Table 31. BWR Isotopics as a Function of 3.5 wt% ^{235}U and Burnup, 10K Year Decay (Cont.)

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)						
		Burnup GWd/mtU 17.5	Burnup GWd/mtU 20	Burnup GWd/mtU 25	Burnup GWd/mtU 30	Burnup GWd/mtU 35	Burnup GWd/mtU 40	Burnup GWd/mtU 45
^{16}O	80160	4.73E-02	4.73E-02	4.71E-02	4.69E-02	4.67E-02	4.65E-02	4.63E-02
^{95}Mo	420950	2.44E-05	2.76E-05	3.38E-05	3.97E-05	4.53E-05	5.07E-05	5.58E-05
^{99}Tc	430990	2.41E-05	2.72E-05	3.32E-05	3.90E-05	4.46E-05	4.99E-05	5.49E-05
^{101}Ru	441010	2.27E-05	2.57E-05	3.19E-05	3.79E-05	4.38E-05	4.97E-05	5.54E-05
^{103}Rh	451030	1.63E-05	1.82E-05	2.18E-05	2.52E-05	2.83E-05	3.13E-05	3.40E-05
^{109}Ag	471090	2.01E-06	2.33E-06	3.04E-06	3.82E-06	4.64E-06	5.50E-06	6.38E-06
^{143}Nd	601430	2.13E-05	2.39E-05	2.88E-05	3.32E-05	3.71E-05	4.05E-05	4.35E-05
^{145}Nd	601450	1.45E-05	1.64E-05	1.99E-05	2.31E-05	2.62E-05	2.90E-05	3.17E-05
^{147}Sm	621470	5.95E-06	6.41E-06	7.20E-06	7.85E-06	8.36E-06	8.76E-06	9.08E-06
^{149}Sm	621490	5.49E-07	5.68E-07	5.99E-07	6.24E-07	6.45E-07	6.63E-07	6.80E-07
^{150}Sm	621500	5.73E-06	6.63E-06	8.39E-06	1.01E-05	1.17E-05	1.33E-05	1.48E-05
^{151}Sm	621510	1.62E-35	1.75E-35	2.01E-35	2.26E-35	2.49E-35	2.72E-35	2.94E-35
^{152}Sm	621520	2.17E-06	2.44E-06	2.94E-06	3.41E-06	3.84E-06	4.25E-06	4.63E-06
^{151}Eu	631510	1.16E-06	1.25E-06	1.44E-06	1.61E-06	1.78E-06	1.94E-06	2.10E-06
^{153}Eu	631530	1.86E-06	2.21E-06	2.92E-06	3.64E-06	4.36E-06	5.05E-06	5.70E-06
^{155}Gd	641550	1.18E-07	1.43E-07	2.04E-07	2.75E-07	3.53E-07	4.37E-07	5.24E-07
^{233}U	922330	9.48E-08	1.10E-07	1.43E-07	1.75E-07	2.05E-07	2.32E-07	2.57E-07
^{234}U	922340	6.85E-06	7.21E-06	8.17E-06	9.43E-06	1.10E-05	1.28E-05	1.48E-05
^{235}U	922350	5.93E-04	5.54E-04	4.85E-04	4.27E-04	3.76E-04	3.33E-04	2.97E-04
^{236}U	922360	1.03E-04	1.12E-04	1.27E-04	1.41E-04	1.53E-04	1.62E-04	1.71E-04
^{238}U	922380	2.25E-02	2.25E-02	2.24E-02	2.23E-02	2.22E-02	2.20E-02	2.19E-02
^{237}Np	932370	3.12E-05	3.64E-05	4.71E-05	5.76E-05	6.75E-05	7.66E-05	8.47E-05
^{238}Pu	942380	9.09E-30	1.29E-29	2.29E-29	3.52E-29	4.88E-29	6.28E-29	7.65E-29
^{239}Pu	942390	2.37E-04	2.49E-04	2.70E-04	2.86E-04	2.99E-04	3.10E-04	3.19E-04
^{240}Pu	942400	1.22E-05	1.37E-05	1.68E-05	2.00E-05	2.32E-05	2.62E-05	2.92E-05
^{241}Pu	942410	1.66E-12	3.43E-12	1.17E-11	2.98E-11	6.19E-11	1.12E-10	1.82E-10
^{242}Pu	942420	1.58E-06	2.11E-06	3.51E-06	5.27E-06	7.32E-06	9.62E-06	1.21E-05
^{241}Am	952410	5.47E-11	1.11E-10	3.71E-10	9.40E-10	1.95E-09	3.52E-09	5.72E-09
^{242m}Am	952421	6.65E-30	9.41E-30	1.67E-29	2.58E-29	3.57E-29	4.59E-29	5.60E-29
^{243}Am	952430	1.11E-07	1.70E-07	3.59E-07	6.46E-07	1.03E-06	1.49E-06	2.03E-06

Table 31. BWR Isotopics as a Function of 3.5 wt% ^{235}U and Burnup, 10K Year Decay (Cont.)

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)					
		Burnup GWd/mtU 50	Burnup GWd/mtU 55	Burnup GWd/mtU 60	Burnup GWd/mtU 65	Burnup GWd/mtU 70	Burnup GWd/mtU 75
^{16}O	80160	4.61E-02	4.60E-02	4.58E-02	4.56E-02	4.54E-02	4.52E-02
^{95}Mo	420950	6.06E-05	6.53E-05	6.97E-05	7.40E-05	7.81E-05	8.21E-05
^{99}Tc	430990	5.97E-05	6.43E-05	6.87E-05	7.29E-05	7.69E-05	8.08E-05
^{101}Ru	441010	6.10E-05	6.65E-05	7.19E-05	7.72E-05	8.24E-05	8.75E-05
^{103}Rh	451030	3.64E-05	3.87E-05	4.07E-05	4.26E-05	4.43E-05	4.58E-05
^{109}Ag	471090	7.28E-06	8.17E-06	9.07E-06	9.95E-06	1.08E-05	1.17E-05
^{143}Nd	601430	4.62E-05	4.85E-05	5.05E-05	5.23E-05	5.38E-05	5.52E-05
^{145}Nd	601450	3.42E-05	3.66E-05	3.88E-05	4.09E-05	4.28E-05	4.47E-05
^{147}Sm	621470	9.33E-06	9.52E-06	9.66E-06	9.77E-06	9.85E-06	9.92E-06
^{149}Sm	621490	6.96E-07	7.11E-07	7.27E-07	7.42E-07	7.58E-07	7.74E-07
^{150}Sm	621500	1.62E-05	1.75E-05	1.88E-05	2.01E-05	2.12E-05	2.24E-05
^{151}Sm	621510	3.15E-35	3.35E-35	3.54E-35	3.72E-35	3.90E-35	4.06E-35
^{152}Sm	621520	4.99E-06	5.32E-06	5.63E-06	5.93E-06	6.21E-06	6.48E-06
^{151}Eu	631510	2.25E-06	2.39E-06	2.53E-06	2.66E-06	2.78E-06	2.90E-06
^{153}Eu	631530	6.32E-06	6.90E-06	7.45E-06	7.95E-06	8.41E-06	8.84E-06
^{155}Gd	641550	6.11E-07	6.98E-07	7.83E-07	8.65E-07	9.44E-07	1.02E-06
^{233}U	922330	2.78E-07	2.97E-07	3.14E-07	3.28E-07	3.40E-07	3.51E-07
^{234}U	922340	1.69E-05	1.92E-05	2.15E-05	2.38E-05	2.61E-05	2.83E-05
^{235}U	922350	2.66E-04	2.40E-04	2.18E-04	2.01E-04	1.86E-04	1.74E-04
^{236}U	922360	1.77E-04	1.83E-04	1.88E-04	1.91E-04	1.94E-04	1.96E-04
^{238}U	922380	2.18E-02	2.17E-02	2.16E-02	2.14E-02	2.13E-02	2.12E-02
^{237}Np	932370	9.19E-05	9.83E-05	1.04E-04	1.09E-04	1.13E-04	1.16E-04
^{238}Pu	942380	8.95E-29	1.02E-28	1.13E-28	1.22E-28	1.31E-28	1.39E-28
^{239}Pu	942390	3.26E-04	3.32E-04	3.38E-04	3.42E-04	3.46E-04	3.49E-04
^{240}Pu	942400	3.21E-05	3.48E-05	3.73E-05	3.98E-05	4.21E-05	4.43E-05
^{241}Pu	942410	2.73E-10	3.86E-10	5.20E-10	6.71E-10	8.38E-10	1.02E-09
^{242}Pu	942420	1.47E-05	1.75E-05	2.03E-05	2.32E-05	2.61E-05	2.90E-05
^{241}Am	952410	8.60E-09	1.22E-08	1.63E-08	2.11E-08	2.63E-08	3.20E-08
^{242m}Am	952421	6.55E-29	7.43E-29	8.23E-29	8.95E-29	9.59E-29	1.02E-28
^{243}Am	952430	2.62E-06	3.25E-06	3.90E-06	4.56E-06	5.23E-06	5.88E-06

Table 32. BWR Isotopics as a Function of 4.0 wt% ^{235}U and Burnup, 10K Year Decay

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)						
		Burnup GWd/mtU 0.001	Burnup GWd/mtU 2.5	Burnup GWd/mtU 5.0	Burnup GWd/mtU 7.5	Burnup GWd/mtU 10	Burnup GWd/mtU 12.5	Burnup GWd/mtU 15
^{16}O	80160	4.79E-02	4.78E-02	4.78E-02	4.77E-02	4.76E-02	4.75E-02	4.74E-02
^{95}Mo	420950	1.61E-09	3.88E-06	7.61E-06	1.12E-05	1.47E-05	1.81E-05	2.13E-05
^{99}Tc	430990	1.51E-09	3.76E-06	7.40E-06	1.09E-05	1.44E-05	1.77E-05	2.10E-05
^{101}Ru	441010	1.34E-09	3.31E-06	6.60E-06	9.88E-06	1.31E-05	1.63E-05	1.95E-05
^{103}Rh	451030	9.24E-10	2.33E-06	4.74E-06	7.14E-06	9.52E-06	1.19E-05	1.42E-05
^{109}Ag	471090	1.97E-11	1.09E-07	3.10E-07	5.71E-07	8.75E-07	1.21E-06	1.57E-06
^{143}Nd	601430	1.46E-09	3.49E-06	6.80E-06	9.97E-06	1.30E-05	1.59E-05	1.88E-05
^{145}Nd	601450	1.00E-09	2.38E-06	4.64E-06	6.81E-06	8.88E-06	1.09E-05	1.28E-05
^{147}Sm	621470	5.96E-10	1.34E-06	2.46E-06	3.41E-06	4.24E-06	4.96E-06	5.60E-06
^{149}Sm	621490	2.94E-10	2.63E-07	3.41E-07	4.05E-07	4.61E-07	5.14E-07	5.62E-07
^{150}Sm	621500	7.92E-15	5.01E-07	1.27E-06	2.09E-06	2.95E-06	3.84E-06	4.73E-06
^{151}Sm	621510	1.73E-39	3.59E-36	6.40E-36	8.81E-36	1.10E-35	1.30E-35	1.50E-35
^{152}Sm	621520	7.86E-11	2.49E-07	5.56E-07	8.84E-07	1.21E-06	1.54E-06	1.86E-06
^{151}Eu	631510	1.23E-10	2.56E-07	4.57E-07	6.29E-07	7.84E-07	9.30E-07	1.07E-06
^{153}Eu	631530	5.39E-11	1.48E-07	3.42E-07	5.77E-07	8.47E-07	1.14E-06	1.46E-06
^{155}Gd	641550	1.27E-11	1.84E-08	2.93E-08	4.07E-08	5.44E-08	7.10E-08	9.08E-08
^{233}U	922330	6.91E-13	3.58E-09	1.19E-08	2.42E-08	3.92E-08	5.61E-08	7.43E-08
^{234}U	922340	8.26E-06	7.83E-06	7.50E-06	7.28E-06	7.19E-06	7.23E-06	7.39E-06
^{235}U	922350	9.70E-04	9.21E-04	8.77E-04	8.36E-04	7.99E-04	7.65E-04	7.33E-04
^{236}U	922360	4.45E-06	2.23E-05	3.94E-05	5.55E-05	7.06E-05	8.49E-05	9.83E-05
^{238}U	922380	2.30E-02	2.29E-02	2.28E-02	2.27E-02	2.27E-02	2.26E-02	2.25E-02
^{237}Np	932370	2.15E-10	1.15E-06	3.87E-06	7.90E-06	1.28E-05	1.84E-05	2.44E-05
^{238}Pu	942380	0.00E+00	1.80E-28	3.54E-27	4.70E-31	1.36E-30	2.98E-30	5.46E-30
^{239}Pu	942390	2.09E-08	4.78E-05	8.86E-05	1.25E-04	1.57E-04	1.87E-04	2.15E-04
^{240}Pu	942400	8.55E-14	6.91E-07	2.07E-06	3.76E-06	5.64E-06	7.66E-06	9.78E-06
^{241}Pu	942410	0.00E+00	1.08E-17	9.33E-16	1.11E-14	5.98E-14	2.10E-13	5.66E-13
^{242}Pu	942420	7.28E-24	4.33E-09	4.41E-08	1.52E-07	3.43E-07	6.21E-07	9.83E-07
^{241}Am	952410	2.41E-25	4.28E-14	2.51E-13	8.70E-13	2.78E-12	7.94E-12	1.96E-11
^{242m}Am	952421	0.00E+00	1.32E-28	2.59E-27	3.44E-31	9.98E-31	2.18E-30	3.99E-30
^{243}Am	952430	1.82E-29	3.86E-11	8.13E-10	4.30E-09	1.31E-08	2.98E-08	5.66E-08

Table 32. BWR Isotopics as a Function of 4.0 wt% ^{235}U and Burnup, 10K Year Decay (Cont.)

