29	0.1543	Absent				
	604.66	0.9756	Present				
	795.76	0.8544	Absent				
	801.84	0.0873	Absent				
	Total	2.1554	ABSENT (	0.9756/	2.1554 =	45.2631 %)	0.000
Cd-117m	564.40	0.1518	Absent				
	860.47	0.0835	Present				
	1029.05	0.1196	Absent				
	1066.02	0.2300	Absent				
	1234.63	0.1134	Absent				
	1432.95	0.1426	Absent				
	1997.45	0.2530	Absent				
	Total	1.0939	ABSENT (	0.0835/	1.0939 =	7.6332 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc				
	768.40	0.0001	Absent				
	1120.30	0.0001	Unable to Calc				
	1764.50	0.0001	Unable to Calc				
	Total	0.0004	ABSENT (	0.0003/	0.0004 =	75.0000 %)	0.000
-127	823.10	0.1060	Absent				
	1095.60	0.1940	Absent				
	1114.30	0.3800	Present				
	Total	0.6800	ABSENT (	0.3800/	0.6800 =	55.8824 %)	0.000

Sc-46	889.25	1.0000	Absent					
	1120.51	1.0000	Present					
	2009.76	0.1000	Absent					
	Total	2.1000	ABSENT	(	1.0000/	2.1000 =	47.6190 %)	0.00
Zn-65	1115.52	0.5075	Present					
	Total	0.5075	PRESENT	(	0.5075/	0.5075 =	100.0000 %)	0.00
Ni-65	1115.53	0.1513	Present					
	1481.84	0.2350	Absent					
	Total	0.3863	ABSENT	(	0.1513/	0.3863 =	39.1665 %)	0.00
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.00

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
1	119	U-238	609.32	1.76e-003	279	77.11	6.69e-004	106
1	13	TH-232	911.07	7.83e-004	119	77.11	1.09e-003	13
4	481	TH-232	911.07	7.83e-004	119	238.63	3.55e-003	481
6	182	U-238	609.32	1.76e-003	279	295.22	1.35e-003	182
7	102	TH-232	911.07	7.83e-004	119	338.40	7.53e-004	102
8	332	U-238	609.32	1.76e-003	279	351.99	2.25e-003	332
10	139	TH-232	911.07	7.83e-004	119	583.14	1.22e-003	139

PEAK INTERFERENCE CORRECTION

Pk#	New Area	Nuclide	Energy	Status
1	0	Hg-197	77.35	Deleted [Net < Critical Level]
1	0	Pt-197	77.35	Deleted [Net < Critical Level]
1	0	Fr-223	80.00	Deleted [Net < Critical Level]
1	0	Hg-197	80.20	Deleted [Net < Critical Level]
1	0	Xe-133	80.99	Deleted [Net < Critical Level]
1	0	U-235	81.07	Deleted [Net < Critical Level]
1	0	U-235	83.78	Deleted [Net < Critical Level]
4	0	Xe-133m	233.20	Deleted [Net < Critical Level]
4	0	Fr-223	234.60	Deleted [Net < Critical Level]
4	0	U-235	236.00	Deleted [Net < Critical Level]
6	0	Ce-143	293.26	Deleted [Net < Critical Level]
6	0	Ag-113	298.40	Deleted [Net < Critical Level]
6	0	Ga-67	300.20	Deleted [Net < Critical Level]
7	0	Au-196	332.90	Deleted [Net < Critical Level]
7	0	In-115m	336.20	Deleted [Net < Critical Level]
7	0	HF-175	343.40	Deleted [Net < Critical Level]
8	0	Pt-197m	346.50	Deleted [Net < Critical Level]
8	0	Bi-211	351.00	Deleted [Net < Critical Level]
8	0	U-235	351.10	Deleted [Net < Critical Level]
8	0	Au-196	355.70	Deleted [Net < Critical Level]
10	0	Tl-208	583.14	Deleted [Net < Critical Level]

SECONDARY NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status	Halflives
Hg-197	77.35	0.1900	Absent	
	80.20	0.0340	Absent	

	191.38	0.0057	Present					
	268.73	0.0005	Absent					
	Total	0.2302	ABSENT	(	0.0057/	0.2302 =	2.4761 %)	0.000
Pt-197	77.35	0.1700	Absent					
	191.31	0.0350	Present					
	Total	0.2050	ABSENT	(	0.0350/	0.2050 =	17.0732 %)	0.000
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0000/	0.0002 =	0.0000 %)	0.000
Xe-133	80.99	0.3700	Absent					
	Total	0.3700	ABSENT	(	0.0000/	0.3700 =	0.0000 %)	0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Present					
	236.00	0.1100	Absent					
	269.60	0.1340	Absent					
	351.10	0.1200	Absent					
	Total	1.4030	ABSENT	(	0.5400/	1.4030 =	38.4890 %)	0.000
HF-175	89.36	0.0235	Present					
	343.40	0.8692	Absent					
	432.80	0.0156	Absent					
	Total	0.9083	ABSENT	(	0.0235/	0.9083 =	2.5873 %)	0.000
Ga-67	93.30	0.3800	Present					
	184.60	0.2360	Present					
	300.20	0.1900	Absent					
	Total	0.8060	ABSENT	(	0.6160/	0.8060 =	76.4268 %)	0.000
Xe-133m	233.20	0.1000	Absent					
	Total	0.1000	ABSENT	(	0.0000/	0.1000 =	0.0000 %)	0.000
Ce-143	293.26	0.4200	Absent					
	664.55	0.0525	Absent					
	721.96	0.0512	Absent					
	Total	0.5237	ABSENT	(	0.0000/	0.5237 =	0.0000 %)	0.000
Ag-113	298.40	0.0900	Absent					
	Total	0.0900	ABSENT	(	0.0000/	0.0900 =	0.0000 %)	0.000
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Absent					
	Total	1.1060	ABSENT	(	0.0000/	1.1060 =	0.0000 %)	0.000
In-115m	336.20	0.4590	Absent					
	Total	0.4590	ABSENT	(	0.0000/	0.4590 =	0.0000 %)	0.000
Pt-197m	346.50	0.1110	Absent					
	Total	0.1110	ABSENT	(	0.0000/	0.1110 =	0.0000 %)	0.000
Bi-211	351.00	0.0001	Absent					
	Total	0.0001	ABSENT	(	0.0000/	0.0001 =	0.0000 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
U-238	Average:	1.64e+000	+-8.32e-002	4.12e+013	5 of 5	0.00
	77.11	1.68e+000	+-5.16e-001			
	295.22	1.44e+000	+-2.08e-001			
	351.99	1.57e+000	+-1.37e-001			
	609.32	1.69e+000	+-1.31e-001			
	1764.28	2.63e+000	+-4.31e-001			

TH-232	Average:	1.33e+000	+-7.50e-002	1.24e+014	6 of	6	0.00
	77.11	1.25e-001	+-3.13e-001				
	238.63	1.43e+000	+-1.01e-001				
	338.40	1.43e+000	+-3.73e-001				
	583.14	1.20e+000	+-1.72e-001				
	911.07	1.60e+000	+-2.31e-001				
	968.90	1.37e+000	+-3.10e-001				
Sn-126	87.60	2.97e-001	+-1.41e-001	8.76e+008	1 of	2	
Th-234	92.80		BKG	1.00e+012	1 of	1	
Cu-67	Average:	3.15e-001	+-8.09e-002	6.20e+001	2 of	2	0.00
	93.30	6.54e-001	+-3.10e-001				
	184.50	2.90e-001	+-8.38e-002				
Pt-195m	98.90	9.94e-001	+-4.71e-001	9.65e+001	1 of	1	
Ra-226	186.20		BKG	1.00e+012	1 of	1	
Xe-125	Average:	3.11e-001	+-6.31e-002	1.68e+001	2 of	2	0.00
	188.43	2.51e-001	+-7.27e-002				
	243.40	4.96e-001	+-1.27e-001				
Ra-224	241.08		BKG	1.00e+012	1 of	1	
Xe-135	247.79	1.61e-001	+-4.14e-002	9.10e+000	1 of	1	
Annihila	511.00		I.D.Only	1.00e+003	1 of	1	
KR-85	514.00	6.97e+001	+-1.19e+001	9.39e+004	1 of	1	
Zn-65	1115.52	7.34e-001	+-1.35e-001	5.86e+003	1 of	1	12.23
K-40	1460.81	2.62e+001	+-1.29e+000	1.12e+013	1 of	1	
TOTAL:		1.02e+002 pCi /g			MPC Total:		12.23

UNKNOWN PEAKS

Energy keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
859.54	1769.86	35	15	27	58	1.85	3.429e+000

Radioactivity Concentrations in Liquid Samples

Sample ID	Location	Radionuclides	Activity (in pCi/l)
LIQ-1	Low-Level Waste Tank # 1	K-40	1.02×10^{1}
LIQ-2	Low-Level Waste Tank # 2	K-40	1.02×10^{1}
LIQ-3	Low-Level Waste Tank # 1 Sludge	Cs-137	5.07×10^{-1}
		Co-60	9.32×10^{-1}
		K-40	1.00×10^{1}
LIQ-4	Low-Level Waste Tank # 2 Sludge	Cs-137	2.29×10^{-1}
		Co-60	5.74×10^{-1}
		K-40	9.58×10^{0}
LIQ-5	Suspect Waste Tank	K-40	1.10×10^{1}
LIQ-6	Suspect Waste Tank Sludge	Cs-137	5.55×10^{0}
		Co-60	1.25×10^{2}
		K-40	6.74×10^{0}
LIQ-7	Ground Floor of Containment Building	K-40	1.18×10^{1}
LIQ-8	Bismuth Tank TB-1	K-40	1.28×10^{1}
		Co-60	4.72×10^{0}
LIQ-9	HXD-1 Tank- Process Equipment Room	K-40	1.11×10^{1}
	(Secondary Side 1)		
LIQ-10	HXD-2 Tank- Process Equipment Room	K-40	1.12×10^{1}
	(Secondary Side 2)		
LIQ-11	Compressor Oil	K-40	1.25×10^{1}
LIQ-12	Bismuth Shield Block Coolant	Co-60	9.29×10^{0}
	Liquid in Plastic Sheet Overhang	K-40	2.28×10^{1}
LIQ-13	ZnBr-Biomedical Irradiation Facility	K-40	5.57×10^{0}
LIQ-14	Water Filled Storage Hole -First Floor	Cs-137	1.40×10^{4}
		Co-60	1.32×10^{4}
		K-40	1.31×10^{4}
LIQ-15	Oil fron MD-2A Tank- Process Equipment Ro	Kr-85	7.83×10^{1}
		Co-60	9.33×10^{0}
		K-40	1.38×10^{1}
		Th-232	<BKG
LIQ-16	TD-1 Tank- Process Equipment Room	Co-60	8.94×10^{2}
		K-40	1.16×10^{4}
		Th-232	<BKG
LIQ-17	Liquid Drain Basin Outside of SE	K-40	1.39×10^{1}
	Corner of Containment Building		
LIQ-18	Dalney Street Sewer	K-40	1.23×10^{1}
		Th-232	<BKG

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GDR_C Version 5.0

Sample ID : LIQ-1

Sample Size	5.50e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-22-97 13:09	Counting Start.	10-22-97 13:09
Sampling Stop	.10-22-97 13:09	Live Time	3600 Sec
Current Date.	.10-22-97 17:50	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	239.63	481.05	54	22	36	183	0.72	
2	1460.33	3018.89	149	14	14	17	1.72	

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GDR_C Nuclide Activity Summary

Sample ID: LIQ-1

Sample Size . . . . . 5.50e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-22-97 13:09	Counting Start. 10-22-97 13:09
Sampling Stop 10-22-97 13:09	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 17:50	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	239.63	54	Fr-223	234.60				
1	239.63	54	Th-227	236.00				
1	239.63	54	U-235	236.00	0.1100	8.22e-003	1.00e+000	8.15e-001
1	239.63	54	TH-232	238.63	0.4310	8.22e-003	1.01e+000	2.06e-001
1	239.63	54	Te-131m	240.93	0.0755	8.22e-003	9.89e-001	1.20e+000
1	239.63	54	Ra-224	241.08				
1	239.63	54	Xe-125	243.40	0.2871	8.22e-003	9.80e-001	3.19e-001
1	239.63	54	IN-116M	244.59	0.0038	8.22e-003	6.99e-001	3.38e+001
1	239.63	54	Eu-152	244.67	0.0772	8.22e-003	1.00e+000	1.16e+000
2	1460.33	149	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.06e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Absent					
	583.14	0.3090	Absent					
	911.07	0.2900	Absent					
	968.90	0.1746	Absent					
	Total	1.4997	ABSENT	(	0.4310/	1.4997 =	28.7391 %)	0.000
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Absent					

	Total	1.4030	ABSENT	(	0.1100/	1.4030 =	7.8403 %	0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Absent					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.0755/	1.6635 =	4.5386 %)	0.000
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Absent					
	778.90	0.1272	Absent					
	964.00	0.1433	Absent					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.0772/	1.3688 =	5.6400 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Xe-125	188.43	0.5500	Absent					
	243.40	0.2871	Present					
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)	Halflife (hrs)	Peaks Found	MPC Fraction
Ra-224	241.08	BKG	1.00e+012	1 of 1	
K-40	1460.81	1.06e+001 +-1.01e+000	1.12e+013	1 of 1	
TAL:		1.06e+001 pCi /g		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
ne							

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GDR_C Version 5.0

Sample ID : LIQ-2

Sample Size	5.35e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-22-97 11:39	Counting Start.	10-22-97 11:39
Sampling Stop	.10-22-97 11:39	Live Time	3600 Sec
Current Date.	.10-22-97 17:51	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	352.97	716.69	61	17	29	92	1.52	
2	583.63	1196.23	37	12	19	45	1.05	
3	609.58	1250.19	63	14	22	55	1.28	
4	1460.32	3018.87	140	14	13	15	2.15	

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Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-2

Sample Size . . . . . 5.35e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-22-97 11:39	Counting Start. 10-22-97 11:39
Sampling Stop 10-22-97 11:39	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 17:51	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	352.97	61	Bi-211	351.00				
1	352.97	61	U-235	351.10	0.1200	6.06e-003	1.00e+000	1.18e+000
1	352.97	61	U-238	351.99	0.3710	6.06e-003	1.00e+000	3.80e-001
1	352.97	61	Au-196	355.70	0.8760	6.06e-003	9.98e-001	1.62e-001
1	352.97	61	Ba-133	356.00	0.6200	6.06e-003	1.00e+000	2.28e-001
2	583.63	37	Tl-208	583.14				
2	583.63	37	TH-232	583.14	0.3090	3.95e-003	1.01e+000	4.21e-001
3	609.58	63	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	2.38e-001
3	609.58	63	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	2.89e+000
3	609.58	63	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	4.46e+000
3	609.58	63	Bi-214	609.30				
3	609.58	63	U-238	609.32	0.4609	3.81e-003	1.00e+000	5.02e-001
3	609.58	63	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	4.27e+000
3	609.58	63	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	2.49e-001
4	1460.32	140	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.02e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Absent					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	0.8319/	1.2813 =	64.9262 %)	0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Absent					
	338.40	0.1201	Absent					
	583.14	0.3090	Present					
	911.07	0.2900	Absent					
	968.90	0.1746	Absent					

	Total	1.4997	ABSENT	(	0.3090/	1.4997 =	20.6041 %)	0.000
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.6200/	1.3051 =	47.5059 %)	0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Absent					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(	0.1200/	1.4030 =	8.5531 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Absent					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.0810/	0.4530 =	17.8808 %)	0.000
Tr-192	295.96	0.2872	Absent					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.0543/	1.9478 =	2.7878 %)	0.000
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Present					
	Total	1.1060	ABSENT	(	0.8760/	1.1060 =	79.2043 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT	(	0.9320/	2.7600 =	33.7681 %)	0.000
Tl-208	510.72	0.0001	Absent					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

FINAL ACTIVITY REPORT

ıclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)	Halflife (hrs)	Peaks Found	MPC Fraction
Bi-211	351.00	BKG	1.00e+012	1 of 1	
K-40	1460.81	1.02e+001 +-1.00e+000	1.12e+013	1 of 1	
TOTAL:		1.02e+001 pCi /g		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
583.63	1196.23	37	12	19	45	1.05	2.599e+000
609.58	1250.19	63	14	22	55	1.28	4.593e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

ample ID : LIQ-3

Sample Size	5.60e+002 g	Spectrum File	.TEMP.SP(
Sampling Start.	.10-21-97 15:57	Counting Start.	10-21-97 15:5
Sampling Stop	.10-21-97 15:57	Live Time	3600 Sec
Current Date.	.10-22-97 17:52	Real Time	0 Sec

Detector #: 22

Energy(keV) = 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	239.66	481.13	62	27	48	253	0.89	
	352.67	716.06	64	19	32	117	1.25	
	583.60	1196.18	43	14	24	57	0.98	
4	609.70	1250.45	50	13	20	48	1.14	
5	662.08	1359.33	114	17	25	58	1.36	
6	911.35	1877.57	43	13	21	39	1.47	
7	1172.91	2421.36	123	15	20	40	2.19	
8	1332.19	2752.49	160	14	10	9	1.51	
9	1460.31	3018.86	144	13	11	9	2.14	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-3

Sample Size . . . . . 5.60e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-21-97 15:57	Counting Start. 10-21-97 15:57
Sampling Stop 10-21-97 15:57	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 17:52	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	239.66	62	Fr-223	234.60				
1	239.66	62	Th-227	236.00				
1	239.66	62	U-235	236.00	0.1100	8.22e-003	1.00e+000	9.19e-001
1	239.66	62	TH-232	238.63	0.4310	8.22e-003	1.01e+000	2.32e-001
1	239.66	62	Te-131m	240.93	0.0755	8.22e-003	9.89e-001	1.35e+000
1	239.66	62	Ra-224	241.08				
1	239.66	62	Xe-125	243.40	0.2871	8.22e-003	9.80e-001	3.59e-001
1	239.66	62	IN-116M	244.59	0.0038	8.22e-003	6.99e-001	3.81e+001
1	239.66	62	Eu-152	244.67	0.0772	8.22e-003	1.00e+000	1.31e+000
2	352.67	64	Bi-211	351.00				
2	352.67	64	U-235	351.10	0.1200	6.06e-003	1.00e+000	1.18e+000
2	352.67	64	U-238	351.99	0.3710	6.06e-003	1.00e+000	3.81e-001
2	352.67	64	Au-196	355.70	0.8760	6.06e-003	9.98e-001	1.62e-001
2	352.67	64	Ba-133	356.00	0.6200	6.06e-003	1.00e+000	2.28e-001
3	583.60	43	Tl-208	583.14				
3	583.60	43	TH-232	583.14	0.3090	3.95e-003	1.01e+000	4.67e-001
4	609.70	50	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	1.80e-001
4	609.70	50	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	2.19e+000
4	609.70	50	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	3.38e+000
4	609.70	50	Bi-214	609.30				
4	609.70	50	U-238	609.32	0.4609	3.81e-003	1.00e+000	3.81e-001
4	609.70	50	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	3.24e+000
4	609.70	50	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	1.89e-001
5	662.08	114	As-76	657.03	0.0608	3.55e-003	9.87e-001	7.18e+000
5	662.08	114	Ag-110m	657.75	0.9440	3.55e-003	1.00e+000	4.56e-001
5	662.08	114	Cs-137	661.65	0.8500	3.55e-003	1.00e+000	5.07e-001
5	662.08	114	Ce-143	664.55	0.0525	3.55e-003	9.90e-001	8.29e+000
5	662.08	114	Sb-126	666.30	0.9970	3.55e-003	9.99e-001	4.32e-001
5	662.08	114	I-126	667.00	0.3300	3.55e-003	9.99e-001	1.31e+000
5	662.08	114	I-132	667.70	0.9870	3.55e-003	8.63e-001	5.06e-001
6	911.35	43	TH-232	911.07	0.2900	2.70e-003	1.01e+000	7.31e-001
6	911.35	43	Ac-228	911.20				
6	911.35	43	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	1.08e+000

7	1172.91	123	Co-60	1173.22	0.9986	2.17e-003	1.00e+000 7.61e-00
7	1172.91	123	TB-160	1177.95	0.1550	2.17e-003	1.00e+000 4.90e-00
8	1332.19	160	Co-60	1332.49	0.9998	1.94e-003	1.00e+000 1.10e+00
9	1460.31	144	K-40	1460.81	0.1070	1.80e-003	1.00e+000 1.00e+00

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Absent					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	0.8319/	1.2813 =	64.9262 %)	0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Absent					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Absent					
	Total	1.4997	ABSENT	(	1.0300/	1.4997 =	68.6804 %)	0.000
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.6200/	1.3051 =	47.5059 %)	0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(	0.2300/	1.4030 =	16.3934 %)	0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Absent					
	876.37	0.3000	Absent					
	962.36	0.1000	Absent					
	966.17	0.2550	Absent					
	1177.95	0.1550	Present					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.1550/	1.3866 =	11.1784 %)	0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Absent					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					

	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.0755/	1.6635 =	4.5386 %)	0.000
-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Absent					
	778.90	0.1272	Absent					
	964.00	0.1433	Absent					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.0772/	1.3688 =	5.6400 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Xe-125	188.43	0.5500	Absent					
	243.40	0.2871	Present					
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.000
Ac-228	209.50	0.0001	Absent					
	338.70	0.0001	Absent					
	790.50	0.0001	Absent					
	911.20	0.0001	Unable to Calc					
	964.40	0.0001	Absent					
	968.80	0.0001	Absent					
	Total	0.0006	ABSENT	(	0.0001/	0.0006 =	16.6667 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Absent					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.0810/	0.4530 =	17.8808 %)	0.000
Ce-143	293.26	0.4200	Absent					
	664.55	0.0525	Present					
	721.96	0.0512	Absent					
	Total	0.5237	ABSENT	(	0.0525/	0.5237 =	10.0248 %)	0.000
Ir-192	295.96	0.2872	Absent					
	308.46	0.2965	Absent					

	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.0543/	1.9478 =	2.7878 %)	0.000
-196	332.90	0.2300	Absent					
	355.70	0.8760	Present					
	Total	1.1060	ABSENT	(	0.8760/	1.1060 =	79.2043 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
I-126	386.00	0.3400	Absent					
	667.00	0.3300	Present					
	Total	0.6700	ABSENT	(	0.3300/	0.6700 =	49.2537 %)	0.000
Sb-126	414.80	0.8770	Absent					
	666.30	0.9970	Present					
	695.00	0.9970	Absent					
	697.00	0.3190	Absent					
	720.50	0.5780	Absent					
	Total	3.7680	ABSENT	(	0.9970/	3.7680 =	26.4597 %)	0.000
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT	(	0.9320/	2.7600 =	33.7681 %)	0.000
Tl-208	510.72	0.0001	Absent					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
I-132	522.65	0.1610	Absent					
	630.20	0.1370	Absent					
	667.70	0.9870	Present					
	772.61	0.7620	Absent					
	954.55	0.1810	Absent					
	Total	2.2280	ABSENT	(	0.9870/	2.2280 =	44.2998 %)	0.000
Sb-129	544.70	0.1920	Absent					
	812.80	0.4600	Absent					
	914.60	0.2140	Present					
	1030.10	0.1350	Absent					
	Total	1.0010	ABSENT	(	0.2140/	1.0010 =	21.3786 %)	0.000
As-76	559.10	0.4500	Absent					
	657.03	0.0608	Present					
	Total	0.5108	ABSENT	(	0.0608/	0.5108 =	11.9029 %)	0.000
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Ag-110m	657.75	0.9440	Present					
	677.60	0.1057	Absent					
	706.67	0.1631	Absent					
	763.93	0.2226	Absent					
	884.67	0.7278	Absent					
	937.48	0.3427	Absent					
	1384.27	0.2164	Absent					
	1505.00	0.1323	Absent					
	Total	2.8546	ABSENT	(	0.9440/	2.8546 =	33.0694 %)	0.000
Cs-137	661.65	0.8500	Present					

	Total	0.8500	PRESENT	(0.8500/	0.8500	=	100.0000 %	0.000
Co-60	1173.22	0.9986	Present					
	1332.49	0.9998	Present					
	Total	1.9984	PRESENT	(1.9984/	1.9984	=	100.0000 %)	0.000
40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(0.1070/	0.1070	=	100.0000 %)	0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
Ra-224	241.08	BKG		1.00e+012	1 of 1	
Bi-211	351.00	BKG		1.00e+012	1 of 1	
Cs-137	661.65	5.07e-001	+-7.46e-002	2.64e+005	1 of 1	50.66
Co-60	Average:	9.32e-001	+-6.66e-002	4.62e+004	2 of 2	103.54
	1173.22	7.61e-001	+-9.40e-002			
	1332.49	1.10e+000	+-9.43e-002			
K-40	1460.81	1.00e+001	+-9.19e-001	1.12e+013	1 of 1	
TOTAL:		1.15e+001 pCi /g			MPC Total:	154.20

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
583.60	1196.18	43	14	24	57	0.98	3.020e+000
09.70	1250.45	50	13	20	48	1.14	3.646e+000
911.35	1877.57	43	13	21	39	1.47	4.430e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : LIQ-4

Sample Size	5.75e+002 g	Spectrum File	.TEMP.S
Sampling Start	.10-21-97 09:09	Counting Start	10-21-97 09:
Sampling Stop	.10-21-97 09:09	Live Time	3600 S
Current Date	.10-22-97 17:53	Real Time	0 S

Detector #: 22

Energy(keV) = 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:

Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End	0 / 409
Sigma Multiplier	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	352.30	715.29	46	24	45	171	1.30	
2	609.95	1250.96	59	14	22	52	1.48	
3	661.53	1358.19	53	15	25	58	1.53	
4	1172.87	2421.27	82	12	15	22	2.09	
5	1331.99	2752.08	98	11	10	9	2.14	
6	1460.24	3018.72	141	14	13	14	2.50	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-4

Sample Size . . . . . 5.75e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-21-97 09:09	Counting Start. 10-21-97 09:09
Sampling Stop 10-21-97 09:09	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 17:53	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	352.30	46	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	1.94e-001
1	352.30	46	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	1.10e+000
1	352.30	46	Na-24	346.55	0.0100	6.07e-003	9.77e-001	1.01e+001
1	352.30	46	Bi-211	351.00				
1	352.30	46	U-235	351.10	0.1200	6.07e-003	1.00e+000	8.25e-001
1	352.30	46	U-238	351.99	0.3710	6.07e-003	1.00e+000	2.66e-001
1	352.30	46	Au-196	355.70	0.8760	6.07e-003	9.98e-001	1.13e-001
1	352.30	46	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	1.60e-001
2	609.95	59	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	2.07e-001
2	609.95	59	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	2.52e+000
2	609.95	59	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	3.89e+000
2	609.95	59	Bi-214	609.30				
2	609.95	59	U-238	609.32	0.4609	3.81e-003	1.00e+000	4.38e-001
2	609.95	59	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	3.73e+000
2	609.95	59	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	2.17e-001
3	661.53	53	Cu-61	656.00	0.1170	3.55e-003	9.05e-001	1.84e+000
3	661.53	53	As-76	657.03	0.0608	3.55e-003	9.87e-001	3.25e+000
3	661.53	53	Ag-110m	657.75	0.9440	3.55e-003	1.00e+000	2.06e-001
3	661.53	53	Cs-137	661.65	0.8500	3.55e-003	1.00e+000	2.29e-001
3	661.53	53	Ce-143	664.55	0.0525	3.55e-003	9.90e-001	3.75e+000
3	661.53	53	Sb-126	666.30	0.9970	3.55e-003	9.99e-001	1.96e-001
3	661.53	53	I-126	667.00	0.3300	3.55e-003	9.99e-001	5.91e-001
4	1172.87	82	Co-60	1173.22	0.9986	2.17e-003	1.00e+000	4.94e-001
4	1172.87	82	TB-160	1177.95	0.1550	2.17e-003	1.00e+000	3.18e+000
5	1331.99	98	Co-60	1332.49	0.9998	1.94e-003	1.00e+000	6.58e-001
6	1460.24	141	K-40	1460.81	0.1070	1.80e-003	1.00e+000	9.58e+000

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status	Halflives
U-238	77.11	0.1070	Absent	

	295.22	0.1920	Absent						
	351.99	0.3710	Present						
	609.32	0.4609	Present						
	1764.28	0.1504	Absent						
	Total	1.2813	ABSENT	(	0.8319/	1.2813	=	64.9262 %)	0.00
-133	81.00	0.3429	Absent						
	276.40	0.0709	Absent						
	302.85	0.1816	Absent						
	356.00	0.6200	Present						
	383.85	0.0897	Absent						
	Total	1.3051	ABSENT	(	0.6200/	1.3051	=	47.5059 %)	0.00
U-235	81.07	0.1480	Absent						
	83.78	0.2460	Absent						
	143.76	0.1050	Absent						
	185.72	0.5400	Absent						
	236.00	0.1100	Absent						
	269.60	0.1340	Absent						
	351.10	0.1200	Present						
	Total	1.4030	ABSENT	(	0.1200/	1.4030	=	8.5531 %)	0.00
TB-160	86.80	0.1340	Absent						
	197.04	0.0524	Absent						
	215.65	0.0402	Absent						
	298.57	0.2740	Absent						
	876.37	0.3000	Absent						
	962.36	0.1000	Absent						
	966.17	0.2550	Absent						
	1177.95	0.1550	Present						
	1271.88	0.0760	Absent						
	Total	1.3866	ABSENT	(	0.1550/	1.3866	=	11.1784 %)	0.00
Sb-125	176.29	0.0630	Absent						
	380.51	0.0140	Absent						
	427.95	0.2960	Absent						
	463.51	0.1000	Absent						
	600.77	0.1840	Absent						
	606.82	0.0520	Present						
	636.15	0.1120	Absent						
	671.66	0.0180	Absent						
	Total	0.8390	ABSENT	(	0.0520/	0.8390	=	6.1979 %)	0.000
Kr-79	261.30	0.1270	Absent						
	397.50	0.0950	Absent						
	511.00	0.1500	Absent						
	606.10	0.0810	Present						
	Total	0.4530	ABSENT	(	0.0810/	0.4530	=	17.8808 %)	0.000
Cu-61	283.70	0.1320	Absent						
	656.00	0.1170	Present						
	Total	0.2490	ABSENT	(	0.1170/	0.2490	=	46.9880 %)	0.000
Ce-143	293.26	0.4200	Absent						
	664.55	0.0525	Present						
	721.96	0.0512	Absent						
	Total	0.5237	ABSENT	(	0.0525/	0.5237	=	10.0248 %)	0.000
Ir-192	295.96	0.2872	Absent						
	308.46	0.2965	Absent						
	316.51	0.8290	Absent						
	468.06	0.4808	Absent						
	612.45	0.0543	Present						
	Total	1.9478	ABSENT	(	0.0543/	1.9478	=	2.7878 %)	0.000
-167	321.30	0.2390	Absent						
	346.50	0.5700	Present						
	Total	0.8090	ABSENT	(	0.5700/	0.8090	=	70.4574 %)	0.000
Au-196	332.90	0.2300	Absent						

	355.70	0.8760	Present						
	Total	1.1060	ABSENT	(	0.8760/	1.1060	=	79.2043 %)	0.000
Pt-197m	346.50	0.1110	Present						
	Total	0.1110	PRESENT	(	0.1110/	0.1110	=	100.0000 %)	0.000
Na-24	346.55	0.0100	Unable to Calc						
	857.55	0.0100	Absent						
	1368.53	1.0000	Absent						
	1732.10	0.0100	Absent						
	Total	1.0300	ABSENT	(	0.0100/	1.0300	=	0.9709 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc						
	Total	0.0001	PRESENT	(	0.0001/	0.0001	=	100.0000 %)	0.000
I-126	386.00	0.3400	Absent						
	667.00	0.3300	Present						
	Total	0.6700	ABSENT	(	0.3300/	0.6700	=	49.2537 %)	0.000
Sb-126	414.80	0.8770	Absent						
	666.30	0.9970	Present						
	695.00	0.9970	Absent						
	697.00	0.3190	Absent						
	720.50	0.5780	Absent						
	Total	3.7680	ABSENT	(	0.9970/	3.7680	=	26.4597 %)	0.000
Ag-108m	434.00	0.9050	Absent						
	614.37	0.9320	Present						
	722.95	0.9230	Absent						
	Total	2.7600	ABSENT	(	0.9320/	2.7600	=	33.7681 %)	0.000
As-76	559.10	0.4500	Absent						
	657.03	0.0608	Present						
	Total	0.5108	ABSENT	(	0.0608/	0.5108	=	11.9029 %)	0.000
Cs-134	563.26	0.0838	Absent						
	569.29	0.1543	Absent						
	604.66	0.9756	Present						
	795.76	0.8544	Absent						
	801.84	0.0873	Absent						
	Total	2.1554	ABSENT	(	0.9756/	2.1554	=	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc						
	768.40	0.0001	Absent						
	1120.30	0.0001	Absent						
	1764.50	0.0001	Absent						
	Total	0.0004	ABSENT	(	0.0001/	0.0004	=	25.0000 %)	0.000
Ag-110m	657.75	0.9440	Present						
	677.60	0.1057	Absent						
	706.67	0.1631	Absent						
	763.93	0.2226	Absent						
	884.67	0.7278	Absent						
	937.48	0.3427	Absent						
	1384.27	0.2164	Absent						
	1505.00	0.1323	Absent						
	Total	2.8546	ABSENT	(	0.9440/	2.8546	=	33.0694 %)	0.000
Cs-137	661.65	0.8500	Present						
	Total	0.8500	PRESENT	(	0.8500/	0.8500	=	100.0000 %)	0.000
Co-60	1173.22	0.9986	Present						
	1332.49	0.9998	Present						
	Total	1.9984	PRESENT	(	1.9984/	1.9984	=	100.0000 %)	0.000
K-40	1460.81	0.1070	Present						
	Total	0.1070	PRESENT	(	0.1070/	0.1070	=	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

			Reference Energy Line ===>>			Calculated Contribution			
Pk#	Old Area	Nuclide	Energy	cts/dis	Ref Area	Energy	cts/dis	New Area	

None

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)	Halflife (hrs)	Peaks Found	MPC Fraction
Pt-197m	346.50	1.10e+000 +-5.70e-001	1.57e+000	1 of 1	
Bi-211	351.00	BKG	1.00e+012	1 of 1	
Cs-137	661.65	2.29e-001 +-6.46e-002	2.64e+005	1 of 1	22.92
Co-60	Average:	5.74e-001 +-5.20e-002	4.62e+004	2 of 2	63.73
	1173.22	4.94e-001 +-7.24e-002			
	1332.49	6.58e-001 +-7.47e-002			
K-40	1460.81	9.58e+000 +-9.26e-001	1.12e+013	1 of 1	
TOTAL:		1.15e+001 pCi /g		MPC Total:	86.65

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
609.95	1250.96	59	14	22	52	1.48	4.304e+000

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GDR_C Version 5.0

Sample ID : LIQ-5

Sample Size	5.55e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-20-97 17:24	Counting Start.	10-20-97 17:24
Sampling Stop	.10-20-97 17:24	Live Time	3600 Sec
Current Date.	.10-22-97 17:54	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	511.99	1047.31	85	18	29	76	1.33	
2	609.94	1250.93	62	14	21	50	1.73	
3	1460.40	3019.05	157	15	16	22	2.47	

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Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-5

Sample Size . . . . . 5.55e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-20-97 17:24	Counting Start. 10-20-97 17:24
Sampling Stop 10-20-97 17:24	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 17:54	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	511.99	85	Te-121	507.59	0.1767	4.42e-003	9.99e-001	1.47e+000
1	511.99	85	Tl-208	510.72				
1	511.99	85	Kr-79	511.00	0.1500	4.42e-003	9.90e-001	1.75e+000
1	511.99	85	Annihila	511.00	1.0000	4.42e-003	1.00e+000	2.60e-001
1	511.99	85	Zn-71m	511.55	0.2806	4.42e-003	9.17e-001	1.01e+000
1	511.99	85	Rh-106m	511.70	0.8640	4.42e-003	8.56e-001	3.52e-001
1	511.99	85	KR-85	514.00	0.0041	4.42e-003	1.00e+000	6.34e+001
2	609.94	62	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	2.26e-001
2	609.94	62	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	2.75e+000
2	609.94	62	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	4.24e+000
2	609.94	62	Bi-214	609.30				
2	609.94	62	U-238	609.32	0.4609	3.81e-003	1.00e+000	4.77e-001
2	609.94	62	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	4.06e+000
2	609.94	62	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	2.36e-001
3	1460.40	157	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.10e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Absent					
	351.99	0.3710	Absent					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	0.4609/	1.2813 =	35.9713 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					

