

Appendix D - Peaks found in Background Spectra

[Appendix Home Page](#) | [Appendix B](#) | [Appendix C](#) | [Appendix E](#) |

Energy	Nuclide	Pg%	Related peaks	Source of radiation
8.04	CuKa	29.3	8.91	fluorescence from shielding
8.91	CuKb	4.7	8.04	fluorescence from shielding
22.98	CdKa2	24.5	23.17	fluorescence from shielding
23.17	CdKa1	46.1	22.98	fluorescence from shielding
25.04	SnKa2	24.7	25.27	fluorescence from shielding
25.27	SnKa1	45.7	25.04	fluorescence from shielding
26.10	CdKb1	7.69	22.98	fluorescence from shielding
26.64	CdKb2	1.98	22.98	fluorescence from shielding
28.49	SnKb1	7.99	25.27	fluorescence from shielding
29.11	SnKb2	2.19	25.27	fluorescence from shielding
46.54	²¹⁰ Pb	4.25	none	²³⁸ U (²²⁶ Ra) series
53.23	²¹⁴ Pb	1.06	295.22 (18.50), 351.93 (35.60)	²³⁸ U (²²⁶ Ra) series
53.44	^{73m} Ge	10.34		⁷² Ge(n,g), ⁷⁴ Ge(n,2n)
63.28	²³⁴ Th	4.8	92.58 (5.58)	²³⁸ U series
68.75	^{73*} Ge			⁷³ Ge(n,n') broad asymmetric peak
72.81	PbKa2	27.7	74.97 (46.2)	fluorescence, and ²⁰⁸ Tl decay
74.82	BiKa2	27.7	77.11 (46.2)	^{212,214} Pb decay
74.97	PbKa1	46.2	72.81 (27.7)	fluorescence, and ²⁰⁸ Tl decay
77.11	BiKa1	46.2	74.82 (27.7)	^{212,214} Pb decay
79.29	PoKa1	46.1		fluorescence, and ^{212,214} Bi decay
81.23	²³¹ Th	0.9		²³⁵ U series
84.94	PbKb1	10.7	74.97 (46.2)	fluorescence, and ²⁰⁸ Tl decay
87.30	PbKb2	3.91	74.97 (46.2)	fluorescence, and ²⁰⁸ Tl decay
87.35	BiKb1	10.7	74.82 (27.7)	^{212,214} Pb decay
89.78	BiKb2	3.93	74.82 (27.7)	^{212,214} Pb decay
89.96	ThKa2	28.1	93.35 (45.4)	²³⁵ U and ²²⁸ Ac decay
92.58	²³⁴ Th	5.58	63.28 (4.8)	²³⁸ U series - doublet
93.35	ThKa1	45.4	89.96 (28.1)	²³⁵ U and ²²⁸ Ac decay