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)						
		Burnup GWd/mtU 17.5	Burnup GWd/mtU 20	Burnup GWd/mtU 25	Burnup GWd/mtU 30	Burnup GWd/mtU 35	Burnup GWd/mtU 40	Burnup GWd/mtU 45
^{16}O	80160	4.73E-02	4.73E-02	4.71E-02	4.69E-02	4.67E-02	4.65E-02	4.63E-02
^{95}Mo	420950	2.48E-05	2.81E-05	3.44E-05	4.05E-05	4.62E-05	5.17E-05	5.70E-05
^{99}Tc	430990	2.43E-05	2.74E-05	3.36E-05	3.95E-05	4.51E-05	5.05E-05	5.57E-05
^{101}Ru	441010	2.26E-05	2.57E-05	3.19E-05	3.79E-05	4.39E-05	4.97E-05	5.55E-05
^{103}Rh	451030	1.60E-05	1.79E-05	2.15E-05	2.49E-05	2.81E-05	3.10E-05	3.38E-05
^{109}Ag	471090	1.83E-06	2.13E-06	2.79E-06	3.53E-06	4.31E-06	5.14E-06	5.99E-06
^{143}Nd	601430	2.17E-05	2.44E-05	2.95E-05	3.41E-05	3.82E-05	4.19E-05	4.51E-05
^{145}Nd	601450	1.48E-05	1.66E-05	2.02E-05	2.36E-05	2.67E-05	2.97E-05	3.25E-05
^{147}Sm	621470	6.14E-06	6.64E-06	7.50E-06	8.19E-06	8.75E-06	9.20E-06	9.54E-06
^{149}Sm	621490	5.83E-07	6.01E-07	6.32E-07	6.56E-07	6.76E-07	6.93E-07	7.08E-07
^{150}Sm	621500	5.63E-06	6.53E-06	8.27E-06	9.97E-06	1.16E-05	1.32E-05	1.47E-05
^{151}Sm	621510	1.64E-35	1.78E-35	2.04E-35	2.28E-35	2.52E-35	2.74E-35	2.96E-35
^{152}Sm	621520	2.14E-06	2.41E-06	2.92E-06	3.39E-06	3.84E-06	4.25E-06	4.64E-06
^{151}Eu	631510	1.17E-06	1.27E-06	1.45E-06	1.63E-06	1.80E-06	1.96E-06	2.11E-06
^{153}Eu	631530	1.78E-06	2.11E-06	2.81E-06	3.53E-06	4.24E-06	4.93E-06	5.59E-06
^{155}Gd	641550	1.11E-07	1.35E-07	1.92E-07	2.59E-07	3.34E-07	4.16E-07	5.01E-07
^{233}U	922330	8.81E-08	1.03E-07	1.35E-07	1.67E-07	1.97E-07	2.26E-07	2.52E-07
^{234}U	922340	7.62E-06	7.93E-06	8.78E-06	9.94E-06	1.14E-05	1.32E-05	1.52E-05
^{235}U	922350	6.88E-04	6.47E-04	5.71E-04	5.05E-04	4.47E-04	3.97E-04	3.53E-04
^{236}U	922360	1.08E-04	1.18E-04	1.35E-04	1.50E-04	1.63E-04	1.74E-04	1.84E-04
^{238}U	922380	2.25E-02	2.24E-02	2.23E-02	2.22E-02	2.21E-02	2.20E-02	2.19E-02
^{237}Np	932370	2.89E-05	3.39E-05	4.44E-05	5.49E-05	6.49E-05	7.43E-05	8.29E-05
^{238}Pu	942380	7.79E-30	1.12E-29	2.05E-29	3.23E-29	4.57E-29	5.99E-29	7.41E-29
^{239}Pu	942390	2.29E-04	2.42E-04	2.64E-04	2.80E-04	2.94E-04	3.06E-04	3.15E-04
^{240}Pu	942400	1.12E-05	1.26E-05	1.56E-05	1.87E-05	2.17E-05	2.48E-05	2.78E-05
^{241}Pu	942410	1.12E-12	2.35E-12	8.21E-12	2.15E-11	4.59E-11	8.49E-11	1.41E-10
^{242}Pu	942420	1.31E-06	1.76E-06	2.98E-06	4.54E-06	6.40E-06	8.51E-06	1.08E-05
^{241}Am	952410	3.75E-11	7.63E-11	2.61E-10	6.80E-10	1.45E-09	2.67E-09	4.45E-09
^{242m}Am	952421	5.70E-30	8.18E-30	1.50E-29	2.36E-29	3.34E-29	4.38E-29	5.42E-29
^{243}Am	952430	8.59E-08	1.33E-07	2.87E-07	5.28E-07	8.56E-07	1.26E-06	1.75E-06

Table 32. BWR Isotopics as a Function of 4.0 wt% ^{235}U and Burnup, 10K Year Decay (Cont.)

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)					
		Burnup GWd/mtU 50	Burnup GWd/mtU 55	Burnup GWd/mtU 60	Burnup GWd/mtU 65	Burnup GWd/mtU 70	Burnup GWd/mtU 75
^{16}O	80160	4.62E-02	4.60E-02	4.58E-02	4.56E-02	4.54E-02	4.52E-02
^{95}Mo	420950	6.20E-05	6.68E-05	7.14E-05	7.57E-05	8.00E-05	8.40E-05
^{99}Tc	430990	6.06E-05	6.53E-05	6.98E-05	7.41E-05	7.82E-05	8.21E-05
^{101}Ru	441010	6.11E-05	6.67E-05	7.21E-05	7.74E-05	8.26E-05	8.77E-05
^{103}Rh	451030	3.63E-05	3.86E-05	4.07E-05	4.26E-05	4.44E-05	4.60E-05
^{109}Ag	471090	6.86E-06	7.74E-06	8.62E-06	9.50E-06	1.04E-05	1.12E-05
^{143}Nd	601430	4.80E-05	5.05E-05	5.27E-05	5.46E-05	5.63E-05	5.77E-05
^{145}Nd	601450	3.50E-05	3.75E-05	3.97E-05	4.19E-05	4.39E-05	4.58E-05
^{147}Sm	621470	9.80E-06	1.00E-05	1.01E-05	1.03E-05	1.03E-05	1.04E-05
^{149}Sm	621490	7.22E-07	7.36E-07	7.50E-07	7.64E-07	7.78E-07	7.92E-07
^{150}Sm	621500	1.61E-05	1.75E-05	1.88E-05	2.01E-05	2.13E-05	2.24E-05
^{151}Sm	621510	3.17E-35	3.37E-35	3.56E-35	3.74E-35	3.92E-35	4.09E-35
^{152}Sm	621520	5.00E-06	5.34E-06	5.66E-06	5.97E-06	6.25E-06	6.52E-06
^{151}Eu	631510	2.26E-06	2.41E-06	2.54E-06	2.68E-06	2.80E-06	2.92E-06
^{153}Eu	631530	6.22E-06	6.82E-06	7.37E-06	7.89E-06	8.37E-06	8.81E-06
^{155}Gd	641550	5.88E-07	6.76E-07	7.62E-07	8.47E-07	9.28E-07	1.01E-06
^{233}U	922330	2.75E-07	2.96E-07	3.14E-07	3.31E-07	3.44E-07	3.56E-07
^{234}U	922340	1.74E-05	1.97E-05	2.21E-05	2.46E-05	2.70E-05	2.94E-05
^{235}U	922350	3.16E-04	2.84E-04	2.56E-04	2.33E-04	2.14E-04	1.98E-04
^{236}U	922360	1.92E-04	1.99E-04	2.04E-04	2.09E-04	2.12E-04	2.14E-04
^{238}U	922380	2.17E-02	2.16E-02	2.15E-02	2.14E-02	2.13E-02	2.11E-02
^{237}Np	932370	9.07E-05	9.77E-05	1.04E-04	1.09E-04	1.14E-04	1.18E-04
^{238}Pu	942380	8.78E-29	1.01E-28	1.13E-28	1.23E-28	1.33E-28	1.41E-28
^{239}Pu	942390	3.23E-04	3.30E-04	3.36E-04	3.41E-04	3.45E-04	3.49E-04
^{240}Pu	942400	3.06E-05	3.34E-05	3.60E-05	3.86E-05	4.09E-05	4.32E-05
^{241}Pu	942410	2.17E-10	3.13E-10	4.30E-10	5.64E-10	7.16E-10	8.82E-10
^{242}Pu	942420	1.33E-05	1.59E-05	1.86E-05	2.14E-05	2.42E-05	2.70E-05
^{241}Am	952410	6.84E-09	9.86E-09	1.35E-08	1.77E-08	2.25E-08	2.77E-08
^{242m}Am	952421	6.43E-29	7.37E-29	8.24E-29	9.02E-29	9.72E-29	1.03E-28
^{243}Am	952430	2.28E-06	2.87E-06	3.49E-06	4.12E-06	4.77E-06	5.42E-06

Table 33. BWR Isotopics as a Function of 4.5 wt% ^{235}U and Burnup, 10K Year Decay

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)						
		Burnup GWd/mtU 0.001	Burnup GWd/mtU 2.5	Burnup GWd/mtU 5.0	Burnup GWd/mtU 7.5	Burnup GWd/mtU 10	Burnup GWd/mtU 12.5	Burnup GWd/mtU 15
^{16}O	80160	4.79E-02	4.79E-02	4.78E-02	4.77E-02	4.76E-02	4.75E-02	4.74E-02
^{95}Mo	420950	1.61E-09	3.90E-06	7.67E-06	1.13E-05	1.49E-05	1.83E-05	2.16E-05
^{99}Tc	430990	1.51E-09	3.77E-06	7.43E-06	1.10E-05	1.45E-05	1.78E-05	2.12E-05
^{101}Ru	441010	1.34E-09	3.31E-06	6.60E-06	9.87E-06	1.31E-05	1.63E-05	1.95E-05
^{103}Rh	451030	9.18E-10	2.31E-06	4.67E-06	7.03E-06	9.36E-06	1.17E-05	1.39E-05
^{109}Ag	471090	1.91E-11	9.82E-08	2.79E-07	5.15E-07	7.92E-07	1.10E-06	1.44E-06
^{143}Nd	601430	1.46E-09	3.52E-06	6.87E-06	1.01E-05	1.32E-05	1.62E-05	1.91E-05
^{145}Nd	601450	1.00E-09	2.40E-06	4.68E-06	6.87E-06	8.98E-06	1.10E-05	1.30E-05
^{147}Sm	621470	5.96E-10	1.35E-06	2.49E-06	3.47E-06	4.33E-06	5.08E-06	5.75E-06
^{149}Sm	621490	2.94E-10	2.89E-07	3.74E-07	4.39E-07	4.97E-07	5.49E-07	5.98E-07
^{150}Sm	621500	7.86E-15	4.71E-07	1.22E-06	2.03E-06	2.88E-06	3.75E-06	4.64E-06
^{151}Sm	621510	1.72E-39	3.63E-36	6.50E-36	8.96E-36	1.12E-35	1.32E-35	1.52E-35
^{152}Sm	621520	7.82E-11	2.42E-07	5.39E-07	8.58E-07	1.18E-06	1.51E-06	1.82E-06
^{151}Eu	631510	1.22E-10	2.59E-07	4.64E-07	6.40E-07	7.98E-07	9.46E-07	1.09E-06
^{153}Eu	631530	5.34E-11	1.45E-07	3.30E-07	5.54E-07	8.11E-07	1.09E-06	1.40E-06
^{155}Gd	641550	1.25E-11	1.86E-08	2.94E-08	4.02E-08	5.31E-08	6.85E-08	8.70E-08
^{233}U	922330	6.75E-13	3.30E-09	1.08E-08	2.20E-08	3.59E-08	5.17E-08	6.89E-08
^{234}U	922340	9.38E-06	8.92E-06	8.56E-06	8.30E-06	8.16E-06	8.14E-06	8.25E-06
^{235}U	922350	1.09E-03	1.04E-03	9.92E-04	9.48E-04	9.08E-04	8.70E-04	8.35E-04
^{236}U	922360	5.01E-06	2.32E-05	4.08E-05	5.75E-05	7.33E-05	8.82E-05	1.02E-04
^{238}U	922380	2.29E-02	2.28E-02	2.27E-02	2.26E-02	2.26E-02	2.25E-02	2.24E-02
^{237}Np	932370	2.10E-10	1.05E-06	3.49E-06	7.16E-06	1.17E-05	1.69E-05	2.26E-05
^{238}Pu	942380	0.00E+00	1.33E-28	2.73E-27	3.75E-31	1.12E-30	2.49E-30	4.64E-30
^{239}Pu	942390	1.95E-08	4.51E-05	8.44E-05	1.19E-04	1.51E-04	1.81E-04	2.08E-04
^{240}Pu	942400	7.57E-14	5.99E-07	1.83E-06	3.36E-06	5.08E-06	6.95E-06	8.94E-06
^{241}Pu	942410	0.00E+00	6.32E-18	5.66E-16	6.97E-15	3.87E-14	1.39E-13	3.84E-13
^{242}Pu	942420	5.28E-24	3.15E-09	3.34E-08	1.19E-07	2.74E-07	5.05E-07	8.12E-07
^{241}Am	952410	1.96E-25	3.44E-14	2.03E-13	6.65E-13	2.00E-12	5.57E-12	1.37E-11
^{242m}Am	952421	0.00E+00	9.75E-29	2.00E-27	2.74E-31	8.17E-31	1.82E-30	3.39E-30
^{243}Am	952430	1.22E-29	2.60E-11	5.70E-10	3.11E-09	9.72E-09	2.26E-08	4.37E-08

Table 33. BWR Isotopics as a Function of 4.5 wt% ^{235}U and Burnup, 10 Year Decay (Cont.)