	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.00
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.00(
Ir-192	295.96	0.2872	Absent					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.0543/	1.9478 =	2.7878 %)	0.00C
Zn-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.00C
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT	(	0.9320/	2.7600 =	33.7681 %)	0.000
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Absent					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT	(	0.8640/	1.8150 =	47.6033 %)	0.000
-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.000
KR-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.000
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

k#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area

None

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)	Halflife (hrs)	Peaks Found	MPC Fraction
Annihila	511.00	I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	6.34e+001 +-1.32e+001	9.39e+004	1 of 1	
K-40	1460.81	1.10e+001 +-1.05e+000	1.12e+013	1 of 1	
TOTAL:		7.44e+001 pCi /g		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
609.94	1250.93	62	14	21	50	1.73	4.523e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : LIQ-6

Sample Size	7.65e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-20-97 15:16	Counting Start.	10-20-97 15:16
Sampling Stop	.10-20-97 15:16	Live Time	3600 Sec
Current Date.	.10-22-97 17:55	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	662.02	1359.21	1705	82	136	1702	1.53	
2	1172.99	2421.51	27346	175	116	985	1.97	
3	1332.03	2752.17	25016	161	58	250	2.03	
4	1460.16	3018.54	132	18	28	65	2.02	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-6

Sample Size . . . . . 7.65e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-20-97 15:16	Counting Start. 10-20-97 15:16
Sampling Stop 10-20-97 15:16	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 17:56	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	662.02	1705	As-76	657.03	0.0608	3.55e-003	9.87e-001	7.86e+001
1	662.02	1705	Ag-110m	657.75	0.9440	3.55e-003	1.00e+000	4.99e+000
1	662.02	1705	Cs-137	661.65	0.8500	3.55e-003	1.00e+000	5.55e+000
1	662.02	1705	Ce-143	664.55	0.0525	3.55e-003	9.90e-001	9.07e+001
1	662.02	1705	Sb-126	666.30	0.9970	3.55e-003	9.99e-001	4.73e+000
1	662.02	1705	I-126	667.00	0.3300	3.55e-003	9.99e-001	1.43e+001
1	662.02	1705	I-132	667.70	0.9870	3.55e-003	8.63e-001	5.54e+000
2	1172.99	27346	Co-60	1173.22	0.9986	2.17e-003	1.00e+000	1.24e+002
2	1172.99	27346	TB-160	1177.95	0.1550	2.17e-003	1.00e+000	7.98e+002
3	1332.03	25016	Co-60	1332.49	0.9998	1.94e-003	1.00e+000	1.26e+002
4	1460.16	132	K-40	1460.81	0.1070	1.80e-003	1.00e+000	6.74e+000

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Absent					
	876.37	0.3000	Absent					
	962.36	0.1000	Absent					
	966.17	0.2550	Absent					
	1177.95	0.1550	Present					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.1550/	1.3866 =	11.1784 %)	0.000
Ce-143	293.26	0.4200	Absent					
	664.55	0.0525	Present					
	721.96	0.0512	Absent					
	Total	0.5237	ABSENT	(	0.0525/	0.5237 =	10.0248 %)	0.000
I-126	386.00	0.3400	Absent					
	667.00	0.3300	Present					

	Total	0.6700	ABSENT	(	0.3300/	0.6700 =	49.2537 %	0.00
Sb-126	414.80	0.8770	Absent					
	666.30	0.9970	Present					
	695.00	0.9970	Absent					
	697.00	0.3190	Absent					
	720.50	0.5780	Absent					
	Total	3.7680	ABSENT	(	0.9970/	3.7680 =	26.4597 %)	0.000
I-132	522.65	0.1610	Absent					
	630.20	0.1370	Absent					
	667.70	0.9870	Present					
	772.61	0.7620	Absent					
	954.55	0.1810	Absent					
	Total	2.2280	ABSENT	(	0.9870/	2.2280 =	44.2998 %)	0.000
As-76	559.10	0.4500	Absent					
	657.03	0.0608	Present					
	Total	0.5108	ABSENT	(	0.0608/	0.5108 =	11.9029 %)	0.000
Ag-110m	657.75	0.9440	Present					
	677.60	0.1057	Absent					
	706.67	0.1631	Absent					
	763.93	0.2226	Absent					
	884.67	0.7278	Absent					
	937.48	0.3427	Absent					
	1384.27	0.2164	Absent					
	1505.00	0.1323	Absent					
	Total	2.8546	ABSENT	(	0.9440/	2.8546 =	33.0694 %)	0.000
Cs-137	661.65	0.8500	Present					
	Total	0.8500	PRESENT	(	0.8500/	0.8500 =	100.0000 %)	0.000
Co-60	1173.22	0.9986	Present					
	1332.49	0.9998	Present					
	Total	1.9984	PRESENT	(	1.9984/	1.9984 =	100.0000 %)	0.000
40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
Cs-137	661.65	5.55e+000	+-2.68e-001	2.64e+005	1 of 1	554.62
Co-60	Average:	1.25e+002	+-5.68e-001	4.62e+004	2 of 2	13894.16
	1173.22	1.24e+002	+-7.95e-001			
	1332.49	1.26e+002	+-8.12e-001			
K-40	1460.81	6.74e+000	+-9.34e-001	1.12e+013	1 of 1	
TOTAL:		1.37e+002 pCi /g			MPC Total:	14448.78

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : LIQ-7

Sample Size	5.75e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-20-97 13:34	Counting Start.	10-20-97 13:34
Sampling Stop	.10-20-97 13:34	Live Time	3600 Sec
Current Date.	.10-22-97 17:56	Real Time	0 Sec

Detector #: 22

Energy(keV) = 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	239.50	480.78	36	20	33	168	0.56	
2	1459.96	3018.13	174	14	9	7	1.99	

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Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-7

Sample Size . . . . . 5.75e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-20-97 13:34	Counting Start. 10-20-97 13:34
Sampling Stop 10-20-97 13:34	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 17:56	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	239.50	36	Fr-223	234.60				
1	239.50	36	Th-227	236.00				
1	239.50	36	U-235	236.00	0.1100	8.23e-003	1.00e+000	5.20e-001
1	239.50	36	TH-232	238.63	0.4310	8.23e-003	1.01e+000	1.31e-001
1	239.50	36	Te-131m	240.93	0.0755	8.23e-003	9.89e-001	7.66e-001
1	239.50	36	Ra-224	241.08				
1	239.50	36	Xe-125	243.40	0.2871	8.23e-003	9.80e-001	2.03e-001
1	239.50	36	IN-116M	244.59	0.0038	8.23e-003	6.99e-001	2.15e+001
1	239.50	36	Eu-152	244.67	0.0772	8.23e-003	1.00e+000	7.40e-001
2	1459.96	174	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.18e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Absent					
	583.14	0.3090	Absent					
	911.07	0.2900	Absent					
	968.90	0.1746	Absent					
	Total	1.4997	ABSENT	(	0.4310/	1.4997 =	28.7391 %)	0.000
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Absent					

	Total	1.4030	ABSENT	(0.1100/	1.4030 =	7.8403 %)	0.00
Te-131m	102.06	0.0790	Absent				
	149.71	0.2054	Absent				
	200.63	0.0752	Absent				
	240.93	0.0755	Present				
	334.27	0.0952	Absent				
	452.30	0.0567	Absent				
	773.67	0.3800	Absent				
	782.49	0.0775	Absent				
	793.75	0.1380	Absent				
	822.78	0.0609	Absent				
	852.21	0.2093	Absent				
	1125.46	0.1137	Absent				
	1206.60	0.0971	Absent				
	Total	1.6635	ABSENT	(0.0755/	1.6635 =	4.5386 %)	0.000
Eu-152	121.78	0.3068	Absent				
	244.67	0.0772	Present				
	344.30	0.2720	Absent				
	778.90	0.1272	Absent				
	964.00	0.1433	Absent				
	1085.80	0.1010	Absent				
	1112.07	0.1340	Absent				
	1408.08	0.2073	Absent				
	Total	1.3688	ABSENT	(0.0772/	1.3688 =	5.6400 %)	0.000
IN-116M	137.92	0.0350	Absent				
	244.59	0.0038	Present				
	416.88	0.2937	Absent				
	463.13	0.0083	Absent				
	818.65	0.1372	Absent				
	1097.23	0.6791	Absent				
	1293.49	1.0000	Absent				
	1507.50	0.1186	Absent				
	1601.12	0.0107	Absent				
	1752.42	0.0289	Absent				
	2212.21	0.1858	Absent				
	Total	2.5011	ABSENT	(0.0038/	2.5011 =	0.1519 %)	0.000
Xe-125	188.43	0.5500	Absent				
	243.40	0.2871	Present				
	Total	0.8371	ABSENT	(0.2871/	0.8371 =	34.2970 %)	0.000
Th-227	236.00	0.0001	Unable to Calc				
	329.90	0.0001	Absent				
	Total	0.0002	ABSENT	(0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc				
	Total	0.0001	PRESENT	(0.0001/	0.0001 =	100.0000 %)	0.000
K-40	1460.81	0.1070	Present				
	Total	0.1070	PRESENT	(0.1070/	0.1070 =	100.0000 %)	0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)	Halflife (hrs)	Peaks Found	MPC Fraction
Ra-224	241.08	BKG	1.00e+012	1 of 1	
K-40	1460.81	1.18e+001 +-9.46e-001	1.12e+013	1 of 1	
TOTAL:		1.18e+001 pCi /g		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
ne							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : LIQ-8

Sample Size	5.30e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-15-97 14:28	Counting Start.	10-15-97 14:28
Sampling Stop	.10-15-97 14:28	Live Time	3600 Sec
Current Date.	.10-22-97 18:03	Real Time	0 Sec

Detector #: 22

Energy(keV) = 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	351.81	714.29	59	21	36	156	1.33	
2	510.85	1044.93	102	24	41	145	2.29	
3	608.81	1248.59	76	18	29	84	1.24	
4	1114.02	2298.93	59	18	33	102	1.39	
5	1171.67	2418.78	720	29	21	37	1.99	
6	1330.65	2749.29	650	28	23	46	2.12	
7	1458.75	3015.61	174	15	14	16	1.75	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-8

Sample Size . . . . . 5.30e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-15-97 14:28	Counting Start. 10-15-97 14:28
Sampling Stop 10-15-97 14:28	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 18:03	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	351.81	59	HF-181	345.95	0.1400	6.07e-003	1.00e+000	9.83e-001
1	351.81	59	Ho-167	346.50	0.5700	6.07e-003	8.96e-001	2.69e-001
1	351.81	59	Pt-197m	346.50	0.1110	6.07e-003	8.09e-001	1.53e+000
1	351.81	59	Na-24	346.55	0.0100	6.07e-003	9.77e-001	1.41e+001
1	351.81	59	Bi-211	351.00				
1	351.81	59	U-235	351.10	0.1200	6.07e-003	1.00e+000	1.15e+000
1	351.81	59	U-238	351.99	0.3710	6.07e-003	1.00e+000	3.70e-001
1	351.81	59	Au-196	355.70	0.8760	6.07e-003	9.98e-001	1.57e-001
1	351.81	59	Ba-133	356.00	0.6200	6.07e-003	1.00e+000	2.22e-001
2	510.85	102	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	8.67e+000
2	510.85	102	Te-121	507.59	0.1767	4.43e-003	9.99e-001	1.85e+000
2	510.85	102	Tl-208	510.72				
2	510.85	102	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	2.19e+000
2	510.85	102	Annihila	511.00	1.0000	4.43e-003	1.00e+000	3.26e-001
2	510.85	102	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.27e+000
2	510.85	102	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	4.41e-001
2	510.85	102	KR-85	514.00	0.0041	4.43e-003	1.00e+000	7.95e+001
3	608.81	76	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	2.89e-001
3	608.81	76	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	3.52e+000
3	608.81	76	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	5.43e+000
3	608.81	76	Bi-214	609.30				
3	608.81	76	U-238	609.32	0.4609	3.81e-003	1.00e+000	6.11e-001
3	608.81	76	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	5.20e+000
3	608.81	76	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	3.03e-001
4	1114.02	59	Eu-152	1112.07	0.1340	2.27e-003	1.00e+000	2.75e+000
4	1114.02	59	Sn-127	1114.30	0.3800	2.27e-003	8.55e-001	1.13e+000
4	1114.02	59	Zn-65	1115.52	0.5075	2.27e-003	1.00e+000	7.26e-001
4	1114.02	59	Ni-65	1115.53	0.1513	2.27e-003	8.76e-001	2.78e+000
5	1171.67	720	Co-60	1173.22	0.9986	2.17e-003	1.00e+000	4.70e+000
6	1330.65	650	Co-60	1332.49	0.9998	1.95e-003	1.00e+000	4.73e+000
7	1458.75	174	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.28e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
238	77.11	0.1070	Absent					
	295.22	0.1920	Absent					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	0.8319/	1.2813 =	64.9262 %)	0.00
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.5200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.6200/	1.3051 =	47.5059 %)	0.00
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Absent					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(	0.1200/	1.4030 =	8.5531 %)	0.000
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Absent					
	344.30	0.2720	Absent					
	778.90	0.1272	Absent					
	964.00	0.1433	Absent					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Present					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.1340/	1.3688 =	9.7896 %)	0.000
HF-181	133.05	0.4300	Absent					
	136.25	0.0610	Absent					
	345.95	0.1400	Present					
	482.16	0.8600	Absent					
	Total	1.4910	ABSENT	(	0.1400/	1.4910 =	9.3897 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Mo-101	191.93	0.1810	Absent					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
Ir-192	295.96	0.2872	Absent					
	308.46	0.2965	Absent					

	316.51	0.8290	Absent						
	468.06	0.4808	Absent						
	612.45	0.0543	Present						
	Total	1.9478	ABSENT	(	0.0543/	1.9478	=	2.7878 %)	0.000
-167	321.30	0.2390	Absent						
	346.50	0.5700	Present						
	Total	0.8090	ABSENT	(	0.5700/	0.8090	=	70.4574 %)	0.000
Au-196	332.90	0.2300	Absent						
	355.70	0.8760	Present						
	Total	1.1060	ABSENT	(	0.8760/	1.1060	=	79.2043 %)	0.000
Pt-197m	346.50	0.1110	Present						
	Total	0.1110	PRESENT	(	0.1110/	0.1110	=	100.0000 %)	0.000
Na-24	346.55	0.0100	Unable to Calc						
	857.55	0.0100	Absent						
	1368.53	1.0000	Absent						
	1732.10	0.0100	Absent						
	Total	1.0300	ABSENT	(	0.0100/	1.0300	=	0.9709 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc						
	Total	0.0001	PRESENT	(	0.0001/	0.0001	=	100.0000 %)	0.000
Zn-71m	386.28	0.9200	Absent						
	487.34	0.6164	Absent						
	511.55	0.2806	Present						
	596.97	0.2760	Absent						
	620.19	0.5612	Absent						
	Total	2.6542	ABSENT	(	0.2806/	2.6542	=	10.5719 %)	0.000
Ag-108m	434.00	0.9050	Absent						
	614.37	0.9320	Present						
	722.95	0.9230	Absent						
	Total	2.7600	ABSENT	(	0.9320/	2.7600	=	33.7681 %)	0.000
Rh-106m	450.80	0.2450	Absent						
	511.70	0.8640	Present						
	616.10	0.2040	Absent						
	748.50	0.1950	Absent						
	1046.70	0.3070	Absent						
	Total	1.8150	ABSENT	(	0.8640/	1.8150	=	47.6033 %)	0.000
Te-121	507.59	0.1767	Present						
	573.14	0.8030	Absent						
	Total	0.9797	ABSENT	(	0.1767/	0.9797	=	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc						
	583.14	0.0001	Absent						
	Total	0.0002	ABSENT	(	0.0001/	0.0002	=	50.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc						
	Total	1.0000	PRESENT	(	1.0000/	1.0000	=	100.0000 %)	0.000
KR-85	514.00	0.0041	Present						
	Total	0.0041	PRESENT	(	0.0041/	0.0041	=	100.0000 %)	0.000
Cs-134	563.26	0.0838	Absent						
	569.29	0.1543	Absent						
	604.66	0.9756	Present						
	795.76	0.8544	Absent						
	801.84	0.0873	Absent						
	Total	2.1554	ABSENT	(	0.9756/	2.1554	=	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc						
	768.40	0.0001	Absent						
	1120.30	0.0001	Absent						
	1764.50	0.0001	Absent						
	Total	0.0004	ABSENT	(	0.0001/	0.0004	=	25.0000 %)	0.000
-127	823.10	0.1060	Absent						
	1095.60	0.1940	Absent						
	1114.30	0.3800	Present						
	Total	0.6800	ABSENT	(	0.3800/	0.6800	=	55.8824 %)	0.000

Zn-65	1115.52	0.5075	Present						
	Total	0.5075	PRESENT	(	0.5075/	0.5075	=	100.0000 %	0.00
Ni-65	1115.53	0.1513	Present						
	1481.84	0.2350	Absent						
	Total	0.3863	ABSENT	(	0.1513/	0.3863	=	39.1665 %)	0.00
Co-60	1173.22	0.9986	Present						
	1332.49	0.9998	Present						
	Total	1.9984	PRESENT	(	1.9984/	1.9984	=	100.0000 %)	0.000
K-40	1460.81	0.1070	Present						
	Total	0.1070	PRESENT	(	0.1070/	0.1070	=	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
None								

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
Pt-197m	346.50	1.53e+000	+-5.43e-001	1.57e+000	1 of 1	
Bi-211	351.00		BKG	1.00e+012	1 of 1	
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
Kr-85	514.00	7.95e+001	+-1.84e+001	9.39e+004	1 of 1	
Zn-65	1115.52	7.26e-001	+-2.28e-001	5.86e+003	1 of 1	12.10
Co-60	Average:	4.72e+000	+-1.39e-001	4.62e+004	2 of 2	524.02
	1173.22	4.70e+000	+-1.89e-001			
	1332.49	4.73e+000	+-2.05e-001			
K-40	1460.81	1.28e+001	+-1.11e+000	1.12e+013	1 of 1	
TOTAL:		9.93e+001	pCi /g		MPC Total:	536.12

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
608.81	1248.59	76	18	29	84	1.24	5.535e+000

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Quantum Technology
GDR_C Version 5.0

Sample ID : LIQ-9

Sample Size . . . . . 5.35e+002 g	Spectrum File . . . . . .TEMP.SP(
Sampling Start. 10-20-97 11:49	Counting Start. 10-20-97 11:4
Sampling Stop 10-20-97 11:49	Live Time . . . . . 3600 Sec
Current Date. 10-22-97 17:57	Real Time . . . . . 0 Sec

Detector #: 22

Energy(keV) = 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:4

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:4
Where En = Sqrt(Energy in keV)

Sensitivity 2.00	Search Start / End. . . . . 0 / 4095
Sigma Multiplier. 1.00	

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	352.44	715.60	78	20	33	102	1.21	
2	583.62	1196.22	47	14	22	53	1.28	
3	609.45	1249.92	67	13	20	45	0.69	
4	1460.03	3018.27	152	13	9	7	1.77	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-9

Sample Size . . . . . 5.35e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-20-97 11:49	Counting Start. 10-20-97 11:49
Sampling Stop 10-20-97 11:49	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 17:57	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	352.44	78	Ho-167	346.50	0.5700	6.06e-003	8.96e-001	3.53e-001
1	352.44	78	Pt-197m	346.50	0.1110	6.06e-003	8.09e-001	2.01e+000
1	352.44	78	Na-24	346.55	0.0100	6.06e-003	9.77e-001	1.85e+001
1	352.44	78	Bi-211	351.00				
1	352.44	78	U-235	351.10	0.1200	6.06e-003	1.00e+000	1.50e+000
1	352.44	78	U-238	351.99	0.3710	6.06e-003	1.00e+000	4.85e-001
1	352.44	78	Au-196	355.70	0.8760	6.06e-003	9.98e-001	2.07e-001
1	352.44	78	Ba-133	356.00	0.6200	6.06e-003	1.00e+000	2.91e-001
2	583.62	47	Tl-208	583.14				
2	583.62	47	TH-232	583.14	0.3090	3.95e-003	1.01e+000	5.35e-001
3	609.45	67	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	2.53e-001
3	609.45	67	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	3.08e+000
3	609.45	67	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	4.74e+000
3	609.45	67	Bi-214	609.30				
3	609.45	67	U-238	609.32	0.4609	3.81e-003	1.00e+000	5.34e-001
3	609.45	67	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	4.54e+000
3	609.45	67	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	2.65e-001
4	1460.03	152	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.11e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Absent					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	0.8319/	1.2813 =	64.9262 %)	0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Absent					
	338.40	0.1201	Absent					

	583.14	0.3090	Present					
	911.07	0.2900	Absent					
	968.90	0.1746	Absent					
	Total	1.4997	ABSENT	(0.3090/	1.4997 =	20.6041 %)	0.0	
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(0.6200/	1.3051 =	47.5059 %)	0.00	
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Absent					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(0.1200/	1.4030 =	8.5531 %)	0.00	
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(0.0520/	0.8390 =	6.1979 %)	0.000	
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Absent					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(0.0810/	0.4530 =	17.8808 %)	0.000	
--192	295.96	0.2872	Absent					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(0.0543/	1.9478 =	2.7878 %)	0.000	
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(0.5700/	0.8090 =	70.4574 %)	0.000	
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Present					
	Total	1.1060	ABSENT	(0.8760/	1.1060 =	79.2043 %)	0.000	
Pt-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT	(0.1110/	0.1110 =	100.0000 %)	0.000	
Na-24	346.55	0.0100	Unable to Calc					
	857.55	0.0100	Absent					
	1368.53	1.0000	Absent					
	1732.10	0.0100	Absent					
	Total	1.0300	ABSENT	(0.0100/	1.0300 =	0.9709 %)	0.000	
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(0.0001/	0.0001 =	100.0000 %)	0.000	
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT	(0.9320/	2.7600 =	33.7681 %)	0.000	
208	510.72	0.0001	Absent					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(0.0001/	0.0002 =	50.0000 %)	0.000	

Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.00
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
None								

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
Pt-197m	346.50	2.01e+000	+-5.05e-001	1.57e+000	1 of 1	
-211	351.00		BKG	1.00e+012	1 of 1	
-40	1460.81	1.11e+001	+-9.64e-001	1.12e+013	1 of 1	
TOTAL:		1.31e+001 pCi /g			MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
583.62	1196.22	47	14	22	53	1.28	3.301e+000
609.45	1249.92	67	13	20	45	0.69	4.884e+000

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GDR_C Version 5.0

Sample ID : LIQ-10

Sample Size	5.70e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-20-97 10:33	Counting Start.	10-20-97 10:33
Sampling Stop	.10-20-97 10:33	Live Time	3600 Sec
Current Date.	.10-22-97 17:58	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	511.11	1045.47	82	18	29	78	1.64	
2	609.44	1249.89	47	15	25	61	0.83	
3	1459.72	3017.64	164	15	14	17	1.80	

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Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-10

Sample Size . . . . . 5.70e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-20-97 10:33	Counting Start. 10-20-97 10:33
Sampling Stop 10-20-97 10:33	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 17:58	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	511.11	82	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	6.49e+000
1	511.11	82	Te-121	507.59	0.1767	4.43e-003	9.99e-001	1.38e+000
1	511.11	82	Tl-208	510.72				
1	511.11	82	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	1.64e+000
1	511.11	82	Annihila	511.00	1.0000	4.43e-003	1.00e+000	2.44e-001
1	511.11	82	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	9.48e-001
1	511.11	82	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	3.30e-001
1	511.11	82	KR-85	514.00	0.0041	4.43e-003	1.00e+000	5.95e+001
2	609.44	47	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	1.67e-001
2	609.44	47	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	2.03e+000
2	609.44	47	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	3.12e+000
2	609.44	47	Bi-214	609.30				
2	609.44	47	U-238	609.32	0.4609	3.81e-003	1.00e+000	3.52e-001
2	609.44	47	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	2.99e+000
2	609.44	47	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	1.74e-001
3	1459.72	164	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.12e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Absent					
	351.99	0.3710	Absent					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	0.4609/	1.2813 =	35.9713 %)	0.000
-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					

	606.82	0.0520	Present						
	636.15	0.1120	Absent						
	671.66	0.0180	Absent						
	Total	0.8390	ABSENT	(	0.0520/	0.8390	=	6.1979 %)	0.00
-101	191.93	0.1810	Absent						
	505.88	0.1135	Present						
	590.82	0.1930	Absent						
	695.53	0.0660	Absent						
	1012.35	0.1135	Absent						
	Total	0.6670	ABSENT	(	0.1135/	0.6670	=	17.0165 %)	0.000
Kr-79	261.30	0.1270	Absent						
	397.50	0.0950	Absent						
	511.00	0.1500	Present						
	606.10	0.0810	Present						
	Total	0.4530	ABSENT	(	0.2310/	0.4530	=	50.9934 %)	0.000
Ir-192	295.96	0.2872	Absent						
	308.46	0.2965	Absent						
	316.51	0.8290	Absent						
	468.06	0.4808	Absent						
	612.45	0.0543	Present						
	Total	1.9478	ABSENT	(	0.0543/	1.9478	=	2.7878 %)	0.000
Zn-71m	386.28	0.9200	Absent						
	487.34	0.6164	Absent						
	511.55	0.2806	Present						
	596.97	0.2760	Absent						
	620.19	0.5612	Absent						
	Total	2.6542	ABSENT	(	0.2806/	2.6542	=	10.5719 %)	0.000
Ag-108m	434.00	0.9050	Absent						
	614.37	0.9320	Present						
	722.95	0.9230	Absent						
	Total	2.7600	ABSENT	(	0.9320/	2.7600	=	33.7681 %)	0.000
h-106m	450.80	0.2450	Absent						
	511.70	0.8640	Present						
	616.10	0.2040	Absent						
	748.50	0.1950	Absent						
	1046.70	0.3070	Absent						
	Total	1.8150	ABSENT	(	0.8640/	1.8150	=	47.6033 %)	0.000
Te-121	507.59	0.1767	Present						
	573.14	0.8030	Absent						
	Total	0.9797	ABSENT	(	0.1767/	0.9797	=	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc						
	583.14	0.0001	Absent						
	Total	0.0002	ABSENT	(	0.0001/	0.0002	=	50.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc						
	Total	1.0000	PRESENT	(	1.0000/	1.0000	=	100.0000 %)	0.000
KR-85	514.00	0.0041	Present						
	Total	0.0041	PRESENT	(	0.0041/	0.0041	=	100.0000 %)	0.000
Cs-134	563.26	0.0838	Absent						
	569.29	0.1543	Absent						
	604.66	0.9756	Present						
	795.76	0.8544	Absent						
	801.84	0.0873	Absent						
	Total	2.1554	ABSENT	(	0.9756/	2.1554	=	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc						
	768.40	0.0001	Absent						
	1120.30	0.0001	Absent						
	1764.50	0.0001	Absent						
	Total	0.0004	ABSENT	(	0.0001/	0.0004	=	25.0000 %)	0.000
K-40	1460.81	0.1070	Present						
	Total	0.1070	PRESENT	(	0.1070/	0.1070	=	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

:#	Old Area	Nuclide	Reference Energy	Energy Line cts/dis	Ref Area	===>>	Calculated Energy	Contribution cts/dis	New Area
None									

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	5.95e+001	+-1.28e+001	9.39e+004	1 of 1	
K-40	1460.81	1.12e+001	+-1.01e+000	1.12e+013	1 of 1	
TOTAL:		7.07e+001 pCi /g			MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
609.44	1249.89	47	15	25	61	0.83	3.426e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : LIQ-11

Sample Size	5.10e+002 g	Spectrum File	TEMP.SP
Sampling Start	10-15-97 13:19	Counting Start	10-15-97 13:1
Sampling Stop	10-15-97 13:19	Live Time	3600 Se
Current Date	10-22-97 17:59	Real Time	0 Se

Detector #: 22

Energy(keV) = 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:4

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:4

Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End	0 / 4095
Sigma Multiplier	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	511.22	1045.70	94	18	28	87	2.43	
2	582.76	1194.43	53	14	23	57	1.39	
3	910.30	1875.39	44	12	18	37	1.17	
4	1458.98	3016.10	163	14	11	11	1.96	

Neely Nuclear Research Center

Quantum Technology

GDR_C Nuclide Activity Summary

Sample ID: LIQ-11

Sample Size . . . . . 5.10e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-15-97 13:19	Counting Start. 10-15-97 13:19
Sampling Stop 10-15-97 13:19	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 17:59	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 1^·47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	511.22	94	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	8.31e+000
1	511.22	94	Te-121	507.59	0.1767	4.43e-003	9.99e-001	1.77e+000
1	511.22	94	Tl-208	510.72				
1	511.22	94	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	2.10e+000
1	511.22	94	Annihila	511.00	1.0000	4.43e-003	1.00e+000	3.13e-001
1	511.22	94	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	1.21e+000
1	511.22	94	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	4.22e-001
1	511.22	94	KR-85	514.00	0.0041	4.43e-003	1.00e+000	7.62e+001
2	582.76	53	Tl-208	583.14				
2	582.76	53	TH-232	583.14	0.3090	3.96e-003	1.01e+000	6.32e-001
3	910.30	44	TH-232	911.07	0.2900	2.70e-003	1.01e+000	8.20e-001
3	910.30	44	Ac-228	911.20				
3	910.30	44	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	1.21e+000
4	1458.98	163	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.25e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Absent					
	338.40	0.1201	Absent					
	583.14	0.3090	Present					
	911.07	0.2900	Present					
	968.90	0.1746	Absent					
	Total	1.4997	ABSENT	(	0.5990/	1.4997 =	39.9413 %)	0.000
Mo-101	191.93	0.1810	Absent					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)	0.000

Ac-228	209.50	0.0001	Absent						
	338.70	0.0001	Absent						
	790.50	0.0001	Absent						
	911.20	0.0001	Unable to Calc						
	964.40	0.0001	Absent						
	968.80	0.0001	Absent						
	Total	0.0006	ABSENT	(	0.0001/	0.0006 =	16.6667 %)	0.000	
Kr-79	261.30	0.1270	Absent						
	397.50	0.0950	Absent						
	511.00	0.1500	Present						
	606.10	0.0810	Absent						
	Total	0.4530	ABSENT	(	0.1500/	0.4530 =	33.1126 %)	0.000	
Zn-71m	386.28	0.9200	Absent						
	487.34	0.6164	Absent						
	511.55	0.2806	Present						
	596.97	0.2760	Absent						
	620.19	0.5612	Absent						
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.000	
Rh-106m	450.80	0.2450	Absent						
	511.70	0.8640	Present						
	616.10	0.2040	Absent						
	748.50	0.1950	Absent						
	1046.70	0.3070	Absent						
	Total	1.8150	ABSENT	(	0.8640/	1.8150 =	47.6033 %)	0.000	
Te-121	507.59	0.1767	Present						
	573.14	0.8030	Absent						
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.000	
Tl-208	510.72	0.0001	Unable to Calc						
	583.14	0.0001	Unable to Calc						
	Total	0.0002	PRESENT	(	0.0002/	0.0002 =	100.0000 %)	0.000	
nihila	511.00	1.0000	Unable to Calc						
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.000	
KR-85	514.00	0.0041	Present						
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.000	
Sb-129	544.70	0.1920	Absent						
	812.80	0.4600	Absent						
	914.60	0.2140	Present						
	1030.10	0.1350	Absent						
	Total	1.0010	ABSENT	(	0.2140/	1.0010 =	21.3786 %)	0.000	
K-40	1460.81	0.1070	Present						
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000	

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
None								

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)	Halflife (hrs)	Peaks Found	MPC Fraction
Tl-208	510.72	BKG	1.00e+012	2 of 2	
	583.14	BKG			
Annihila	511.00	I.D.Only	1.00e+003	1 of 1	

KR-85	514.00	7.62e+001	+-1.46e+001	9.39e-004	1 of 1
K-40	1460.81	1.25e+001	+-1.08e+000	1.12e+013	1 of 1

TOTAL: 8.87e+001 pCi /g MPC Total: 0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
910.30	1875.39	44	12	18	37	1.17	4.528e+000

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GDR_C Version 5.0

Sample ID : LIQ-12

Sample Size	2.95e+002 g	Spectrum File	.TEMP.SP(
Sampling Start.	.10-20-97 09:20	Counting Start.	10-20-97 09:2(
Sampling Stop	.10-20-97 09:20	Live Time	3600 Sec
Current Date.	.10-22-97 18:00	Real Time	0 Sec

Detector #: 22

Energy(keV) = 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	583.19	1195.33	44	15	25	78	1.11	
2	1172.61	2420.72	761	31	29	72	1.90	
3	1331.59	2751.24	738	29	20	33	1.93	
4	1459.88	3017.96	172	14	12	12	2.18	

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GDR_C Nuclide Activity Summary

Sample ID: LIQ-12

Sample Size . . . . . 2.95e+002 g	Spectrum File . . . . . .TEMP.SP
Sampling Start. 10-20-97 09:20	Counting Start. 10-20-97 09:2
Sampling Stop 10-20-97 09:20	Buildup Time. . . . . 0.00e+000 Hr
Current Date. 10-22-97 18:00	Decay Time. . . . . 0.00e+000 Hr
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.li
ID.	IDGeneral Radionuclide Analysis Librar

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:4

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	583.19	44	Tl-208	583.14				
1	583.19	44	TH-232	583.14	0.3090	3.96e-003	1.01e+000	9.07e-001
2	1172.61	761	Co-60	1173.22	0.9986	2.17e-003	1.00e+000	8.94e+000
2	1172.61	761	TB-160	1177.95	0.1550	2.17e-003	1.00e+000	5.76e+001
3	1331.59	738	Co-60	1332.49	0.9998	1.95e-003	1.00e+000	9.66e+000
4	1459.88	172	K-40	1460.81	0.1070	1.80e-003	1.00e+000	2.28e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Absent					
	338.40	0.1201	Absent					
	583.14	0.3090	Present					
	911.07	0.2900	Absent					
	968.90	0.1746	Absent					
	Total	1.4997	ABSENT	(0.3090/	1.4997 =	20.6041 %)		0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Absent					
	876.37	0.3000	Absent					
	962.36	0.1000	Absent					
	966.17	0.2550	Absent					
	1177.95	0.1550	Present					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(0.1550/	1.3866 =	11.1784 %)		0.000
-208	510.72	0.0001	Absent					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(0.0001/	0.0002 =	50.0000 %)		0.000
Co-60	1173.22	0.9986	Present					

	1332.49	0.9998	Present				
	Total	1.9984	PRESENT	(1.9984/	1.9984 =	100.0000 %)	0.000
K-40	1460.81	0.1070	Present				
	Total	0.1070	PRESENT	(0.1070/	0.1070 =	100.0000 %)	0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
Co-60	Average:	9.29e+000	+-2.64e-001	4.62e+004	2 of 2	1031.87
	1173.22	8.94e+000	+-3.68e-001			
	1332.49	9.66e+000	+-3.79e-001			
K-40	1460.81	2.28e+001	+-1.92e+000	1.12e+013	1 of 1	
TOTAL:		3.21e+001 pCi /g			MPC Total:	1031.87

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
583.19	1195.33	44	15	25	78	1.11	3.089e+000

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GDR_C Version 5.0

Sample ID : LIQ-13

Sample Size	1.33e+003 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-17-97 15:28	Counting Start.	10-17-97 15:28
Sampling Stop	.10-17-97 15:28	Live Time	3600 Sec
Current Date.	.10-22-97 18:01	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	352.42	715.56	46	19	33	131	1.17	
2	510.99	1045.22	109	19	29	83	1.43	
3	609.68	1250.39	53	15	24	63	1.61	
4	1114.80	2300.55	155	15	18	31	1.78	
5	1459.45	3017.06	189	15	12	13	2.15	

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GDR_C Nuclide Activity Summary

Sample ID: LIQ-13

Sample Size . . . . . 1.33e+003 g	Spectrum File . . . . . .T
Sampling Start. 10-17-97 15:28	Counting Start. 10-17-9
Sampling Stop 10-17-97 15:28	Buildup Time. . . . . 0.00e+
Current Date. 10-22-97 18:01	Decay Time. . . . . 0.00e+
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\
ID.	IDGeneral Radionuclide Analysis

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-9

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Ha

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	C
1	352.42	46	Ho-167	346.50	0.5700	6.06e-003	8.96e-001	8.
1	352.42	46	Pt-197m	346.50	0.1110	6.06e-003	8.09e-001	4.
1	352.42	46	Na-24	346.55	0.0100	6.06e-003	9.77e-001	4.
1	352.42	46	Bi-211	351.00				
1	352.42	46	U-235	351.10	0.1200	6.06e-003	1.00e+000	3.
1	352.42	46	U-238	351.99	0.3710	6.06e-003	1.00e+000	1.
1	352.42	46	Au-196	355.70	0.8760	6.06e-003	9.98e-001	4.
1	352.42	46	Ba-133	356.00	0.6200	6.06e-003	1.00e+000	6.
2	510.99	109	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	3.
2	510.99	109	Te-121	507.59	0.1767	4.43e-003	9.99e-001	7.
2	510.99	109	Tl-208	510.72				
2	510.99	109	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	9.3c
2	510.99	109	Annihila	511.00	1.0000	4.43e-003	1.00e+000	1.39
2	510.99	109	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	5.42
2	510.99	109	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	1.88
2	510.99	109	KR-85	514.00	0.0041	4.43e-003	1.00e+000	3.40
3	609.68	53	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	8.08
3	609.68	53	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	9.
3	609.68	53	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	1.
3	609.68	53	Bi-214	609.30				
3	609.68	53	U-238	609.32	0.4609	3.81e-003	1.00e+000	1.
3	609.68	53	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	1.
3	609.68	53	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	8.
4	1114.80	155	Eu-152	1112.07	0.1340	2.27e-003	1.00e+000	2.
4	1114.80	155	Sn-127	1114.30	0.3800	2.27e-003	8.55e-001	1.
4	1114.80	155	Zn-65	1115.52	0.5075	2.27e-003	1.00e+000	7.
4	1114.80	155	Ni-65	1115.53	0.1513	2.27e-003	8.76e-001	2.
4	1114.80	155	Bi-214	1120.30				
4	1114.80	155	Sc-46	1120.51	1.0000	2.27e-003	1.00e+000	3.
5	1459.45	189	K-40	1460.81	0.1070	1.80e-003	1.00e+000	5.