105.60	ThKb1	10.7	93.35 (45.4)	^{235}U and ^{228}Ac decay
109.16	^{235}U	1.54	185.72 (57.2)	primordial
112.81	^{234}Th	0.28	63.28 (4.8), 92.58 (5.58)	^{238}U series
122.32	^{223}Ra	1.192	269.49 (13.7)	^{235}U series
129.06	^{228}Ac	2.42	911.20 (25.8), 968.97 (15.8)	^{232}Th series
139.68	^{75}mGe	39		$^{74}\text{Ge}(\text{n,g})$, $^{76}\text{Ge}(\text{n,2n})$
143.76	^{235}U	10.96		primordial
159.7	^{77}mGe	10.33		$^{76}\text{Ge}(\text{n,g})$
163.33	^{238}U	5.08	185.72 (57.2)	primordial
174.95	^{71}mGe v. small		198.39 (?100)	$^{70}\text{Ge}(\text{n,g})$ activation (summed out)
185.72	^{235}U	57.2	143.76 10.96)	primordial
186.21	^{226}Ra	3.555	none	^{238}U series
198.39	^{71}mGe	sum		$^{70}\text{Ge}(\text{n,g})$
205.31	^{235}U	5.01	185.72 (57.2)	primordial
209.26	^{228}Ac	3.89	911.20 (25.8), 968.97 (15.8)	^{232}Th series
238.63	^{212}Pb	43.6	300.09 (3.18)	^{232}Th series
240.89	^{224}Ra	4.12		^{232}Th series
242.00	^{214}Pb	7.268	295.22 (18.50), 351.93 (35.6)	^{238}U (^{226}Ra) series
269.49	^{223}Ra	13.7	122.32 (1.192)	^{235}U series
270.24	^{228}Ac	3.46	911.20 (25.8), 968.97 (15.8)	^{232}Th series
277.37	^{208}Tl	2.37	583.19 (30.6), 2614.51 (35.85)	^{232}Th series – Note1
278.26	$^{64*}\text{Cu}$			$^{63}\text{Cu}(\text{n,g})$, $^{65}\text{Cu}(\text{n,2n})$ promptg
295.22	^{214}Pb	18.5	351.93 (35.60)	^{238}U (^{226}Ra) series
299.98	^{227}Th	2.16		^{235}U series
300.07	^{231}Pa	2.47		^{235}U series
300.09	^{212}Pb	3.18	238.63 (43.6)	^{232}Th series
328.00	^{228}Ac	2.95	911.20 (25.8), 968.97 (15.8)	^{232}Th series
336.24	$^{115\text{m}}\text{Cd}/^{115\text{m}}\text{In}$	45.9	527.90 (27.5)	Activation of Cd (daughter of ^{115}Cd)
338.28	^{223}Ra	2.79		^{235}U series
338.32	^{228}Ac	11.27	911.20 (25.8), 968.97 (15.8)	^{232}Th series
351.06	^{211}Bi	12.91		^{235}U series
351.93	^{214}Pb	35.6	295.22 (18.50)	^{238}U (^{226}Ra) series
409.46	^{228}Ac	1.92	911.20 (25.8), 968.97 (15.8)	^{232}Th series
416.86	$^{116\text{m}}\text{In}$	27.7		$^{115}\text{In}(\text{n,g})$ activation of In metal seal
447.60	^7Be	10.44	none	cosmic
462.00	^{214}Pb	0.213	295.22 (18.50), 351.93 (35.6)	^{238}U (^{226}Ra) series
463.00	^{228}Ac	4.4	911.20 (25.8), 968.97 (15.8)	^{232}Th series
510.70	^{208}Tl	6.29	583.19 (30.6), 2614.51 (35.85)	^{232}Th series – Note1
511.00	Annihilation			Annihilation radiation (b^+)
527.90	^{115}Cd	27.5	336.2(45.9)	$^{114}\text{Cd}(\text{n,g})$ activation
558.46	$^{114*}\text{Cd}$			$^{113}\text{Cd}(\text{n,g})$ promptg
569.7	$^{207*}\text{Pb}$	97.87		$^{207}\text{Pb}(\text{n,n}')$
570.82	^{228}Ac	0.182	911.20 (25.8), 968.97 (15.8)	^{232}Th series