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)						
		Burnup GWd/mtU 17.5	Burnup GWd/mtU 20	Burnup GWd/mtU 25	Burnup GWd/mtU 30	Burnup GWd/mtU 35	Burnup GWd/mtU 40	Burnup GWd/mtU 45
^{16}O	80160	4.73E-02	4.73E-02	4.71E-02	4.69E-02	4.67E-02	4.65E-02	4.63E-02
^{95}Mo	420950	2.51E-05	2.85E-05	3.49E-05	4.11E-05	4.70E-05	5.27E-05	5.81E-05
^{99}Tc	430990	2.45E-05	2.77E-05	3.39E-05	3.99E-05	4.56E-05	5.11E-05	5.64E-05
^{101}Ru	441010	2.26E-05	2.58E-05	3.19E-05	3.80E-05	4.39E-05	4.98E-05	5.56E-05
^{103}Rh	451030	1.58E-05	1.77E-05	2.12E-05	2.46E-05	2.78E-05	3.08E-05	3.36E-05
^{109}Ag	471090	1.68E-06	1.95E-06	2.58E-06	3.27E-06	4.02E-06	4.81E-06	5.63E-06
^{143}Nd	601430	2.21E-05	2.49E-05	3.01E-05	3.49E-05	3.92E-05	4.31E-05	4.66E-05
^{145}Nd	601450	1.50E-05	1.69E-05	2.06E-05	2.40E-05	2.72E-05	3.03E-05	3.31E-05
^{147}Sm	621470	6.33E-06	6.86E-06	7.78E-06	8.53E-06	9.14E-06	9.62E-06	1.00E-05
^{149}Sm	621490	6.19E-07	6.38E-07	6.68E-07	6.92E-07	7.11E-07	7.26E-07	7.40E-07
^{150}Sm	621500	5.53E-06	6.42E-06	8.16E-06	9.85E-06	1.15E-05	1.31E-05	1.46E-05
^{151}Sm	621510	1.67E-35	1.81E-35	2.06E-35	2.31E-35	2.54E-35	2.77E-35	2.98E-35
^{152}Sm	621520	2.10E-06	2.38E-06	2.89E-06	3.38E-06	3.83E-06	4.25E-06	4.65E-06
^{151}Eu	631510	1.19E-06	1.29E-06	1.47E-06	1.65E-06	1.82E-06	1.98E-06	2.13E-06
^{153}Eu	631530	1.71E-06	2.03E-06	2.71E-06	3.42E-06	4.12E-06	4.81E-06	5.48E-06
^{155}Gd	641550	1.06E-07	1.28E-07	1.81E-07	2.45E-07	3.17E-07	3.96E-07	4.79E-07
^{233}U	922330	8.20E-08	9.65E-08	1.27E-07	1.59E-07	1.90E-07	2.19E-07	2.46E-07
^{234}U	922340	8.43E-06	8.68E-06	9.43E-06	1.05E-05	1.19E-05	1.36E-05	1.55E-05
^{235}U	922350	7.87E-04	7.43E-04	6.61E-04	5.89E-04	5.24E-04	4.67E-04	4.16E-04
^{236}U	922360	1.13E-04	1.23E-04	1.42E-04	1.58E-04	1.73E-04	1.86E-04	1.97E-04
^{238}U	922380	2.24E-02	2.23E-02	2.22E-02	2.21E-02	2.20E-02	2.19E-02	2.18E-02
^{237}Np	932370	2.69E-05	3.17E-05	4.18E-05	5.22E-05	6.23E-05	7.20E-05	8.09E-05
^{238}Pu	942380	6.69E-30	9.73E-30	1.83E-29	2.95E-29	4.27E-29	5.69E-29	7.15E-29
^{239}Pu	942390	2.22E-04	2.35E-04	2.57E-04	2.75E-04	2.89E-04	3.02E-04	3.12E-04
^{240}Pu	942400	1.03E-05	1.16E-05	1.45E-05	1.74E-05	2.04E-05	2.34E-05	2.64E-05
^{241}Pu	942410	7.71E-13	1.63E-12	5.85E-12	1.57E-11	3.43E-11	6.48E-11	1.10E-10
^{242}Pu	942420	1.09E-06	1.48E-06	2.54E-06	3.93E-06	5.61E-06	7.54E-06	9.67E-06
^{241}Am	952410	2.62E-11	5.35E-11	1.87E-10	4.97E-10	1.08E-09	2.04E-09	3.47E-09
^{242m}Am	952421	4.90E-30	7.12E-30	1.34E-29	2.16E-29	3.12E-29	4.16E-29	5.23E-29
^{243}Am	952430	6.70E-08	1.05E-07	2.31E-07	4.33E-07	7.15E-07	1.07E-06	1.50E-06

Table 33. BWR Isotopics as a Function of 4.5 wt% ^{235}U and Burnup, 10K Year Decay (Cont.)

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)					
		Burnup GWd/mtU 50	Burnup GWd/mtU 55	Burnup GWd/mtU 60	Burnup GWd/mtU 65	Burnup GWd/mtU 70	Burnup GWd/mtU 75
^{16}O	80160	4.62E-02	4.60E-02	4.58E-02	4.56E-02	4.54E-02	4.52E-02
^{95}Mo	420950	6.32E-05	6.82E-05	7.29E-05	7.74E-05	8.17E-05	8.59E-05
^{99}Tc	430990	6.14E-05	6.63E-05	7.08E-05	7.52E-05	7.94E-05	8.34E-05
^{101}Ru	441010	6.13E-05	6.68E-05	7.23E-05	7.76E-05	8.28E-05	8.80E-05
^{103}Rh	451030	3.62E-05	3.85E-05	4.07E-05	4.27E-05	4.45E-05	4.61E-05
^{109}Ag	471090	6.47E-06	7.33E-06	8.19E-06	9.06E-06	9.93E-06	1.08E-05
^{143}Nd	601430	4.97E-05	5.24E-05	5.48E-05	5.69E-05	5.87E-05	6.03E-05
^{145}Nd	601450	3.58E-05	3.83E-05	4.07E-05	4.29E-05	4.50E-05	4.69E-05
^{147}Sm	621470	1.03E-05	1.05E-05	1.07E-05	1.08E-05	1.08E-05	1.09E-05
^{149}Sm	621490	7.52E-07	7.65E-07	7.76E-07	7.89E-07	8.01E-07	8.14E-07
^{150}Sm	621500	1.61E-05	1.75E-05	1.88E-05	2.01E-05	2.13E-05	2.25E-05
^{151}Sm	621510	3.19E-35	3.39E-35	3.58E-35	3.77E-35	3.95E-35	4.12E-35
^{152}Sm	621520	5.02E-06	5.37E-06	5.70E-06	6.00E-06	6.29E-06	6.57E-06
^{151}Eu	631510	2.28E-06	2.42E-06	2.56E-06	2.69E-06	2.82E-06	2.94E-06
^{153}Eu	631530	6.12E-06	6.72E-06	7.29E-06	7.82E-06	8.32E-06	8.78E-06
^{155}Gd	641550	5.65E-07	6.53E-07	7.40E-07	8.27E-07	9.10E-07	9.91E-07
^{233}U	922330	2.71E-07	2.93E-07	3.13E-07	3.31E-07	3.47E-07	3.60E-07
^{234}U	922340	1.77E-05	2.00E-05	2.25E-05	2.51E-05	2.77E-05	3.03E-05
^{235}U	922350	3.72E-04	3.34E-04	3.00E-04	2.72E-04	2.47E-04	2.27E-04
^{238}U	922360	2.06E-04	2.14E-04	2.20E-04	2.26E-04	2.30E-04	2.33E-04
^{238}U	922380	2.17E-02	2.16E-02	2.14E-02	2.13E-02	2.12E-02	2.11E-02
^{237}Np	932370	8.91E-05	9.66E-05	1.03E-04	1.09E-04	1.14E-04	1.19E-04
^{238}Pu	942380	8.58E-29	9.95E-29	1.12E-28	1.24E-28	1.34E-28	1.44E-28
^{239}Pu	942390	3.20E-04	3.28E-04	3.34E-04	3.39E-04	3.44E-04	3.48E-04
^{240}Pu	942400	2.93E-05	3.21E-05	3.47E-05	3.73E-05	3.98E-05	4.21E-05
^{241}Pu	942410	1.73E-10	2.54E-10	3.54E-10	4.73E-10	6.09E-10	7.61E-10
^{242}Pu	942420	1.20E-05	1.44E-05	1.70E-05	1.97E-05	2.24E-05	2.52E-05
^{241}Am	952410	5.44E-09	7.99E-09	1.11E-08	1.49E-08	1.92E-08	2.39E-08
^{242m}Am	952421	6.28E-29	7.28E-29	8.21E-29	9.06E-29	9.83E-29	1.05E-28
^{243}Am	952430	1.99E-06	2.53E-06	3.11E-06	3.72E-06	4.34E-06	4.97E-06

Table 34. BWR Isotopics as a Function of 5.0 wt% ^{235}U and Burnup, 10K Year Decay

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)						
		Burnup GWd/mtU 0.001	Burnup GWd/mtU 2.5	Burnup GWd/mtU 5.0	Burnup GWd/mtU 7.5	Burnup GWd/mtU 10	Burnup GWd/mtU 12.5	Burnup GWd/mtU 15
^{16}O	80160	4.79E-02	4.79E-02	4.78E-02	4.77E-02	4.76E-02	4.75E-02	4.74E-02
^{95}Mo	420950	1.61E-09	3.92E-06	7.73E-06	1.14E-05	1.50E-05	1.85E-05	2.19E-05
^{99}Tc	430990	1.51E-09	3.78E-06	7.46E-06	1.10E-05	1.45E-05	1.79E-05	2.13E-05
^{101}Ru	441010	1.34E-09	3.31E-06	6.60E-06	9.87E-06	1.31E-05	1.63E-05	1.95E-05
^{103}Rh	451030	9.12E-10	2.28E-06	4.61E-06	6.93E-06	9.23E-06	1.15E-05	1.37E-05
^{109}Ag	471090	1.87E-11	8.98E-08	2.53E-07	4.68E-07	7.22E-07	1.01E-06	1.32E-06
^{143}Nd	601430	1.47E-09	3.54E-06	6.93E-06	1.02E-05	1.33E-05	1.64E-05	1.93E-05
^{145}Nd	601450	1.00E-09	2.41E-06	4.71E-06	6.93E-06	9.06E-06	1.11E-05	1.31E-05
^{147}Sm	621470	5.96E-10	1.35E-06	2.51E-06	3.52E-06	4.41E-06	5.19E-06	5.88E-06
^{149}Sm	621490	2.93E-10	3.14E-07	4.08E-07	4.75E-07	5.34E-07	5.88E-07	6.37E-07
^{150}Sm	621500	7.82E-15	4.42E-07	1.17E-06	1.97E-06	2.81E-06	3.67E-06	4.55E-06
^{151}Sm	621510	1.71E-39	3.65E-36	6.58E-36	9.10E-36	1.14E-35	1.35E-35	1.54E-35
^{152}Sm	621520	7.79E-11	2.36E-07	5.25E-07	8.36E-07	1.15E-06	1.47E-06	1.79E-06
^{151}Eu	631510	1.22E-10	2.60E-07	4.70E-07	6.50E-07	8.11E-07	9.61E-07	1.10E-06
^{153}Eu	631530	5.30E-11	1.42E-07	3.20E-07	5.34E-07	7.80E-07	1.05E-06	1.35E-06
^{155}Gd	641550	1.23E-11	1.88E-08	2.96E-08	4.00E-08	5.21E-08	6.66E-08	8.38E-08
^{233}U	922330	6.61E-13	3.07E-09	9.87E-09	2.01E-08	3.30E-08	4.78E-08	6.40E-08
^{234}U	922340	1.05E-05	1.00E-05	9.63E-06	9.34E-06	9.16E-06	9.09E-06	9.14E-06
^{235}U	922350	1.21E-03	1.16E-03	1.11E-03	1.06E-03	1.02E-03	9.77E-04	9.39E-04
^{236}U	922360	5.56E-06	2.42E-05	4.21E-05	5.93E-05	7.56E-05	9.12E-05	1.06E-04
^{238}U	922380	2.27E-02	2.27E-02	2.26E-02	2.25E-02	2.25E-02	2.24E-02	2.23E-02
^{237}Np	932370	2.05E-10	9.77E-07	3.18E-06	6.53E-06	1.07E-05	1.56E-05	2.09E-05
^{238}Pu	942380	0.00E+00	1.01E-28	2.14E-27	3.02E-31	9.19E-31	2.09E-30	3.95E-30
^{239}Pu	942390	1.84E-08	4.28E-05	8.06E-05	1.15E-04	1.46E-04	1.74E-04	2.01E-04
^{240}Pu	942400	6.78E-14	5.24E-07	1.62E-06	3.02E-06	4.61E-06	6.34E-06	8.19E-06
^{241}Pu	942410	0.00E+00	3.83E-18	3.55E-16	4.50E-15	2.56E-14	9.42E-14	2.65E-13
^{242}Pu	942420	3.94E-24	2.34E-09	2.56E-08	9.34E-08	2.20E-07	4.14E-07	6.74E-07
^{241}Am	952410	1.63E-25	2.81E-14	1.67E-13	5.25E-13	1.49E-12	4.01E-12	9.78E-12
^{242m}Am	952421	0.00E+00	7.37E-29	1.56E-27	2.21E-31	6.72E-31	1.53E-30	2.89E-30
^{243}Am	952430	8.54E-30	1.81E-11	4.08E-10	2.28E-09	7.31E-09	1.73E-08	3.41E-08

Table 34. BWR Isotopics as a Function of 5.0 wt% ^{235}U and Burnup, 10K Year Decay (Cont.)