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Absent					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	0.8319/	1.2813 =	64.9262 %)	0.000
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(	0.6200/	1.3051 =	47.5059 %)	0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Absent					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(	0.1200/	1.4030 =	8.5531 %)	0.000
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Absent					
	344.30	0.2720	Absent					
	778.90	0.1272	Absent					
	964.00	0.1433	Absent					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Present					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.1340/	1.3688 =	9.7896 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Mo-101	191.93	0.1810	Absent					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
Ir-192	295.96	0.2872	Absent					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.0543/	1.9478 =	2.7878 %)	0.000
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					

	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %	0.00
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Present					
	Total	1.1060	ABSENT	(	0.8760/	1.1060 =	79.2043 %)	0.00
-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.00
Na-24	346.55	0.0100	Unable to Calc					
	857.55	0.0100	Absent					
	1368.53	1.0000	Absent					
	1732.10	0.0100	Absent					
	Total	1.0300	ABSENT	(	0.0100/	1.0300 =	0.9709 %)	0.00
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.00
Zn-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.00
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT	(	0.9320/	2.7600 =	33.7681 %)	0.00
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Absent					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT	(	0.8640/	1.8150 =	47.6033 %)	0.00
Te-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.00
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.00
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.00
KR-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.00
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.00
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Unable to Calc					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0002/	0.0004 =	50.0000 %)	0.00
Sn-127	823.10	0.1060	Absent					
	1095.60	0.1940	Absent					
	1114.30	0.3800	Present					
	Total	0.6800	ABSENT	(	0.3800/	0.6800 =	55.8824 %)	0.00
Sc-46	889.25	1.0000	Absent					
	1120.51	1.0000	Present					
	2009.76	0.1000	Absent					
	Total	2.1000	ABSENT	(	1.0000/	2.1000 =	47.6190 %)	0.00
Zn-65	1115.52	0.5075	Present					
	Total	0.5075	PRESENT	(	0.5075/	0.5075 =	100.0000 %)	0.00

Ni-65	1115.53	0.1513	Present					
	1481.84	0.2350	Absent					
	Total	0.3863	ABSENT	(	0.1513/	0.3863 =	39.1665 %)	0.00
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.00

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy	Energy Line cts/dis	Ref Area	===>> Calculated Contribution Energy	cts/dis	New Area
None								

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
Pt-197m	346.50	4.79e-001	+-2.00e-001	1.57e+000	1 of 1	
Bi-211	351.00		BKG	1.00e+012	1 of 1	
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	3.40e+001	+-5.78e+000	9.39e+004	1 of 1	
Zn-65	1115.52	7.63e-001	+-7.63e-002	5.86e+003	1 of 1	12.72
K-40	1460.81	5.57e+000	+-4.46e-001	1.12e+013	1 of 1	
TOTAL:		4.08e+001 pCi /g			MPC Total:	12.72

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
609.68	1250.39	53	15	24	63	1.61	3.865e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : LIQ-14

Sample Size	5.50e-001 L	Spectrum File	.TEMP.SPC
Sampling Start.	.10-17-97 13:57	Counting Start.	10-17-97 13:57
Sampling Stop	.10-17-97 13:57	Live Time	3600 Sec
Current Date.	.10-22-97 08:35	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	661.46	1358.05	3087	61	49	206	1.55	
2	1172.18	2419.83	2045	49	39	119	1.86	
3	1331.14	2750.31	1923	45	15	19	2.05	
4	1459.20	3016.56	184	14	6	3	2.27	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-14

Sample Size . . . . . 5.50e-001 L	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-17-97 13:57	Counting Start. 10-17-97 13:57
Sampling Stop 10-17-97 13:57	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 08:35	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	661.46	3087	Cu-61	656.00	0.1170	3.55e-003	9.05e-001	1.12e+005
1	661.46	3087	As-76	657.03	0.0608	3.55e-003	9.87e-001	1.98e+005
1	661.46	3087	Ag-110m	657.75	0.9440	3.55e-003	1.00e+000	1.26e+004
1	661.46	3087	Cs-137	661.65	0.8500	3.55e-003	1.00e+000	1.40e+004
1	661.46	3087	Ce-143	664.55	0.0525	3.55e-003	9.90e-001	2.28e+005
1	661.46	3087	Sb-126	666.30	0.9970	3.55e-003	9.99e-001	1.19e+004
1	661.46	3087	I-126	667.00	0.3300	3.55e-003	9.99e-001	3.60e+004
2	1172.18	2045	Co-60	1173.22	0.9986	2.17e-003	1.00e+000	1.29e+004
2	1172.18	2045	TB-160	1177.95	0.1550	2.17e-003	1.00e+000	8.30e+004
3	1331.14	1923	Co-60	1332.49	0.9998	1.95e-003	1.00e+000	1.35e+004
4	1459.20	184	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.31e+004

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Absent					
	876.37	0.3000	Absent					
	962.36	0.1000	Absent					
	966.17	0.2550	Absent					
	1177.95	0.1550	Present					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(	0.1550/	1.3866 =	11.1784 %)	0.000
Cu-61	283.70	0.1320	Absent					
	656.00	0.1170	Present					
	Total	0.2490	ABSENT	(	0.1170/	0.2490 =	46.9880 %)	0.000
Ce-143	293.26	0.4200	Absent					
	664.55	0.0525	Present					
	721.96	0.0512	Absent					

	Total	0.5237	ABSENT	(	0.0525/	0.5237 =	10.0248 %)	0.000
I-126	386.00	0.3400	Absent					
	667.00	0.3300	Present					
	Total	0.6700	ABSENT	(	0.3300/	0.6700 =	49.2537 %)	0.000
-126	414.80	0.8770	Absent					
	666.30	0.9970	Present					
	695.00	0.9970	Absent					
	697.00	0.3190	Absent					
	720.50	0.5780	Absent					
	Total	3.7680	ABSENT	(	0.9970/	3.7680 =	26.4597 %)	0.000
As-76	559.10	0.4500	Absent					
	657.03	0.0608	Present					
	Total	0.5108	ABSENT	(	0.0608/	0.5108 =	11.9029 %)	0.000
Ag-110m	657.75	0.9440	Present					
	677.60	0.1057	Absent					
	706.67	0.1631	Absent					
	763.93	0.2226	Absent					
	884.67	0.7278	Absent					
	937.48	0.3427	Absent					
	1384.27	0.2164	Absent					
	1505.00	0.1323	Absent					
	Total	2.8546	ABSENT	(	0.9440/	2.8546 =	33.0694 %)	0.000
Cs-137	661.65	0.8500	Present					
	Total	0.8500	PRESENT	(	0.8500/	0.8500 =	100.0000 %)	0.000
Co-60	1173.22	0.9986	Present					
	1332.49	0.9998	Present					
	Total	1.9984	PRESENT	(	1.9984/	1.9984 =	100.0000 %)	0.000
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /L)	Halflife (hrs)	Peaks Found	MPC Fraction
Cs-137	661.65	1.40e+004 +-2.76e+002	2.64e+005	1 of 1	1395684.63
Co-60	Average:	1.32e+004 +-2.21e+002	4.62e+004	2 of 2	1464852.75
	1173.22	1.29e+004 +-3.11e+002			
	1332.49	1.35e+004 +-3.13e+002			
K-40	1460.81	1.31e+004 +-9.84e+002	1.12e+013	1 of 1	
TOTAL:		4.02e+004 pCi /L		MPC Total:	2860537.50

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : LIQ-15

Sample Size	4.80e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-15-97 15:48	Counting Start.	10-15-97 15:48
Sampling Stop	.10-15-97 15:48	Live Time	3600 Sec
Current Date.	.10-22-97 18:02	Real Time	0 Sec

Detector #: 22

Energy(keV) = 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	238.81	479.36	62	27	46	296	1.09	
2	510.40	1043.99	91	22	39	138	1.38	
3	1171.44	2418.29	1204	39	34	104	2.02	
4	1330.44	2748.85	1250	37	18	26	2.04	
5	1458.59	3015.29	170	15	14	17	2.43	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-15

Sample Size . . . . . 4.80e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-15-97 15:48	Counting Start. 10-15-97 15:48
Sampling Stop 10-15-97 15:48	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 18:02	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	238.81	62	Xe-133m	233.20	0.1000	8.24e-003	9.94e-001	1.18e+000
1	238.81	62	Fr-223	234.60				
1	238.81	62	Th-227	236.00				
1	238.81	62	U-235	236.00	0.1100	8.24e-003	1.00e+000	1.07e+000
1	238.81	62	TH-232	238.63	0.4310	8.24e-003	1.01e+000	2.70e-001
1	238.81	62	Te-131m	240.93	0.0755	8.24e-003	9.89e-001	1.58e+000
1	238.81	62	Ra-224	241.08				
1	238.81	62	Xe-125	243.40	0.2871	8.24e-003	9.80e-001	4.18e-001
1	238.81	62	IN-116M	244.59	0.0038	8.24e-003	6.99e-001	4.43e+001
1	238.81	62	Eu-152	244.67	0.0772	8.24e-003	1.00e+000	1.52e+000
2	510.40	91	Mo-101	505.88	0.1135	4.44e-003	3.31e-001	8.54e+000
2	510.40	91	Te-121	507.59	0.1767	4.44e-003	9.99e-001	1.82e+000
2	510.40	91	Tl-208	510.72				
2	510.40	91	Kr-79	511.00	0.1500	4.44e-003	9.90e-001	2.16e+000
2	510.40	91	Annihila	511.00	1.0000	4.44e-003	1.00e+000	3.21e-001
2	510.40	91	Zn-71m	511.55	0.2806	4.44e-003	9.17e-001	1.25e+000
2	510.40	91	Rh-106m	511.70	0.8640	4.44e-003	8.56e-001	4.34e-001
2	510.40	91	KR-85	514.00	0.0041	4.44e-003	1.00e+000	7.83e+001
3	1171.44	1204	Co-60	1173.22	0.9986	2.17e-003	1.00e+000	8.68e+000
4	1330.44	1250	Co-60	1332.49	0.9998	1.95e-003	1.00e+000	1.00e+001
5	1458.59	170	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.38e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status	Halflives
TH-232	77.11	0.1750	Absent	
	238.63	0.4310	Present	
	338.40	0.1201	Absent	
	583.14	0.3090	Absent	
	911.07	0.2900	Absent	
	968.90	0.1746	Absent	

	Total	1.4997	ABSENT	(	0.4310/	1.4997 =	28.7391 %)	0.000
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
[illegible]-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Absent					
	Total	1.4030	ABSENT	(	0.1100/	1.4030 =	7.8403 %)	0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Absent					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.0755/	1.6635 =	4.5386 %)	0.000
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Absent					
	778.90	0.1272	Absent					
	964.00	0.1433	Absent					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.0772/	1.3688 =	5.6400 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Xe-125	188.43	0.5500	Absent					
	243.40	0.2871	Present					
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.000
Mo-101	191.93	0.1810	Absent					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)	0.000
[illegible]-133m	233.20	0.1000	Present					
	Total	0.1000	PRESENT	(	0.1000/	0.1000 =	100.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					

	Total	0.0002	ABSENT (	0.0001/	0.0002 =	50.0000 %	0.000
Ra-224	241.08	0.0001	Unable to Calc				
	Total	0.0001	PRESENT (	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent				
	397.50	0.0950	Absent				
	511.00	0.1500	Present				
	606.10	0.0810	Absent				
	Total	0.4530	ABSENT (	0.1500/	0.4530 =	33.1126 %)	0.000
Zn-71m	386.28	0.9200	Absent				
	487.34	0.6164	Absent				
	511.55	0.2806	Present				
	596.97	0.2760	Absent				
	620.19	0.5612	Absent				
	Total	2.6542	ABSENT (	0.2806/	2.6542 =	10.5719 %)	0.000
Rh-106m	450.80	0.2450	Absent				
	511.70	0.8640	Present				
	616.10	0.2040	Absent				
	748.50	0.1950	Absent				
	1046.70	0.3070	Absent				
	Total	1.8150	ABSENT (	0.8640/	1.8150 =	47.6033 %)	0.000
Te-121	507.59	0.1767	Present				
	573.14	0.8030	Absent				
	Total	0.9797	ABSENT (	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc				
	583.14	0.0001	Absent				
	Total	0.0002	ABSENT (	0.0001/	0.0002 =	50.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc				
	Total	1.0000	PRESENT (	1.0000/	1.0000 =	100.0000 %)	0.000
KR-85	514.00	0.0041	Present				
	Total	0.0041	PRESENT (	0.0041/	0.0041 =	100.0000 %)	0.000
-60	1173.22	0.9986	Present				
	1332.49	0.9998	Present				
	Total	1.9984	PRESENT (	1.9984/	1.9984 =	100.0000 %)	0.000
K-40	1460.81	0.1070	Present				
	Total	0.1070	PRESENT (	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
None								

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
Xe-133m	233.20	1.18e+000	+-5.18e-001	5.42e+001	1 of 1	
Ra-224	241.08		BKG	1.00e+012	1 of 1	
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	7.83e+001	+-1.92e+001	9.39e+004	1 of 1	
Co-60	Average:	9.33e+000	+-2.03e-001	4.62e+004	2 of 2	1036.95
	1173.22	8.68e+000	+-2.80e-001			
	1332.49	1.00e+001	+-2.94e-001			
K-40	1460.81	1.38e+001	+-1.22e+000	1.12e+013	1 of 1	

TOTAL: 1.03e+002 pCi /g MPC Total: 1036.95

UNKNOWN PEAKS

ıergy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : LIQ-16

Sample Size	5.50e-001 L	Spectrum File	.TEMP.SPC
Sampling Start.	.10-17-97 11:27	Counting Start.	10-17-97 11:27
Sampling Stop	.10-17-97 11:27	Live Time	3600 Sec
Current Date.	.10-22-97 08:45	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	238.97	479.69	91	25	43	224	1.00	
2	352.33	715.36	52	15	24	90	1.10	
3	511.08	1045.40	60	22	40	137	0.92	
4	582.79	1194.49	51	16	29	83	1.55	
5	609.13	1249.25	52	14	23	63	1.74	
6	1172.13	2419.73	147	15	17	28	1.26	
7	1331.08	2750.18	123	13	14	16	2.19	
8	1459.21	3016.58	163	14	12	13	2.19	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-16

Sample Size . . . . . 5.50e-001 L	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-17-97 11:27	Counting Start. 10-17-97 11:27
Sampling Stop 10-17-97 11:27	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 08:45	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	238.97	91	Xe-133m	233.20	0.1000	8.24e-003	9.94e-001	1.52e+003
1	238.97	91	Fr-223	234.60				
1	238.97	91	Th-227	236.00				
1	238.97	91	U-235	236.00	0.1100	8.24e-003	1.00e+000	1.37e+003
1	238.97	91	TH-232	238.63	0.4310	8.24e-003	1.01e+000	3.47e+002
1	238.97	91	Te-131m	240.93	0.0755	8.24e-003	9.89e-001	2.02e+003
1	238.97	91	Ra-224	241.08				
1	238.97	91	Xe-125	243.40	0.2871	8.24e-003	9.80e-001	5.36e+002
1	238.97	91	IN-116M	244.59	0.0038	8.24e-003	6.99e-001	5.68e+004
1	238.97	91	Eu-152	244.67	0.0772	8.24e-003	1.00e+000	1.95e+003
2	352.33	52	Ho-167	346.50	0.5700	6.06e-003	8.96e-001	2.29e+002
2	352.33	52	Pt-197m	346.50	0.1110	6.06e-003	8.09e-001	1.30e+003
2	352.33	52	Na-24	346.55	0.0100	6.06e-003	9.77e-001	1.20e+004
2	352.33	52	Bi-211	351.00				
2	352.33	52	U-235	351.10	0.1200	6.06e-003	1.00e+000	9.75e+002
2	352.33	52	U-238	351.99	0.3710	6.06e-003	1.00e+000	3.15e+002
2	352.33	52	Au-196	355.70	0.8760	6.06e-003	9.98e-001	1.34e+002
2	352.33	52	Ba-133	356.00	0.6200	6.06e-003	1.00e+000	1.89e+002
3	511.08	60	Mo-101	505.88	0.1135	4.43e-003	3.31e-001	4.92e+003
3	511.08	60	Te-121	507.59	0.1767	4.43e-003	9.99e-001	1.05e+003
3	511.08	60	Tl-208	510.72				
3	511.08	60	Kr-79	511.00	0.1500	4.43e-003	9.90e-001	1.24e+003
3	511.08	60	Annihila	511.00	1.0000	4.43e-003	1.00e+000	1.85e+002
3	511.08	60	Zn-71m	511.55	0.2806	4.43e-003	9.17e-001	7.19e+002
3	511.08	60	Rh-106m	511.70	0.8640	4.43e-003	8.56e-001	2.50e+002
3	511.08	60	KR-85	514.00	0.0041	4.43e-003	1.00e+000	4.51e+004
4	582.79	51	Tl-208	583.14				
4	582.79	51	TH-232	583.14	0.3090	3.96e-003	1.01e+000	5.64e+002
5	609.13	52	Cs-134	604.66	0.9756	3.81e-003	1.00e+000	1.91e+002
5	609.13	52	Kr-79	606.10	0.0810	3.81e-003	9.90e-001	2.32e+003
5	609.13	52	Sb-125	606.82	0.0520	3.81e-003	1.00e+000	3.58e+003
5	609.13	52	Bi-214	609.30				
5	609.13	52	U-238	609.32	0.4609	3.81e-003	1.00e+000	4.03e+002

5	609.13	52	Ir-192	612.45	0.0543	3.81e-003	1.00e+000	3.43e-003
5	609.13	52	Ag-108m	614.37	0.9320	3.81e-003	1.00e+000	2.00e-002
6	1172.13	147	Co-60	1173.22	0.9986	2.17e-003	1.00e+000	9.26e+002
6	1172.13	147	TB-160	1177.95	0.1550	2.17e-003	1.00e+000	5.96e+003
7	1331.08	123	Co-60	1332.49	0.9998	1.95e-003	1.00e+000	8.63e+002
8	1459.21	163	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.16e+004

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status					Halflives
U-238	77.11	0.1070	Absent					
	295.22	0.1920	Absent					
	351.99	0.3710	Present					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(0.8319/	1.2813 =	64.9262 %)		0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Absent					
	583.14	0.3090	Present					
	911.07	0.2900	Absent					
	968.90	0.1746	Absent					
	Total	1.4997	ABSENT	(0.7400/	1.4997 =	49.3432 %)		0.000
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(0.0001/	0.0002 =	50.0000 %)		0.000
Ba-133	81.00	0.3429	Absent					
	276.40	0.0709	Absent					
	302.85	0.1816	Absent					
	356.00	0.6200	Present					
	383.85	0.0897	Absent					
	Total	1.3051	ABSENT	(0.6200/	1.3051 =	47.5059 %)		0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Present					
	Total	1.4030	ABSENT	(0.2300/	1.4030 =	16.3934 %)		0.000
TB-160	86.80	0.1340	Absent					
	197.04	0.0524	Absent					
	215.65	0.0402	Absent					
	298.57	0.2740	Absent					
	876.37	0.3000	Absent					
	962.36	0.1000	Absent					
	966.17	0.2550	Absent					
	1177.95	0.1550	Present					
	1271.88	0.0760	Absent					
	Total	1.3866	ABSENT	(0.1550/	1.3866 =	11.1784 %)		0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Absent					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					

	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.0755/	1.6635 =	4.5386 %)	0.00(
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Absent					
	778.90	0.1272	Absent					
	964.00	0.1433	Absent					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.0772/	1.3688 =	5.6400 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000
Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Xe-125	188.43	0.5500	Absent					
	243.40	0.2871	Present					
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.000
Mo-101	191.93	0.1810	Absent					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)	0.000
Xe-133m	233.20	0.1000	Present					
	Total	0.1000	PRESENT	(	0.1000/	0.1000 =	100.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
Ir-192	295.96	0.2872	Absent					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					

	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.0543/	1.9478 =	2.7878 %)	0.00
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %)	0.00
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Present					
	Total	1.1060	ABSENT	(	0.8760/	1.1060 =	79.2043 %)	0.00
Pt-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.00
Na-24	346.55	0.0100	Unable to Calc					
	857.55	0.0100	Absent					
	1368.53	1.0000	Absent					
	1732.10	0.0100	Absent					
	Total	1.0300	ABSENT	(	0.0100/	1.0300 =	0.9709 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Zn-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.000
Ag-108m	434.00	0.9050	Absent					
	614.37	0.9320	Present					
	722.95	0.9230	Absent					
	Total	2.7600	ABSENT	(	0.9320/	2.7600 =	33.7681 %)	0.000
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Absent					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT	(	0.8640/	1.8150 =	47.6033 %)	0.000
Te-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	PRESENT	(	0.0002/	0.0002 =	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.000
KR-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.000
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc					
	768.40	0.0001	Absent					
	1120.30	0.0001	Absent					
	1764.50	0.0001	Absent					
	Total	0.0004	ABSENT	(	0.0001/	0.0004 =	25.0000 %)	0.000
Co-60	1173.22	0.9986	Present					
	1332.49	0.9998	Present					
	Total	1.9984	PRESENT	(	1.9984/	1.9984 =	100.0000 %)	0.000
K-40	1460.81	0.1070	Present					
	Total	0.1070	PRESENT	(	0.1070/	0.1070 =	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

#	Old Area	Nuclide	Reference Energy	Energy Line cts/dis	Ref Area	===>> Calculated Contribution Energy	cts/dis	New Area
None								

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /L)		Halflife (hrs)	Peaks Found	MPC Fraction
Xe-133m	233.20	1.52e+003	+-4.21e+002	5.42e+001	1 of 1	
Ra-224	241.08		BKG	1.00e+012	1 of 1	
Pt-197m	346.50	1.30e+003	+-3.88e+002	1.57e+000	1 of 1	
Bi-211	351.00		BKG	1.00e+012	1 of 1	
Tl-208	510.72		BKG	1.00e+012	2 of 2	
	583.14		BKG			
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	4.51e+004	+-1.64e+004	9.39e+004	1 of 1	
Co-60	Average:	8.94e+002	+-6.67e+001	4.62e+004	2 of 2	99299.10
	1173.22	9.26e+002	+-9.53e+001			
	1332.49	8.63e+002	+-9.34e+001			
K-40	1460.81	1.16e+004	+-1.01e+003	1.12e+013	1 of 1	
TOTAL:		6.04e+004 pCi /L			MPC Total:	99299.10

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
609.13	1249.25	52	14	23	63	1.74	3.789e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : LIQ-17

Sample Size	5.40e+002 g	Spectrum File	.TEMP.SPC
Sampling Start.	.10-15-97 08:39	Counting Start.	10-15-97 08:39
Sampling Stop	.10-15-97 08:39	Live Time	3600 Sec
Current Date.	.10-22-97 18:04	Real Time	0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	351.31	713.24	76	19	32	117	1.17	
2	510.10	1043.38	124	18	28	65	2.58	
3	608.19	1247.29	53	15	26	73	1.18	
4	910.06	1874.88	66	9	9	8	2.07	
5	1458.38	3014.84	192	15	13	16	2.15	
6	1761.61	3645.26	36	7	8	5	1.60	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-17

Sample Size . . . . . 5.40e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-15-97 08:39	Counting Start. 10-15-97 08:39
Sampling Stop 10-15-97 08:39	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 18:04	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	351.31	76	HF-181	345.95	0.1400	6.08e-003	1.00e+000	1.24e+000
1	351.31	76	Ho-167	346.50	0.5700	6.08e-003	8.96e-001	3.40e-001
1	351.31	76	Pt-197m	346.50	0.1110	6.08e-003	8.09e-001	1.94e+000
1	351.31	76	Na-24	346.55	0.0100	6.08e-003	9.77e-001	1.78e+001
1	351.31	76	Bi-211	351.00				
1	351.31	76	U-235	351.10	0.1200	6.08e-003	1.00e+000	1.45e+000
1	351.31	76	U-238	351.99	0.3710	6.08e-003	1.00e+000	4.67e-001
1	351.31	76	Au-196	355.70	0.8760	6.08e-003	9.98e-001	1.99e-001
1	351.31	76	Ba-133	356.00	0.6200	6.08e-003	1.00e+000	2.80e-001
2	510.10	124	Mo-101	505.88	0.1135	4.44e-003	3.31e-001	1.03e+001
2	510.10	124	Te-121	507.59	0.1767	4.44e-003	9.99e-001	2.20e+000
2	510.10	124	Tl-208	510.72				
2	510.10	124	Kr-79	511.00	0.1500	4.44e-003	9.90e-001	2.62e+000
2	510.10	124	Annihila	511.00	1.0000	4.44e-003	1.00e+000	3.89e-001
2	510.10	124	Zn-71m	511.55	0.2806	4.44e-003	9.17e-001	1.51e+000
2	510.10	124	Rh-106m	511.70	0.8640	4.44e-003	8.56e-001	5.25e-001
2	510.10	124	KR-85	514.00	0.0041	4.44e-003	1.00e+000	9.48e+001
3	608.19	53	Sb-124	602.72	0.9830	3.82e-003	1.00e+000	1.96e-001
3	608.19	53	Cs-134	604.66	0.9756	3.82e-003	1.00e+000	1.98e-001
3	608.19	53	Kr-79	606.10	0.0810	3.82e-003	9.90e-001	2.41e+000
3	608.19	53	Sb-125	606.82	0.0520	3.82e-003	1.00e+000	3.71e+000
3	608.19	53	Bi-214	609.30				
3	608.19	53	U-238	609.32	0.4609	3.82e-003	1.00e+000	4.18e-001
3	608.19	53	Ir-192	612.45	0.0543	3.82e-003	1.00e+000	3.56e+000
4	910.06	66	TH-232	911.07	0.2900	2.70e-003	1.01e+000	1.16e+000
4	910.06	66	Ac-228	911.20				
4	910.06	66	Sb-129	914.60	0.2140	2.70e-003	9.25e-001	1.72e+000
5	1458.38	192	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.39e+001
6	1761.61	36	U-238	1764.28	0.1504	1.53e-003	1.00e+000	2.17e+000
6	1761.61	36	Bi-214	1764.50				

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status						Halflives
U-238	77.11	0.1070	Absent						
	295.22	0.1920	Absent						
	351.99	0.3710	Present						
	609.32	0.4609	Present						
	1764.28	0.1504	Present						
	Total	1.2813	ABSENT	(	0.9823/	1.2813 =	76.6643 %)		0.00
TH-232	77.11	0.1750	Absent						
	238.63	0.4310	Absent						
	338.40	0.1201	Absent						
	583.14	0.3090	Absent						
	911.07	0.2900	Present						
	968.90	0.1746	Absent						
	Total	1.4997	ABSENT	(	0.2900/	1.4997 =	19.3372 %)		0.00(
Ba-133	81.00	0.3429	Absent						
	276.40	0.0709	Absent						
	302.85	0.1816	Absent						
	356.00	0.6200	Present						
	383.85	0.0897	Absent						
	Total	1.3051	ABSENT	(	0.6200/	1.3051 =	47.5059 %)		0.00(
U-235	81.07	0.1480	Absent						
	83.78	0.2460	Absent						
	143.76	0.1050	Absent						
	185.72	0.5400	Absent						
	236.00	0.1100	Absent						
	269.60	0.1340	Absent						
	351.10	0.1200	Present						
	Total	1.4030	ABSENT	(	0.1200/	1.4030 =	8.5531 %)		0.00(
'-181	133.05	0.4300	Absent						
	136.25	0.0610	Absent						
	345.95	0.1400	Present						
	482.16	0.8600	Absent						
	Total	1.4910	ABSENT	(	0.1400/	1.4910 =	9.3897 %)		0.000
Sb-125	176.29	0.0630	Absent						
	380.51	0.0140	Absent						
	427.95	0.2960	Absent						
	463.51	0.1000	Absent						
	600.77	0.1840	Absent						
	606.82	0.0520	Present						
	636.15	0.1120	Absent						
	671.66	0.0180	Absent						
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)		0.000
Mo-101	191.93	0.1810	Absent						
	505.88	0.1135	Present						
	590.82	0.1930	Absent						
	695.53	0.0660	Absent						
	1012.35	0.1135	Absent						
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)		0.000
Ac-228	209.50	0.0001	Absent						
	338.70	0.0001	Absent						
	790.50	0.0001	Absent						
	911.20	0.0001	Unable to Calc						
	964.40	0.0001	Absent						
	968.80	0.0001	Absent						
	Total	0.0006	ABSENT	(	0.0001/	0.0006 =	16.6667 %)		0.000
Kr-79	261.30	0.1270	Absent						
	397.50	0.0950	Absent						
	511.00	0.1500	Present						

	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
Ir-192	295.96	0.2872	Absent					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.0543/	1.9478 =	2.7878 %)	0.000
Ho-167	321.30	0.2390	Absent					
	346.50	0.5700	Present					
	Total	0.8090	ABSENT	(	0.5700/	0.8090 =	70.4574 %)	0.000
Au-196	332.90	0.2300	Absent					
	355.70	0.8760	Present					
	Total	1.1060	ABSENT	(	0.8760/	1.1060 =	79.2043 %)	0.000
Pt-197m	346.50	0.1110	Present					
	Total	0.1110	PRESENT	(	0.1110/	0.1110 =	100.0000 %)	0.000
Na-24	346.55	0.0100	Unable to Calc					
	857.55	0.0100	Absent					
	1368.53	1.0000	Absent					
	1732.10	0.0100	Absent					
	Total	1.0300	ABSENT	(	0.0100/	1.0300 =	0.9709 %)	0.000
Bi-211	351.00	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Zn-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.000
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Absent					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT	(	0.8640/	1.8150 =	47.6033 %)	0.000
Te-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.000
KR-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.000
Sb-129	544.70	0.1920	Absent					
	812.80	0.4600	Absent					
	914.60	0.2140	Present					
	1030.10	0.1350	Absent					
	Total	1.0010	ABSENT	(	0.2140/	1.0010 =	21.3786 %)	0.000
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					
	604.66	0.9756	Present					
	795.76	0.8544	Absent					
	801.84	0.0873	Absent					
	Total	2.1554	ABSENT	(	0.9756/	2.1554 =	45.2631 %)	0.000
-124	602.72	0.9830	Present					
	645.82	0.0723	Absent					
	722.78	0.1130	Absent					
	1691.02	0.4900	Absent					

	Total	1.6583	ABSENT	(0.9830/	1.6583 =	59.2776 %)	0.00
Bi-214	609.30	0.0001	Unable to Calc				
	768.40	0.0001	Absent				
	1120.30	0.0001	Absent				
	1764.50	0.0001	Unable to Calc				
	Total	0.0004	ABSENT	(0.0002/	0.0004 =	50.0000 %)	0.00
K-40	1460.81	0.1070	Present				
	Total	0.1070	PRESENT	(0.1070/	0.1070 =	100.0000 %)	0.00

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
None								

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
Pt-197m	346.50	1.94e+000	+-4.96e-001	1.57e+000	1 of 1	
Bi-211	351.00		BKG	1.00e+012	1 of 1	
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	9.48e+001	+-1.39e+001	9.39e+004	1 of 1	
K-40	1460.81	1.39e+001	+-1.12e+000	1.12e+013	1 of 1	

TAL: 1.11e+002 pCi /g MPC Total: 0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
608.19	1247.29	53	15	26	73	1.18	3.857e+000
910.06	1874.88	66	9	9	8	2.07	6.791e+000
1761.61	3645.26	36	7	8	5	1.60	6.543e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : LIQ-18

Sample Size . . . . . 5.40e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-09-97 09:19	Counting Start. 10-09-97 09:19
Sampling Stop 10-09-97 09:19	Live Time . . . . . 3600 Sec
Current Date. 10-22-97 18:05	Real Time . . . . . 0 Sec

Detector #: 22

Energy(keV)= 8.24 + 0.481*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-05-96 10:47

FWHM(keV) = 0.98 + 0.006*En + 6.22e-004*En^2 + 0.00e+000*En^3 12-05-96 10:47
Where En = Sqrt(Energy in keV)

Sensitivity 2.00	Search Start / End. . . . . 0 / 4095
Sigma Multiplier. 1.00	

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	239.07	479.89	65	23	38	199	1.10	
2	509.95	1043.05	95	19	31	88	2.54	
3	582.76	1194.43	71	16	27	63	1.86	
4	608.31	1247.55	49	15	25	72	1.56	
5	1457.62	3013.27	171	14	11	11	2.06	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: LIQ-18

Sample Size . . . . . 5.40e+002 g	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-09-97 09:19	Counting Start. 10-09-97 09:19
Sampling Stop 10-09-97 09:19	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-22-97 18:05	Decay Time. . . . . 0.00e+000 Hrs
Efficiency Filec:\gdr\eff\550mlliq.ef	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[6.66e-002*En^-2.92e+000 + 4.02e+002*En^8.62e-001] 12-05-96 10:47

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

INITIAL NUCLIDE IDENTIFICATION

Pk#	Energy	Counts	Nuclide	Energy	Fraction	Eff	Decay	Conc
1	239.07	65	Xe-133m	233.20	0.1000	8.24e-003	9.94e-001	1.10e+000
1	239.07	65	Fr-223	234.60				
1	239.07	65	Th-227	236.00				
1	239.07	65	U-235	236.00	0.1100	8.24e-003	1.00e+000	9.98e-001
1	239.07	65	TH-232	238.63	0.4310	8.24e-003	1.01e+000	2.52e-001
1	239.07	65	Te-131m	240.93	0.0755	8.24e-003	9.89e-001	1.47e+000
1	239.07	65	Ra-224	241.08				
1	239.07	65	Xe-125	243.40	0.2871	8.24e-003	9.80e-001	3.90e-001
1	239.07	65	IN-116M	244.59	0.0038	8.24e-003	6.99e-001	4.13e+001
1	239.07	65	Eu-152	244.67	0.0772	8.24e-003	1.00e+000	1.42e+000
2	509.95	95	Mo-101	505.88	0.1135	4.44e-003	3.31e-001	7.92e+000
2	509.95	95	Te-121	507.59	0.1767	4.44e-003	9.99e-001	1.69e+000
2	509.95	95	Tl-208	510.72				
2	509.95	95	Kr-79	511.00	0.1500	4.44e-003	9.90e-001	2.00e+000
2	509.95	95	Annihila	511.00	1.0000	4.44e-003	1.00e+000	2.98e-001
2	509.95	95	Zn-71m	511.55	0.2806	4.44e-003	9.17e-001	1.16e+000
2	509.95	95	Rh-106m	511.70	0.8640	4.44e-003	8.56e-001	4.02e-001
2	509.95	95	KR-85	514.00	0.0041	4.44e-003	1.00e+000	7.26e+001
3	582.76	71	Tl-208	583.14				
3	582.76	71	TH-232	583.14	0.3090	3.96e-003	1.01e+000	7.99e-001
4	608.31	49	Sb-124	602.72	0.9830	3.82e-003	1.00e+000	1.82e-001
4	608.31	49	Cs-134	604.66	0.9756	3.82e-003	1.00e+000	1.83e-001
4	608.31	49	Kr-79	606.10	0.0810	3.82e-003	9.90e-001	2.23e+000
4	608.31	49	Sb-125	606.82	0.0520	3.82e-003	1.00e+000	3.43e+000
4	608.31	49	Bi-214	609.30				
4	608.31	49	U-238	609.32	0.4609	3.82e-003	1.00e+000	3.86e-001
4	608.31	49	Ir-192	612.45	0.0543	3.82e-003	1.00e+000	3.29e+000
5	1457.62	171	K-40	1460.81	0.1070	1.80e-003	1.00e+000	1.23e+001