579.20	²⁰⁷ Pb			²⁰⁷ Pb(n,n') promptg
583.19	²⁰⁸ Tl	30.6	2614.51 (35.85)	²³² Th series – Note1
595.85	⁷⁴ Ge			⁷⁴ Ge(n,n') broad asymmetric peak
609.31	²¹⁴ Bi	45.49	1120.29 (14.907), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
661.66	¹³⁷ Cs	84.99	none	fission
669.62	⁶³ Cu			⁶³ Cu(n,n') promptg
689.6	⁷² Ge			⁷² Ge(n,n') broad asymmetric peak
726.86	²²⁸ Ac	0.62	911.20 (25.8), 968.97 (15.8)	²³² Th series
727.33	²¹² Bi	6.74	1620.74 (1.51)	²³² Th series
755.31	²²⁸ Ac	1	911.20 (25.8), 968.97 (15.8)	²³² Th series
768.36	²¹⁴ Bi	4.891	609.31 (45.49), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
794.95	²²⁸ Ac	4.25	911.20 (25.8), 968.97 (15.8)	²³² Th series
803.06	²⁰⁶ Pb			²⁰⁶ Pb(n,n') promptg
806.17	²¹⁴ Bi	1.262	609.31 (45.49), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
832.01	²¹¹ Pb	3.52		²³⁵ U series
835.71	²²⁸ Ac	1.61	911.20 (25.8), 968.97 (15.8)	²³² Th series
839.04	²¹⁴ Pb	0.587	295.22 (18.50), 351.93 (35.6)	²³⁸ U (²²⁶ Ra) series
843.76	²⁷ Mg	71.8		²⁶ Mg(n,g) or ²⁷ Al(n,p) of encapsulation
846.77	⁵⁶ Fe			⁵⁶ Fe(n,n')
860.56	²⁰⁸ Tl	4.48	583.19 (30.6), 2614.51 (35.85)	²³² Th series – Note1
911.20	²²⁸ Ac	25.8	968.97 (15.8)	²³² Th series
934.06	²¹⁴ Bi	3.096	609.31 (45.49), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
962.06	⁶³ Cu			⁶³ Cu(n,n') promptg
964.77	²²⁸ Ac	4.99	911.20 (25.8), 968.97 (15.8)	²³² Th series
968.97	²²⁸ Ac	15.8	911.20 (25.8)	²³² Th series
1001.03	^{234m} Pa	1.021		²³⁸ U series (GRG empirical Pg)
1014.44	²⁷ Mg	28		²⁶ Mg(n,g) or ²⁷ Al(n,p) of encapsulation
1063.66	²⁰⁷ Pb	88.5		²⁰⁷ Pb(n,n')
1097.3	¹¹⁶ In	56.2	1293.54 (84.4)	¹¹⁵ In(n,g) activation of In metal seal
1115.56	⁶⁵ Cu			⁶⁵ Cu(n,n')
1120.29	²¹⁴ Bi	14.907	609.31 (45.49), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
1155.19	²¹⁴ Bi	1.635	609.31 (45.49), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
1173.23	⁶⁰ Co	99.85	1332.49 (99.98)	activation
1238.11	²¹⁴ Bi	5.827	609.31 (45.49), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
1293.54	¹¹⁶ In	84.4	1097.3 (56.2)	¹¹⁵ In(n,g) activation of In metal seal
1332.49	⁶⁰ Co	99.98	1173.23 (99.85)	activation
1377.67	²¹⁴ Bi	3.967	609.31 (45.49), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
1407.98	²¹⁴ Bi	2.389	609.31 (45.49), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
1459.14	²²⁸ Ac	0.83	911.20 (25.8), 968.97 (15.8)	²³² Th series
1460.82	⁴⁰ K	10.66	none	primordial
1588.2	²²⁸ Ac	3.22	911.20 (25.8), 968.97 (15.8)	²³² Th series
1620.74	²¹² Bi	1.51	727.33 (6.74)	²³² Th series
1630.63	²²⁸ Ac	1.51	911.20 (25.8), 968.97 (15.8)	²³² Th series

1729.60	²¹⁴ Bi	2.843	609.31 (45.49), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
1764.49	²¹⁴ Bi	15.28	609.31 (45.49), 1764.49 (15.28)	²³⁸ U(²²⁶ Ra) series
1847.42	²¹⁴ Bi	2.023	609.31 (45.49), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
2204.21	²¹⁴ Bi	4.913	609.31 (45.49), 1764.49 (15.28)	²³⁸ U (²²⁶ Ra) series
2224.57	² *H			¹ H(n,g)
2614.51	²⁰⁸ Tl	35.85	583.19 (30.6)	²³² Th series; ²⁰⁸ Pb(n,p) – Note1

[Home Page](#)[Data](#)[Example Spectra](#)[Links](#)[Spreadsheets](#)[Test Spectra](#)

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