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)						
		Burnup GWd/mtU 17.5	Burnup GWd/mtU 20	Burnup GWd/mtU 25	Burnup GWd/mtU 30	Burnup GWd/mtU 35	Burnup GWd/mtU 40	Burnup GWd/mtU 45
^{16}O	80160	4.73E-02	4.73E-02	4.71E-02	4.69E-02	4.67E-02	4.65E-02	4.64E-02
^{95}Mo	420950	2.54E-05	2.88E-05	3.54E-05	4.17E-05	4.78E-05	5.36E-05	5.91E-05
^{99}Tc	430990	2.46E-05	2.79E-05	3.42E-05	4.03E-05	4.61E-05	5.17E-05	5.71E-05
^{101}Ru	441010	2.26E-05	2.58E-05	3.19E-05	3.80E-05	4.40E-05	4.99E-05	5.57E-05
^{103}Rh	451030	1.56E-05	1.75E-05	2.10E-05	2.44E-05	2.76E-05	3.07E-05	3.35E-05
^{109}Ag	471090	1.55E-06	1.80E-06	2.38E-06	3.04E-06	3.75E-06	4.50E-06	5.29E-06
^{143}Nd	601430	2.24E-05	2.53E-05	3.07E-05	3.56E-05	4.02E-05	4.43E-05	4.80E-05
^{145}Nd	601450	1.51E-05	1.71E-05	2.08E-05	2.44E-05	2.77E-05	3.08E-05	3.38E-05
^{147}Sm	621470	6.50E-06	7.06E-06	8.04E-06	8.85E-06	9.51E-06	1.00E-05	1.05E-05
^{149}Sm	621490	6.58E-07	6.77E-07	7.08E-07	7.31E-07	7.49E-07	7.63E-07	7.75E-07
^{150}Sm	621500	5.43E-06	6.31E-06	8.05E-06	9.74E-06	1.14E-05	1.30E-05	1.45E-05
^{151}Sm	621510	1.70E-35	1.84E-35	2.09E-35	2.34E-35	2.57E-35	2.79E-35	3.01E-35
^{152}Sm	621520	2.07E-06	2.35E-06	2.87E-06	3.37E-06	3.83E-06	4.26E-06	4.66E-06
^{151}Eu	631510	1.21E-06	1.31E-06	1.50E-06	1.67E-06	1.84E-06	2.00E-06	2.15E-06
^{153}Eu	631530	1.64E-06	1.95E-06	2.62E-06	3.31E-06	4.01E-06	4.70E-06	5.37E-06
^{155}Gd	641550	1.01E-07	1.22E-07	1.72E-07	2.32E-07	3.01E-07	3.77E-07	4.58E-07
^{233}U	922330	7.65E-08	9.04E-08	1.20E-07	1.51E-07	1.82E-07	2.11E-07	2.39E-07
^{234}U	922340	9.27E-06	9.48E-06	1.01E-05	1.11E-05	1.24E-05	1.39E-05	1.58E-05
^{235}U	922350	8.89E-04	8.42E-04	7.55E-04	6.76E-04	6.06E-04	5.42E-04	4.85E-04
^{236}U	922360	1.17E-04	1.28E-04	1.48E-04	1.66E-04	1.82E-04	1.96E-04	2.09E-04
^{238}U	922380	2.23E-02	2.22E-02	2.21E-02	2.20E-02	2.19E-02	2.18E-02	2.17E-02
^{237}Np	932370	2.51E-05	2.96E-05	3.95E-05	4.97E-05	5.98E-05	6.95E-05	7.87E-05
^{238}Pu	942380	5.77E-30	8.50E-30	1.64E-29	2.70E-29	3.98E-29	5.39E-29	6.87E-29
^{239}Pu	942390	2.16E-04	2.29E-04	2.51E-04	2.70E-04	2.85E-04	2.97E-04	3.08E-04
^{240}Pu	942400	9.43E-06	1.07E-05	1.34E-05	1.63E-05	1.92E-05	2.21E-05	2.51E-05
^{241}Pu	942410	5.37E-13	1.15E-12	4.22E-12	1.16E-11	2.58E-11	4.98E-11	8.62E-11
^{242}Pu	942420	9.14E-07	1.25E-06	2.18E-06	3.42E-06	4.93E-06	6.69E-06	8.66E-06
^{241}Am	952410	1.86E-11	3.82E-11	1.35E-10	3.67E-10	8.16E-10	1.57E-09	2.72E-09
^{242m}Am	952421	4.22E-30	6.22E-30	1.20E-29	1.98E-29	2.91E-29	3.94E-29	5.03E-29
^{243}Am	952430	5.27E-08	8.34E-08	1.88E-07	3.58E-07	5.99E-07	9.13E-07	1.30E-06

Table 34. BWR Isotopics as a Function of 5.0 wt% ^{235}U and Burnup, 10K Year Decay (Cont.)

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)					
		Burnup GWd/mtU 50	Burnup GWd/mtU 55	Burnup GWd/mtU 60	Burnup GWd/mtU 65	Burnup GWd/mtU 70	Burnup GWd/mtU 75
^{16}O	80160	4.62E-02	4.60E-02	4.58E-02	4.56E-02	4.54E-02	4.52E-02
^{95}Mo	420950	6.44E-05	6.95E-05	7.43E-05	7.90E-05	8.34E-05	8.77E-05
^{99}Tc	430990	6.22E-05	6.71E-05	7.18E-05	7.63E-05	8.06E-05	8.47E-05
^{101}Ru	441010	6.14E-05	6.70E-05	7.24E-05	7.78E-05	8.31E-05	8.82E-05
^{103}Rh	451030	3.61E-05	3.85E-05	4.07E-05	4.27E-05	4.46E-05	4.63E-05
^{109}Ag	471090	6.10E-06	6.94E-06	7.79E-06	8.64E-06	9.50E-06	1.04E-05
^{143}Nd	601430	5.13E-05	5.42E-05	5.68E-05	5.91E-05	6.11E-05	6.28E-05
^{145}Nd	601450	3.65E-05	3.91E-05	4.16E-05	4.38E-05	4.60E-05	4.80E-05
^{147}Sm	621470	1.08E-05	1.10E-05	1.12E-05	1.13E-05	1.14E-05	1.14E-05
^{149}Sm	621490	7.86E-07	7.96E-07	8.06E-07	8.16E-07	8.27E-07	8.38E-07
^{150}Sm	621500	1.60E-05	1.74E-05	1.88E-05	2.01E-05	2.14E-05	2.26E-05
^{151}Sm	621510	3.22E-35	3.42E-35	3.61E-35	3.80E-35	3.97E-35	4.14E-35
^{152}Sm	621520	5.04E-06	5.40E-06	5.73E-06	6.04E-06	6.34E-06	6.62E-06
^{151}Eu	631510	2.30E-06	2.44E-06	2.58E-06	2.71E-06	2.84E-06	2.96E-06
^{153}Eu	631530	6.01E-06	6.63E-06	7.21E-06	7.75E-06	8.26E-06	8.74E-06
^{155}Gd	641550	5.43E-07	6.30E-07	7.18E-07	8.06E-07	8.91E-07	9.74E-07
^{233}U	922330	2.65E-07	2.89E-07	3.11E-07	3.30E-07	3.48E-07	3.63E-07
^{234}U	922340	1.80E-05	2.03E-05	2.28E-05	2.55E-05	2.82E-05	3.10E-05
^{235}U	922350	4.35E-04	3.90E-04	3.51E-04	3.16E-04	2.86E-04	2.61E-04
^{236}U	922360	2.19E-04	2.28E-04	2.36E-04	2.42E-04	2.47E-04	2.51E-04
^{238}U	922380	2.16E-02	2.15E-02	2.14E-02	2.13E-02	2.12E-02	2.10E-02
^{237}Np	932370	8.73E-05	9.52E-05	1.02E-04	1.09E-04	1.15E-04	1.20E-04
^{238}Pu	942380	8.35E-29	9.79E-29	1.11E-28	1.24E-28	1.35E-28	1.46E-28
^{239}Pu	942390	3.17E-04	3.25E-04	3.32E-04	3.38E-04	3.43E-04	3.47E-04
^{240}Pu	942400	2.79E-05	3.07E-05	3.34E-05	3.60E-05	3.86E-05	4.09E-05
^{241}Pu	942410	1.38E-10	2.06E-10	2.92E-10	3.95E-10	5.17E-10	6.54E-10
^{242}Pu	942420	1.08E-05	1.31E-05	1.56E-05	1.81E-05	2.07E-05	2.34E-05
^{241}Am	952410	4.33E-09	6.47E-09	9.17E-09	1.24E-08	1.62E-08	2.06E-08
^{242m}Am	952421	6.11E-29	7.16E-29	8.16E-29	9.07E-29	9.91E-29	1.06E-28
^{243}Am	952430	1.74E-06	2.24E-06	2.77E-06	3.35E-06	3.94E-06	4.56E-06

Table 35. BWR Isotopics as a Function of 5.5 wt% ^{235}U and Burnup, 10K Year Decay

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm) Burnup GWd/mtU 0.001	Burnup GWd/mtU 2.5	Burnup GWd/mtU 5.0	Burnup GWd/mtU 7.5	Burnup GWd/mtU 10	Burnup GWd/mtU 12.5	Burnup GWd/mtU 15
^{16}O	80160	4.79E-02	4.79E-02	4.78E-02	4.77E-02	4.76E-02	4.75E-02	4.74E-02
^{95}Mo	420950	1.62E-09	3.94E-06	7.77E-06	1.15E-05	1.51E-05	1.86E-05	2.21E-05
^{99}Tc	430990	1.51E-09	3.79E-06	7.48E-06	1.11E-05	1.46E-05	1.80E-05	2.14E-05
^{101}Ru	441010	1.34E-09	3.31E-06	6.60E-06	9.86E-06	1.31E-05	1.63E-05	1.95E-05
^{103}Rh	451030	9.08E-10	2.26E-06	4.56E-06	6.85E-06	9.12E-06	1.14E-05	1.36E-05
^{109}Ag	471090	1.83E-11	8.30E-08	2.32E-07	4.28E-07	6.62E-07	9.25E-07	1.21E-06
^{143}Nd	601430	1.47E-09	3.56E-06	6.98E-06	1.03E-05	1.35E-05	1.66E-05	1.96E-05
^{145}Nd	601450	1.00E-09	2.42E-06	4.74E-06	6.97E-06	9.14E-06	1.12E-05	1.33E-05
^{147}Sm	621470	5.96E-10	1.36E-06	2.54E-06	3.57E-06	4.48E-06	5.29E-06	6.01E-06
^{149}Sm	621490	2.93E-10	3.38E-07	4.43E-07	5.14E-07	5.74E-07	6.29E-07	6.78E-07
^{150}Sm	621500	7.79E-15	4.15E-07	1.13E-06	1.92E-06	2.74E-06	3.59E-06	4.46E-06
^{151}Sm	621510	1.71E-39	3.68E-36	6.66E-36	9.23E-36	1.15E-35	1.37E-35	1.57E-35
^{152}Sm	621520	7.76E-11	2.31E-07	5.12E-07	8.16E-07	1.13E-06	1.44E-06	1.76E-06
^{151}Eu	631510	1.21E-10	2.62E-07	4.75E-07	6.59E-07	8.24E-07	9.76E-07	1.12E-06
^{153}Eu	631530	5.26E-11	1.39E-07	3.12E-07	5.17E-07	7.53E-07	1.01E-06	1.30E-06
^{155}Gd	641550	1.22E-11	1.90E-08	2.99E-08	4.00E-08	5.15E-08	6.51E-08	8.13E-08
^{233}U	922330	6.50E-13	2.89E-09	9.11E-09	1.85E-08	3.05E-08	4.43E-08	5.97E-08
^{234}U	922340	1.17E-05	1.11E-05	1.07E-05	1.04E-05	1.02E-05	1.01E-05	1.01E-05
^{235}U	922350	1.33E-03	1.28E-03	1.23E-03	1.18E-03	1.13E-03	1.09E-03	1.04E-03
^{236}U	922360	6.12E-06	2.50E-05	4.34E-05	6.10E-05	7.78E-05	9.39E-05	1.09E-04
^{238}U	922380	2.26E-02	2.25E-02	2.25E-02	2.24E-02	2.23E-02	2.23E-02	2.22E-02
^{237}Np	932370	2.02E-10	9.16E-07	2.93E-06	6.00E-06	9.91E-06	1.45E-05	1.95E-05
^{238}Pu	942380	0.00E+00	7.74E-29	1.69E-27	2.45E-31	7.61E-31	1.76E-30	3.38E-30
^{239}Pu	942390	1.74E-08	4.08E-05	7.71E-05	1.10E-04	1.41E-04	1.69E-04	1.95E-04
^{240}Pu	942400	6.14E-14	4.62E-07	1.45E-06	2.73E-06	4.19E-06	5.80E-06	7.53E-06
^{241}Pu	942410	0.00E+00	2.40E-18	2.28E-16	2.97E-15	1.72E-14	6.48E-14	1.85E-13
^{242}Pu	942420	3.02E-24	1.78E-09	2.00E-08	7.45E-08	1.79E-07	3.41E-07	5.63E-07
^{241}Am	952410	1.37E-25	2.33E-14	1.40E-13	4.25E-13	1.15E-12	2.97E-12	7.13E-12
^{242m}Am	952421	0.00E+00	5.67E-29	1.24E-27	1.79E-31	5.57E-31	1.29E-30	2.47E-30
^{243}Am	952430	6.14E-30	1.28E-11	2.97E-10	1.70E-09	5.56E-09	1.34E-08	2.68E-08

Table 35. BWR Isotopics as a Function of 5.5 wt% ^{235}U and Burnup, 10K Year Decay (Cont.)