INITIAL NUCLIDE EVALUATION

Nuclide	Energy	Fraction	Status	Halflives

U-238	77.11	0.1070	Absent					
	295.22	0.1920	Absent					
	351.99	0.3710	Absent					
	609.32	0.4609	Present					
	1764.28	0.1504	Absent					
	Total	1.2813	ABSENT	(	0.4609/	1.2813 =	35.9713 %)	0.000
TH-232	77.11	0.1750	Absent					
	238.63	0.4310	Present					
	338.40	0.1201	Absent					
	583.14	0.3090	Present					
	911.07	0.2900	Absent					
	968.90	0.1746	Absent					
	Total	1.4997	ABSENT	(	0.7400/	1.4997 =	49.3432 %)	0.000
Fr-223	80.00	0.0001	Absent					
	234.60	0.0001	Unable to Calc					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
U-235	81.07	0.1480	Absent					
	83.78	0.2460	Absent					
	143.76	0.1050	Absent					
	185.72	0.5400	Absent					
	236.00	0.1100	Present					
	269.60	0.1340	Absent					
	351.10	0.1200	Absent					
	Total	1.4030	ABSENT	(	0.1100/	1.4030 =	7.8403 %)	0.000
Te-131m	102.06	0.0790	Absent					
	149.71	0.2054	Absent					
	200.63	0.0752	Absent					
	240.93	0.0755	Present					
	334.27	0.0952	Absent					
	452.30	0.0567	Absent					
	773.67	0.3800	Absent					
	782.49	0.0775	Absent					
	793.75	0.1380	Absent					
	822.78	0.0609	Absent					
	852.21	0.2093	Absent					
	1125.46	0.1137	Absent					
	1206.60	0.0971	Absent					
	Total	1.6635	ABSENT	(	0.0755/	1.6635 =	4.5386 %)	0.000
Eu-152	121.78	0.3068	Absent					
	244.67	0.0772	Present					
	344.30	0.2720	Absent					
	778.90	0.1272	Absent					
	964.00	0.1433	Absent					
	1085.80	0.1010	Absent					
	1112.07	0.1340	Absent					
	1408.08	0.2073	Absent					
	Total	1.3688	ABSENT	(	0.0772/	1.3688 =	5.6400 %)	0.000
IN-116M	137.92	0.0350	Absent					
	244.59	0.0038	Present					
	416.88	0.2937	Absent					
	463.13	0.0083	Absent					
	818.65	0.1372	Absent					
	1097.23	0.6791	Absent					
	1293.49	1.0000	Absent					
	1507.50	0.1186	Absent					
	1601.12	0.0107	Absent					
	1752.42	0.0289	Absent					
	2212.21	0.1858	Absent					
	Total	2.5011	ABSENT	(	0.0038/	2.5011 =	0.1519 %)	0.000

Sb-125	176.29	0.0630	Absent					
	380.51	0.0140	Absent					
	427.95	0.2960	Absent					
	463.51	0.1000	Absent					
	600.77	0.1840	Absent					
	606.82	0.0520	Present					
	636.15	0.1120	Absent					
	671.66	0.0180	Absent					
	Total	0.8390	ABSENT	(	0.0520/	0.8390 =	6.1979 %)	0.000
Xe-125	188.43	0.5500	Absent					
	243.40	0.2871	Present					
	Total	0.8371	ABSENT	(	0.2871/	0.8371 =	34.2970 %)	0.000
Mo-101	191.93	0.1810	Absent					
	505.88	0.1135	Present					
	590.82	0.1930	Absent					
	695.53	0.0660	Absent					
	1012.35	0.1135	Absent					
	Total	0.6670	ABSENT	(	0.1135/	0.6670 =	17.0165 %)	0.000
Xe-133m	233.20	0.1000	Present					
	Total	0.1000	PRESENT	(	0.1000/	0.1000 =	100.0000 %)	0.000
Th-227	236.00	0.0001	Unable to Calc					
	329.90	0.0001	Absent					
	Total	0.0002	ABSENT	(	0.0001/	0.0002 =	50.0000 %)	0.000
Ra-224	241.08	0.0001	Unable to Calc					
	Total	0.0001	PRESENT	(	0.0001/	0.0001 =	100.0000 %)	0.000
Kr-79	261.30	0.1270	Absent					
	397.50	0.0950	Absent					
	511.00	0.1500	Present					
	606.10	0.0810	Present					
	Total	0.4530	ABSENT	(	0.2310/	0.4530 =	50.9934 %)	0.000
-192	295.96	0.2872	Absent					
	308.46	0.2965	Absent					
	316.51	0.8290	Absent					
	468.06	0.4808	Absent					
	612.45	0.0543	Present					
	Total	1.9478	ABSENT	(	0.0543/	1.9478 =	2.7878 %)	0.000
Zn-71m	386.28	0.9200	Absent					
	487.34	0.6164	Absent					
	511.55	0.2806	Present					
	596.97	0.2760	Absent					
	620.19	0.5612	Absent					
	Total	2.6542	ABSENT	(	0.2806/	2.6542 =	10.5719 %)	0.000
Rh-106m	450.80	0.2450	Absent					
	511.70	0.8640	Present					
	616.10	0.2040	Absent					
	748.50	0.1950	Absent					
	1046.70	0.3070	Absent					
	Total	1.8150	ABSENT	(	0.8640/	1.8150 =	47.6033 %)	0.000
Te-121	507.59	0.1767	Present					
	573.14	0.8030	Absent					
	Total	0.9797	ABSENT	(	0.1767/	0.9797 =	18.0361 %)	0.000
Tl-208	510.72	0.0001	Unable to Calc					
	583.14	0.0001	Unable to Calc					
	Total	0.0002	PRESENT	(	0.0002/	0.0002 =	100.0000 %)	0.000
Annihila	511.00	1.0000	Unable to Calc					
	Total	1.0000	PRESENT	(	1.0000/	1.0000 =	100.0000 %)	0.000
-85	514.00	0.0041	Present					
	Total	0.0041	PRESENT	(	0.0041/	0.0041 =	100.0000 %)	0.000
Cs-134	563.26	0.0838	Absent					
	569.29	0.1543	Absent					

	604.66	0.9756	Present						
	795.76	0.8544	Absent						
	801.84	0.0873	Absent						
	Total	2.1554	ABSENT	(	0.9756/	2.1554	=	45.2631 %)	0.000
Pb-124	602.72	0.9830	Present						
	645.82	0.0723	Absent						
	722.78	0.1130	Absent						
	1691.02	0.4900	Absent						
	Total	1.6583	ABSENT	(	0.9830/	1.6583	=	59.2776 %)	0.000
Bi-214	609.30	0.0001	Unable to Calc						
	768.40	0.0001	Absent						
	1120.30	0.0001	Absent						
	1764.50	0.0001	Absent						
	Total	0.0004	ABSENT	(	0.0001/	0.0004	=	25.0000 %)	0.000
K-40	1460.81	0.1070	Present						
	Total	0.1070	PRESENT	(	0.1070/	0.1070	=	100.0000 %)	0.000

PEAK CONTRIBUTION CORRECTION

Pk#	Old Area	Nuclide	Reference Energy Line ===>> Energy	cts/dis	Ref Area	Calculated Contribution Energy	cts/dis	New Area
None								

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /g)		Halflife (hrs)	Peaks Found	MPC Fraction
Xe-133m	233.20	1.10e+000	+-3.86e-001	5.42e+001	1 of 1	
Ra-224	241.08		BKG	1.00e+012	1 of 1	
Tl-208	510.72		BKG	1.00e+012	2 of 2	
	583.14		BKG			
Annihila	511.00		I.D.Only	1.00e+003	1 of 1	
KR-85	514.00	7.26e+001	+-1.44e+001	9.39e+004	1 of 1	
K-40	1460.81	1.23e+001	+-1.04e+000	1.12e+013	1 of 1	
TOTAL:		8.60e+001 pCi /g			MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
608.31	1247.55	49	15	25	72	1.56	3.566e+000

Preparation of Concrete for LSC

0.2g	finely ground concrete
10 cc	liquid scintillation cocktail (Ecoscint H, National Diagnostics)

Each concrete sample was prepared using 0.2g of finely ground concrete to 10 cc of liquid scintillation cocktail (Ecoscint H, National Diagnostics). The samples were shaken vigorously and placed in the dark for 24-hr. Each sample was then counted for 20-min on the liquid scintillation counter (TriCarb 2000CA). This procedure was followed for samples PT-1 - PT-3 and BS-1 - BS-8.

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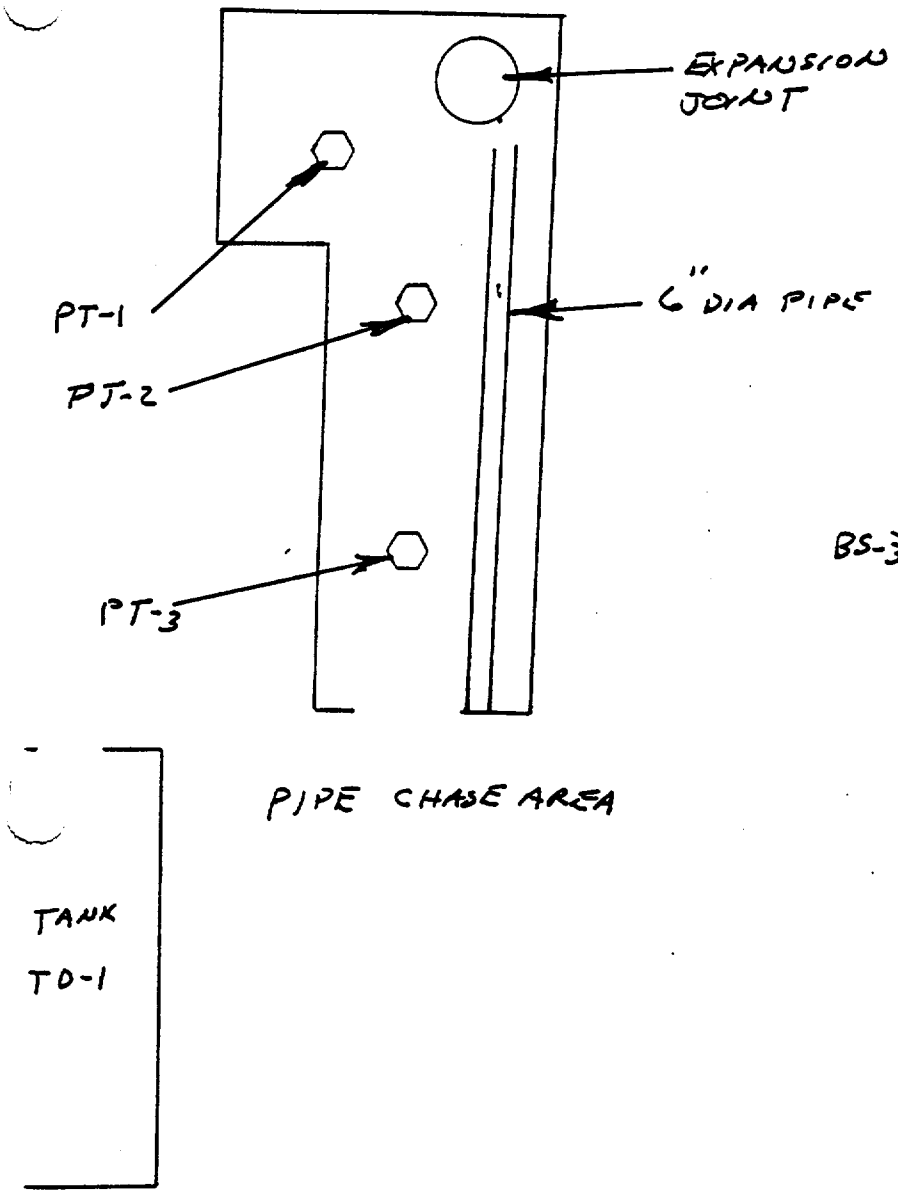
Radioactivity Concentrations in Concrete Samples

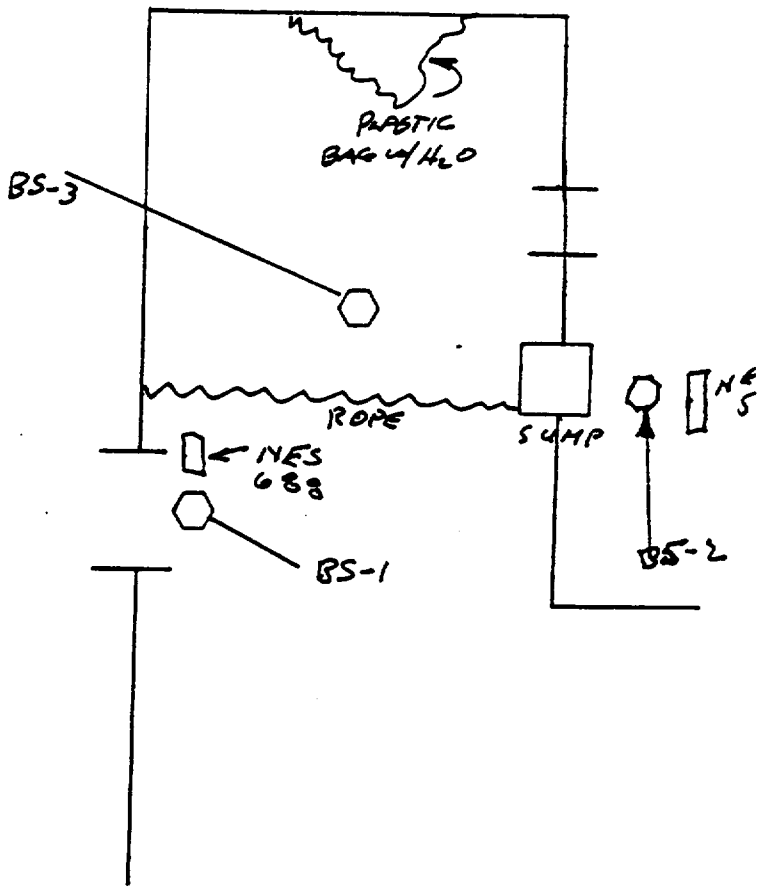
Sample ID	Location	Radionuclides	Activity
			(in pCi/g)
PT-1	Pipe Chase Tunnel	ND	-
PT-2	Pipe Chase Tunnel	Co-60	2.40×10^2
PT-3	Pipe Chase Tunnel	ND	-
BS-1	Bismuth Shield Leak Area	ND	-
BS-2	Bismuth Shield Leak Area	ND	-
BS-3	Bismuth Shield Leak Area	ND	-
BS-4	Bismuth Shield Leak Area	ND	-
BS-5	Bismuth Shield Leak Area	ND	-
BS-6	Bismuth Shield Leak Area	K-40	9.93×10^2
BS-7	Bismuth Shield Leak Area	ND	-
BS-8	Bismuth Shield Leak Area	ND	-

ND= Radionuclides in Library Were Not Detected

DRILLINGS IN PIPE CHASE
AND
BIZMUTH SHIELD BLOCK AREA



PIPE CHASE AREA



BIZMUTH SHIELD BLOCK AREA

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Quantum Technology
GDR_C Version 5.0

Sample ID : PT-1

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 17:46	Counting Start.	10-23-97 17:46
Sampling Stop	.10-23-97 17:46	Live Time	600 Sec
Current Date.	.10-29-97 15:27	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG

0 Peaks Detected

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: PT-1

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 17:46	Counting Start. 10-23-97 17:46
Sampling Stop 10-23-97 17:46	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-29-97 15:28	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction

TAL: 0.00e+000 pCi /gm MPC Total: 0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : PT-2

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 17:34	Counting Start.	10-23-97 17:34
Sampling Stop	.10-23-97 17:34	Live Time	600 Sec
Current Date.	.10-29-97 15:28	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	1175.72	2422.16	81	11	11	11	1.99	
2	1335.16	2752.90	79	9	5	2	1.88	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: PT-2

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SP
Sampling Start. 10-23-97 17:34	Counting Start. 10-23-97 17:3
Sampling Stop 10-23-97 17:34	Buildup Time. . . . . 0.00e+000 Hr
Current Date. 10-29-97 15:28	Decay Time. . . . . 0.00e+000 Hr
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
Co-60	Average:	2.40e+002 +-2.10e+001	4.62e+004	2 of 2	26665.95
	1173.22	2.26e+002 +-3.00e+001			
	1332.49	2.53e+002 +-2.94e+001			
TOTAL:		2.40e+002 pCi /gm		MPC Total:	26665.95

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : PT-3

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 17:13	Counting Start.	10-23-97 17:13
Sampling Stop	.10-23-97 17:13	Live Time	600 Sec
Current Date.	.10-29-97 15:28	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG

0 Peaks Detected

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: PT-3

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 17:13	Counting Start. 10-23-97 17:13
Sampling Stop 10-23-97 17:13	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-29-97 15:28	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
TAL:		0.00e+000 pCi /gm		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : BS-1

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-29-97 12:45	Counting Start.	10-29-97 12:45
Sampling Stop	.10-29-97 12:45	Live Time	600 Sec
Current Date.	.10-29-97 15:31	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG

Peaks Detected

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: BS-1

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-29-97 12:45	Counting Start. 10-29-97 12:45
Sampling Stop 10-29-97 12:45	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-29-97 15:31	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction

TAL: 0.00e+000 pCi /gm MPC Total: 0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : BS-2

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-29-97 15:01	Counting Start.	10-29-97 15:01
Sampling Stop	.10-29-97 15:01	Live Time	600 Sec
Current Date.	.10-29-97 15:31	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG

0 Peaks Detected

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: BS-2

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-29-97 15:01	Counting Start. 10-29-97 15:01
Sampling Stop 10-29-97 15:01	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-29-97 15:31	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction

TOTAL: 0.00e+000 pCi /gm MPC Total: 0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : BS-3

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SP(
Sampling Start.	.10-23-97 19:15	Counting Start.	10-23-97 19:1!
Sampling Stop	.10-23-97 19:15	Live Time	600 Sec
Current Date.	.10-29-97 15:30	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG

Peaks Detected

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: BS-3

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 19:15	Counting Start. 10-23-97 19:15
Sampling Stop 10-23-97 19:15	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-29-97 15:30	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
TAL:		0.00e+000 pCi /gm		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : BS-4

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 18:56	Counting Start.	10-23-97 18:56
Sampling Stop	.10-23-97 18:56	Live Time	600 Sec
Current Date.	.10-29-97 15:30	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG

Peaks Detected

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: BS-4

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SP(
Sampling Start.	.10-23-97 18:56	Counting Start.	10-23-97 18:5(
Sampling Stop	.10-23-97 18:56	Buildup Time.	0.00e+000 Hr:
Current Date.	.10-29-97 15:30	Decay Time.	0.00e+000 Hr:
Efficiency File.	c:\gdr\eff\point.eff	Library File. . .	.c:\gdr\library\nes.lib
ID.		IDGeneral Radionuclide Analysis Library	

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
)TAL:		0.00e+000 pCi /gm		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : BS-5

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SP(
Sampling Start.	.10-23-97 18:44	Counting Start.	10-23-97 18:4
Sampling Stop	.10-23-97 18:44	Live Time	600 Se(
Current Date.	.10-29-97 15:29	Real Time	0 Se(

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:5

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:5
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 409
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	611.45	1251.63	29	6	5	3	1.66	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: BS-5

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 18:44	Counting Start. 10-23-97 18:44
Sampling Stop 10-23-97 18:44	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-29-97 15:29	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
Ag-112	617.40	9.58e+001 +-2.00e+001	3.14e+000	1 of 2	
.OTAL:		9.58e+001 pCi /gm		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : BS-6

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-29-97 15:27	Counting Start.	10-29-97 15:27
Sampling Stop	.10-29-97 15:27	Live Time	600 Sec
Current Date.	.10-29-97 15:56	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	1463.01	3018.11	30	6	7	4	1.49	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: BS-6

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-29-97 15:27	Counting Start. 10-29-97 15:27
Sampling Stop 10-29-97 15:27	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-29-97 15:56	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
K-40	1460.81	9.93e+002 +-2.12e+002	1.12e+013	1 of 1	
TOTAL:		9.93e+002 pCi /gm		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : BS-7

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 18:16	Counting Start.	10-23-97 18:16
Sampling Stop	.10-23-97 18:16	Live Time	600 Sec
Current Date.	.10-29-97 15:29	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG

0 Peaks Detected

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: BS-7

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 18:16	Counting Start. 10-23-97 18:16
Sampling Stop 10-23-97 18:16	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-29-97 15:29	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction

TAL: 0.00e+000 pCi /gm MPC Total: 0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : BS-8

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 18:01	Counting Start.	10-23-97 18:01
Sampling Stop	.10-23-97 18:01	Live Time	600 Sec
Current Date.	.10-29-97 15:29	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG

Peaks Detected

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: BS-8

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SP
Sampling Start. 10-23-97 18:01	Counting Start. 10-23-97 18:0
Sampling Stop 10-23-97 18:01	Buildup Time. . . . . 0.00e+000 Hr
Current Date. 10-29-97 15:29	Decay Time. . . . . 0.00e+000 Hr
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.li
ID.	IDGeneral Radionuclide Analysis Librar

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:5

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
TAL:		0.00e+000 pCi /gm		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							
None							

Radioactivity Concentrations in Locations with Elevated Removable Activity

Sample ID	Location	Radionuclides	Activity
			(in pCi/g)
911	Graphite cylinder in Plug Storage No. 2	Co-60	2.18×10^2
		K-40	9.94×10^2
912	Inside Plug Storage Hole No. 2	Co-60	2.34×10^3
921	Graphite cylinder in Plug Storage No. 4	Co-60	1.32×10^3
923	Metal Rod in Plug Storage Hole No. 4	Co-60	3.64×10^2
		K-40	9.6×10^2
988	Graphite cylinder in Plug Storage No. 6	Co-60	3.37×10^2
1012	Graphite cylinder in Plug Storage No. 8	Co-60	3.67×10^2
1302	Inside Horizontal Port No. 12 (NW side)	Co-60	6.88×10^2
1309	Inside Horizontal Port No. 11 (NW side)	Co-60	2.26×10^2
1454	Inside Vertical Port No. 40	K-40	1.06×10^3
1504	Inside Horizontal Port No. 8	Co-60	1.08×10^3
		K-40	1.16×10^3
1516	Inside Horizontal Port No. 11 (E side)	Zn-65	2.44×10^2
		Co-60	5.15×10^2
		K-40	1.09×10^3

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Quantum Technology
GDR_C Version 5.0

Sample ID : 911

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 11:07	Counting Start.	10-23-97 11:07
Sampling Stop	.10-23-97 11:07	Live Time	600 Sec
Current Date.	.10-23-97 11:18	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	1175.59	2421.89	80	9	5	2	1.63	
2	1334.87	2752.29	66	9	7	4	1.63	
3	1463.26	3018.63	30	6	5	2	1.90	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 911

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 11:07	Counting Start. 10-23-97 11:07
Sampling Stop 10-23-97 11:07	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-23-97 11:18	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
Co-60	Average:	2.18e+002 +-1.93e+001	4.62e+004	2 of 2	24218.40
	1173.22	2.23e+002 +-2.61e+001			
	1332.49	2.12e+002 +-2.86e+001			
K-40	1460.81	9.94e+002 +-1.96e+002	1.12e+013	1 of 1	
TOTAL:		1.21e+003 pCi /gm		MPC Total:	24218.40

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 912

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 11:35	Counting Start.	10-23-97 11:35
Sampling Stop	.10-23-97 11:35	Live Time	600 Sec
Current Date.	.10-23-97 11:48	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM (keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	123.75	239.95	135	20	31	105	1.15	
2	357.38	724.59	58	15	24	69	1.45	
3	1175.54	2421.78	840	31	22	41	1.90	
4	1334.96	2752.49	728	28	13	15	2.11	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 912

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 11:35	Counting Start.	10-23-97 11:35
Sampling Stop	.10-23-97 11:35	Buildup Time.	0.00e+000 Hrs
Current Date.	.10-23-97 11:48	Decay Time.	0.00e+000 Hrs

Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)		Halflife (hrs)	Peaks Found	MPC Fraction
57	122.06	5.46e+001	+-8.22e+000	6.52e+003	1 of 2	
134m	127.50	3.81e+002	+-5.74e+001	2.91e+000	1 of 1	
s-191	129.50	1.80e+002	+-2.71e+001	3.70e+002	1 of 1	
Gd-159	363.30	4.43e+002	+-1.14e+002	1.86e+001	1 of 1	
Co-60	Average:	2.34e+003	+-6.23e+001	4.62e+004	2 of 2	259929.09
	1173.22	2.34e+003	+-8.69e+001			
	1332.49	2.33e+003	+-8.92e+001			

TOTAL: 3.40e+003 pCi /gm MPC Total: 259929.09

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 921

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 11:47	Counting Start.	10-23-97 11:47
Sampling Stop	.10-23-97 11:47	Live Time	600 Sec
Current Date.	.10-23-97 12:01	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	122.98	238.36	46	18	31	107	1.07	
2	345.69	700.35	29	12	20	39	0.61	
3	1175.51	2421.72	439	22	13	15	1.39	
4	1334.90	2752.36	450	22	9	7	1.90	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 921

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 11:47	Counting Start. 10-23-97 11:47
Sampling Stop 10-23-97 11:47	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-23-97 12:01	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)		Halflife (hrs)	Peaks Found	MPC Fraction
175	343.40	2.45e+001	+-9.85e+000	1.68e+003	1 of 3	
-57	122.06	1.86e+001	+-7.29e+000	6.52e+003	1 of 2	
s-134m	127.50	1.30e+002	+-5.09e+001	2.91e+000	1 of 1	
t-197m	346.50	1.99e+002	+-8.00e+001	1.57e+000	1 of 1	
Bi-211	351.00		BKG	1.00e+012	1 of 1	
Co-60	Average:	1.32e+003	+-4.61e+001	4.62e+004	2 of 2	146777.25
	1173.22	1.23e+003	+-6.17e+001			
	1332.49	1.44e+003	+-6.95e+001			
TOTAL:		1.69e+003 pCi /gm			MPC Total:	146777.25

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 923

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SP(
Sampling Start.	.10-23-97 12:01	Counting Start.	10-23-97 12:0:
Sampling Stop	.10-23-97 12:01	Live Time	600 Sec
Current Date.	.10-23-97 13:32	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	123.04	238.49	173	19	26	83	1.54	
2	345.45	699.84	50	11	16	33	0.75	
3	1175.31	2421.32	136	12	7	4	1.54	
4	1334.84	2752.23	108	12	10	9	2.16	
5	1463.30	3018.72	29	6	5	2	2.05	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 923

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 12:01	Counting Start.	10-23-97 12:01
Sampling Stop	.10-23-97 12:01	Buildup Time.	0.00e+000 Hrs
Current Date.	.10-23-97 13:32	Decay Time.	0.00e+000 Hrs

Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)		Halflife (hrs)	Peaks Found	MPC Fraction
175	343.40	4.23e+001	+-9.62e+000	1.68e+003	1 of 3	
57	122.06	7.00e+001	+-7.83e+000	6.52e+003	1 of 2	
s-134m	127.50	4.89e+002	+-5.47e+001	2.91e+000	1 of 1	
t-197m	346.50	3.43e+002	+-7.81e+001	1.57e+000	1 of 1	
Bi-211	351.00		BKG	1.00e+012	1 of 1	
Co-60	Average:	3.64e+002	+-2.51e+001	4.62e+004	2 of 2	40464.83
	1173.22	3.80e+002	+-3.41e+001			
	1332.49	3.46e+002	+-3.69e+001			
K-40	1460.81	9.60e+002	+-1.98e+002	1.12e+013	1 of 1	
TOTAL:		2.27e+003	pCi /gm		MPC Total:	40464.83

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 988

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 13:31	Counting Start.	10-23-97 13:31
Sampling Stop	.10-23-97 13:31	Live Time	600 Sec
Current Date.	.10-23-97 14:04	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	1175.69	2422.09	108	11	9	7	1.95	
2	1334.92	2752.40	119	11	0	0	2.06	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 988

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 13:31	Counting Start. 10-23-97 13:31
Sampling Stop 10-23-97 13:31	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-23-97 14:04	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
C 60	Average:	3.37e+002 +-2.34e+001	4.62e+004	2 of 2	37477.01
	1173.22	3.02e+002 +-3.15e+001			
	1332.49	3.81e+002 +-3.50e+001			
TOTAL:		3.37e+002 pCi /gm		MPC Total:	37477.01

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 1012

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SP(
Sampling Start.	.10-23-97 14:04	Counting Start.	10-23-97 14:04
Sampling Stop	.10-23-97 14:04	Live Time	600 Sec
Current Date.	.10-23-97 14:22	Real Time	0 Sec

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	122.92	238.23	55	17	29	90	1.11	
2	1175.49	2421.68	124	11	5	2	2.32	
3	1335.19	2752.96	123	11	5	2	2.20	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 1012

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 14:04	Counting Start. 10-23-97 14:04
Sampling Stop 10-23-97 14:04	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-23-97 14:22	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
57	122.06	2.22e+001 +-6.86e+000	6.52e+003	1 of 2	
134m	127.50	1.55e+002 +-4.79e+001	2.91e+000	1 of 1	
o-60	Average:	3.67e+002 +-2.40e+001	4.62e+004	2 of 2	40779.16
	1173.22	3.46e+002 +-3.19e+001			
	1332.49	3.94e+002 +-3.65e+001			

TOTAL: 5.45e+002 pCi /gm MPC Total: 40779.16

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 1262

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 14:22	Counting Start.	10-23-97 14:22
Sampling Stop	.10-23-97 14:22	Live Time	600 Sec
Current Date.	.10-23-97 16:41	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	610.66	1250.00	20	6	7	5	1.48	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 1262

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SP(
Sampling Start. 10-23-97 14:22	Counting Start. 10-23-97 14:2
Sampling Stop 10-23-97 14:22	Buildup Time. . . . . 0.00e+000 Hr
Current Date. 10-23-97 16:41	Decay Time. . . . . 0.00e+000 Hr
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.li
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
AL:		0.00e+000 pCi /gm		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
610.66	1250.00	20	6	7	5	1.48	1.007e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 1302

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 15:29	Counting Start.	10-23-97 15:29
Sampling Stop	.10-23-97 15:29	Live Time	600 Sec
Current Date.	.10-23-97 16:41	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	1175.55	2421.81	261	19	18	28	1.79	
2	1335.13	2752.85	204	15	9	7	2.14	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 1302

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SP(
Sampling Start. 10-23-97 15:29	Counting Start. 10-23-97 15:2
Sampling Stop 10-23-97 15:29	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-23-97 16:41	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
60	Average:	6.88e+002 +-3.55e+001	4.62e+004	2 of 2	76490.30
	1173.22	7.29e+002 +-5.22e+001			
	1332.49	6.54e+002 +-4.83e+001			
TOTAL:		6.88e+002 pCi /gm		MPC Total:	76490.30

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 1309

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SP(
Sampling Start.	.10-23-97 16:15	Counting Start.	10-23-97 16:1
Sampling Stop	.10-23-97 16:15	Live Time	600 Sec
Current Date.	.10-23-97 16:41	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	611.16	1251.03	25	7	9	7	1.28	
2	1175.76	2422.24	84	11	11	11	1.47	
3	1335.23	2753.04	68	10	10	9	2.05	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 1309

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 16:15	Counting Start. 10-23-97 16:15
Sampling Stop 10-23-97 16:15	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-23-97 16:41	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
60	Average:	2.26e+002 +-2.18e+001	4.62e+004	2 of 2	25166.30
	1173.22	2.35e+002 +-3.04e+001			
	1332.49	2.18e+002 +-3.12e+001			
TOTAL:		2.26e+002 pCi /gm		MPC Total:	25166.30

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
611.16	1251.03	25	7	9	7	1.28	1.260e+000

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 1454

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 16:31	Counting Start.	10-23-97 16:31
Sampling Stop	.10-23-97 16:31	Live Time	600 Sec
Current Date.	.10-23-97 16:43	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
-	1463.58	3019.30	32	6	5	2	1.16	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 1454

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 16:31	Counting Start. 10-23-97 16:31
Sampling Stop 10-23-97 16:31	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-23-97 16:43	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
0	1460.81	1.06e+003 +-2.08e+002	1.12e+013	1 of 1	
OTAL:		1.06e+003 pCi /gm		MPC Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 1504

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 16:42	Counting Start.	10-23-97 16:42
Sampling Stop	.10-23-97 16:42	Live Time	600 Sec
Current Date.	.10-23-97 16:57	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	1175.67	2422.06	399	21	15	20	2.03	
2	1335.12	2752.82	327	19	10	10	2.01	
3	1463.47	3019.07	35	6	5	2	1.58	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 1504

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-23-97 16:42	Counting Start. 10-23-97 16:42
Sampling Stop 10-23-97 16:42	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-23-97 16:57	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)		Halflife (hrs)	Peaks Found	MPC Fraction
60	Average:	1.08e+003	+-4.26e+001	4.62e+004	2 of 2	120179.75
	1173.22	1.11e+003	+-5.98e+001			
	1332.49	1.05e+003	+-6.07e+001			
-40	1460.81	1.16e+003	+-2.11e+002	1.12e+013	1 of 1	
TOTAL:		2.24e+003 pCi /gm			MPC Total:	120179.75

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 1516

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 16:57	Counting Start.	10-23-97 16:57
Sampling Stop	.10-23-97 16:57	Live Time	600 Sec
Current Date.	.10-23-97 17:14	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
.	1117.99	2302.41	47	10	14	18	1.41	
2	1175.69	2422.09	177	15	12	13	2.08	
3	1335.23	2753.05	168	14	9	7	2.34	
4	1463.69	3019.52	33	6	5	2	2.47	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 1516

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SP(
Sampling Start. 10-23-97 16:57	Counting Start. . . . . 10-23-97 16:5'
Sampling Stop 10-23-97 16:57	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-23-97 17:14	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. . .c:\gdr\library\nes.lib
ID.	IDGeneral Radionuclide Analysis Library

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (pCi /gm)	Halflife (hrs)	Peaks Found	MPC Fraction
65	1115.52	2.44e+002 +-5.11e+001	5.86e+003	1 of 1	4072.60
60	Average:	5.15e+002 +-2.99e+001	4.62e+004	2 of 2	57196.87
	1173.22	4.94e+002 +-4.09e+001			
	1332.49	5.39e+002 +-4.40e+001			
K-40	1460.81	1.09e+003 +-2.06e+002	1.12e+013	1 of 1	
TOTAL:		1.85e+003 pCi /gm		MPC Total:	61269.47

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
None							

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION Date : 10/7/97

Normalized ? Yes

B. BACKGROUND (CPMA) Packard Std: 18.7 cpm

NNRC Std: 11.9 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{94009.9 - 18.7}{1.515\text{E+05}} \times 100\ \% = 62.1\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{84190.1 - 11.9}{1.400\text{E+05}} \times 100\ \% = 60.1\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : MRS JCS Michele Sutton / Johannes Strydom Date : 10/7/97

Reviewed By : Edgar A. [illegible] Date : 10-7-97

SYSTEM NORMALIZED 10/7/97

Protocol #114 Name H-3 Efficiency [illegible]
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 88% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	94031.1	21.710	
1	10.00	94082.7	21.680	
1	10.00	93913.9	21.700	
	10.00	94009.9	21.697	A
2	10.00	84099.6	17.460	
2	10.00	84184.3	17.440	
2	10.00	84286.6	17.440	
	10.00	84190.1	17.447	A

Protocol #:15 Name:Background Check 07-Oct-97 [illegible]
Region A. LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B. LL-UL=18.6-256. Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C. LL-UL=256.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 GIP = 313
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIG	FLAG
1	10.00	18.70	12.10	14.30	146.41	
2	10.00	11.90	21.90	16.60	233.97	

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

OK MRS

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.S
Sampling Start.	.10-07-97 07:08	Counting Start.	10-07-97 07:
Sampling Stop	.10-07-97 07:08	Live Time	600 S
Current Date.	.10-07-97 08:58	Real Time	0 S

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 40
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	88.56	166.96	69382	295	244	6602	1.05	
2	122.40	237.15	31586	207	200	4035	1.10	
3	136.75	266.92	3708	103	150	2750	1.08	
4	165.99	327.57	16528	156	163	2948	1.22	
5	254.94	512.10	331	81	146	2350	1.28	
6	278.83	561.65	566	78	137	2072	1.16	
7	390.97	794.28	7023	112	140	1982	1.37	
8	660.05	1352.45	23738	172	150	1778	1.62	
9	895.70	1841.29	5751	102	131	1572	1.83	
10	1170.01	2410.32	21050	156	115	970	1.96	
11	1328.74	2739.59	18626	143	81	516	2.11	
12	1830.45	3780.33	2921	59	49	168	2.31	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.S
Sampling Start.	.10-07-97 07:08	Counting Start.	10-07-97 07:
Sampling Stop	.10-07-97 07:08	Buildup Time.	0.00e+000 H
Current Date.	.10-07-97 08:59	Decay Time.	0.00e+000 H

Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.l
ID.	ID. . . . . SRS 49183-25 POINT SOUR

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflife

FINAL ACTIVITY REPORT

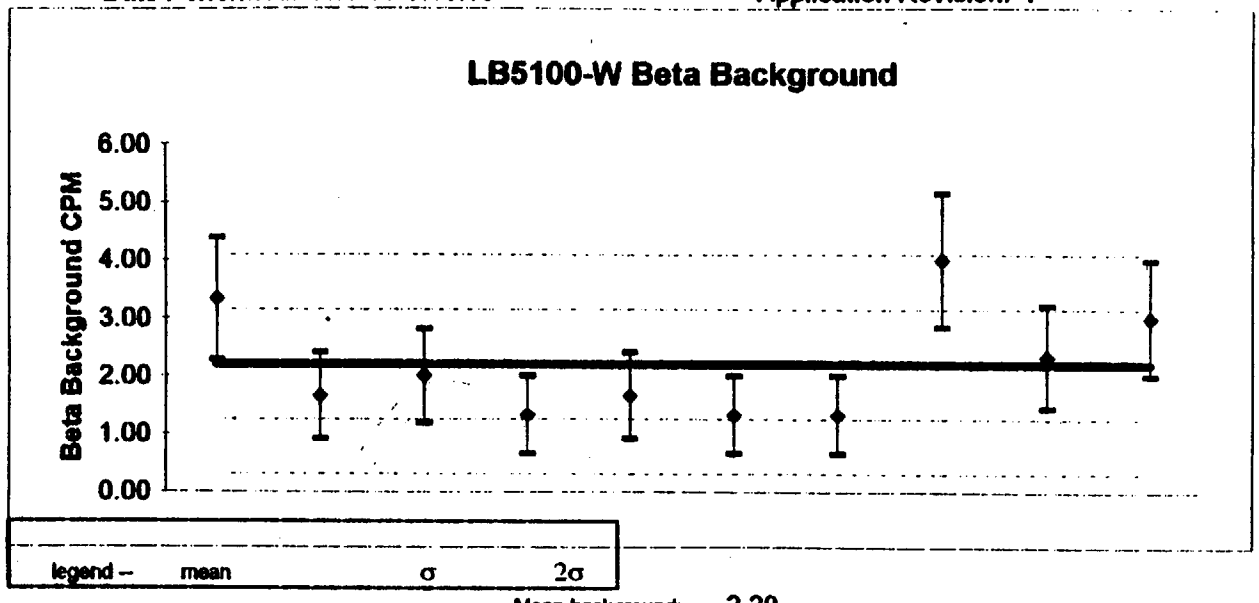
Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)	Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.33e-001 +-3.54e-003	1.11e+004	1 of 1	
)-57	122.00	1.28e-002 +-8.39e-005	6.54e+003	1 of 1	
.E-139	166.00	7.76e-003 +-7.33e-005	3.30e+003	1 of 1	
HG-203	279.00	4.08e-004 +-5.60e-005	1.12e+003	1 of 1	
SN-113	392.00	9.20e-003 +-1.47e-004	2.76e+003	1 of 1	
CS-137	662.00	4.14e-002 +-3.00e-004	2.63e+005	1 of 1	
TOTAL:		9.05e-001 uCi /gm		~&>šc Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
136.75	266.92	3708	103	150	2750	1.08	4.763e+001
254.94	512.10	331	81	146	2350	1.28	6.579e+000
895.70	1841.29	5751	102	131	1572	1.83	4.404e+002
1170.01	2410.32	21050	156	115	970	1.96	2.160e+003
1328.74	2739.59	18626	143	81	516	2.11	2.197e+003
1830.45	3780.33	2921	59	49	168	2.31	4.895e+002

BAC1B027.XLD

Unit Id: 1
Date Performed: 10/7/97 6:56:18 Application Revision: 4



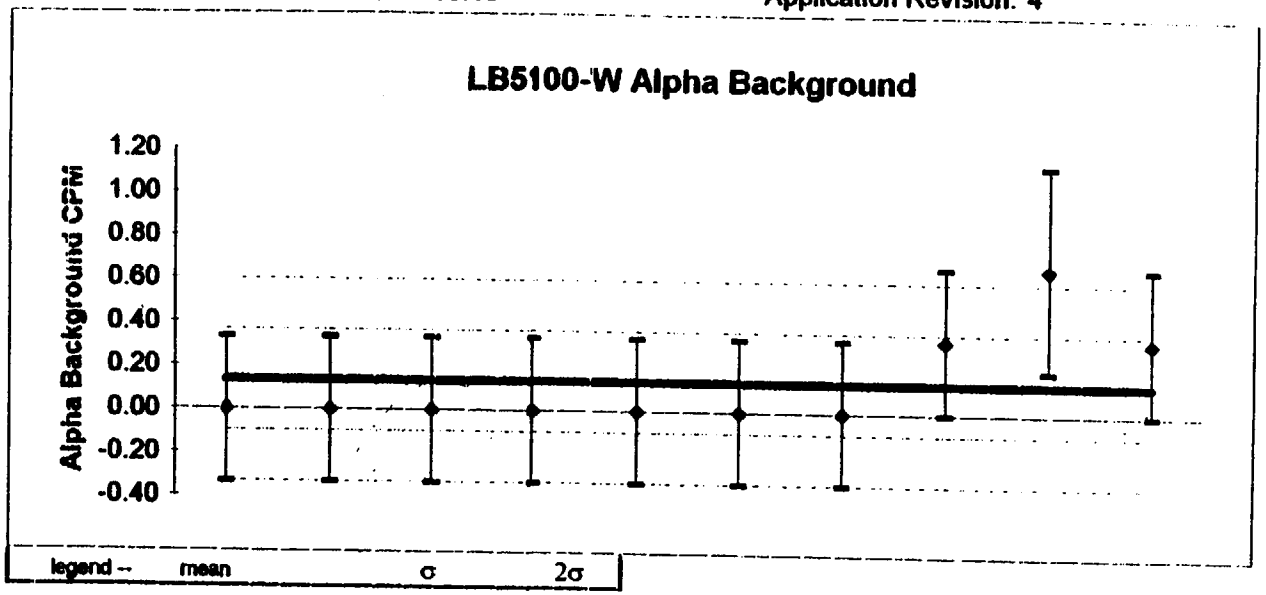
Mean background:	2.20
Error for mean background:	0.27
Actual standard deviation:	0.95
Predicted standard deviation:	0.86
Number of individual measurements:	10
Chi-square:	10.97
Reduced chi-square:	1.22

N-635

BAC1B027.XLD

Unit Id: 1
Date Performed: 10/7/97 6:56:18

Application Revision: 4



Mean background:	0.13
Error for mean background:	0.07
Actual standard deviation:	0.23
Predicted standard deviation:	0.21
Number of individual measurements:	10
Chi-square:	11.00
Reduced chi-square:	1.22

N-636

EFF1D025.XLD

Unit Id: 1
Date Performed: 10/7/97
File Name: C:\LBXL\UNIT1\EFF1D025.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-012-00**

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	7/13/94	Custodian	Edgar	
DPM @ calibration date	29500.00	Error	295.00	
Decay Corrected DPM	29499.14	Error	294.99	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	28.20%	0.41%	2.40	8319.73	5	28.74%
Beta	11.37%	0.17%	5.41	3354.97		A into B
Gross	39.58%	0.57%	0.28	11674.70		

N-637

EFF1E025.XLD

Unit Id: 1
Date Performed: 10/7/97
File Name: C:\LBXL\UNIT1\EFF1E025.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 166-011-00

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	60000.00	Error	1320.00	
Decay Corrected DPM	52618.98	Error	1157.62	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.19%	0.01%	3.51	101.40	5	B into A
Beta	43.21%	1.05%	5.21	22735.97		0.44%
Gross	43.40%	1.05%	5.67	22837.37		

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION Date : 10/8/97

Normalized ? Yes

B. BACKGROUND (CPMA) Packard Std: 18.8 cpm

NNRC Std: 13.4 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{94008 - 18.8}{1.515\text{E+05}} \times 100\ \% = 62.1\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{83968 - 13.4}{1.400\text{E+05}} \times 100\ \% = 60.0\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Michele R. Sutton MRS Date : 10/8/97

Reviewed By : Edgar A. [illegible] Date : 10-8-97

✓ SYSTEM NORMALIZED MRL 10/8/97

Protocol #:14 Name:H-3 Efficiency 08-Oct-97 06:48
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	94161.9	21.800	
1	10.00	93968.1	21.770	
1	10.00	93894.1	21.760	
	10.00	94008.0	21.777	A
2	10.00	84088.9	17.550	
2	10.00	83894.6	17.540	
2	10.00	83920.6	17.500	
	10.00	83968.0	17.530	A

Protocol #:15 Name:Background Check 08-Oct-97 06:27
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL=18.6-256. Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=256.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	18.80	14.60	16.10	163.24	
2	10.00	13.40	24.90	17.10	217.14	

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

OK JCS

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-08-97 09:15	Counting Start.	10-08-97 09:15
Sampling Stop	.10-08-97 09:15	Live Time	600 Sec
Current Date.	.10-08-97 09:39	Real Time	0 Sec

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	88.87	167.60	69478	295	244	6565	1.14	
2	122.81	238.00	31154	206	201	4074	1.11	
3	137.20	267.84	3816	102	147	2651	1.14	
4	166.50	328.64	16424	155	160	2833	1.17	
5	255.86	513.99	394	87	159	2541	1.22	
6	279.62	563.29	581	71	120	1767	1.37	
7	392.05	796.52	6723	107	128	1800	1.32	
8	661.81	1356.10	24565	173	141	1697	1.56	
9	898.08	1846.22	5686	103	134	1642	1.67	
10	1173.04	2416.61	21505	156	105	875	1.90	
11	1332.19	2746.74	18901	143	76	403	2.04	
12	1835.10	3789.98	2984	60	49	139	2.41	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SP(
Sampling Start.	.10-08-97 09:15	Counting Start.	10-08-97 09:1!
Sampling Stop	.10-08-97 09:15	Buildup Time.	0.00e+000 Hr:
Current Date.	.10-08-97 09:39	Decay Time.	0.00e+000 Hr:

Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.lib
ID.	ID. . . . . SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

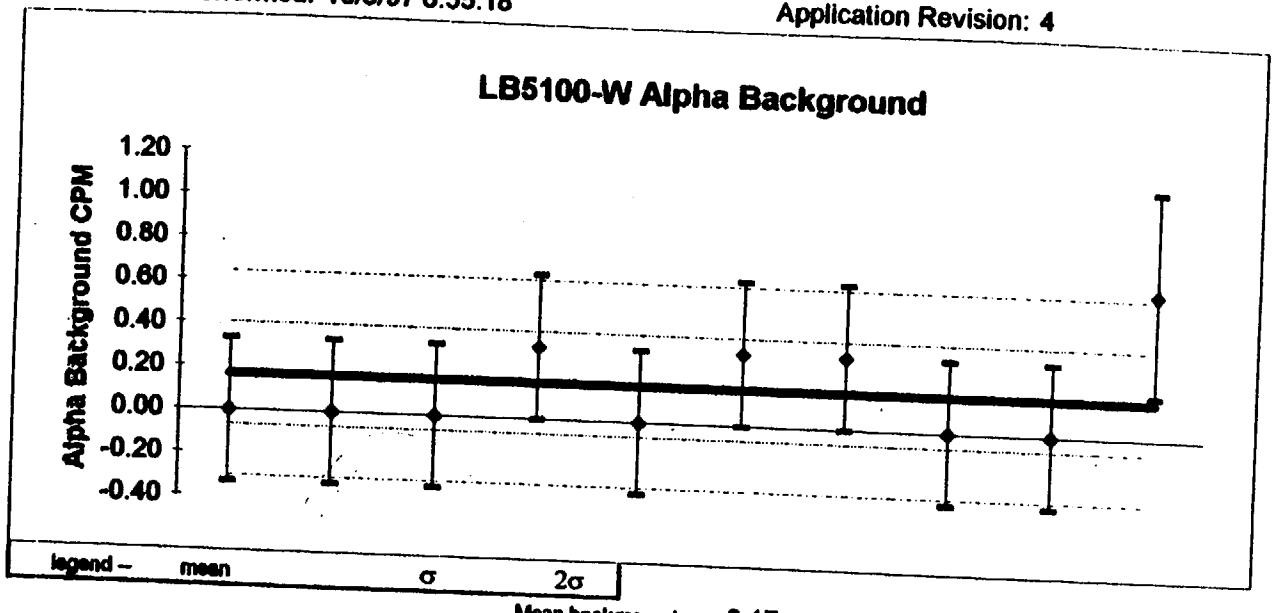
FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)	Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.31e-001 +-3.52e-003	1.11e+004	1 of 1	
-57	122.00	1.26e-002 +-8.35e-005	6.54e+003	1 of 1	
LE-139	166.00	7.73e-003 +-7.29e-005	3.30e+003	1 of 1	
HG-203	279.00	4.20e-004 +-5.11e-005	1.12e+003	1 of 1	
SN-113	392.00	8.84e-003 +-1.41e-004	2.76e+003	1 of 1	
CS-137	662.00	4.29e-002 +-3.02e-004	2.63e+005	1 of 1	
Y-88	Average:	1.32e-002 +-1.78e-004	2.56e+003	2 of 2	0.00
	898.00	1.29e-002 +-2.34e-004			
	1836.00	1.37e-002 +-2.74e-004			
CO-60	Average:	6.01e-002 +-3.15e-004	4.62e+004	2 of 2	0.00
	1173.00	5.98e-002 +-4.35e-004			
	1333.00	6.04e-002 +-4.56e-004			
TOTAL:		9.76e-001 uCi /gm		~&>šc Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
137.20	267.84	3816	102	147	2651	1.14	4.905e+001
255.86	513.99	394	87	159	2541	1.22	7.858e+000

Unit Id: 1
Date Performed: 10/8/97 6:55:18
Application Revision: 4

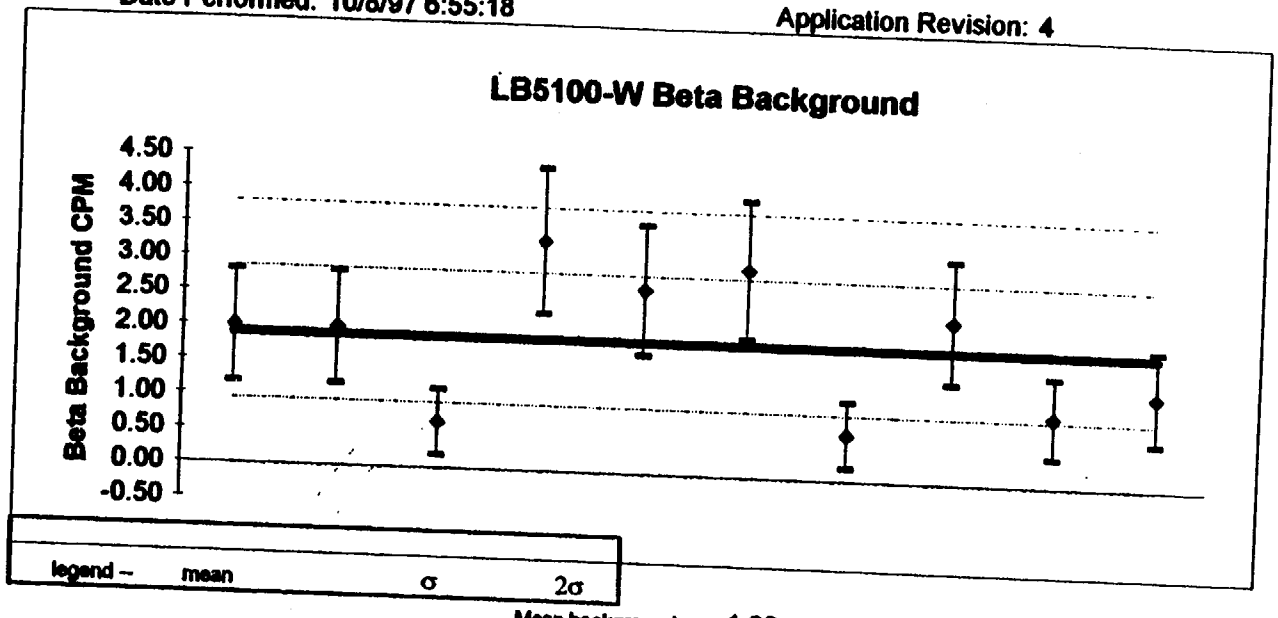


Mean background:	0.17
Error for mean background:	0.07
Actual standard deviation:	0.24
Predicted standard deviation:	0.24
Number of individual measurements:	10
Chi-square:	9.00
Reduced chi-square:	1.00

BAC1B028.XLD

Unit Id: 1
Date Performed: 10/8/97 6:55:18

Application Revision: 4



Mean background:	1.90
Error for mean background:	0.25
Actual standard deviation:	0.96
Predicted standard deviation:	0.80
Number of individual measurements:	10
Chi-square:	13.00
Reduced chi-square:	1.44

N-646

Unit Id: 1
Date Performed: 10/8/97
File Name: C:\LBXL\UNIT1\EFF1D026.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 166-012-00

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	7/13/94	Custodian	Edgar	
DPM @ calibration date	29500.00	Error	295.00	
Decay Corrected DPM	29499.14	Error	294.99	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	28.31%	0.41%	5.05	8349.73	5	28.67%
Beta	11.38%	0.17%	20.16	3356.10		A into B
Gross	39.68%	0.57%	1.31	11705.83		

N-647

EFF1E026.XLD

Unit Id: 1
Date Performed: 10/8/97
File Name: C:\LBXL\UNIT1\EFF1E026.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 166-011-00

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	60000.00	Error	1320.00	
Decay Corrected DPM	52615.62	Error	1157.54	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.20%	0.01%	3.86	103.13	5	B into A
Beta	43.28%	1.05%	4.75	22772.30		0.45%
Gross	43.48%	1.05%	5.06	22875.43		

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION

Date : 10/9/97

Normalized ? Yes

B. BACKGROUND (CPMA)

Packard Std: 16.2 cpm

NNRC Std: 11.2 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{94024.2 - 16.2}{1.514\text{E+05}} \times 100\ \% = 62.1\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{83916.5 - 11.2}{1.399\text{E+05}} \times 100\ \% = 60.0\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Johannes Strydom JCS Date : 10/9/97

Reviewed By : Edgar A. Jewell Date : 10-11-97

SYSTEM NORMALIZED JCS 10/2/97

Protocol #:15 Name:Background Check 09-Oct-97 06:28
Region A. LL-UL= 0.0-16.6 Corr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B. LL-UL=18.6-256. Corr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C. LL-UL=256.-2000 Corr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	16.20	14.00	13.40	146.40	
2	10.00	11.20	26.80	18.90	230.53	

Protocol #:14 Name:H-3 Efficiency 09-Oct-97 06:49
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	94067.6	21.640	
1	10.00	94008.8	21.650	
1	10.00	93996.3	21.630	
	10.00	94024.2	21.640	A
2	10.00	83963.7	17.400	
2	10.00	83813.1	17.400	
2	10.00	83972.6	17.390	
	10.00	83916.5	17.397	A

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

OK JCS

Sample Size	1.00e+000 gm	Spectrum File	TEMP.SPC
Sampling Start	10-09-97 08:24	Counting Start	10-09-97 08:24
Sampling Stop	10-09-97 08:24	Live Time	600 Sec
Current Date	10-09-97 09:16	Real Time	0 Sec

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End	0 / 4095
Sigma Multiplier	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	88.88	167.61	70535	305	286	7526	1.15	
2	122.83	238.04	31331	214	234	4667	1.10	
3	137.20	267.85	3996	102	145	2577	1.15	
4	166.55	328.74	16218	152	149	2739	1.15	
5	255.73	513.73	332	69	118	1921	0.76	
6	279.83	563.72	511	76	134	1972	1.23	
7	392.17	796.77	6866	113	145	2118	1.36	
8	662.03	1356.55	24215	172	141	1681	1.66	
9	898.40	1846.88	5476	104	140	1675	1.70	
10	1173.47	2417.48	21334	157	112	920	2.07	
11	1332.67	2747.74	18625	143	83	477	2.16	
12	1835.80	3791.44	2917	58	45	130	2.55	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SP(
Sampling Start.	.10-09-97 08:24	Counting Start.	10-09-97 08:24
Sampling Stop	.10-09-97 08:24	Buildup Time.	0.00e+000 Hrs
Current Date.	.10-09-97 09:17	Decay Time.	0.00e+000 Hrs

Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.lib
ID.	ID. . . . . SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

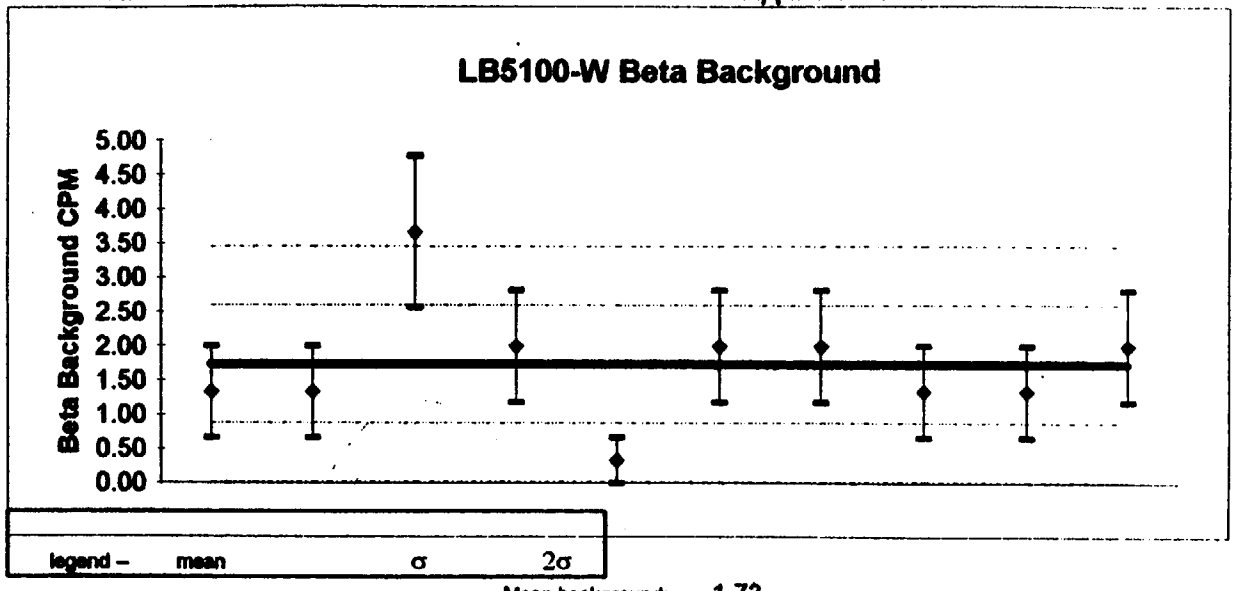
Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)		Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.43e-001	+-3.65e-003	1.11e+004	1 of 1	
C 57	122.00	1.27e-002	+-8.68e-005	6.54e+003	1 of 1	
139	166.00	7.63e-003	+-7.15e-005	3.30e+003	1 of 1	
G-203	279.00	3.70e-004	+-5.48e-005	1.12e+003	1 of 1	
SN-113	392.00	9.03e-003	+-1.49e-004	2.76e+003	1 of 1	
CS-137	662.00	4.23e-002	+-3.00e-004	2.63e+005	1 of 1	
Y-88	Average:	1.29e-002	+-1.77e-004	2.56e+003	2 of 2	0.00
	898.00	1.25e-002	+-2.36e-004			
	1836.00	1.34e-002	+-2.68e-004			
CO-60	Average:	5.95e-002	+-3.15e-004	4.62e+004	2 of 2	0.00
	1173.00	5.94e-002	+-4.36e-004			
	1333.00	5.96e-002	+-4.57e-004			

TOTAL: 9.88e-001 uCi /gm ~&>šc Total: 0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
137.20	267.85	3996	102	145	2577	1.15	5.137e+001
255.73	513.73	332	69	118	1921	0.76	6.619e+000

Unit Id: 1
Date Performed: 10/9/97 6:57:19 Application Revision: 4



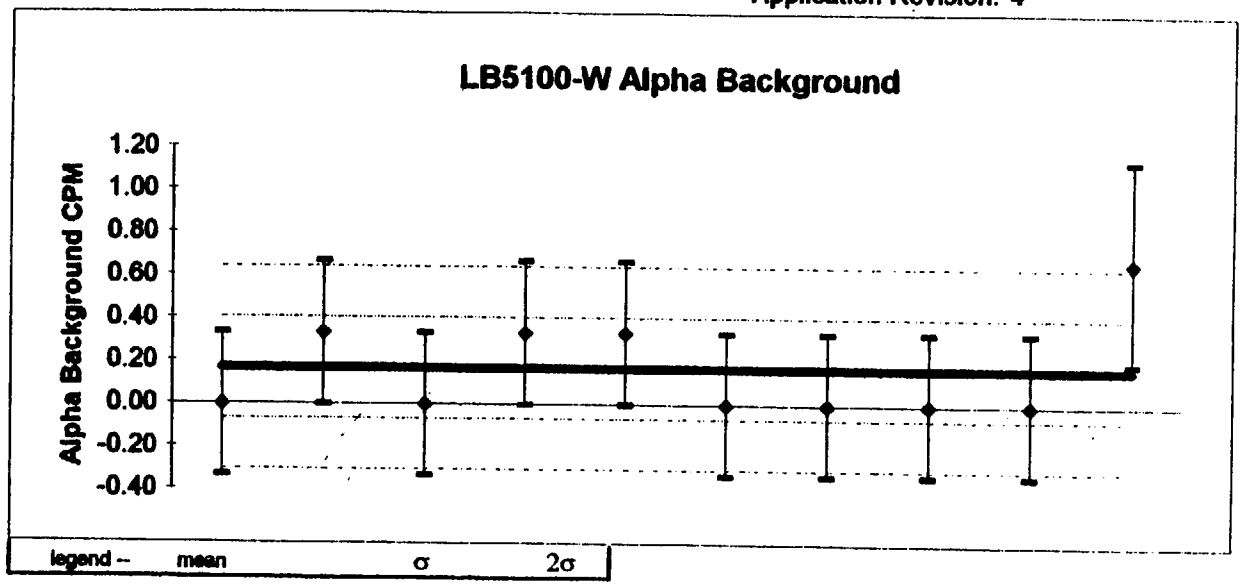
Mean background:	1.73
Error for mean background:	0.24
Actual standard deviation:	0.86
Predicted standard deviation:	0.76
Number of individual measurements:	10
Chi-square:	11.46
Reduced chi-square:	1.27

N-655

BAC1B029.XLD

Unit Id: 1
Date Performed: 10/9/97 6:57:19

Application Revision: 4



Mean background:	0.17
Error for mean background:	0.07
Actual standard deviation:	0.24
Predicted standard deviation:	0.24
Number of individual measurements:	10
Chi-square:	9.00
Reduced chi-square:	1.00

N-656

Unit Id: 1
Date Performed: 10/9/97
File Name: C:\LBXL\UNIT1\EFF1E027.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 166-011-00

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	60000.00	Error	1320.00	
Decay Corrected DPM	52612.11	Error	1157.47	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.18%	0.01%	2.07	96.40	5	B into A
Beta	43.13%	1.04%	2.00	22692.10		0.42%
Gross	43.31%	1.05%	2.04	22788.50		

Unit Id: 1
Date Performed: 10/9/97
File Name: C:\LBXL\UNIT1\EFF1D027.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-012-00**

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	7/13/94	Custodian	Edgar	
DPM @ calibration date	29500.00	Error	295.00	
Decay Corrected DPM	29499.14	Error	294.99	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	28.12%	0.41%	7.18	8295.27	5	29.05%
Beta	11.51%	0.17%	14.60	3396.63		A into B
Gross	39.63%	0.57%	2.87	11691.90		

N-658

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION

Date : 10/10/97

Normalized ? Yes

B. BACKGROUND (CPMA)

Packard Std: 18.6 cpm

NNRC Std: 14.4 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{93977.1 - 18.6}{1.514E+05} \times 100\ \% = 62.1\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{83808.7 - 14.4}{1.399E+05} \times 100\ \% = 59.9\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Michele R. Sutton MRS Date : 10/10/97

Reviewed By : Edgar D. Jewdel Date : 10-11-97

SYSTEM NORMALIZED

Protocol #:14 Name:H-3 Efficiency 10-Oct-97 06:52
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	94024.8	21.700	
1	10.00	93973.4	21.680	
1	10.00	93933.0	21.680	
	10.00	93977.1	21.687	A
2	10.00	83933.8	17.450	
2	10.00	83839.0	17.450	
2	10.00	83653.3	17.430	
	10.00	83808.7	17.443	A

Protocol #:15 Name:Background Check 10-Oct-97 06:31
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL=18.6-256. Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=256.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	18.60	12.20	16.80	130.30	
2	10.00	14.40	24.60	16.70	206.46	

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

OK JCS

Sample Size	1.00e+000 gm	Spectrum File	TEMP.SPC
Sampling Start	10-10-97 07:10	Counting Start	10-10-97 07:10
Sampling Stop	10-10-97 07:10	Live Time	600 Sec
Current Date	10-10-97 08:44	Real Time	0 Sec

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End	0 / 4095
Sigma Multiplier	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	88.86	167.58	69384	295	245	6628	1.16	
	122.82	238.02	30994	202	184	3755	1.13	
3	137.20	267.85	3737	102	147	2667	1.10	
4	166.57	328.77	16710	153	147	2651	1.14	
5	255.75	513.77	385	69	116	1859	1.40	
6	279.81	563.68	498	72	124	1890	1.18	
7	392.29	797.01	6921	115	150	2082	1.32	
8	662.28	1357.07	24424	173	142	1718	1.53	
9	814.52	1672.89	191	62	115	1208	1.91	
10	898.73	1847.57	5502	102	133	1618	1.87	
11	1173.94	2418.47	21229	157	117	1002	1.98	
12	1333.22	2748.87	18585	142	77	474	2.02	
13	1836.59	3793.07	2977	59	44	133	2.44	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-10-97 07:10	Counting Start.	10-10-97 07:10
Sampling Stop	.10-10-97 07:10	Buildup Time.	0.00e+000 Hrs
Current Date.	.10-10-97 08:44	Decay Time.	0.00e+000 Hrs

Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.lib
ID.	ID. . . . . SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)		Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.30e-001	+-3.53e-003	1.11e+004	1 of 1	
CO-57	122.00	1.25e-002	+-8.19e-005	6.54e+003	1 of 1	
39	166.00	7.87e-003	+-7.19e-005	3.30e+003	1 of 1	
203	279.00	3.60e-004	+-5.20e-005	1.12e+003	1 of 1	
N-113	392.00	9.10e-003	+-1.51e-004	2.76e+003	1 of 1	
CS-137	662.00	4.27e-002	+-3.02e-004	2.63e+005	1 of 1	
Y-88	Average:	1.30e-002	+-1.76e-004	2.56e+003	2 of 2	0.00
	898.00	1.25e-002	+-2.31e-004			
	1836.00	1.37e-002	+-2.70e-004			
CO-60	Average:	5.93e-002	+-3.15e-004	4.62e+004	2 of 2	0.00
	1173.00	5.91e-002	+-4.38e-004			
	1333.00	5.95e-002	+-4.54e-004			
TOTAL:		9.74e-001 uCi /gm			~&>šc Total:	0.00

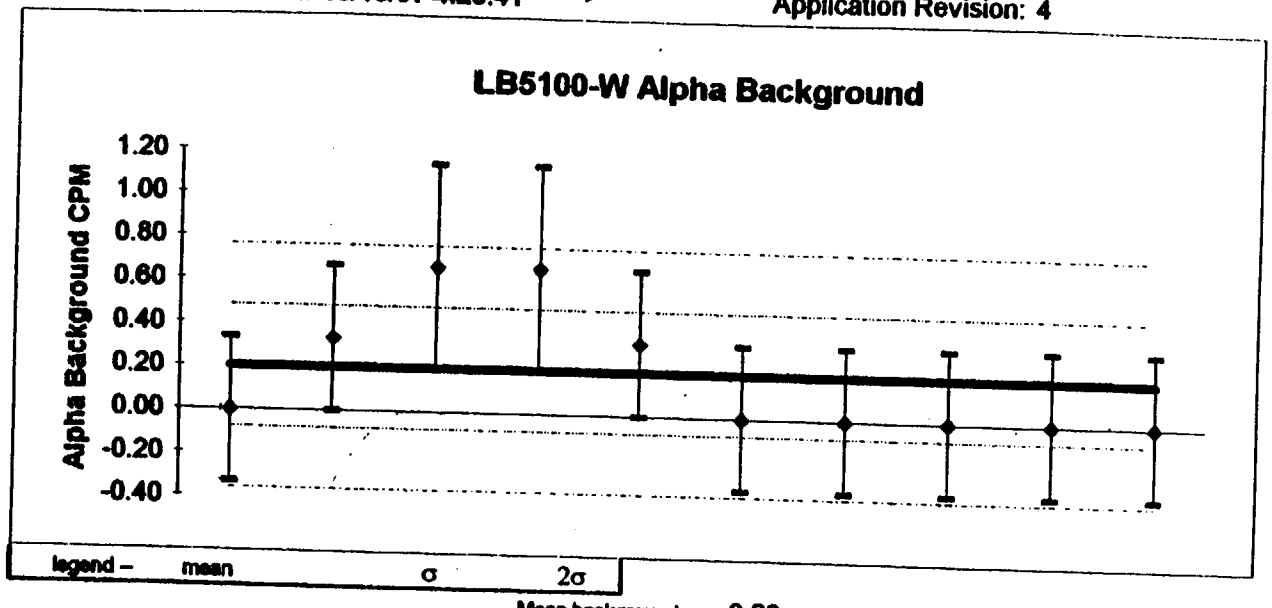
UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
137.20	267.85	3737	102	147	2667	1.10	4.804e+001
255.75	513.77	385	69	116	1859	1.40	7.676e+000
814.52	1672.89	191	62	115	1208	1.91	1.318e+001