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)						
		Burnup GWd/mtU 17.5	Burnup GWd/mtU 20	Burnup GWd/mtU 25	Burnup GWd/mtU 30	Burnup GWd/mtU 35	Burnup GWd/mtU 40	Burnup GWd/mtU 45
^{16}O	80160	4.73E-02	4.73E-02	4.71E-02	4.69E-02	4.67E-02	4.65E-02	4.64E-02
^{95}Mo	420950	2.56E-05	2.91E-05	3.58E-05	4.22E-05	4.84E-05	5.43E-05	6.00E-05
^{99}Tc	430990	2.48E-05	2.81E-05	3.44E-05	4.06E-05	4.65E-05	5.22E-05	5.77E-05
^{101}Ru	441010	2.27E-05	2.58E-05	3.19E-05	3.80E-05	4.41E-05	5.00E-05	5.58E-05
^{103}Rh	451030	1.54E-05	1.73E-05	2.09E-05	2.43E-05	2.75E-05	3.05E-05	3.34E-05
^{109}Ag	471090	1.43E-06	1.67E-06	2.22E-06	2.83E-06	3.51E-06	4.23E-06	4.98E-06
^{143}Nd	601430	2.27E-05	2.56E-05	3.12E-05	3.63E-05	4.10E-05	4.53E-05	4.92E-05
^{145}Nd	601450	1.53E-05	1.73E-05	2.11E-05	2.47E-05	2.81E-05	3.13E-05	3.44E-05
^{147}Sm	621470	6.66E-06	7.25E-06	8.29E-06	9.16E-06	9.87E-06	1.04E-05	1.09E-05
^{149}Sm	621490	7.00E-07	7.19E-07	7.50E-07	7.73E-07	7.89E-07	8.03E-07	8.13E-07
^{150}Sm	621500	5.34E-06	6.21E-06	7.93E-06	9.62E-06	1.13E-05	1.29E-05	1.44E-05
^{151}Sm	621510	1.72E-35	1.87E-35	2.13E-35	2.37E-35	2.60E-35	2.82E-35	3.04E-35
^{152}Sm	621520	2.04E-06	2.32E-06	2.85E-06	3.35E-06	3.82E-06	4.26E-06	4.68E-06
^{151}Eu	631510	1.23E-06	1.33E-06	1.52E-06	1.69E-06	1.86E-06	2.02E-06	2.17E-06
^{153}Eu	631530	1.58E-06	1.89E-06	2.53E-06	3.21E-06	3.90E-06	4.59E-06	5.26E-06
^{155}Gd	641550	9.77E-08	1.17E-07	1.64E-07	2.21E-07	2.86E-07	3.60E-07	4.39E-07
^{233}U	922330	7.16E-08	8.49E-08	1.14E-07	1.44E-07	1.74E-07	2.04E-07	2.33E-07
^{234}U	922340	1.02E-05	1.03E-05	1.09E-05	1.17E-05	1.29E-05	1.44E-05	1.62E-05
^{235}U	922350	9.93E-04	9.44E-04	8.52E-04	7.68E-04	6.91E-04	6.22E-04	5.59E-04
^{236}U	922360	1.21E-04	1.32E-04	1.54E-04	1.73E-04	1.90E-04	2.06E-04	2.20E-04
^{238}U	922380	2.22E-02	2.21E-02	2.20E-02	2.19E-02	2.18E-02	2.17E-02	2.16E-02
^{237}Np	932370	2.34E-05	2.78E-05	3.73E-05	4.73E-05	5.73E-05	6.70E-05	7.64E-05
^{238}Pu	942380	4.98E-30	7.43E-30	1.47E-29	2.47E-29	3.70E-29	5.10E-29	6.58E-29
^{239}Pu	942390	2.10E-04	2.23E-04	2.46E-04	2.64E-04	2.80E-04	2.93E-04	3.04E-04
^{240}Pu	942400	8.70E-06	9.93E-06	1.25E-05	1.53E-05	1.81E-05	2.10E-05	2.38E-05
^{241}Pu	942410	3.80E-13	8.20E-13	3.08E-12	8.62E-12	1.96E-11	3.85E-11	6.77E-11
^{242}Pu	942420	7.69E-07	1.06E-06	1.88E-06	2.98E-06	4.35E-06	5.95E-06	7.76E-06
^{241}Am	952410	1.35E-11	2.77E-11	9.95E-11	2.74E-10	6.20E-10	1.21E-09	2.13E-09
^{242m}Am	952421	3.65E-30	5.44E-30	1.07E-29	1.81E-29	2.71E-29	3.73E-29	4.82E-29
^{243}Am	952430	4.18E-08	6.68E-08	1.53E-07	2.97E-07	5.04E-07	7.79E-07	1.12E-06

Table 35. BWR Isotopics as a Function of 5.5 wt% ^{235}U and Burnup, 10K Year Decay (Cont.)

Isotope	SAS2H ID	Isotopic Concentrations atoms / (barn – cm)					
		Burnup GWd/mtU 50	Burnup GWd/mtU 55	Burnup GWd/mtU 60	Burnup GWd/mtU 65	Burnup GWd/mtU 70	Burnup GWd/mtU 75
^{16}O	80160	4.62E-02	4.60E-02	4.58E-02	4.56E-02	4.54E-02	4.52E-02
^{95}Mo	420950	6.55E-05	7.07E-05	7.57E-05	8.04E-05	8.50E-05	8.94E-05
^{99}Tc	430990	6.30E-05	6.80E-05	7.28E-05	7.74E-05	8.18E-05	8.60E-05
^{101}Ru	441010	6.15E-05	6.71E-05	7.26E-05	7.80E-05	8.33E-05	8.85E-05
^{103}Rh	451030	3.60E-05	3.84E-05	4.07E-05	4.28E-05	4.47E-05	4.65E-05
^{109}Ag	471090	5.77E-06	6.57E-06	7.40E-06	8.24E-06	9.08E-06	9.93E-06
^{143}Nd	601430	5.27E-05	5.59E-05	5.87E-05	6.11E-05	6.33E-05	6.52E-05
^{145}Nd	601450	3.72E-05	3.99E-05	4.24E-05	4.48E-05	4.70E-05	4.90E-05
^{147}Sm	621470	1.13E-05	1.15E-05	1.17E-05	1.18E-05	1.19E-05	1.19E-05
^{149}Sm	621490	8.23E-07	8.31E-07	8.39E-07	8.48E-07	8.56E-07	8.66E-07
^{150}Sm	621500	1.59E-05	1.74E-05	1.88E-05	2.01E-05	2.14E-05	2.26E-05
^{151}Sm	621510	3.25E-35	3.45E-35	3.64E-35	3.82E-35	4.00E-35	4.17E-35
^{152}Sm	621520	5.06E-06	5.43E-06	5.77E-06	6.09E-06	6.39E-06	6.67E-06
^{151}Eu	631510	2.32E-06	2.46E-06	2.60E-06	2.73E-06	2.86E-06	2.98E-06
^{153}Eu	631530	5.91E-06	6.53E-06	7.12E-06	7.68E-06	8.20E-06	8.69E-06
^{155}Gd	641550	5.22E-07	6.08E-07	6.96E-07	7.84E-07	8.71E-07	9.56E-07
^{233}U	922330	2.59E-07	2.84E-07	3.07E-07	3.28E-07	3.47E-07	3.64E-07
^{234}U	922340	1.82E-05	2.05E-05	2.31E-05	2.57E-05	2.85E-05	3.14E-05
^{235}U	922350	5.02E-04	4.52E-04	4.06E-04	3.66E-04	3.31E-04	3.00E-04
^{236}U	922360	2.32E-04	2.42E-04	2.51E-04	2.58E-04	2.64E-04	2.69E-04
^{238}U	922380	2.15E-02	2.14E-02	2.13E-02	2.12E-02	2.11E-02	2.10E-02
^{237}Np	932370	8.52E-05	9.35E-05	1.01E-04	1.08E-04	1.14E-04	1.20E-04
^{238}Pu	942380	8.10E-29	9.59E-29	1.10E-28	1.24E-28	1.36E-28	1.47E-28
^{239}Pu	942390	3.14E-04	3.22E-04	3.29E-04	3.36E-04	3.41E-04	3.46E-04
^{240}Pu	942400	2.67E-05	2.95E-05	3.22E-05	3.48E-05	3.73E-05	3.98E-05
^{241}Pu	942410	1.10E-10	1.67E-10	2.40E-10	3.30E-10	4.37E-10	5.60E-10
^{242}Pu	942420	9.76E-06	1.19E-05	1.42E-05	1.66E-05	1.91E-05	2.17E-05
^{241}Am	952410	3.46E-09	5.25E-09	7.54E-09	1.04E-08	1.37E-08	1.76E-08
^{242m}Am	952421	5.93E-29	7.02E-29	8.07E-29	9.05E-29	9.95E-29	1.08E-28
^{243}Am	952430	1.52E-06	1.97E-06	2.47E-06	3.01E-06	3.58E-06	4.16E-06

6.3 MCNP RESULTS

6.3.1 Confirmation of Isotopic Database Using RCA Data

The results presented in References 7.10 and 7.11 evaluated the RCA data by placing the sample data in all nodes of all assemblies within a 44 BWR waste package. These cases were rerun as described in Section 5.2.1 above. The resulting k_{eff} values are recorded in Table 36 along with the k_{eff} values calculated using isotopic database concentration values. For all of the samples using the isotopic database, the material density was increased to 10.741 g/cm^3. This density change is consistent with the density used in the bounding isotopic concentration calculations.

Section 2 of this report presents two requirements imposed in the Disposal Criticality Analysis Methodology Topical Report (Reference 7.1, pp. 3-38 and 3-39) to ensure that the isotopic concentrations used for burnup credit are conservative with respect to criticality. For the second requirement the k_{eff} values for waste package calculations with concentrations from the isotopic database must always be greater than the k_{eff} values obtained when using the measured (RCA) isotopic concentration values. The last column of Table 36 presents $\Delta k_{eff} / k_{eff}$ values for waste package calculations with concentrations from the isotopic database compared with WP calculations with measured isotopic concentrations. A positive value indicates a "bounded sample". That is to say that the k_{eff} value for the 44 BWR WP containing the material concentrations from the isotopic database exceeds the k_{eff} value for the 44 BWR WP containing the material concentrations based on the RCA values. In all cases, the isotopic database materials were bounding when compared to the RCAs.

Table 36. RCA Sample Comparison to Isotopic Database Concentration in a 44 BWR Waste Package

Sample Name	Isotopic Database (ID)		RCA		[Δk/k][a] (%)
	k_{eff}	σ	k_{eff}	σ	
D8-3D2B	0.76073	0.00072	0.56062	0.00044	35.69%
D8-4G3	0.80084	0.00058	0.63548	0.00057	26.02%
D9-1D2	0.75160	0.00055	0.46859	0.00039	60.40%
D9-2D2	0.74515	0.00056	0.50906	0.00042	46.38%
D9-4D4	0.74679	0.00059	0.53387	0.00051	39.88%
D9-4G1E1	0.76307	0.00063	0.56883	0.00049	34.15%
H5-3A1C	0.76020	0.00062	0.59039	0.00052	28.76%
H5-3A1G	0.75909	0.00064	0.59217	0.00058	28.19%
Rod add2966, cut-b	0.88817	0.00074	0.74136	0.00065	19.80%
Rod add2966, cut-k	0.86304	0.00063	0.64206	0.00052	34.42%
Rod add2966, cut-t	0.86200	0.00061	0.60751	0.00046	41.89%
Rod add2974, cut-b	0.89008	0.00064	0.76164	0.00059	16.86%
Rod add2974, cut-j	0.86940	0.00068	0.69331	0.00056	25.40%
Rod add2974, cut-u	0.86695	0.00061	0.64811	0.00053	33.77%
assy. b23, rod a1, 44cm	0.73073	0.00067	0.54400	0.00055	34.33%
assy. b23, rod a1, 268cm	0.72980	0.00067	0.57765	0.00057	26.34%
assy. b23, rod b3, 268cm	0.73435	0.00069	0.61827	0.00062	18.77%
assy. b23, rod e3, 268cm	0.73265	0.00068	0.59666	0.00054	22.79%
assy. c16, rod a1, 44cm	0.73495	0.00069	0.56778	0.00058	29.44%
assy. c16, rod a1, 268cm	0.73487	0.00070	0.60154	0.00056	22.16%
assy. c16, rod b3, 268cm	0.74020	0.00059	0.63653	0.00064	16.29%
assy. c16, rod e5, 268cm	0.73713	0.00066	0.59853	0.00050	23.16%
assy. a-14, rod c-d-3-4 (2)	0.78744	0.00063	0.74262	0.00066	6.04%
assy. a-14, rod c-d-3-4 (9)	0.78946	0.00062	0.73526	0.00064	7.37%
assy. a-18, rod c-d-3-4 (2)	0.78426	0.00066	0.74296	0.00072	5.56%
assy. a-18, rod c-d-3-4 (6)	0.79064	0.00068	0.73467	0.00062	7.62%
assy. a-20, rod a-1 (3)	0.79684	0.00072	0.71585	0.00060	11.31%
assy. a-20, rod a-1 (10)	0.79588	0.00066	0.71048	0.00053	12.02%
assy. a-20, rod a-3 (3)	0.79930	0.00065	0.71494	0.00063	11.80%
assy. a-20, rod a-6 (9)	0.79757	0.00074	0.71572	0.00063	11.44%
assy. a-20, rod a-6 (1)	0.78378	0.00058	0.74448	0.00058	5.28%
assy. a-20, rod c-3 (3)	0.79354	0.00076	0.73457	0.00066	8.03%
assy. a-20, rod c-3 (5)	0.79556	0.00064	0.72902	0.00065	9.13%
assy. a-20, rod a-1 (8)	0.79680	0.00065	0.72427	0.00064	10.01%
assy. a-20, rod c-3 (10)	0.79367	0.00068	0.72774	0.00060	9.06%
assy. a-20, rod c-3 (12)	0.77975	0.00067	0.74484	0.00065	4.69%
assy. a-20, rod e-2 (3)	0.79471	0.00070	0.73042	0.00063	8.80%
assy. a-20, rod e-2 (10)	0.79367	0.00071	0.72369	0.00066	9.67%

Notes:
[a] $\Delta k/k$ (%) = [k_{eff} (Isotopic Database) – k_{eff}(RCA)] x 100 / k_{eff}(RCA)

6.3.2 Confirmation of Isotopic Database Using CRC Data

The CRCs have been previously evaluated using MCNP. The calculated k_{eff} values for the CRCs are documented in Reference 7.20 and are not re-evaluated in this calculation. The comparison of CRC data is based on the k_{eff} results calculated using the best-estimate isotopic data set. The applicable k_{eff} values are listed in Table 37, along with the new values calculated using the isotopic database material compositions. For each cycle reported, the first k_{eff} and σ values are the original best-estimate CRC k_{eff} values taken from Reference 7.20. Using the best-estimate CRC k_{eff} values identifies the full range of conservatism built into the isotopic database, including the conservatism resulting from the use of the principal isotopes instead of the entire best-estimate material description.