BAC1B032.XLD

Unit Id: 1 11:45
Date Performed: 10/10/97 ~~4:26:41~~ TCS

Application Revision: 4



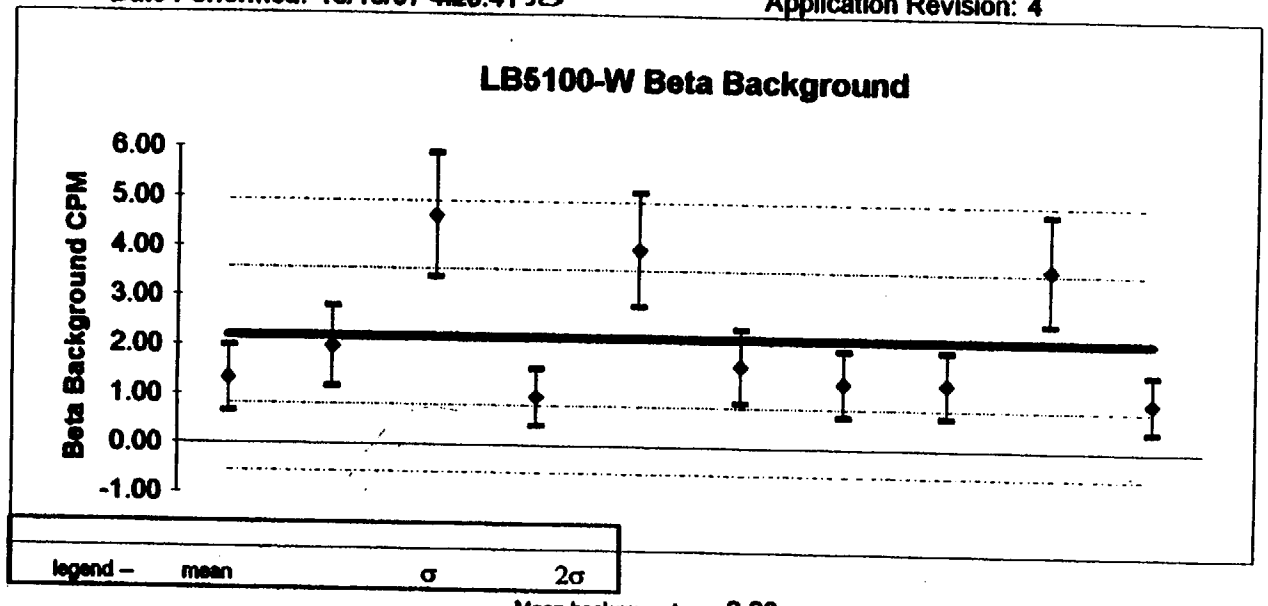
Mean background:	0.20
Error for mean background:	0.08
Actual standard deviation:	0.28
Predicted standard deviation:	0.26
Number of individual measurements:	10
Chi-square:	10.67
Reduced chi-square:	1.19

N-665

Unit Id: 1

Date Performed: 10/10/97 ~~4:25:41~~ 11:45 JCS

Application Revision: 4



Mean background:	2.20
Error for mean background:	0.27
Actual standard deviation:	1.37
Predicted standard deviation:	0.86
Number of individual measurements:	10
Chi-square:	23.09
Reduced chi-square:	2.57

N-666

Unit Id: 1
Date Performed: 10/10/97
File Name: C:\LBXL\UNIT1\EFF1D028.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-012-00**

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	7/13/94	Custodian	Edgar	
DPM @ calibration date	29500.00	Error	295.00	
Decay Corrected DPM	29499.14	Error	294.99	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	28.34%	0.41%	5.12	8360.40	5	28.91%
Beta	11.52%	0.17%	9.08	3399.77		A into B
Gross	39.87%	0.57%	7.47	11760.17		

N-667

Unit Id: 1
Date Performed: 10/10/97
File Name: C:\LBXL\UNIT1\EFF1E028.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-011-00**

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	60000.00	Error	1320.00	
Decay Corrected DPM	52609.46	Error	1157.41	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.18%	0.01%	4.22	93.07	5	B into A
Beta	43.09%	1.04%	9.36	22667.77		0.41%
Gross	43.26%	1.05%	9.54	22760.83		

N-668

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION

Date : 10/11/97

Normalized ? Yes

B. BACKGROUND (CPMA)

Packard Std: 19.4 cpm

NNRC Std: 12.8 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{93991.8 - 19.4}{1.514E+05} \times 100\ \% = 62.1\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{83697.9 - 12.8}{1.399E+05} \times 100\ \% = 59.8\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Michele R. Sutton MRS Date : 10/11/97

Reviewed By : Edgar A. [illegible] Date : 10-11-97

MRS

SYSTEM NORMALIZED

Protocol #:15 Name:Background Check 11-Oct-97 06:27
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL=18.6-256. Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C. LL-UL=256.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	19.40	15.00	15.50	142.45	
2	10.00	12.80	23.40	16.80	231.57	

Protocol #:14 Name:H-3 Efficiency 11-Oct-97 06:48
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	94053.6	21.640	
1	10.00	93941.6	21.680	
1	10.00	93980.2	21.670	
	10.00	93991.8	21.663	A
2	10.00	83752.6	17.410	
2	10.00	83693.2	17.410	
2	10.00	83648.0	17.400	
	10.00	83697.9	17.407	A

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

OK MRS

Sample Size	1.00e+000 gm	Spectrum File	TEMP.SP
Sampling Start	10-11-97 09:54	Counting Start	10-11-97 09:5
Sampling Stop	10-11-97 09:54	Live Time	600 Sec
Current Date	10-11-97 10:10	Real Time	0 Sec

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End	0 / 4095
Sigma Multiplier	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	89.02	167.91	68853	290	223	6093	1.09	
	122.97	238.33	31096	204	194	3775	1.15	
3	137.37	268.20	3803	108	164	2963	1.09	
4	166.73	329.10	16244	163	192	3404	1.15	
5	255.91	514.11	521	81	143	2248	1.00	
6	279.99	564.06	515	71	121	1808	1.47	
7	392.49	797.42	6700	114	152	2120	1.30	
8	662.51	1357.56	24194	172	143	1727	1.60	
9	899.01	1848.16	5463	102	133	1636	1.82	
10	1174.26	2419.13	21235	157	116	1000	1.96	
11	1333.55	2749.57	18789	142	72	404	2.03	
12	1836.99	3793.90	2959	59	46	136	2.35	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

ample ID: 53046-25

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-11-97 09:54	Counting Start.	10-11-97 09:54
Sampling Stop	.10-11-97 09:54	Buildup Time.	0.00e+000 Hrs
Current Date.	.10-11-97 10:10	Decay Time.	0.00e+000 Hrs

Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.lib
ID.	ID. . . . . SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)		Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.21e-001	+-3.46e-003	1.11e+004	1 of 1	
57	122.00	1.26e-002	+-8.27e-005	6.54e+003	1 of 1	
-139	166.00	7.65e-003	+-7.66e-005	3.30e+003	1 of 1	
-203	279.00	3.73e-004	+-5.12e-005	1.12e+003	1 of 1	
SN-113	392.00	8.82e-003	+-1.50e-004	2.76e+003	1 of 1	
CS-137	662.00	4.23e-002	+-3.01e-004	2.63e+005	1 of 1	
Y-88	Average:	1.29e-002	+-1.76e-004	2.56e+003	2 of 2	0.00
	898.00	1.24e-002	+-2.32e-004			
	1836.00	1.36e-002	+-2.71e-004			
CO-60	Average:	5.96e-002	+-3.15e-004	4.62e+004	2 of 2	0.00
	1173.00	5.91e-002	+-4.38e-004			
	1333.00	6.01e-002	+-4.54e-004			
TOTAL:		9.66e-001 uCi /gm			~&>šc Total:	0.00

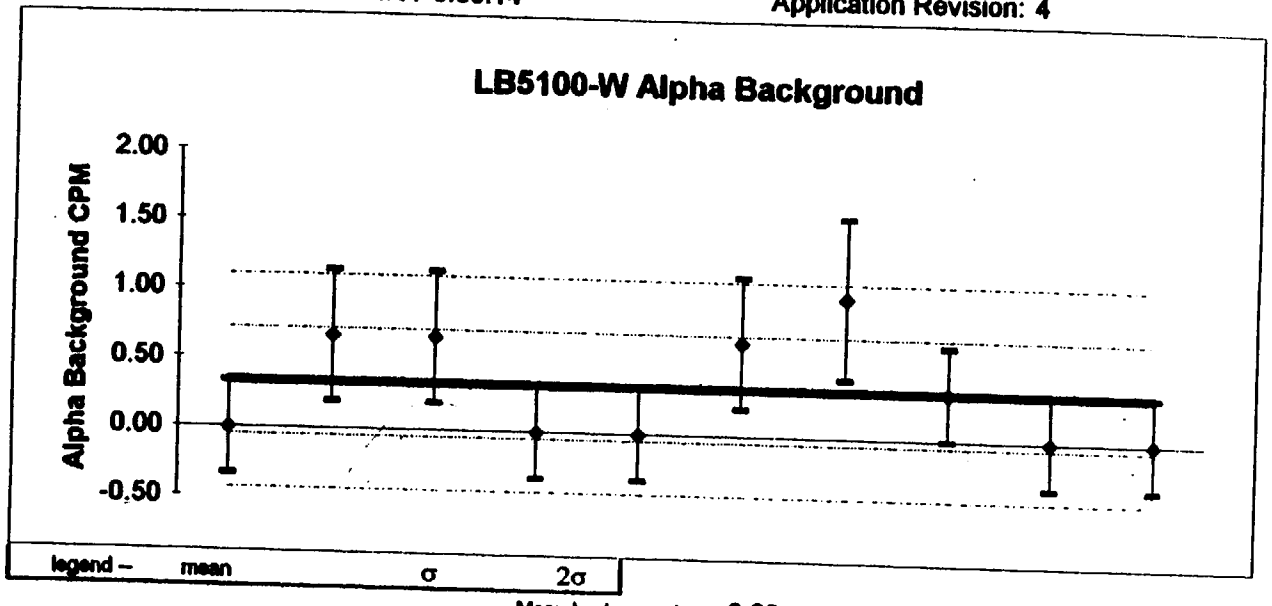
UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
137.37	268.20	3803	108	164	2963	1.09	4.890e+001
255.91	514.11	521	81	143	2248	1.00	1.039e+001

BAC1B033.XLD

Unit Id: 1
Date Performed: 10/11/97 8:35:14

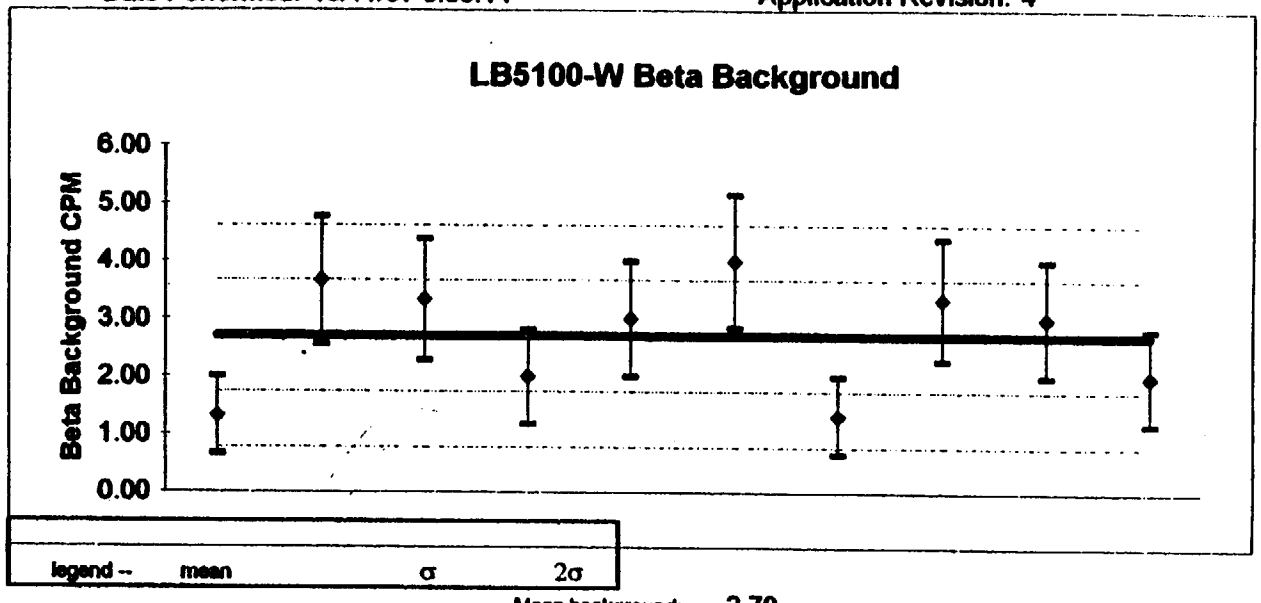
Application Revision: 4



Mean background:	0.33
Error for mean background:	0.11
Actual standard deviation:	0.38
Predicted standard deviation:	0.33
Number of individual measurements:	10
Chi-square:	12.00
Reduced chi-square:	1.33

N-675

Unit Id: 1
Date Performed: 10/11/97 8:35:14
Application Revision: 4



Mean background:	2.70
Error for mean background:	0.30
Actual standard deviation:	0.96
Predicted standard deviation:	0.95
Number of individual measurements:	10
Chi-square:	9.25
Reduced chi-square:	1.03

N-676

Unit Id: 1
Date Performed: 10/11/97
File Name: C:\LBXL\UNIT1\EFF1D029.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-012-00**

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	7/13/94	Custodian	Edgar	
DPM @ calibration date	29500.00	Error	295.00	
Decay Corrected DPM	29499.14	Error	294.99	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	28.51%	0.41%	2.93	8411.13	5	28.44%
Beta	11.33%	0.17%	18.95	3343.63		A into B
Gross	39.85%	0.57%	5.90	11754.77		

N-677

EFF1E029.XLD

Unit Id: 1
Date Performed: 10/11/97
File Name: C:\LBXL\UNIT1\EFF1E029.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 166-011-00

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	60000.00	Error	1320.00	
Decay Corrected DPM	52604.90	Error	1157.31	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.19%	0.01%	3.76	101.20	5	B into A
Beta	43.13%	1.04%	2.82	22687.03		0.44%
Gross	43.32%	1.05%	2.61	22788.23		

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION

Date : 10/13/97

Normalized ? Yes

B. BACKGROUND (CPMA)

Packard Std: 17.5 cpm

NNRC Std: 12.0 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{93754.4 - 17.5}{1.513E+05} \times 100\ \% = 61.9\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{83580.7 - 12}{1.399E+05} \times 100\ \% = 59.8\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Michele R. Sutton MRS 10/13/97 Date : 10/13/97

Reviewed By : Edgar B. Jordel Date : 10-13-97

SYSTEM NORMALIZED MTPS 10/13/97

Protocol #:15 Name:Background Check 13-Oct-97 06:32
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL=18.6-256. Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=256.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	17.50	15.20	15.80	152.29	
2	10.00	12.00	24.30	16.30	224.45	

Protocol #:14 Name:H-3 Efficiency 13-Oct-97 06:53
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	93670.6	21.820	
1	10.00	93820.7	21.830	
1	10.00	93772.0	21.760	
	10.00	93754.4	21.803	A
2	10.00	83704.4	17.560	
2	10.00	83552.2	17.570	
2	10.00	83485.4	17.540	
	10.00	83580.7	17.557	A

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

OK MRS

Sample Size	1.00e+000 gm	Spectrum File	TEMP.SPC
Sampling Start.	10-13-97 07:10	Counting Start.	10-13-97 07:10
Sampling Stop	10-13-97 07:10	Live Time	600 Sec
Current Date.	10-13-97 09:11	Real Time	0 Sec

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	88.82	167.49	69416	299	265	7080	1.20	
2	122.78	237.94	30677	204	197	3905	1.11	
3	137.18	267.80	3837	101	145	2585	1.18	
4	166.54	328.71	16023	151	149	2742	1.20	
5	255.61	513.49	247	62	103	1688	1.16	
6	279.94	563.96	566	81	146	2140	1.30	
7	392.32	797.07	6580	107	128	1822	1.36	
8	662.34	1357.20	24114	173	147	1710	1.56	
9	898.87	1847.85	5609	101	128	1520	1.81	
10	1174.11	2418.82	20921	158	128	1068	1.96	
11	1333.43	2749.30	18910	143	74	408	2.06	
12	1836.90	3793.71	2887	59	47	145	2.46	

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Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-13-97 07:10	Counting Start.	10-13-97 07:10
Sampling Stop	.10-13-97 07:10	Buildup Time.	0.00e+000 Hrs
Current Date.	.10-13-97 09:11	Decay Time.	0.00e+000 Hrs

Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.lib
ID.	ID. . . . . SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

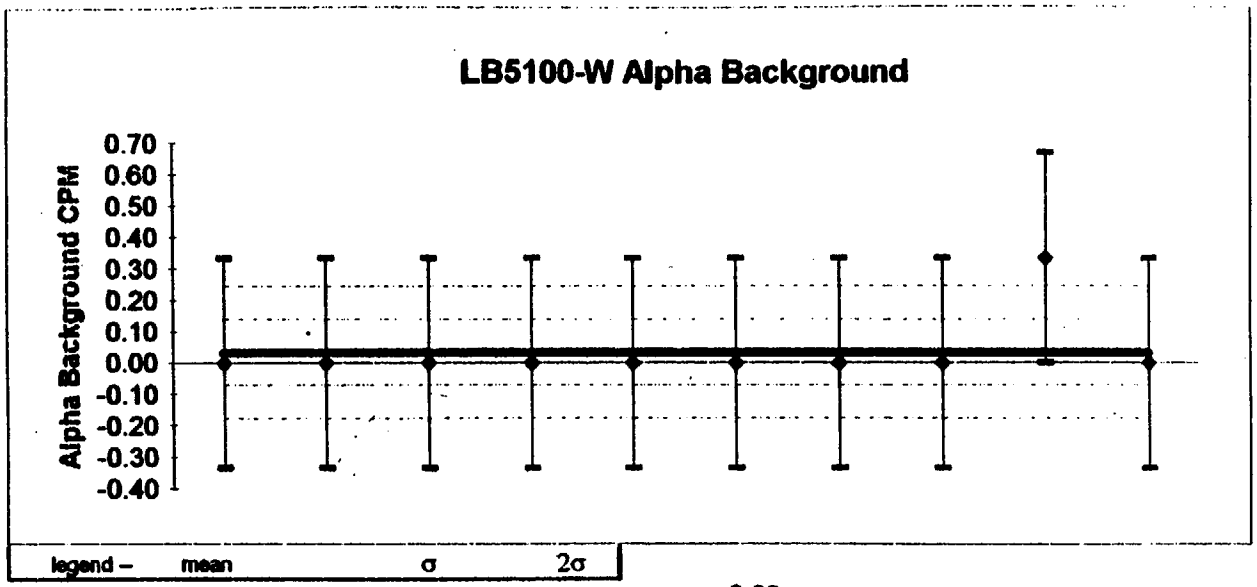
FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)		Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.30e-001	+-3.58e-003	1.11e+004	1 of 1	
57	122.00	1.24e-002	+-8.26e-005	6.54e+003	1 of 1	
-139	166.00	7.54e-003	+-7.12e-005	3.30e+003	1 of 1	
G-203	279.00	4.10e-004	+-5.89e-005	1.12e+003	1 of 1	
SN-113	392.00	8.65e-003	+-1.41e-004	2.76e+003	1 of 1	
CS-137	662.00	4.22e-002	+-3.02e-004	2.63e+005	1 of 1	
Y-88	Average:	1.30e-002	+-1.75e-004	2.56e+003	2 of 2	0.00
	898.00	1.28e-002	+-2.29e-004			
	1836.00	1.33e-002	+-2.69e-004			
CO-60	Average:	5.93e-002	+-3.17e-004	4.62e+004	2 of 2	0.00
	1173.00	5.82e-002	+-4.40e-004			
	1333.00	6.05e-002	+-4.56e-004			
TOTAL:		9.74e-001 uCi /gm			~&>šc Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
137.18	267.80	3837	101	145	2585	1.18	4.932e+001
255.61	513.49	247	62	103	1688	1.16	4.922e+000

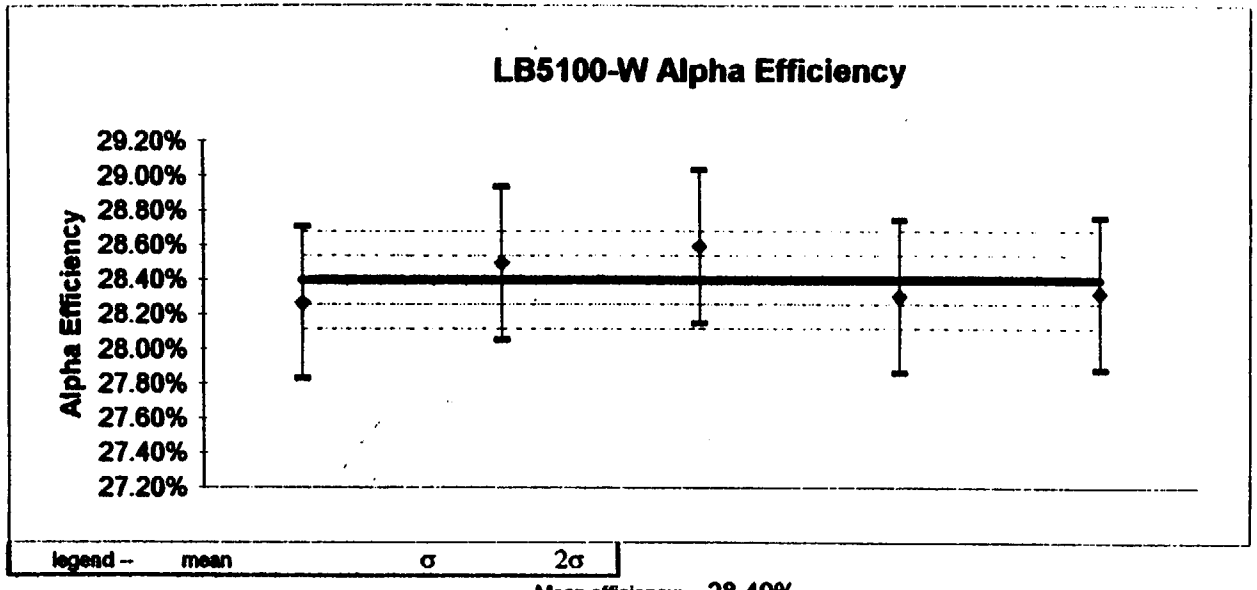
Unit Id: 1
Date Performed: 10/13/97 7:00:12 Application Revision: 4



Mean background:	0.03
Error for mean background:	0.03
Actual standard deviation:	0.11
Predicted standard deviation:	0.11
Number of individual measurements:	10
Chi-square:	9.00
Reduced chi-square:	1.00

N-685

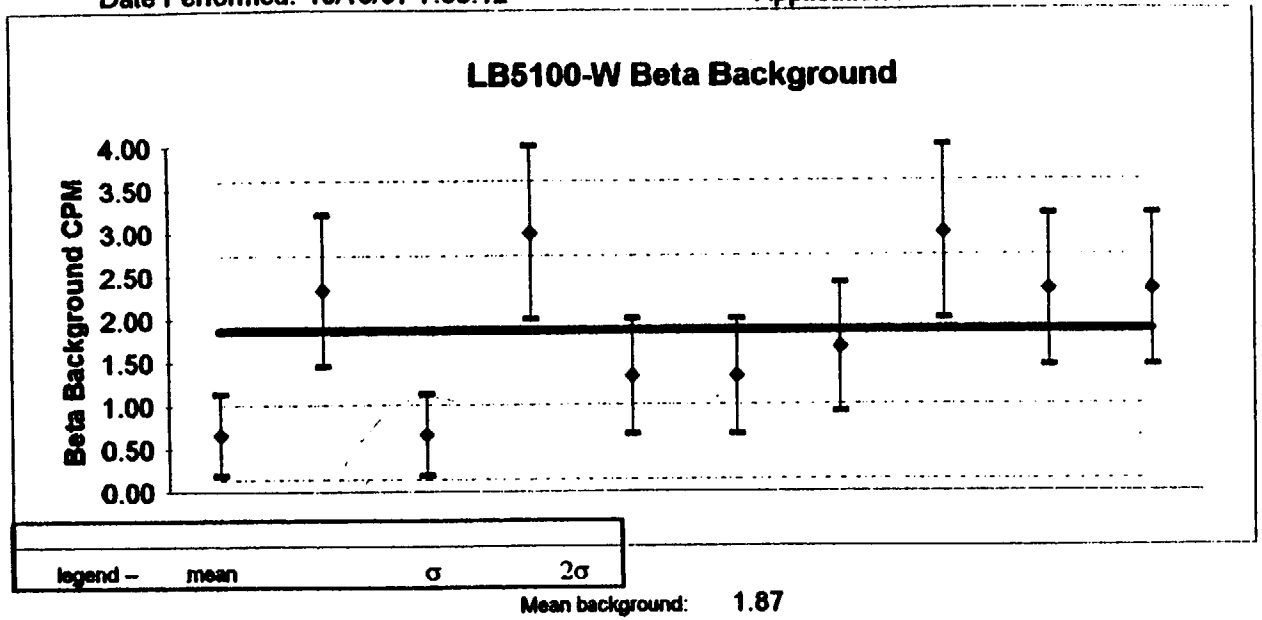
Unit Id: 1
Date Performed: 10/13/97 7:31:44 Application Revision: 3



Mean efficiency:	28.40%
Error for mean efficiency:	0.41%
Actual standard deviation:	0.14%
Predicted standard deviation:	0.18%
Number of individual measurements:	5
Chi-square:	2.45
Reduced chi-square:	0.61

N-686

Unit Id: 1
Date Performed: 10/13/97 7:00:12 Application Revision: 4

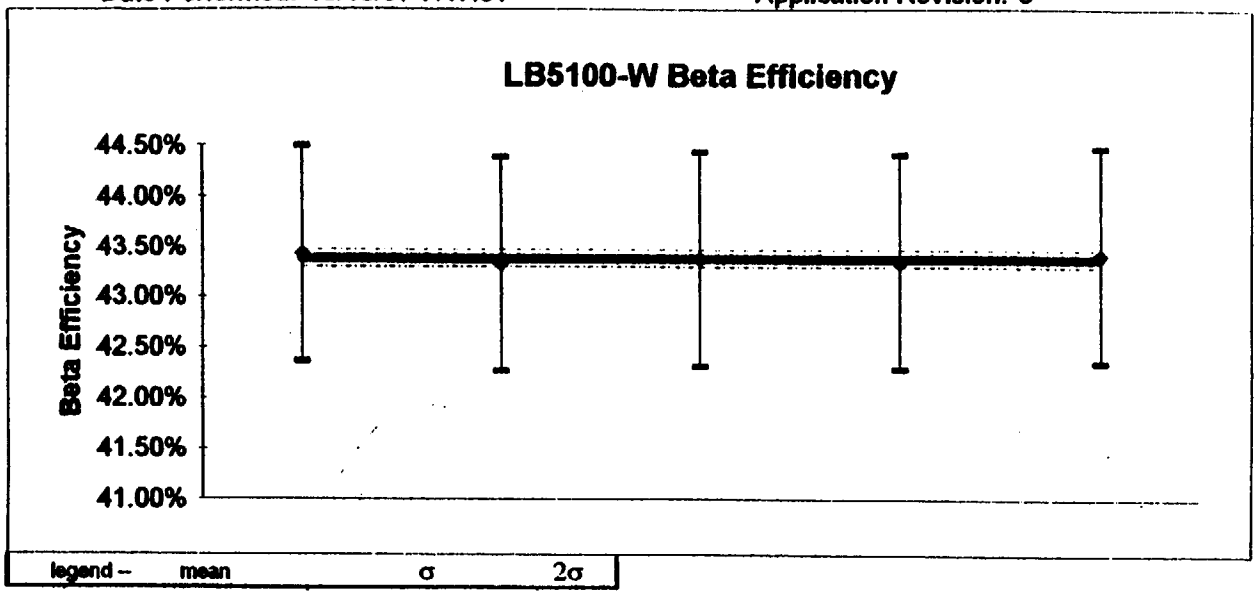


Mean background:	1.87
Error for mean background:	0.25
Actual standard deviation:	0.86
Predicted standard deviation:	0.79
Number of individual measurements:	10
Chi-square:	10.79
Reduced chi-square:	1.20

N-687

EFF1E030.XLD

Unit Id: 1
Date Performed: 10/13/97 7:47:51 Application Revision: 3



Mean efficiency:	43.38%
Error for mean efficiency:	1.05%
Actual standard deviation:	0.04%
Predicted standard deviation:	0.17%
Number of individual measurements:	5
Chi-square:	0.26
Reduced chi-square:	0.06

N-688

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION Date : 10/14/97

Normalized ? Yes

B. BACKGROUND (CPMA)

Packard Std: 17.4 cpm

NNRC Std: 13.0 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{93801.5 - 17.4}{1.513\text{E+05}} \times 100\ \% = 62.0\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{83606.8 - 13}{1.398\text{E+05}} \times 100\ \% = 59.8\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Johannes Strydom Date : 10/14/97

Reviewed By : Edgar A. Jaudel Date : 10-14-97

SYSTEM NORMALIZED JCS 10/14/97

Protocol #:15 Name:Background Check 14-Oct-97 06:34
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL=18.6-256. Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=256.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	17.40	15.20	16.60	146.24	
2	10.00	13.00	22.80	17.70	242.28	

Protocol #:14 Name H-3 Efficiency 14-Oct-87 06 55
Region A: LL-UL= 0.0-16.6 Lcr= 0 Bkg= 0.00 %2 sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	93756.8	21.840	
1	10.00	93693.8	21.820	
1	10.00	93954.0	21.830	
	10.00	93801.5	21.830	A
2	10.00	83701.8	17.580	
2	10.00	83551.8	17.570	
2	10.00	83566.9	17.590	
	10.00	83606.8	17.580	A

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

OK MRS

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SP
Sampling Start	.10-14-97 10:59	Counting Start	10-14-97 10:5
Sampling Stop	.10-14-97 10:59	Live Time	600 Se
Current Date	.10-14-97 12:01	Real Time	0 Se

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End	0 / 4095
Sigma Multiplier	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	88.81	167.47	68754	295	248	6798	1.19	
-	122.77	237.93	30652	205	202	4087	1.13	
3	137.16	267.77	3851	107	160	2843	1.16	
4	166.52	328.67	16033	154	160	2838	1.19	
5	255.59	513.45	310	69	117	1907	1.14	
6	279.80	563.66	485	72	125	1904	1.23	
7	392.30	797.04	6649	107	129	1825	1.40	
8	662.32	1357.17	24375	172	139	1634	1.54	
9	898.81	1847.74	5272	105	147	1842	1.79	
10	1174.11	2418.82	21522	157	108	924	1.93	
11	1333.40	2749.24	18944	143	75	366	2.08	
12	1836.83	3793.56	2900	58	43	122	2.45	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SP(
Sampling Start	10-14-97 10:59	Counting Start	10-14-97 10:5
Sampling Stop	10-14-97 10:59	Buildup Time	0.00e+000 Hrs
Current Date	10-14-97 12:01	Decay Time	0.00e+000 Hrs
Efficiency File. ID	c:\gdr\eff\point.eff	Library File. ID	.c:\gdr\library\point.lib SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000]

12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

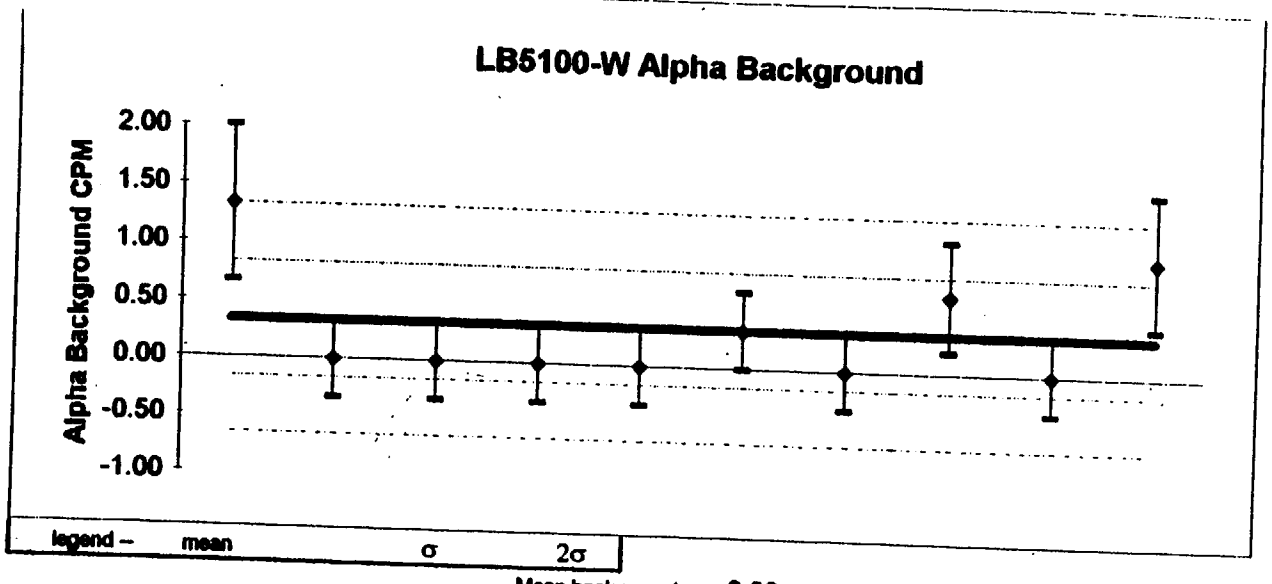
Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)	Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.23e-001 +-3.52e-003	1.11e+004	1 of 1	
C 57	122.00	1.24e-002 +-8.30e-005	6.54e+003	1 of 1	
C -139	166.00	7.55e-003 +-7.23e-005	3.30e+003	1 of 1	
203	279.00	3.51e-004 +-5.21e-005	1.12e+003	1 of 1	
-113	392.00	8.74e-003 +-1.41e-004	2.76e+003	1 of 1	
CS-137	662.00	4.26e-002 +-3.01e-004	2.63e+005	1 of 1	
Y-88	Average:	1.26e-002 +-1.78e-004	2.56e+003	2 of 2	0.00
	898.00	1.20e-002 +-2.39e-004			
	1836.00	1.33e-002 +-2.66e-004			
CO-60	Average:	6.03e-002 +-3.16e-004	4.62e+004	2 of 2	0.00
	1173.00	5.99e-002 +-4.37e-004			
	1333.00	6.06e-002 +-4.56e-004			
TOTAL:		9.67e-001 uCi /gm		~&>šc Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
137.16	267.77	3851	107	160	2843	1.16	4.950e+001
255.59	513.45	310	69	117	1907	1.14	6.177e+000

Unit Id: 1
Date Performed: 10/14/97 9:44:47

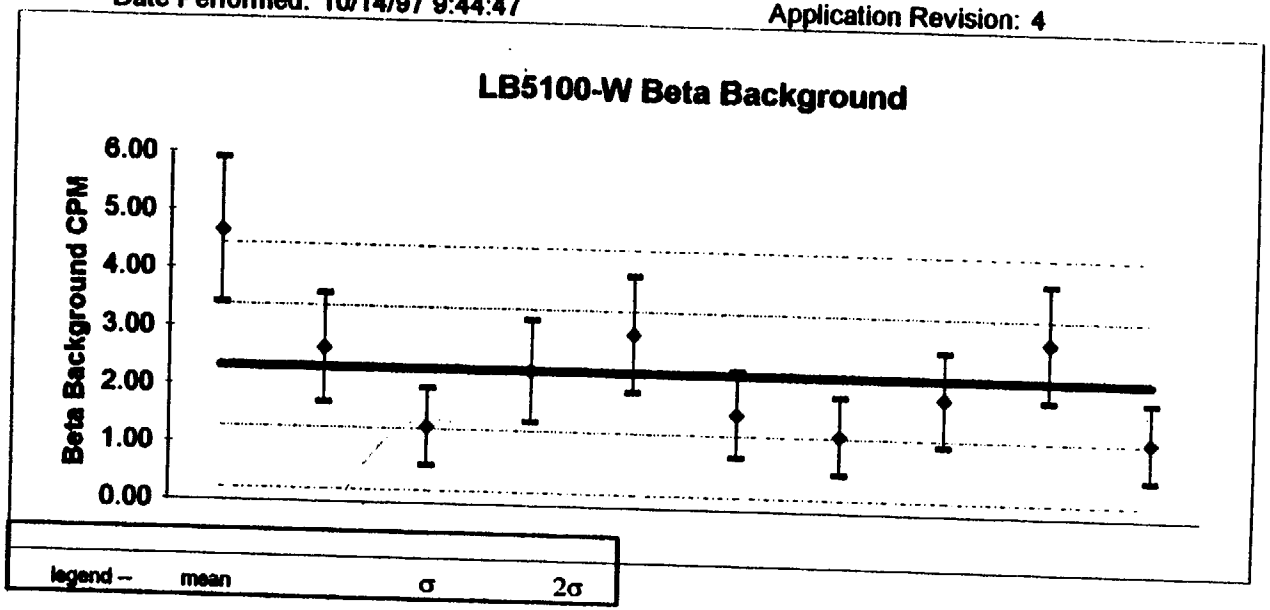
Application Revision: 4



Mean background:	0.33
Error for mean background:	0.11
Actual standard deviation:	0.50
Predicted standard deviation:	0.33
Number of individual measurements:	10
Chi-square:	20.00
Reduced chi-square:	2.22

N-695

Unit Id: 1
Date Performed: 10/14/97 9:44:47
Application Revision: 4



Mean background:	2.33
Error for mean background:	0.28
Actual standard deviation:	1.05
Predicted standard deviation:	0.88
Number of individual measurements:	10
Chi-square:	12.86
Reduced chi-square:	1.43