The revised MCNP input files are based on the actual MCNP input files taken from the CRC reactivity calculation report (Reference 7.20). For each evaluated assembly, the isotopic database concentrations replaced the CRC material data in the MCNP fuel material cards for all fuel nodes of the affected assembly. Also, the material density for each axial fuel node was changed to 10.741 g/cm^3. This density change is consistent with the density used in the bounding isotopic concentration calculations. Only one set of assembly fuel data was modified in each of the MCNP calculations reported in Table 37. The total number of affected assemblies in the entire core is listed in Table 37.

The data reported in Table 37 demonstrates that the isotopic database provides bounding material definitions for all tested assemblies. Because these assemblies are expected to be the most difficult to bound in the available BWR CRC database, this demonstrates that the isotopic database approach will bound the current CRC database. Thus, requirement A discussed in Section 2 of this document and in Reference 7.1, Section 3.5.3.1.2 is satisfied.

However, additional confirmation should be performed using additional assemblies that may be bounding, but are not currently included in the CRC database. Also, it would be advisable to investigate the relative affect of the bounding model in a waste package, similar to the RCA confirmation calculations documented above. This may be accomplished by calculating k_{eff} values for the each assembly listed in Table 10 in a 44 BWR waste package. All 44 locations in the waste package could be filled with the same assembly using the best-estimate isotopic concentrations present in the CRC calculations. The calculations would then be repeated using the isotopic database isotopic concentrations. These "best-estimate" k_{eff} values could be compared to the "Isotopic Database" k_{eff} values to determine the level of relative conservatism.

Table 37. Comparison of CRCs to Isotopic Database Concentrations

State-point	Assembly	Number of Effected Assemblies	k_{eff}	σ	[Δk/k][a] (%)
6	Base[b]		0.99324	0.0001	
	A16	8	1.00238	0.00012	0.92%
	C06	8	0.99401	0.00010	0.08%
13	Base[b]		0.98551	0.0001	
	B37	8	0.99057	0.00010	0.51%
14	Base[b]		0.98295	0.0001	
	D45	8	0.98310	0.00010	0.02%
15	Base[b]		0.98309	0.0001	
	B32	8	0.98373	0.00010	0.07%
18	Base[b]		0.98993	0.0001	
	H15	8	0.99044	0.00010	0.05%
	F16	4	0.99006	0.00010	0.01%
20	Base[b]		0.96644	0.0001	
	K06	8	0.96661	0.00010	0.02%
	H22	8	0.96714	0.00010	0.07%
	J30	8	0.96916	0.00011	0.28%
21	Base[b]		0.99211	0.0001	
	H06	8	1.00096	0.00011	0.89%

Notes:

[a] $\Delta k/k\ (\%) = [k_{eff}\text{ (Isotopic Database)} - k_{eff}\text{(Base)}] \times 100 / k_{eff}\text{(Base)}$

[b] Base is based on best-estimate isotopic data (Reference 7.20)

6.3.3 Confirmation of Isotopic Database Using Nominal Depletion Data

For comparison to the conservative isotopic database depletion, a nominal depletion was defined based on information from the *Commercial Reactor Criticality Depletion for Grand Gulf, Unit 1* (Reference 7.15). For this calculation, the base depletion is taken from the Assembly C16, node 3 depletion calculation for state-point 15 recorded in Reference 7.15. This SAS2H input file was selected for the following reasons:

- C16 is an 8x8 assembly
- Contains 6 Gadolinia rods (4wt% Gd_2O_3)
- Burnup of 43.63 GWd/mtU (maximum node burnup available for the state-points recorded in Reference 7.15 of any 8x8 assembly)
- Significant control rod history compared to other 8x8 assemblies depleted in Reference 7.15

The C16, node 3 depletion input file was modified to reflect nominal values for various parameters. The following parameters are considered nominal for BWR fuel assemblies.

- Fuel temperature, 1000 K (consistent with C16 node 3, ranges from 1122 K to 865 K)
- Moderator Density, 0.43 g/cm^3 (consistent with node 4 values for C16, intended to match node 4 moderator density with node 3 control rod history)

These provide the nominal parameter set used as the baseline for comparison for the determination of the conservatism of the isotopic database.

For comparison to the isotopic database, convenient enrichment burnup pairs were selected. The nominal depletion SAS2H inputs were modified to reflect the enrichment in the UO_2 rods only. The Gadolinia rod uranium enrichment remained consistent with the C16, node 3 value. To facilitate the uranium enrichment changes, only ^{235}U and ^{238}U were included in the fuel description. ^{234}U and ^{236}U were added to list of "tracked" isotopes. The burnup step lengths were modified to provide steps that ended on the selected burnup values. For the 50 GWd/mtU cases, depletion steps, consistent with the last step recorded in the C16, node 3 depletion input, were added to the end of the depletion. Finally, the final decay time was extended to 5 years for comparison with the 5 year decayed isotopic database values.

The isotopic concentrations generated by SAS2H were placed in a 7x7 assembly in a 44 BWR Waste Package. The base model is the Cooper 7x7 (sample c1m, Table 8) used in the Cooper RCA calculations reported above. The calculated k_{eff} values for the nominal depletion assembly in a 44 BWR Waste Package are listed in Table 38, along with the values calculated using the isotopic database material compositions. The calculated Δk_{eff} values are shown in Figure 34.

Table 38. Comparison of Nominal Depletion Assemblies to Isotopic Database Concentrations

MCNP File Name	Enrichment (wt% ^{235}U)	Burnup (GWd/mt U)	Nominal Depletion Assembly		Isotopic Database		Δk_{eff}[a]
			k_{eff}	σ	k_{eff}	σ	
bwr310	3.0	10.0	0.77892	0.00062	0.85388	0.00074	0.07496
bwr320	3.0	20.0	0.73099	0.00061	0.83141	0.00069	0.10042
bwr330	3.0	30.0	0.67143	0.00055	0.80003	0.00065	0.12860
bwr340	3.0	40.0	0.58425	0.00052	0.77664	0.00064	0.19239
bwr350	3.0	50.0	0.52599	0.00049	0.75485	0.00071	0.22886
bwr410	4.0	10.0	0.84828	0.00061	0.88921	0.00059	0.04093
bwr420	4.0	20.0	0.79600	0.00067	0.85702	0.00068	0.06102
bwr430	4.0	30.0	0.73984	0.00063	0.82657	0.00066	0.08673
bwr440	4.0	40.0	0.65649	0.00058	0.79615	0.00065	0.13966
bwr450	4.0	50.0	0.58881	0.00051	0.77134	0.00057	0.18253
bwr510	5.0	10.0	0.89856	0.00071	0.91902	0.00069	0.02046
bwr520	5.0	20.0	0.84699	0.00061	0.88542	0.00058	0.03843
bwr530	5.0	30.0	0.79648	0.00063	0.85147	0.00067	0.05499
bwr540	5.0	40.0	0.72449	0.00055	0.81982	0.00064	0.09533
bwr550	5.0	50.0	0.65625	0.00055	0.79027	0.00056	0.13402

Notes:
[a] Δk_{eff} = k_{eff} (Isotopic Database) – k_{eff}(Nominal)

The MCNP input files are based on the 44 BWR Waste Package input files containing 7x7 assemblies. For each evaluated assembly, the isotopic database concentrations replaced the nominal depletion assembly material data in the MCNP fuel material cards. Also, the fuel material density was set to 10.741 g/cm^3. This density is consistent with the density used in the bounding isotopic concentration calculations. The fuel material definitions for all forty-four assemblies in the 44 BWR Waste Package were modified in the MCNP calculations reported in Table 38.

Figure 34 shows the calculated Δk_{eff} relative to the absolute value of the calculated bias plus uncertainty for the CRCs, 1-0.0003*(System Average Burnup)+0.9829, Reference 7.9, Table 6, and the absolute value of the lower limit and uncertainty for the RCAs, -4.813e^{-4}*(System Average Burnup)-0.0366, Reference 7.11 Table 6-1). Figure 34 indicates that the isotopic database bounding depletion model is conservative with respect to the nominal depletion model for all three enrichments presented over most of the range of burnups presented. For 3.0 wt%, the isotopic database bounding depletion model is always conservative over the presented range of burnups. However, for 4.0 wt%, the isotopic database bounding depletion model is only

conservative, versus the RCAs for burnups greater than 10.3 GWd/mtU. Also, for the 5.0 wt% cases, the isotopic database bounding depletion model is only conservative versus the CRCs for burnups greater than 9.7 GWd/mtU and versus the RCAs for burnups greater than 26.6 GWd/mtU. Above these burnup values, the calculated k_{eff} value meets the criteria for conservatism presented in Reference 7.1.

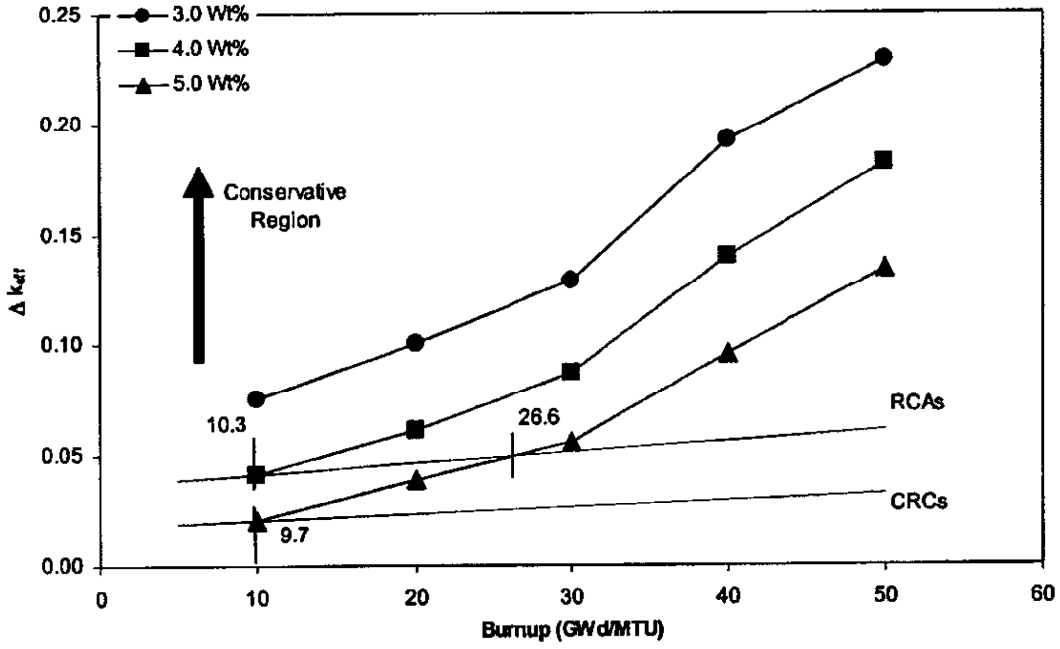

Figure 34. Comparison of Δk_{eff} for Isotopic Database versus Nominal Depletion

7. REFERENCES

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8. COMPUTER OUTPUT

Table 39 lists the SAS2H Tape 72/output files for the sensitivity study.

Table 40 lists the MCNP output files for the sensitivity study.

Table 41 lists the SAS2H Tape 72/output files for the isotopic database generation, 5 year decay.

Table 42 lists the SAS2H Tape 72/output files for the isotopic database generation, 10,000 year decay.

Table 43 lists the SAS2H Tape 72/output files for the nominal depletion cases used for confirmation of the isotopic database.

Table 44 lists the MCNP output files for confirmation of the isotopic database.

Table 39. Sensitivity Study SAS2H Tape 72/Output Files

File Name	File Size (bytes)	Date of Last Update	Time
bwrs0001.ft72	1908764	17-Feb-2004	13:55
bwrs0001.out	46016102	17-Feb-2004	13:56
bwrs0002.ft72	1908764	17-Feb-2004	14:03
bwrs0002.out	46403470	17-Feb-2004	14:03
bwrs0003.ft72	1908764	17-Feb-2004	14:07
bwrs0003.out	47535974	17-Feb-2004	14:07
bwrs0004.ft72	1908764	16-Feb-2004	13:09
bwrs0004.out	46017095	16-Feb-2004	13:09
bwrs0005.ft72	1908764	16-Feb-2004	13:09
bwrs0005.out	46366836	16-Feb-2004	13:09
bwrs0006.ft72	1908764	16-Feb-2004	13:18
bwrs0006.out	47498234	16-Feb-2004	13:18
bwrs0007.ft72	1908764	17-Feb-2004	13:56
bwrs0007.out	46012735	17-Feb-2004	13:56
bwrs0008.ft72	1908764	16-Feb-2004	13:19
bwrs0008.out	46017095	16-Feb-2004	13:19
bwrs0009.ft72	2030600	17-Feb-2004	10:44
bwrs0009.out	47695831	17-Feb-2004	10:44
bwrs0010.ft72	2030600	17-Feb-2004	11:06
bwrs0010.out	49148978	17-Feb-2004	11:06
bwrs0011.ft72	1908764	16-Feb-2004	14:10
bwrs0011.out	46332830	16-Feb-2004	14:10
bwrs0012.ft72	1908764	16-Feb-2004	14:27
bwrs0012.out	46259969	16-Feb-2004	14:27
bwrs0013.ft72	446732	16-Feb-2004	15:51
bwrs0013.out	10070487	16-Feb-2004	15:51
bwrs0014.ft72	1177748	16-Feb-2004	15:54
bwrs0014.out	28147892	16-Feb-2004	15:54
bwrs0015.ft72	1949376	16-Feb-2004	15:58
bwrs0015.out	47490875	16-Feb-2004	15:58

Table 39. Sensitivity Study SAS2H Tape 72/Output Files (Cont'd)

File Name	File Size (bytes)	Date of Last Update	Time
Bwrs0016.ft72	1949376	16-Feb-2004	17:08
Bwrs0016.out	47840515	16-Feb-2004	17:08
Bwrs0017.ft72	487344	17-Feb-2004	11:03
Bwrs0017.out	11038729	17-Feb-2004	11:03
bwrs0018.ft72	1258972	17-Feb-2004	11:09
bwrs0018.out	30075306	17-Feb-2004	11:09
bwrs0019.ft72	2071212	17-Feb-2004	11:35
bwrs0019.out	50406433	17-Feb-2004	11:35
bwrs0020.ft72	2071212	17-Feb-2004	11:35
bwrs0020.out	50775197	17-Feb-2004	11:35
bwrs0021.ft72	2111824	17-Feb-2004	11:43
bwrs0021.out	51551245	17-Feb-2004	11:43
bwrs0022.ft72	2071212	17-Feb-2004	13:01
bwrs0022.out	50536482	17-Feb-2004	13:01
bwrs0023.ft72	1908764	17-Feb-2004	14:21
bwrs0023.out	47072831	17-Feb-2004	14:21
bwrs0024.ft72	1908764	17-Feb-2004	14:21
bwrs0024.out	47426361	17-Feb-2004	14:21
bwrs0025.ft72	1908764	17-Feb-2004	14:26
bwrs0025.out	48492378	17-Feb-2004	14:27
bwrs0026.ft72	446732	17-Feb-2004	14:17
bwrs0026.out	10283019	17-Feb-2004	14:17
bwrs0027.ft72	487344	17-Feb-2004	13:35
bwrs0027.out	11280604	17-Feb-2004	13:35
bwrs0028.ft72	1989988	16-Feb-2004	16:40
bwrs0028.out	48619538	16-Feb-2004	16:40
bwrs0029.ft72	1949376	16-Feb-2004	16:38
bwrs0029.out	47633241	16-Feb-2004	16:38
bwrs0030.ft72	487344	17-Feb-2004	14:47
bwrs0030.out	11547124	17-Feb-2004	14:47
bwrs0031.ft72	487344	17-Feb-2004	15:02
bwrs0031.out	11288778	17-Feb-2004	15:02
bwrs0032.ft72	487344	17-Feb-2004	15:02
bwrs0032.out	11331515	17-Feb-2004	15:02
bwrs0033.ft72	487344	17-Feb-2004	15:02
bwrs0033.out	11062044	17-Feb-2004	15:02
bwrs0034.ft72	487344	17-Feb-2004	15:02
bwrs0034.out	11246608	17-Feb-2004	15:02
bwrs0035.ft72	487344	17-Feb-2004	15:00
bwrs0035.out	10978429	17-Feb-2004	15:00
bwrs0036.ft72	487344	17-Feb-2004	15:00
bwrs0036.out	11193969	17-Feb-2004	15:00
bwrs0037.ft72	487344	17-Feb-2004	15:01
bwrs0037.out	10928304	17-Feb-2004	15:01
bwrs0038.ft72	446732	16-Feb-2004	16:43
bwrs0038.out	10227538	16-Feb-2004	16:43
bwrs0039.ft72	446732	16-Feb-2004	16:44
bwrs0039.out	10008696	16-Feb-2004	16:44

Table 39. Sensitivity Study SAS2H Tape 72/Output Files (Cont'd)

File Name	File Size (bytes)	Date of Last Update	Time
bwrs0040.out	28147884	24-May-2004	13:14
bwrs0040.ft72	1177748	24-May-2004	13:13
bwrs0041.out	28724349	24-May-2004	13:16
bwrs0041.ft72	1177748	24-May-2004	13:16
bwrs0042.out	30075306	24-May-2004	13:16
bwrs0042.ft72	1258972	24-May-2004	13:16
bwrs0043.out	30700297	24-May-2004	13:16
bwrs0043.ft72	1258972	24-May-2004	13:16
bwrs0044.out	30769273	24-May-2004	14:32
bwrs0044.ft72	1258972	24-May-2004	14:32
bwrs0045.out	30181919	24-May-2004	15:48
bwrs0045.ft72	1258972	24-May-2004	15:48
bwrs0046.out	29950715	24-May-2004	15:48
bwrs0046.ft72	1258972	24-May-2004	15:48
bwrs0047.out	29813944	24-May-2004	15:48
bwrs0047.ft72	1258972	24-May-2004	15:48
bwrs0048.out	27977193	24-May-2004	15:49
bwrs0048.ft72	1177748	24-May-2004	15:49
bwrs0049.out	31438209	24-May-2004	15:52
bwrs0049.ft72	1258972	24-May-2004	15:52
bwrs0050.out	30874636	24-May-2004	16:21
bwrs0050.ft72	1258972	24-May-2004	16:21
bwrs0051.out	30643665	24-May-2004	15:55
bwrs0051.ft72	1258972	24-May-2004	15:55
bwrs0052.out	30501931	24-May-2004	15:54
bwrs0052.ft72	1258972	24-May-2004	15:54
bwrs0053.out	28556033	24-May-2004	16:23
bwrs0053.ft72	1177748	24-May-2004	16:23

Table 40. Sensitivity Study MCNP Output Files

File Name	File Size (bytes)	Date of Last Update	Time
bwrm0001.out	271953	17-Feb-2004	15:39
bwrm0002.out	270849	17-Feb-2004	15:40
bwrm0003.out	271953	17-Feb-2004	15:53
bwrm0004.out	271953	17-Feb-2004	15:39
bwrm0005.out	271953	17-Feb-2004	15:39
bwrm0006.out	271953	17-Feb-2004	15:53
bwrm0007.out	267562	17-Feb-2004	17:06
bwrm0008.out	271953	17-Feb-2004	15:52
bwrm0009.out	270837	17-Feb-2004	15:52
bwrm0010.out	270837	17-Feb-2004	15:53
bwrm0011.out	271346	17-Feb-2004	15:58
bwrm0012.out	259370	17-Feb-2004	16:05
bwrm0013.out	271952	17-Feb-2004	16:05

Table 40. Sensitivity Study MCNP Output Files (Cont'd)

bwrm0014.out	271944	17-Feb-2004	16:02
bwrm0015.out	267559	17-Feb-2004	16:10
bwrm0016.out	271944	17-Feb-2004	16:04
bwrm0017.out	271944	17-Feb-2004	16:07
bwrm0018.out	270848	17-Feb-2004	16:11
bwrm0019.out	271952	17-Feb-2004	16:15
bwrm0020.out	271944	17-Feb-2004	16:17
bwrm0021.out	271944	17-Feb-2004	16:18
bwrm0022.out	271014	17-Feb-2004	16:14
bwrm0023.out	271022	17-Feb-2004	16:19
bwrm0024.out	270848	17-Feb-2004	16:22
bwrm0025.out	271944	17-Feb-2004	16:19
bwrm0026.out	270241	17-Feb-2004	16:31
bwrm0027.out	271344	17-Feb-2004	16:31
bwrm0028.out	270836	17-Feb-2004	16:30
bwrm0029.out	267562	17-Feb-2004	16:30
bwrm0030.out	271944	17-Feb-2004	16:29
bwrm0031.out	271944	17-Feb-2004	16:32
bwrm0032.out	271024	17-Feb-2004	16:34
bwrm0033.out	271946	17-Feb-2004	16:48
bwrm0034.out	271953	17-Feb-2004	16:48
bwrm0035.out	271953	17-Feb-2004	16:49
bwrm0036.out	271032	17-Feb-2004	16:43
bwrm0037.out	271006	17-Feb-2004	16:44
bwrm0038.out	271344	17-Feb-2004	16:48
bwrm0039.out	271944	17-Feb-2004	16:47
bwrm0040.out	271945	24-May-2004	17:14
bwrm0041.out	270829	24-May-2004	17:13
bwrm0042.out	271953	24-May-2004	17:14
bwrm0043.out	271025	24-May-2004	17:13
bwrm0044.out	271937	24-May-2004	17:15
bwrm0045.out	271945	24-May-2004	17:15
bwrm0046.out	271945	24-May-2004	17:15
bwrm0047.out	271033	24-May-2004	17:15
bwrm0048.out	270829	24-May-2004	17:14
bwrm0049.out	271953	24-May-2004	17:13
bwrm0050.out	271032	24-May-2004	17:24
bwrm0051.out	271952	24-May-2004	17:24
bwrm0052.out	271947	24-May-2004	17:28
bwrm0053.out	271944	24-May-2004	17:26

Table 41. BWR Isotopic Database SAS2H Tape 72/Output Files, 5 Year Decay

File Name	File Size (bytes)	Date of Last Update	Time
bse1.5b0.001y5.ft72	121836	29-Jan-2004	10:12
bse1.5b0.001y5.out	2099603	28-Jan-2004	16:30
bse1.5b2.5y5.ft72	203060	29-Jan-2004	10:12
bse1.5b2.5y5.out	4148362	28-Jan-2004	16:30
bse1.5b5.0y5.ft72	284284	29-Jan-2004	10:12
bse1.5b5.0y5.out	6176175	28-Jan-2004	16:31
bse1.5b7.5y5.ft72	365508	29-Jan-2004	10:12
bse1.5b7.5y5.out	8209217	28-Jan-2004	16:31
bse1.5b10.0y5.ft72	446732	29-Jan-2004	10:12
bse1.5b10.0y5.out	10243883	28-Jan-2004	16:31
bse1.5b12.5y5.ft72	568568	29-Jan-2004	10:12
bse1.5b12.5y5.out	13297030	28-Jan-2004	16:32
bse1.5b15.0y5.ft72	649792	29-Jan-2004	10:12
bse1.5b15.0y5.out	15333961	28-Jan-2004	16:32
bse1.5b17.5y5.ft72	771628	29-Jan-2004	10:12
bse1.5b17.5y5.out	18289014	28-Jan-2004	16:34
bse1.5b20.0y5.ft72	852852	29-Jan-2004	10:12
bse1.5b20.0y5.out	20286085	28-Jan-2004	16:34
bse1.5b25.0y5.ft72	1015300	29-Jan-2004	10:12
bse1.5b25.0y5.out	24279650	28-Jan-2004	16:36
bse1.5b30.0y5.ft72	1218360	29-Jan-2004	10:12
bse1.5b30.0y5.out	29291106	28-Jan-2004	16:39
bse1.5b35.0y5.ft72	1380808	29-Jan-2004	10:12
bse1.5b35.0y5.out	33312694	28-Jan-2004	16:40
bse1.5b40.0y5.ft72	1583868	29-Jan-2004	10:12
bse1.5b40.0y5.out	38326392	28-Jan-2004	16:41
bse1.5b45.0y5.ft72	1746316	29-Jan-2004	10:12
bse1.5b45.0y5.out	42323782	28-Jan-2004	16:40
bse1.5b50.0y5.ft72	1949376	29-Jan-2004	10:12
bse1.5b50.0y5.out	47339234	28-Jan-2004	16:47
bse1.5b55.0y5.ft72	2111824	29-Jan-2004	10:12
bse1.5b55.0y5.out	51362488	28-Jan-2004	16:42
bse1.5b60.0y5.ft72	2314884	29-Jan-2004	10:12
bse1.5b60.0y5.out	56391312	28-Jan-2004	16:43
bse1.5b65.0y5.ft72	2477332	29-Jan-2004	10:12
bse1.5b65.0y5.out	60413419	28-Jan-2004	16:44
bse1.5b70.0y5.ft72	2680392	29-Jan-2004	10:12
bse1.5b70.0y5.out	65440543	28-Jan-2004	16:51
bse1.5b75.0y5.ft72	2842840	29-Jan-2004	10:12
bse1.5b75.0y5.out	69437051	28-Jan-2004	16:50

Table 41. BWR Isotopic Database SAS2H Tape 72/Output Files, 5 Year Decay (Cont.)

File Name	File Size (bytes)	Date of Last Update	Time
bse2.0b0.001y5.ft72	121836	29-Jan-2004	10:12
bse2.0b0.001y5.out	2099603	28-Jan-2004	16:41
bse2.0b2.5y5.ft72	203060	29-Jan-2004	10:12
bse2.0b2.5y5.out	4147116	28-Jan-2004	16:41
bse2.0b5.0y5.ft72	284284	29-Jan-2004	10:12
bse2.0b5.0y5.out	6170792	28-Jan-2004	16:42
bse2.0b7.5y5.ft72	365508	29-Jan-2004	10:12
bse2.0b7.5y5.out	8203113	28-Jan-2004	16:43
bse2.0b10.0y5.ft72	446732	29-Jan-2004	10:12
bse2.0b10.0y5.out	10237533	28-Jan-2004	16:43
bse2.0b12.5y5.ft72	568568	29-Jan-2004	10:12
bse2.0b12.5y5.out	13290422	28-Jan-2004	16:45
bse2.0b15.0y5.ft72	649792	29-Jan-2004	10:12
bse2.0b15.0y5.out	15327682	28-Jan-2004	16:46
bse2.0b17.5y5.ft72	771628	29-Jan-2004	10:12
bse2.0b17.5y5.out	18281794	28-Jan-2004	16:47
bse2.0b20.0y5.ft72	852852	29-Jan-2004	10:12
bse2.0b20.0y5.out	20279984	28-Jan-2004	16:46
bse2.0b25.0y5.ft72	1015300	29-Jan-2004	10:12
bse2.0b25.0y5.out	24269695	28-Jan-2004	16:48
bse2.0b30.0y5.ft72	1218360	29-Jan-2004	10:12
bse2.0b30.0y5.out	29261420	28-Jan-2004	16:50
bse2.0b35.0y5.ft72	1380808	29-Jan-2004	10:12
bse2.0b35.0y5.out	33259953	28-Jan-2004	16:50
bse2.0b40.0y5.ft72	1583868	29-Jan-2004	10:12
bse2.0b40.0y5.out	38256656	28-Jan-2004	16:54
bse2.0b45.0y5.ft72	1746316	29-Jan-2004	10:12
bse2.0b45.0y5.out	42254334	28-Jan-2004	16:55
bse2.0b50.0y5.ft72	1949376	29-Jan-2004	10:12
bse2.0b50.0y5.out	47251325	28-Jan-2004	16:56
bse2.0b55.0y5.ft72	2111824	29-Jan-2004	10:12
bse2.0b55.0y5.out	51249858	28-Jan-2004	17:03
bse2.0b60.0y5.ft72	2314884	29-Jan-2004	10:12
bse2.0b60.0y5.out	56247932	28-Jan-2004	17:08
bse2.0b65.0y5.ft72	2477332	29-Jan-2004	10:12
bse2.0b65.0y5.out	60245827	28-Jan-2004	17:09
bse2.0b70.0y5.ft72	2680392	29-Jan-2004	10:12
bse2.0b70.0y5.out	65242754	28-Jan-2004	17:10
bse2.0b75.0y5.ft72	2842840	29-Jan-2004	10:12
bse2.0b75.0y5.out	69239600	28-Jan-2004	17:03

Table 41. BWR Isotopic Database SAS2H Tape 72/Output Files, 5 Year Decay (Cont.)