N-696

EFF1D031.XLD

Unit Id: 1
Date Performed: 10/14/97
File Name: C:\LBXL\UNIT1\EFF1D031.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-012-00**

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	7/13/94	Custodian	Edgar	
DPM @ calibration date	29500.00	Error	295.00	
Decay Corrected DPM	29499.13	Error	294.99	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	28.53%	0.41%	1.03	8416.47	5	28.14%
Beta	11.17%	0.17%	30.07	3296.30		A into B
Gross	39.71%	0.57%	6.69	11712.77		

N-697

EFF1E031.XLD

Unit Id: 1
Date Performed: 10/14/97
File Name: C:\LBXL\UNIT1\EFF1E031.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-011-00**

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	60000.00	Error	1320.00	
Decay Corrected DPM	52594.58	Error	1157.08	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.24%	0.01%	7.01	125.33	5	B into A
Beta	43.44%	1.05%	4.45	22846.77		0.55%
Gross	43.68%	1.06%	4.79	22972.10		

N-698

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION Date : 10/15/97

Normalized ? Yes

B. BACKGROUND (CPMA) Packard Std: 18.1 cpm

NNRC Std: 12.8 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{93803.6 - 18.1}{1.513E+05} \times 100\ \% = 62.0\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{83516 - 12.8}{1.398E+05} \times 100\ \% = 59.7\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Michele R Sutton MRS 10/15/97 Date : 10/15/97

Reviewed By : Edgar S. Jewell Date : 10-15-97

SYSTEM NORMALIZED MRS 10/15/97

Protocol #:15 Name:Background Check 15-Oct-97 06:36
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL=18.6-256. Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=256.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	18.10	13.60	16.80	141.28	
2	10.00	12.80	26.30	17.40	244.16	

Protocol #:14 Name:H-3 Efficiency 15-Oct-97 06:57
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	93676.2	21.740	
1	10.00	93920.9	21.770	
1	10.00	93813.6	21.750	
	10.00	93803.6	21.753	A
2	10.00	83667.7	17.500	
2	10.00	83391.9	17.500	
2	10.00	83488.5	17.490	
	10.00	83516.0	17.497	A

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

OK-MRS

Sample Size	1.00e+000 gm	Spectrum File	TEMP.SPC
Sampling Start	10-15-97 07:43	Counting Start	10-15-97 07:43
Sampling Stop	10-15-97 07:43	Live Time	600 Sec
Current Date	10-15-97 08:34	Real Time	0 Sec

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End	0 / 4095
Sigma Multiplier	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	88.38	166.59	68596	293	243	6547	1.14	
2	122.34	237.03	30377	208	217	4318	1.11	
3	136.74	266.91	4061	102	144	2547	1.18	
4	166.10	327.81	15635	149	146	2618	1.18	
5	255.27	512.79	330	74	131	2109	1.10	
6	279.30	562.62	531	82	148	2196	1.76	
7	391.89	796.17	6809	118	162	2230	1.41	
8	661.93	1356.34	24330	169	125	1450	1.62	
9	898.42	1846.92	5281	99	129	1528	1.81	
10	1173.71	2417.98	21189	155	104	849	1.87	
11	1333.00	2748.43	18702	142	74	434	2.08	
12	1836.50	3792.88	2782	58	49	153	2.22	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-15-97 07:43	Counting Start. 10-15-97 07:43
Sampling Stop 10-15-97 07:43	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-15-97 08:34	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.lib
ID.	ID. . . . . SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

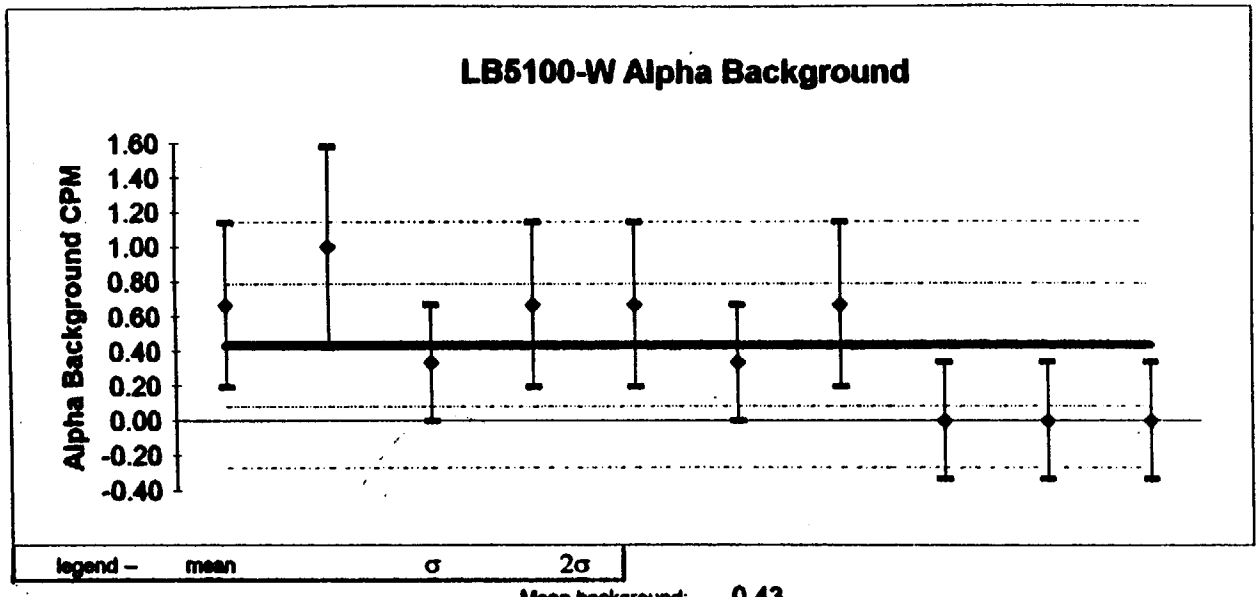
FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)		Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.26e-001	+-3.53e-003	1.11e+004	1 of 1	
[illegible]7	122.00	1.23e-002	+-8.42e-005	6.54e+003	1 of 1	
[illegible]-139	166.00	7.35e-003	+-7.00e-005	3.30e+003	1 of 1	
HG-203	279.00	3.84e-004	+-5.93e-005	1.12e+003	1 of 1	
SN-113	392.00	8.94e-003	+-1.55e-004	2.76e+003	1 of 1	
CS-137	662.00	4.25e-002	+-2.96e-004	2.63e+005	1 of 1	
Y-88	Average:	1.23e-002	+-1.72e-004	2.56e+003	2 of 2	0.00
	898.00	1.20e-002	+-2.26e-004			
	1836.00	1.28e-002	+-2.66e-004			
CO-60	Average:	5.94e-002	+-3.13e-004	4.62e+004	2 of 2	0.00
	1173.00	5.90e-002	+-4.31e-004			
	1333.00	5.98e-002	+-4.54e-004			
TOTAL:		9.69e-001 uCi /gm			~&>šc Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
136.74	266.91	4061	102	144	2547	1.18	5.217e+001
255.27	512.79	330	74	131	2109	1.10	6.567e+000

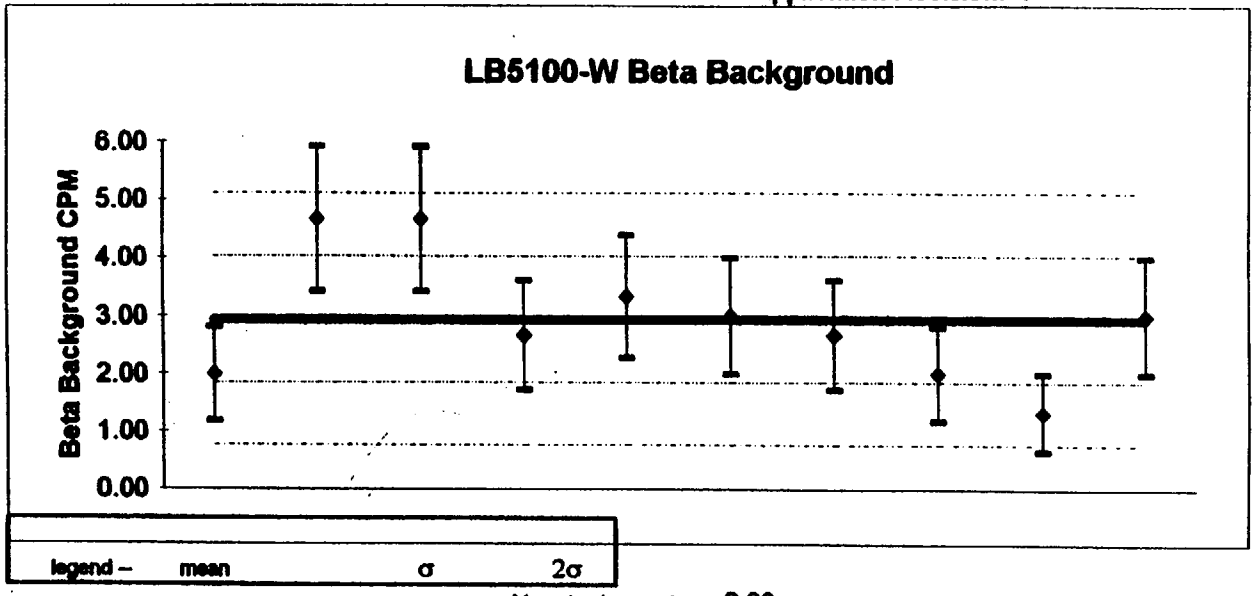
Unit Id: 1
Date Performed: 10/15/97 7:04:31 Application Revision: 4



Mean background:	0.43
Error for mean background:	0.12
Actual standard deviation:	0.35
Predicted standard deviation:	0.38
Number of individual measurements:	10
Chi-square:	7.77
Reduced chi-square:	0.86

N-705

Unit Id: 1
Date Performed: 10/15/97 7:04:31 Application Revision: 4



Mean background:	2.93
Error for mean background:	0.31
Actual standard deviation:	1.09
Predicted standard deviation:	0.99
Number of individual measurements:	10
Chi-square:	10.86
Reduced chi-square:	1.21

N-706

Unit Id: 1
Date Performed: 10/15/97
File Name: C:\LBXL\UNIT1\EFF1E032.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-012-00**

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	7/13/94	Custodian	Edgar	
DPM @ calibration date	29500.00	Error	295.00	
Decay Corrected DPM	29499.13	Error	294.99	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	28.77%	0.41%	14.47	8488.13	5	27.64%
Beta	10.99%	0.16%	10.88	3243.03		A into B
Gross	39.77%	0.57%	4.55	11731.17		

N-707

Unit Id: 1
Date Performed: 10/15/97
File Name: C:\LBXL\UNIT1\EFF1D032.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 166-011-00

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	60000.00	Error	1320.00	
Decay Corrected DPM	52590.97	Error	1157.00	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.24%	0.01%	0.73	126.40	5	B into A
Beta	43.39%	1.05%	7.63	22820.50		0.55%
Gross	43.63%	1.06%	7.47	22946.90		

N-708

Revision 02 (05/97)

RS - 33

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION

Date : 10/16/97

Normalized ? Yes

B. BACKGROUND (CPMA)

Packard Std: 17.8 cpm

NNRC Std: 12.3 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{93805.3 - 17.8}{1.513E+05} \times 100\ \% = 62.0\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{83554.4 - 12.3}{1.398E+05} \times 100\ \% = 59.8\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Johannes Strydom Date : 10/16/97

Reviewed By : Edgar A. Jewell Date : 10-16-97

SYSTEM NORMALIZED JCS 10/16/97

Protocol #:13 Name:Background Check 16-Oct-97 06:37
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL=18.6-256. Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=256.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	17.80	13.20	18.20	139.39	
2	10.00	12.30	25.80	18.40	238.14	

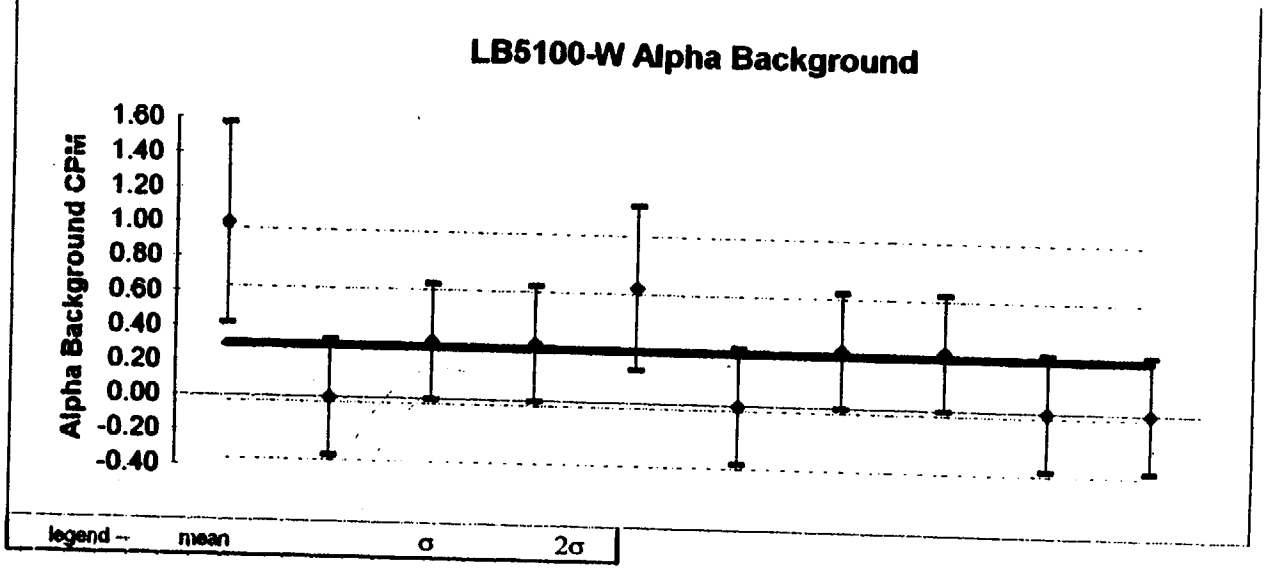
Protocol #:14 Name:H-3 Efficiency 16-Oct-97 06:58
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	93751.5	21.800	
1	10.00	93786.3	21.780	
1	10.00	93878.2	21.780	
	10.00	93805.3	21.787	A
2	10.00	83626.0	17.550	
2	10.00	83630.0	17.520	
2	10.00	83407.1	17.510	
	10.00	83554.4	17.527	A

BAC1B037.XLD

Unit Id: 1
Date Performed: 10/16/97 7:06:49

Application Revision: 4

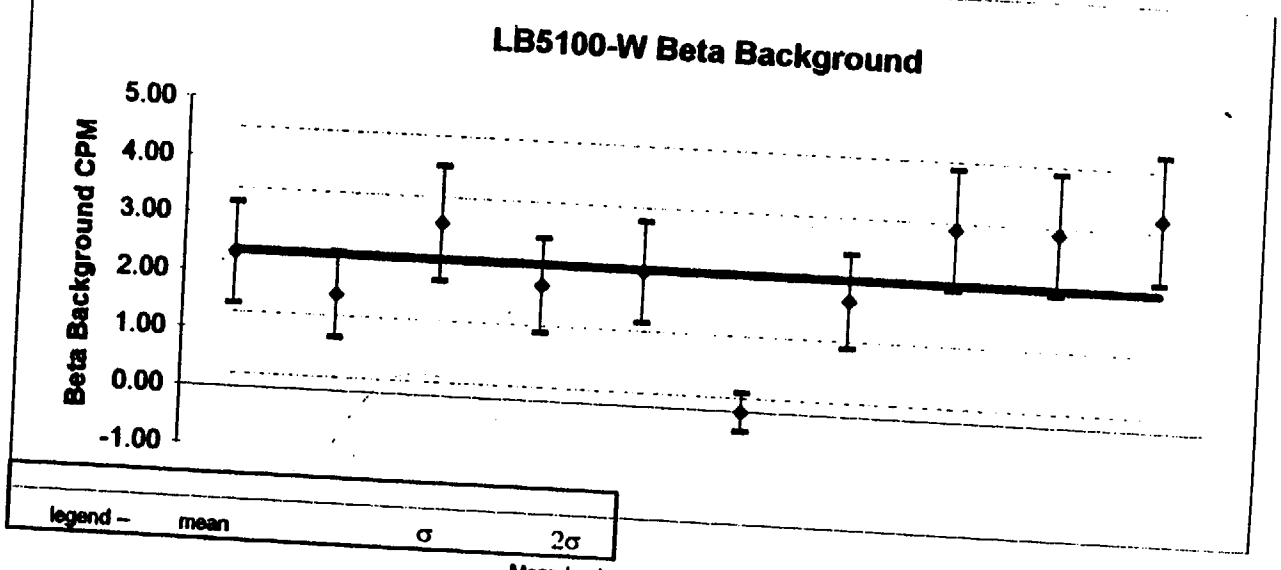


Mean background:	0.30
Error for mean background:	0.10
Actual standard deviation:	0.33
Predicted standard deviation:	0.32
Number of individual measurements:	10
Chi-square:	9.89
Reduced chi-square:	1.10

BAC1B037.XLD

Unit Id: 1
Date Performed: 10/16/97 7:06:49

Application Revision: 4



Mean background:	2.37
Error for mean background:	0.28
Actual standard deviation:	1.07
Predicted standard deviation:	0.89
Number of individual measurements:	10
Chi-square:	13.08
Reduced chi-square:	1.45

EFF1D033.XLD

Unit Id: 1
Date Performed: 10/16/97
File Name: C:\LBXL\UNIT1\EFF1D033.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-012-00**

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	7/13/94	Custodian	Edgar	
DPM @ calibration date	29500.00	Error	295.00	
Decay Corrected DPM	29499.13	Error	294.99	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	28.84%	0.42%	5.64	8507.87	5	27.28%
Beta	10.82%	0.16%	3.27	3190.90		A into B
Gross	39.66%	0.57%	2.14	11698.77		

N-715

Unit Id: 1
Date Performed: 10/16/97
File Name: C:\LBXL\UNIT1\EFF1E033.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-011-00**

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	60000.00	Error	1320.00	
Decay Corrected DPM	52587.57	Error	1156.93	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.24%	0.01%	1.41	125.60	5	B into A
Beta	43.55%	1.05%	1.45	22899.30		0.55%
Gross	43.78%	1.06%	1.53	23024.90		

N-716

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION

Date : 10/17/97

Normalized ? Yes

B. BACKGROUND (CPMA)

Packard Std: 19.7 cpm

NNRC Std: 14.4 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{93690 - 19.7}{1.512\text{E+05}} \times 100\ \% = 61.9\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{82322.1 - 14.4}{1.398\text{E+05}} \times 100\ \% = 58.9\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Michele R Sutton MRS 10/17/97 Date : 10/17/97

Reviewed By : Edgar A. Rudel Date : 10-17-97

[illegible] # 14 Name:H- Efficiency [illegible] 07 0[illegible]
Region A LL-UL= 0.0-18.6 Lim= 0 Bkg= 0.00 %2 Sigma=0.00
Region B LL-UL= 1.0-18.6 Lim= 0 Bkg= 0.00 %2 Sigma=0.00
Region C LL-UL=18.6-2000 Lim= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 38% for Packard Standard

SA	TIME	CPMA	SIS	FLAG
1	10.00	93668.7	21.900	
9	10.00	93830.3	21.920	
8	10.00	93569.0	21.860	
	10.00	93690.0	21.893	A
4	10.00	80405.4	17.620	
3	10.00	80337.6	17.590	
2	10.00	80223.[illegible]	17.590	
	10.00	80320.1	17.600	A

SYSTEM NORMALIZED
SYSTEM NORMALIZED MRS 10/17/97
SYSTEM NORMALIZED
SYSTEM NORMALIZED
SYSTEM NORMALIZED
SYSTEM NORMALIZED

Channel #[illegible] Hamk -Background Check [illegible]

Region A: LL-UL= 0.0-18.6 Cpm= 0 Bkg= 0.00 %2 Sigma=0.00

Region B: LL-UL=18.[illegible]-25[illegible] Cpm= 0 Bkg= 0.00 %[illegible] Sigma=0.00

Region C: LL-UL=256.-2000 Cpm= 0 Bkg= 0.00 %[illegible] Sigma=0.00

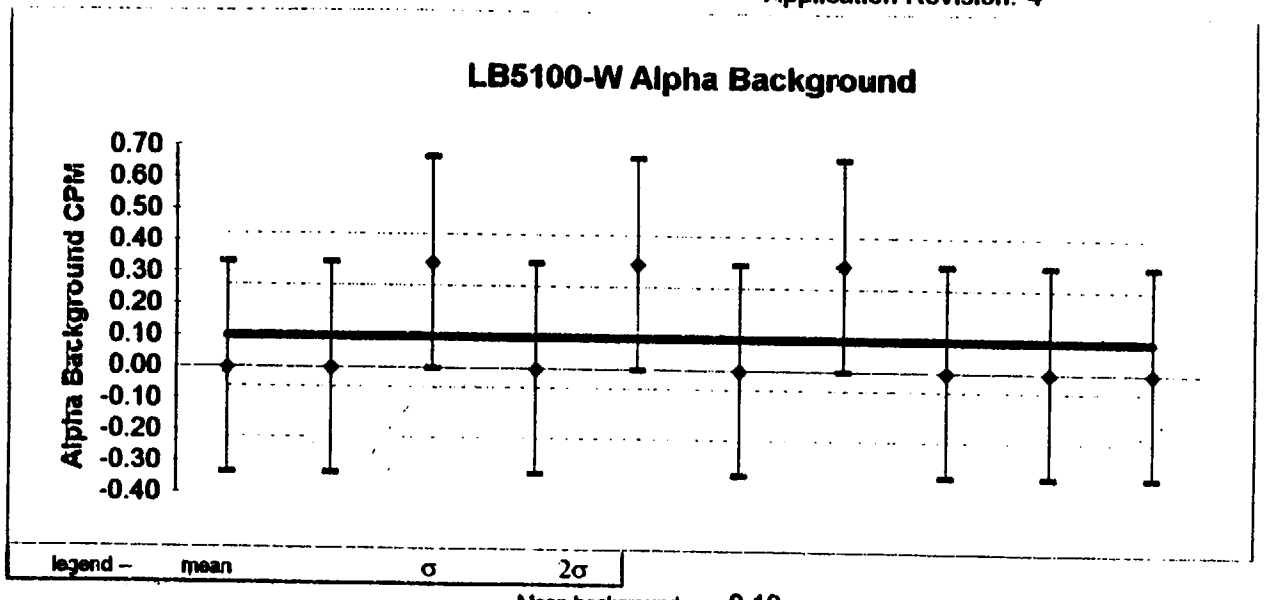
Time = 10.00 QIP = SIS

Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	19.70	14.80	17.60	134.35	
2	10.00	14.40	23.10	14.50	211.91	

Unit Id: 1
Date Performed: 10/17/97 10:14:44

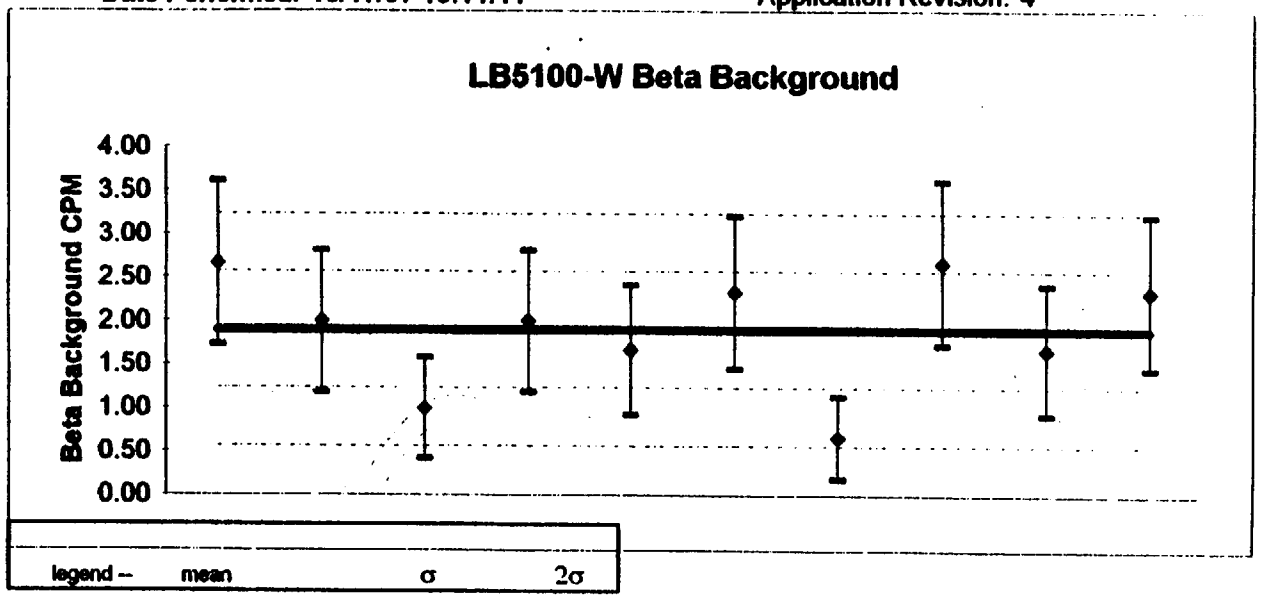
Application Revision: 4



Mean background:	0.10
Error for mean background:	0.06
Actual standard deviation:	0.16
Predicted standard deviation:	0.18
Number of individual measurements:	10
Chi-square:	7.00
Reduced chi-square:	0.78

N-720

Unit Id: 1
Date Performed: 10/17/97 10:14:44 Application Revision: 4



Mean background:	1.90
Error for mean background:	0.25
Actual standard deviation:	0.67
Predicted standard deviation:	0.80
Number of individual measurements:	10
Chi-square:	6.33
Reduced chi-square:	0.70

N-721

Unit Id: 1
Date Performed: 10/17/97
File Name: C:\LBXL\UNIT1\EFF1D034.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 166-012-00

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	7/13/94	Custodian	Edgar	
DPM @ calibration date	29500.00	Error	295.00	
Decay Corrected DPM	29499.13	Error	294.99	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	29.01%	0.42%	7.23	8557.47	5	27.23%
Beta	10.85%	0.16%	5.10	3201.77		A into B
Gross	39.86%	0.57%	6.41	11759.23		

N-722

EFF1E034.XLD

Unit Id: 1
Date Performed: 10/17/97
File Name: C:\LBXL\UNIT1\EFF1E034.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 166-011-00

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	60000.00	Error	1320.00	
Decay Corrected DPM	52583.61	Error	1156.84	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.33%	0.01%	4.38	176.13	5	B into A
Beta	43.78%	1.06%	2.39	23021.77		0.76%
Gross	44.12%	1.07%	2.46	23197.90		

N-723

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

OK MRS

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SP
Sampling Start	10-17-97 08:58	Counting Start	10-17-97 08:5
Sampling Stop	10-17-97 08:58	Live Time	600 Se
Current Date	10-17-97 10:08	Real Time	0 Se

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52

Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End	0 / 4095
Sigma Multiplier	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	89.17	168.22	69847	303	282	7312	1.11	
	123.15	238.72	30278	204	199	3962	1.12	
	137.53	268.54	3842	101	145	2579	1.18	
4	166.90	329.47	15786	154	164	2985	1.22	
5	256.24	514.79	253	74	130	2076	1.14	
6	280.28	564.66	447	76	135	2025	1.17	
7	392.73	797.93	6488	105	123	1677	1.33	
8	662.78	1358.12	24394	171	131	1582	1.54	
9	899.34	1848.83	5379	105	147	1708	1.86	
10	1174.63	2419.91	21422	157	111	905	1.98	
11	1333.96	2750.41	18638	143	82	490	2.08	
12	1837.50	3794.95	2835	57	42	120	2.25	

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Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-17-97 08:58	Counting Start.	10-17-97 08:58
Sampling Stop	.10-17-97 08:58	Buildup Time.	0.00e+000 Hrs
Current Date.	.10-17-97 10:08	Decay Time.	0.00e+000 Hrs

Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.lib
ID.	ID. . . . . SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)		Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.31e-001	+-3.61e-003	1.11e+004	1 of 1	
C 57	122.00	1.22e-002	+-8.24e-005	6.54e+003	1 of 1	
139	166.00	7.44e-003	+-7.26e-005	3.30e+003	1 of 1	
-203	279.00	3.24e-004	+-5.51e-005	1.12e+003	1 of 1	
N-113	392.00	8.54e-003	+-1.38e-004	2.76e+003	1 of 1	
CS-137	662.00	4.27e-002	+-2.99e-004	2.63e+005	1 of 1	
Y-88	Average:	1.26e-002	+-1.77e-004	2.56e+003	2 of 2	0.00
	898.00	1.22e-002	+-2.40e-004			
	1836.00	1.30e-002	+-2.63e-004			
CO-60	Average:	5.97e-002	+-3.16e-004	4.62e+004	2 of 2	0.00
	1173.00	5.97e-002	+-4.37e-004			
	1333.00	5.97e-002	+-4.57e-004			
TOTAL:		9.75e-001 uCi /gm			~&>šc Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
137.53	268.54	3842	101	145	2579	1.18	4.941e+001
256.24	514.79	253	74	130	2076	1.14	5.054e+000

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION

Date : 10/20/97

Normalized ? Yes

B. BACKGROUND (CPMA)

Packard Std: 19.0 cpm

NNRC Std: 11.3 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{93546.5 - 19}{1.512\text{E+05}} \times 100\ \% = 61.9\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{81889.1 - 11.3}{1.397\text{E+05}} \times 100\ \% = 58.6\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Michele R Sutton MRS Date : 10/20/97

Reviewed By : Edgar S. Plunkett Date : 10-20-97

DATA NORMALIZED MRS 10/20/97

[illegible] #15 Name:Background Check 20-[illegible] 06.37
[illegible] LL-UL [illegible] Bkg= [illegible] %2 Sigma=0.00
Region [illegible] LL-UL=[illegible] [illegible] 0 Bkg= 0.00 %2 Sigma=0.00
Region [illegible] LL-UL=256 -2000 [illegible] 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIS = SIS
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	19.00	12.00	19.30	127.00	
1	[illegible].00	11.[illegible]	24.50	17.4[illegible]	223.31	

Protocol #:14 Name:H-3 Efficiency 27-Oct-97 09:54
Region A: LL-UL= 0.0-18.6 LCr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL= 2.0-19.6 LCr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=18.6-2000 LCr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	93548.4	21.830	
2	10.00	93534.9	21.840	
	10.00	93556.2	21.810	
	10.00	93540.5	21.827	A
6	10.00	81865.9	17.580	
7	10.00	81903.2	17.560	

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

ample ID : 53046-25

OK. MRS

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-20-97 07:16	Counting Start.	10-20-97 07:16
Sampling Stop	.10-20-97 07:16	Live Time	600 Sec
Current Date.	.10-20-97 09:13	Real Time	0 Sec

Detector #: 21

Energy(keV)= 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	89.16	168.19	68094	292	242	6480	1.10	
	123.13	238.67	30237	200	182	3670	1.14	
3	137.56	268.60	3880	107	161	2853	1.16	
4	166.90	329.46	15465	152	161	2858	1.20	
5	256.19	514.68	214	69	118	1939	1.26	
6	280.20	564.50	520	82	149	2222	1.26	
7	392.83	798.14	6489	106	127	1793	1.36	
8	662.99	1358.55	24044	168	120	1458	1.64	
9	899.58	1849.33	5241	107	154	1867	1.78	
10	1175.06	2420.78	21105	159	128	1063	1.97	
11	1334.42	2751.37	18677	144	92	497	2.09	
12	1838.18	3796.37	2743	56	42	130	2.43	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-20-97 07:16	Counting Start. 10-20-97 07:16
Sampling Stop 10-20-97 07:16	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-20-97 09:13	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.lib
ID.	ID. . . . . SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)	Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.11e-001 +-3.48e-003	1.11e+004	1 of 1	
C 7	122.00	1.22e-002 +-8.08e-005	6.54e+003	1 of 1	
-39	166.00	7.29e-003 +-7.16e-005	3.30e+003	1 of 1	
-203	279.00	3.77e-004 +-5.96e-005	1.12e+003	1 of 1	
SN-113	392.00	8.55e-003 +-1.40e-004	2.76e+003	1 of 1	
CS-137	662.00	4.21e-002 +-2.94e-004	2.63e+005	1 of 1	
Y-88	Average:	1.23e-002 +-1.78e-004	2.56e+003	2 of 2	0.00
	898.00	1.19e-002 +-2.43e-004			
	1836.00	1.26e-002 +-2.60e-004			
CO-60	Average:	5.93e-002 +-3.19e-004	4.62e+004	2 of 2	0.00
	1173.00	5.88e-002 +-4.42e-004			
	1333.00	5.98e-002 +-4.61e-004			
TOTAL:		9.53e-001 uCi /gm		~&>šc Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
137.56	268.60	3880	107	161	2853	1.16	4.990e+001
256.19	514.68	214	69	118	1939	1.26	4.274e+000

Unit Id: 1
Date Performed: 10/20/97
File Name: C:\LBXL\UNIT1\EFF1E035.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 166-011-00

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	6000.00	Error	1320.00	
Decay Corrected DPM	525.73.57	Error	1156.62	
Archive File	SREO\B			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.43%	0.01%	1.32	223.47	5	B into A
Beta	43.78%	1.06%	2.48	23017.70		0.96%
Gross	44.21%	1.07%	2.31	23241.17		

N-732

EFF1D035.XLD

Unit Id: 1
Date Performed: 10/20/97
File Name: C:\LBXL\UNIT1\EFF1D035.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 166-012-00

Isotope	Th-230	Half-Life	28100000	days
Type	Alpha			
Calibration Date	7/13/94	Custodian	Edgar	
DPM @ calibration date	58000.00	Error	295.00	
Decay Corrected DPM	59499.13	Error	294.99	
Archive File	TH230AB			

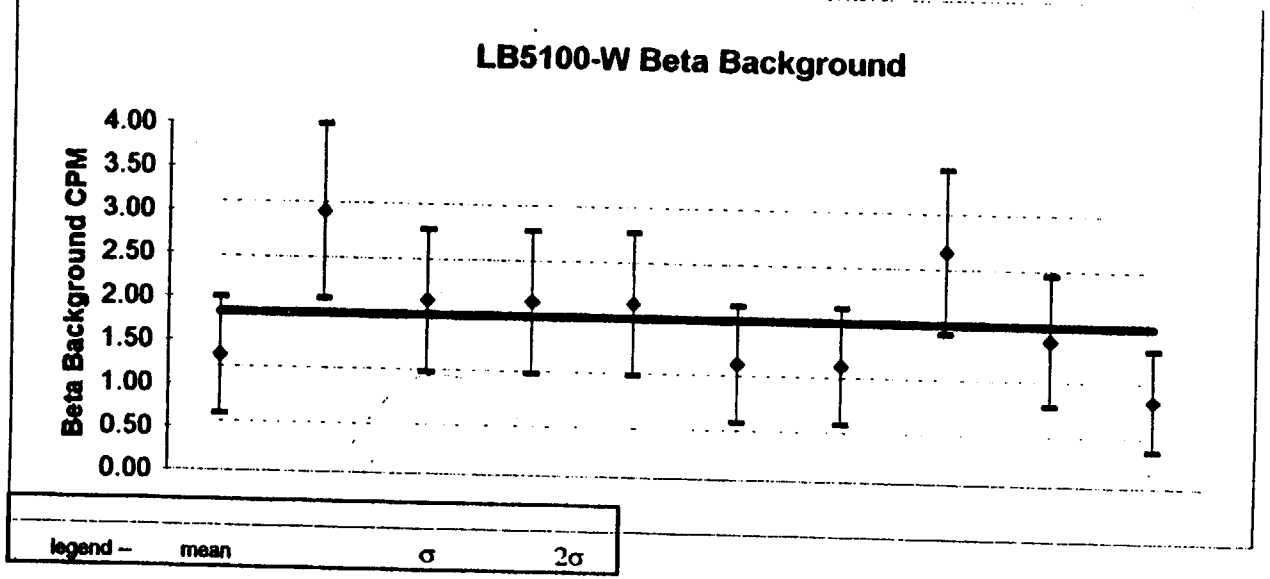
	Efficiency	Error	Chi^2	CPM	Events	X-Talk
Alpha	29.25%	0.42%	1.56	8628.20	5	26.64%
Beta	10.62%	0.16%	0.75	3133.43		A into B
Gross	39.87%	0.57%	1.15	11761.63		