File Name	File Size (bytes)	Date of Last Update	Time
bse2.5b0.001y5.ft72	121836	29-Jan-2004	10:12
bse2.5b0.001y5.out	2099771	28-Jan-2004	16:54
bse2.5b2.5y5.ft72	203060	29-Jan-2004	10:12
bse2.5b2.5y5.out	4146404	28-Jan-2004	16:55
bse2.5b5.0y5.ft72	284284	29-Jan-2004	10:12
bse2.5b5.0y5.out	6167722	28-Jan-2004	16:56
bse2.5b7.5y5.ft72	365508	29-Jan-2004	10:12
bse2.5b7.5y5.out	8199441	28-Jan-2004	16:56
bse2.5b10.0y5.ft72	446732	29-Jan-2004	10:12
bse2.5b10.0y5.out	10233837	28-Jan-2004	16:57
bse2.5b12.5y5.ft72	568568	29-Jan-2004	10:12
bse2.5b12.5y5.out	13286320	28-Jan-2004	16:58
bse2.5b15.0y5.ft72	649792	29-Jan-2004	10:12
bse2.5b15.0y5.out	15323051	28-Jan-2004	16:58
bse2.5b17.5y5.ft72	771628	29-Jan-2004	10:12
bse2.5b17.5y5.out	18277573	28-Jan-2004	17:00
bse2.5b20.0y5.ft72	852852	29-Jan-2004	10:12
bse2.5b20.0y5.out	20273521	28-Jan-2004	17:01
bse2.5b25.0y5.ft72	1015300	29-Jan-2004	10:12
bse2.5b25.0y5.out	24264392	28-Jan-2004	17:05
bse2.5b30.0y5.ft72	1218360	29-Jan-2004	10:12
bse2.5b30.0y5.out	29256778	28-Jan-2004	17:04
bse2.5b35.0y5.ft72	1380808	29-Jan-2004	10:12
bse2.5b35.0y5.out	33253850	28-Jan-2004	17:05
bse2.5b40.0y5.ft72	1583868	29-Jan-2004	10:12
bse2.5b40.0y5.out	38251758	28-Jan-2004	17:08
bse2.5b45.0y5.ft72	1746316	29-Jan-2004	10:12
bse2.5b45.0y5.out	42249973	28-Jan-2004	17:11
bse2.5b50.0y5.ft72	1949376	29-Jan-2004	10:12
bse2.5b50.0y5.out	47246865	28-Jan-2004	17:12
bse2.5b55.0y5.ft72	2111824	29-Jan-2004	10:12
bse2.5b55.0y5.out	51244873	28-Jan-2004	17:14
bse2.5b60.0y5.ft72	2314884	29-Jan-2004	10:12
bse2.5b60.0y5.out	56242888	28-Jan-2004	17:13
bse2.5b65.0y5.ft72	2477332	29-Jan-2004	10:12
bse2.5b65.0y5.out	60242127	28-Jan-2004	17:21
bse2.5b70.0y5.ft72	2680392	29-Jan-2004	10:12
bse2.5b70.0y5.out	65239557	28-Jan-2004	17:22
bse2.5b75.0y5.ft72	2842840	29-Jan-2004	10:12
bse2.5b75.0y5.out	69237703	28-Jan-2004	17:23

Table 41. BWR Isotopic Database SAS2H Tape 72/Output Files, 5 Year Decay (Cont.)

File Name	File Size (bytes)	Date of Last Update	Time
bse3.0b0.001y5.ft72	121836	29-Jan-2004	10:12
bse3.0b0.001y5.out	2099813	28-Jan-2004	17:11
bse3.0b2.5y5.ft72	203060	29-Jan-2004	10:12
bse3.0b2.5y5.out	4146022	28-Jan-2004	17:11
bse3.0b5.0y5.ft72	284284	29-Jan-2004	10:12
bse3.0b5.0y5.out	6166353	28-Jan-2004	17:12
bse3.0b7.5y5.ft72	365508	29-Jan-2004	10:12
bse3.0b7.5y5.out	8194872	28-Jan-2004	17:13
bse3.0b10.0y5.ft72	446732	29-Jan-2004	10:12
bse3.0b10.0y5.out	10227535	28-Jan-2004	17:14
bse3.0b12.5y5.ft72	568568	29-Jan-2004	10:12
bse3.0b12.5y5.out	13279719	28-Jan-2004	17:15
bse3.0b15.0y5.ft72	649792	29-Jan-2004	10:12
bse3.0b15.0y5.out	15315475	28-Jan-2004	17:16
bse3.0b17.5y5.ft72	771628	29-Jan-2004	10:12
bse3.0b17.5y5.out	18273977	28-Jan-2004	17:17
bse3.0b20.0y5.ft72	852852	29-Jan-2004	10:12
bse3.0b20.0y5.out	20270072	28-Jan-2004	17:16
bse3.0b25.0y5.ft72	1015300	29-Jan-2004	10:12
bse3.0b25.0y5.out	24261012	28-Jan-2004	17:17
bse3.0b30.0y5.ft72	1218360	29-Jan-2004	10:12
bse3.0b30.0y5.out	29251400	28-Jan-2004	17:23
bse3.0b35.0y5.ft72	1380808	29-Jan-2004	10:12
bse3.0b35.0y5.out	33247498	28-Jan-2004	17:22
bse3.0b40.0y5.ft72	1583868	29-Jan-2004	10:12
bse3.0b40.0y5.out	38244518	28-Jan-2004	17:26
bse3.0b45.0y5.ft72	1746316	29-Jan-2004	10:12
bse3.0b45.0y5.out	42244206	28-Jan-2004	17:27
bse3.0b50.0y5.ft72	1949376	29-Jan-2004	10:12
bse3.0b50.0y5.out	47241364	28-Jan-2004	17:28
bse3.0b55.0y5.ft72	2111824	29-Jan-2004	10:12
bse3.0b55.0y5.out	51239728	28-Jan-2004	17:30
bse3.0b60.0y5.ft72	2314884	29-Jan-2004	10:12
bse3.0b60.0y5.out	56237545	28-Jan-2004	17:33
bse3.0b65.0y5.ft72	2477332	29-Jan-2004	10:12
bse3.0b65.0y5.out	60236564	28-Jan-2004	17:34
bse3.0b70.0y5.ft72	2680392	29-Jan-2004	10:12
bse3.0b70.0y5.out	65235024	28-Jan-2004	17:36
bse3.0b75.0y5.ft72	2842840	29-Jan-2004	10:12
bse3.0b75.0y5.out	69232847	28-Jan-2004	17:36

Table 41. BWR Isotopic Database SAS2H Tape 72/Output Files, 5 Year Decay (Cont.)

File Name	File Size (bytes)	Date of Last Update	Time
bse3.5b0.001y5.ft72	121836	29-Jan-2004	10:12
bse3.5b0.001y5.out	2099810	28-Jan-2004	17:26
bse3.5b2.5y5.ft72	203060	29-Jan-2004	10:12
bse3.5b2.5y5.out	4143477	28-Jan-2004	17:27
bse3.5b5.0y5.ft72	284284	29-Jan-2004	10:12
bse3.5b5.0y5.out	6163432	28-Jan-2004	17:28
bse3.5b7.5y5.ft72	365508	29-Jan-2004	10:12
bse3.5b7.5y5.out	8191861	28-Jan-2004	17:29
bse3.5b10.0y5.ft72	446732	29-Jan-2004	10:12
bse3.5b10.0y5.out	10223189	28-Jan-2004	17:31
bse3.5b12.5y5.ft72	568568	29-Jan-2004	10:12
bse3.5b12.5y5.out	13275119	28-Jan-2004	17:32
bse3.5b15.0y5.ft72	649792	29-Jan-2004	10:12
bse3.5b15.0y5.out	15310765	28-Jan-2004	17:32
bse3.5b17.5y5.ft72	771628	29-Jan-2004	10:12
bse3.5b17.5y5.out	18268548	28-Jan-2004	17:34
bse3.5b20.0y5.ft72	852852	29-Jan-2004	10:12
bse3.5b20.0y5.out	20266523	28-Jan-2004	17:34
bse3.5b25.0y5.ft72	1015300	29-Jan-2004	10:12
bse3.5b25.0y5.out	24255792	28-Jan-2004	17:35
bse3.5b30.0y5.ft72	1218360	29-Jan-2004	10:12
bse3.5b30.0y5.out	29247233	28-Jan-2004	17:38
bse3.5b35.0y5.ft72	1380808	29-Jan-2004	10:12
bse3.5b35.0y5.out	33243432	28-Jan-2004	17:40
bse3.5b40.0y5.ft72	1583868	29-Jan-2004	10:12
bse3.5b40.0y5.out	38239114	28-Jan-2004	17:43
bse3.5b45.0y5.ft72	1746316	29-Jan-2004	10:12
bse3.5b45.0y5.out	42238363	28-Jan-2004	17:44
bse3.5b50.0y5.ft72	1949376	29-Jan-2004	10:12
bse3.5b50.0y5.out	47236358	28-Jan-2004	17:45
bse3.5b55.0y5.ft72	2111824	29-Jan-2004	10:12
bse3.5b55.0y5.out	51235417	28-Jan-2004	17:49
bse3.5b60.0y5.ft72	2314884	29-Jan-2004	10:12
bse3.5b60.0y5.out	56233814	28-Jan-2004	17:44
bse3.5b65.0y5.ft72	2477332	29-Jan-2004	10:12
bse3.5b65.0y5.out	60232180	28-Jan-2004	17:45
bse3.5b70.0y5.ft72	2680392	29-Jan-2004	10:12
bse3.5b70.0y5.out	65230044	28-Jan-2004	17:49
bse3.5b75.0y5.ft72	2842840	29-Jan-2004	10:12
bse3.5b75.0y5.out	69228863	28-Jan-2004	17:48

Table 41. BWR Isotopic Database SAS2H Tape 72/Output Files, 5 Year Decay (Cont.)

File Name	File Size (bytes)	Date of Last Update	Time
bse4.0b0.001y5.ft72	121836	29-Jan-2004	10:12
bse4.0b0.001y5.out	2099797	28-Jan-2004	17:44
bse4.0b2.5y5.ft72	203060	29-Jan-2004	10:12
bse4.0b2.5y5.out	4143383	28-Jan-2004	17:44
bse4.0b5.0y5.ft72	284284	29-Jan-2004	10:12
bse4.0b5.0y5.out	6165632	28-Jan-2004	17:45
bse4.0b7.5y5.ft72	365508	29-Jan-2004	10:12
bse4.0b7.5y5.out	8191654	28-Jan-2004	17:46
bse4.0b10.0y5.ft72	446732	29-Jan-2004	10:12
bse4.0b10.0y5.out	10221789	28-Jan-2004	17:46
bse4.0b12.5y5.ft72	568568	29-Jan-2004	10:12
bse4.0b12.5y5.out	13273600	28-Jan-2004	17:48
bse4.0b15.0y5.ft72	649792	29-Jan-2004	10:12
bse4.0b15.0y5.out	15308858	28-Jan-2004	17:49
bse4.0b17.5y5.ft72	771628	29-Jan-2004	10:12
bse4.0b17.5y5.out	18262083	28-Jan-2004	17:50
bse4.0b20.0y5.ft72	852852	29-Jan-2004	10:12
bse4.0b20.0y5.out	20258636	28-Jan-2004	17:49
bse4.0b25.0y5.ft72	1015300	29-Jan-2004	10:12
bse4.0b25.0y5.out	24250677	28-Jan-2004	17:49
bse4.0b30.0y5.ft72	1218360	29-Jan-2004	10:12
bse4.0b30.0y5.out	29242097	28-Jan-2004	17:54
bse4.0b35.0y5.ft72	1380808	29-Jan-2004	10:12
bse4.0b35.0y5.out	33237749	28-Jan-2004	17:54
bse4.0b40.0y5.ft72	1583868	29-Jan-2004	10:12
bse4.0b40.0y5.out	38233264	28-Jan-2004	17:57
bse4.0b45.0y5.ft72	1746316	29-Jan-2004	10:12
bse4.0b45.0y5.out	42232313	28-Jan-2004	17:58
bse4.0b50.0y5.ft72	1949376	29-Jan-2004	10:12
bse4.0b50.0y5.out	47230391	28-Jan-2004	17:58
bse4.0b55.0y5.ft72	2111824	29-Jan-2004	10:12
bse4.0b55.0y5.out	51229961	28-Jan-2004	18:03
bse4.0b60.0y5.ft72	2314884	29-Jan-2004	10:12
bse4.0b60.0y5.out	56228039	28-Jan-2004	18:04
bse4.0b65.0y5.ft72	2477332	29-Jan-2004	10:12
bse4.0b65.0y5.out	60226361	28-Jan-2004	18:05
bse4.0b70.0y5.ft72	2680392	29-Jan-2004	10:12
bse4.0b70.0y5.out	65223952	28-Jan-2004	18:05
bse4.0b75.0y5.ft72	2842840	29-Jan-2004	10:12
bse4.0b75.0y5.out	69222667	28-Jan-2004	18:06