N-733

BAC1B039.XLD

Unit Id: 1
Date Performed: 10/20/97 7:04:22

Application Revision: 4

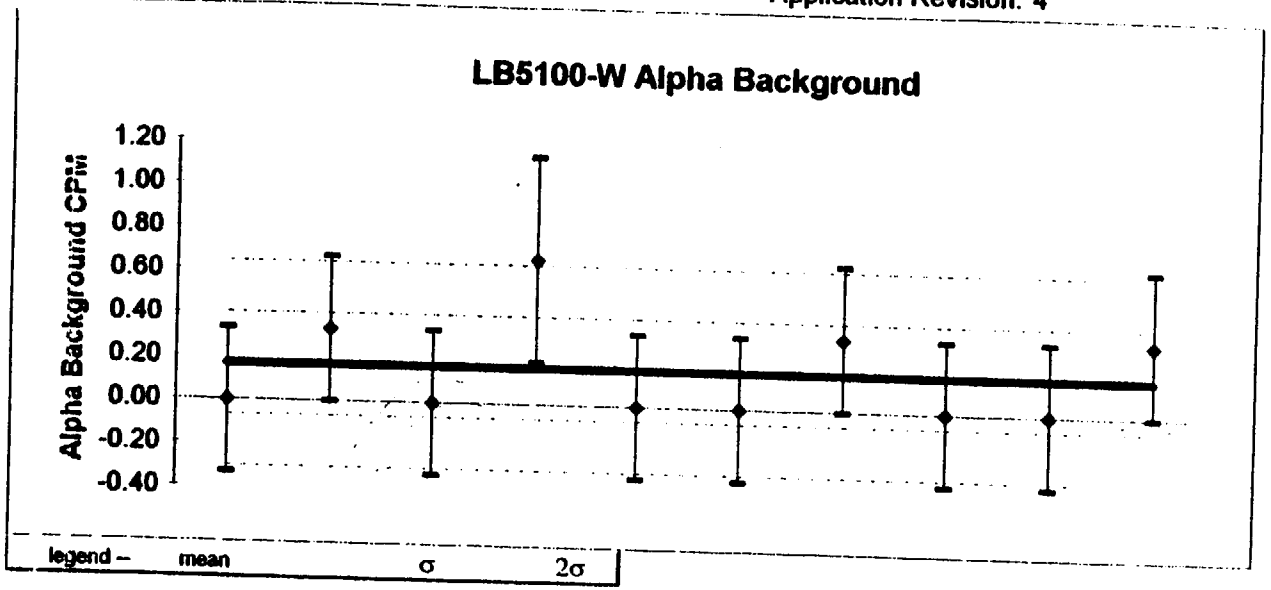


Mean background:	1.83
Error for mean background:	0.25
Actual standard deviation:	0.63
Predicted standard deviation:	0.78
Number of individual measurements:	10
Chi-square:	5.91
Reduced chi-square:	0.66

BAC1B039.XLD

Unit Id: 1
Date Performed: 10/20/97 7:04:22

Application Revision: 4



Mean background:	0.17
Error for mean background:	0.07
Actual standard deviation:	0.24
Predicted standard deviation:	0.24
Number of individual measurements:	10
Chi-square:	9.00
Reduced chi-square:	1.00

N-735

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION

Date : 10/21/97

Normalized ? Yes

B. BACKGROUND (CPMA)

Packard Std: 17.5 cpm

NNRC Std: 13.3 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{93623.1 - 17.5}{1.511\text{E+05}} \times 100\ \% = 61.9\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{81747.6 - 13.3}{1.397\text{E+05}} \times 100\ \% = 58.5\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Michele R Sutton MRS 10/21/97 Date : 10/21/97

Reviewed By : Edgar A. Jenden Date : 10-21-97

SYSTEM NORMALIZED MRS 10/2/97

Protocol #:15 Name Background Check 21-Oct-97 06:51
Region A: LL-UL= 0.0-18.0 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL=18.0-256. Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C LL-UL=256.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
Background Channel A must be < 30 cpm

Sil	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	17.50	13.00	16.30	153.61	
2	10.00	13.30	23.00	19.00	218.72	

Protocol #:14 Name:H-3 Efficiency 21-Oct-97 07:13
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	93808.9	21.710	
1	10.00	93582.2	21.740	
1	10.00	93478.2	21.710	
	10.00	93623.1	21.720	A
2	10.00	81778.0	17.480	
2	10.00	81694.2	17.440	
2	10.00	81770.6	17.450	
	10.00	81747.6	17.457	A

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Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

AR OK

Sample Size	1.00e+000 gm	Spectrum File	TEMP.SPC
Sampling Start	10-21-97 11:18	Counting Start	10-21-97 11:18
Sampling Stop	10-21-97 11:18	Live Time	600 Sec
Current Date	10-21-97 12:33	Real Time	0 Sec

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End	0 / 4095
Sigma Multiplier	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	89.42	168.75	69088	297	260	6809	1.07	
	123.42	239.27	30041	199	181	3625	1.11	
3	137.82	269.13	3857	101	145	2576	1.13	
4	167.20	330.09	15144	152	164	2960	1.14	
5	256.49	515.31	322	73	129	2040	1.50	
6	280.63	565.38	381	64	109	1639	1.11	
7	393.14	798.77	6214	105	128	1810	1.31	
8	663.34	1359.27	23939	169	128	1500	1.55	
9	899.97	1850.15	5134	102	140	1671	1.72	
10	1175.45	2421.61	21257	155	103	840	1.98	
11	1334.84	2752.24	18526	141	77	408	2.10	
12	1838.66	3797.37	2736	56	40	105	2.36	

19891.5

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size . . . . . 1.00e+000 gm	Spectrum File . . . . . .TEMP.SPC
Sampling Start. 10-21-97 11:18	Counting Start. 10-21-97 11:18
Sampling Stop 10-21-97 11:18	Buildup Time. . . . . 0.00e+000 Hrs
Current Date. 10-21-97 12:33	Decay Time. . . . . 0.00e+000 Hrs
Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.lib
ID.	ID. . . . . SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)	Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.20e-001 +-3.53e-003	1.11e+004	1 of 1	
7	122.00	1.21e-002 +-8.05e-005	6.54e+003	1 of 1	
. .39	166.00	7.15e-003 +-7.16e-005	3.30e+003	1 of 1	
G-203	279.00	2.77e-004 +-4.67e-005	1.12e+003	1 of 1	
SN-113	392.00	8.19e-003 +-1.38e-004	2.76e+003	1 of 1	
CS-137	662.00	4.20e-002 +-2.95e-004	2.63e+005	1 of 1	
Y-88	Average:	1.21e-002 +-1.73e-004	2.56e+003	2 of 2	0.00
	898.00	1.17e-002 +-2.33e-004			
	1836.00	1.26e-002 +-2.57e-004			
CO-60	Average:	5.93e-002 +-3.13e-004	4.62e+004	2 of 2	0.00
	1173.00	5.93e-002 +-4.32e-004			
	1333.00	5.94e-002 +-4.53e-004			
TOTAL:		9.61e-001 uCi /gm		~&>šc Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
137.82	269.13	3857	101	145	2576	1.13	4.962e+001
256.49	515.31	322	73	129	2040	1.50	6.438e+000

EFF1E036.XLD

Unit Id: 1
Date Performed: 10/21/97
File Name: C:\LBXL\UNIT1\EFF1E036.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-011-00**

Isotope	Sr-90/Y-90	**Half-Life**	10409.6	**days**
Type	Beta			
Calibration Date	5/15/92	**Custodian**	Edgar	
DPM @ calibration date	60000.00	**Error**	1320.00	
Decay Corrected DPM	52570.03	**Error**	1156.54	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.47%	0.01%	0.78	248.67	5	B into A
Beta	43.94%	1.06%	5.13	23098.23		1.07%
Gross	44.41%	1.08%	5.27	23346.90		

N-742

EFF1D036.XLD

Unit Id: 1
Date Performed: 10/21/97
File Name: C:\LBXL\UNIT1\EFF1D036.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-012-00**

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	7/13/94	**Custodian**	Edgar	
DPM @ calibration date	29500.00	**Error**	295.00	
Decay Corrected DPM	29499.13	**Error**	294.99	
Archive File	TH230AB			

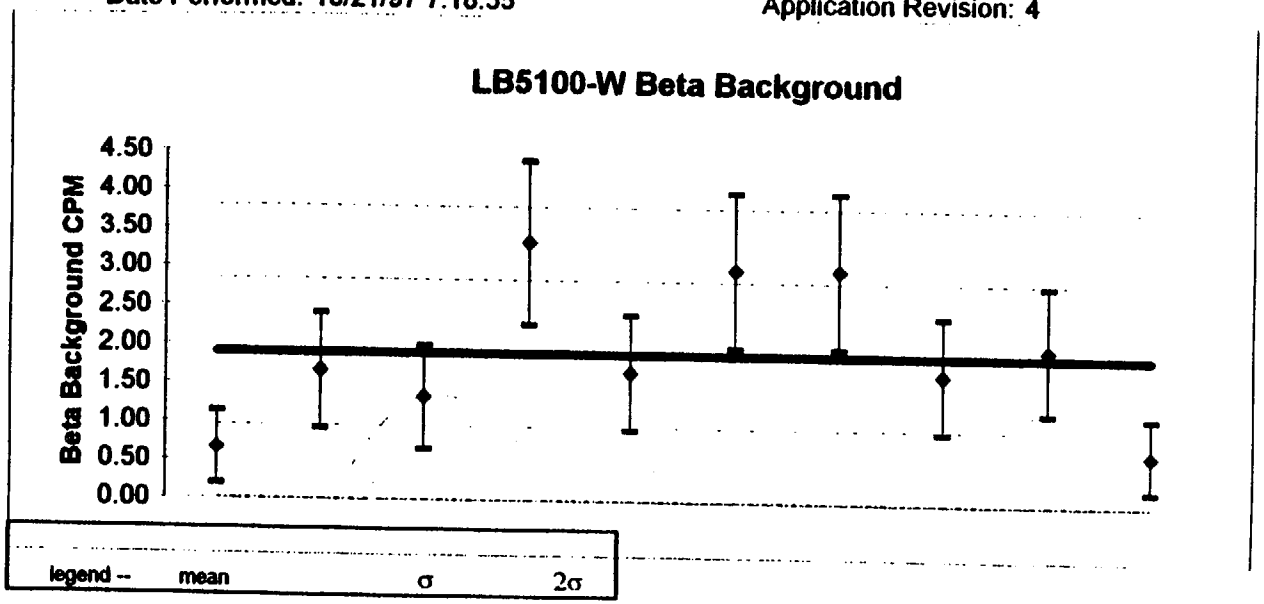
	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	29.39%	0.42%	16.68	8668.87	5	26.71%
Beta	10.71%	0.16%	9.94	3159.97		A into B
Gross	40.10%	0.58%	10.66	11828.83		

N-743

BAC1B040.XLD

Unit Id: 1
Date Performed: 10/21/97 7:18:55

Application Revision: 4

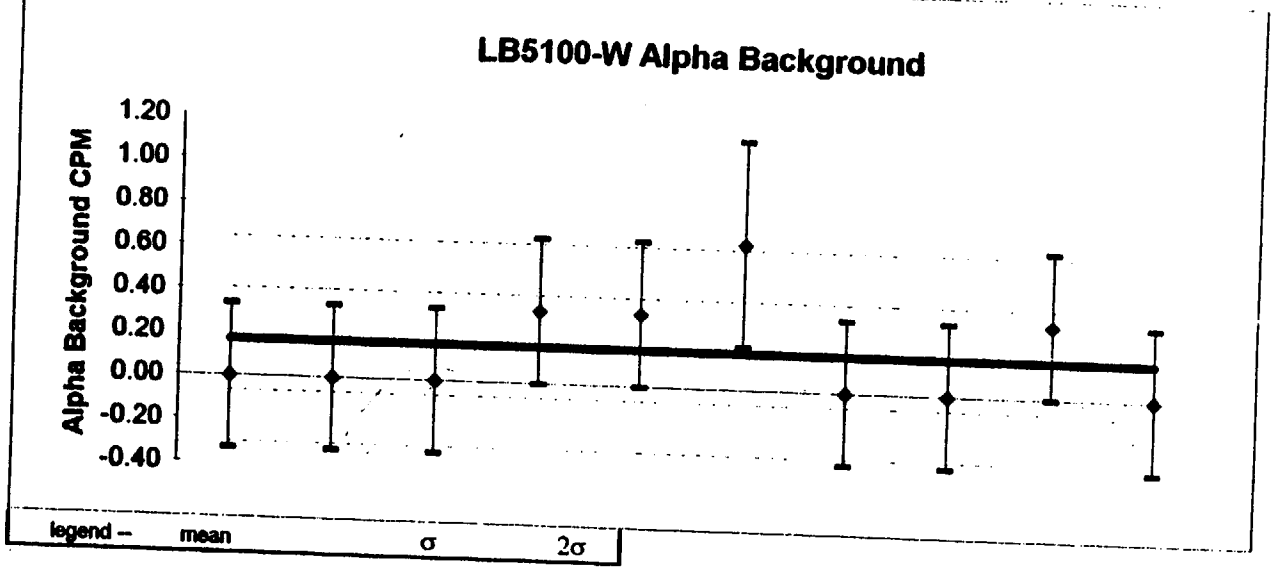


Mean background:	1.90
Error for mean background:	0.25
Actual standard deviation:	0.94
Predicted standard deviation:	0.80
Number of individual measurements:	10
Chi-square:	12.65
Reduced chi-square:	1.41

BAC1B040.XLD

Unit Id: 1
Date Performed: 10/21/97 7:18:55

Application Revision: 4



Mean background:	0.17
Error for mean background:	0.07
Actual standard deviation:	0.24
Predicted standard deviation:	0.24
Number of individual measurements:	10
Chi-square:	9.00
Reduced chi-square:	1.00

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION Date : 10/22/97

Normalized ? Yes

B. BACKGROUND (CPMA) Packard Std: 19.1 cpm

NNRC Std: 13.1 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{93478.4 - 19.1}{1.511\text{E+05}} \times 100\ \% = 61.8\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{81480.8 - 13.1}{1.397\text{E+05}} \times 100\ \% = 58.3\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Alain Rodriguez AR Date : 10/22/97

Reviewed By : Edgar B. Jewdel Date : 10-22-97

SYSTEM NORMALIZED 10/22/97 AR

Protocol: [illegible] Name: Background Check 22-Oct-97 06:49
Region A: LL-UL = 0.0-19.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL=13.6-256. Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=256.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	19.10	11.80	15.00	134.19	
2	10.00	13.10	20.30	15.30	221.02	

Protocol #:14 Name:H-3 Efficiency 22-Oct-97 07:10
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency. Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	93655.3	21.800	
1	10.00	93401.5	21.790	
1	10.00	93378.3	21.790	
	10.00	93478.4	21.793	A
2	10.00	81536.4	17.570	
2	10.00	81489.6	17.550	
2	10.00	81416.4	17.580	
	10.00	81480.8	17.567	A

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

OK. MRS

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-22-97 09:04	Counting Start.	10-22-97 09:04
Sampling Stop	.10-22-97 09:04	Live Time	600 Sec
Current Date.	.10-22-97 09:55	Real Time	0 Sec

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	89.45	168.81	67179	295	268	7194	1.07	
-	123.44	239.30	29861	199	181	3637	1.14	
3	137.86	269.23	3682	100	144	2543	1.14	
4	167.21	330.11	15246	148	147	2667	1.17	
5	256.19	514.68	395	105	201	3183	1.35	
6	280.58	565.28	473	82	149	2233	1.18	
7	393.14	798.77	6257	108	140	1956	1.36	
8	663.36	1359.31	23946	170	135	1549	1.58	
9	900.04	1850.29	5247	101	136	1582	1.74	
10	1175.51	2421.73	21091	156	115	967	1.91	
11	1334.89	2752.35	18615	142	76	395	2.13	
12	1838.69	3797.43	2720	56	38	101	2.43	

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Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-22-97 09:04	Counting Start.	10-22-97 09:04
Sampling Stop	.10-22-97 09:04	Buildup Time.	0.00e+000 Hrs
Current Date.	.10-22-97 09:55	Decay Time.	0.00e+000 Hrs

Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.lib
ID.	ID. . . . . SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 %	Decay Limit <=. . . . 8.000 Halflives

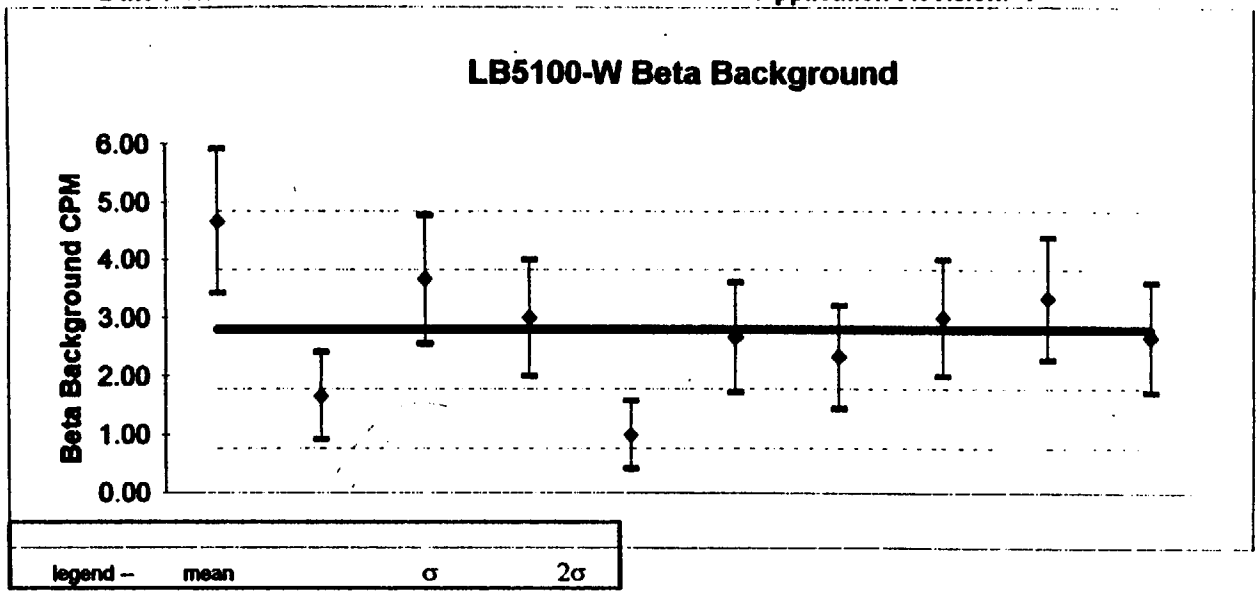
FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)		Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	7.97e-001	+-3.50e-003	1.11e+004	1 of 1	
CO-57	122.00	1.21e-002	+-8.04e-005	6.54e+003	1 of 1	
.39	166.00	7.19e-003	+-6.97e-005	3.30e+003	1 of 1	
G-203	279.00	3.43e-004	+-5.95e-005	1.12e+003	1 of 1	
SN-113	392.00	8.25e-003	+-1.43e-004	2.76e+003	1 of 1	
CS-137	662.00	4.20e-002	+-2.98e-004	2.63e+005	1 of 1	
Y-88	Average:	1.22e-002	+-1.71e-004	2.56e+003	2 of 2	0.00
	898.00	1.20e-002	+-2.31e-004			
	1836.00	1.25e-002	+-2.56e-004			
CO-60	Average:	5.92e-002	+-3.14e-004	4.62e+004	2 of 2	0.00
	1173.00	5.88e-002	+-4.36e-004			
	1333.00	5.97e-002	+-4.54e-004			
TOTAL:		9.38e-001 uCi /gm			~&>šc Total:	0.00

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
137.86	269.23	3682	100	144	2543	1.14	4.737e+001
256.19	514.68	395	105	201	3183	1.35	7.888e+000

Unit Id: 1
Date Performed: 10/22/97 10:14:44 Application Revision: 4



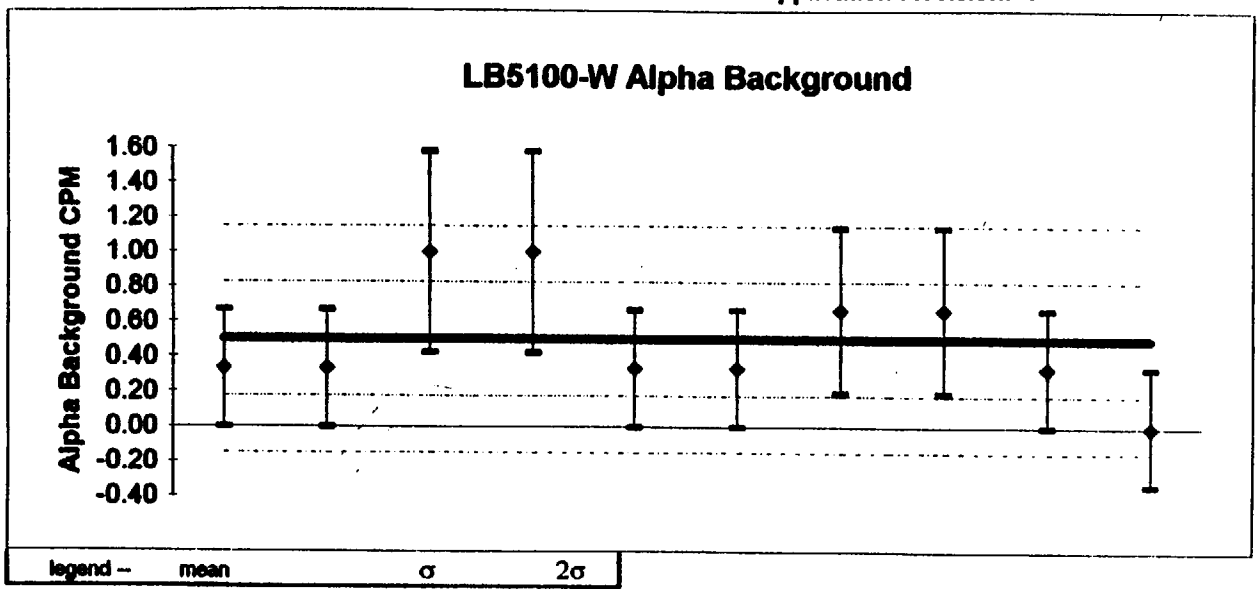
Mean background:	2.80
Error for mean background:	0.31
Actual standard deviation:	1.02
Predicted standard deviation:	0.97
Number of individual measurements:	10
Chi-square:	10.05
Reduced chi-square:	1.12

N-752

BAC1B041.XLD

Unit Id: 1
Date Performed: 10/22/97 10:14:44

Application Revision: 4



Mean background:	0.50
Error for mean background:	0.13
Actual standard deviation:	0.32
Predicted standard deviation:	0.41
Number of individual measurements:	10
Chi-square:	5.67
Reduced chi-square:	0.63

N-753

Unit Id: 1
Date Performed: 10/22/97
File Name: C:\LBXL\UNIT1\EFF1D037.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-012-00**

Isotope	Th-230	Half-Life	28105000	days
Type	Alpha			
Calibration Date	7/13/94	Custodian	Edgar	
DPM @ calibration date	29500.00	Error	295.00	
Decay Corrected DPM	29499.13	Error	294.99	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	29.23%	0.42%	2.46	8621.40	5	26.85%
Beta	10.73%	0.16%	3.97	3164.17		A into B
Gross	39.95%	0.57%	2.14	11785.57		

N-754

EFF1E038.XLD

Unit Id: 1
Date Performed: 10/23/97
File Name: C:\LBXL\UNIT1\EFF1E038.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: 166-011-00

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	60000.00	Error	1320.00	
Decay Corrected DPM	52563.05	Error	1156.39	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.46%	0.01%	1.94	243.93	5	B into A
Beta	43.82%	1.06%	1.96	23031.23		1.05%
Gross	44.28%	1.07%	1.83	23275.17		

N-755

Liquid Scintillation Counter Data Sheet

A. SYSTEM NORMALIZATION

Date : 10/23/97

Normalized ? Yes

B. BACKGROUND (CPMA)

Packard Std: 17.1 cpm

NNRC Std: 12.4 cpm

C. H-3 STANDARD Check (Packard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{93599.6 - 17.1}{1.511\text{E+05}} \times 100\ \% = 61.9\%$$

D. H-3 EFFICIENCY (NNRC Standard)

$$\frac{\text{CPMA} - \text{BKG}}{\text{Corrected dpm}} \times 100\ \%$$

$$\frac{80727.1 - 12.4}{1.396\text{E+05}} \times 100\ \% = 57.8\%$$

E. NNRC Standard must be re-made every six (6) months or if the efficiency drops to less than 90 % of original efficiency.

Original Efficiency : 60.6%

Date standard made : 10/1/97

Performed By : Ken Veinot Date : 10/23/97

Reviewed By : Date : 10-23-97

Protocol #:15 Name:Background Check 23-Oct-97 06:38
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL=18.6-256. Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=256.-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
Background Channel A must be < 30 cpm

S#	TIME	CPMA	CPMB	CPMC	SIS	FLAG
1	10.00	17.10	12.80	15.20	164.82	
2	10.00	12.40	23.30	16.80	233.26	

Protocol #:14 Name:H-3 Efficiency 23-Oct-97 06:59
Region A: LL-UL= 0.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region B: LL-UL= 2.0-18.6 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Region C: LL-UL=18.6-2000 Lcr= 0 Bkg= 0.00 %2 Sigma=0.00
Time = 10.00 QIP = SIS
H-3 Efficiency: Minimum 58% for Packard Standard

S#	TIME	CPMA	SIS	FLAG
1	10.00	93469.8	21.790	
1	10.00	93726.6	21.780	
1	10.00	93602.3	21.770	
	10.00	93599.6	21.780	A
2	10.00	80754.1	17.530	
2	10.00	80696.3	17.500	
2	10.00	80731.0	17.500	
	10.00	80727.1	17.510	A

SYSTEM NORMALIZED

Neely Nuclear Research Center

Quantum Technology
GDR_C Version 5.0

Sample ID : 53046-25

OK. MRS

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 08:15	Counting Start.	10-23-97 08:15
Sampling Stop	.10-23-97 08:15	Live Time	600 Sec
Current Date.	.10-23-97 08:58	Real Time	0 Sec

Detector #: 21

Energy(keV) = 8.08 + 0.482*Ch + 0.00e+000*Ch^2 + 0.00e+000*Ch^3 12-04-96 10:52

FWHM(keV) = 1.14 + -0.004*En + 8.21e-004*En^2 + 0.00e+000*En^3 12-04-96 10:52
Where En = Sqrt(Energy in keV)

Sensitivity	2.00	Search Start / End.	0 / 4095
Sigma Multiplier.	1.00		

PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN-CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
	89.20	168.28	68206	292	243	6507	1.11	
2	123.18	238.78	30051	199	180	3600	1.11	
3	137.60	268.68	3717	100	144	2559	1.15	
4	166.97	329.62	15185	151	160	2813	1.15	
5	256.26	514.84	410	74	129	2058	1.04	
6	280.29	564.69	507	69	118	1721	1.41	
7	392.99	798.45	6537	109	138	1918	1.40	
8	663.28	1359.16	24419	170	130	1556	1.57	
9	900.04	1850.28	5074	105	150	1778	1.67	
10	1175.55	2421.81	21191	157	115	920	1.92	
11	1335.01	2752.59	18689	143	84	459	2.07	
12	1838.98	3798.02	2733	56	41	115	2.39	

Neely Nuclear Research Center

Quantum Technology
GDR_C Nuclide Activity Summary

Sample ID: 53046-25

Sample Size	1.00e+000 gm	Spectrum File	.TEMP.SPC
Sampling Start.	.10-23-97 08:15	Counting Start.	10-23-97 08:15
Sampling Stop	.10-23-97 08:15	Buildup Time.	0.00e+000 Hrs
Current Date.	.10-23-97 08:58	Decay Time.	0.00e+000 Hrs

Efficiency File. c:\gdr\eff\point.eff	Library File. .c:\gdr\library\point.lib
ID.	ID. . . . . SRS 49183-25 POINT SOURCE

Eff.= 1/[8.35e-003*En^-2.72e+000 + 5.18e+001*En^1.10e+000] 12-04-96 10:52

Gamma Fraction Limit >= . . . 80.00 % | Decay Limit <=. . . . 8.000 Halflives

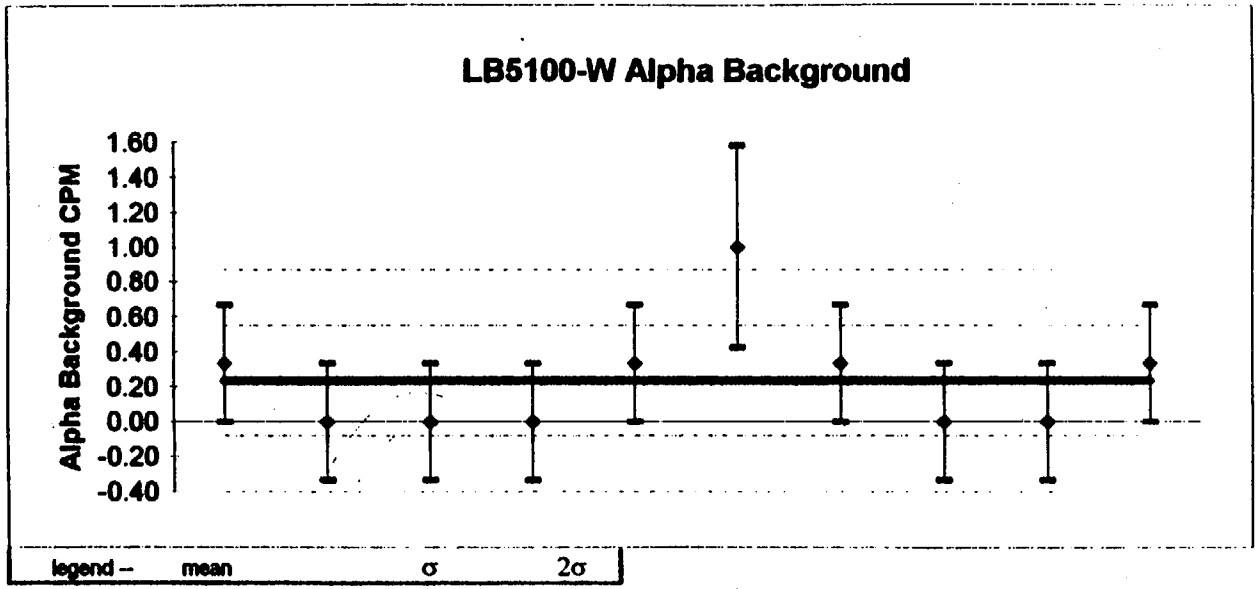
FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi /gm)		Halflife (hrs)	Peaks Found	~&>šc Fraction
CD-109	88.00	8.12e-001	+-3.48e-003	1.11e+004	1 of 1	
C[illegible]-7	122.00	1.22e-002	+-8.05e-005	6.54e+003	1 of 1	
[illegible]39	166.00	7.16e-003	+-7.10e-005	3.30e+003	1 of 1	
[illegible]-203	279.00	3.68e-004	+-5.02e-005	1.12e+003	1 of 1	
SN-113	392.00	8.61e-003	+-1.44e-004	2.76e+003	1 of 1	
CS-137	662.00	4.28e-002	+-2.99e-004	2.63e+005	1 of 1	
Y-88	Average:	1.20e-002	+-1.75e-004	2.56e+003	2 of 2	0.00
	898.00	1.16e-002	+-2.39e-004			
	1836.00	1.26e-002	+-2.58e-004			
CO-60	Average:	5.95e-002	+-3.16e-004	4.62e+004	2 of 2	0.00
	1173.00	5.91e-002	+-4.37e-004			
	1333.00	5.99e-002	+-4.58e-004			
TOTAL:		9.54e-001 uCi /gm			~&>šc Total:	0.00

UNKNOWN PEAKS

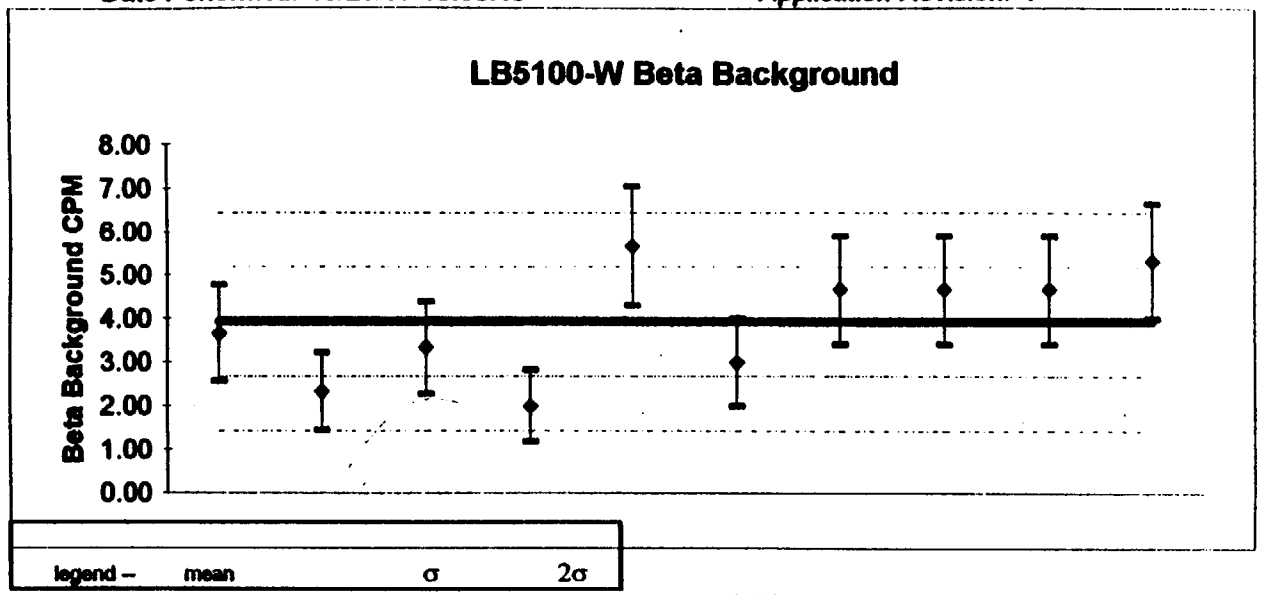
Energy (keV)	Centroid Channel	Net Counts	Un-Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
137.60	268.68	3717	100	144	2559	1.15	4.781e+001
256.26	514.84	410	74	129	2058	1.04	8.190e+000

Unit Id: 1
Date Performed: 10/23/97 10:03:48 Application Revision: 4



Mean background:	0.23
Error for mean background:	0.09
Actual standard deviation:	0.32
Predicted standard deviation:	0.28
Number of individual measurements:	10
Chi-square:	11.57
Reduced chi-square:	1.29

Unit Id: 1
Date Performed: 10/23/97 10:03:48 Application Revision: 4



Mean background:	3.93
Error for mean background:	0.36
Actual standard deviation:	1.26
Predicted standard deviation:	1.15
Number of individual measurements:	10
Chi-square:	10.81
Reduced chi-square:	1.20

N-762

Unit Id: 1
Date Performed: 10/23/97
File Name: C:\LBXL\UNIT1\EFF1D038.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-012-00**

Isotope	Th-230	**Half-Life**	28105000	**days**
Type	Alpha			
Calibration Date	7/13/94	**Custodian**	Edgar	
DPM @ calibration date	29500.00	**Error**	295.00	
Decay Corrected DPM	29499.13	**Error**	294.99	
Archive File	TH230AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	29.55%	0.43%	0.33	8716.93	5	26.21%
Beta	10.50%	0.16%	5.96	3096.30		A into B
Gross	40.05%	0.57%	1.51	11813.23		

N-763

Unit Id: 1
Date Performed: 10/23/97
File Name: C:\LBXL\UNIT1\EFF1E038.XLD

Application Revision: 3
Application Version: Standard

LB5100-W Alpha-Beta Efficiency Data Entry and Output

Source Control ID: **166-011-00**

Isotope	Sr-90/Y-90	Half-Life	10409.6	days
Type	Beta			
Calibration Date	5/15/92	Custodian	Edgar	
DPM @ calibration date	60000.00	Error	1320.00	
Decay Corrected DPM	52563.05	Error	1156.39	
Archive File	SR90AB			

	Efficiency	Error	Chi ^2	CPM	Events	X-Talk
Alpha	0.46%	0.01%	1.94	243.93	5	B into A
Beta	43.82%	1.06%	1.96	23031.23		1.05%
Gross	44.28%	1.07%	1.83	23275.17		

N-764